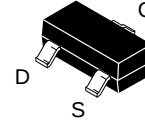


# N-Channel RF Amplifier

## MMBF5484, MMBF5485, MMBF5486

This device is designed primarily for electronic switching applications such as low On Resistance analog switching. Sourced from Process 50.



NOTE: Source & Drain  
are interchangeable

**SOT-23  
CASE 318**

### ABSOLUTE MAXIMUM RATINGS\* ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

| Symbol         | Rating                                           | Value       | Unit             |
|----------------|--------------------------------------------------|-------------|------------------|
| $V_{DG}$       | Drain-Gate Voltage                               | 25          | V                |
| $V_{GS}$       | Gate-Source Voltage                              | -25         | V                |
| $I_{GF}$       | Forward Gate Current                             | 10          | mA               |
| $T_J, T_{stg}$ | Operating and Storage Junction Temperature Range | -55 to +150 | $^\circ\text{C}$ |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

\*These rating are limiting values above which the serviceability of any semiconductor device may be impaired.

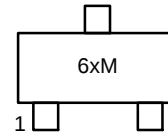
- These rating are based on a maximum junction temperature of  $150^\circ\text{C}$ .
- These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

### THERMAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

| Symbol          | Characteristic                                              | Max            | Unit                       |
|-----------------|-------------------------------------------------------------|----------------|----------------------------|
|                 |                                                             | *MMBF5484-5486 |                            |
| $P_D$           | Total Device Dissipation<br>Derate above $25^\circ\text{C}$ | 225<br>1.8     | mW<br>mW/ $^\circ\text{C}$ |
| $R_{\theta JC}$ | Thermal Resistance, Junction<br>to Case                     | -              | $^\circ\text{C}/\text{W}$  |
| $R_{\theta JA}$ | Thermal Resistance, Junction<br>to Ambient                  | 556            | $^\circ\text{C}/\text{W}$  |

\*Device mounted on FR-4 PCB  $1.6'' \times 1.6'' \times 0.06''$ .

### MARKING DIAGRAM



6x = Device Code (x = B, M, H)  
M = Date Code

### ORDERING INFORMATION

| Device   | Package             | Shipping <sup>†</sup> |
|----------|---------------------|-----------------------|
| MMBF5484 | SOT-23<br>(Pb-Free) | 3000 Tape &<br>Reel   |
| MMBF5485 |                     |                       |
| MMBF5486 |                     |                       |

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

# MMBF5484, MMBF5485, MMBF5486

## ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

| Symbol | Parameter | Test Condition | Min | Typ | Max | Unit |
|--------|-----------|----------------|-----|-----|-----|------|
|--------|-----------|----------------|-----|-----|-----|------|

### OFF CHARACTERISTICS

|                      |                               |                                                                                                                      |                      |                      |             |                      |             |
|----------------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|-------------|----------------------|-------------|
| V <sub>(BR)GSS</sub> | Gate-Source Breakdown Voltage | I <sub>G</sub> = -1.0 μA, V <sub>DS</sub> = 0                                                                        |                      | -25                  | -           | -                    | V           |
| I <sub>GSS</sub>     | Gate Reverse Current          | V <sub>GS</sub> = -20 V, V <sub>DS</sub> = 0<br>V <sub>GS</sub> = -20 V, V <sub>DS</sub> = 0, T <sub>A</sub> = 100°C |                      | -                    | -           | -1.0<br>-0.2         | nA<br>μA    |
| V <sub>GS(off)</sub> | Gate-Source Cutoff Voltage    | V <sub>DS</sub> = 15 V, I <sub>D</sub> = 10 nA                                                                       | 5484<br>5485<br>5486 | -0.3<br>-0.5<br>-2.0 | -<br>-<br>- | -3.0<br>-4.0<br>-6.0 | V<br>V<br>V |

