

## Surface Mount Plastic PIN Diodes

Rev. V25

### Electrical Specifications @ +25°C

| Part #                         | Reverse Voltage <sup>1</sup><br>(V) | Total Capacitance <sup>2</sup><br>Maximum<br>(pF) | RS @ 10 mA <sup>3</sup><br>Maximum<br>(Ohms) | Nominal Characteristics               |                              |
|--------------------------------|-------------------------------------|---------------------------------------------------|----------------------------------------------|---------------------------------------|------------------------------|
|                                |                                     |                                                   |                                              | Carrier Lifetime <sup>4</sup><br>(µs) | I-Region Thickness<br>(mils) |
| MA4P7436<br>MADP-007436 Series | 75                                  | 1.00 @ 20 V                                       | 0.5                                          | 0.2                                   | 0.4                          |
| MA4P7433<br>MADP-007433 Series | 75                                  | 0.35 @ 20 V                                       | 1.5                                          | 0.2                                   | 0.4                          |
| MA4P7447<br>MADP-007155 Series | 100                                 | 1.20 @ 20 V                                       | 0.6                                          | 1.0                                   | 0.8                          |
| MADP-007448 Series             | 100                                 | 0.25 @ 50 V                                       | 2.0                                          | 0.4                                   | 0.6                          |
| MA4P7455<br>MADP-007455 Series | 100                                 | 0.35 @ 50 V                                       | 3.0                                          | 1.0                                   | 2.0                          |
| MA4P7437<br>MADP-007437 Series | 200                                 | 0.35 @ 50 V                                       | 6.0                                          | 2.0                                   | 4.0                          |
| MA4P7438<br>MADP-007438 Series | 200                                 | 0.35 @ 50 V                                       | 10.0                                         | 3.0                                   | 5.0                          |
| MADP-007167                    | 200                                 | 0.30 @ 50 V                                       | 16.0                                         | 3.0                                   | 7.0                          |

1. The reverse current will not exceed 10 µA at the reverse voltage rating.
2. Total capacitance is measured at 1 MHz at the indicated voltage.
3. Series resistance is measured at the specified current and a frequency of 100 MHz.
4. Nominal minority carrier lifetime is measured at  $I_F = 10$  mA,  $I_R = 6$  mA, 90% recovery.

### Absolute Maximum Ratings @ +25°C<sup>5</sup> (Unless Otherwise Noted)

| Parameter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Rating                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Operating Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -65°C to +150°C                                                                                 |
| Storage Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | -65°C to +125°C                                                                                 |
| Junction Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | +175°C                                                                                          |
| RF CW Incident Power:<br>MA4P7447, MADP-007155 Series ( $\theta$ die = 15°C/W), RF & DC Incident De-rating Coefficient = -21.3 mW/°C<br>MA4P7436, MADP-007436 Series ( $\theta$ die = 25°C/W), RF & DC Incident De-rating Coefficient = -16.8 mW/°C<br>MA4P7438, MADP-007438 Series ( $\theta$ die = 30°C/W), RF & DC Incident De-rating Coefficient = -13.3 mW/°C<br>MA4P7455, MADP-007455 Series ( $\theta$ die = 35°C/W), RF & DC Incident De-rating Coefficient = -13.3 mW/°C<br>MA4P7437, MADP-007437 Series ( $\theta$ die = 45°C/W), RF & DC Incident De-rating Coefficient = -13.3 mW/°C<br>MADP-007167 Series ( $\theta$ die = 55°C/W), RF & DC Incident De-rating Coefficient = -13.3 mW/°C<br>MA4P7433, MADP-007433 Series ( $\theta$ die = 80°C/W), RF & DC Incident De-rating Coefficient = -10.7 mW/°C<br>MADP-007448 Series ( $\theta$ die = 80°C/W), RF & DC Incident De-rating Coefficient = -10.7 mW/°C | +32 dBm<br>+31 dBm<br>+30 dBm<br>+30 dBm<br>+30 dBm<br>+30 dBm<br>+30 dBm<br>+29 dBm<br>+32 dBm |
| Total (RF + DC) Power Dissipation:<br>(SOT-23): RF & DC Dissipated De-rating Coefficient = -33.3 mW/°C<br>(SOT-323, SOD-323, SC-79): RF & DC Dissipated De-rating Coefficient = -26.7 mW/°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 250 mW<br>200 mW                                                                                |
| Reverse Voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Voltage Rating                                                                                  |
| Forward Current                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 150 mA DC                                                                                       |

