

# Switch-Mode Power Rectifiers

## MUR405, MUR410, MUR415, MUR420, MUR440, MUR460

These state-of-the-art devices are a series designed for use in switching power supplies, inverters and as free wheeling diodes.

### Features

- Ultrafast 25 ns, 50 ns and 75 ns Recovery Times
- 175°C Operating Junction Temperature
- Low Forward Voltage
- Low Leakage Current
- High Temperature Glass Passivated Junction
- Reverse Voltage to 600 V
- Shipped in Plastic Bags, 500 per Bag
- Available in Tape and Reel, 1500 per Reel, by Adding a “RLG” Suffix to the Part Number
- MUR460 available in Fan Fold Ammo Pak, 1000 per Box, by adding a “FFG” suffix to the part number
- These are Pb-Free Packages\*

### Mechanical Characteristics:

- Case: Epoxy, Molded
- Weight: 1.1 Gram (Approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes: 260°C Max. for 10 Seconds
- Polarity: Cathode indicated by Polarity Band



**ON Semiconductor®**

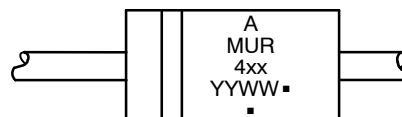
[www.onsemi.com](http://www.onsemi.com)

## ULTRAFAST RECTIFIERS 4.0 AMPERES, 50–600 VOLTS



**AXIAL LEAD  
CASE 267  
STYLE 1**

### MARKING DIAGRAM



A = Assembly Location  
MUR4xx = Device Number  
x = 05, 10, 15, 20, 40, 60  
YY = Year  
WW = Work Week  
■ = Pb-Free Package

(Note: Microdot may be in either location)

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 3 of this data sheet.

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

# MUR405, MUR410, MUR415, MUR420, MUR440, MUR460

## MAXIMUM RATINGS

| Rating                                                                                                       | Symbol                          | MUR                              |     |     |     |                                  |     | Unit               |
|--------------------------------------------------------------------------------------------------------------|---------------------------------|----------------------------------|-----|-----|-----|----------------------------------|-----|--------------------|
|                                                                                                              |                                 | 405                              | 410 | 415 | 420 | 440                              | 460 |                    |
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage                       | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | 50                               | 100 | 150 | 200 | 400                              | 600 | V                  |
| Average Rectified Forward Current (Square Wave)<br>(Mounting Method #3 Per Note 2)                           | $I_{F(AV)}$                     | 4.0 @ $T_A = 80^{\circ}\text{C}$ |     |     |     | 4.0 @ $T_A = 40^{\circ}\text{C}$ |     | A                  |
| Nonrepetitive Peak Surge Current<br>(Surge applied at rated load conditions, half wave, single phase, 60 Hz) | $I_{FSM}$                       | 125                              |     |     |     | 110                              |     | A                  |
| Operating Junction Temperature & Storage Temperature                                                         | $T_J, T_{stg}$                  | - 65 to +175                     |     |     |     |                                  |     | $^{\circ}\text{C}$ |

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.

## THERMAL CHARACTERISTICS

| Rating                                            | Symbol             | MUR        |     |     |     |     |     | Unit               |
|---------------------------------------------------|--------------------|------------|-----|-----|-----|-----|-----|--------------------|
|                                                   |                    | 405        | 410 | 415 | 420 | 440 | 460 |                    |
| Maximum Thermal Resistance, Junction-to-Ambient   | $R_{\theta JA}$    | See Note 2 |     |     |     |     |     | $^\circ\text{C/W}$ |
| Maximum Thermal Resistance, Junction-to-Case Body | $\Psi_{\theta JC}$ | 6.6        |     |     |     |     |     | $^\circ\text{C/W}$ |

