

### Features

- Very Low 1/f Noise
- Detector Applications up to 40 GHz
- Chip Beam Lead and Packaged Devices

### Description

The MSS20-xxx-x Series of Schottky diodes is fabricated on P-Type epitaxial substrates for superior 1/f noise performance in microwave 0-bias detector applications up to 40 GHz.



### Chip

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

| Model           | $C_J$<br>Max.<br>pF                          | $T_{SS}$<br>Typ.<br>dBm             | $R_V$<br>Min.<br>$\Omega$                        | $R_V$<br>Max.<br>$\Omega$ | $\gamma$<br>Typ.<br>mV / mW | Frequency<br>Max.<br>GHz | Outline |
|-----------------|--|-------------------------------------|--|---------------------------|-----------------------------|--------------------------|---------|
| MSS20-046-C15   | 0.10   | -58                                 | 1000   | 2000                      | 5000                        | 18                       | C15     |
| MSS20-047-C15   | 0.10   | -59                                 | 2000   | 6000                      | 8000                        | 18                       | C15     |
| MSS20-050-C15   | 0.15   | -58                                 | 1000   | 2000                      | 5000                        | 12                       | C15     |
| MSS20-051-C15   | 0.15   | -59                                 | 2000   | 6000                      | 8000                        | 12                       | C15     |
| MSS20-054-C15   | 0.20   | -58                                 | 1000   | 2000                      | 5000                        | 8                        | C15     |
| MSS20-055-C15   | 0.20   | -59                                 | 2000   | 6000                      | 8000                        | 8                        | C15     |
| Test Conditions | $f = 1 \text{ MHz}$ ,<br>$V_R = 0 \text{ V}$ | $f = 10 \text{ GHz}$ ,<br>NF = 3 dB | $P_{IN} = -30 \text{ dBm}$<br>Video BW = 500 KHz |                           | $R_L = 1 \text{ M}\Omega$   |                          |         |

### Beam Lead

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

| Model           | $C_J$<br>Max.<br>pF                          | $T_{SS}$<br>Typ.<br>dBm             | $R_V$<br>Min.<br>$\Omega$                        | $R_V$<br>Max.<br>$\Omega$ | $\gamma$<br>Typ.<br>mV / mW | Frequency<br>Max.<br>GHz | Outline |
|-----------------|--|-------------------------------------|--|---------------------------|-----------------------------|--------------------------|---------|
| MSS20-140-B10D  | 0.08   | -58                                 | 1000   | 2000                      | 5000                        | 40                       | B10D    |
| MSS20-141-B10D  | 0.08   | -59                                 | 2000   | 6000                      | 8000                        | 40                       | B10D    |
| MSS20-142-B10D  | 0.10   | -58                                 | 1000   | 2000                      | 5000                        | 26                       | B10D    |
| MSS20-143-B10D  | 0.10   | -59                                 | 2000   | 6000                      | 8000                        | 26                       | B10D    |
| MSS20-145-B10D  | 0.12   | -58                                 | 1000   | 2000                      | 5000                        | 18                       | B10D    |
| MSS20-146-B10D  | 0.12   | -59                                 | 2000   | 6000                      | 8000                        | 18                       | B10D    |
| Test Conditions | $f = 1 \text{ MHz}$ ,<br>$V_R = 0 \text{ V}$ | $f = 10 \text{ GHz}$ ,<br>NF = 3 dB | $P_{IN} = -30 \text{ dBm}$<br>Video BW = 500 KHz |                           | $R_L = 1 \text{ M}\Omega$   |                          |         |