### ON CHARACTERISTICS

|           |                                  |                                        |                      |                   |   |                 |                |
|-----------|----------------------------------|----------------------------------------|----------------------|-------------------|---|-----------------|----------------|
| $I_{DSS}$ | Zero-Gate Voltage Drain Current* | $V_{DS} = 15\ \text{V}$ , $V_{GS} = 0$ | 5484<br>5485<br>5486 | 1.0<br>4.0<br>8.0 | - | 5.0<br>10<br>20 | mA<br>mA<br>mA |
|-----------|----------------------------------|----------------------------------------|----------------------|-------------------|---|-----------------|----------------|

### SMALL SIGNAL CHARACTERISTICS

|              |                              |                                                                               |                      |                      |             |                      |                                                          |
|--------------|------------------------------|-------------------------------------------------------------------------------|----------------------|----------------------|-------------|----------------------|----------------------------------------------------------|
| $g_{fs}$     | Forward Transfer Conductance | $V_{DS} = 15\ \text{V}$ , $V_{GS} = 0$ , $f = 1.0\ \text{kHz}$                | 5484<br>5485<br>5486 | 3000<br>3500<br>4000 | -           | 6000<br>7000<br>8000 | $\mu\text{mhos}$<br>$\mu\text{mhos}$<br>$\mu\text{mhos}$ |
| $Re(y_{is})$ | Input Conductance            | $V_{DS} = 15\ \text{V}$ , $V_{GS} = 0$ , $f = 100\ \text{MHz}$                | 5484                 | -                    | -           | 100                  | $\mu\text{mhos}$                                         |
|              |                              | $V_{DS} = 15\ \text{V}$ , $V_{GS} = 0$ , $f = 400\ \text{kHz}$                | 5485 /<br>5486       | -                    | -           | 1000                 | $\mu\text{mhos}$                                         |
| $g_{os}$     | Output Conductance           | $V_{DS} = 15\ \text{V}$ , $V_{GS} = 0$ , $f = 1.0\ \text{kHz}$                | 5484<br>5485<br>5486 | -<br>-<br>-          | -<br>-<br>- | 50<br>60<br>75       | $\mu\text{mhos}$<br>$\mu\text{mhos}$<br>$\mu\text{mhos}$ |
|              |                              | $V_{DS} = 15\ \text{V}$ , $V_{GS} = 0$ , $f = 100\ \text{MHz}$                | 5484                 | -                    | -           | 75                   | $\mu\text{mhos}$                                         |
|              |                              | $V_{DS} = 15\ \text{V}$ , $V_{GS} = 0$ , $f = 400\ \text{MHz}$                | 5485 /<br>5486       | -                    | -           | 100                  | $\mu\text{mhos}$                                         |
| $Re(y_{fs})$ | Forward Transconductance     | $V_{DS} = 15\ \text{V}$ , $V_{GS} = 0$ , $f = 100\ \text{MHz}$                | 5484                 | 2500                 | -           | -                    | $\mu\text{mhos}$                                         |
|              |                              | $V_{DS} = 15\ \text{V}$ , $V_{GS} = 0$ , $f = 400\ \text{MHz}$                | 5485<br>5486         | 3000<br>3500         | -<br>-      | -<br>-               | $\mu\text{mhos}$<br>$\mu\text{mhos}$                     |
| $C_{iss}$    | Input Capacitance            | $V_{DS} = 15\ \text{V}$ , $V_{GS} = 0$ , $f = 1.0\ \text{MHz}$                | -                    | -                    | -           | 5.0                  | pF                                                       |
| $C_{rss}$    | Reverse Transfer Capacitance | $V_{DS} = 15\ \text{V}$ , $V_{GS} = 0$ , $f = 1.0\ \text{MHz}$                | -                    | -                    | -           | 1.0                  | pF                                                       |
| $C_{oss}$    | Output Capacitance           | $V_{DS} = 15\ \text{V}$ , $V_{GS} = 0$ , $f = 1.0\ \text{MHz}$                | -                    | -                    | -           | 2.0                  | pF                                                       |
| NF           | Noise Figure                 | $V_{DS} = 15\ \text{V}$ , $R_G = 1.0\ \text{k}\Omega$ , $f = 100\ \text{MHz}$ | 5484                 | -                    | -           | 3.0                  | dB                                                       |
|              |                              | $V_{DS} = 15\ \text{V}$ , $R_G = 1.0\ \text{k}\Omega$ , $f = 400\ \text{MHz}$ | 5484                 | -                    | 4.0         | -                    | dB                                                       |
|              |                              | $V_{DS} = 15\ \text{V}$ , $R_G = 1.0\ \text{k}\Omega$ , $f = 100\ \text{MHz}$ | 5485 /<br>5486       | -                    | -           | 2.0                  | dB                                                       |
|              |                              | $V_{DS} = 15\ \text{V}$ , $R_G = 1.0\ \text{k}\Omega$ , $f = 400\ \text{MHz}$ | 5485 /<br>5486       | -                    | -           | 4.0                  | dB                                                       |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