## ELECTRICAL CHARACTERISTICS

| Rating                                                                                                                                                                                                               | Symbol     | MUR                  |     |     |     |                      |     | Unit          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------------------|-----|-----|-----|----------------------|-----|---------------|
|                                                                                                                                                                                                                      |            | 405                  | 410 | 415 | 420 | 440                  | 460 |               |
| Maximum Instantaneous Forward Voltage (Note 1)<br>( $I_F = 3.0\text{ A}$ , $T_J = 150^\circ\text{C}$ )<br>( $I_F = 3.0\text{ A}$ , $T_J = 25^\circ\text{C}$ )<br>( $I_F = 4.0\text{ A}$ , $T_J = 25^\circ\text{C}$ ) | $V_F$      | 0.71<br>0.88<br>0.89 |     |     |     | 1.05<br>1.25<br>1.28 |     | V             |
| Maximum Instantaneous Reverse Current (Note 1)<br>(Rated dc Voltage, $T_J = 150^\circ\text{C}$ )<br>(Rated dc Voltage, $T_J = 25^\circ\text{C}$ )                                                                    | $i_R$      | 150<br>5             |     |     |     | 250<br>10            |     | $\mu\text{A}$ |
| Maximum Reverse Recovery Time<br>( $I_F = 1.0\text{ A}$ , $di/dt = 50\text{ A}/\mu\text{s}$ )<br>( $I_F = 0.5\text{ A}$ , $i_R = 1.0\text{ A}$ , $I_{REC} = 0.25\text{ A}$ )                                         | $t_{rr}$   | 35<br>25             |     |     |     | 75<br>50             |     | ns            |
| Maximum Forward Recovery Time<br>( $I_F = 1.0\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$ , Recovery to 1.0 V)                                                                                                    | $t_{fr}$   | 25                   |     |     |     | 50                   |     | ns            |
| Controlled Avalanche Energy (Maximum)                                                                                                                                                                                | $W_{aval}$ | 5                    |     |     |     |                      |     | mJ            |
| Typical Peak Reverse Recovery Current<br>( $I_F = 1.0\text{ A}$ , $di/dt = 50\text{ A}/\mu\text{s}$ )                                                                                                                | $I_{RM}$   | 0.8                  |     |     |     | 1.7                  |     | A             |

1. Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

## MUR405, MUR410, MUR415, MUR420, MUR440, MUR460

### ORDERING INFORMATION

| Device    | Package     | Shipping†          |
|-----------|-------------|--------------------|
| MUR405G   | Axial Lead* | 500 Units / Bag    |
| MUR410G   | Axial Lead* |                    |
| MUR410RLG | Axial Lead* | 1500 / Tape & Reel |
| MUR415G   | Axial Lead* | 500 Units / Bag    |
| MUR415RLG | Axial Lead* | 1500 / Tape & Reel |
| MUR420G   | Axial Lead* | 500 Units / Bag    |
| MUR420RLG | Axial Lead* | 1500 / Tape & Reel |
| MUR440G   | Axial Lead* | 500 Units / Bag    |
| MUR440RLG | Axial Lead* | 1500 / Tape & Reel |
| MUR460G   | Axial Lead* | 500 Units / Bag    |
| MUR460FFG | Axial Lead* | 1000 Units / Box   |
| MUR460RLG | Axial Lead* | 1500 / Tape & Reel |

†For information on tape and reel and ammo pak specifications, including part orientation, tape sizes and box dimensions, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

\*These packages are inherently Pb-Free.

