

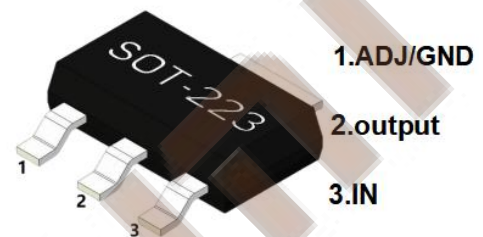
## General Description



- The 1117-xxx is a series of low dropout three-terminal regulators with a dropout of 1.15V at 1A output current.
- The 1117-3.3V provides current limiting and thermal shutdown. Its circuit includes a trimmed bandage. Reference to assure output voltage accuracy to be within 1.5%. Current limit is trimmed to ensure specified. Output current and controlled short-circuit current. On-chip thermal shutdown provides protection against any combination of overload and ambient temperature that would create excessive junction temperature.

## Features

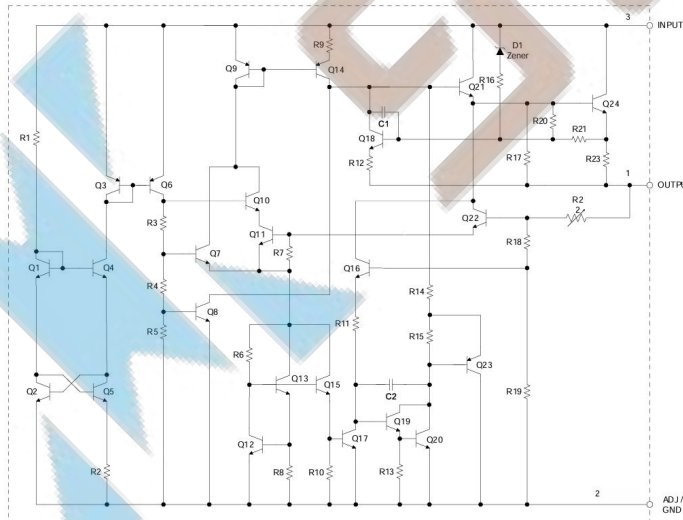
- Low Dropout Voltage: 1.15V at 1A Output Current
- Trimmed Current Limit
- On-Chip Thermal Shutdown
- Three-Terminal Adjustable of 3.3V
- Operation Junction Temperature: -40°C to 125°C



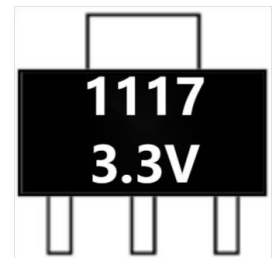
## APPLICATION

- PC Motherboard
- LCD Monitor
- Graphic Card
- DVD-Video Player
- NIC/Switch
- Telecon Modem
- ADSL Modem
- Printer and other peripheral Equipment

## FUNCTIONAL BLOCK DIAGRAM



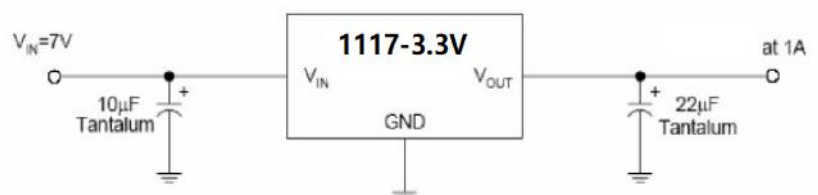
## MARKING:



## TYPICAL APPLICATION CIRCUIT

## Mechanical Data

- SOT-223 Small Outline Plastic Package.
- Mounting Position: Any.



