ALSO AVAILABLE IN SURFACE MOUNT

**Microsemi Corp.**
The diode experts

*SCOTTSDALE, AZ*
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# 40SL SERIES

## 4 AMP AXIAL-LEAD FAST RECOVERY RECTIFIER DIODES

## DESCRIPTION/FEATURES

- ECONOMICAL 4 AMP $I_O$ MOLDED DEVICE OFFERS CAPABILITY OF STUD-MOUNTED RECTIFIERS
- 150 AMPS SURGE PROVIDES HIGH IN-RUSH CURRENT CAPABILITY
- WIDE VOLTAGE RANGE AVAILABLE: 50 TO 1000 VOLTS $V_{RRM}$

### MAJOR RATINGS AND CHARACTERISTICS

| | 40 SL | |
|---|---|---|
| $I_{F(AV)}$ | 4 | A |
| at Max. $T_L$ | 62 | °C |
| $I_{FSM}$ at 50Hz | 143 | A |
| $I_{FSM}$ at 60Hz | 150 | A |
| $I^2t$ at 50Hz | 103 | $A^2s$ |
| $I^2t$ at 60Hz | 94 | $A^2s$ |
| $T_J$ | -40 to 150 | °C |
| $V_{RRM}$ Range | 50 - 1000 | V |
| $t_{rr}$ | 200 | ns |

### VOLTAGE RATINGS

| Part Number | Working $V_{RWM}$ Peak Reverse Voltage $T_J$ = -40°C to 200°C | $V_R$ (V) Max. Direct Reverse Voltage $T_J$ = -40°C to 200°C |
|---|---|---|
| 40SL05 | 50 | 50 |
| 40SL1 | 100 | 100 |
| 40SL2 | 200 | 200 |
| 40SL4 | 400 | 400 |
| 40SL5 | 500 | 500 |
| 40SL6 | 600 | 600 |
| 40SL8 | 800 | 800 |
| 40SL10 | 1000 | 1000 |

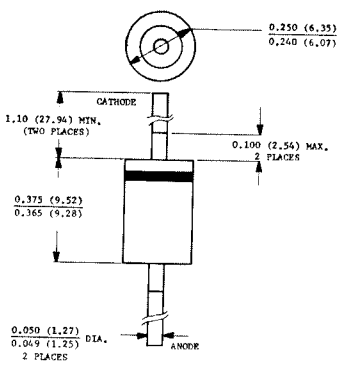
### ELECTRICAL SPECIFICATIONS

| | | 40SL | Units | Conditions |
|---|---|---|---|---|
| $I_{F(AV)}$ | Max. average forward current | 4 | A | 1-phase operation, 180° conduction. $T_L$ = 95°C, $\ell$ = 9.5 mm (0.375 in.) |
| $I_{FSM}$ | Max. peak one-cycle non-repetitive surge current | 143 | A | Half cycle 50Hz sine wave or 6ms rectangular pulse — Following any rated load condition and with rated $V_{RRM}$ applied. |
| | | 150 | | Half cycle 60Hz sine wave or 5ms rectangular pulse |
| | | 170 | | Half cycle 50Hz sine wave or 6 ms rectangular pulse — Following any rated load condition and with $V_{RRM}$ applied following surge = 0. |
| | | 178 | | Half cycle 60Hz sine wave or 5 ms rectangular pulse |
| $I^2t$ | Max. $I^2t$ for fusing | 103 | $A^2s$ | t = 10 ms — With rated $V_{RRM}$ applied following surge, initial $T_J$ = 175°C. |
| | | 94 | | t = 8.3 ms |
| | Max. $I^2t$ for individual device fusing | 145 | | t = 10 ms — With $V_{RRM}$ = 0 following surge, initial $T_J$ = 175°C. |
| | | 132 | | t = 8.3 ms |
| $I^2\sqrt{t}$ | Max. $I^2\sqrt{t}$ for individual device fusing (Note 1.) | 1450 | $A^2\sqrt{s}$ | t = 0.1 to 10ms, $V_{RRM}$ = 0 following surge. |
| $V_{FM}$ | Max. peak forward voltage | 1.40 | V | $I_{F(AV)}$ = 4A (12.6A peak), $T_J$ = 25°C |
| $I_{R(AV)}$ | Max. average reverse current | 5 | mA | $T_L$ = 62°C, $V_{RRM}$ = rated $V_{RRM}$, $I_{F(AV)}$ = rated $I_{F(AV)}$, 1 phase operation. |
| $I_R$ | Max. dc reverse current | 3 | mA | $T_L$ = 100°C — $V_R$ = Rated $V_R$. |
| | | 25 | $\mu$A | $T_L$ = 25°C |
| $t_{rr}$ | Max. reverse recovery time | 200 | ns | $T_L$ = 25°C, $I_F$ = 1A, $V_R$ = 30V |
| | Typ. reverse recovery time | | | di/dt = 25A/$\mu$s |
| $I_{RM(REC)}$ | Max. peak reverse recovery current | 5 | A | $T_L$ = 25°C, $I_{FM}$ = 12.5A $t_p \approx 1.6\mu s$, di/dt = 25A/$\mu$s |

### THERMAL MECHANICAL SPECIFICATIONS

| | | | | |
|---|---|---|---|---|
| $T_J$ | Max. operating junction temperature range | -40°C to 150 | °C | |
| $T_{stg}$ | Max. storage temperature range | -40°C to 175 | °C | |
| $R_{thJC}$ | Max. internal thermal resistance, junction-to-leads | -- | deg C/W | (Note 2.) |
| $\ell$ | Length of leads ( $\ell$ ) (1/8") 3.2 mm | 11.0 | deg C/W | ±10% |
| | Length of leads ( $\ell$ ) (3/8") 9.5 mm | 14.7 | | |
| | Length of leads ( $\ell$ ) (3/4") 19 mm | 20.0 | | |
| wt | Approximate weight | 1.5 (0.053) | g (oz) | |

Note 1. $I^2t$ for time $t_x = I^2\sqrt{t} \cdot \sqrt{t_x}$
Note 2. DC operation, double side cooled, measured 9.5 mm (0.375 in.) from body.