## TYPICAL CHARACTERISTICS

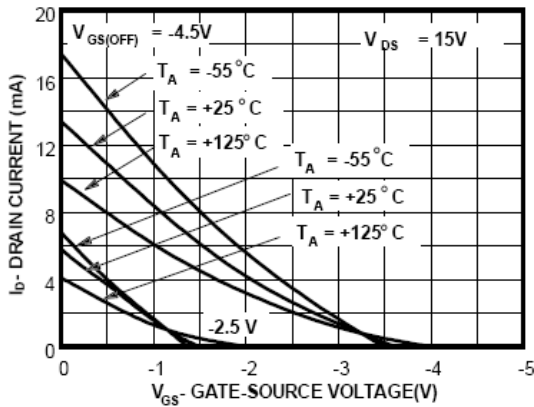


Figure 1. Transfer Characteristics

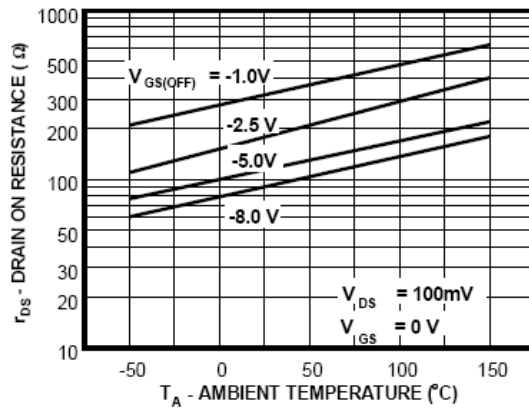


Figure 2. Channel Resistance vs. Temperature

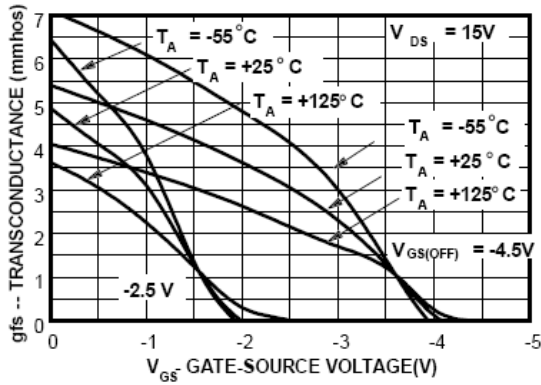


Figure 3. Transconductance Characteristics

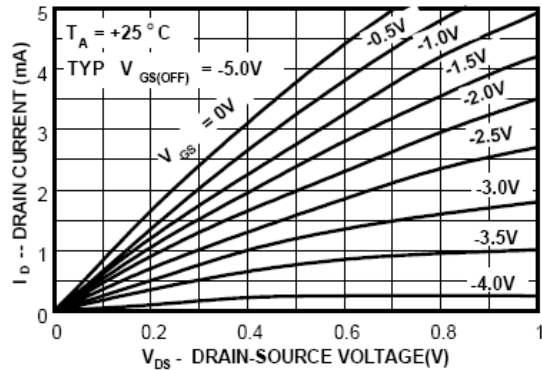


Figure 4. Common Drain-Source Characteristics

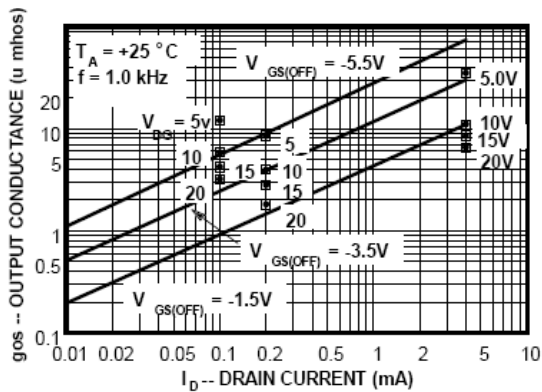


Figure 5. Output Conductance vs. Drain Current

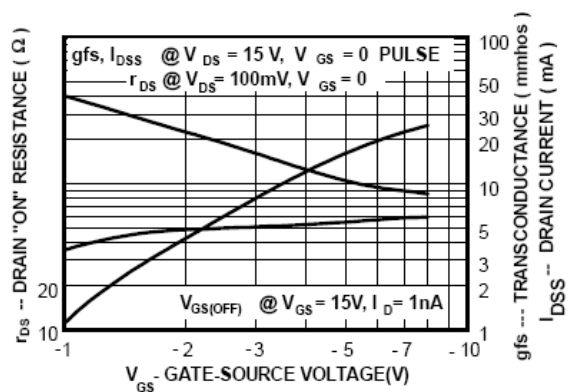


Figure 6. Transconductance Parameter Interactions

TYPICAL CHARACTERISTICS (CONTINUED)

