

## LM4040xxx Precision Micropower Shunt Voltage Reference

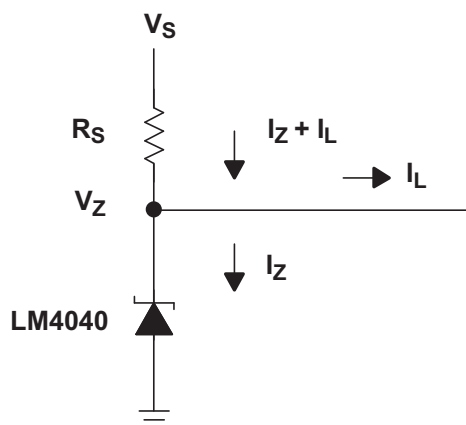
### 1 Features

- Fixed Output Voltages of 2.048 V, 2.5 V, 3 V, 4.096 V, 5 V, 8.192 V, and 10 V
- Tight Output Tolerances and Low Temperature Coefficient
  - Max 0.1%, 100 ppm/°C – A Grade
  - Max 0.2%, 100 ppm/°C – B Grade
  - Max 0.5%, 100 ppm/°C – C Grade
  - Max 1.0%, 150 ppm/°C – D Grade
- Low Output Noise: 35  $\mu\text{V}_{\text{RMS}}$  Typ
- Wide Operating Current Range: 45  $\mu\text{A}$  Typ to 15 mA
- Stable With All Capacitive Loads; No Output Capacitor Required
- Available in Extended Temperature Range:  $-40^{\circ}\text{C}$  to  $125^{\circ}\text{C}$

### 2 Applications

- Data-Acquisition Systems
- Power Supplies and Power-Supply Monitors
- Instrumentation and Test Equipment
- Process Controls
- Precision Audio
- Automotive Electronics
- Energy Management
- Battery-Powered Equipment

### 4 Simplified Schematic



### 3 Description

The LM4040 series of shunt voltage references are versatile, easy-to-use references that cater to a vast array of applications. The 2-pin fixed-output device requires no external capacitors for operation and is stable with all capacitive loads. Additionally, the reference offers low dynamic impedance, low noise, and low temperature coefficient to ensure a stable output voltage over a wide range of operating currents and temperatures. The LM4040 uses fuse and Zener-zap reverse breakdown voltage trim during wafer sort to offer four output voltage tolerances, ranging from 0.1% (max) for the A grade to 1% (max) for the D grade. Thus, a great deal of flexibility is offered to designers in choosing the best cost-to-performance ratio for their applications.

Packaged in space-saving SC-70 and SOT-23-3 packages and requiring a minimum current of 45  $\mu\text{A}$  (typ), the LM4040 also is ideal for portable applications. The LM4040xl is characterized for operation over an ambient temperature range of  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$ . The LM4040xQ is characterized for operation over an ambient temperature range of  $-40^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ .

#### Device Information<sup>(1)</sup>

| PART NUMBER | PACKAGE (PIN) | BODY SIZE (NOM)   |
|-------------|---------------|-------------------|
| LM4040xxx   | SOT-23 (3)    | 2.92 mm x 1.30 mm |
|             | SC70 (6)      | 2.00 mm x 1.25 mm |

(1) For all available packages, see the orderable addendum at the end of the data sheet.



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## 5 Revision History

### Changes from Revision L (January 2009) to Revision M

Page

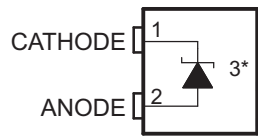
- Added *Applications*, *Device Information* table, *Pin Functions* table, *ESD Ratings* table, *Thermal Information* table, *Feature Description* section, *Device Functional Modes*, *Application and Implementation* section, *Power Supply Recommendations* section, *Layout* section, *Device and Documentation Support* section, and *Mechanical, Packaging, and Orderable Information* section. .... **1**
- Deleted *Ordering Information* table. .... **1**

**Table 1. Device Comparison Table<sup>(1)</sup>**

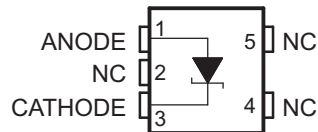
| $T_A$          | DEVICE GRADE   | $V_{KA}$ | ORDERABLE PART NUMBER |
|----------------|--|----------|-----------------------|
| –40°C to 85°C  | A grade:<br>0.1% initial accuracy<br>and<br>100 ppm/°C temperature coefficient | 2.048 V  | LM4040A20I            |
|                |  | 2.5 V    | LM4040A25I            |
|                |  | 3 V      | LM4040A30I            |
|                |  | 4.096 V  | LM4040A41I            |
|                |  | 5 V      | LM4040A50I            |
|                |  | 8.192 V  | LM4040A82I            |
|                |  | 10 V     | LM4040A10I            |
|                | B grade:<br>0.2% initial accuracy<br>and<br>100 ppm/°C temperature coefficient | 2.048 V  | LM4040B20I            |
|                |  | 2.5 V    | LM4040B25I            |
|                |  | 3 V      | LM4040B30I            |
|                |  | 4.096 V  | LM4040B41I            |
|                |  | 5 V      | LM4040B50I            |
|                |  | 8.192 V  | LM4040B82I            |
|                |  | 10 V     | LM4040B10I            |
| –40°C to 85°C  | C grade:<br>0.5% initial accuracy<br>and<br>100 ppm/°C temperature coefficient | 2.048 V  | LM4040C20I            |
|                |  | 2.5 V    | LM4040C25I            |
|                |  | 3 V      | LM4040C30I            |
|                |  | 4.096 V  | LM4040C41I            |
|                |  | 5 V      | LM4040C50I            |
|                |  | 8.192 V  | LM4040C82I            |
|                |  | 10 V     | LM4040C10I            |
| –40°C to 85°C  | D grade:<br>1.0% initial accuracy<br>and<br>150 ppm/°C temperature coefficient | 2.048 V  | LM4040D20I            |
|                |  | 2.5 V    | LM4040D25I            |
|                |  | 3 V      | LM4040D30I            |
|                |  | 4.096 V  | LM4040D41I            |
|                |  | 5 V      | LM4040D50I            |
|                |  | 8.192 V  | LM4040D82I            |
|                |  | 10 V     | LM4040D10I            |
| –40°C to 125°C | C grade:<br>0.5% initial accuracy<br>and<br>100 ppm/°C temperature coefficient | 2.048 V  | LM4040C20Q            |
|                |  | 2.5 V    | LM4040C25Q            |
|                |  | 3 V      | LM4040C30Q            |
|                |  | 5 V      | LM4040C50Q            |
|                | D grade:<br>1.0% initial accuracy<br>and<br>150 ppm/°C temperature coefficient | 2.048 V  | LM4040D20Q            |
|                |  | 2.5 V    | LM4040D25Q            |
|                |  | 3 V      | LM4040D30Q            |
|                |  | 5 V      | LM4040D50Q            |

(1) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI web site at [www.ti.com](http://www.ti.com).

## 6 Pin Configuration and Functions

 DBZ (SOT-23) PACKAGE  
(TOP VIEW)


\* Pin 3 is attached to substrate and must be connected to ANODE or left open.

 DCK (SC-70) PACKAGE  
(TOP VIEW)


NC – No internal connection

### Pin Functions

| NAME    | PIN |         | TYPE | DESCRIPTION                              |
|---------|-----|---------|------|--|
|         | DBZ | DCK     |      |  |
| CATHODE | 1   | 3       | I/O  | Shunt Current/Voltage input              |
| ANODE   | 2   | 1       | O    | Common pin, normally connected to ground |
| NC      | —   | 2, 4, 5 | I    | No Internal Connection                   |
| *       | 3   | —       | I    | Substrate Connection                     |

## 7 Specifications

### 7.1 Absolute Maximum Ratings

over free-air temperature range (unless otherwise noted)<sup>(1)</sup>

|           |  | MIN | MAX | UNIT |
|-----------|--|-----|-----|------|
| $I_Z$     | Continuous cathode current             | -10 | 25  | mA   |
| $T_J$     | Operating virtual junction temperature |     | 150 | °C   |
| $T_{stg}$ | Storage temperature range              | -65 | 150 | °C   |

- (1) Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions* is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

### 7.2 ESD Ratings

|             |                         |  | VALUE | UNIT |
|-------------|-------------------------|--|-------|------|
| $V_{(ESD)}$ | Electrostatic discharge | Human body model (HBM), per ANSI/ESDA/JEDEC JS-001, all pins <sup>(1)</sup>              | ±2000 | V    |
|             |                         | Charged device model (CDM), per JEDEC specification JESD22-C101, all pins <sup>(2)</sup> | ±1000 |      |

- (1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.  
 (2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

### 7.3 Recommended Operating Conditions

|       |                      |            | MIN            | MAX | UNIT |
|-------|----------------------|------------|----------------|-----|------|
| $I_Z$ | Cathode current      |            | <sup>(1)</sup> | 15  | mA   |
| $T_A$ | Free-air temperature | LM4040xxxI | -40            | 85  | °C   |
|       |                      | LM4040xxxQ | -40            | 125 |      |

- (1) See parametric tables

### 7.4 Thermal Information

| THERMAL METRIC <sup>(1)</sup> | LM4040xxx                              |        | UNIT |      |
|-------------------------------|--|--------|------|------|
|                               | DBZ                                    | DCK    |      |      |
|                               | 3 PINS                                 | 5 PINS |      |      |
| $R_{\theta JA}$               | Junction-to-ambient thermal resistance | 206    | 252  | °C/W |

- (1) For more information about traditional and new thermal metrics, see the *IC Package Thermal Metrics* application report ([SPRA953](#)).

## 7.5 LM4040A20I, LM4040B20I Electrical Characteristics

 at industrial temperature range, full-range  $T_A = -40^\circ\text{C}$  to  $85^\circ\text{C}$  (unless otherwise noted)

| PARAMETER                       | TEST CONDITIONS  | $T_A$  | LM4040A20I |     |     | LM4040B20I                       |     |     | UNIT                       |
|---------------------------------|--|--|------------|-----|-----|----------------------------------|-----|-----|----------------------------|
|                                 |  |  | MIN        | TYP | MAX | MIN                              | TYP | MAX |                            |
| $V_Z$                           | Reverse breakdown voltage                                    | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | 2.048                            |     |     | V                          |
| $\Delta V_Z$                    | Reverse breakdown voltage tolerance                          | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | -2                      2        |     |     | mV                         |
|                                 |  |  | Full range |     |     | -15                      15      |     |     |                            |
| $I_{Z,\text{min}}$              | Minimum cathode current                                      |  | 25°C       |     |     | 45      75                       |     |     | $\mu\text{A}$              |
|                                 |  |  | Full range |     |     | 80                      80       |     |     |                            |
| $\alpha_{V_Z}$                  | Average temperature coefficient of reverse breakdown voltage | $I_Z = 10\ \text{mA}$  | 25°C       |     |     | $\pm 20$                         |     |     | ppm/°C                     |
|                                 |  |  | 25°C       |     |     | $\pm 15$                         |     |     |                            |
|                                 |  | $I_Z = 1\ \text{mA}$   | Full range |     |     | $\pm 100$                        |     |     |                            |
|                                 |  |  | 25°C       |     |     | $\pm 15$                         |     |     |                            |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,\text{min}} < I_Z < 1\ \text{mA}$  | 25°C       |     |     | 0.3      0.8                     |     |     | mV                         |
|                                 |  |  | Full range |     |     | 1                      1         |     |     |                            |
|                                 |  | $1\ \text{mA} < I_Z < 15\ \text{mA}$   | 25°C       |     |     | 2.5      6                       |     |     |                            |
|                                 |  |  | Full range |     |     | 8                      8         |     |     |                            |
| $Z_Z$                           | Reverse dynamic impedance                                    | $I_Z = 1\ \text{mA}$ , $f = 120\ \text{Hz}$ ,<br>$I_{AC} = 0.1 I_Z$                                    | 25°C       |     |     | 0.3      0.8                     |     |     | $\Omega$                   |
| $e_N$                           | Wideband noise   | $I_Z = 100\ \mu\text{A}$ ,<br>$10\ \text{Hz} \leq f \leq 10\ \text{kHz}$                               | 25°C       |     |     | 35                      35       |     |     | $\mu\text{V}_{\text{RMS}}$ |
|                                 | Long-term stability of reverse breakdown voltage             | $t = 1000\ \text{h}$ ,<br>$T_A = 25^\circ\text{C} \pm 0.1^\circ\text{C}$ ,<br>$I_Z = 100\ \mu\text{A}$ |            |     |     | 120                      120     |     |     | ppm                        |
| $V_{\text{HYST}}$               | Thermal hysteresis <sup>(1)</sup>                            | $\Delta T_A = -40^\circ\text{C}$ to $125^\circ\text{C}$  |            |     |     | 0.08%                      0.08% |     |     | —                          |

 (1) Thermal hysteresis is defined as  $V_{Z,25^\circ\text{C}}$  (after cycling to  $-40^\circ\text{C}$ ) –  $V_{Z,25^\circ\text{C}}$  (after cycling to  $125^\circ\text{C}$ ).

## 7.6 LM4040C20I, LM4040D20I Electrical Characteristics

 at industrial temperature range, full-range  $T_A = -40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$  (unless otherwise noted)

| PARAMETER                       | TEST CONDITIONS  | $T_A$  | LM4040C20I |     |     | LM4040D20I |     |     | UNIT   |                            |               |
|---------------------------------|--|--|------------|-----|-----|------------|-----|-----|--------|----------------------------|---------------|
|                                 |  |  | MIN        | TYP | MAX | MIN        | TYP | MAX |        |                            |               |
| $V_Z$                           | Reverse breakdown voltage                                    | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | 2.048      |     |     | V      |                            |               |
| $\Delta V_Z$                    | Reverse breakdown voltage tolerance                          | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | -10        | 10  |     | -20    | 20                         | mV            |
|                                 |  |  | Full range |     |     | -23        | 23  |     | -40    | 40                         |               |
| $I_{Z,\text{min}}$              | Minimum cathode current                                      |  | 25°C       |     |     | 45         | 75  |     | 45     | 75                         | $\mu\text{A}$ |
|                                 |  |  | Full range |     |     | 80         |     |     | 80     |                            |               |
| $\alpha_{V_Z}$                  | Average temperature coefficient of reverse breakdown voltage | $I_Z = 10\ \text{mA}$  | 25°C       |     |     | $\pm 20$   |     |     | ppm/°C |                            |               |
|                                 |  | $I_Z = 1\ \text{mA}$   | 25°C       |     |     | $\pm 15$   |     |     |        |                            |               |
|                                 |  |  | Full range |     |     | $\pm 100$  |     |     |        | $\pm 150$                  |               |
|                                 |  | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | $\pm 15$   |     |     |        | $\pm 15$                   |               |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,\text{min}} < I_Z < 1\ \text{mA}$  | 25°C       |     |     | 0.3        | 0.8 |     | 0.3    | 1                          | mV            |
|                                 |  |  | Full range |     |     | 1          |     |     | 1.2    |                            |               |
|                                 |  | $1\ \text{mA} < I_Z < 15\ \text{mA}$   | 25°C       |     |     | 2.5        | 6   |     | 2.5    | 8                          |               |
|                                 |  |  | Full range |     |     | 8          |     |     | 10     |                            |               |
| $Z_Z$                           | Reverse dynamic impedance                                    | $I_Z = 1\ \text{mA}$ , $f = 120\ \text{Hz}$ ,<br>$I_{AC} = 0.1\ I_Z$                                       | 25°C       |     |     | 0.3        | 0.9 |     | 0.3    | 1.1                        | $\Omega$      |
| $e_N$                           | Wideband noise   | $I_Z = 100\ \mu\text{A}$ ,<br>$10\ \text{Hz} \leq f \leq 10\ \text{kHz}$                                   | 25°C       |     |     | 35         |     |     | 35     | $\mu\text{V}_{\text{RMS}}$ |               |
|                                 | Long-term stability of reverse breakdown voltage             | $t = 1000\ \text{h}$ ,<br>$T_A = 25^{\circ}\text{C} \pm 0.1^{\circ}\text{C}$ ,<br>$I_Z = 100\ \mu\text{A}$ |            |     |     | 120        |     |     | 120    | ppm                        |               |
| $V_{\text{HYST}}$               | Thermal hysteresis <sup>(1)</sup>                            | $\Delta T_A = -40^{\circ}\text{C}$ to $125^{\circ}\text{C}$  |            |     |     | 0.08%      |     |     | 0.08%  | —                          |               |

 (1) Thermal hysteresis is defined as  $V_{Z,25^{\circ}\text{C}}$  (after cycling to  $-40^{\circ}\text{C}$ ) –  $V_{Z,25^{\circ}\text{C}}$  (after cycling to  $125^{\circ}\text{C}$ ).

## 7.7 LM4040C20Q, LM4040D20Q Electrical Characteristics

 at extended temperature range, full-range  $T_A = -40^\circ\text{C}$  to  $125^\circ\text{C}$  (unless otherwise noted)

| PARAMETER                       | TEST CONDITIONS  | $T_A$  | LM4040C20Q |     |     | LM4040D20Q |     |     | UNIT   |                            |               |
|---------------------------------|--|--|------------|-----|-----|------------|-----|-----|--------|----------------------------|---------------|
|                                 |  |  | MIN        | TYP | MAX | MIN        | TYP | MAX |        |                            |               |
| $V_Z$                           | Reverse breakdown voltage                                    | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | 2.048      |     |     | V      |                            |               |
| $\Delta V_Z$                    | Reverse breakdown voltage tolerance                          | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | -10        | 10  |     | -20    | 20                         | mV            |
|                                 |  |  | Full range |     |     | -30        | 30  |     | -50    | 50                         |               |
| $I_{Z,\text{min}}$              | Minimum cathode current                                      |  | 25°C       |     |     | 45         | 75  |     | 45     | 75                         | $\mu\text{A}$ |
|                                 |  |  | Full range |     |     | 80         |     |     | 80     |                            |               |
| $\alpha_{V_Z}$                  | Average temperature coefficient of reverse breakdown voltage | $I_Z = 10\ \text{mA}$  | 25°C       |     |     | $\pm 20$   |     |     | ppm/°C |                            |               |
|                                 |  |  | 25°C       |     |     | $\pm 15$   |     |     |        |                            |               |
|                                 |  | $I_Z = 1\ \text{mA}$   | Full range |     |     | $\pm 100$  |     |     |        |                            |               |
|                                 |  |  | 25°C       |     |     | $\pm 15$   |     |     |        |                            |               |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,\text{min}} < I_Z < 1\ \text{mA}$  | 25°C       |     |     | 0.3        | 0.8 |     | 0.3    | 1                          | mV            |
|                                 |  |  | Full range |     |     | 1          |     |     | 1.2    |                            |               |
|                                 |  | $1\ \text{mA} < I_Z < 15\ \text{mA}$   | 25°C       |     |     | 2.5        | 6   |     | 2.5    | 8                          |               |
|                                 |  |  | Full range |     |     | 8          |     |     | 10     |                            |               |
| $Z_Z$                           | Reverse dynamic impedance                                    | $I_Z = 1\ \text{mA}$ , $f = 120\ \text{Hz}$ ,<br>$I_{AC} = 0.1 I_Z$                                    | 25°C       |     |     | 0.3        | 0.9 |     | 0.3    | 1.1                        | $\Omega$      |
| $e_N$                           | Wideband noise   | $I_Z = 100\ \mu\text{A}$ ,<br>$10\ \text{Hz} \leq f \leq 10\ \text{kHz}$                               | 25°C       |     |     | 35         |     |     | 35     | $\mu\text{V}_{\text{RMS}}$ |               |
|                                 | Long-term stability of reverse breakdown voltage             | $t = 1000\ \text{h}$ ,<br>$T_A = 25^\circ\text{C} \pm 0.1^\circ\text{C}$ ,<br>$I_Z = 100\ \mu\text{A}$ |            |     |     | 120        |     |     | 120    | ppm                        |               |
| $V_{\text{HYST}}$               | Thermal hysteresis <sup>(1)</sup>                            | $\Delta T_A = -40^\circ\text{C}$ to $125^\circ\text{C}$  |            |     |     | 0.08%      |     |     | 0.08%  | —                          |               |

 (1) Thermal hysteresis is defined as  $V_{Z,25^\circ\text{C}}$  (after cycling to  $-40^\circ\text{C}$ )  $- V_{Z,25^\circ\text{C}}$  (after cycling to  $125^\circ\text{C}$ ).