### Maximum Ratings & Thermal Characteristics (Ratings at 25°C ambient temperature unless otherwise specified.)

| Parameters                                  | Symbol          | Value      | Unit |
|---------------------------------------------|-----------------|------------|------|
| Input Voltage                               | $V_i$           | 20         | V    |
| ESD Voltage (Machine Mode)                  | VESD            | 400        | V    |
| Operating Ambient Temperature               | $T_A$           | -40~+85    | °C   |
| Operating Junction Temperature              | $T_j$           | -40~+125   | °C   |
| Storage Temperature                         | $T_{stg}$       | -40~+125   | °C   |
| Soldering Temperature & Time                | $T_{solder}$    | 260°C, 10s |      |
| Thermal Resistance From Junction to Ambient | $R_{\theta JA}$ | 250        | °C/W |

Note: Stresses greater than those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional of the device at these of any other conditions beyond those indicated under “Recommended Operating Conditions” is not implied. Exposure to “Absolute Maximum Ratings” for extended periods may affect device reliability

### Recommended Operating Conditions

| Parameter                      | Symbol | Value    | Unit |
|--------------------------------|--------|----------|------|
| Input Voltage                  | $V_i$  | 15       | V    |
| Operating Junction Temperature | $T_j$  | -40~+125 | °C   |

### Electrical Characteristics( $T_a=25^\circ\text{C}$ unless otherwise noted)

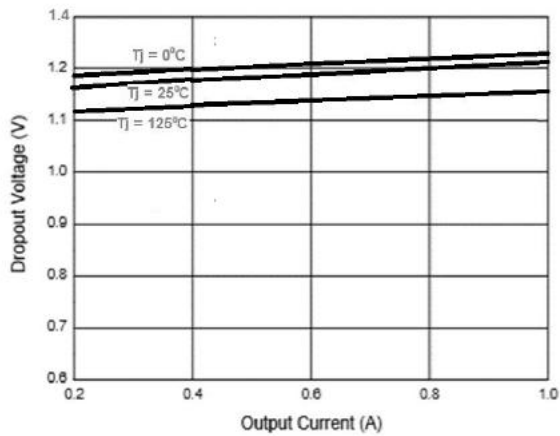
( $V_i=10\text{V}$ ,  $I_o=40\text{mA}$ ,  $C_i=0.33\mu\text{F}$ ,  $C_o=0.1\mu\text{F}$ , unless otherwise specified).

| Parameter                   | Symbol      | Test Conditions                                                                                              | Min.  | Typ. | Max.  | Unit          |
|-----------------------------|-------------|--------------------------------------------------------------------------------------------------------------|-------|------|-------|---------------|
| Output Voltage              | $V_O$       | $I_{OUT}=10\text{mA}$ , $V_{IN}=5.3\text{V}$                                                                 | 3.250 | 3.3  | 3.350 | V             |
|                             |             | $10\text{mA} \leq I_{OUT} \leq 0.8\text{A}$ , $4.8\text{V} \leq V_{IN} \leq 12\text{V}$                      | 3.234 | 3.3  | 3.366 |               |
| Line Regulation             | LNR         | $I_{OUT}=10\text{mA}$ , $1.5\text{V} \leq V_{IN}-V_{OUT} \leq 8.7\text{V}$                                   |       | 1    | 6     | mV            |
| Load Regulation             | LDR         | $V_{IN}-V_{OUT}=1.5\text{V}$ , $10\text{mA} \leq I_{OUT} \leq 0.8\text{A}$                                   |       |      | 10    | mV            |
| Dropout Voltage             | $V_D$       | $\Delta V_{REF}=1\%$ , $I_{OUT}=0.8\text{A}$                                                                 |       |      | 1.3   | V             |
| Current Limit               | $I_{limit}$ | $V_{IN}-V_{OUT}=2.0\text{V}$                                                                                 | 0.8   |      |       | A             |
| Adjust Pin Current          |             |                                                                                                              |       | 60   | 120   | $\mu\text{A}$ |
| Minimum Load Current        | $I_L$       | $1.5\text{V} \leq V_{IN}-V_{OUT} \leq 12\text{V}$ (ADJ only)                                                 |       | 1.7  | 5     | $\mu\text{A}$ |
| Quiescent Current           | $I_q$       | $V_{IN}=V_{OUT}+1.25\text{V}$ (ADJ except)                                                                   |       | 5    | 10    | mA            |
| Ripple Rejection            | RR          | $f=120\text{Hz}$ , $C_{OUT}=22\mu\text{F}$ tantalum,<br>$V_{IN}-V_{OUT}=3.0\text{V}$ , $I_{OUT}=1.0\text{A}$ | 60    | 75   |       | dB            |
| Temperature Stability       |             |                                                                                                              |       | 0.5  |       | %             |
| Thermal Shutdown Hysteresis |             |                                                                                                              |       | 25   |       | °C            |