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### Packaged

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

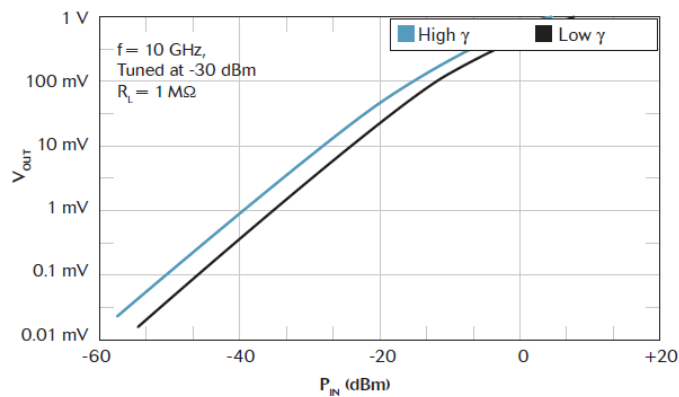
| Model           | $C_J$<br>Max.<br>pF                          | $T_{SS}$<br>Typ.<br>dBm                       | $R_V$<br>Min.<br>$\Omega$                        | $R_V$<br>Max.<br>$\Omega$ | $\gamma$<br>Typ.<br>mV / mW | Frequency<br>Max.<br>GHz | Outline |
|-----------------|--|---|--|---------------------------|-----------------------------|--------------------------|---------|
| MSS20-046-H27   | 0.22   | -58   | 1000   | 2000                      | 5000                        | 18                       | H27     |
| MSS20-046-E25   | 0.18   | -58   | 1000   | 2000                      | 5000                        | 18                       | E25     |
| MSS20-046-T86   | 0.28   | -58   | 1000   | 2000                      | 5000                        | 18                       | T86     |
| MSS20-047-H27   | 0.22   | -59   | 2000   | 6000                      | 8000                        | 18                       | H27     |
| MSS20-047-E25   | 0.18   | -59   | 2000   | 6000                      | 8000                        | 18                       | E25     |
| MSS20-047-T86   | 0.28   | -59   | 2000   | 6000                      | 8000                        | 18                       | T86     |
| MSS20-050-H27   | 0.27   | -58   | 1000   | 2000                      | 5000                        | 12                       | H27     |
| MSS20-050-E25   | 0.23   | -58   | 1000   | 2000                      | 5000                        | 12                       | E25     |
| MSS20-050-T86   | 0.33   | -58   | 1000   | 2000                      | 5000                        | 12                       | T86     |
| MSS20-051-H27   | 0.27   | -59   | 2000   | 6000                      | 8000                        | 12                       | H27     |
| MSS20-051-E25   | 0.23   | -59   | 2000   | 6000                      | 8000                        | 12                       | E25     |
| MSS20-051-T86   | 0.33   | -59   | 2000   | 6000                      | 8000                        | 12                       | T86     |
| MSS20-054-H27   | 0.32   | -58   | 1000   | 2000                      | 5000                        | 8                        | H27     |
| MSS20-054-E25   | 0.28   | -58   | 1000   | 2000                      | 5000                        | 8                        | E25     |
| MSS20-054-T86   | 0.38   | -58   | 1000   | 2000                      | 5000                        | 8                        | T86     |
| MSS20-055-H27   | 0.32   | -59   | 2000   | 6000                      | 8000                        | 8                        | H27     |
| MSS20-055-E25   | 0.28   | -59   | 2000   | 6000                      | 8000                        | 8                        | E25     |
| MSS20-055-T86   | 0.38   | -59   | 2000   | 6000                      | 8000                        | 8                        | T86     |
| Test Conditions | $f = 1 \text{ MHz}$ ,<br>$V_R = 0 \text{ V}$ | $f = 10 \text{ GHz}$ ,<br>$NF = 3 \text{ dB}$ | $P_{IN} = -30 \text{ dBm}$<br>Video BW = 500 KHz |                           | $R_L = 1 \text{ M}\Omega$   |                          |         |

### Absolute Maximum Ratings

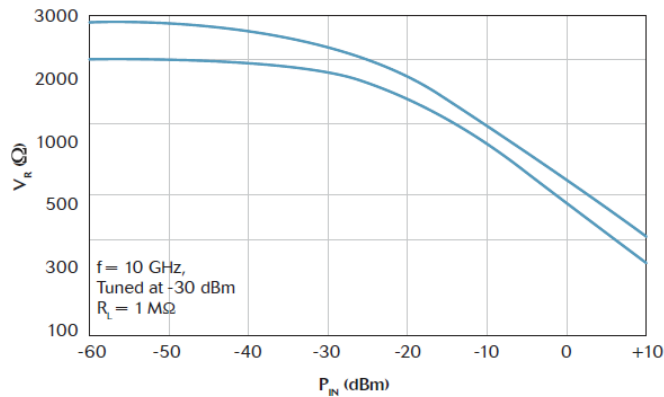
| Parameters                       | Rating   |
|----------------------------------|--|
| Reverse Voltage                  | 1 V  |
| Forward Current                  | 35 mA  |
| CW Power Dissipation             | 100 mW, derated linearly to 0 @ $T_A = +150^\circ\text{C}$ |
| Operating Temperature            | $-65^\circ\text{C}$ to $+150^\circ\text{C}$                |
| Storage Temperature              | $-65^\circ\text{C}$ to $+150^\circ\text{C}$                |
| Soldering Temperature (packaged) | $+230^\circ\text{C}$ for 5 seconds                         |