5. Operation of these devices above any one of these parameters may cause permanent damage.

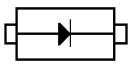
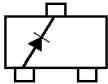
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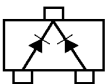
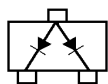
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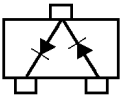
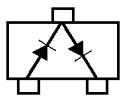
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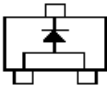
### Packaging and Configurations

|  |                                               |  |                                               |
|-----------------------------------------------------------------------------------|-----------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------|
| Single                                                                            |                                               | Single                                                                              |                                               |
| SC-79 Part #                                                                      | SOD-323 Part #                                | SOT-23 Part #                                                                       | SC70 (3L) Part #                              |
| $L_s = 0.6 \text{ nH}, C_p = 0.10 \text{ pF}$                                     | $L_s = 1.3 \text{ nH}, C_p = 0.11 \text{ pF}$ | $L_s = 1.4 \text{ nH}, C_p = 0.12 \text{ pF}$                                       | $L_s = 1.3 \text{ nH}, C_p = 0.12 \text{ pF}$ |
| MADP-007436-12790T                                                                | MA4P7436-1141T                                | MA4P7436-287T                                                                       | MA4P7436-1146T                                |
| MADP-007433-12790T                                                                | MA4P7433-1141T                                | MA4P7433-287T                                                                       | —                                             |
| —                                                                                 | MA4P7447-1141T                                | MA4P7447-287T                                                                       | —                                             |
| MADP-007448-12790T                                                                | MADP-007448-11410T                            | MADP-007448-0287AT                                                                  | —                                             |
| MADP-007455-12790T                                                                | MA4P7455-1141T                                | MA4P7455-287T                                                                       | —                                             |
| —                                                                                 | MA4P7437-1141T                                | MA4P7437-287T                                                                       | —                                             |
| —                                                                                 | MA4P7438-1141T                                | MA4P7438-287T                                                                       | —                                             |
| —                                                                                 | MADP-007167-11410T                            | MADP-007167-0287AT                                                                  | —                                             |

|  |                                               |  |                                               |
|-------------------------------------------------------------------------------------|-----------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------|
| Common Cathode                                                                      |                                               | Common Anode                                                                          |                                               |
| SOT-23 Part #                                                                       | SC70 (3L) Part #                              | SOT-23 Part #                                                                         | SC70 (3L) Part #                              |
| $L_s = 1.4 \text{ nH}, C_p = 0.12 \text{ pF}$                                       | $L_s = 1.3 \text{ nH}, C_p = 0.12 \text{ pF}$ | $L_s = 1.4 \text{ nH}, C_p = 0.12 \text{ pF}$                                         | $L_s = 1.3 \text{ nH}, C_p = 0.12 \text{ pF}$ |
| MA4P7436CK-287T                                                                     | MA4P7436CK-1146T                              | MA4P7436CA-287T                                                                       | MA4P7436CA-1146T                              |
| MA4P7433CK-287T                                                                     | MA4P7433CK-1146T                              | MA4P7433CA-287T                                                                       | MA4P7433CA-1146T                              |
| MA4P7447CK-287T                                                                     | —                                             | MA4P7447CA-287T                                                                       | —                                             |
| MADP-007448-0287FT                                                                  | —                                             | MADP-007448-0287GT                                                                    | MADP-007448-1146GT                            |
| MA4P7455CK-287T                                                                     | MA4P7455CK-1146T                              | MA4P7455CA-287T                                                                       | MA4P7455CA-1146T                              |
| MADP-007437-0287FT                                                                  | —                                             | MA4P7437CA-287T                                                                       | —                                             |
| MADP-007438-0287FT                                                                  | —                                             | MA4P7438CA-287T                                                                       | —                                             |
| MADP-007167-0287FT                                                                  | —                                             | MADP-007167-0287GT                                                                    | —                                             |

