

Features

- Industry Standard Surface Mount Packages
- Lead-Free (RoHS* Compliant)
- Available with 260°C Reflow Compatibility
- Low Loss, High Isolation Switching Diodes
- Low Distortion Attenuator Diodes
- Single and Dual Diode Configurations
- Tape and Reel Packaging

Description and Applications

MACOM offers silicon PIN diodes in five standard, low cost, surface mount plastic packages for use as switches and attenuators. These diodes are offered with 100% matte Sn plating. These PIN diodes feature a variety of I-region lengths resulting in lower resistance, and lower capacitance devices for various microwave control circuit applications.

The MA4P7436, and MADP-007436 series offer the lowest series resistance for best performance as low loss series switches and high isolation shunt switches.

The MA4P7433, and MADP-007433 series have the lowest capacitance and offers the highest isolation in series and series-shunt switches through 3 GHz.

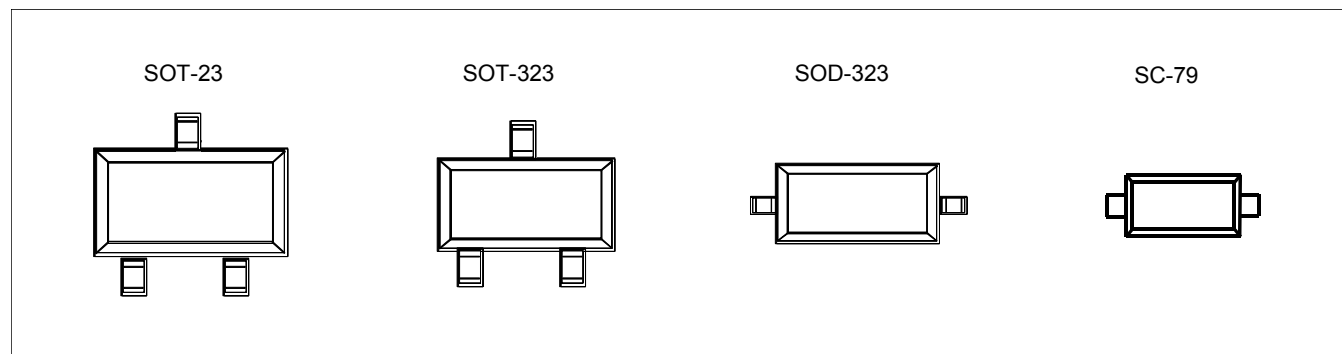
The MA4P7447, MADP-007155 series, MA4P7455, MADP-007455 series and the MADP-007448 series are general purpose PIN diodes useful as either switches or attenuators.

The MA4P7437, MADP-007437 series and MA4P7438, MADP-007438 series device have thicker intrinsic regions to provide lower distortion in attenuator circuits.

The MADP-007167 series devices have the thickest I-Region, offering the lowest distortion and highest IP3 for current controlled attenuator circuits. These devices are ideal for AGC functions for infrastructure and CATV applications.

These parts are available as single diodes, series tees (ST), series tee reverse (STR), common cathode pairs (CK), and common anode pairs (CA). MACOM's PIN diodes are available in the SOT-23 (case style 287), the SOT-323/SC-70(3L) (case style 1146), the SOD-323 (case style 1141), and the SC-79 (case style 1279) packages. These packages are supplied on tape and reel for automatic pick and place assembly. The tape and reel suffix designation is a "T" at the end of the part number.

Package Outlines



* Restrictions on Hazardous Substances, European Union Directive 2011/65/EU.