## 7.8 LM4040A25I, LM4040B25I Electrical Characteristics

 at industrial temperature range, full-range  $T_A = -40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$  (unless otherwise noted)

| PARAMETER                       | TEST CONDITIONS  | $T_A$  | LM4040A25I |     |     | LM4040B25I |     |     | UNIT                       |
|---------------------------------|--|--|------------|-----|-----|------------|-----|-----|----------------------------|
|                                 |  |  | MIN        | TYP | MAX | MIN        | TYP | MAX |                            |
| $V_Z$                           | Reverse breakdown voltage                                    | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | 2.5        |     |     | V                          |
| $\Delta V_Z$                    | Reverse breakdown voltage tolerance                          | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | -2.5       | 2.5 |     | mV                         |
|                                 |  |  | Full range |     |     | -19        | 19  |     |                            |
| $I_{Z,\text{min}}$              | Minimum cathode current                                      |  | 25°C       |     |     | 45         | 75  |     | $\mu\text{A}$              |
|                                 |  |  | Full range |     |     | 80         |     |     |                            |
| $\alpha_{V_Z}$                  | Average temperature coefficient of reverse breakdown voltage | $I_Z = 10\ \text{mA}$  | 25°C       |     |     | $\pm 20$   |     |     | ppm/°C                     |
|                                 |  | $I_Z = 1\ \text{mA}$   | 25°C       |     |     | $\pm 15$   |     |     |                            |
|                                 |  |  | Full range |     |     | $\pm 100$  |     |     |                            |
|                                 |  | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | $\pm 15$   |     |     |                            |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,\text{min}} < I_Z < 1\ \text{mA}$  | 25°C       |     |     | 0.3        | 0.8 |     | mV                         |
|                                 |  |  | Full range |     |     | 1          |     |     |                            |
|                                 |  | $1\ \text{mA} < I_Z < 15\ \text{mA}$   | 25°C       |     |     | 2.5        | 6   |     |                            |
|                                 |  |  | Full range |     |     | 8          |     |     |                            |
| $Z_Z$                           | Reverse dynamic impedance                                    | $I_Z = 1\ \text{mA}$ , $f = 120\ \text{Hz}$ ,<br>$I_{AC} = 0.1 I_Z$  | 25°C       |     |     | 0.3        | 0.8 |     | $\Omega$                   |
| $e_N$                           | Wideband noise   | $I_Z = 100\ \mu\text{A}$ ,<br>$10\ \text{Hz} \leq f \leq 10\ \text{kHz}$                                   | 25°C       |     |     | 35         |     |     | $\mu\text{V}_{\text{RMS}}$ |
|                                 | Long-term stability of reverse breakdown voltage             | $t = 1000\ \text{h}$ ,<br>$T_A = 25^{\circ}\text{C} \pm 0.1^{\circ}\text{C}$ ,<br>$I_Z = 100\ \mu\text{A}$ |            |     |     | 120        |     |     | ppm                        |
| $V_{\text{HYST}}$               | Thermal hysteresis <sup>(1)</sup>                            | $\Delta T_A = -40^{\circ}\text{C}$ to $125^{\circ}\text{C}$  |            |     |     | 0.08%      |     |     | —                          |

 (1) Thermal hysteresis is defined as  $V_{Z,25^{\circ}\text{C}}$  (after cycling to  $-40^{\circ}\text{C}$ ) –  $V_{Z,25^{\circ}\text{C}}$  (after cycling to  $125^{\circ}\text{C}$ ).

## 7.9 LM4040C25I, LM4040D25I Electrical Characteristics

 at industrial temperature range, full-range  $T_A = -40^\circ\text{C}$  to  $85^\circ\text{C}$  (unless otherwise noted)

| PARAMETER                       | TEST CONDITIONS  | $T_A$  | LM4040C25I |     |     | LM4040D25I |     |     | UNIT   |                            |               |
|---------------------------------|--|--|------------|-----|-----|------------|-----|-----|--------|----------------------------|---------------|
|                                 |  |  | MIN        | TYP | MAX | MIN        | TYP | MAX |        |                            |               |
| $V_Z$                           | Reverse breakdown voltage                                    | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | 2.5        |     |     | V      |                            |               |
| $\Delta V_Z$                    | Reverse breakdown voltage tolerance                          | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | -12        | 12  |     | -25    | 25                         | mV            |
|                                 |  |  | Full range |     |     | -29        | 29  |     | -49    | 49                         |               |
| $I_{Z,\text{min}}$              | Minimum cathode current                                      |  | 25°C       |     |     | 45         | 75  |     | 45     | 75                         | $\mu\text{A}$ |
|                                 |  |  | Full range |     |     | 80         |     |     | 80     |                            |               |
| $\alpha_{V_Z}$                  | Average temperature coefficient of reverse breakdown voltage | $I_Z = 10\ \text{mA}$  | 25°C       |     |     | $\pm 20$   |     |     | ppm/°C |                            |               |
|                                 |  | $I_Z = 1\ \text{mA}$   | 25°C       |     |     | $\pm 15$   |     |     |        |                            |               |
|                                 |  |  | Full range |     |     | $\pm 100$  |     |     |        | $\pm 150$                  |               |
|                                 |  | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | $\pm 15$   |     |     |        | $\pm 15$                   |               |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,\text{min}} < I_Z < 1\ \text{mA}$  | 25°C       |     |     | 0.3        | 0.8 |     | 0.3    | 1                          | mV            |
|                                 |  |  | Full range |     |     | 1          |     |     | 1.2    |                            |               |
|                                 |  | $1\ \text{mA} < I_Z < 15\ \text{mA}$   | 25°C       |     |     | 2.5        | 6   |     | 2.5    | 8                          |               |
|                                 |  |  | Full range |     |     | 8          |     |     | 10     |                            |               |
| $Z_Z$                           | Reverse dynamic impedance                                    | $I_Z = 1\ \text{mA}$ , $f = 120\ \text{Hz}$ ,<br>$I_{AC} = 0.1 I_Z$                                    | 25°C       |     |     | 0.3        | 0.9 |     | 0.3    | 1.1                        | $\Omega$      |
| $e_N$                           | Wideband noise   | $I_Z = 100\ \mu\text{A}$ ,<br>$10\ \text{Hz} \leq f \leq 10\ \text{kHz}$                               | 25°C       |     |     | 35         |     |     | 35     | $\mu\text{V}_{\text{RMS}}$ |               |
|                                 | Long-term stability of reverse breakdown voltage             | $t = 1000\ \text{h}$ ,<br>$T_A = 25^\circ\text{C} \pm 0.1^\circ\text{C}$ ,<br>$I_Z = 100\ \mu\text{A}$ |            |     |     | 120        |     |     | 120    | ppm                        |               |
| $V_{\text{HYST}}$               | Thermal hysteresis <sup>(1)</sup>                            | $\Delta T_A = -40^\circ\text{C}$ to $125^\circ\text{C}$  |            |     |     | 0.08%      |     |     | 0.08%  | —                          |               |

 (1) Thermal hysteresis is defined as  $V_{Z,25^\circ\text{C}}$  (after cycling to  $-40^\circ\text{C}$ )  $- V_{Z,25^\circ\text{C}}$  (after cycling to  $125^\circ\text{C}$ ).

## 7.10 LM4040C25Q, LM4040D25Q Electrical Characteristics

 at extended temperature range, full-range  $T_A = -40^\circ\text{C}$  to  $125^\circ\text{C}$  (unless otherwise noted)

| PARAMETER                       | TEST CONDITIONS  | $T_A$  | LM4040C25Q               |            |     | LM4040D25Q |           |     | UNIT   |                            |               |
|---------------------------------|--|--|--------------------------|------------|-----|------------|-----------|-----|--------|----------------------------|---------------|
|                                 |  |  | MIN                      | TYP        | MAX | MIN        | TYP       | MAX |        |                            |               |
| $V_Z$                           | Reverse breakdown voltage                                    | $I_Z = 100\ \mu\text{A}$   | 25°C                     |            |     | 2.5        |           |     | V      |                            |               |
| $\Delta V_Z$                    | Reverse breakdown voltage tolerance                          | $I_Z = 100\ \mu\text{A}$   | 25°C                     |            |     | -12        | 12        |     | -25    | 25                         | mV            |
|                                 |  |  | Full range               |            |     | -38        | 38        |     | -63    | 63                         |               |
| $I_{Z,\text{min}}$              | Minimum cathode current                                      |  | 25°C                     |            |     | 45         | 75        |     | 45     | 75                         | $\mu\text{A}$ |
|                                 |  |  | Full range               |            |     | 80         |           |     | 80     |                            |               |
| $\alpha_{V_Z}$                  | Average temperature coefficient of reverse breakdown voltage | $I_Z = 10\ \text{mA}$  | 25°C                     |            |     | $\pm 20$   |           |     | ppm/°C |                            |               |
|                                 |  |  | $I_Z = 1\ \text{mA}$     | 25°C       |     |            | $\pm 15$  |     |        |                            |               |
|                                 |  |  |                          | Full range |     |            | $\pm 100$ |     |        |                            |               |
|                                 |  |  | $I_Z = 100\ \mu\text{A}$ | 25°C       |     |            | $\pm 15$  |     |        |                            |               |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,\text{min}} < I_Z < 1\ \text{mA}$  | 25°C                     |            |     | 0.3        | 0.8       |     | 0.3    | 1                          | mV            |
|                                 |  |  | Full range               |            |     | 1          |           |     | 1.2    |                            |               |
|                                 |  | $1\ \text{mA} < I_Z < 15\ \text{mA}$   | 25°C                     |            |     | 2.5        | 6         |     | 2.5    | 8                          |               |
|                                 |  |  | Full range               |            |     | 8          |           |     | 10     |                            |               |
| $Z_Z$                           | Reverse dynamic impedance                                    | $I_Z = 1\ \text{mA}$ , $f = 120\ \text{Hz}$ , $I_{AC} = 0.1 I_Z$                                 | 25°C                     |            |     | 0.3        | 0.9       |     | 0.3    | 1.1                        | $\Omega$      |
| $e_N$                           | Wideband noise   | $I_Z = 100\ \mu\text{A}$ , $10\ \text{Hz} \leq f \leq 10\ \text{kHz}$                            | 25°C                     |            |     | 35         |           |     | 35     | $\mu\text{V}_{\text{RMS}}$ |               |
|                                 | Long-term stability of reverse breakdown voltage             | $t = 1000\ \text{h}$ , $T_A = 25^\circ\text{C} \pm 0.1^\circ\text{C}$ , $I_Z = 100\ \mu\text{A}$ |                          |            |     | 120        |           |     | 120    | ppm                        |               |
| $V_{\text{HYST}}$               | Thermal hysteresis <sup>(1)</sup>                            | $\Delta T_A = -40^\circ\text{C}$ to $125^\circ\text{C}$  |                          |            |     | 0.08%      |           |     | 0.08%  | —                          |               |

 (1) Thermal hysteresis is defined as  $V_{Z,25^\circ\text{C}}$  (after cycling to  $-40^\circ\text{C}$ ) –  $V_{Z,25^\circ\text{C}}$  (after cycling to  $125^\circ\text{C}$ ).

## 7.11 LM4040A30I, LM4040B30I Electrical Characteristics

 at industrial temperature range, full-range  $T_A = -40^\circ\text{C}$  to  $85^\circ\text{C}$  (unless otherwise noted)

| PARAMETER                       | TEST CONDITIONS  | $T_A$  | LM4040A30I |     |     | LM4040B30I                   |     |     | UNIT                       |
|---------------------------------|--|--|------------|-----|-----|------------------------------|-----|-----|----------------------------|
|                                 |  |  | MIN        | TYP | MAX | MIN                          | TYP | MAX |                            |
| $V_Z$                           | Reverse breakdown voltage                                    | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | 3                            |     |     | V                          |
| $\Delta V_Z$                    | Reverse breakdown voltage tolerance                          | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | -3                      3    |     |     | mV                         |
|                                 |  |  | Full range |     |     | -22                      22  |     |     |                            |
| $I_{Z,\text{min}}$              | Minimum cathode current                                      |  | 25°C       |     |     | 47      77                   |     |     | $\mu\text{A}$              |
|                                 |  |  | Full range |     |     | 82                      82   |     |     |                            |
| $\alpha_{V_Z}$                  | Average temperature coefficient of reverse breakdown voltage | $I_Z = 10\ \text{mA}$  | 25°C       |     |     | $\pm 20$                     |     |     | ppm/°C                     |
|                                 |  | $I_Z = 1\ \text{mA}$   | 25°C       |     |     | $\pm 15$                     |     |     |                            |
|                                 |  |  | Full range |     |     | $\pm 100$                    |     |     |                            |
|                                 |  | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | $\pm 15$                     |     |     |                            |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,\text{min}} < I_Z < 1\ \text{mA}$  | 25°C       |     |     | 0.6      0.8                 |     |     | mV                         |
|                                 |  |  | Full range |     |     | 1.1                      1.1 |     |     |                            |
|                                 |  | $1\ \text{mA} < I_Z < 15\ \text{mA}$   | 25°C       |     |     | 2.7      6                   |     |     |                            |
|                                 |  |  | Full range |     |     | 9                      9     |     |     |                            |
| $Z_Z$                           | Reverse dynamic impedance                                    | $I_Z = 1\ \text{mA}$ , $f = 120\ \text{Hz}$ ,<br>$I_{AC} = 0.1 I_Z$                                    | 25°C       |     |     | 0.4      0.9                 |     |     | $\Omega$                   |
| $e_N$                           | Wideband noise   | $I_Z = 100\ \mu\text{A}$ ,<br>$10\ \text{Hz} \leq f \leq 10\ \text{kHz}$                               | 25°C       |     |     | 35                           |     |     | $\mu\text{V}_{\text{RMS}}$ |
|                                 | Long-term stability of reverse breakdown voltage             | $t = 1000\ \text{h}$ ,<br>$T_A = 25^\circ\text{C} \pm 0.1^\circ\text{C}$ ,<br>$I_Z = 100\ \mu\text{A}$ |            |     |     | 120                          |     |     | ppm                        |
| $V_{\text{HYST}}$               | Thermal hysteresis <sup>(1)</sup>                            | $\Delta T_A = -40^\circ\text{C}$ to $125^\circ\text{C}$  |            |     |     | 0.08%                        |     |     | —                          |

 (1) Thermal hysteresis is defined as  $V_{Z,25^\circ\text{C}}$  (after cycling to  $-40^\circ\text{C}$ ) –  $V_{Z,25^\circ\text{C}}$  (after cycling to  $125^\circ\text{C}$ ).

## 7.12 LM4040C30I, LM4040D30I Electrical Characteristics

 at industrial temperature range, full-range  $T_A = -40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$  (unless otherwise noted)

| PARAMETER                       | TEST CONDITIONS  | $T_A$  | LM4040C30I |     |     | LM4040D30I   |     |              | UNIT          |                            |
|---------------------------------|--|--|------------|-----|-----|--------------|-----|--------------|---------------|----------------------------|
|                                 |  |  | MIN        | TYP | MAX | MIN          | TYP | MAX          |               |                            |
| $V_Z$                           | Reverse breakdown voltage                                    | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | 3            |     |              | V             |                            |
| $\Delta V_Z$                    | Reverse breakdown voltage tolerance                          | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | -15      15  |     |              | mV            |                            |
|                                 |  |  | Full range |     |     | -34      34  |     |              |               |                            |
| $I_{Z,\text{min}}$              | Minimum cathode current                                      |  | 25°C       |     |     | 45      77   |     |              | $\mu\text{A}$ |                            |
|                                 |  |  | Full range |     |     | 82           |     |              |               |                            |
| $\alpha_{V_Z}$                  | Average temperature coefficient of reverse breakdown voltage | $I_Z = 10\ \text{mA}$  | 25°C       |     |     | $\pm 20$     |     |              | ppm/°C        |                            |
|                                 |  | $I_Z = 1\ \text{mA}$   | 25°C       |     |     | $\pm 15$     |     |              |               |                            |
|                                 |  |  | Full range |     |     | $\pm 100$    |     |              |               |                            |
|                                 |  | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | $\pm 15$     |     |              |               |                            |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,\text{min}} < I_Z < 1\ \text{mA}$  | 25°C       |     |     | 0.4      0.8 |     | 1.4      1   |               | mV                         |
|                                 |  |  | Full range |     |     | 1.1          |     | 1.3          |               |                            |
|                                 |  | $1\ \text{mA} < I_Z < 15\ \text{mA}$   | 25°C       |     |     | 2.7      6   |     | 2.7      8   |               |                            |
|                                 |  |  | Full range |     |     | 9            |     | 11           |               |                            |
| $Z_Z$                           | Reverse dynamic impedance                                    | $I_Z = 1\ \text{mA}$ , $f = 120\ \text{Hz}$ ,<br>$I_{AC} = 0.1 I_Z$  | 25°C       |     |     | 0.4      0.9 |     | 0.4      1.2 |               | $\Omega$                   |
| $e_N$                           | Wideband noise   | $I_Z = 100\ \mu\text{A}$ ,<br>$10\ \text{Hz} \leq f \leq 10\ \text{kHz}$                                   | 25°C       |     |     | 35           |     | 35           |               | $\mu\text{V}_{\text{RMS}}$ |
|                                 | Long-term stability of reverse breakdown voltage             | $t = 1000\ \text{h}$ ,<br>$T_A = 25^{\circ}\text{C} \pm 0.1^{\circ}\text{C}$ ,<br>$I_Z = 100\ \mu\text{A}$ |            |     |     | 120          |     | 120          |               | ppm                        |
| $V_{\text{HYST}}$               | Thermal hysteresis <sup>(1)</sup>                            | $\Delta T_A = -40^{\circ}\text{C}$ to $125^{\circ}\text{C}$  |            |     |     | 0.08%        |     | 0.08%        |               | —                          |

 (1) Thermal hysteresis is defined as  $V_{Z,25^{\circ}\text{C}}$  (after cycling to  $-40^{\circ}\text{C}$ ) –  $V_{Z,25^{\circ}\text{C}}$  (after cycling to  $125^{\circ}\text{C}$ ).

### 7.13 LM4040C30Q, LM4040D30Q Electrical Characteristics

 at extended temperature range, full-range  $T_A = -40^\circ\text{C}$  to  $125^\circ\text{C}$  (unless otherwise noted)

| PARAMETER                       | TEST CONDITIONS  | $T_A$  | LM4040C30Q |     |     | LM4040D30Q   |     |              | UNIT          |                            |
|---------------------------------|--|--|------------|-----|-----|--------------|-----|--------------|---------------|----------------------------|
|                                 |  |  | MIN        | TYP | MAX | MIN          | TYP | MAX          |               |                            |
| $V_Z$                           | Reverse breakdown voltage                                    | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | 3            |     |              | V             |                            |
| $\Delta V_Z$                    | Reverse breakdown voltage tolerance                          | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | -15      15  |     |              | mV            |                            |
|                                 |  |  | Full range |     |     | -45      45  |     |              |               |                            |
| $I_{Z,\text{min}}$              | Minimum cathode current                                      |  | 25°C       |     |     | 47      77   |     |              | $\mu\text{A}$ |                            |
|                                 |  |  | Full range |     |     | 82           |     |              |               |                            |
| $\alpha_{V_Z}$                  | Average temperature coefficient of reverse breakdown voltage | $I_Z = 10\ \text{mA}$  | 25°C       |     |     | $\pm 20$     |     |              | ppm/°C        |                            |
|                                 |  | $I_Z = 1\ \text{mA}$   | 25°C       |     |     | $\pm 15$     |     |              |               |                            |
|                                 |  |  | Full range |     |     | $\pm 100$    |     |              |               |                            |
|                                 |  | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | $\pm 15$     |     |              |               |                            |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,\text{min}} < I_Z < 1\ \text{mA}$  | 25°C       |     |     | 0.4      0.8 |     | 0.4      1.1 |               | mV                         |
|                                 |  |  | Full range |     |     | 1.1          |     | 1.3          |               |                            |
|                                 |  | $1\ \text{mA} < I_Z < 15\ \text{mA}$   | 25°C       |     |     | 2.7      6   |     | 2.7      8   |               |                            |
|                                 |  |  | Full range |     |     | 9            |     | 11           |               |                            |
| $Z_Z$                           | Reverse dynamic impedance                                    | $I_Z = 1\ \text{mA}$ , $f = 120\ \text{Hz}$ ,<br>$I_{AC} = 0.1 I_Z$                                    | 25°C       |     |     | 0.4      0.9 |     | 0.4      1.2 |               | $\Omega$                   |
| $e_N$                           | Wideband noise   | $I_Z = 100\ \mu\text{A}$ ,<br>$10\ \text{Hz} \leq f \leq 10\ \text{kHz}$                               | 25°C       |     |     | 35           |     | 35           |               | $\mu\text{V}_{\text{RMS}}$ |
|                                 | Long-term stability of reverse breakdown voltage             | $t = 1000\ \text{h}$ ,<br>$T_A = 25^\circ\text{C} \pm 0.1^\circ\text{C}$ ,<br>$I_Z = 100\ \mu\text{A}$ |            |     |     | 120          |     | 120          |               | ppm                        |
| $V_{\text{HYST}}$               | Thermal hysteresis <sup>(1)</sup>                            | $\Delta T_A = -40^\circ\text{C}$ to $125^\circ\text{C}$  |            |     |     | 0.08%        |     | 0.08%        |               | —                          |

 (1) Thermal hysteresis is defined as  $V_{Z,25^\circ\text{C}}$  (after cycling to  $-40^\circ\text{C}$ )  $- V_{Z,25^\circ\text{C}}$  (after cycling to  $125^\circ\text{C}$ ).