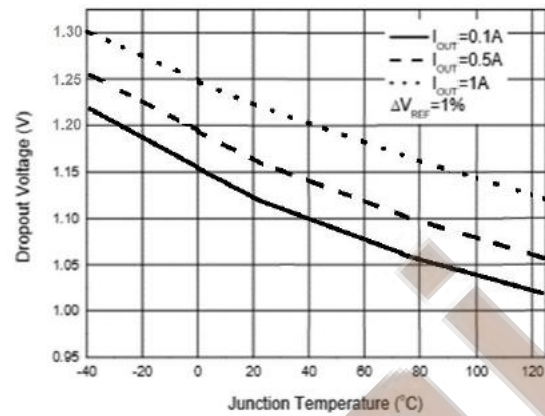
\*With package soldering to copper area over backside ground plane or internal power plane  $R_{\theta JA}$  can vary from 46°C/W to >90°C/W depending on mounting technique and the size of the copper area

# Typical characteristics

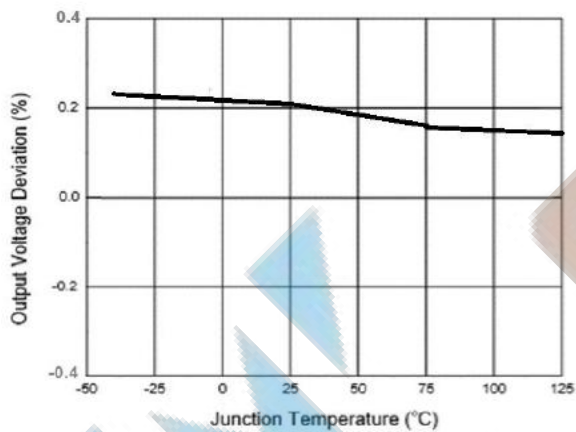
Dropout Voltage vs. Output Current



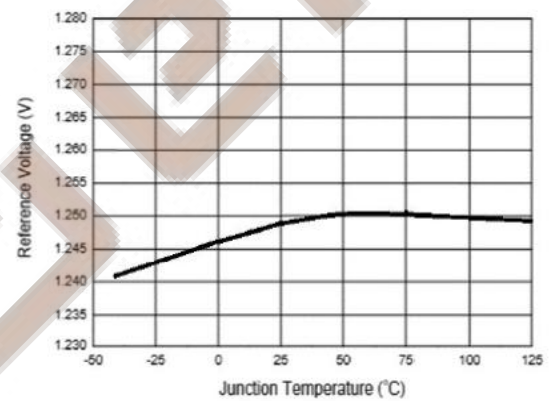
Dropout Voltage vs. Junction Temperature



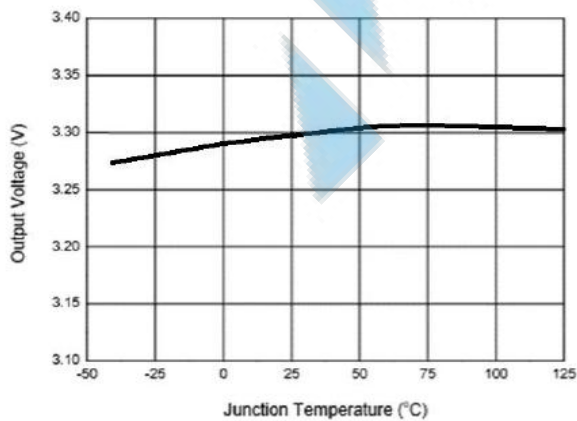
Load Regulation vs. Junction Temperature