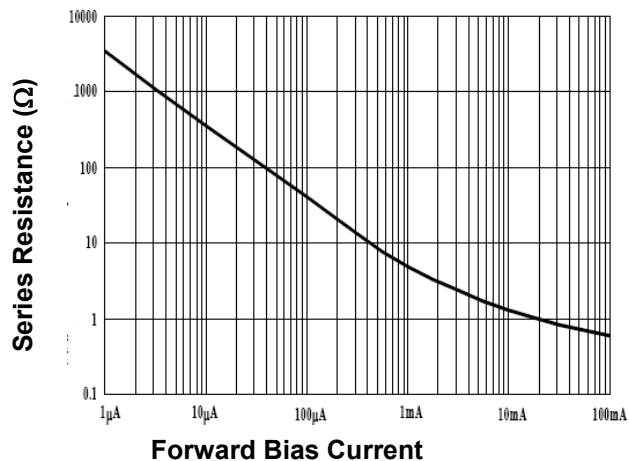
### Packaging and Configurations

|  |                                               |  |                                               |
|-----------------------------------------------------------------------------------|-----------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------|
| Series Tee                                                                        |                                               | Series Tee Reverse                                                                  |                                               |
| SOT-23 Part #                                                                     | SC70 (3L) Part #                              | SOT-23 Part #                                                                       | SC70 (3L) Part #                              |
| $L_S = 1.4 \text{ nH}, C_P = 0.12 \text{ pF}$                                     | $L_S = 1.3 \text{ nH}, C_P = 0.12 \text{ pF}$ | $L_S = 1.4 \text{ nH}, C_P = 0.12 \text{ pF}$                                       | $L_S = 1.3 \text{ nH}, C_P = 0.12 \text{ pF}$ |
| MA4P7436ST-287T                                                                   | MA4P7436ST-1146T                              | MADP-007436-0287DT                                                                  | MADP-007436-1146DT                            |
| MA4P7433ST-287T                                                                   | MA4P7433ST-1146T                              | MADP-007433-0287DT                                                                  | MADP-007433-1146DT                            |
| MA4P7447ST-287T                                                                   | —                                             | MADP-007155-0287DT                                                                  | —                                             |
| MADP-007448-0287BT                                                                | MADP-007448-1146BT                            | MADP-007448-0287DT                                                                  | MADP-007448-1146DT                            |
| MA4P7455ST-287T                                                                   | MA4P7455ST-1146T                              | MADP-007455-0287DT                                                                  | MADP-007455-1146DT                            |
| MADP-007437-0287BT                                                                | —                                             | MADP-007437-0287DT                                                                  | —                                             |
| MADP-007438-0287BT                                                                | —                                             | MADP-007438-0287DT                                                                  | —                                             |
| MADP-007167-0287BT                                                                | —                                             | MADP-007167-0287DT                                                                  | —                                             |