## 7.14 LM4040A41I, LM4040B41I Electrical Characteristics

 at industrial temperature range, full-range  $T_A = -40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$  (unless otherwise noted)

| PARAMETER                       | TEST CONDITIONS  | $T_A$  | LM4040A41I |     |     | LM4040B41I                       |     |     | UNIT                       |
|---------------------------------|--|--|------------|-----|-----|----------------------------------|-----|-----|----------------------------|
|                                 |  |  | MIN        | TYP | MAX | MIN                              | TYP | MAX |                            |
| $V_Z$                           | Reverse breakdown voltage                                    | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | 4.096                            |     |     | V                          |
| $\Delta V_Z$                    | Reverse breakdown voltage tolerance                          | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | -4.1      4.1      -8.2      8.2 |     |     | mV                         |
|                                 |  |  | Full range |     |     | -31      31      -35      35     |     |     |                            |
| $I_{Z,\text{min}}$              | Minimum cathode current                                      |  | 25°C       |     |     | 50      83      50      83       |     |     | $\mu\text{A}$              |
|                                 |  |  | Full range |     |     | 88      88                       |     |     |                            |
| $\alpha_{V_Z}$                  | Average temperature coefficient of reverse breakdown voltage | $I_Z = 10\ \text{mA}$  | 25°C       |     |     | $\pm 30$                         |     |     | ppm/°C                     |
|                                 |  |  | 25°C       |     |     | $\pm 20$                         |     |     |                            |
|                                 |  | $I_Z = 1\ \text{mA}$   | Full range |     |     | $\pm 100$                        |     |     |                            |
|                                 |  |  | 25°C       |     |     | $\pm 20$                         |     |     |                            |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,\text{min}} < I_Z < 1\ \text{mA}$  | 25°C       |     |     | 0.5      0.9      0.5      0.9   |     |     | mV                         |
|                                 |  |  | Full range |     |     | 1.2      1.2                     |     |     |                            |
|                                 |  | $1\ \text{mA} < I_Z < 15\ \text{mA}$   | 25°C       |     |     | 3      7      3      7           |     |     |                            |
|                                 |  |  | Full range |     |     | 10      10                       |     |     |                            |
| $Z_Z$                           | Reverse dynamic impedance                                    | $I_Z = 1\ \text{mA}$ , $f = 120\ \text{Hz}$ ,<br>$I_{AC} = 0.1\ I_Z$                                       | 25°C       |     |     | 0.5      1      0.5      1       |     |     | $\Omega$                   |
| $e_N$                           | Wideband noise   | $I_Z = 100\ \mu\text{A}$ ,<br>$10\ \text{Hz} \leq f \leq 10\ \text{kHz}$                                   | 25°C       |     |     | 80      80                       |     |     | $\mu\text{V}_{\text{RMS}}$ |
|                                 | Long-term stability of reverse breakdown voltage             | $t = 1000\ \text{h}$ ,<br>$T_A = 25^{\circ}\text{C} \pm 0.1^{\circ}\text{C}$ ,<br>$I_Z = 100\ \mu\text{A}$ |            |     |     | 120      120                     |     |     | ppm                        |
| $V_{\text{HYST}}$               | Thermal hysteresis <sup>(1)</sup>                            | $\Delta T_A = -40^{\circ}\text{C}$ to $125^{\circ}\text{C}$  |            |     |     | 0.08%      0.08%                 |     |     | —                          |

 (1) Thermal hysteresis is defined as  $V_{Z,25^{\circ}\text{C}}$  (after cycling to  $-40^{\circ}\text{C}$ ) –  $V_{Z,25^{\circ}\text{C}}$  (after cycling to  $125^{\circ}\text{C}$ ).

## 7.15 LM4040C41I, LM4040D41I Electrical Characteristics

 at industrial temperature range, full-range  $T_A = -40^\circ\text{C}$  to  $85^\circ\text{C}$  (unless otherwise noted)

| PARAMETER                       | TEST CONDITIONS  | $T_A$  | LM4040C41I |     |     | LM4040D41I |     |           | UNIT   |                            |               |   |
|---------------------------------|--|--|------------|-----|-----|------------|-----|-----------|--------|----------------------------|---------------|---|
|                                 |  |  | MIN        | TYP | MAX | MIN        | TYP | MAX       |        |                            |               |   |
| $V_Z$                           | Reverse breakdown voltage                                    | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | 4.096      |     |           | V      |                            |               |   |
| $\Delta V_Z$                    | Reverse breakdown voltage tolerance                          | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | -20        | 20  |           | -41    | 41                         | mV            |   |
|                                 |  |  | Full range |     |     | -47        | 47  |           | -81    | 81                         |               |   |
| $I_{Z,\text{min}}$              | Minimum cathode current                                      |  | 25°C       |     |     | 50         | 83  |           | 50     | 83                         | $\mu\text{A}$ |   |
|                                 |  |  | Full range |     |     | 88         |     | 88        |        |                            |               |   |
| $\alpha_{V_Z}$                  | Average temperature coefficient of reverse breakdown voltage | $I_Z = 10\ \text{mA}$  | 25°C       |     |     | $\pm 30$   |     |           | ppm/°C |                            |               |   |
|                                 |  |  | 25°C       |     |     | $\pm 20$   |     |           |        |                            |               |   |
|                                 |  | $I_Z = 1\ \text{mA}$   | Full range |     |     | $\pm 100$  |     | $\pm 150$ |        |                            |               |   |
|                                 |  |  | 25°C       |     |     | $\pm 20$   |     |           |        | $\pm 20$                   |               |   |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,\text{min}} < I_Z < 1\ \text{mA}$  | 25°C       |     |     | 0.5        | 0.9 |           | 0.5    | 1.2                        | mV            |   |
|                                 |  |  | Full range |     |     | 1.2        |     | 1.5       |        |                            |               |   |
|                                 |  | $1\ \text{mA} < I_Z < 15\ \text{mA}$   | 25°C       |     |     | 3          |     | 7         |        | 3                          |               | 9 |
|                                 |  |  | Full range |     |     | 10         |     | 13        |        |                            |               |   |
| $Z_Z$                           | Reverse dynamic impedance                                    | $I_Z = 1\ \text{mA}$ , $f = 120\ \text{Hz}$ , $I_{AC} = 0.1\ I_Z$                                | 25°C       |     |     | 0.5        | 1   |           | 0.5    | 1.3                        | $\Omega$      |   |
| $e_N$                           | Wideband noise   | $I_Z = 100\ \mu\text{A}$ , $10\ \text{Hz} \leq f \leq 10\ \text{kHz}$                            | 25°C       |     |     | 80         |     |           | 80     | $\mu\text{V}_{\text{RMS}}$ |               |   |
|                                 | Long-term stability of reverse breakdown voltage             | $t = 1000\ \text{h}$ , $T_A = 25^\circ\text{C} \pm 0.1^\circ\text{C}$ , $I_Z = 100\ \mu\text{A}$ |            |     |     | 120        |     |           | 120    | ppm                        |               |   |
| $V_{\text{HYST}}$               | Thermal hysteresis <sup>(1)</sup>                            | $\Delta T_A = -40^\circ\text{C}$ to $125^\circ\text{C}$  |            |     |     | 0.08%      |     |           | 0.08%  | —                          |               |   |

 (1) Thermal hysteresis is defined as  $V_{Z,25^\circ\text{C}}$  (after cycling to  $-40^\circ\text{C}$ )  $- V_{Z,25^\circ\text{C}}$  (after cycling to  $125^\circ\text{C}$ ).

## 7.16 LM4040A50I, LM4040B50I Electrical Characteristics

 at industrial temperature range, full-range  $T_A = -40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$  (unless otherwise noted)

| PARAMETER                       | TEST CONDITIONS  | $T_A$  | LM4040A50I |     |     | LM4040B50I       |     |     | UNIT                       |
|---------------------------------|--|--|------------|-----|-----|------------------|-----|-----|----------------------------|
|                                 |  |  | MIN        | TYP | MAX | MIN              | TYP | MAX |                            |
| $V_Z$                           | Reverse breakdown voltage                                    | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | 5                |     |     | V                          |
| $\Delta V_Z$                    | Reverse breakdown voltage tolerance                          | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | -5      5        |     |     | mV                         |
|                                 |  |  | Full range |     |     | -38      38      |     |     |                            |
| $I_{Z,\text{min}}$              | Minimum cathode current                                      |  | 25°C       |     |     | 65      89       |     |     | $\mu\text{A}$              |
|                                 |  |  | Full range |     |     | 95      95       |     |     |                            |
| $\alpha_{V_Z}$                  | Average temperature coefficient of reverse breakdown voltage | $I_Z = 10\ \text{mA}$  | 25°C       |     |     | $\pm 30$         |     |     | ppm/°C                     |
|                                 |  | $I_Z = 1\ \text{mA}$   | 25°C       |     |     | $\pm 20$         |     |     |                            |
|                                 |  |  | Full range |     |     | $\pm 100$        |     |     |                            |
|                                 |  | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | $\pm 20$         |     |     |                            |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,\text{min}} < I_Z < 1\ \text{mA}$  | 25°C       |     |     | 0.5      1       |     |     | mV                         |
|                                 |  |  | Full range |     |     | 1.4      1.4     |     |     |                            |
|                                 |  | $1\ \text{mA} < I_Z < 15\ \text{mA}$   | 25°C       |     |     | 3.5      8       |     |     |                            |
|                                 |  |  | Full range |     |     | 12      12       |     |     |                            |
| $Z_Z$                           | Reverse dynamic impedance                                    | $I_Z = 1\ \text{mA}$ , $f = 120\ \text{Hz}$ ,<br>$I_{AC} = 0.1 I_Z$  | 25°C       |     |     | 0.5      1.1     |     |     | $\Omega$                   |
| $e_N$                           | Wideband noise   | $I_Z = 100\ \mu\text{A}$ ,<br>$10\ \text{Hz} \leq f \leq 10\ \text{kHz}$                                   | 25°C       |     |     | 80      80       |     |     | $\mu\text{V}_{\text{RMS}}$ |
|                                 | Long-term stability of reverse breakdown voltage             | $t = 1000\ \text{h}$ ,<br>$T_A = 25^{\circ}\text{C} \pm 0.1^{\circ}\text{C}$ ,<br>$I_Z = 100\ \mu\text{A}$ |            |     |     | 120      120     |     |     | ppm                        |
| $V_{\text{HYST}}$               | Thermal hysteresis <sup>(1)</sup>                            | $\Delta T_A = -40^{\circ}\text{C}$ to $125^{\circ}\text{C}$  |            |     |     | 0.08%      0.08% |     |     | —                          |

 (1) Thermal hysteresis is defined as  $V_{Z,25^{\circ}\text{C}}$  (after cycling to  $-40^{\circ}\text{C}$ ) –  $V_{Z,25^{\circ}\text{C}}$  (after cycling to  $125^{\circ}\text{C}$ ).

## 7.17 LM4040C50I, LM4040D50I Electrical Characteristics

 at industrial temperature range, full-range  $T_A = -40^\circ\text{C}$  to  $85^\circ\text{C}$  (unless otherwise noted)

| PARAMETER                       | TEST CONDITIONS  | $T_A$  | LM4040C50I |     |     | LM4040D50I  |     |     | UNIT                       |
|---------------------------------|--|--|------------|-----|-----|-------------|-----|-----|----------------------------|
|                                 |  |  | MIN        | TYP | MAX | MIN         | TYP | MAX |                            |
| $V_Z$                           | Reverse breakdown voltage                                    | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | 5           |     |     | V                          |
| $\Delta V_Z$                    | Reverse breakdown voltage tolerance                          | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | -25      25 |     |     | mV                         |
|                                 |  |  | Full range |     |     | -58      58 |     |     |                            |
| $I_{Z,\text{min}}$              | Minimum cathode current                                      |  | 25°C       |     |     | 65    89    |     |     | $\mu\text{A}$              |
|                                 |  |  | Full range |     |     | 95          |     |     |                            |
| $\alpha_{V_Z}$                  | Average temperature coefficient of reverse breakdown voltage | $I_Z = 10\ \text{mA}$  | 25°C       |     |     | $\pm 30$    |     |     | ppm/°C                     |
|                                 |  | $I_Z = 1\ \text{mA}$   | 25°C       |     |     | $\pm 20$    |     |     |                            |
|                                 |  |  | Full range |     |     | $\pm 100$   |     |     |                            |
|                                 |  | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | $\pm 20$    |     |     |                            |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,\text{min}} < I_Z < 1\ \text{mA}$  | 25°C       |     |     | 0.5    1    |     |     | mV                         |
|                                 |  |  | Full range |     |     | 1.4         |     |     |                            |
|                                 |  | $1\ \text{mA} < I_Z < 15\ \text{mA}$   | 25°C       |     |     | 3.5    8    |     |     |                            |
|                                 |  |  | Full range |     |     | 12          |     |     |                            |
| $Z_Z$                           | Reverse dynamic impedance                                    | $I_Z = 1\ \text{mA}$ , $f = 120\ \text{Hz}$ ,<br>$I_{AC} = 0.1 I_Z$                                    | 25°C       |     |     | 0.5    1.1  |     |     | $\Omega$                   |
| $e_N$                           | Wideband noise   | $I_Z = 100\ \mu\text{A}$ ,<br>$10\ \text{Hz} \leq f \leq 10\ \text{kHz}$                               | 25°C       |     |     | 80          |     |     | $\mu\text{V}_{\text{RMS}}$ |
|                                 | Long-term stability of reverse breakdown voltage             | $t = 1000\ \text{h}$ ,<br>$T_A = 25^\circ\text{C} \pm 0.1^\circ\text{C}$ ,<br>$I_Z = 100\ \mu\text{A}$ |            |     |     | 120         |     |     | ppm                        |
| $V_{\text{HYST}}$               | Thermal hysteresis <sup>(1)</sup>                            | $\Delta T_A = -40^\circ\text{C}$ to $125^\circ\text{C}$  |            |     |     | 0.08%       |     |     | —                          |

 (1) Thermal hysteresis is defined as  $V_{Z,25^\circ\text{C}}$  (after cycling to  $-40^\circ\text{C}$ ) –  $V_{Z,25^\circ\text{C}}$  (after cycling to  $125^\circ\text{C}$ ).

## 7.18 LM4040C50Q, LM4040D50Q Electrical Characteristics

 at extended temperature range, full-range  $T_A = -40^{\circ}\text{C}$  to  $125^{\circ}\text{C}$  (unless otherwise noted)

| PARAMETER                       | TEST CONDITIONS  | $T_A$  | LM4040C50Q |     |     | LM4040D50Q  |     |     | UNIT                       |
|---------------------------------|--|--|------------|-----|-----|-------------|-----|-----|----------------------------|
|                                 |  |  | MIN        | TYP | MAX | MIN         | TYP | MAX |                            |
| $V_Z$                           | Reverse breakdown voltage                                    | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | 5           |     |     | V                          |
| $\Delta V_Z$                    | Reverse breakdown voltage tolerance                          | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | -25      25 |     |     | mV                         |
|                                 |  |  | Full range |     |     | -75      75 |     |     |                            |
| $I_{Z,\text{min}}$              | Minimum cathode current                                      |  | 25°C       |     |     | 65    89    |     |     | $\mu\text{A}$              |
|                                 |  |  | Full range |     |     | 95          |     |     |                            |
| $\alpha_{V_Z}$                  | Average temperature coefficient of reverse breakdown voltage | $I_Z = 10\ \text{mA}$  | 25°C       |     |     | $\pm 30$    |     |     | ppm/°C                     |
|                                 |  | $I_Z = 1\ \text{mA}$   | 25°C       |     |     | $\pm 20$    |     |     |                            |
|                                 |  |  | Full range |     |     | $\pm 100$   |     |     |                            |
|                                 |  | $I_Z = 100\ \mu\text{A}$   | 25°C       |     |     | $\pm 20$    |     |     |                            |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,\text{min}} < I_Z < 1\ \text{mA}$  | 25°C       |     |     | 0.5    1    |     |     | mV                         |
|                                 |  |  | Full range |     |     | 1.4         |     |     |                            |
|                                 |  | $1\ \text{mA} < I_Z < 15\ \text{mA}$   | 25°C       |     |     | 3.5    8    |     |     |                            |
|                                 |  |  | Full range |     |     | 12          |     |     |                            |
| $Z_Z$                           | Reverse dynamic impedance                                    | $I_Z = 1\ \text{mA}$ , $f = 120\ \text{Hz}$ ,<br>$I_{AC} = 0.1 I_Z$  | 25°C       |     |     | 0.5    1.1  |     |     | $\Omega$                   |
| $e_N$                           | Wideband noise   | $I_Z = 100\ \mu\text{A}$ ,<br>$10\ \text{Hz} \leq f \leq 10\ \text{kHz}$                                   | 25°C       |     |     | 80          |     |     | $\mu\text{V}_{\text{RMS}}$ |
|                                 | Long-term stability of reverse breakdown voltage             | $t = 1000\ \text{h}$ ,<br>$T_A = 25^{\circ}\text{C} \pm 0.1^{\circ}\text{C}$ ,<br>$I_Z = 100\ \mu\text{A}$ |            |     |     | 120         |     |     | ppm                        |
| $V_{\text{HYST}}$               | Thermal hysteresis <sup>(1)</sup>                            | $\Delta T_A = -40^{\circ}\text{C}$ to $125^{\circ}\text{C}$  |            |     |     | 0.08%       |     |     | —                          |

 (1) Thermal hysteresis is defined as  $V_{Z,25^{\circ}\text{C}}$  (after cycling to  $-40^{\circ}\text{C}$ ) –  $V_{Z,25^{\circ}\text{C}}$  (after cycling to  $125^{\circ}\text{C}$ ).

## 7.19 LM4040A82I, LM4040B82I Electrical Characteristics

 at industrial temperature range, full-range  $T_A = -40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$  (unless otherwise noted)

| PARAMETER                       | TEST CONDITIONS  | $T_A$  | LM4040A82I |     |     | LM4040B82I    |     |     | UNIT                       |
|---------------------------------|--|--|------------|-----|-----|---------------|-----|-----|----------------------------|
|                                 |  |  | MIN        | TYP | MAX | MIN           | TYP | MAX |                            |
| $V_Z$                           | Reverse breakdown voltage                                    | $I_Z = 150\ \mu\text{A}$   | 25°C       |     |     | 8.192         |     |     | V                          |
| $\Delta V_Z$                    | Reverse breakdown voltage tolerance                          | $I_Z = 150\ \mu\text{A}$   | 25°C       |     |     | -8.2      8.2 |     |     | mV                         |
|                                 |  |  | Full range |     |     | -61      61   |     |     |                            |
| $I_{Z,\text{min}}$              | Minimum cathode current                                      |  | 25°C       |     |     | 67    106     |     |     | $\mu\text{A}$              |
|                                 |  |  | Full range |     |     | 110           |     |     |                            |
| $\alpha_{V_Z}$                  | Average temperature coefficient of reverse breakdown voltage | $I_Z = 10\ \text{mA}$<br>$I_Z = 1\ \text{mA}$<br>$I_Z = 150\ \mu\text{A}$                                  | 25°C       |     |     | $\pm 40$      |     |     | ppm/°C                     |
|                                 |  |  | 25°C       |     |     | $\pm 20$      |     |     |                            |
|                                 |  |  | Full range |     |     | $\pm 100$     |     |     |                            |
|                                 |  |  | 25°C       |     |     | $\pm 20$      |     |     |                            |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,\text{min}} < I_Z < 1\ \text{mA}$  | 25°C       |     |     | 0.6    1.3    |     |     | mV                         |
|                                 |  |  | Full range |     |     | 2.5           |     |     |                            |
|                                 |  | $1\ \text{mA} < I_Z < 15\ \text{mA}$   | 25°C       |     |     | 7    10       |     |     |                            |
|                                 |  |  | Full range |     |     | 18            |     |     |                            |
| $Z_Z$                           | Reverse dynamic impedance                                    | $I_Z = 1\ \text{mA}$ , $f = 120\ \text{Hz}$ ,<br>$I_{AC} = 0.1\ I_Z$                                       | 25°C       |     |     | 0.6    1.5    |     |     | $\Omega$                   |
| $e_N$                           | Wideband noise   | $I_Z = 150\ \mu\text{A}$ ,<br>$10\ \text{Hz} \leq f \leq 10\ \text{kHz}$                                   | 25°C       |     |     | 130           |     |     | $\mu\text{V}_{\text{RMS}}$ |
|                                 | Long-term stability of reverse breakdown voltage             | $t = 1000\ \text{h}$ ,<br>$T_A = 25^{\circ}\text{C} \pm 0.1^{\circ}\text{C}$ ,<br>$I_Z = 150\ \mu\text{A}$ |            |     |     | 120           |     |     | ppm                        |
| $V_{\text{HYST}}$               | Thermal hysteresis <sup>(1)</sup>                            | $\Delta T_A = -40^{\circ}\text{C}$ to $125^{\circ}\text{C}$  |            |     |     | 0.08%         |     |     | —                          |

 (1) Thermal hysteresis is defined as  $V_{Z,25^{\circ}\text{C}}$  (after cycling to  $-40^{\circ}\text{C}$ ) –  $V_{Z,25^{\circ}\text{C}}$  (after cycling to  $125^{\circ}\text{C}$ ).