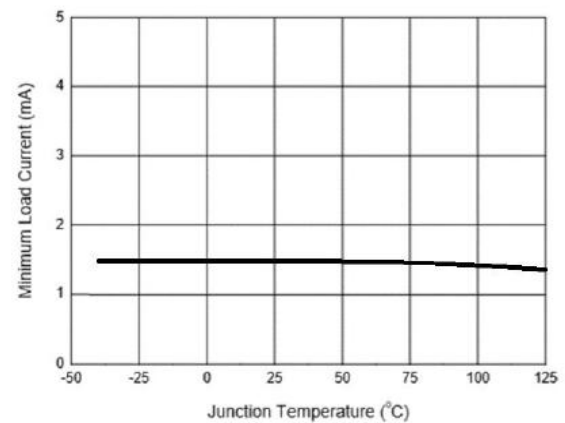
Reference Voltage vs. Junction Temperature



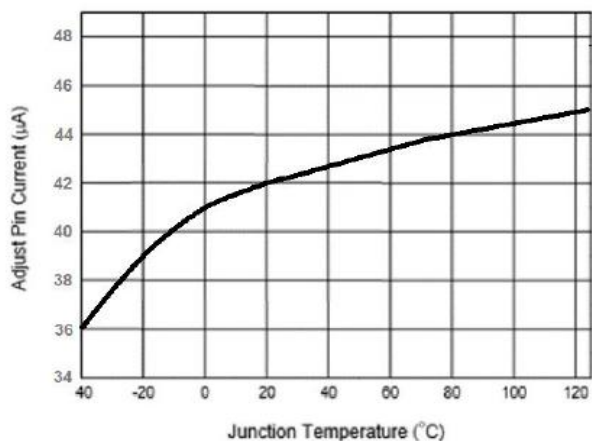
Output Voltage vs. Junction Temperature



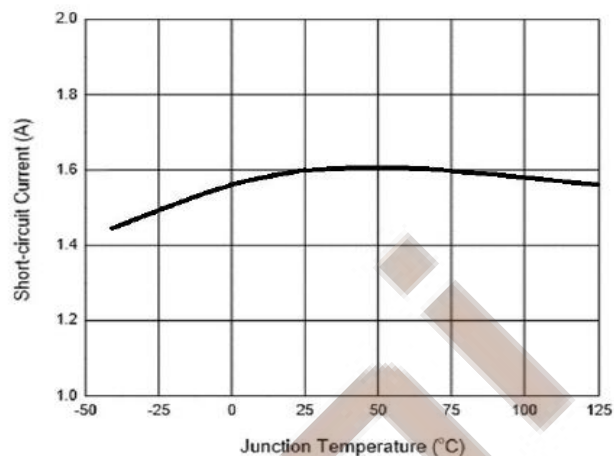
Minimum Load Current vs. Junction Temperature



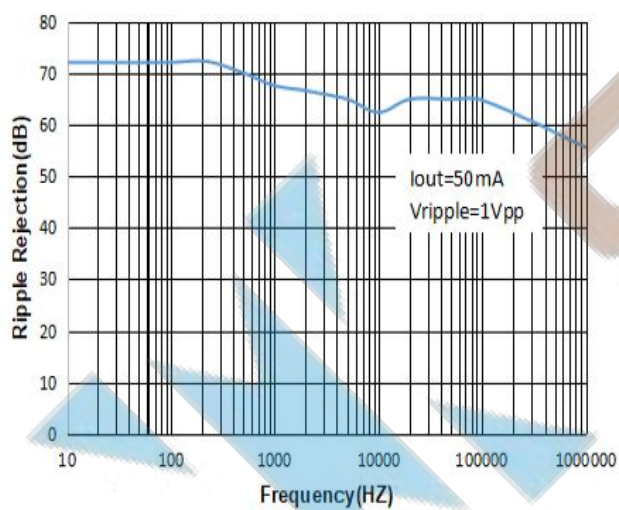
**Adjust Pin Current vs. Junction Temperature**