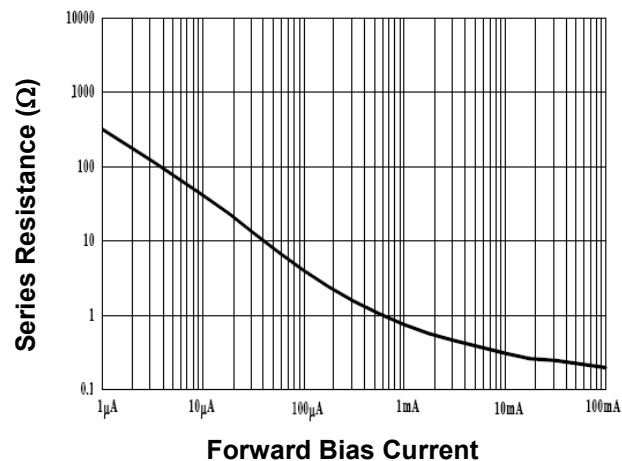
|  |
|-------------------------------------------------------------------------------------|
| Low Inductance                                                                      |
| SOT-23 Part #                                                                       |
| $L_S = 0.4 \text{ nH}, C_P = 0.12 \text{ pF}$                                       |
| MADP-007167-0287HT                                                                  |
| MADP-007433-0287HT                                                                  |

### Typical Forward Resistance vs. DC Bias Current Curves @ 100 MHz

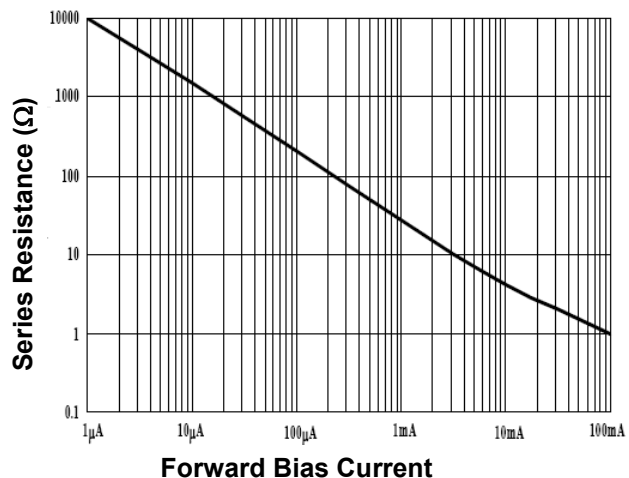
*Resistance vs. Forward Current  
(MA4P7455 /MADP-007155 Series)*



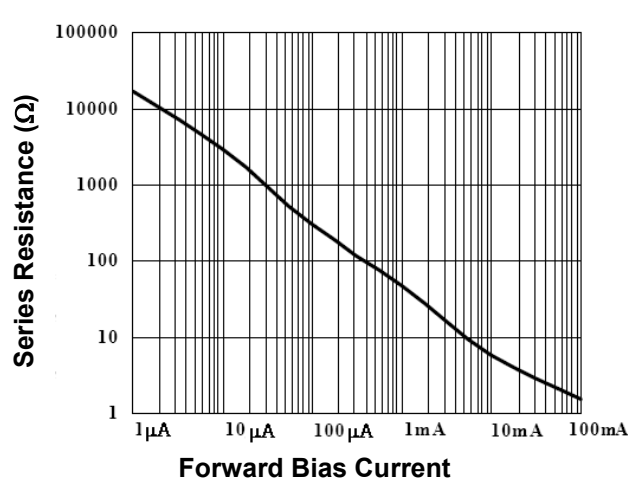
*Resistance vs. Forward Current  
(MA4P7436 /MADP-007436 Series)*