## 7.20 LM4040C82I, LM4040D82I Electrical Characteristics

 at industrial temperature range, full-range  $T_A = -40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$  (unless otherwise noted)

| PARAMETER                       | TEST CONDITIONS  | $T_A$  | LM4040C82I               |            |     | LM4040D82I |           |      | UNIT                       |               |
|---------------------------------|--|--|--------------------------|------------|-----|------------|-----------|------|----------------------------|---------------|
|                                 |  |  | MIN                      | TYP        | MAX | MIN        | TYP       | MAX  |                            |               |
| $V_Z$                           | Reverse breakdown voltage                                    | $I_Z = 150\ \mu\text{A}$   | 25°C                     |            |     | 8.192      |           |      | V                          |               |
| $\Delta V_Z$                    | Reverse breakdown voltage tolerance                          | $I_Z = 150\ \mu\text{A}$   | 25°C                     |            |     | -41        | 41        | -82  | 82                         | mV            |
|                                 |  |  | Full range               |            |     | -94        | 94        | -162 | 162                        |               |
| $I_{Z,\text{min}}$              | Minimum cathode current                                      |  | 25°C                     |            |     | 67         | 106       | 67   | 111                        | $\mu\text{A}$ |
|                                 |  |  | Full range               |            |     |            | 110       |      | 115                        |               |
| $\alpha_{V_Z}$                  | Average temperature coefficient of reverse breakdown voltage | $I_Z = 10\ \text{mA}$  | 25°C                     |            |     | $\pm 40$   |           |      | ppm/°C                     |               |
|                                 |  |  | $I_Z = 1\ \text{mA}$     | 25°C       |     |            | $\pm 20$  |      |                            |               |
|                                 |  |  |                          | Full range |     |            | $\pm 100$ |      |                            |               |
|                                 |  |  | $I_Z = 150\ \mu\text{A}$ | 25°C       |     |            | $\pm 20$  |      |                            |               |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,\text{min}} < I_Z < 1\ \text{mA}$  | 25°C                     |            |     | 0.6        | 1.3       | 0.6  | 1.7                        | mV            |
|                                 |  |  | Full range               |            |     | 2.5        |           |      | 3                          |               |
|                                 |  | $1\ \text{mA} < I_Z < 15\ \text{mA}$   | 25°C                     |            |     | 7          | 10        | 7    | 15                         |               |
|                                 |  |  | Full range               |            |     | 18         |           |      | 24                         |               |
| $Z_Z$                           | Reverse dynamic impedance                                    | $I_Z = 1\ \text{mA}$ , $f = 120\ \text{Hz}$ , $I_{AC} = 0.1 I_Z$                                     | 25°C                     |            |     | 0.6        | 1.5       | 0.6  | 1.9                        | $\Omega$      |
| $e_N$                           | Wideband noise   | $I_Z = 150\ \mu\text{A}$ , $10\ \text{Hz} \leq f \leq 10\ \text{kHz}$                                | 25°C                     |            |     | 130        |           |      | $\mu\text{V}_{\text{RMS}}$ |               |
|                                 | Long-term stability of reverse breakdown voltage             | $t = 1000\ \text{h}$ , $T_A = 25^{\circ}\text{C} \pm 0.1^{\circ}\text{C}$ , $I_Z = 150\ \mu\text{A}$ |                          |            |     | 120        |           |      | ppm                        |               |
| $V_{\text{HYST}}$               | Thermal hysteresis <sup>(1)</sup>                            | $\Delta T_A = -40^{\circ}\text{C}$ to $125^{\circ}\text{C}$  |                          |            |     | 0.08%      |           |      | —                          |               |

 (1) Thermal hysteresis is defined as  $V_{Z,25^{\circ}\text{C}}$  (after cycling to  $-40^{\circ}\text{C}$ ) –  $V_{Z,25^{\circ}\text{C}}$  (after cycling to  $125^{\circ}\text{C}$ ).

## 7.21 LM4040A10I, LM4040B10I Electrical Characteristics

 at industrial temperature range, full-range  $T_A = -40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$  (unless otherwise noted)

| PARAMETER                       | TEST CONDITIONS  | $T_A$  | LM4040A10I |     |     | LM4040B10I   |     |     | UNIT                       |
|---------------------------------|--|--|------------|-----|-----|--------------|-----|-----|----------------------------|
|                                 |  |  | MIN        | TYP | MAX | MIN          | TYP | MAX |                            |
| $V_Z$                           | Reverse breakdown voltage                                    | $I_Z = 150\ \mu\text{A}$   | 25°C       |     |     | 10           |     |     | V                          |
| $\Delta V_Z$                    | Reverse breakdown voltage tolerance                          | $I_Z = 150\ \mu\text{A}$   | 25°C       |     |     | -10      10  |     |     | mV                         |
|                                 |  |  | Full range |     |     | -75      75  |     |     |                            |
| $I_{Z,\text{min}}$              | Minimum cathode current                                      |  | 25°C       |     |     | 75    120    |     |     | $\mu\text{A}$              |
|                                 |  |  | Full range |     |     | 125      125 |     |     |                            |
| $\alpha_{V_Z}$                  | Average temperature coefficient of reverse breakdown voltage | $I_Z = 10\ \text{mA}$  | 25°C       |     |     | $\pm 40$     |     |     | ppm/°C                     |
|                                 |  | $I_Z = 1\ \text{mA}$   | 25°C       |     |     | $\pm 20$     |     |     |                            |
|                                 |  |  | Full range |     |     | $\pm 100$    |     |     |                            |
|                                 |  | $I_Z = 150\ \mu\text{A}$   | 25°C       |     |     | $\pm 20$     |     |     |                            |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,\text{min}} < I_Z < 1\ \text{mA}$  | 25°C       |     |     | 0.8    1.5   |     |     | mV                         |
|                                 |  |  | Full range |     |     | 3.5      3.5 |     |     |                            |
|                                 |  | $1\ \text{mA} < I_Z < 15\ \text{mA}$   | 25°C       |     |     | 8      14    |     |     |                            |
|                                 |  |  | Full range |     |     | 24      24   |     |     |                            |
| $Z_Z$                           | Reverse dynamic impedance                                    | $I_Z = 1\ \text{mA}$ , $f = 120\ \text{Hz}$ ,<br>$I_{AC} = 0.1 I_Z$  | 25°C       |     |     | 0.7    1.7   |     |     | $\Omega$                   |
| $e_N$                           | Wideband noise   | $I_Z = 150\ \mu\text{A}$ ,<br>$10\ \text{Hz} \leq f \leq 10\ \text{kHz}$                                   | 25°C       |     |     | 180          |     |     | $\mu\text{V}_{\text{RMS}}$ |
|                                 | Long-term stability of reverse breakdown voltage             | $t = 1000\ \text{h}$ ,<br>$T_A = 25^{\circ}\text{C} \pm 0.1^{\circ}\text{C}$ ,<br>$I_Z = 150\ \mu\text{A}$ |            |     |     | 120          |     |     | ppm                        |
| $V_{\text{HYST}}$               | Thermal hysteresis <sup>(1)</sup>                            | $\Delta T_A = -40^{\circ}\text{C}$ to $125^{\circ}\text{C}$  |            |     |     | 0.08%        |     |     | —                          |

 (1) Thermal hysteresis is defined as  $V_{Z,25^{\circ}\text{C}}$  (after cycling to  $-40^{\circ}\text{C}$ )  $- V_{Z,25^{\circ}\text{C}}$  (after cycling to  $125^{\circ}\text{C}$ ).

## 7.22 LM4040C10I, LM4040D10I Electrical Characteristics

 at industrial temperature range, full-range  $T_A = -40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$  (unless otherwise noted)

| PARAMETER                       | TEST CONDITIONS  | $T_A$  | LM4040C10I |     |     | LM4040D10I    |     |     | UNIT                       |
|---------------------------------|--|--|------------|-----|-----|---------------|-----|-----|----------------------------|
|                                 |  |  | MIN        | TYP | MAX | MIN           | TYP | MAX |                            |
| $V_Z$                           | Reverse breakdown voltage                                    | $I_Z = 150\ \mu\text{A}$   | 25°C       |     |     | 10            |     |     | V                          |
| $\Delta V_Z$                    | Reverse breakdown voltage tolerance                          | $I_Z = 150\ \mu\text{A}$   | 25°C       |     |     | -50      50   |     |     | mV                         |
|                                 |  |  | Full range |     |     | -115      115 |     |     |                            |
| $I_{Z,\text{min}}$              | Minimum cathode current                                      |  | 25°C       |     |     | 75    120     |     |     | $\mu\text{A}$              |
|                                 |  |  | Full range |     |     | 125      135  |     |     |                            |
| $\alpha_{V_Z}$                  | Average temperature coefficient of reverse breakdown voltage | $I_Z = 10\ \text{mA}$<br>$I_Z = 1\ \text{mA}$<br>$I_Z = 150\ \mu\text{A}$                                  | 25°C       |     |     | $\pm 40$      |     |     | ppm/°C                     |
|                                 |  |  | 25°C       |     |     | $\pm 20$      |     |     |                            |
|                                 |  |  | Full range |     |     | $\pm 100$     |     |     |                            |
|                                 |  |  | 25°C       |     |     | $\pm 20$      |     |     |                            |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,\text{min}} < I_Z < 1\ \text{mA}$  | 25°C       |     |     | 0.8    1.5    |     |     | mV                         |
|                                 |  |  | Full range |     |     | 3.5           |     |     |                            |
|                                 |  | $1\ \text{mA} < I_Z < 15\ \text{mA}$   | 25°C       |     |     | 8    14       |     |     |                            |
|                                 |  |  | Full range |     |     | 24      29    |     |     |                            |
| $Z_Z$                           | Reverse dynamic impedance                                    | $I_Z = 1\ \text{mA}$ , $f = 120\ \text{Hz}$ ,<br>$I_{AC} = 0.1\ I_Z$                                       | 25°C       |     |     | 0.7    1.7    |     |     | $\Omega$                   |
| $e_N$                           | Wideband noise   | $I_Z = 150\ \mu\text{A}$ ,<br>$10\ \text{Hz} \leq f \leq 10\ \text{kHz}$                                   | 25°C       |     |     | 180           |     |     | $\mu\text{V}_{\text{RMS}}$ |
|                                 | Long-term stability of reverse breakdown voltage             | $t = 1000\ \text{h}$ ,<br>$T_A = 25^{\circ}\text{C} \pm 0.1^{\circ}\text{C}$ ,<br>$I_Z = 150\ \mu\text{A}$ |            |     |     | 120           |     |     | ppm                        |
| $V_{\text{HYST}}$               | Thermal hysteresis <sup>(1)</sup>                            | $\Delta T_A = -40^{\circ}\text{C}$ to $125^{\circ}\text{C}$  |            |     |     | 0.08%         |     |     | —                          |

 (1) Thermal hysteresis is defined as  $V_{Z,25^{\circ}\text{C}}$  (after cycling to  $-40^{\circ}\text{C}$ ) –  $V_{Z,25^{\circ}\text{C}}$  (after cycling to  $125^{\circ}\text{C}$ ).

### 7.23 Typical Characteristics

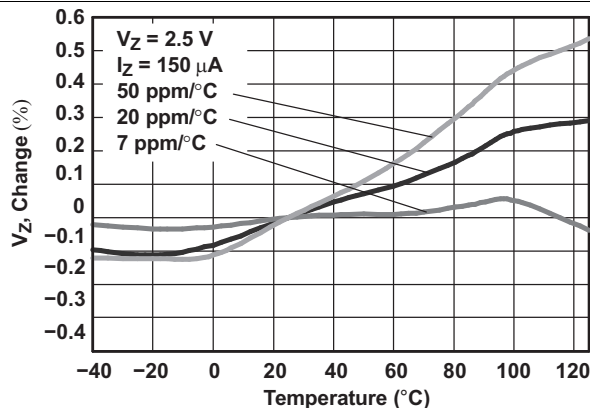


Figure 1. Temperature Drift for Different Average Temperature Coefficients

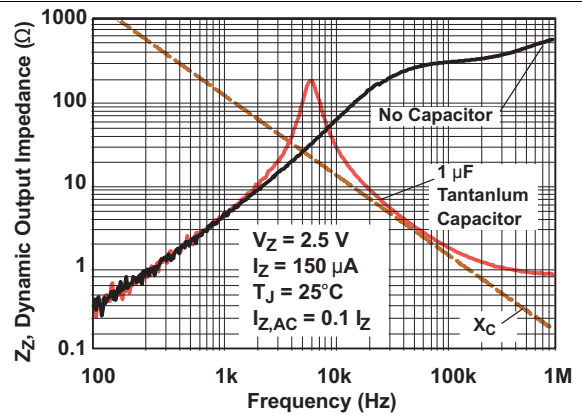


Figure 2. Output Impedance vs Frequency

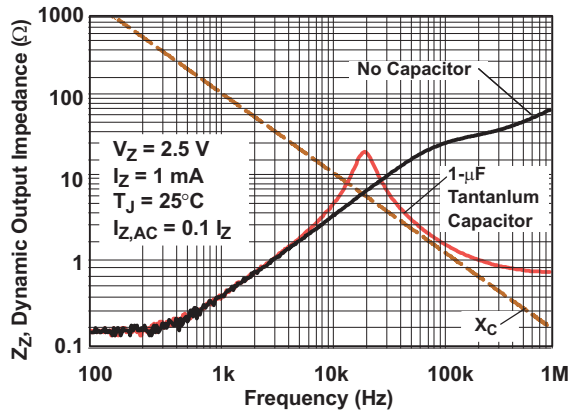


Figure 3. Output Impedance vs Frequency

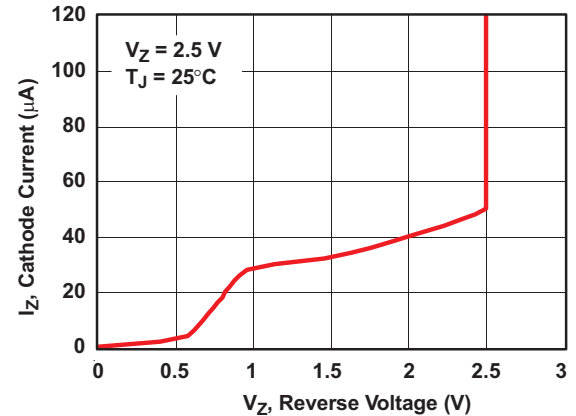


Figure 4. Temperature Drift for Different Average Temperature Coefficient

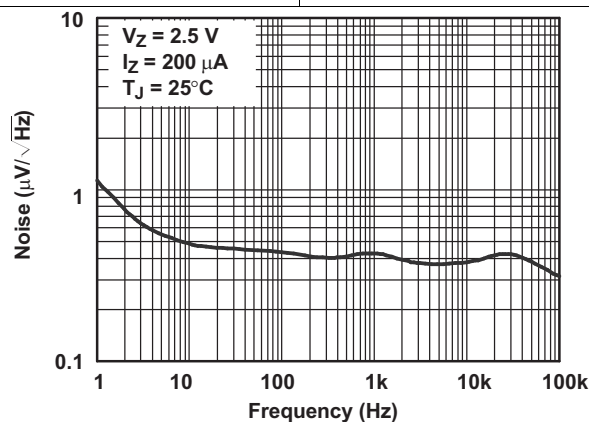


Figure 5. Noise Voltage vs Frequency

## 8 Detailed Description

### 8.1 Overview

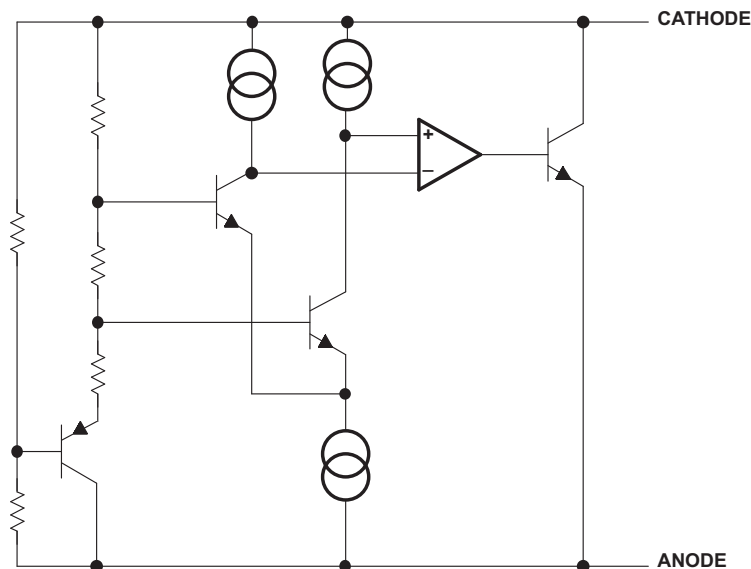
The LM4040 is a precision micro-power curvature-corrected bandgap shunt voltage reference. The LM4040 has been designed for stable operation without the need of an external capacitor connected between the “+” pin and the “-” pin. If, however, a bypass capacitor is used, the LM4040 remains stable.

LM4040 offers several fixed reverse breakdown voltages: 2.048 V, 2.500 V, 3.000 V, 4.096 V, 5.000 V, 6.000, 8.192 V, and 10.000 V. The minimum operating current increases from 60  $\mu\text{A}$  for the LM4040-N-2.048 and LM4040-N-2.5 to 100  $\mu\text{A}$  for the 10.0-V LM4040. All versions have a maximum operating current of 15 mA.

Each reverse voltage options can be purchased with initial tolerances (at 25°C) of 0.1%, 0.2%, 0.5% and 1.0%. These reference options are denoted by A (0.1%), B (0.2%), C (0.5%) and D for (1.0%).

The LM4040xxxI devices are characterized for operation from  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$ , and the LM4040xxxQ devices are characterized for operation from  $-40^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ .

### 8.2 Functional Block Diagram



### 8.3 Feature Description

A temperature compensated band gap voltage reference controls high gain amplifier and shunt pass element to maintain a nearly constant voltage between cathode and anode. Regulation occurs after a minimum current is provided to power the voltage divider and amplifier. Internal frequency compensation provides a stable loop for all capacitor loads. Floating shunt design is useful for both positive and negative regulation applications.

### 8.4 Device Functional Modes

#### 8.4.1 Shunt Reference

LM4040x will operate in one mode, which is as a fixed voltage reference that cannot be adjusted. LM4040x does offer various Reverse Voltage options that have unique electrical characteristics detailed in the [Specifications](#) section.

In order for a proper Reverse Voltage to be developed, current must be sourced into the cathode of LM4040x. The minimum current needed for proper regulation is denoted in the [Specifications](#) section as  $I_{z,\text{min}}$ .

## 9 Applications and Implementation

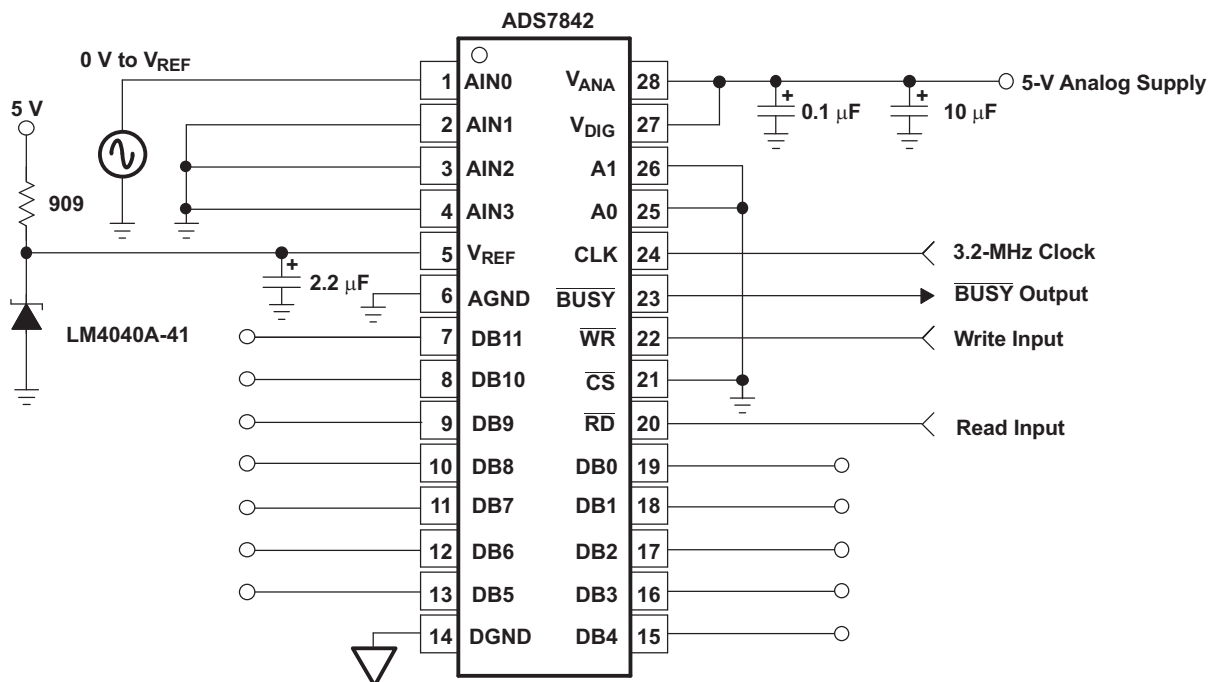
### NOTE

Information in the following applications sections is not part of the TI component specification, and TI does not warrant its accuracy or completeness. TI's customers are responsible for determining suitability of components for their purposes. Customers should validate and test their design implementation to confirm system functionality.