# MUR405, MUR410, MUR415, MUR420, MUR440, MUR460

## MUR405, MUR410, MUR415, MUR420

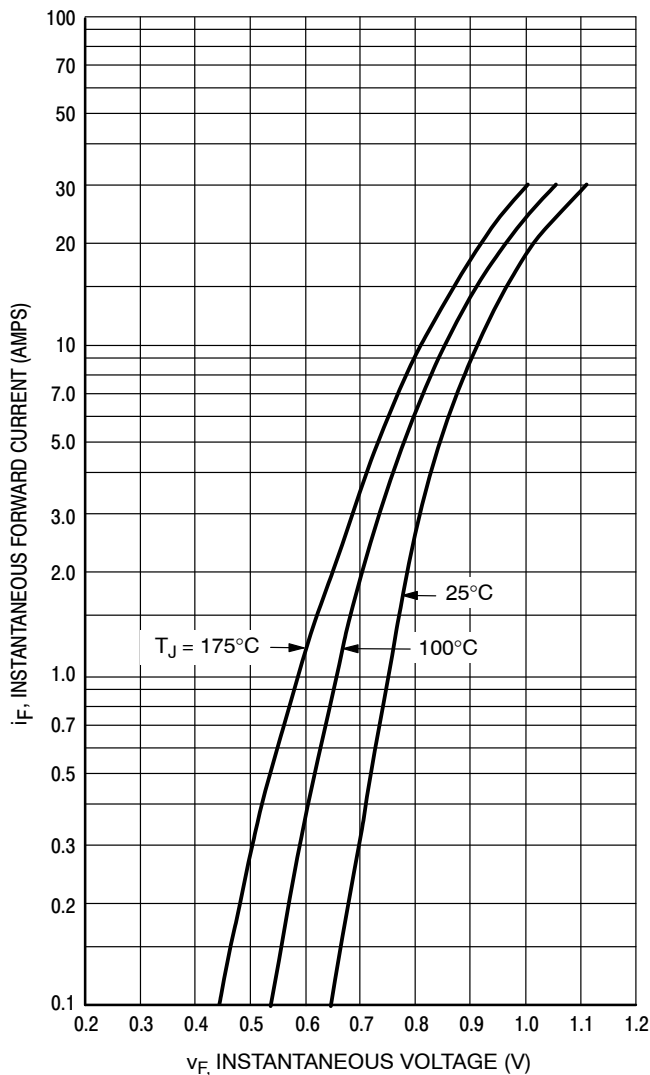


Figure 1. Typical Forward Voltage

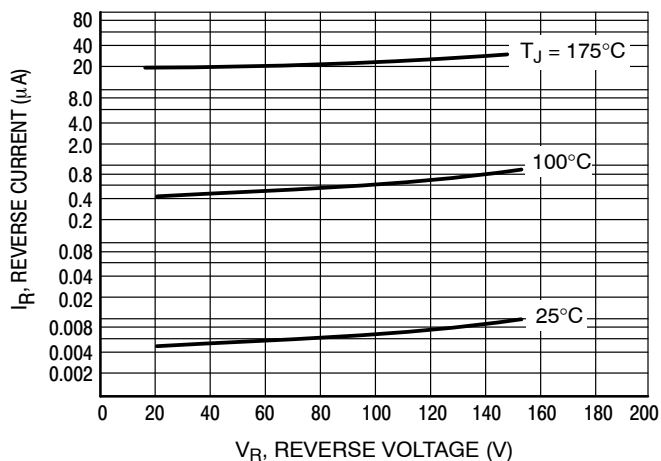


Figure 2. Typical Reverse Current

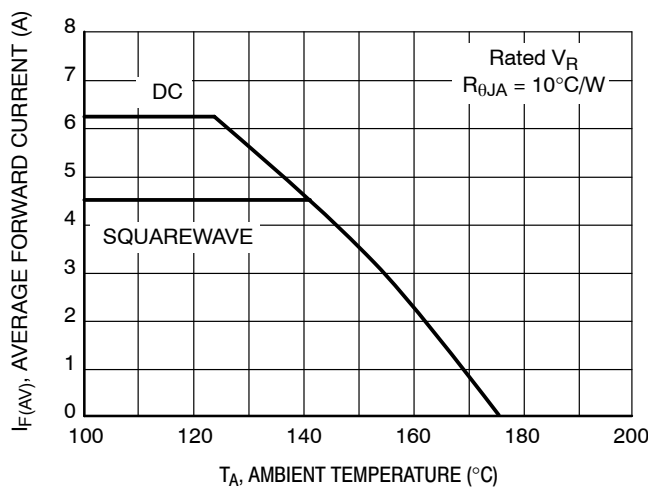


Figure 3. Current Derating  
(Mounting Method #3 Per Note 2)