*Resistance vs. Forward Current  
(MA4P7437 /MADP-007437 Series)*

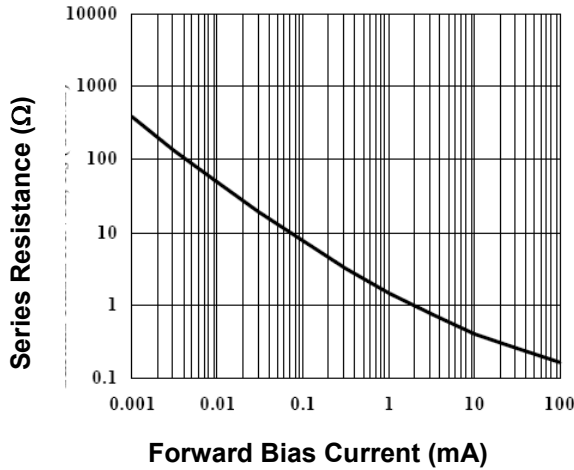


*Resistance vs. Forward Current  
(MA4P7438 /MADP-007438 Series)*

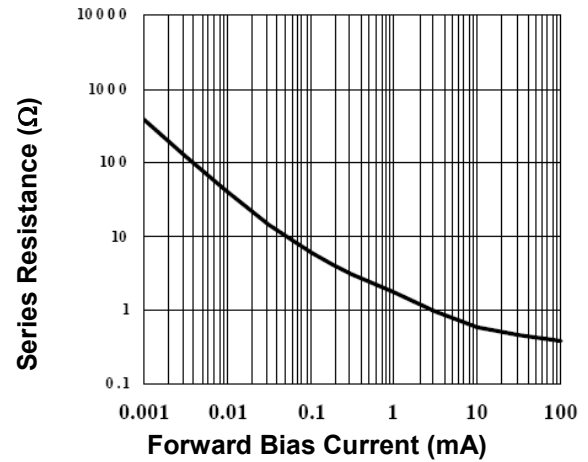


### Typical Forward Resistance vs. DC Bias Current Curves @ 100 MHz

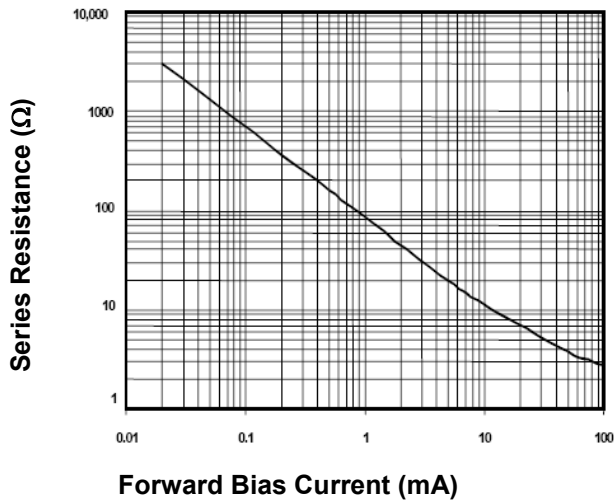
**Resistance vs. Forward Current**  
(MA4P7447 / MADP-007155 Series)



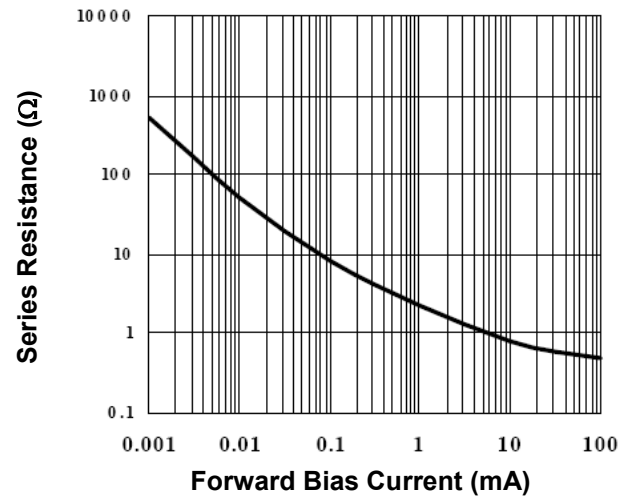
**Resistance vs. Forward Current**  
(MA4P7433/ MADP-007433 Series)