### 9.1 Application Information

LM4040xxx is a well known industry standard device used in several applications and end equipment where a reference is required. Below describes this device being used in a data acquisition system. Analog to Digital conversion systems are the most common applications to use LM4040x due to its low reference tolerance which allows high precision in these systems.

### 9.2 Typical Applications



**Figure 6. Data-Acquisition Circuit With LM4040x-41**

#### 9.2.1 Design Requirements

For this design example, use the parameters listed in [Table 2](#) as the input parameters.

**Table 2. Design Parameters**

| DESIGN PARAMETER           | EXAMPLE VALUE |
|----------------------------|---------------|
| ADC FSR (Full Scale Range) | 4.096         |
| ADC Resolution             | 12 Bits       |
| Supply Voltage             | 5 V           |
| Cathode Current (Ik)       | 100 $\mu$ A   |

## 9.2.2 Detailed Design Procedure

When using LM4040x as a comparator with reference, determine the following:

- Input voltage range
- Reference voltage accuracy
- Output logic input high and low level thresholds
- Current source resistance

### 9.2.2.1 LM4040x Voltage and Accuracy Choice

When using LM4040x as a reference for an ADC, the ADC's FSR (Full Scale Range), Resolution and LSB must be determined. LSB can be determined by:

$$\text{LSB} = \text{FSR} / (2^N - 1)$$

With N being the resolution or Number of Bits. FSR and Resolution can be determined by the ADC's datasheet.

Vref can be determined by:

$$\text{Vref} = \text{FSR} + \text{LSB}$$

Though modern data converters use calibration techniques to compensate for any error introduced by a Vref's inaccuracy, it is best to use the highest accuracy available. This is due to errors in the calibration method that may allow some non-linearities introduced by the Vref's initial accuracy.

A good example is the LM4040x-41 that is designed to be a cost-effective voltage reference as required in 12-bit data-acquisition systems. For 12-bit systems operating from 5-V supplies (see Figure 6), the LM4040A-41 (4.096 V, 0.01%) only introduces 4 LSBs (4mV) of possible error in a system that consists of 4096 LSBs.

### 9.2.2.2 Cathode and Load Currents

In a typical shunt-regulator configuration (see Figure 7), an external resistor,  $R_S$ , is connected between the supply and the cathode of the LM4040.  $R_S$  must be set properly, as it sets the total current available to supply the load ( $I_L$ ) and bias the LM4040 ( $I_Z$ ). In all cases,  $I_Z$  must stay within a specified range for proper operation of the reference. Taking into consideration one extreme in the variation of the load and supply voltage (maximum  $I_L$  and minimum  $V_S$ ),  $R_S$  must be small enough to supply the minimum  $I_Z$  required for operation of the regulator, as given by data-sheet parameters. At the other extreme, maximum  $V_S$  and minimum  $I_L$ ,  $R_S$  must be large enough to limit  $I_Z$  to less than its maximum-rated value of 15 mA.

$R_S$  is calculated according to Equation 1:

$$R_S = \frac{(V_S - V_Z)}{(I_L + I_Z)} \quad (1)$$

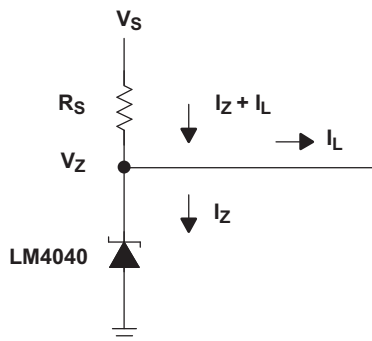


Figure 7. Shunt Regulator

### 9.2.2.3 Output Capacitor

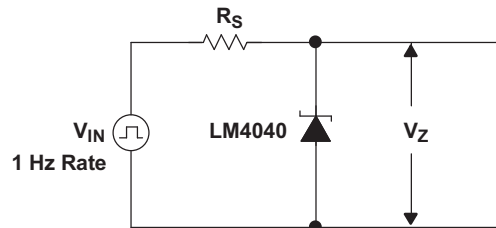
The LM4040 does not require an output capacitor across cathode and anode for stability. However, if an output bypass capacitor is desired, the LM4040 is designed to be stable with all capacitive loads.

### 9.2.2.4 SOT-23 Connections

There is a parasitic Schottky diode connected between pins 2 and 3 of the SOT-23 packaged device. Thus, pin 3 of the SOT-23 package must be left floating or connected to pin 2.

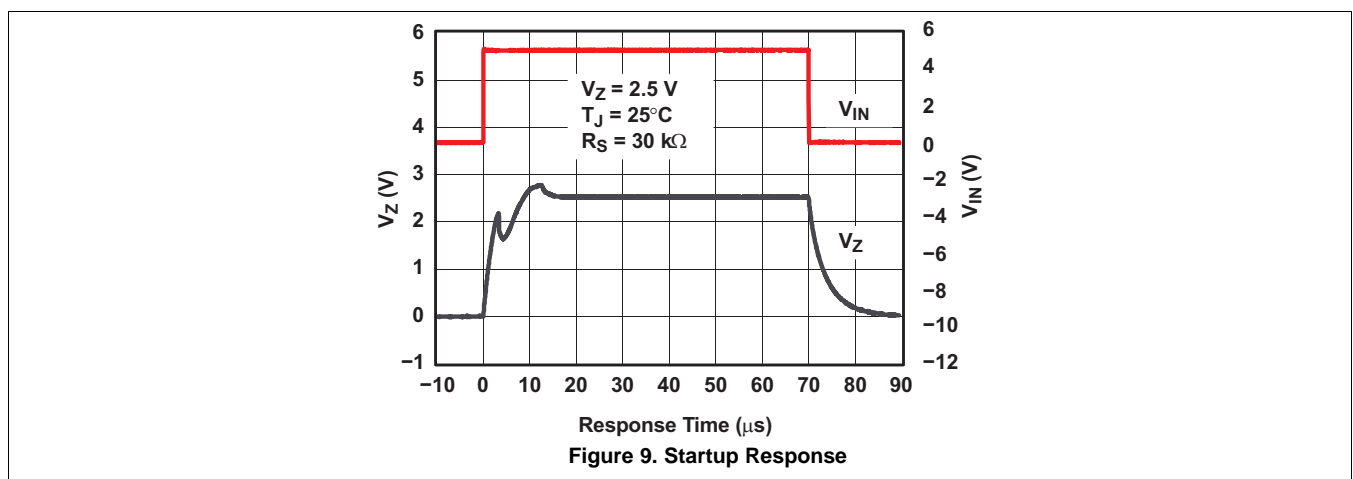
### 9.2.2.5 Start-Up Characteristics

In any data conversion system, start-up characteristics are important, as to determine when it is safe begin conversion based upon a steady and settled reference value. As shown in [Figure 9](#) it is best to allow for  $>20\mu\text{s}$  from supply start-up to begin conversion.



**Figure 8. Test Circuit**

### 9.2.3 Application Curves



## 10 Power Supply Recommendations

In order to not exceed the maximum cathode current, be sure that the supply voltage is current limited.

For applications shunting high currents (15 mA max), pay attention to the cathode and anode trace lengths, adjusting the width of the traces to have the proper current density.

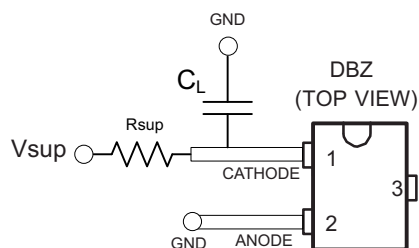
## 11 Layout

### 11.1 Layout Guidelines

Figure 10 shows an example of a PCB layout of LM4040XXXDBZ. Some key  $V_{ref}$  noise considerations are:

- Connect a low-ESR, 0.1- $\mu$ F ( $C_L$ ) ceramic bypass capacitor on the cathode pin node.
- Decouple other active devices in the system per the device specifications.
- Using a solid ground plane helps distribute heat and reduces electromagnetic interference (EMI) noise pickup.
- Place the external components as close to the device as possible. This configuration prevents parasitic errors (such as the Seebeck effect) from occurring.
- Do not run sensitive analog traces in parallel with digital traces. Avoid crossing digital and analog traces if possible and only make perpendicular crossings when absolutely necessary.

### 11.2 Layout Example



**Figure 10. DBZ Layout example**

## 12 Device and Documentation Support

### 12.1 Related Links

The table below lists quick access links. Categories include technical documents, support and community resources, tools and software, and quick access to sample or buy.

Table 3. Related Links

| PARTS     | PRODUCT FOLDER             | SAMPLE & BUY               | TECHNICAL DOCUMENTS        | TOOLS & SOFTWARE           | SUPPORT & COMMUNITY        |
|-----------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| LM4040A10 | <a href="#">Click here</a> | <a href="#">Click here</a> | <a href="#">Click here</a> | <a href="#">Click here</a> | <a href="#">Click here</a> |
| LM4040A20 | <a href="#">Click here</a> | <a href="#">Click here</a> | <a href="#">Click here</a> | <a href="#">Click here</a> | <a href="#">Click here</a> |

### 12.2 Trademarks

All trademarks are the property of their respective owners.

### 12.3 Electrostatic Discharge Caution



These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

### 12.4 Glossary

[SLYZ022](#) — *TI Glossary*.

This glossary lists and explains terms, acronyms, and definitions.

## 13 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

**PACKAGING INFORMATION**

| Orderable Device | Status<br>(1) | Package Type | Package<br>Drawing | Pins | Package<br>Qty | Eco Plan<br>(2)            | Lead/Ball Finish<br>(6) | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5) | Samples                 |
|------------------|---------------|--------------|--------------------|------|----------------|----------------------------|-------------------------|----------------------|--------------|-------------------------|-------------------------|
| LM4040A10IDBZR   | ACTIVE        | SOT-23       | DBZ                | 3    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4NQ3 ~ 4NQU)           | <a href="#">Samples</a> |
| LM4040A10IDBZRG4 | ACTIVE        | SOT-23       | DBZ                | 3    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4NQ3 ~ 4NQU)           | <a href="#">Samples</a> |
| LM4040A10IDBZT   | ACTIVE        | SOT-23       | DBZ                | 3    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4NQU                    | <a href="#">Samples</a> |
| LM4040A10IDCKR   | ACTIVE        | SC70         | DCK                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PHU                     | <a href="#">Samples</a> |
| LM4040A10ILP     | PREVIEW       | TO-92        | LP                 | 3    | 1000           | TBD                        | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040A10ILPR    | PREVIEW       | TO-92        | LP                 | 3    | 2000           | TBD                        | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040A20IDBZR   | ACTIVE        | SOT-23       | DBZ                | 3    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4MC3 ~ 4MCU)           | <a href="#">Samples</a> |
| LM4040A20IDBZRG4 | ACTIVE        | SOT-23       | DBZ                | 3    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4MC3 ~ 4MCU)           | <a href="#">Samples</a> |
| LM4040A20IDBZT   | ACTIVE        | SOT-23       | DBZ                | 3    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4MCU                    | <a href="#">Samples</a> |
| LM4040A20IDBZTG4 | ACTIVE        | SOT-23       | DBZ                | 3    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4MCU                    | <a href="#">Samples</a> |
| LM4040A20IDCKR   | ACTIVE        | SC70         | DCK                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | MSU                     | <a href="#">Samples</a> |
| LM4040A20IDCKRE4 | ACTIVE        | SC70         | DCK                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | MSU                     | <a href="#">Samples</a> |
| LM4040A25IDBZR   | ACTIVE        | SOT-23       | DBZ                | 3    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4NG3 ~ 4NGU)           | <a href="#">Samples</a> |
| LM4040A25IDBZT   | ACTIVE        | SOT-23       | DBZ                | 3    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4NG3 ~ 4NGU)           | <a href="#">Samples</a> |
| LM4040A25IDBZTG4 | ACTIVE        | SOT-23       | DBZ                | 3    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4NG3 ~ 4NGU)           | <a href="#">Samples</a> |
| LM4040A25IDCKR   | ACTIVE        | SC70         | DCK                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | P2U                     | <a href="#">Samples</a> |
| LM4040A25ILP     | PREVIEW       | TO-92        | LP                 | 3    | 1000           | TBD                        | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040A25ILPR    | PREVIEW       | TO-92        | LP                 | 3    | 2000           | TBD                        | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040A30IDBZR   | ACTIVE        | SOT-23       | DBZ                | 3    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4M63 ~ 4M6U)           | <a href="#">Samples</a> |

| Orderable Device | Status<br>(1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan<br>(2)         | Lead/Ball Finish<br>(6) | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5) | Samples                 |
|------------------|---------------|--------------|-----------------|------|-------------|-------------------------|-------------------------|----------------------|--------------|-------------------------|-------------------------|
| LM4040A30IDBZRG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4M63 ~ 4M6U)           | <a href="#">Samples</a> |
| LM4040A30IDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4M6U                    | <a href="#">Samples</a> |
| LM4040A30IDBZTG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4M6U                    | <a href="#">Samples</a> |
| LM4040A30IDCKR   | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | P9U                     | <a href="#">Samples</a> |
| LM4040A30IDCKRE4 | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | P9U                     | <a href="#">Samples</a> |
| LM4040A30IDCKT   | PREVIEW       | SC70         | DCK             | 5    | 250         | TBD                     | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040A30ILP     | PREVIEW       | TO-92        | LP              | 3    | 1000        | TBD                     | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040A30ILPM    | PREVIEW       | TO-92        | LP              | 3    | 2000        | TBD                     | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040A30ILPR    | PREVIEW       | TO-92        | LP              | 3    | 2000        | TBD                     | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040A41IDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4M23 ~ 4M2U)           | <a href="#">Samples</a> |
| LM4040A41IDBZRG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4M23 ~ 4M2U)           | <a href="#">Samples</a> |
| LM4040A41IDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4M2U                    | <a href="#">Samples</a> |
| LM4040A41IDBZTG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4M2U                    | <a href="#">Samples</a> |
| LM4040A41IDCKR   | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | P4U                     | <a href="#">Samples</a> |
| LM4040A41ILP     | PREVIEW       | TO-92        | LP              | 3    | 1000        | TBD                     | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040A41ILPR    | PREVIEW       | TO-92        | LP              | 3    | 2000        | TBD                     | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040A50IDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4NA3 ~ 4NAU)           | <a href="#">Samples</a> |
| LM4040A50IDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4NA3 ~ 4NAU)           | <a href="#">Samples</a> |
| LM4040A50IDBZTG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4NA3 ~ 4NAU)           | <a href="#">Samples</a> |
| LM4040A50IDCKR   | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | N5U                     | <a href="#">Samples</a> |

| Orderable Device | Status<br>(1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan<br>(2)         | Lead/Ball Finish<br>(6) | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5) | Samples                 |
|------------------|---------------|--------------|-----------------|------|-------------|-------------------------|-------------------------|----------------------|--------------|-------------------------|-------------------------|
| LM4040A50IDCKRG4 | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | N5U                     | <a href="#">Samples</a> |
| LM4040A50ILP     | PREVIEW       | TO-92        | LP              | 3    | 1000        | TBD                     | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040A82IDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4NLU                    | <a href="#">Samples</a> |
| LM4040A82IDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4NLU                    | <a href="#">Samples</a> |
| LM4040A82IDBZTG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4NLU                    | <a href="#">Samples</a> |
| LM4040A82IDCKR   | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PDU                     | <a href="#">Samples</a> |
| LM4040B10IDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4NR3 ~ 4NRU)           | <a href="#">Samples</a> |
| LM4040B10IDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4NRU                    | <a href="#">Samples</a> |
| LM4040B10IDBZTG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4NRU                    | <a href="#">Samples</a> |
| LM4040B10IDCKR   | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PJU                     | <a href="#">Samples</a> |
| LM4040B10ILP     | PREVIEW       | TO-92        | LP              | 3    | 1000        | TBD                     | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040B10ILPR    | PREVIEW       | TO-92        | LP              | 3    | 2000        | TBD                     | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040B20IDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4MD3 ~ 4MDU)           | <a href="#">Samples</a> |
| LM4040B20IDBZRG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4MD3 ~ 4MDU)           | <a href="#">Samples</a> |
| LM4040B20IDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4MDU                    | <a href="#">Samples</a> |
| LM4040B20IDBZTG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4MDU                    | <a href="#">Samples</a> |
| LM4040B20IDCKR   | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | MTU                     | <a href="#">Samples</a> |
| LM4040B25IDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4NH3 ~ 4NHU)           | <a href="#">Samples</a> |
| LM4040B25IDBZRG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4NH3 ~ 4NHU)           | <a href="#">Samples</a> |

| Orderable Device | Status<br>(1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan<br>(2)         | Lead/Ball Finish<br>(6) | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5) | Samples                 |
|------------------|---------------|--------------|-----------------|------|-------------|-------------------------|-------------------------|----------------------|--------------|-------------------------|-------------------------|
| LM4040B25IDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4NH3 ~ 4NHU)           | <a href="#">Samples</a> |
| LM4040B25IDBZTG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4NH3 ~ 4NHU)           | <a href="#">Samples</a> |
| LM4040B25IDCKR   | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | P3U                     | <a href="#">Samples</a> |
| LM4040B25IDCKRG4 | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | P3U                     | <a href="#">Samples</a> |
| LM4040B25ILP     | PREVIEW       | TO-92        | LP              | 3    | 1000        | TBD                     | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040B25ILPR    | PREVIEW       | TO-92        | LP              | 3    | 2000        | TBD                     | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040B30IDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4M73 ~ 4M7U)           | <a href="#">Samples</a> |
| LM4040B30IDBZRG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4M73 ~ 4M7U)           | <a href="#">Samples</a> |
| LM4040B30IDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4M7U                    | <a href="#">Samples</a> |
| LM4040B30IDCKR   | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PAU                     | <a href="#">Samples</a> |
| LM4040B30IDCKRG4 | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PAU                     | <a href="#">Samples</a> |
| LM4040B30IDCKT   | PREVIEW       | SC70         | DCK             | 5    | 250         | TBD                     | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040B30ILP     | PREVIEW       | TO-92        | LP              | 3    | 1000        | TBD                     | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040B30ILPM    | PREVIEW       | TO-92        | LP              | 3    | 2000        | TBD                     | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040B30ILPR    | PREVIEW       | TO-92        | LP              | 3    | 2000        | TBD                     | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040B41IDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4M3U                    | <a href="#">Samples</a> |
| LM4040B41IDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4M3U                    | <a href="#">Samples</a> |
| LM4040B41IDBZTG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4M3U                    | <a href="#">Samples</a> |
| LM4040B41IDCKR   | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | P5U                     | <a href="#">Samples</a> |
| LM4040B41ILP     | PREVIEW       | TO-92        | LP              | 3    | 1000        | TBD                     | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040B41ILPR    | PREVIEW       | TO-92        | LP              | 3    | 2000        | TBD                     | Call TI                 | Call TI              | -40 to 85    |                         |                         |