Surface Mount Plastic PIN Diodes

Rev. V25

Electrical Specifications @ +25°C

| Part # | Reverse Voltage ¹ (V) | Total Capacitance ² Maximum (pF) | RS @ 10 mA ³ Maximum (Ohms) | Nominal Characteristics | |
|--------------------------------|-------------------------------------|---|--|---------------------------------------|------------------------------|
| | | | | Carrier Lifetime ⁴ (µs) | I-Region Thickness (mils) |
| MA4P7436 MADP-007436 Series | 75 | 1.00 @ 20 V | 0.5 | 0.2 | 0.4 |
| MA4P7433 MADP-007433 Series | 75 | 0.35 @ 20 V | 1.5 | 0.2 | 0.4 |
| MA4P7447 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 MADP-007455 Series | 100 | 0.35 @ 50 V | 3.0 | 1.0 | 2.0 |
| MA4P7437 MADP-007437 Series | 200 | 0.35 @ 50 V | 6.0 | 2.0 | 4.0 |
| MA4P7438 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°C⁵ (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: MA4P7447, MADP-007155 Series (θ die = 15°C/W), RF & DC Incident De-rating Coefficient = -21.3 mW/°C MA4P7436, MADP-007436 Series (θ die = 25°C/W), RF & DC Incident De-rating Coefficient = -16.8 mW/°C MA4P7438, MADP-007438 Series (θ die = 30°C/W), RF & DC Incident De-rating Coefficient = -13.3 mW/°C MA4P7455, MADP-007455 Series (θ die = 35°C/W), RF & DC Incident De-rating Coefficient = -13.3 mW/°C MA4P7437, MADP-007437 Series (θ die = 45°C/W), RF & DC Incident De-rating Coefficient = -13.3 mW/°C MADP-007167 Series (θ die = 55°C/W), RF & DC Incident De-rating Coefficient = -13.3 mW/°C MA4P7433, MADP-007433 Series (θ die = 80°C/W), RF & DC Incident De-rating Coefficient = -10.7 mW/°C MADP-007448 Series (θ die = 80°C/W), RF & DC Incident De-rating Coefficient = -10.7 mW/°C | +32 dBm +31 dBm +30 dBm +30 dBm +30 dBm +30 dBm +30 dBm +29 dBm +32 dBm |
| Total (RF + DC) Power Dissipation: (SOT-23): RF & DC Dissipated De-rating Coefficient = -33.3 mW/°C (SOT-323, SOD-323, SC-79): RF & DC Dissipated De-rating Coefficient = -26.7 mW/°C | 250 mW 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.

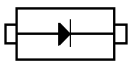
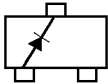
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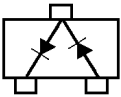
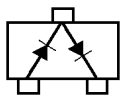
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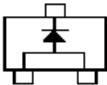
Packaging and Configurations

|  | |  | |
|---|---|---|---|
| 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 | — |

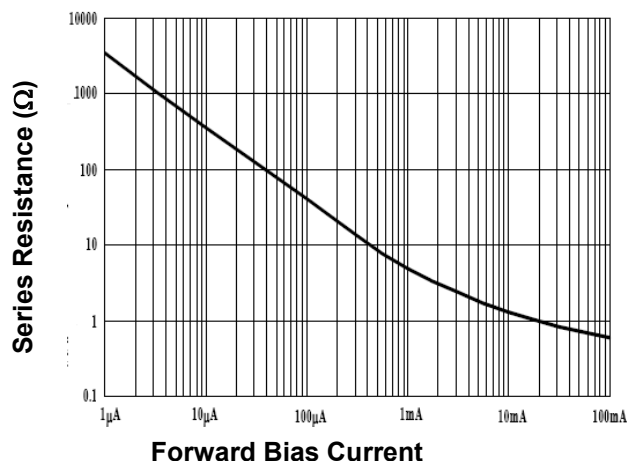
Packaging and Configurations

|  | |  | |
|---|---|---|---|
| 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 | — |

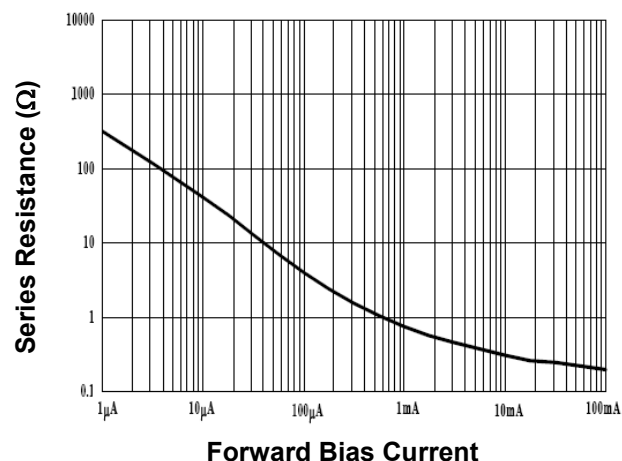
|  |
|---|
| Low Inductance |
| SOT-23 Part # |
| $L_S = 0.4 \text{ nH}, C_P = 0.12 \text{ pF}$ |
| MADP-007167-0287HT |
| MADP-007433-0287HT |

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

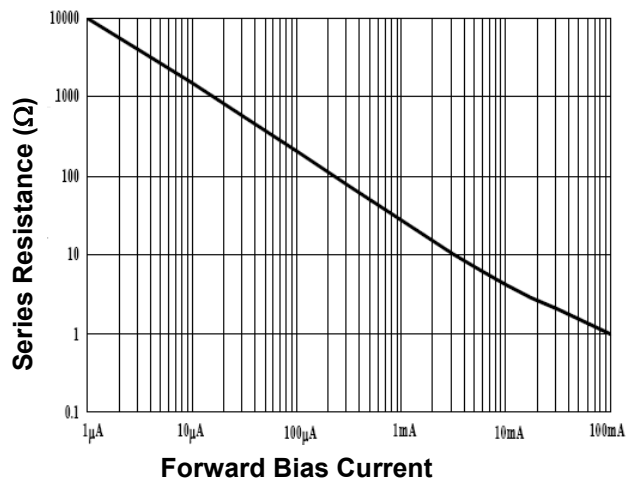
*Resistance vs. Forward Current
(MA4P7455 /MADP-007155 Series)*



