

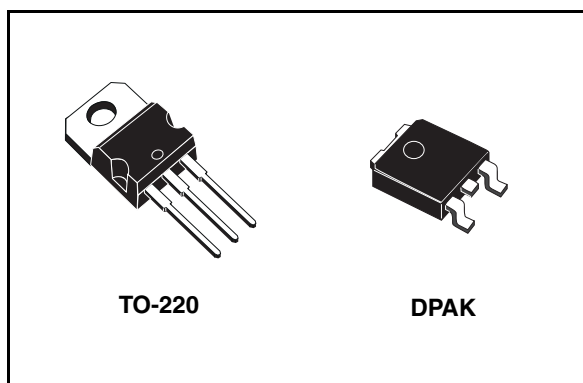
## Precision 500 mA regulators

### Features

- Output current to 0.5 A
- Output voltages of 5; 6; 8; 9; 10; 12; 15; 18; 24 V
- Thermal overload protection
- Short circuit protection
- Output transition SOA protection
- $\pm 2\%$  Output voltage tolerance
- Guaranteed in extended temperature range

### Description

The L78MxxAB series of three-terminal positive regulators is available in TO-220 and DPAK packages and with several fixed output voltages, making it useful in a wide range of applications. These regulators can provide local on-card regulation eliminating the distribution problems associated with single point regulation. Each type employs internal current limiting, thermal shut-down and safe area protection, making it essentially indestructible. If adequate heat sinking is provided, they can deliver over 0.5 A output current. Although designed primarily as fixed voltage regulators, these devices can be used



with external components to obtain adjustable voltage and currents.

**Table 1. Device summary**

| Part number |          |
|-------------|----------|
| L78M05AB    | L78M10AB |
| L78M05AC    | L78M12AB |
| L78M06AB    | L78M12AC |
| L78M08AB    | L78M15AB |
| L78M08AC    | L78M24AB |
| L78M09AB    | L78M24AC |

### 3 Maximum ratings

Table 2. Absolute maximum ratings

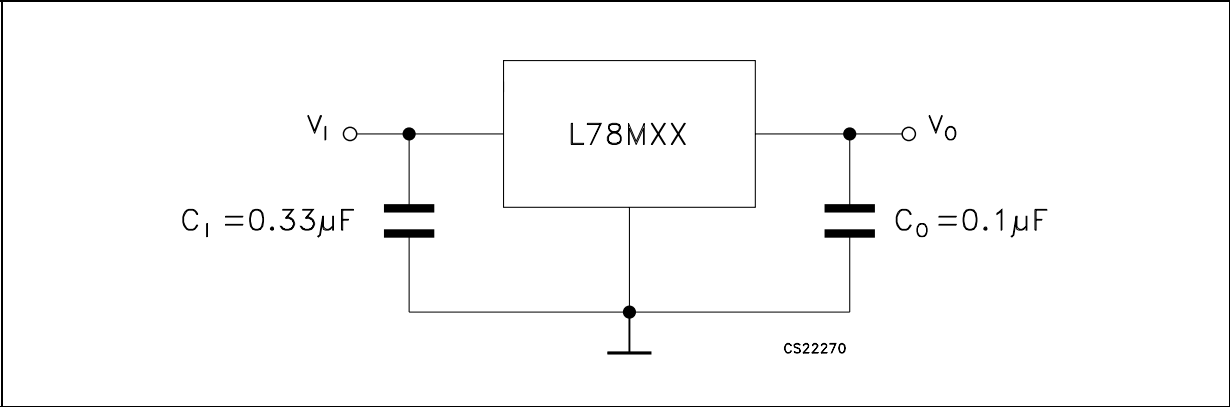
| Symbol    | Parameter                            |                        | Value              | Unit |
|-----------|--------------------------------------|------------------------|--------------------|------|
| $V_I$     | DC input voltage                     | for $V_O = 5$ to $18V$ | 35                 | V    |
|           |                                      | for $V_O = 20, 24V$    | 40                 |      |
| $I_O$     | Output current                       |                        | Internally limited | mA   |
| $P_D$     | Power dissipation                    |                        | Internally limited | mW   |
| $T_{STG}$ | Storage temperature range            |                        | -65 to 150         | °C   |
| $T_{OP}$  | Operating junction temperature range | for L78M00AC           | 0 to 125           | °C   |
|           |                                      | for L78M00AB           | -40 to 125         |      |

*Note:* Absolute maximum ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied

Table 3. Thermal data

| Symbol     | Parameter                           | TO-220 | DPAK | Unit |
|------------|-------------------------------------|--------|------|------|
| $R_{thJC}$ | Thermal resistance junction-case    | 3      | 8    | °C/W |
| $R_{thJA}$ | Thermal resistance junction-ambient | 50     | 100  | °C/W |

