

## Small Signal Fast Switching Diodes



### FEATURES

- Silicon epitaxial planar diode
- Saving space
- Hermetic sealed parts
- Fits onto SOD-323/SOT-23 footprints
- Electrical data identical with the devices 1N4148 and 1N4448 respectively
- MicroMELF package
- AEC-Q101 qualified
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

### MECHANICAL DATA

**Case:** MicroMELF

**Weight:** approx. 12 mg

**Cathode band color:** black

**Packaging codes/options:**

TR3/10K per 13" reel (8 mm tape), 10K/box

TR/2.5K per 7" reel (8 mm tape), 12.5K/box

### APPLICATIONS

- Extreme fast switches

### PARTS TABLE

| PART    | TYPE DIFFERENTIATION                                                 | ORDERING CODE             | INTERNAL CONSTRUCTION | REMARKS       |
|---------|----------------------------------------------------------------------|---------------------------|-----------------------|---------------|
| MCL4148 | $V_{RRM} = 100\text{ V}$ , $V_F$ at $I_F 50\text{ mA} = 1\text{ V}$  | MCL4148-TR3 or MCL4148-TR | Single                | Tape and reel |
| MCL4448 | $V_{RRM} = 100\text{ V}$ , $V_F$ at $I_F 100\text{ mA} = 1\text{ V}$ | MCL4448-TR3 or MCL4448-TR | Single                | Tape and reel |

### ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

| PARAMETER                       | TEST CONDITION               | SYMBOL    | VALUE | UNIT |
|---------------------------------|------------------------------|-----------|-------|------|
| Reverse voltage                 |                              | $V_R$     | 75    | V    |
| Repetitive peak reverse voltage |                              | $V_{RRM}$ | 100   | V    |
| Peak forward surge current      | $t_p = 1\text{ }\mu\text{s}$ | $I_{FSM}$ | 2     | A    |
| Repetitive peak forward current |                              | $I_{FRM}$ | 450   | mA   |
| Forward continuous current      |                              | $I_F$     | 200   | mA   |
| Average forward current         | $V_R = 0$                    | $I_{FAV}$ | 150   | mA   |
| Power dissipation               |                              | $P_{tot}$ | 500   | mW   |

### THERMAL CHARACTERISTICS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

| PARAMETER                                  | TEST CONDITION                                                                                                        | SYMBOL     | VALUE         | UNIT               |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------|---------------|--------------------|
| Thermal resistance junction to ambient air | Mounted on epoxy-glass hard tissue, Fig. 5, 35 $\mu\text{m}$ copper clad, 0.9 $\text{mm}^2$ copper area per electrode | $R_{thJA}$ | 500           | K/W                |
| Junction temperature                       |                                                                                                                       | $T_j$      | 175           | $^{\circ}\text{C}$ |
| Storage temperature range                  |                                                                                                                       | $T_{stg}$  | - 65 to + 175 | $^{\circ}\text{C}$ |



| <b>ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |                                                                                       |         |            |       |       |       |               |
|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------|------------|-------|-------|-------|---------------|
| PARAMETER                                                                                                | TEST CONDITION                                                                        | SYMBOL  | SYMBOL     | MIN.  | TYP.  | MAX.  | UNIT          |
| Forward voltage                                                                                          | $I_F = 5\text{ mA}$                                                                   | MCL4448 | $V_F$      | 0.620 |       | 0.720 | V             |
|                                                                                                          | $I_F = 50\text{ mA}$                                                                  | MCL4148 | $V_F$      |       | 0.860 | 1     | V             |
|                                                                                                          | $I_F = 100\text{ mA}$                                                                 | MCL4448 | $V_F$      |       | 0.930 | 1     | V             |
| Reverse current                                                                                          | $V_R = 20\text{ V}$                                                                   |         | $I_R$      |       |       | 25    | nA            |
|                                                                                                          | $V_R = 20\text{ V}, T_j = 150\text{ }^{\circ}\text{C}$                                |         | $I_R$      |       |       | 50    | $\mu\text{A}$ |
|                                                                                                          | $V_R = 75\text{ V}$                                                                   |         | $I_R$      |       |       | 5     | $\mu\text{A}$ |
| Breakdown voltage                                                                                        | $I_R = 100\text{ }\mu\text{A}, t_p/T = 0.01, t_p = 0.3\text{ ms}$                     |         | $V_{(BR)}$ | 100   |       |       | V             |
| Diode capacitance                                                                                        | $V_R = 0\text{ V}, f = 1\text{ MHz}, V_{HF} = 50\text{ mV}$                           |         | $C_D$      |       |       | 4     | pF            |
| Rectification efficiency                                                                                 | $V_{HF} = 2\text{ V}, f = 100\text{ MHz}$                                             |         | $\eta_r$   | 45    |       |       | %             |
| Reverse recovery time                                                                                    | $I_F = I_R = 10\text{ mA}, i_R = 1\text{ mA}$                                         |         | $t_{rr}$   |       |       | 8     | ns            |
|                                                                                                          | $I_F = 10\text{ mA}, V_R = 6\text{ V}, i_R = 0.1 \times I_R, R_L = 100\text{ }\Omega$ |         | $t_{rr}$   |       |       | 4     |               |