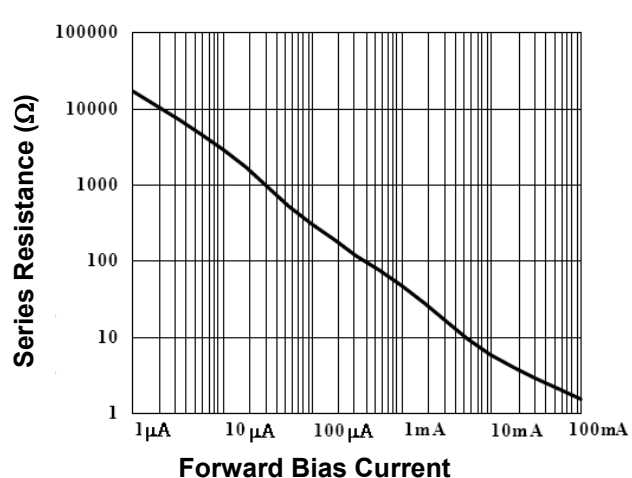
*Resistance vs. Forward Current
(MA4P7436 /MADP-007436 Series)*



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

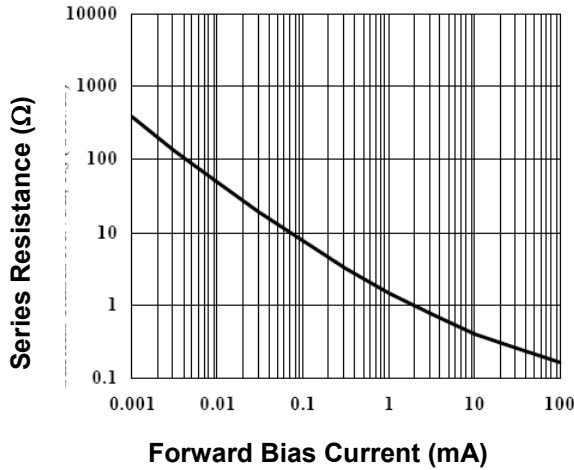


*Resistance vs. Forward Current
(MA4P7438 /MADP-007438 Series)*

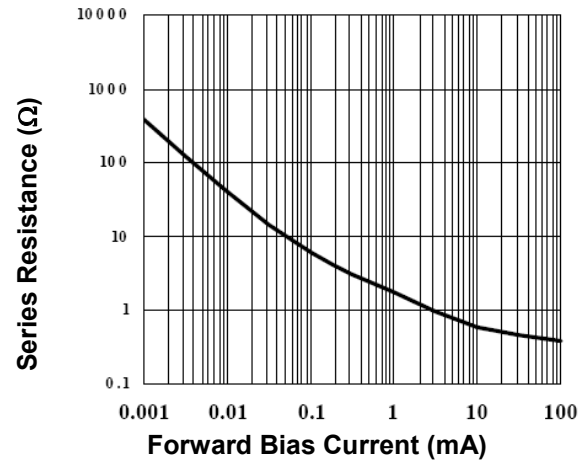


Typical Forward Resistance vs. DC Bias Current Curves @ 100 MHz

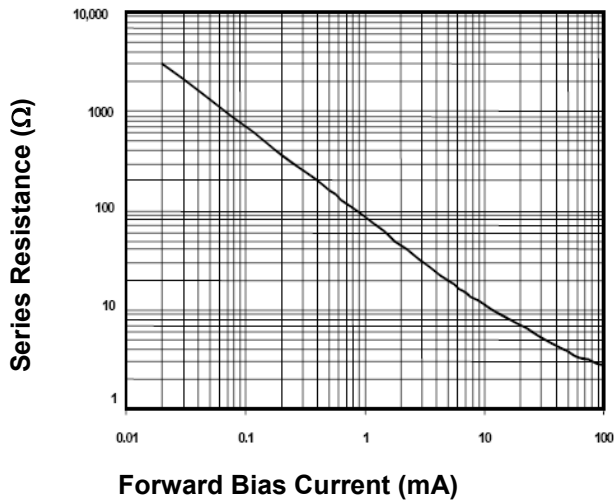
Resistance vs. Forward Current
(MA4P7447 / MADP-007155 Series)