Figure 4. Application circuit



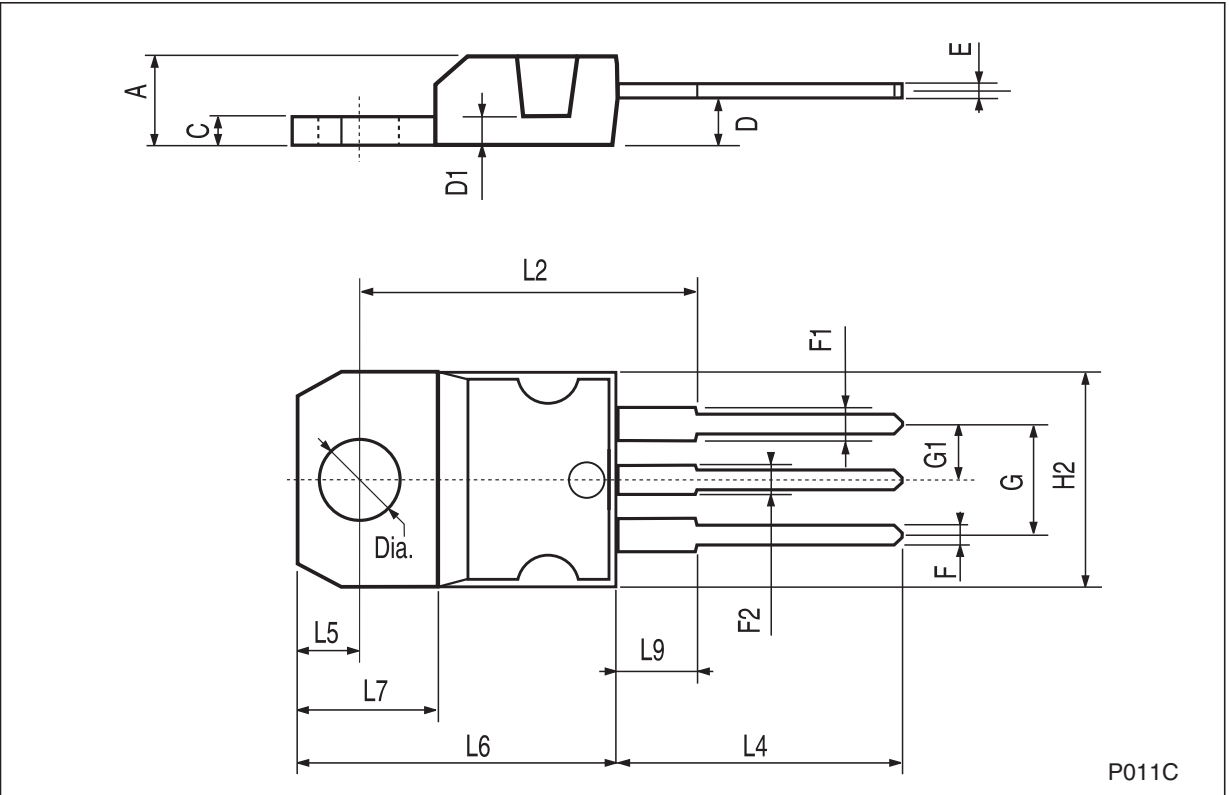
## 5 Electrical characteristics

**Table 4. Electrical characteristics of L78M05XX** (refer to the test circuits,  $V_I = 10\text{ V}$ ,  $I_O = 350\text{ mA}$ ,  $C_I = 0.33\text{ }\mu\text{F}$ ,  $C_O = 0.1\text{ }\mu\text{F}$ ,  $T_J = -40\text{ to }125\text{ }^\circ\text{C}$  (AB),  $T_J = 0\text{ to }125\text{ }^\circ\text{C}$  (AC) unless otherwise specified)