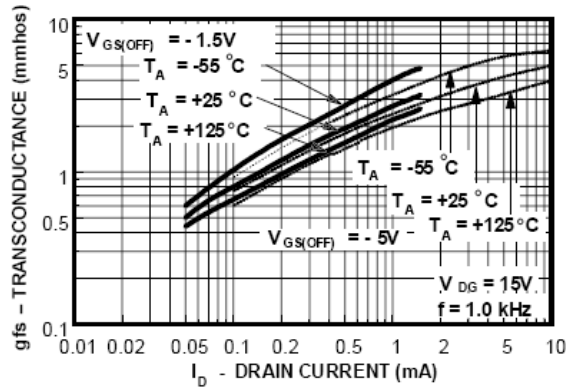


Figure 7. Transconductance vs. Drain Current

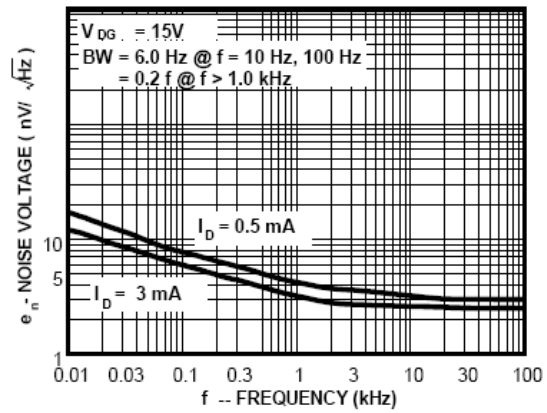


Figure 8. Noise Voltage vs. Frequency

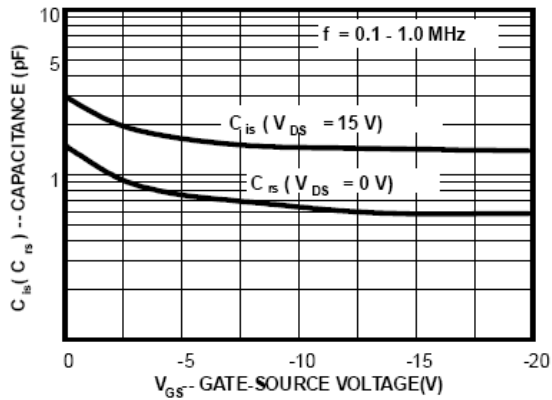


Figure 9. Capacitance vs. Voltage

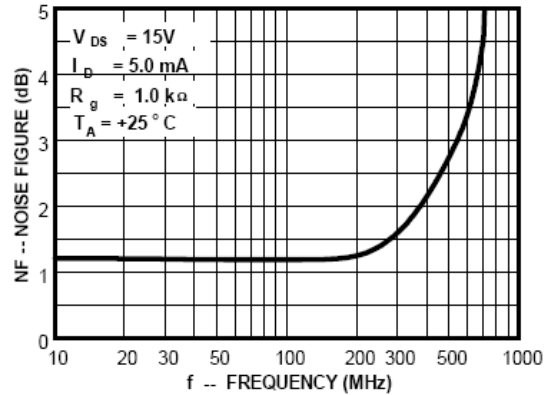


Figure 10. Noise Figure Frequency

COMMON SOURCE CHARACTERISTICS