| Orderable Device | Status<br>(1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan<br>(2)         | Lead/Ball Finish<br>(6) | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5) | Samples                 |
|------------------|---------------|--------------|-----------------|------|-------------|-------------------------|-------------------------|----------------------|--------------|-------------------------|-------------------------|
| LM4040B50IDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4NB3 ~ 4NBU)           | <a href="#">Samples</a> |
| LM4040B50IDBZRG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4NB3 ~ 4NBU)           | <a href="#">Samples</a> |
| LM4040B50IDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4NB3 ~ 4NBU)           | <a href="#">Samples</a> |
| LM4040B50IDCKR   | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | MXU                     | <a href="#">Samples</a> |
| LM4040B50ILP     | PREVIEW       | TO-92        | LP              | 3    | 1000        | TBD                     | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040B50ILPR    | PREVIEW       | TO-92        | LP              | 3    | 2000        | TBD                     | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040B82IDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4NMU                    | <a href="#">Samples</a> |
| LM4040C10IDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4NS3 ~ 4NSU)           | <a href="#">Samples</a> |
| LM4040C10IDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4NSU                    | <a href="#">Samples</a> |
| LM4040C10IDBZTG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4NSU                    | <a href="#">Samples</a> |
| LM4040C10IDCKR   | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PKU                     | <a href="#">Samples</a> |
| LM4040C10ILP     | ACTIVE        | TO-92        | LP              | 3    | 1000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFC10I                  | <a href="#">Samples</a> |
| LM4040C10ILPE3   | ACTIVE        | TO-92        | LP              | 3    | 1000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFC10I                  | <a href="#">Samples</a> |
| LM4040C10ILPR    | ACTIVE        | TO-92        | LP              | 3    | 2000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFC10I                  | <a href="#">Samples</a> |
| LM4040C10ILPRE3  | ACTIVE        | TO-92        | LP              | 3    | 2000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFC10I                  | <a href="#">Samples</a> |
| LM4040C20IDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4MQ3 ~ 4MQU)           | <a href="#">Samples</a> |
| LM4040C20IDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4MQU                    | <a href="#">Samples</a> |
| LM4040C20IDBZTG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4MQU                    | <a href="#">Samples</a> |
| LM4040C20IDCKR   | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | MVU                     | <a href="#">Samples</a> |

| Orderable Device | Status<br>(1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan<br>(2)         | Lead/Ball Finish<br>(6) | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5) | Samples                 |
|------------------|---------------|--------------|-----------------|------|-------------|-------------------------|-------------------------|----------------------|--------------|-------------------------|-------------------------|
| LM4040C20ILP     | ACTIVE        | TO-92        | LP              | 3    | 1000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFC20I                  | <a href="#">Samples</a> |
| LM4040C20ILPE3   | ACTIVE        | TO-92        | LP              | 3    | 1000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFC20I                  | <a href="#">Samples</a> |
| LM4040C20ILPR    | ACTIVE        | TO-92        | LP              | 3    | 2000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFC20I                  | <a href="#">Samples</a> |
| LM4040C20QDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 125   | 4MWU                    | <a href="#">Samples</a> |
| LM4040C20QDBZRG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 125   | 4MWU                    | <a href="#">Samples</a> |
| LM4040C20QDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 125   | 4MWU                    | <a href="#">Samples</a> |
| LM4040C20QDBZTG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 125   | 4MWU                    | <a href="#">Samples</a> |
| LM4040C25IDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4MU3 ~ 4MUU)           | <a href="#">Samples</a> |
| LM4040C25IDBZRG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4MU3 ~ 4MUU)           | <a href="#">Samples</a> |
| LM4040C25IDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4MU3 ~ 4MUU)           | <a href="#">Samples</a> |
| LM4040C25IDBZTG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4MU3 ~ 4MUU)           | <a href="#">Samples</a> |
| LM4040C25IDCKR   | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | MUU                     | <a href="#">Samples</a> |
| LM4040C25IDCKT   | ACTIVE        | SC70         | DCK             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | MUU                     | <a href="#">Samples</a> |
| LM4040C25IDCKTE4 | ACTIVE        | SC70         | DCK             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | MUU                     | <a href="#">Samples</a> |
| LM4040C25IDCKTG4 | ACTIVE        | SC70         | DCK             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | MUU                     | <a href="#">Samples</a> |
| LM4040C25ILP     | ACTIVE        | TO-92        | LP              | 3    | 1000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFC25I                  | <a href="#">Samples</a> |
| LM4040C25ILPE3   | ACTIVE        | TO-92        | LP              | 3    | 1000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFC25I                  | <a href="#">Samples</a> |
| LM4040C25ILPR    | ACTIVE        | TO-92        | LP              | 3    | 2000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFC25I                  | <a href="#">Samples</a> |

| Orderable Device | Status<br>(1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan<br>(2)         | Lead/Ball Finish<br>(6) | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5) | Samples                 |
|------------------|---------------|--------------|-----------------|------|-------------|-------------------------|-------------------------|----------------------|--------------|-------------------------|-------------------------|
| LM4040C25ILPRE3  | ACTIVE        | TO-92        | LP              | 3    | 2000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFC25I                  | <a href="#">Samples</a> |
| LM4040C25QDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 125   | (4MA3 ~ 4MAU)           | <a href="#">Samples</a> |
| LM4040C25QDBZRG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 125   | (4MA3 ~ 4MAU)           | <a href="#">Samples</a> |
| LM4040C25QDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 125   | (4MA3 ~ 4MAU)           | <a href="#">Samples</a> |
| LM4040C25QDBZTG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 125   | (4MA3 ~ 4MAU)           | <a href="#">Samples</a> |
| LM4040C30IDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4M83 ~ 4M8U)           | <a href="#">Samples</a> |
| LM4040C30IDBZRG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4M83 ~ 4M8U)           | <a href="#">Samples</a> |
| LM4040C30IDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4M8U                    | <a href="#">Samples</a> |
| LM4040C30IDBZTG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4M8U                    | <a href="#">Samples</a> |
| LM4040C30IDCKR   | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PBU                     | <a href="#">Samples</a> |
| LM4040C30IDCKT   | PREVIEW       | SC70         | DCK             | 5    | 250         | TBD                     | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040C30ILP     | ACTIVE        | TO-92        | LP              | 3    | 1000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFC30I                  | <a href="#">Samples</a> |
| LM4040C30ILPE3   | ACTIVE        | TO-92        | LP              | 3    | 1000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFC30I                  | <a href="#">Samples</a> |
| LM4040C30ILPM    | PREVIEW       | TO-92        | LP              | 3    | 2000        | TBD                     | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040C30ILPR    | ACTIVE        | TO-92        | LP              | 3    | 2000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFC30I                  | <a href="#">Samples</a> |
| LM4040C30QDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 125   | 4NJU                    | <a href="#">Samples</a> |
| LM4040C30QDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 125   | 4NJU                    | <a href="#">Samples</a> |
| LM4040C41IDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4M43 ~ 4M4U)           | <a href="#">Samples</a> |
| LM4040C41IDBZRG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4M43 ~ 4M4U)           | <a href="#">Samples</a> |

| Orderable Device | Status<br>(1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan<br>(2)         | Lead/Ball Finish<br>(6) | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5) | Samples                 |
|------------------|---------------|--------------|-----------------|------|-------------|-------------------------|-------------------------|----------------------|--------------|-------------------------|-------------------------|
| LM4040C41IDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4M4U                    | <a href="#">Samples</a> |
| LM4040C41IDBZTG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4M4U                    | <a href="#">Samples</a> |
| LM4040C41IDCKR   | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | P6U                     | <a href="#">Samples</a> |
| LM4040C41IDCKRE4 | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | P6U                     | <a href="#">Samples</a> |
| LM4040C41IDCKRG4 | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | P6U                     | <a href="#">Samples</a> |
| LM4040C41ILP     | ACTIVE        | TO-92        | LP              | 3    | 1000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFC41I                  | <a href="#">Samples</a> |
| LM4040C41ILPE3   | ACTIVE        | TO-92        | LP              | 3    | 1000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFC41I                  | <a href="#">Samples</a> |
| LM4040C41ILPR    | ACTIVE        | TO-92        | LP              | 3    | 2000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFC41I                  | <a href="#">Samples</a> |
| LM4040C50IDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4NC3 ~ 4NCU)           | <a href="#">Samples</a> |
| LM4040C50IDBZRG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4NC3 ~ 4NCU)           | <a href="#">Samples</a> |
| LM4040C50IDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4NC3 ~ 4NCU)           | <a href="#">Samples</a> |
| LM4040C50IDBZTG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4NC3 ~ 4NCU)           | <a href="#">Samples</a> |
| LM4040C50IDCKR   | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | MZU                     | <a href="#">Samples</a> |
| LM4040C50ILP     | ACTIVE        | TO-92        | LP              | 3    | 1000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFC50I                  | <a href="#">Samples</a> |
| LM4040C50ILPE3   | ACTIVE        | TO-92        | LP              | 3    | 1000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFC50I                  | <a href="#">Samples</a> |
| LM4040C50ILPR    | ACTIVE        | TO-92        | LP              | 3    | 2000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFC50I                  | <a href="#">Samples</a> |
| LM4040C50QDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 125   | (4NE3 ~ 4NEU)           | <a href="#">Samples</a> |
| LM4040C50QDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 125   | (4NE3 ~ 4NEU)           | <a href="#">Samples</a> |

| Orderable Device | Status<br>(1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan<br>(2)         | Lead/Ball Finish<br>(6) | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5) | Samples                 |
|------------------|---------------|--------------|-----------------|------|-------------|-------------------------|-------------------------|----------------------|--------------|-------------------------|-------------------------|
| LM4040C50QDBZTG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 125   | (4NE3 ~ 4NEU)           | <a href="#">Samples</a> |
| LM4040C82IDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4NNU                    | <a href="#">Samples</a> |
| LM4040C82IDCKR   | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PFU                     | <a href="#">Samples</a> |
| LM4040C82ILP     | ACTIVE        | TO-92        | LP              | 3    | 1000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFC82I                  | <a href="#">Samples</a> |
| LM4040C82ILPR    | ACTIVE        | TO-92        | LP              | 3    | 2000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFC82I                  | <a href="#">Samples</a> |
| LM4040D20IDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4MV3 ~ 4MVU)           | <a href="#">Samples</a> |
| LM4040D20IDBZRG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4MV3 ~ 4MVU)           | <a href="#">Samples</a> |
| LM4040D20IDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4MVU                    | <a href="#">Samples</a> |
| LM4040D20IDBZTG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4MVU                    | <a href="#">Samples</a> |
| LM4040D20IDCKR   | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | MWU                     | <a href="#">Samples</a> |
| LM4040D20IDCKRE4 | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | MWU                     | <a href="#">Samples</a> |
| LM4040D20IDCKRG4 | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | MWU                     | <a href="#">Samples</a> |
| LM4040D20ILPR    | ACTIVE        | TO-92        | LP              | 3    | 2000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFD20I                  | <a href="#">Samples</a> |
| LM4040D20ILPRE3  | ACTIVE        | TO-92        | LP              | 3    | 2000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFD20I                  | <a href="#">Samples</a> |
| LM4040D20QDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 125   | 4MYU                    | <a href="#">Samples</a> |
| LM4040D20QDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 125   | 4MYU                    | <a href="#">Samples</a> |
| LM4040D20QDBZTG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 125   | 4MYU                    | <a href="#">Samples</a> |
| LM4040D25IDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4ME3 ~ 4MEU)           | <a href="#">Samples</a> |

| Orderable Device | Status<br>(1) | Package Type | Package<br>Drawing | Pins | Package<br>Qty | Eco Plan<br>(2)            | Lead/Ball Finish<br>(6) | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5) | Samples                 |
|------------------|---------------|--------------|--------------------|------|----------------|----------------------------|-------------------------|----------------------|--------------|-------------------------|-------------------------|
| LM4040D25IDBZRG4 | ACTIVE        | SOT-23       | DBZ                | 3    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4ME3 ~ 4MEU)           | <a href="#">Samples</a> |
| LM4040D25IDBZT   | ACTIVE        | SOT-23       | DBZ                | 3    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4ME3 ~ 4MEU)           | <a href="#">Samples</a> |
| LM4040D25IDBZTG4 | ACTIVE        | SOT-23       | DBZ                | 3    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4ME3 ~ 4MEU)           | <a href="#">Samples</a> |
| LM4040D25IDCKR   | ACTIVE        | SC70         | DCK                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | MEU                     | <a href="#">Samples</a> |
| LM4040D25IDCKRG4 | ACTIVE        | SC70         | DCK                | 5    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | MEU                     | <a href="#">Samples</a> |
| LM4040D25IDCKT   | ACTIVE        | SC70         | DCK                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | MEU                     | <a href="#">Samples</a> |
| LM4040D25IDCKTG4 | ACTIVE        | SC70         | DCK                | 5    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | MEU                     | <a href="#">Samples</a> |
| LM4040D25ILP     | ACTIVE        | TO-92        | LP                 | 3    | 1000           | Pb-Free<br>(RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFD25I                  | <a href="#">Samples</a> |
| LM4040D25ILPE3   | ACTIVE        | TO-92        | LP                 | 3    | 1000           | Pb-Free<br>(RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFD25I                  | <a href="#">Samples</a> |
| LM4040D25ILPR    | ACTIVE        | TO-92        | LP                 | 3    | 2000           | Pb-Free<br>(RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFD25I                  | <a href="#">Samples</a> |
| LM4040D25QDBZR   | ACTIVE        | SOT-23       | DBZ                | 3    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 125   | (4MB3 ~ 4MBU)           | <a href="#">Samples</a> |
| LM4040D25QDBZRG4 | ACTIVE        | SOT-23       | DBZ                | 3    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 125   | (4MB3 ~ 4MBU)           | <a href="#">Samples</a> |
| LM4040D25QDBZT   | ACTIVE        | SOT-23       | DBZ                | 3    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 125   | (4MB3 ~ 4MBU)           | <a href="#">Samples</a> |
| LM4040D25QDBZTG4 | ACTIVE        | SOT-23       | DBZ                | 3    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 125   | (4MB3 ~ 4MBU)           | <a href="#">Samples</a> |
| LM4040D30IDBZR   | ACTIVE        | SOT-23       | DBZ                | 3    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4M93 ~ 4M9U)           | <a href="#">Samples</a> |
| LM4040D30IDBZRG4 | ACTIVE        | SOT-23       | DBZ                | 3    | 3000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4M93 ~ 4M9U)           | <a href="#">Samples</a> |
| LM4040D30IDBZT   | ACTIVE        | SOT-23       | DBZ                | 3    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4M9U                    | <a href="#">Samples</a> |
| LM4040D30IDBZTG4 | ACTIVE        | SOT-23       | DBZ                | 3    | 250            | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4M9U                    | <a href="#">Samples</a> |

| Orderable Device | Status<br>(1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan<br>(2)         | Lead/Ball Finish<br>(6) | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5) | Samples                 |
|------------------|---------------|--------------|-----------------|------|-------------|-------------------------|-------------------------|----------------------|--------------|-------------------------|-------------------------|
| LM4040D30IDCKR   | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PCU                     | <a href="#">Samples</a> |
| LM4040D30IDCKT   | PREVIEW       | SC70         | DCK             | 5    | 250         | TBD                     | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040D30ILP     | ACTIVE        | TO-92        | LP              | 3    | 1000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFD30I                  | <a href="#">Samples</a> |
| LM4040D30ILPE3   | ACTIVE        | TO-92        | LP              | 3    | 1000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFD30I                  | <a href="#">Samples</a> |
| LM4040D30ILPM    | PREVIEW       | TO-92        | LP              | 3    | 2000        | TBD                     | Call TI                 | Call TI              | -40 to 85    |                         |                         |
| LM4040D30ILPR    | ACTIVE        | TO-92        | LP              | 3    | 2000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFD30I                  | <a href="#">Samples</a> |
| LM4040D30ILPRE3  | ACTIVE        | TO-92        | LP              | 3    | 2000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFD30I                  | <a href="#">Samples</a> |
| LM4040D30QDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 125   | 4NKU                    | <a href="#">Samples</a> |
| LM4040D30QDBZRG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 125   | 4NKU                    | <a href="#">Samples</a> |
| LM4040D41IDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4M53 ~ 4M5U)           | <a href="#">Samples</a> |
| LM4040D41IDBZRG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4M53 ~ 4M5U)           | <a href="#">Samples</a> |
| LM4040D41IDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4M5U                    | <a href="#">Samples</a> |
| LM4040D41IDBZTG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4M5U                    | <a href="#">Samples</a> |
| LM4040D41IDCKR   | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | P7U                     | <a href="#">Samples</a> |
| LM4040D41ILP     | ACTIVE        | TO-92        | LP              | 3    | 1000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFD41I                  | <a href="#">Samples</a> |
| LM4040D41ILPE3   | ACTIVE        | TO-92        | LP              | 3    | 1000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFD41I                  | <a href="#">Samples</a> |
| LM4040D41ILPR    | ACTIVE        | TO-92        | LP              | 3    | 2000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFD41I                  | <a href="#">Samples</a> |
| LM4040D41ILPRE3  | ACTIVE        | TO-92        | LP              | 3    | 2000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFD41I                  | <a href="#">Samples</a> |
| LM4040D50IDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4ND3 ~ 4NDU)           | <a href="#">Samples</a> |

| Orderable Device | Status<br>(1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan<br>(2)         | Lead/Ball Finish<br>(6) | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5) | Samples                 |
|------------------|---------------|--------------|-----------------|------|-------------|-------------------------|-------------------------|----------------------|--------------|-------------------------|-------------------------|
| LM4040D50IDBZRG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4ND3 ~ 4NDU)           | <a href="#">Samples</a> |
| LM4040D50IDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4ND3 ~ 4NDU)           | <a href="#">Samples</a> |
| LM4040D50IDBZTG4 | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | (4ND3 ~ 4NDU)           | <a href="#">Samples</a> |
| LM4040D50IDCKR   | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | M4U                     | <a href="#">Samples</a> |
| LM4040D50IDCKRG4 | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | M4U                     | <a href="#">Samples</a> |
| LM4040D50ILP     | ACTIVE        | TO-92        | LP              | 3    | 1000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFD50I                  | <a href="#">Samples</a> |
| LM4040D50ILPE3   | ACTIVE        | TO-92        | LP              | 3    | 1000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFD50I                  | <a href="#">Samples</a> |
| LM4040D50ILPR    | ACTIVE        | TO-92        | LP              | 3    | 2000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFD50I                  | <a href="#">Samples</a> |
| LM4040D50ILPRE3  | ACTIVE        | TO-92        | LP              | 3    | 2000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFD50I                  | <a href="#">Samples</a> |
| LM4040D50QDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 125   | (4NF3 ~ 4NFU)           | <a href="#">Samples</a> |
| LM4040D50QDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 125   | (4NF3 ~ 4NFU)           | <a href="#">Samples</a> |
| LM4040D82IDBZR   | ACTIVE        | SOT-23       | DBZ             | 3    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4NPU                    | <a href="#">Samples</a> |
| LM4040D82IDBZT   | ACTIVE        | SOT-23       | DBZ             | 3    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | 4NPU                    | <a href="#">Samples</a> |
| LM4040D82IDCKR   | ACTIVE        | SC70         | DCK             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | PGU                     | <a href="#">Samples</a> |
| LM4040D82ILP     | ACTIVE        | TO-92        | LP              | 3    | 1000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFD82I                  | <a href="#">Samples</a> |
| LM4040D82ILPR    | ACTIVE        | TO-92        | LP              | 3    | 2000        | Pb-Free (RoHS)          | CU SN                   | N / A for Pkg Type   | -40 to 85    | NFD82I                  | <a href="#">Samples</a> |

(1) The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBSOLETE:** TI has discontinued the production of the device.