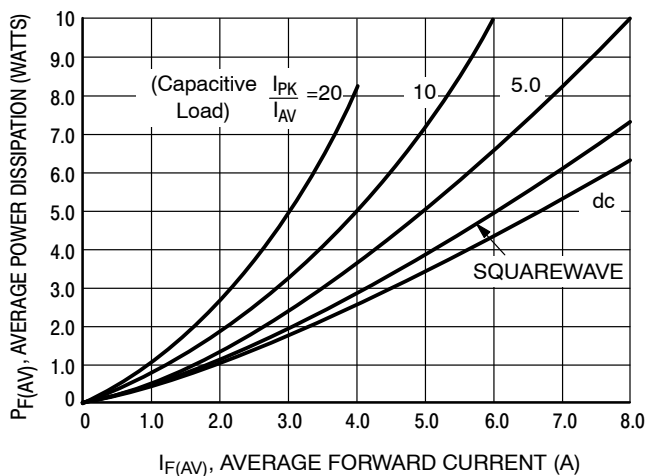


Figure 4. Power Dissipation

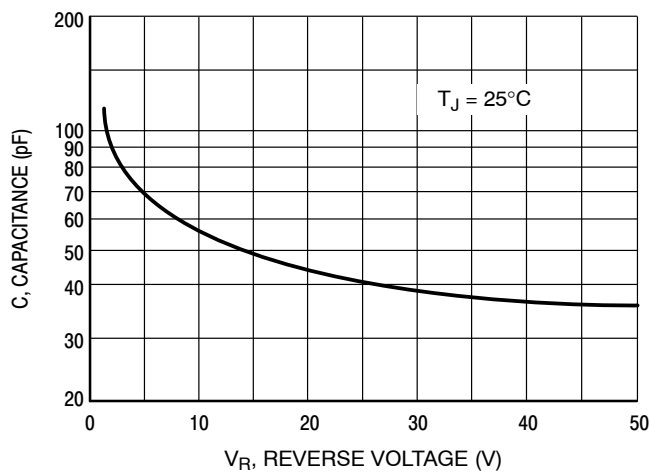


Figure 5. Typical Capacitance

# MUR405, MUR410, MUR415, MUR420, MUR440, MUR460

## MUR440, MUR460

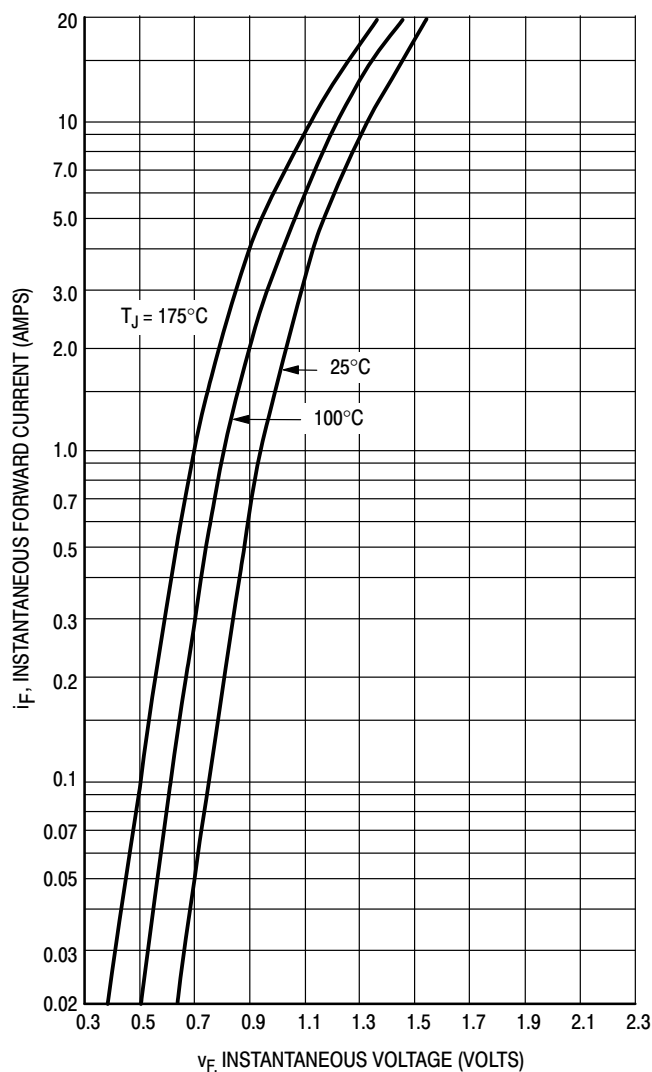


Figure 6. Typical Forward Voltage

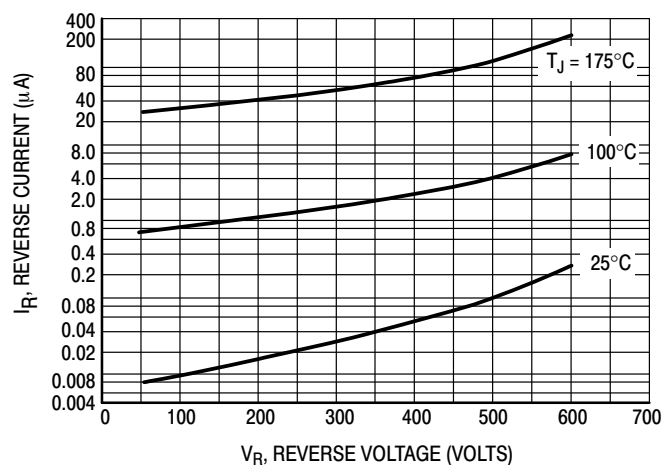