**Resistance vs. Forward Current**  
(MADP-007167 Series)

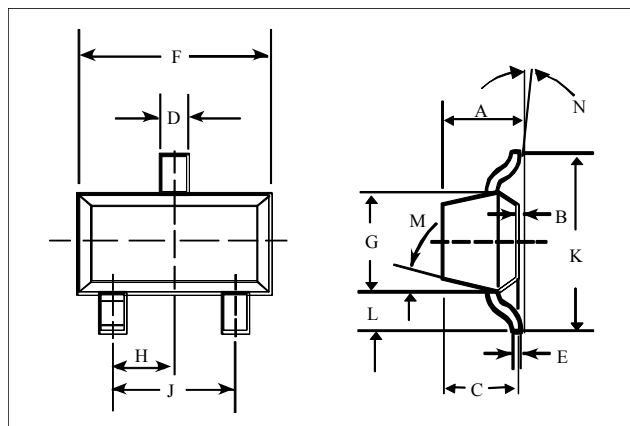


**Resistance vs. Forward Current**  
(MADP-007448 Series)



### Case Styles

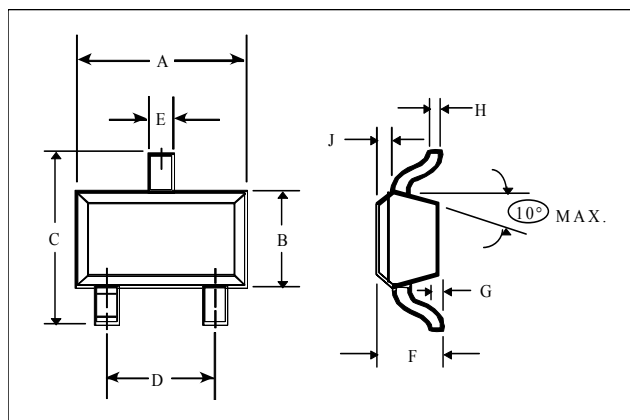
#### SOT-23 (Case Style 287)



| DIM. | INCHES                |       | MILLIMETERS  |      |
|------|-----------------------|-------|--------------|------|
|      | MIN.                  | MAX.  | MIN.         | MAX. |
| A    | —                     | 0.048 | —            | 1.22 |
| B    | —                     | 0.008 | —            | 0.20 |
| C    | —                     | 0.040 | —            | 1.00 |
| D    | 0.013                 | 0.020 | 0.35         | 0.50 |
| E    | 0.003                 | 0.006 | 0.08         | 0.15 |
| F    | 0.110                 | 0.119 | 2.80         | 3.00 |
| G    | 0.047                 | 0.056 | 1.20         | 1.40 |
| H    | 0.037 typical         |       | 0.95 typical |      |
| J    | 0.075 typical         |       | 1.90 typical |      |
| K    | —                     | 0.103 | —            | 2.60 |
| L    | —                     | 0.024 | —            | 0.60 |
| DIM. | GRADIENT              |       |              |      |
| M    | 10° max. <sup>6</sup> |       |              |      |
| N    | 2° . . . 30°          |       |              |      |

6. Applicable on all sides

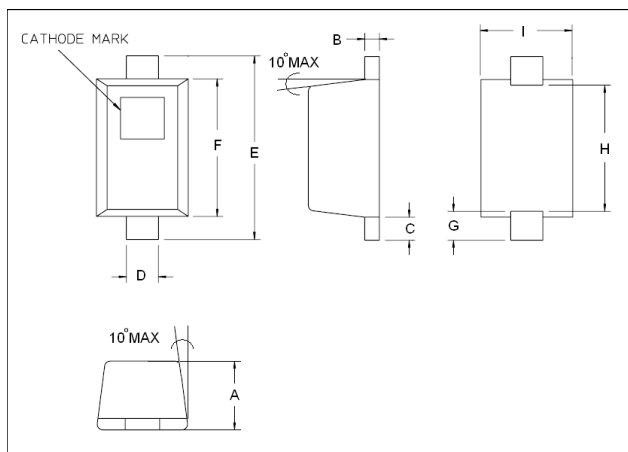
#### SC-70, 3 Lead (Case Style 1146)