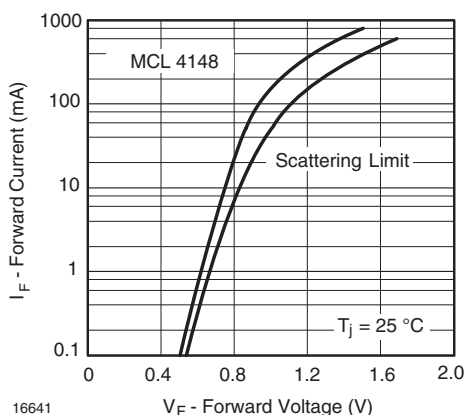
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

Fig. 1 - Reverse Current vs. Junction Temperature

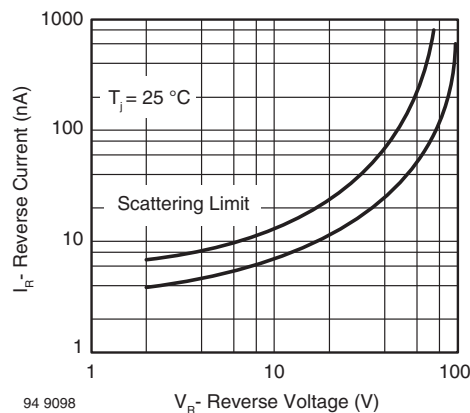


Fig. 3 - Reverse Current vs. Reverse Voltage

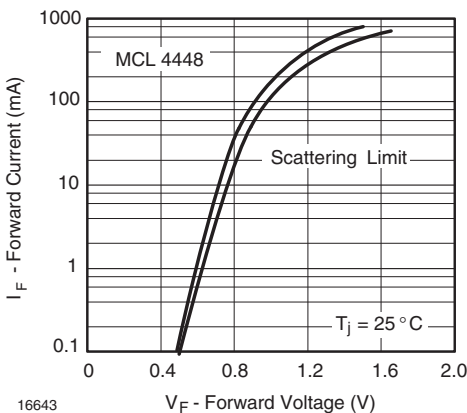


Fig. 2 - Forward Current vs. Forward Voltage

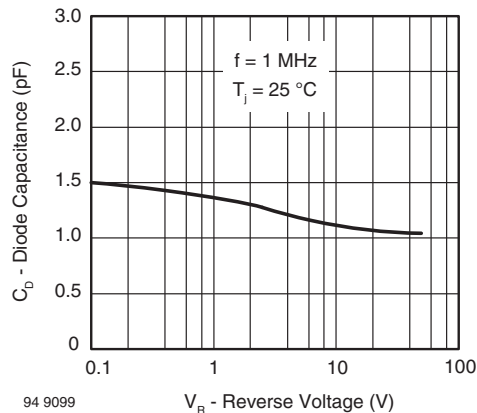


Fig. 4 - Diode Capacitance vs. Reverse Voltage

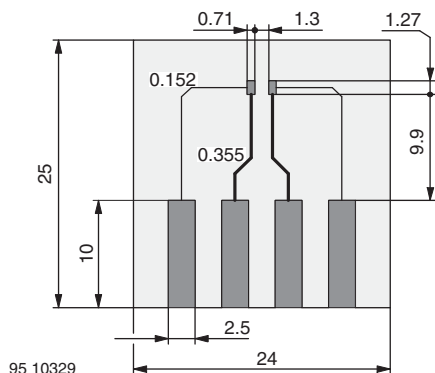
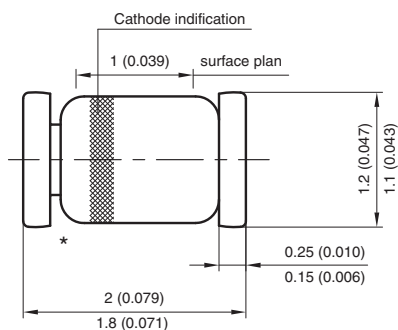
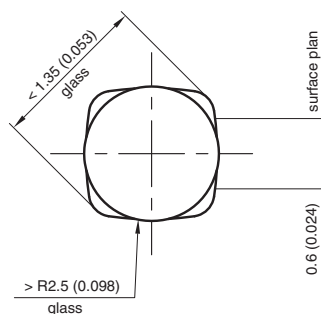


Fig. 5 - Board for  $R_{thJA}$  definition (in mm)

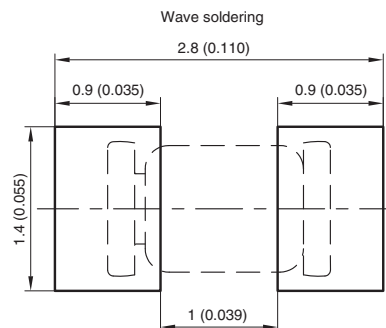
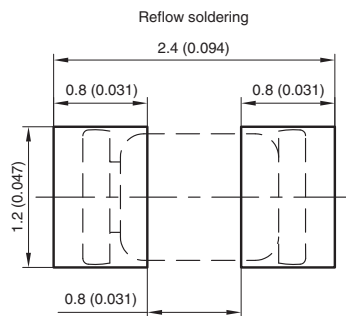
# **PACKAGE DIMENSIONS** in millimeters (inches): **MicroMELF**



\* The gap between plug and glass can be either on cathode or anode side



Foot print recommendation:



Created - Date: 26.July.1996  
Rev. 13 - Date: 07.June.2006  
Document no.:6.560-5007.01-4  
96 12072



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