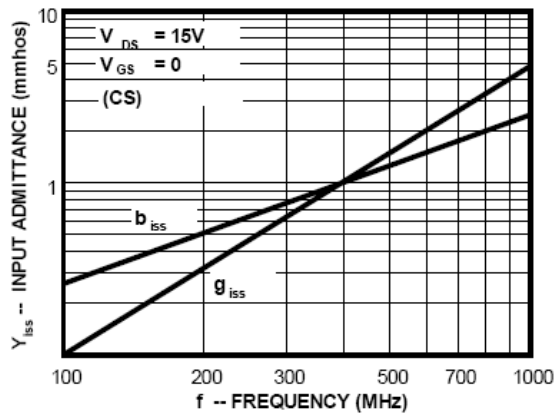


Figure 11. Input Admittance

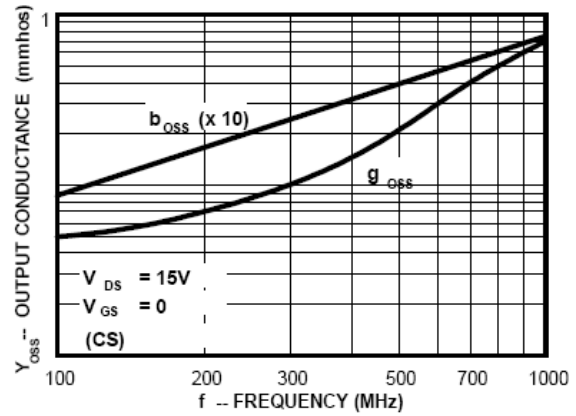


Figure 12. Output Admittance

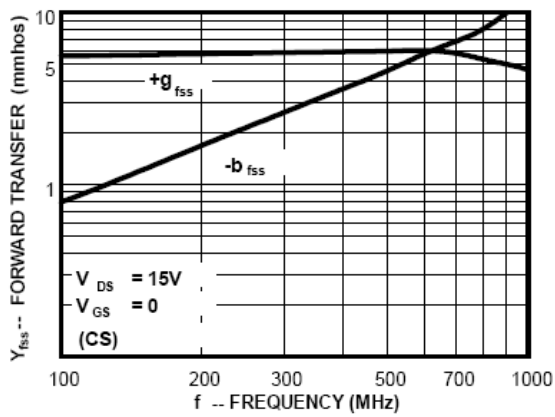


Figure 13. Forward Transadmittance

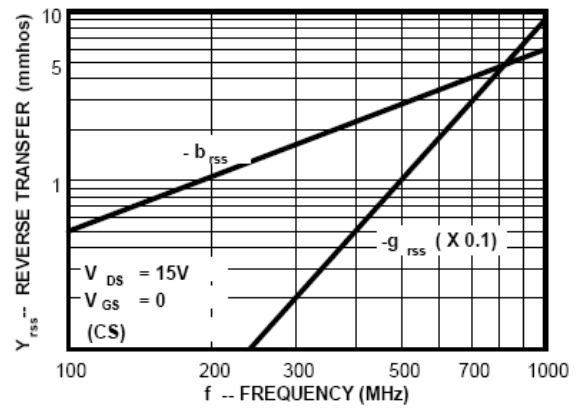


Figure 14. Reverse Transadmittance

## COMMON GATE CHARACTERISTICS

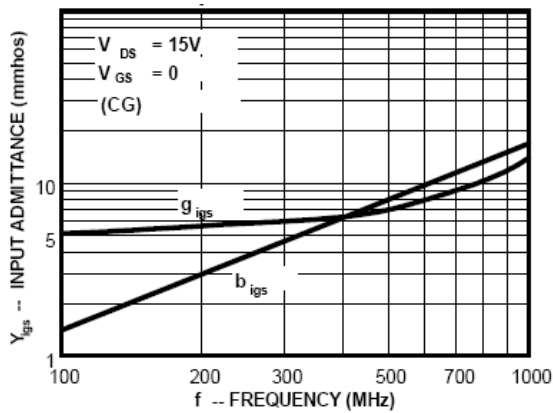