**Short-circuit Current vs. Junction Temperature**

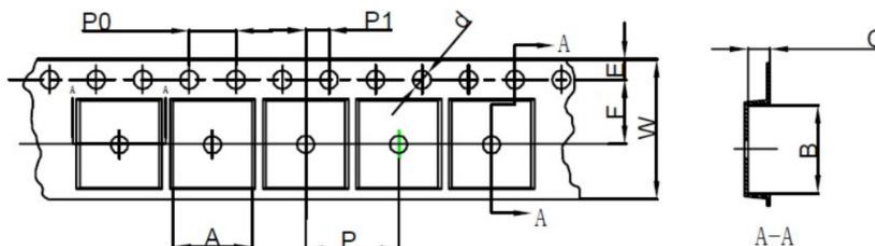


**PSRR Vs.Frequency**



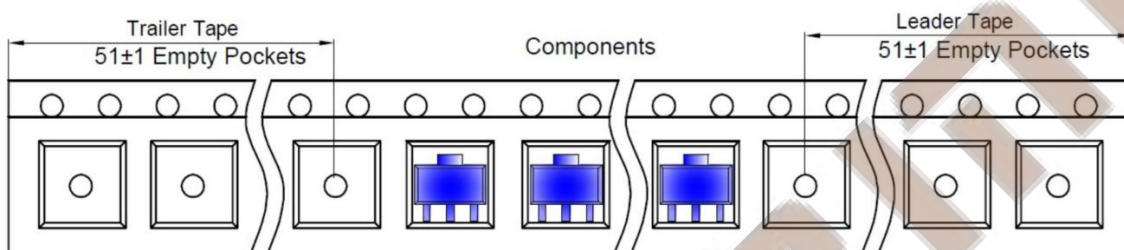
## Package Information

### Carrier Dimension(mm)

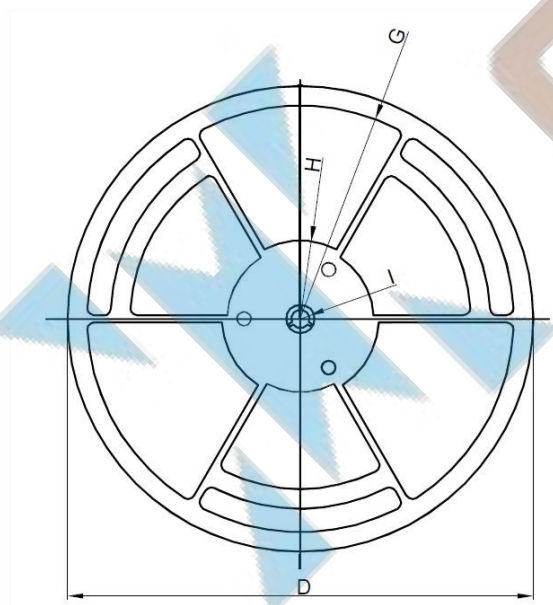
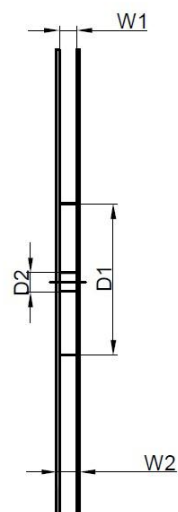


Dimensions are in millimeter

| Pkg Type | A     | B     | C    | d     | E    | F    | P0   | P    | P1   | W     |
|----------|-------|-------|------|-------|------|------|------|------|------|-------|
| SOT-223  | 6.765 | 7.335 | 1.88 | Ø1.50 | 1.75 | 5.50 | 4.00 | 8.00 | 2.00 | 12.00 |



