

## Step Recovery Diode

Rev. V1

### Features

- Low Transition Time
- High Efficiency
- High Cutoff Frequency
- High Reliability
- RoHS\* Compliant

### Description

The MSD7xx Series of step recovery diodes are designed with epitaxial silicon which provides high output power and efficiency in harmonic generator applications. These diodes are manufactured using a proven diode fabrication process for high reproducibility. A unique silicon dioxide passivation process assures greater stability reliability and low leakage currents at high temperatures.

These diodes are available in various package outlines with capacitance ranges for each of the 4 voltage ratings.

This rugged device is capable of reliable operation in all military, commercial and industrial applications.



Bare Die



Beam Lead Chips



Ceramic Microwave Pill



Ceramic Epoxy SMT



Ceramic Hermetic SMT



Plastic SMT

### Electrical Specifications @ $T_A = 25^\circ\text{C}$ :

**Voltage Breakdown ( $V_B$ ) = 15 V min. @ 10  $\mu\text{A}$**

**Lifetime ( $T_L$ ) = 8 ns min. and Transition Time ( $T_T$ ) = 60 ps max. @  $I_F$  6 mA /  $I_R$  10 mA**

| Model  | Junction Capacitance ( $C_J$ )<br>@ 6 V, 1 MHz | Series Resistance ( $R_S$ )<br>@ 25 mA | Thermal Resistance ( $\theta_{JC}$ )<br>Pulsed |
|--------|------------------------------------------------|----------------------------------------|------------------------------------------------|
|        | Minimum                                        | Maximum                                | Maximum                                        |
|        | pF                                             | $\Omega$                               | $^\circ\text{C/W}$                             |
| MSD700 | 0.2 - 0.4                                      | 1.20                                   | 125                                            |
| MSD701 | 0.4 - 0.6                                      | 1.00                                   | 100                                            |
| MSD702 | 0.6 - 0.8                                      | 0.70                                   | 100                                            |
| MSD703 | 0.8 - 1.0                                      | 0.50                                   | 75                                             |
| MSD704 | 1.0 - 1.4                                      | 0.40                                   | 75                                             |
| MSD705 | 1.4 - 2.0                                      | 0.30                                   | 60                                             |
| MSD706 | 2.0 - 3.0                                      | 0.25                                   | 60                                             |

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

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**Electrical Specifications @  $T_A = 25^\circ\text{C}$ :**

**Voltage Breakdown ( $V_B$ ) = 20 V min. @ 10  $\mu\text{A}$**

**Lifetime ( $T_L$ ) = 11 ns min. and Transition Time ( $T_T$ ) = 70 ps max. @  $I_F$  6 mA /  $I_R$  10 mA**

| Model  | Junction Capacitance ( $C_J$ )<br>@ 6 V, 1 MHz | Series Resistance ( $R_S$ )<br>@ 25 mA | Thermal Resistance ( $\theta_{JC}$ )<br>Pulsed |
|--------|------------------------------------------------|----------------------------------------|------------------------------------------------|
|        | Minimum                                        | Maximum                                | Maximum                                        |
|        | pF                                             | $\Omega$                               | $^\circ\text{C/W}$                             |
| MSD710 | 0.2 - 0.4                                      | 1.00                                   | 100                                            |
| MSD711 | 0.4 - 0.6                                      | 0.70                                   | 75                                             |
| MSD712 | 0.6 - 0.8                                      | 0.60                                   | 75                                             |
| MSD713 | 0.8 - 1.0                                      | 0.50                                   | 75                                             |
| MSD714 | 1.0 - 1.4                                      | 0.40                                   | 75                                             |
| MSD715 | 1.4 - 2.0                                      | 0.30                                   | 60                                             |
| MSD716 | 2.0 - 3.0                                      | 0.25                                   | 60                                             |