Figure 15. Input Admittance

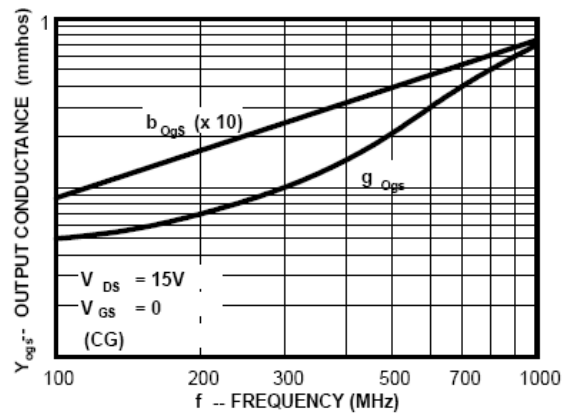


Figure 16. Output Admittance

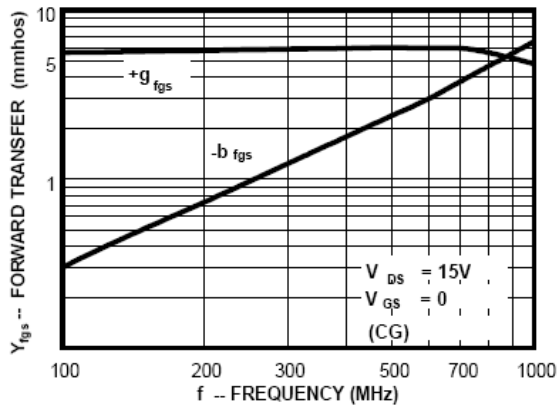


Figure 17. Forward Transadmittance

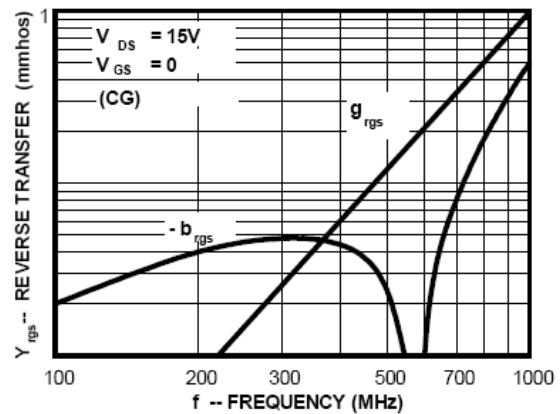


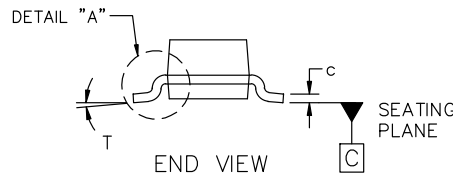
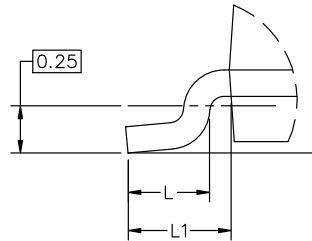
Figure 18. Reverse Transadmittance