### Reel Dimension(mm)



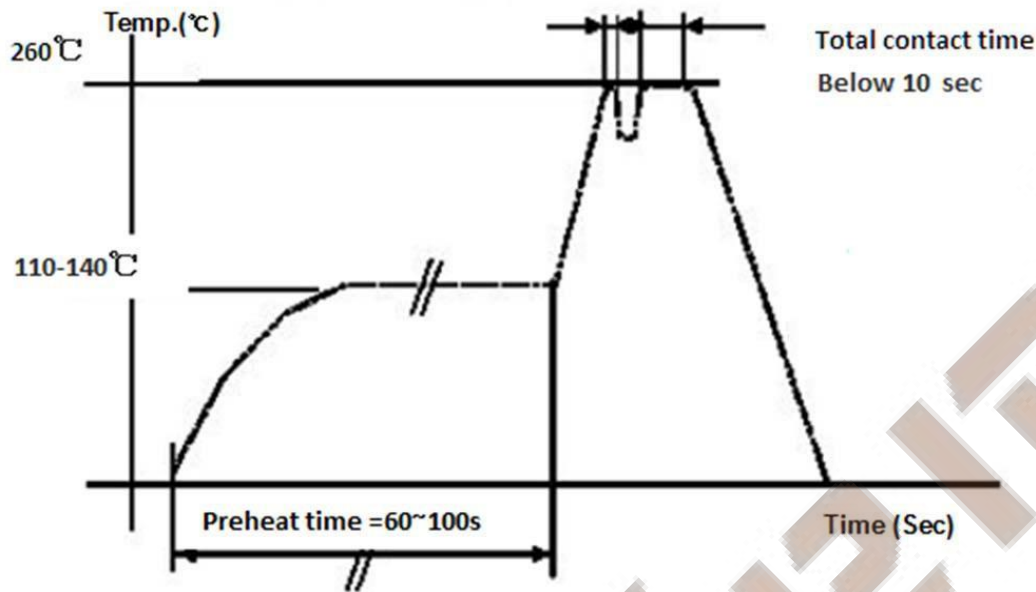
| Reel Option | D       | D1     | D2    | G       | H      | I     | W1    | W2    |
|-------------|---------|--------|-------|---------|--------|-------|-------|-------|
| 13"Dia      | Φ330.00 | 100.00 | 13.00 | R151.00 | R56.00 | R6.50 | 12.40 | 17.60 |

## Package Specifications

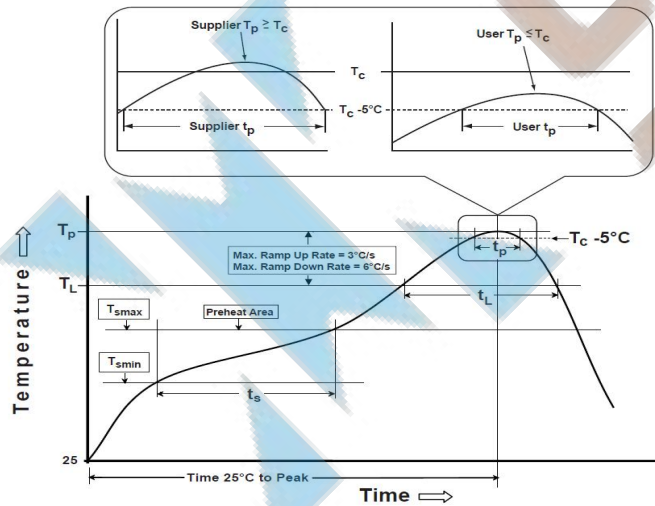
| Package | Reel Size | Reel DIA.<br>(mm) | Q'TY/Reel<br>(Kpcs) | Box Size<br>(mm) | QTY/Box<br>(Kpcs) | Carton Size<br>(mm) | Q'TY/Carton<br>(Kpcs) |
|---------|-----------|-------------------|---------------------|------------------|-------------------|---------------------|-----------------------|
| SOT223  | 13'       | 330               | 2.5                 | 340*345*45       | 5                 | 365*360*460         | 50                    |