| Symbol                | Parameter                  | Test conditions                                                                                          | Min. | Typ. | Max. | Unit                 |
|-----------------------|----------------------------|----------------------------------------------------------------------------------------------------------|------|------|------|----------------------|
| $V_O$                 | Output voltage             | $T_J = 25^\circ\text{C}$                                                                                 | 4.9  | 5    | 5.1  | V                    |
| $V_O$                 | Output voltage             | $I_O = 5\text{ to }350\text{ mA}$ , $V_I = 7\text{ to }20\text{ V}$                                      | 4.8  | 5    | 5.2  | V                    |
| $\Delta V_O$          | Line regulation            | $V_I = 7\text{ to }25\text{ V}$ , $I_O = 200\text{ mA}$ , $T_J = 25^\circ\text{C}$                       |      |      | 100  | mV                   |
|                       |                            | $V_I = 8\text{ to }25\text{ V}$ , $I_O = 200\text{ mA}$ , $T_J = 25^\circ\text{C}$                       |      |      | 50   |                      |
| $\Delta V_O$          | Load regulation            | $I_O = 5\text{ to }500\text{ mA}$ , $T_J = 25^\circ\text{C}$                                             |      |      | 100  | mV                   |
|                       |                            | $I_O = 5\text{ to }200\text{ mA}$ , $T_J = 25^\circ\text{C}$                                             |      |      | 50   |                      |
| $I_d$                 | Quiescent current          | $T_J = 25^\circ\text{C}$                                                                                 |      |      | 6    | mA                   |
| $\Delta I_d$          | Quiescent current change   | $I_O = 5\text{ to }350\text{ mA}$                                                                        |      |      | 0.5  | mA                   |
|                       |                            | $I_O = 200\text{ mA}$ , $V_I = 8\text{ to }25\text{ V}$                                                  |      |      | 0.8  |                      |
| $\Delta V_O/\Delta T$ | Output voltage drift       | $I_O = 5\text{ mA}$                                                                                      |      | -0.5 |      | mV/ $^\circ\text{C}$ |
| SVR                   | Supply voltage rejection   | $V_I = 8\text{ to }18\text{ V}$ , $f = 120\text{ Hz}$ , $I_O = 300\text{ mA}$ , $T_J = 25^\circ\text{C}$ | 62   |      |      | dB                   |
| eN                    | Output noise voltage       | $B = 10\text{ Hz to }100\text{ kHz}$ , $T_J = 25^\circ\text{C}$                                          |      | 40   |      | $\mu\text{V}$        |
| $V_d$                 | Dropout voltage            | $T_J = 25^\circ\text{C}$                                                                                 |      | 2    |      | V                    |
| $I_{sc}$              | Short circuit current      | $T_J = 25^\circ\text{C}$ , $V_I = 35\text{ V}$                                                           |      | 300  |      | mA                   |
| $I_{scp}$             | Short circuit peak current | $T_J = 25^\circ\text{C}$                                                                                 |      | 700  |      | mA                   |

TO-220 mechanical data

| Dim. | mm.   |      |       | inch. |       |       |
|------|-------|------|-------|-------|-------|-------|
|      | Min.  | Typ. | Max.  | Min.  | Typ.  | Max.  |
| A    | 4.40  |      | 4.60  | 0.173 |       | 0.181 |
| C    | 1.23  |      | 1.32  | 0.048 |       | 0.051 |
| D    | 2.40  |      | 2.72  | 0.094 |       | 0.107 |
| D1   |       | 1.27 |       |       | 0.050 |       |
| E    | 0.49  |      | 0.70  | 0.019 |       | 0.027 |
| F    | 0.61  |      | 0.88  | 0.024 |       | 0.034 |
| F1   | 1.14  |      | 1.70  | 0.044 |       | 0.067 |
| F2   | 1.14  |      | 1.70  | 0.044 |       | 0.067 |
| G    | 4.95  |      | 5.15  | 0.194 |       | 0.203 |
| G1   | 2.4   |      | 2.7   | 0.094 |       | 0.106 |
| H2   | 10.0  |      | 10.40 | 0.393 |       | 0.409 |
| L2   |       | 16.4 |       |       | 0.645 |       |
| L4   | 13.0  |      | 14.0  | 0.511 |       | 0.551 |
| L5   | 2.65  |      | 2.95  | 0.104 |       | 0.116 |
| L6   | 15.25 |      | 15.75 | 0.600 |       | 0.620 |
| L7   | 6.2   |      | 6.6   | 0.244 |       | 0.260 |
| L9   | 3.5   |      | 3.93  | 0.137 |       | 0.154 |
| DIA. | 3.75  |      | 3.85  | 0.147 |       | 0.151 |



## 9 Order codes

Table 14. Order codes

| Part numbers | Packaging |               |                |
|--------------|-----------|---------------|----------------|
|              | TO-220    | DPAK          | Output voltage |
| L78M05AB     | L78M05ABV | L78M05ABDT-TR | 5 V            |
| L78M05AC     |           | L78M05ACDT-TR | 5 V            |
| L78M06AB     |           | L78M06ABDT-TR | 6 V            |
| L78M08AB     |           | L78M08ABDT-TR | 8 V            |
| L78M08AC     |           | L78M08ACDT-TR | 8 V            |
| L78M09AB     | L78M09ABV | L78M09ABDT-TR | 9 V            |
| L78M10AB     |           | L78M10ABDT-TR | 10 V           |
| L78M12AB     | L78M12ABV | L78M12ABDT-TR | 12 V           |
| L78M12AC     |           | L78M12ACDT-TR | 12 V           |
| L78M15AB     | L78M15ABV | L78M15ABDT-TR | 15 V           |
| L78M24AB     |           | L78M24ABDT-TR | 24 V           |
| L78M24AC     |           | L78M24ACDT-TR | 24 V           |