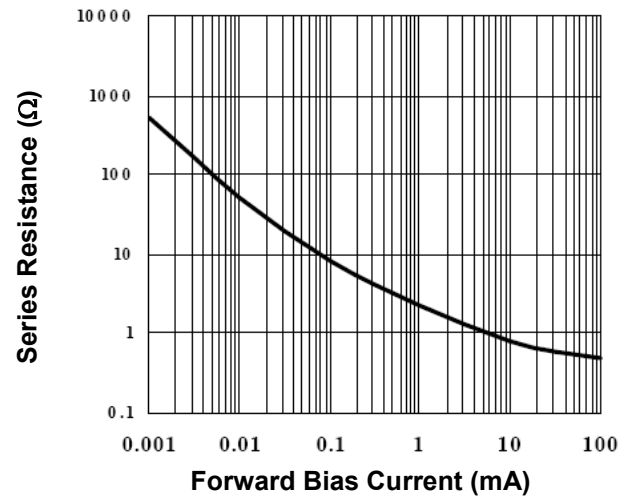
Resistance vs. Forward Current
(MA4P7433/ MADP-007433 Series)



Resistance vs. Forward Current
(MADP-007167 Series)

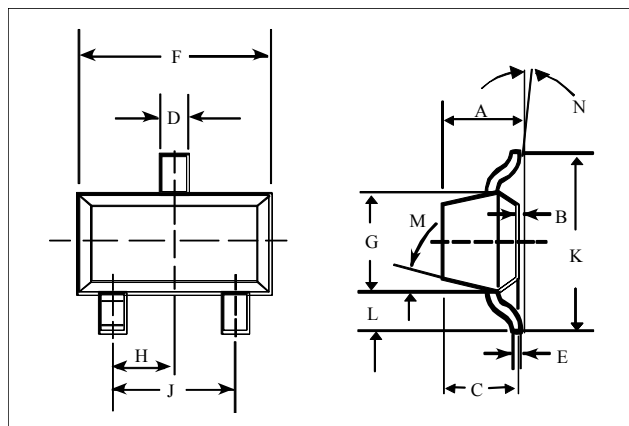


Resistance vs. Forward Current
(MADP-007448 Series)



Case Styles

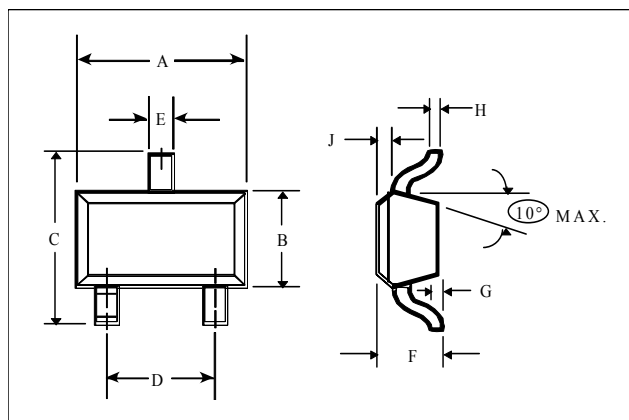
SOT-23 (Case Style 287)



| 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. ⁶ | | | |
| N | 2° . . . 30° | | | |

6. Applicable on all sides

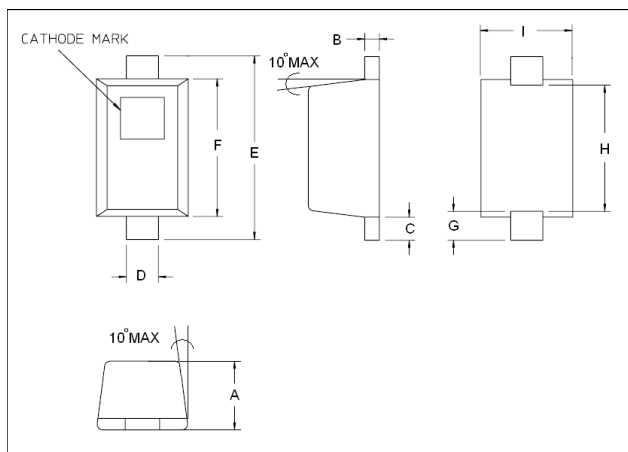
SC-70, 3 Lead (Case Style 1146)



| 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 |

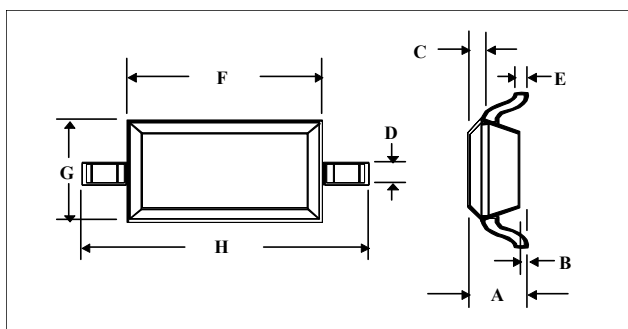
Case Styles (Cont'd)

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 |

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- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
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- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

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JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



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