**Electrical Specifications @  $T_A = 25^\circ\text{C}$ :**

**Voltage Breakdown ( $V_B$ ) = 30 V min. @ 10  $\mu\text{A}$**

**Lifetime ( $T_L$ ) = 17 ns min. and Transition Time ( $T_T$ ) = 100 ps max. @  $I_F$  6 mA /  $I_R$  10 mA**

| Model  | Junction Capacitance ( $C_J$ )<br>@ 6 V, 1 MHz | Series Resistance ( $R_S$ )<br>@ 25 mA | Thermal Resistance ( $\theta_{JC}$ )<br>Pulsed |
|--------|------------------------------------------------|----------------------------------------|------------------------------------------------|
|        | Minimum                                        | Maximum                                | Maximum                                        |
|        | pF                                             | $\Omega$                               | $^\circ\text{C/W}$                             |
| MSD720 | 0.2 - 0.4                                      | 0.80                                   | 75                                             |
| MSD721 | 0.4 - 0.6                                      | 0.60                                   | 60                                             |
| MSD722 | 0.6 - 0.8                                      | 0.50                                   | 60                                             |
| MSD723 | 0.8 - 1.0                                      | 0.40                                   | 60                                             |
| MSD724 | 1.0 - 1.4                                      | 0.30                                   | 60                                             |
| MSD725 | 1.4 - 2.0                                      | 0.25                                   | 50                                             |
| MSD726 | 2.0 - 3.0                                      | 0.20                                   | 50                                             |

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**Electrical Specifications @  $T_A = 25^\circ\text{C}$ :**

**Voltage Breakdown ( $V_B$ ) = 15 V min. @ 10  $\mu\text{A}$**

**Lifetime ( $T_L$ ) = 8 ns min. and Transition Time ( $T_T$ ) = 60 ps max. @  $I_F$  6 mA /  $I_R$  10 mA**

| Model  | Junction Capacitance ( $C_J$ )<br>@ 6 V, 1 MHz | Series Resistance ( $R_S$ )<br>@ 25 mA | Thermal Resistance ( $\theta_{JC}$ )<br>Pulsed |
|--------|------------------------------------------------|----------------------------------------|------------------------------------------------|
|        | Minimum                                        | Maximum                                | Maximum                                        |
|        | pF                                             | $\Omega$                               | $^\circ\text{C/W}$                             |
| MSD730 | 0.2 - 0.4                                      | 0.80                                   | 50                                             |
| MSD731 | 0.4 - 0.6                                      | 0.60                                   | 50                                             |
| MSD732 | 0.6 - 0.8                                      | 0.50                                   | 50                                             |
| MSD733 | 0.8 - 1.0                                      | 0.40                                   | 50                                             |
| MSD734 | 1.0 - 1.4                                      | 0.30                                   | 50                                             |
| MSD735 | 1.4 - 2.0                                      | 0.25                                   | 40                                             |
| MSD736 | 2.0 - 3.0                                      | 0.20                                   | 40                                             |

## Absolute Maximum Ratings

| Parameter             | Absolute Maximum                              |
|-----------------------|-----------------------------------------------|
| Junction Temperature  | +150 $^\circ\text{C}$                         |
| Operating Temperature | -55 $^\circ\text{C}$ to +150 $^\circ\text{C}$ |
| Storage Temperature   | -65 $^\circ\text{C}$ to +200 $^\circ\text{C}$ |

## Environmental Capabilities

The MSD7xx Series of step recovery diodes are capable of meeting the environmental requirements of MIL-STD-750 and MIL-STD-883.

## ESD & Moisture Sensitivity Level Rating

These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD prevention procedures should be followed. The ESD rating for this device is Class 0 (HBM).

## Assembly Instructions

Die attach of the MSD7xx SRD chip diodes may be accomplished with eutectic solders, such as 80 Au / 20 Sn, or conductive epoxy. The leads of the beam lead device may be attached to a hybrid circuit using thermo compression bonding or conductive epoxy.

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