<sup>(2)</sup> Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

**Green (RoHS & no Sb/Br):** TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

<sup>(3)</sup> MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

<sup>(4)</sup> There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

<sup>(5)</sup> Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

<sup>(6)</sup> Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

**Important Information and Disclaimer:** The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

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#### **OTHER QUALIFIED VERSIONS OF LM4040C25 :**

- Enhanced Product: [LM4040C25-EP](#)

NOTE: Qualified Version Definitions:

- Enhanced Product - Supports Defense, Aerospace and Medical Applications

**TAPE AND REEL INFORMATION**

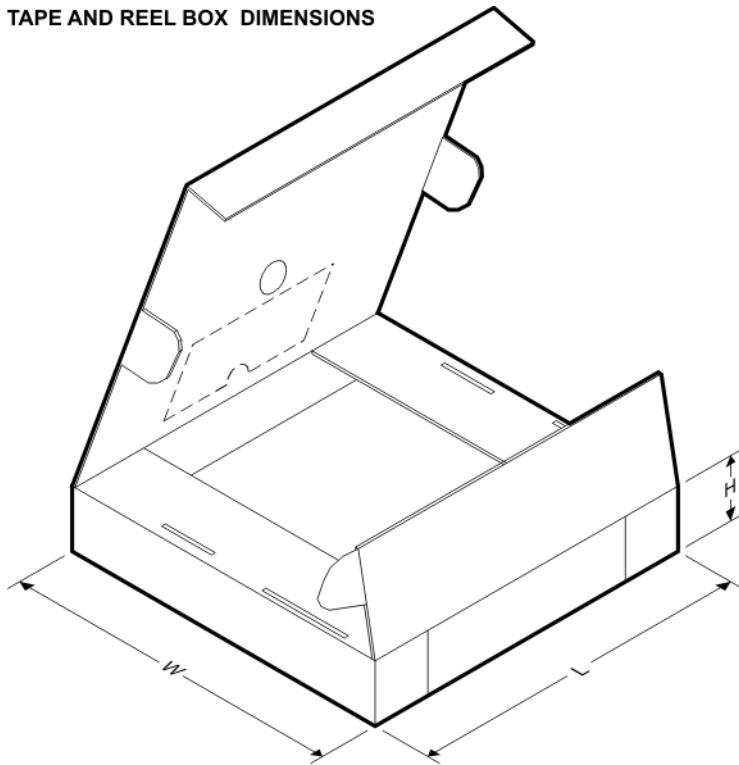
**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**


\*All dimensions are nominal

| Device         | Package Type | Package Drawing | Pins | SPQ  | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|----------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| LM4040A10IDBZR | SOT-23       | DBZ             | 3    | 3000 | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040A10IDBZT | SOT-23       | DBZ             | 3    | 250  | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040A10IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040A20IDBZR | SOT-23       | DBZ             | 3    | 3000 | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040A20IDBZT | SOT-23       | DBZ             | 3    | 250  | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040A20IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040A25IDBZR | SOT-23       | DBZ             | 3    | 3000 | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040A25IDBZT | SOT-23       | DBZ             | 3    | 250  | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040A25IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040A30IDBZR | SOT-23       | DBZ             | 3    | 3000 | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040A30IDBZT | SOT-23       | DBZ             | 3    | 250  | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040A30IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040A41IDBZR | SOT-23       | DBZ             | 3    | 3000 | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040A41IDBZT | SOT-23       | DBZ             | 3    | 250  | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040A41IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040A50IDBZR | SOT-23       | DBZ             | 3    | 3000 | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040A50IDBZT | SOT-23       | DBZ             | 3    | 250  | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040A50IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |

| Device         | Package Type | Package Drawing | Pins | SPQ  | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|----------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| LM4040A82IDBZR | SOT-23       | DBZ             | 3    | 3000 | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040A82IDBZT | SOT-23       | DBZ             | 3    | 250  | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040A82IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040B10IDBZR | SOT-23       | DBZ             | 3    | 3000 | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040B10IDBZT | SOT-23       | DBZ             | 3    | 250  | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040B10IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040B20IDBZR | SOT-23       | DBZ             | 3    | 3000 | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040B20IDBZT | SOT-23       | DBZ             | 3    | 3000 | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040B20IDBZT | SOT-23       | DBZ             | 3    | 250  | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040B20IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040B25IDBZR | SOT-23       | DBZ             | 3    | 3000 | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040B25IDBZT | SOT-23       | DBZ             | 3    | 250  | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040B25IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040B30IDBZR | SOT-23       | DBZ             | 3    | 3000 | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040B30IDBZT | SOT-23       | DBZ             | 3    | 250  | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040B30IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040B41IDBZR | SOT-23       | DBZ             | 3    | 3000 | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040B41IDBZT | SOT-23       | DBZ             | 3    | 250  | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040B41IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040B50IDBZR | SOT-23       | DBZ             | 3    | 3000 | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040B50IDBZT | SOT-23       | DBZ             | 3    | 250  | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040B50IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040B82IDBZR | SOT-23       | DBZ             | 3    | 3000 | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040C10IDBZR | SOT-23       | DBZ             | 3    | 3000 | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040C10IDBZT | SOT-23       | DBZ             | 3    | 250  | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040C10IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040C20IDBZR | SOT-23       | DBZ             | 3    | 3000 | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040C20IDBZT | SOT-23       | DBZ             | 3    | 250  | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040C20IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040C20QDBZR | SOT-23       | DBZ             | 3    | 3000 | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040C20QDBZT | SOT-23       | DBZ             | 3    | 250  | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040C25IDBZR | SOT-23       | DBZ             | 3    | 3000 | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040C25IDBZT | SOT-23       | DBZ             | 3    | 250  | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040C25IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040C25IDCKT | SC70         | DCK             | 5    | 250  | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040C25QDBZR | SOT-23       | DBZ             | 3    | 3000 | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040C25QDBZT | SOT-23       | DBZ             | 3    | 250  | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040C30IDBZR | SOT-23       | DBZ             | 3    | 3000 | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040C30IDBZT | SOT-23       | DBZ             | 3    | 250  | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040C30IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040C30QDBZR | SOT-23       | DBZ             | 3    | 3000 | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040C30QDBZT | SOT-23       | DBZ             | 3    | 250  | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040C41IDBZR | SOT-23       | DBZ             | 3    | 3000 | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |

| Device         | Package Type | Package Drawing | Pins | SPQ  | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|----------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| LM4040C41IDBZT | SOT-23       | DBZ             | 3    | 250  | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040C41IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040C50IDBZR | SOT-23       | DBZ             | 3    | 3000 | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040C50IDBZT | SOT-23       | DBZ             | 3    | 250  | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040C50IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040C50QDBZR | SOT-23       | DBZ             | 3    | 3000 | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040C50QDBZT | SOT-23       | DBZ             | 3    | 250  | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040C82IDBZR | SOT-23       | DBZ             | 3    | 3000 | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040C82IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040D20IDBZR | SOT-23       | DBZ             | 3    | 3000 | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040D20IDBZR | SOT-23       | DBZ             | 3    | 3000 | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040D20IDBZT | SOT-23       | DBZ             | 3    | 250  | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040D20IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040D20QDBZR | SOT-23       | DBZ             | 3    | 3000 | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040D20QDBZT | SOT-23       | DBZ             | 3    | 250  | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040D25IDBZR | SOT-23       | DBZ             | 3    | 3000 | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040D25IDBZT | SOT-23       | DBZ             | 3    | 250  | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040D25IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040D25IDCKT | SC70         | DCK             | 5    | 250  | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040D25QDBZR | SOT-23       | DBZ             | 3    | 3000 | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040D25QDBZT | SOT-23       | DBZ             | 3    | 250  | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040D30IDBZR | SOT-23       | DBZ             | 3    | 3000 | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040D30IDBZR | SOT-23       | DBZ             | 3    | 3000 | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040D30IDBZT | SOT-23       | DBZ             | 3    | 250  | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040D30IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040D30QDBZR | SOT-23       | DBZ             | 3    | 3000 | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040D41IDBZR | SOT-23       | DBZ             | 3    | 3000 | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040D41IDBZT | SOT-23       | DBZ             | 3    | 250  | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040D41IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040D50IDBZR | SOT-23       | DBZ             | 3    | 3000 | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040D50IDBZT | SOT-23       | DBZ             | 3    | 250  | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040D50IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |
| LM4040D50QDBZR | SOT-23       | DBZ             | 3    | 3000 | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040D50QDBZT | SOT-23       | DBZ             | 3    | 250  | 178.0              | 9.2                | 3.08    | 2.8     | 1.27    | 4.0     | 8.0    | Q3            |
| LM4040D82IDBZR | SOT-23       | DBZ             | 3    | 3000 | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040D82IDBZT | SOT-23       | DBZ             | 3    | 250  | 179.0              | 8.4                | 3.15    | 2.95    | 1.22    | 4.0     | 8.0    | Q3            |
| LM4040D82IDCKR | SC70         | DCK             | 5    | 3000 | 179.0              | 8.4                | 2.2     | 2.5     | 1.2     | 4.0     | 8.0    | Q3            |

**TAPE AND REEL BOX DIMENSIONS**


\*All dimensions are nominal

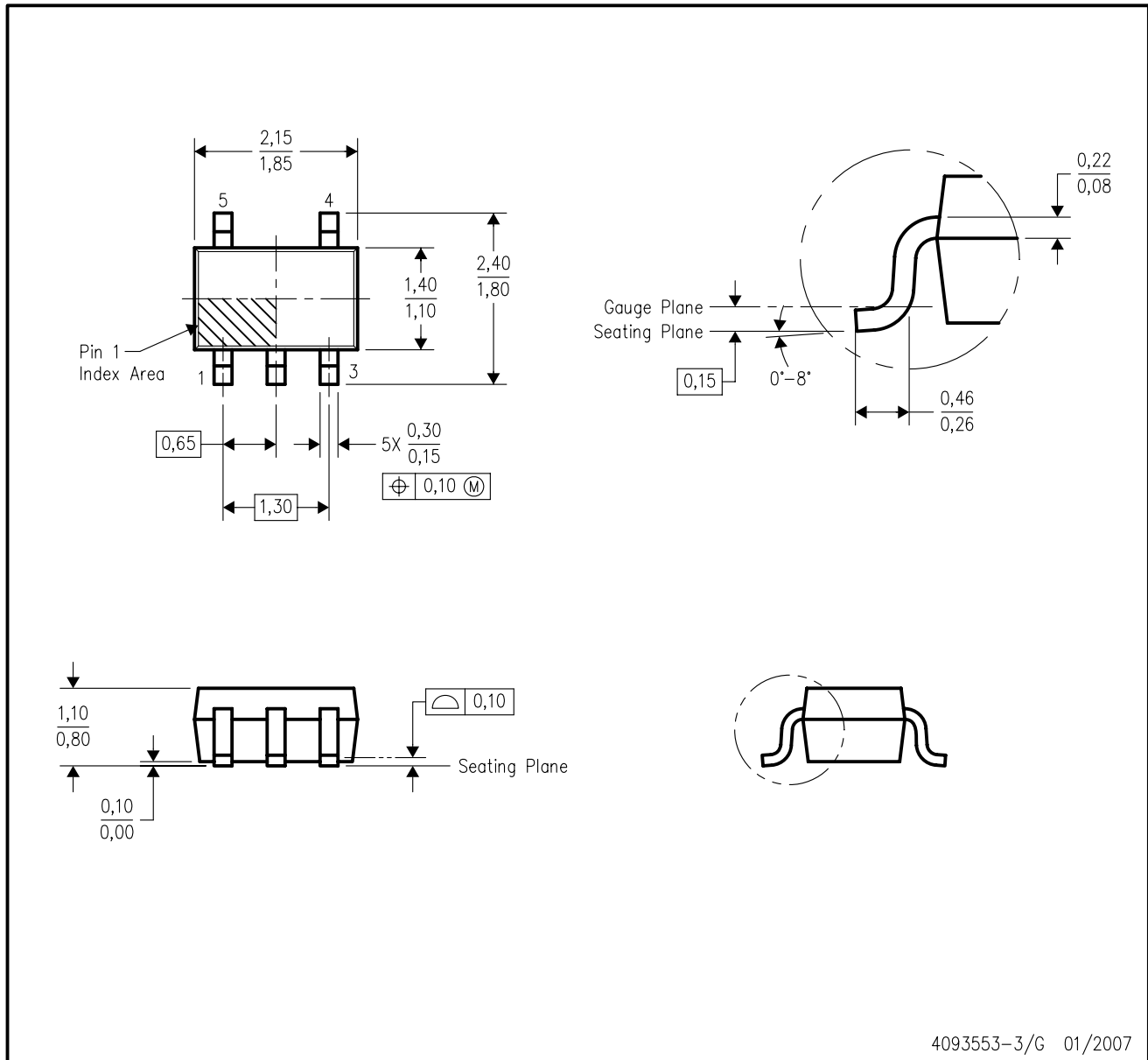
| Device         | Package Type | Package Drawing | Pins | SPQ  | Length (mm) | Width (mm) | Height (mm) |
|----------------|--------------|-----------------|------|------|-------------|------------|-------------|
| LM4040A10IDBZR | SOT-23       | DBZ             | 3    | 3000 | 180.0       | 180.0      | 18.0        |
| LM4040A10IDBZT | SOT-23       | DBZ             | 3    | 250  | 203.0       | 203.0      | 35.0        |
| LM4040A10IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040A20IDBZR | SOT-23       | DBZ             | 3    | 3000 | 180.0       | 180.0      | 18.0        |
| LM4040A20IDBZT | SOT-23       | DBZ             | 3    | 250  | 203.0       | 203.0      | 35.0        |
| LM4040A20IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040A25IDBZR | SOT-23       | DBZ             | 3    | 3000 | 180.0       | 180.0      | 18.0        |
| LM4040A25IDBZT | SOT-23       | DBZ             | 3    | 250  | 180.0       | 180.0      | 18.0        |
| LM4040A25IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040A30IDBZR | SOT-23       | DBZ             | 3    | 3000 | 180.0       | 180.0      | 18.0        |
| LM4040A30IDBZT | SOT-23       | DBZ             | 3    | 250  | 203.0       | 203.0      | 35.0        |
| LM4040A30IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040A41IDBZR | SOT-23       | DBZ             | 3    | 3000 | 180.0       | 180.0      | 18.0        |
| LM4040A41IDBZT | SOT-23       | DBZ             | 3    | 250  | 203.0       | 203.0      | 35.0        |
| LM4040A41IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040A50IDBZR | SOT-23       | DBZ             | 3    | 3000 | 180.0       | 180.0      | 18.0        |
| LM4040A50IDBZT | SOT-23       | DBZ             | 3    | 250  | 180.0       | 180.0      | 18.0        |
| LM4040A50IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040A82IDBZR | SOT-23       | DBZ             | 3    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040A82IDBZT | SOT-23       | DBZ             | 3    | 250  | 203.0       | 203.0      | 35.0        |

| Device         | Package Type | Package Drawing | Pins | SPQ  | Length (mm) | Width (mm) | Height (mm) |
|----------------|--------------|-----------------|------|------|-------------|------------|-------------|
| LM4040A82IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040B10IDBZR | SOT-23       | DBZ             | 3    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040B10IDBZT | SOT-23       | DBZ             | 3    | 250  | 203.0       | 203.0      | 35.0        |
| LM4040B10IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040B20IDBZR | SOT-23       | DBZ             | 3    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040B20IDBZR | SOT-23       | DBZ             | 3    | 3000 | 180.0       | 180.0      | 18.0        |
| LM4040B20IDBZT | SOT-23       | DBZ             | 3    | 250  | 203.0       | 203.0      | 35.0        |
| LM4040B20IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040B25IDBZR | SOT-23       | DBZ             | 3    | 3000 | 180.0       | 180.0      | 18.0        |
| LM4040B25IDBZT | SOT-23       | DBZ             | 3    | 250  | 180.0       | 180.0      | 18.0        |
| LM4040B25IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040B30IDBZR | SOT-23       | DBZ             | 3    | 3000 | 180.0       | 180.0      | 18.0        |
| LM4040B30IDBZT | SOT-23       | DBZ             | 3    | 250  | 203.0       | 203.0      | 35.0        |
| LM4040B30IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040B41IDBZR | SOT-23       | DBZ             | 3    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040B41IDBZT | SOT-23       | DBZ             | 3    | 250  | 203.0       | 203.0      | 35.0        |
| LM4040B41IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040B50IDBZR | SOT-23       | DBZ             | 3    | 3000 | 180.0       | 180.0      | 18.0        |
| LM4040B50IDBZT | SOT-23       | DBZ             | 3    | 250  | 180.0       | 180.0      | 18.0        |
| LM4040B50IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040B82IDBZR | SOT-23       | DBZ             | 3    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040C10IDBZR | SOT-23       | DBZ             | 3    | 3000 | 180.0       | 180.0      | 18.0        |
| LM4040C10IDBZT | SOT-23       | DBZ             | 3    | 250  | 203.0       | 203.0      | 35.0        |
| LM4040C10IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040C20IDBZR | SOT-23       | DBZ             | 3    | 3000 | 180.0       | 180.0      | 18.0        |
| LM4040C20IDBZT | SOT-23       | DBZ             | 3    | 250  | 203.0       | 203.0      | 35.0        |
| LM4040C20IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040C20QDBZR | SOT-23       | DBZ             | 3    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040C20QDBZT | SOT-23       | DBZ             | 3    | 250  | 203.0       | 203.0      | 35.0        |
| LM4040C25IDBZR | SOT-23       | DBZ             | 3    | 3000 | 180.0       | 180.0      | 18.0        |
| LM4040C25IDBZT | SOT-23       | DBZ             | 3    | 250  | 180.0       | 180.0      | 18.0        |
| LM4040C25IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040C25IDCKT | SC70         | DCK             | 5    | 250  | 203.0       | 203.0      | 35.0        |
| LM4040C25QDBZR | SOT-23       | DBZ             | 3    | 3000 | 180.0       | 180.0      | 18.0        |
| LM4040C25QDBZT | SOT-23       | DBZ             | 3    | 250  | 180.0       | 180.0      | 18.0        |
| LM4040C30IDBZR | SOT-23       | DBZ             | 3    | 3000 | 180.0       | 180.0      | 18.0        |
| LM4040C30IDBZT | SOT-23       | DBZ             | 3    | 250  | 203.0       | 203.0      | 35.0        |
| LM4040C30IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040C30QDBZR | SOT-23       | DBZ             | 3    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040C30QDBZT | SOT-23       | DBZ             | 3    | 250  | 203.0       | 203.0      | 35.0        |
| LM4040C41IDBZR | SOT-23       | DBZ             | 3    | 3000 | 180.0       | 180.0      | 18.0        |
| LM4040C41IDBZT | SOT-23       | DBZ             | 3    | 250  | 203.0       | 203.0      | 35.0        |
| LM4040C41IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040C50IDBZR | SOT-23       | DBZ             | 3    | 3000 | 180.0       | 180.0      | 18.0        |

| Device         | Package Type | Package Drawing | Pins | SPQ  | Length (mm) | Width (mm) | Height (mm) |
|----------------|--------------|-----------------|------|------|-------------|------------|-------------|
| LM4040C50IDBZT | SOT-23       | DBZ             | 3    | 250  | 180.0       | 180.0      | 18.0        |
| LM4040C50IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040C50QDBZR | SOT-23       | DBZ             | 3    | 3000 | 180.0       | 180.0      | 18.0        |
| LM4040C50QDBZT | SOT-23       | DBZ             | 3    | 250  | 180.0       | 180.0      | 18.0        |
| LM4040C82IDBZR | SOT-23       | DBZ             | 3    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040C82IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040D20IDBZR | SOT-23       | DBZ             | 3    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040D20IDBZT | SOT-23       | DBZ             | 3    | 3000 | 180.0       | 180.0      | 18.0        |
| LM4040D20IDBZT | SOT-23       | DBZ             | 3    | 250  | 203.0       | 203.0      | 35.0        |
| LM4040D20IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040D20QDBZR | SOT-23       | DBZ             | 3    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040D20QDBZT | SOT-23       | DBZ             | 3    | 250  | 203.0       | 203.0      | 35.0        |
| LM4040D25IDBZR | SOT-23       | DBZ             | 3    | 3000 | 180.0       | 180.0      | 18.0        |
| LM4040D25IDBZT | SOT-23       | DBZ             | 3    | 250  | 180.0       | 180.0      | 18.0        |
| LM4040D25IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040D25IDCKT | SC70         | DCK             | 5    | 250  | 203.0       | 203.0      | 35.0        |
| LM4040D25QDBZR | SOT-23       | DBZ             | 3    | 3000 | 180.0       | 180.0      | 18.0        |
| LM4040D25QDBZT | SOT-23       | DBZ             | 3    | 250  | 180.0       | 180.0      | 18.0        |
| LM4040D30IDBZR | SOT-23       | DBZ             | 3    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040D30IDBZT | SOT-23       | DBZ             | 3    | 3000 | 180.0       | 180.0      | 18.0        |
| LM4040D30IDBZT | SOT-23       | DBZ             | 3    | 250  | 203.0       | 203.0      | 35.0        |
| LM4040D30IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040D30QDBZR | SOT-23       | DBZ             | 3    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040D41IDBZR | SOT-23       | DBZ             | 3    | 3000 | 180.0       | 180.0      | 18.0        |
| LM4040D41IDBZT | SOT-23       | DBZ             | 3    | 250  | 203.0       | 203.0      | 35.0        |
| LM4040D41IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040D50IDBZR | SOT-23       | DBZ             | 3    | 3000 | 180.0       | 180.0      | 18.0        |
| LM4040D50IDBZT | SOT-23       | DBZ             | 3    | 250  | 180.0       | 180.0      | 18.0        |
| LM4040D50IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040D50QDBZR | SOT-23       | DBZ             | 3    | 3000 | 180.0       | 180.0      | 18.0        |
| LM4040D50QDBZT | SOT-23       | DBZ             | 3    | 250  | 180.0       | 180.0      | 18.0        |
| LM4040D82IDBZR | SOT-23       | DBZ             | 3    | 3000 | 203.0       | 203.0      | 35.0        |
| LM4040D82IDBZT | SOT-23       | DBZ             | 3    | 250  | 203.0       | 203.0      | 35.0        |
| LM4040D82IDCKR | SC70         | DCK             | 5    | 3000 | 203.0       | 203.0      | 35.0        |

DCK (R-PDSO-G5)