SCALE 4:1

SOT-23 (TO-236) 2.90x1.30x1.00 1.90P  
CASE 318  
ISSUE AU

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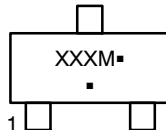


| MILLIMETERS |      |      |      |
|-------------|------|------|------|
| DIM         | MIN  | NOM  | MAX  |
| A           | 0.89 | 1.00 | 1.11 |
| A1          | 0.01 | 0.06 | 0.10 |
| b           | 0.37 | 0.44 | 0.50 |
| c           | 0.08 | 0.14 | 0.20 |
| D           | 2.80 | 2.90 | 3.04 |
| E           | 1.20 | 1.30 | 1.40 |
| e           | 1.78 | 1.90 | 2.04 |
| L           | 0.30 | 0.43 | 0.55 |
| L1          | 0.35 | 0.54 | 0.69 |
| HE          | 2.10 | 2.40 | 2.64 |
| T           | 0°   | ---  | 10°  |

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSIONS: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

GENERIC  
MARKING DIAGRAM\*



XXX = Specific Device Code  
M = Date Code  
▪ = Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.



RECOMMENDED  
MOUNTING FOOTPRINT

\* For additional information on our Pb-Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERM/D.

STYLES ON PAGE 2

|                  |                                      |                                                                                                                                                                                     |
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**CASE 318**  
**ISSUE AU**

DATE 14 AUG 2024

|                                                         |                                                       |                                                             |                                                             |                                                             |                                                             |
|---------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|
| STYLE 1 THRU 5:<br>CANCELLED                            | STYLE 6:<br>PIN 1. BASE<br>2. EMITTER<br>3. COLLECTOR | STYLE 7:<br>PIN 1. EMITTER<br>2. BASE<br>3. COLLECTOR       | STYLE 8:<br>PIN 1. ANODE<br>2. NO CONNECTION<br>3. CATHODE  |                                                             |                                                             |
| STYLE 9:<br>PIN 1. ANODE<br>2. ANODE<br>3. CATHODE      | STYLE 10:<br>PIN 1. DRAIN<br>2. SOURCE<br>3. GATE     | STYLE 11:<br>PIN 1. ANODE<br>2. CATHODE<br>3. CATHODE-ANODE | STYLE 12:<br>PIN 1. CATHODE<br>2. CATHODE<br>3. ANODE       | STYLE 13:<br>PIN 1. SOURCE<br>2. DRAIN<br>3. GATE           | STYLE 14:<br>PIN 1. CATHODE<br>2. GATE<br>3. ANODE          |
| STYLE 15:<br>PIN 1. GATE<br>2. CATHODE<br>3. ANODE      | STYLE 16:<br>PIN 1. ANODE<br>2. CATHODE<br>3. CATHODE | STYLE 17:<br>PIN 1. NO CONNECTION<br>2. ANODE<br>3. CATHODE | STYLE 18:<br>PIN 1. NO CONNECTION<br>2. CATHODE<br>3. ANODE | STYLE 19:<br>PIN 1. CATHODE<br>2. ANODE<br>3. CATHODE-ANODE | STYLE 20:<br>PIN 1. CATHODE<br>2. ANODE<br>3. GATE          |
| STYLE 21:<br>PIN 1. GATE<br>2. SOURCE<br>3. DRAIN       | STYLE 22:<br>PIN 1. RETURN<br>2. OUTPUT<br>3. INPUT   | STYLE 23:<br>PIN 1. ANODE<br>2. ANODE<br>3. CATHODE         | STYLE 24:<br>PIN 1. GATE<br>2. DRAIN<br>3. SOURCE           | STYLE 25:<br>PIN 1. ANODE<br>2. CATHODE<br>3. GATE          | STYLE 26:<br>PIN 1. CATHODE<br>2. ANODE<br>3. NO CONNECTION |
| STYLE 27:<br>PIN 1. CATHODE<br>2. CATHODE<br>3. CATHODE | STYLE 28:<br>PIN 1. ANODE<br>2. ANODE<br>3. ANODE     |                                                             |                                                             |                                                             |                                                             |

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