All Dimensions in Inches and (Millimeters)

### MECHANICAL CHARACTERISTICS

CASE: Molded plastic use Flame Retardant Epoxy.

TERMINALS: Axial leads, solderable per MIL-STD-202, Method 208.

POLARITY: Color band denotes cathode.

MOUNTING POSITION: Any.

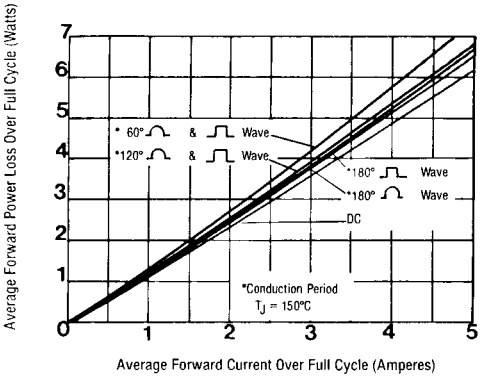



**FIGURE 1**
MAXIMUM LOW-LEVEL AVERAGE FORWARD POWER LOSS VS. AVERAGE FORWARD CURRENT

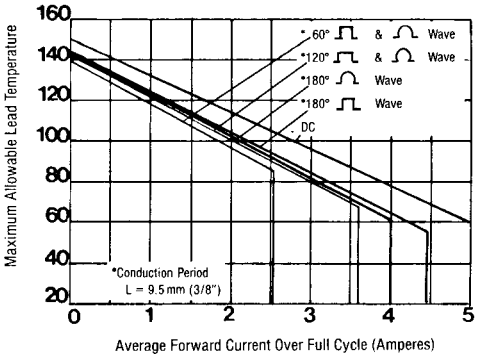



**FIGURE 2**
AVERAGE FORWARD CURRENT VS. LEAD TEMPERATURE

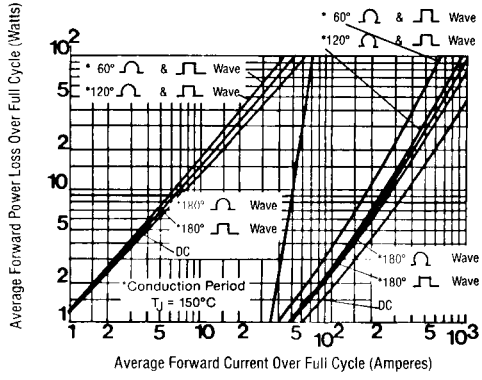



**FIGURE 3**
MAXIMUM HIGH-LEVEL FORWARD POWER LOSS VS. AVERAGE FORWARD CURRENT

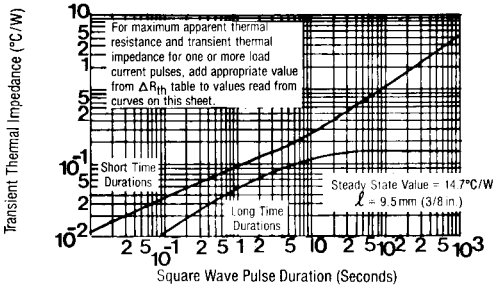



**FIGURE 4**
MAXIMUM TRANSIENT THERMAL IMPEDANCE JUNCTION TO LEAD VS. PULSE DURATION

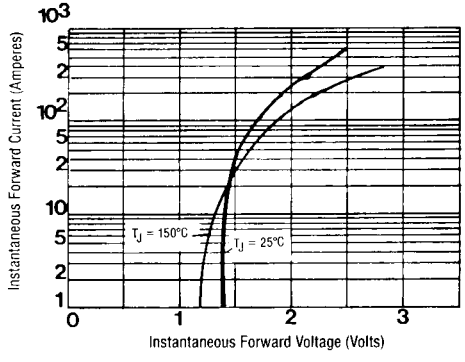



**FIGURE 5**
MAXIMUM FORWARD VOLTAGE VS. FORWARD CURRENT

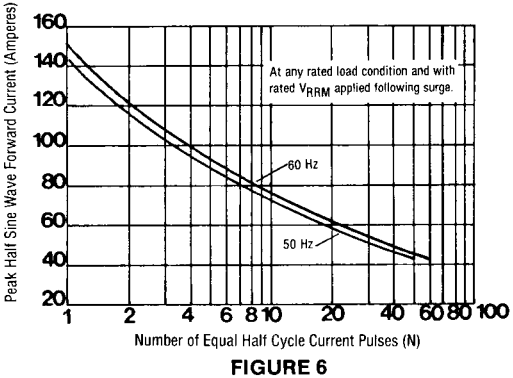



**FIGURE 6**
MAXIMUM NON-REPETITIVE SURGE CURRENT VS. NUMBER OF CURRENT PULSES