## Recommended Soldering Profile for Rectifier Diodes (Pb Free)

### a) Wave Soldering Profile



### b) Reflow Soldering Profile (Pb Free Application), refer to IPC/JEDEC J-STD-020

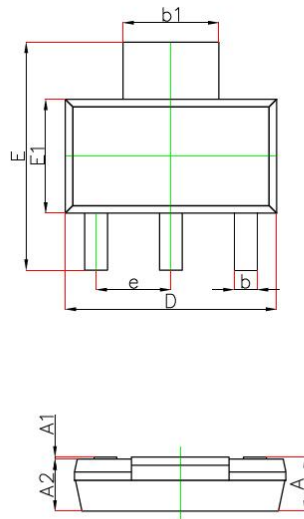
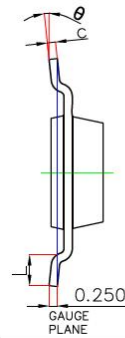


|                                                                                                  |                                   |
|--------------------------------------------------------------------------------------------------|-----------------------------------|
| Preheat/Soak Temperature Min (T Amin) Temperature Max (T smax) Time (ts) from (T Amin to T smax) | 50 °C<br>200 °C<br>60-120 seconds |
| Melting Point of Solder (Sn Ag Cu)                                                               | 217°C                             |
| Ramp-up Rate to 217°C(Melting Point of Solder)                                                   | 3°C/sec                           |
| Time at Temp.>217°C (Melting Point of Solder)                                                    | 60~150 Sec                        |
| Peak Temperature                                                                                 | 255±5°C                           |
| Time within 5°Cbelow Peak Temp.                                                                  | 20~40 Sec                         |
| Cooling Rate                                                                                     | 6°C/sec (max)                     |
| Time from 25°C to Peak Temp.                                                                     | 8min (max)                        |

### c) Manual Soldering

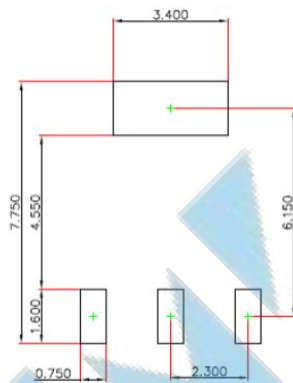
When using an electric soldering iron for manual soldering, it is recommended that the temperature does not exceed 300°C and the soldering time is less than 10 seconds.

## Package Mechanical Data



| Symbol | Dimensions in Millimeters |       | Dimensions in inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | —                         | 1.800 | —                    | 0.071 |
| A1     | 0.020                     | 0.100 | 0.001                | 0.004 |
| A2     | 1.500                     | 1.700 | 0.059                | 0.067 |
| b      | 0.660                     | 0.840 | 0.026                | 0.033 |
| b1     | 2.900                     | 3.100 | 0.114                | 0.122 |
| c      | 0.230                     | 0.350 | 0.009                | 0.014 |
| D      | 6.300                     | 6.700 | 0.248                | 0.264 |
| E      | 6.700                     | 7.300 | 0.264                | 0.287 |
| E1     | 3.300                     | 3.700 | 0.130                | 0.146 |
| e      | 2.300(BSC)                |       | 0.091(BSC)           |       |
| L      | 0.750                     | —     | 0.030                | —     |
| θ      | 0°                        | 10°   | 0°                   | 10°   |

## Suggested Pad Layout



**Note:**  
1. Controlling dimension: in millimeters.  
2. General tolerance:  $\pm 0.050\text{mm}$ .  
3. The pad layout is for reference purposes only.

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