| DIM. | INCHES |       | MILLIMETERS |      |
|------|--------|-------|-------------|------|
|      | MIN.   | MAX.  | MIN.        | MAX. |
| A    | 0.071  | 0.087 | 1.80        | 2.21 |
| B    | 0.045  | 0.053 | 1.14        | 1.35 |
| C    | 0.071  | 0.094 | 1.80        | 2.39 |
| D    | 0.047  | 0.057 | 1.19        | 1.45 |
| E    | 0.010  | 0.016 | 0.25        | 0.41 |
| F    | 0.031  | 0.039 | 0.79        | 1.00 |
| G    | 0.000  | 0.004 | 0.00        | 0.10 |
| H    | 0.004  | 0.007 | 0.10        | 0.18 |
| J    | 0.004  | 0.010 | 0.10        | 0.25 |

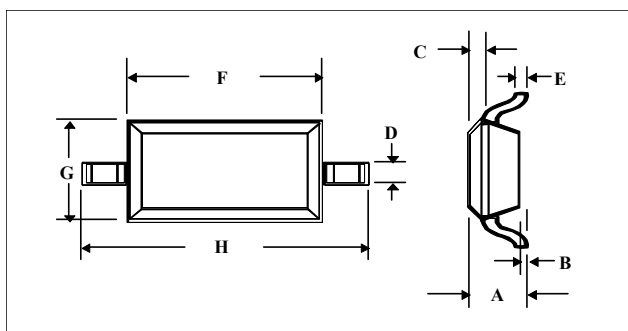
### Case Styles (Cont'd)

#### SC-79 (Case Style 1279)



| DIM. | INCHES         |        | MILLIMETERS   |      |
|------|----------------|--------|---------------|------|
|      | MIN.           | MAX.   | MIN.          | MAX. |
| A    | 0.0197         | 0.0276 | 0.50          | 0.70 |
| B    | 0.003          | 0.008  | 0.07          | 0.20 |
| C    | 0.006          | 0.010  | 0.15          | 0.25 |
| D    | 0.010          | 0.014  | 0.25          | 0.35 |
| E    | 0.059          | 0.067  | 1.50          | 1.70 |
| F    | 0.043          | 0.051  | 1.09          | 1.30 |
| G    | 0.0098 nominal |        | 0.250 nominal |      |
| H    | 0.0433 nominal |        | 1.10 nominal  |      |
| I    | 0.027          | 0.035  | 0.68          | 0.89 |

#### SOD-323 (Case Style 1141)



| DIM. | INCHES |       | MILLIMETERS |      |
|------|--------|-------|-------------|------|
|      | MIN.   | MAX.  | MIN.        | MAX. |
| A    | —      | 0.043 | —           | 1.1  |
| B    | —      | 0.004 | —           | 0.1  |
| C    | —      | 0.008 | —           | 0.2  |
| D    | 0.010  | 0.016 | 0.25        | 0.41 |
| E    | 0.003  | 0.006 | 0.07        | 0.15 |
| F    | 0.063  | 0.075 | 1.6         | 1.9  |
| G    | 0.045  | 0.057 | 1.14        | 1.45 |
| H    | 0.091  | 0.106 | 2.3         | 2.7  |