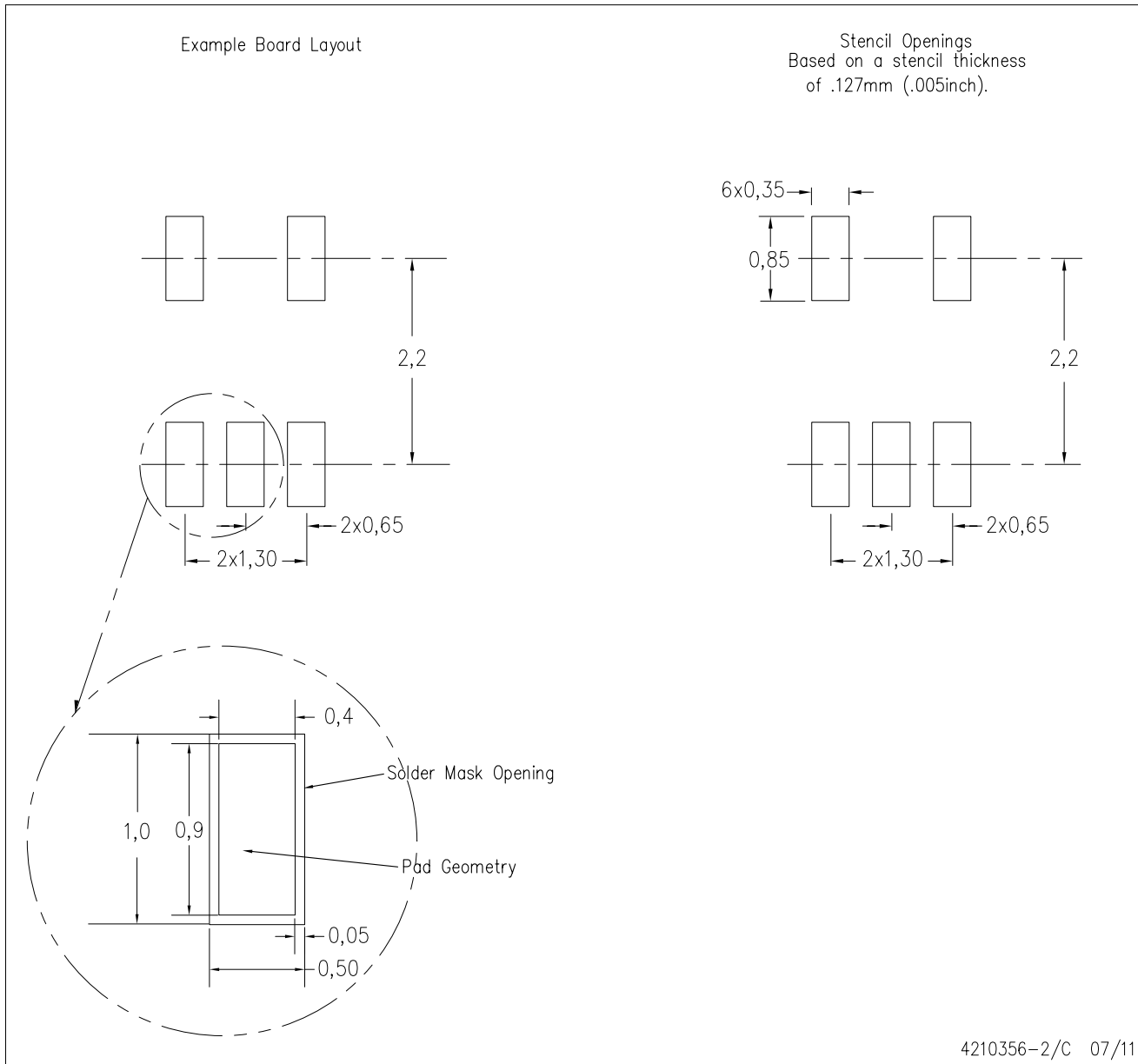
PLASTIC SMALL-OUTLINE PACKAGE



- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side.
  - D. Falls within JEDEC MO-203 variation AA.

DCK (R-PDSO-G5)

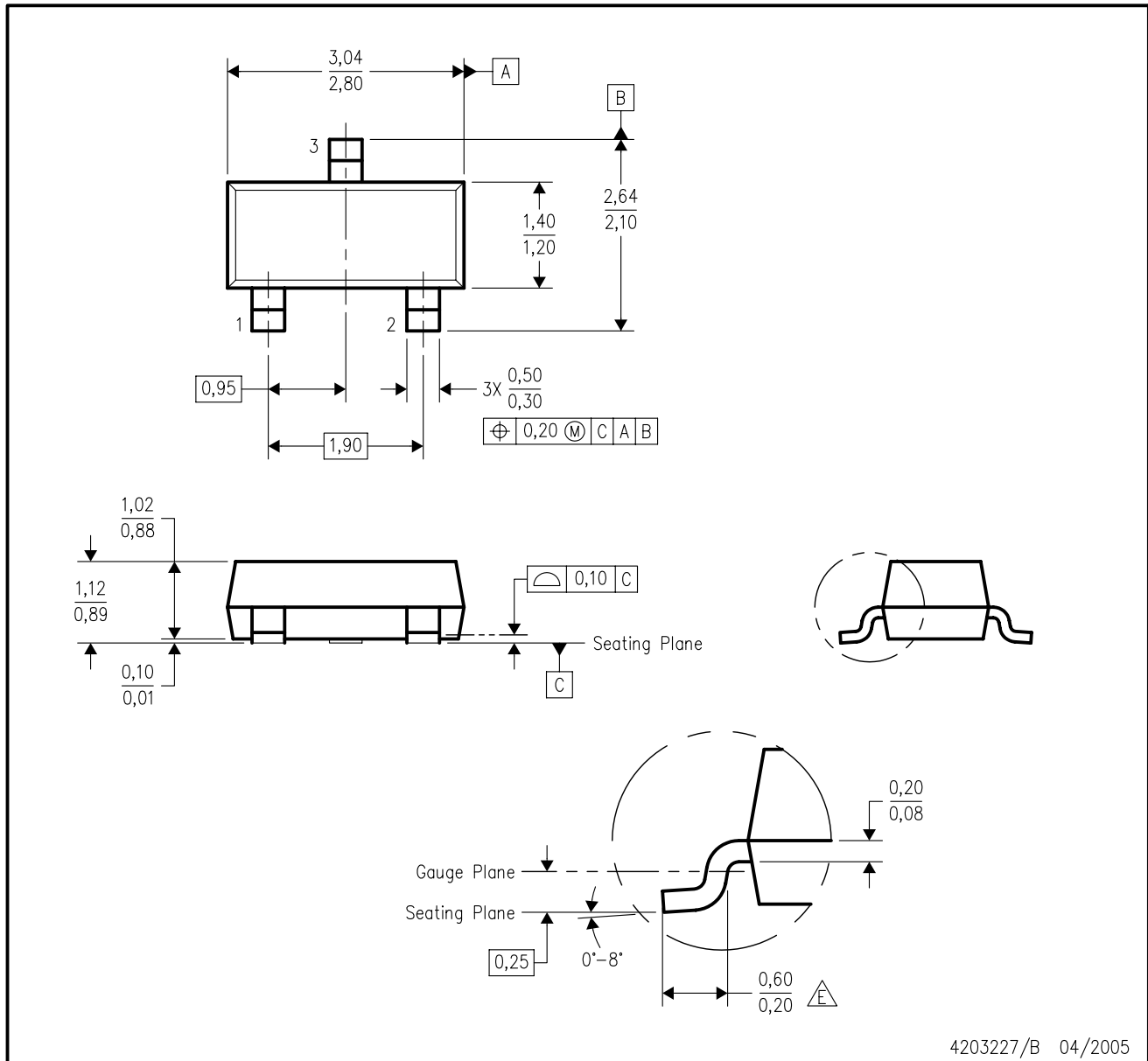
PLASTIC SMALL OUTLINE



- NOTES:
- All linear dimensions are in millimeters.
  - This drawing is subject to change without notice.
  - Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
  - Publication IPC-7351 is recommended for alternate designs.
  - Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Example stencil design based on a 50% volumetric metal load solder paste. Refer to IPC-7525 for other stencil recommendations.

DBZ (R-PDSO-G3)

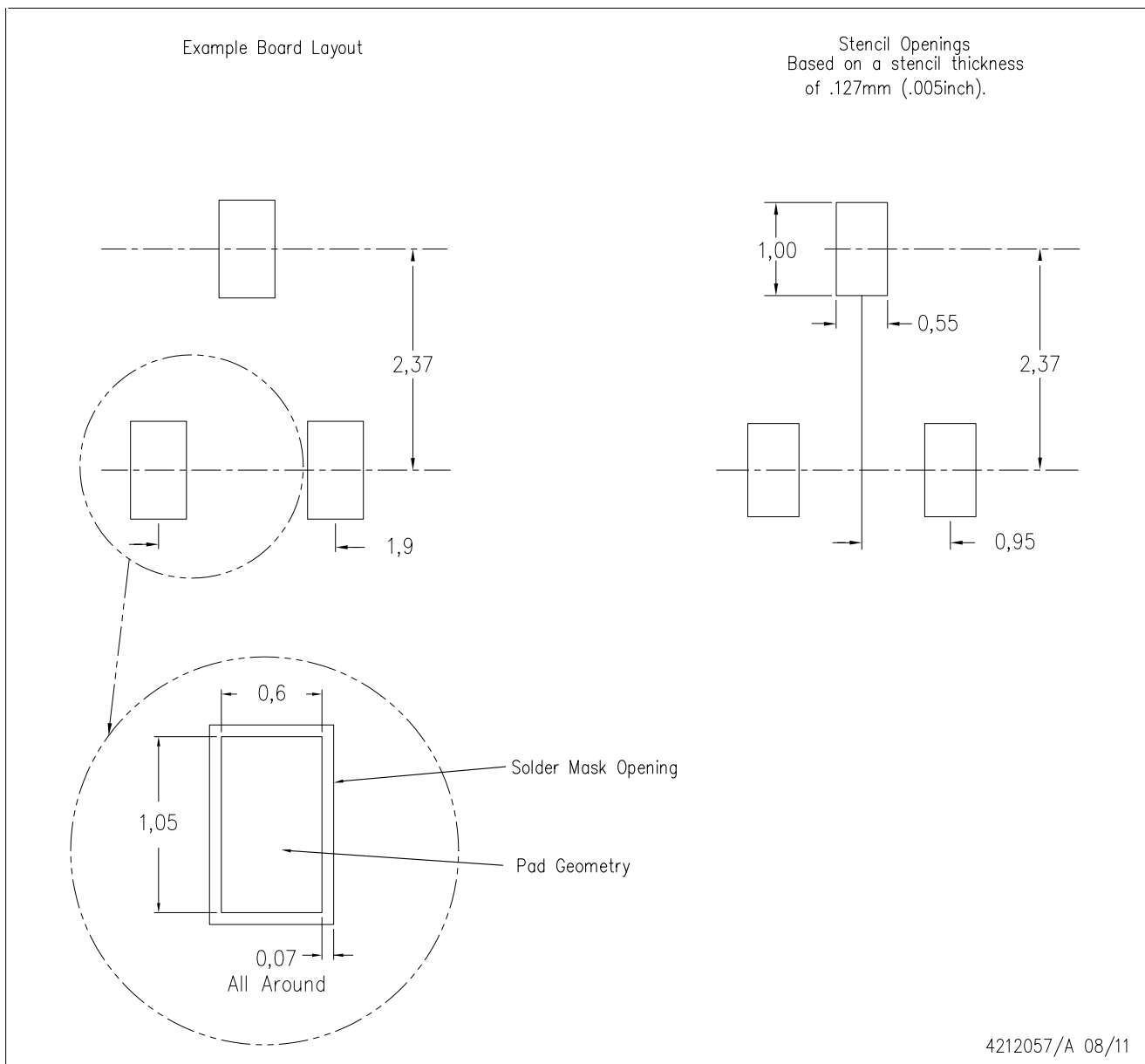
PLASTIC SMALL-OUTLINE



- NOTES:
- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
  - B. This drawing is subject to change without notice.
  - C. Lead dimensions are inclusive of plating.
  - D. Body dimensions are exclusive of mold flash and protrusion. Mold flash and protrusion not to exceed 0.25 per side.
  - $\triangle E$  Falls within JEDEC TO-236 variation AB, except minimum foot length.

DBZ (R-PDSO-G3)

PLASTIC SMALL OUTLINE

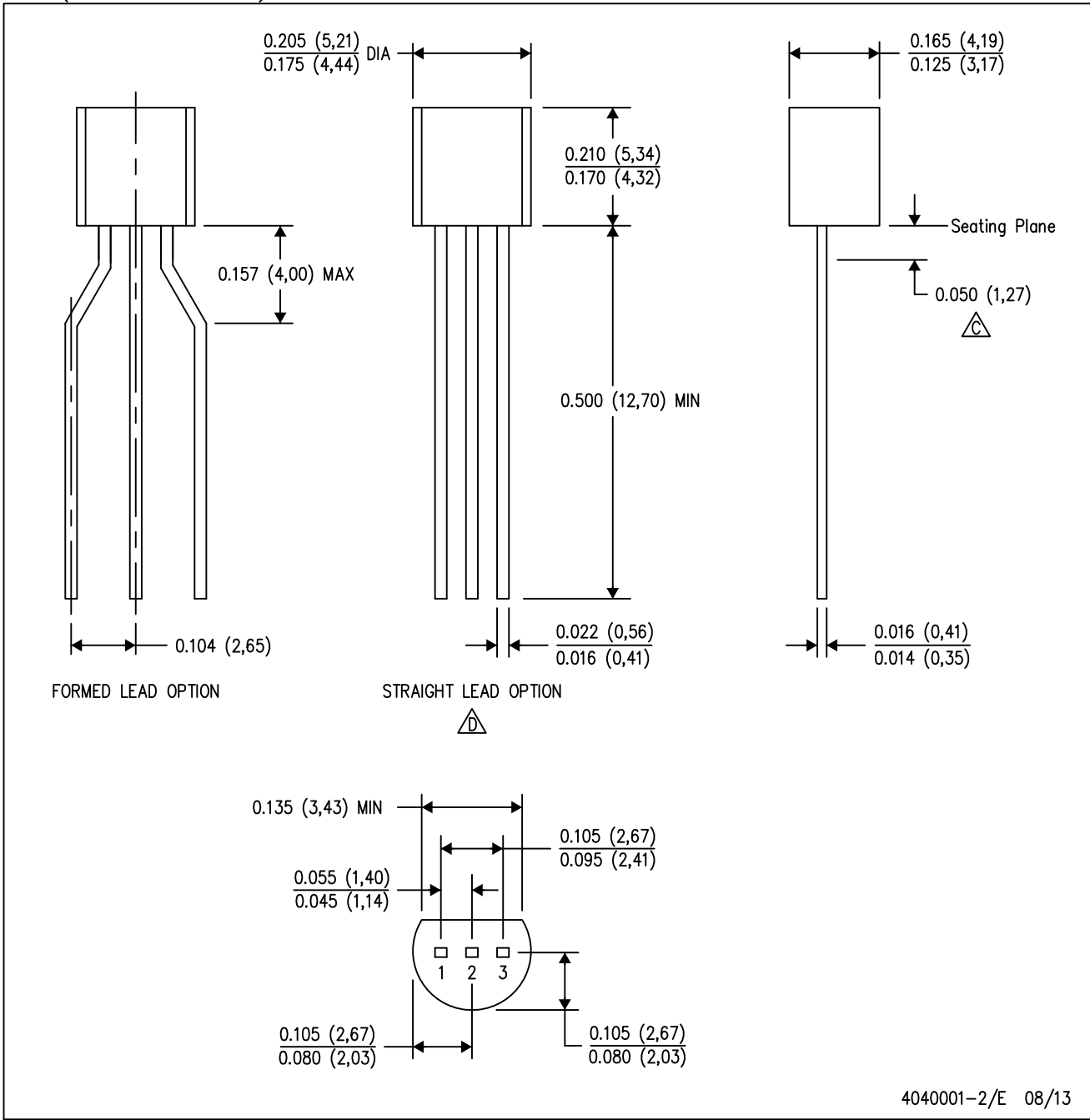


- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
  - D. Publication IPC-7351 is recommended for alternate designs.
  - E. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Example stencil design based on a 50% volumetric metal load solder paste. Refer to IPC-7525 for other stencil recommendations.

**MECHANICAL DATA**

LP (O-PBCY-W3)

PLASTIC CYLINDRICAL PACKAGE



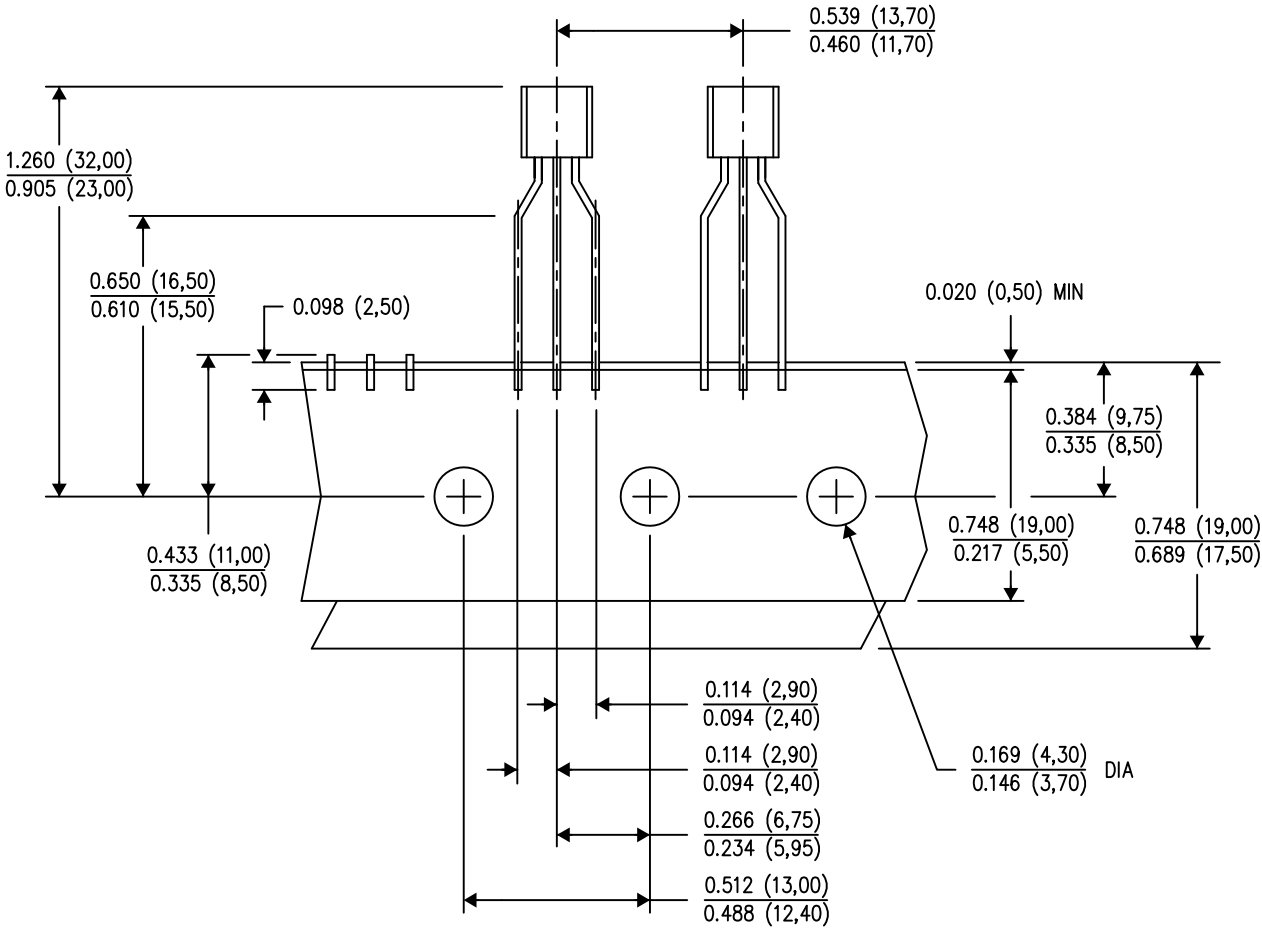
4040001-2/E 08/13

- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - Lead dimensions are not controlled within this area.
  - Falls within JEDEC TO-226 Variation AA (TO-226 replaces TO-92).
  - E. Shipping Method:  
 Straight lead option available in bulk pack only.  
 Formed lead option available in tape & reel or ammo pack.  
 Specific products can be offered in limited combinations of shipping mediums and lead options.  
 Consult product folder for more information on available options.

**MECHANICAL DATA**

LP (O-PBCY-W3)

PLASTIC CYLINDRICAL PACKAGE



TAPE & REEL

4040001-3/E 08/13

- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. Tape and Reel information for the Formed Lead Option package.

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| Logic                        | <a href="http://logic.ti.com">logic.ti.com</a>                                       |
| Power Mgmt                   | <a href="http://power.ti.com">power.ti.com</a>                                       |
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|                               |  |
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| Computers and Peripherals     | <a href="http://www.ti.com/computers">www.ti.com/computers</a>                           |
| Consumer Electronics          | <a href="http://www.ti.com/consumer-apps">www.ti.com/consumer-apps</a>                   |
| Energy and Lighting           | <a href="http://www.ti.com/energy">www.ti.com/energy</a>                                 |
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