Figure 7. Typical Reverse Current

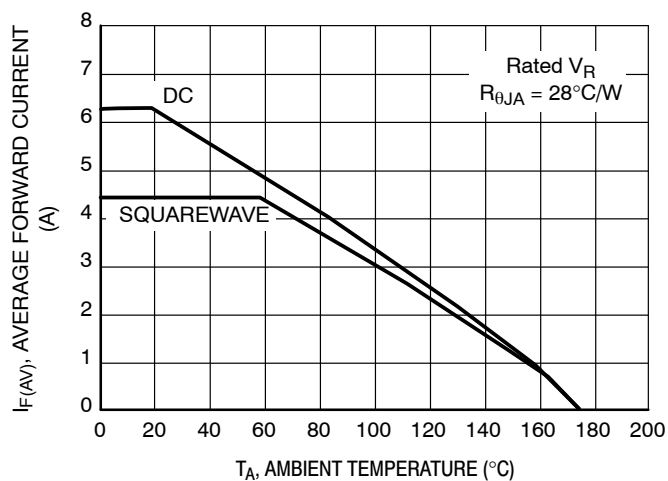


Figure 8. Current Derating  
(Mounting Method #3 Per Note 2)

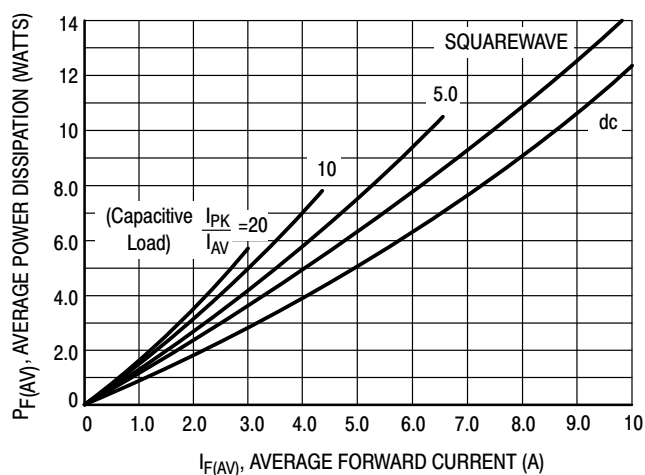


Figure 9. Power Dissipation

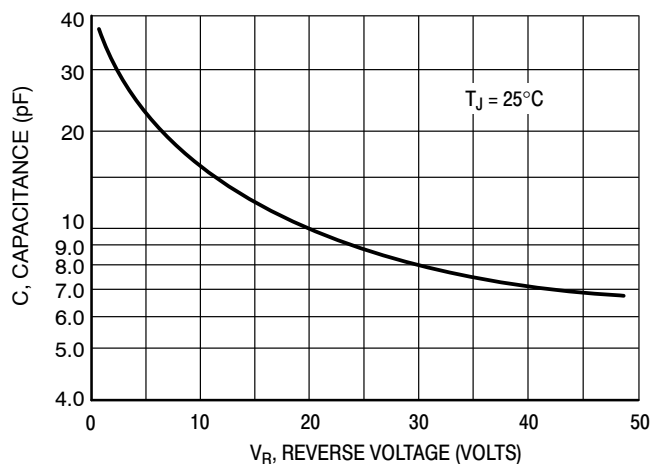
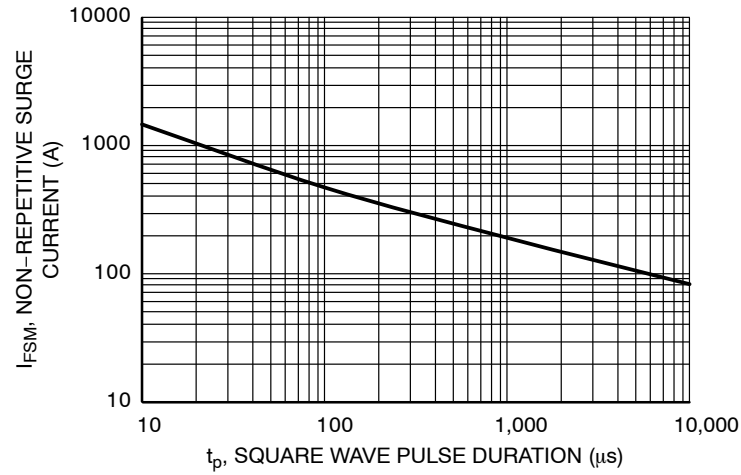