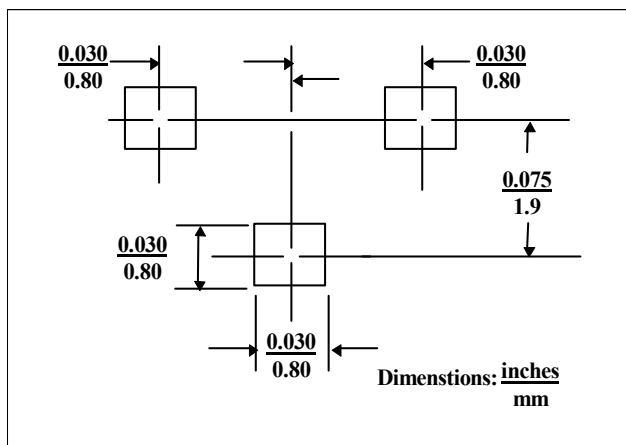
### Mounting Information

The illustration indicates the recommended mounting pad configuration for the SOT-23, SOT-323, SOD-323, and SC-79 packages. Solder paste containing flux should be screened onto the pads to a thickness of 0.005- 0.007 inches. The plastic package is placed in position, firmly adhering to the solder paste.

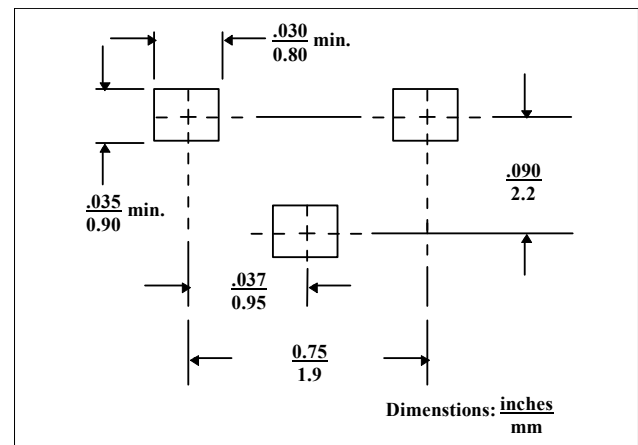
Permanent attachment is performed by a reflow soldering procedure during which the tab temperature does not exceed +275°C and the body temperature does not exceed +250°C, for standard models and +260°C for the RoHS compliant devices.

Please refer to Application Note M538 for surface mounting instructions.

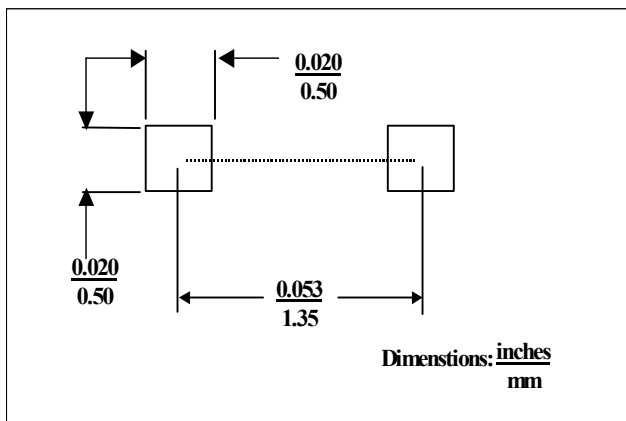
### SOT-323



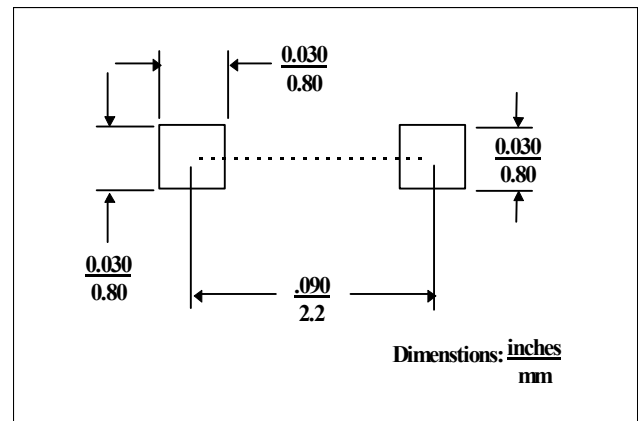
### SOT-23



### SC-79



### SOD-323





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