Figure 10. Typical Capacitance

MUR440, MUR460



**Figure 11. Typical Non-Repetitive Surge Current**

\*Typical performance based on a limited sample size. ON Semiconductor does not guarantee ratings not listed in the Maximum Ratings table.

NOTE 2 — AMBIENT MOUNTING DATA

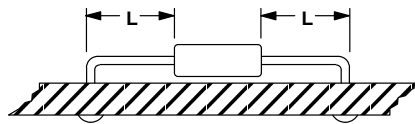
Data shown for thermal resistance junction-to-ambient ( $R_{\theta JA}$ ) for the mountings shown is to be used as typical guideline values for preliminary engineering or in case the tie point temperature cannot be measured.

TYPICAL VALUES FOR  $R_{\theta JA}$  IN STILL AIR

| Mounting Method |                 | Lead Length, L (IN) |     |     |     | Units |
|-----------------|-----------------|---------------------|-----|-----|-----|-------|
|                 |                 | 1/8                 | 1/4 | 1/2 | 3/4 |       |
| 1               | $R_{\theta JA}$ | 50                  | 51  | 53  | 55  | °C/W  |
| 2               |                 | 58                  | 59  | 61  | 63  | °C/W  |
| 3               |                 | 28                  |     |     |     | °C/W  |

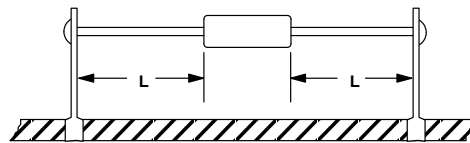
MOUNTING METHOD 1

P.C. Board Where Available Copper Surface area is small.



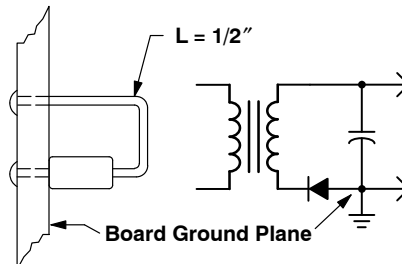
MOUNTING METHOD 2

Vector Push-In Terminals T-28



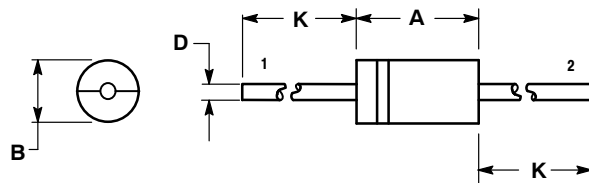
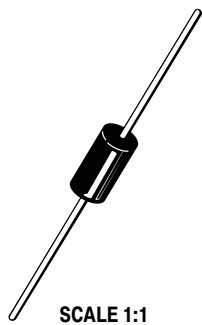
MOUNTING METHOD 3

P.C. Board with 1-1/2" x 1-1/2" Copper Surface



AXIAL LEAD  
CASE 267-05  
ISSUE G

DATE 06 JUN 2000



NOTES:

1. DIMENSIONS AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 267-04 OBSOLETE, NEW STANDARD 267-05.

| DIM | INCHES |       | MILLIMETERS |      |
|-----|--------|-------|-------------|------|
|     | MIN    | MAX   | MIN         | MAX  |
| A   | 0.287  | 0.374 | 7.30        | 9.50 |
| B   | 0.189  | 0.209 | 4.80        | 5.30 |
| D   | 0.047  | 0.051 | 1.20        | 1.30 |
| K   | 1.000  | ---   | 25.40       | ---  |

STYLE 1:  
PIN 1: CATHODE (POLARITY BAND)  
2: ANODE

STYLE 2:  
NO POLARITY

|                  |             |                                                                                                                                                                                     |
|------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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| DESCRIPTION:     | AXIAL LEAD  | PAGE 1 OF 1                                                                                                                                                                         |

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