### Typical Performance Curves: $T_A = 25^\circ\text{C}$

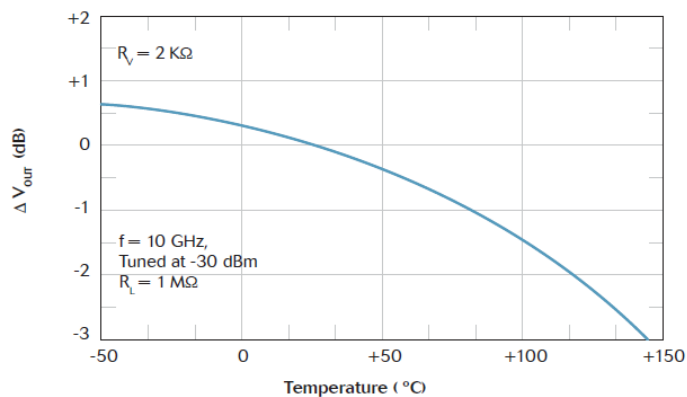
Detected Output vs. RF Input Power



Video Resistance vs. RF Input Power



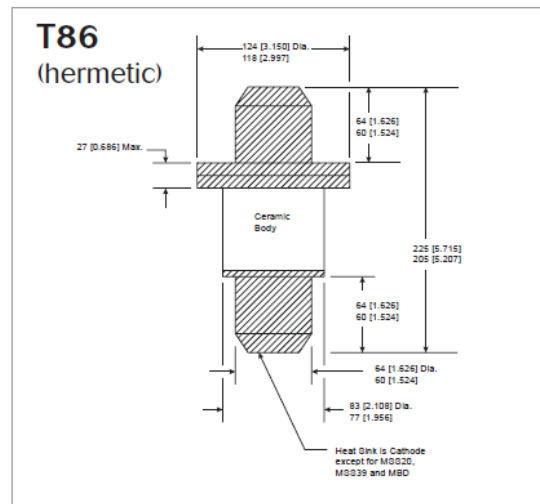
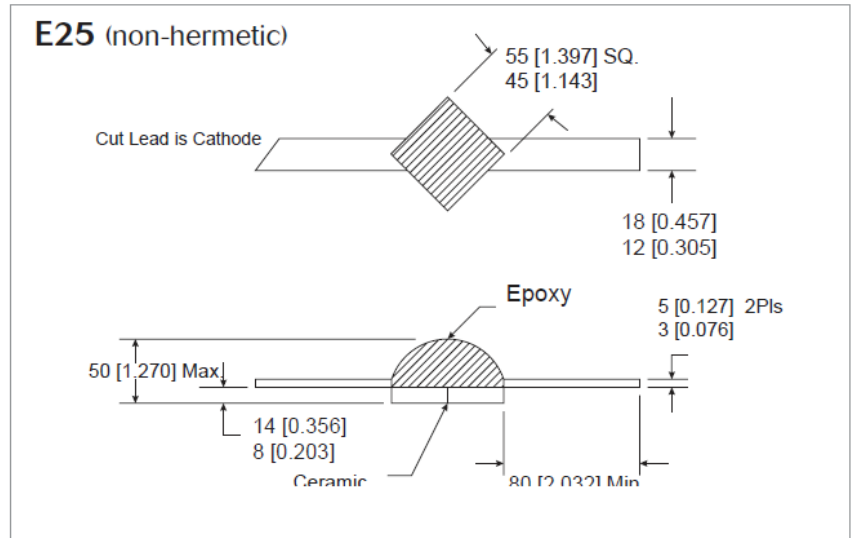
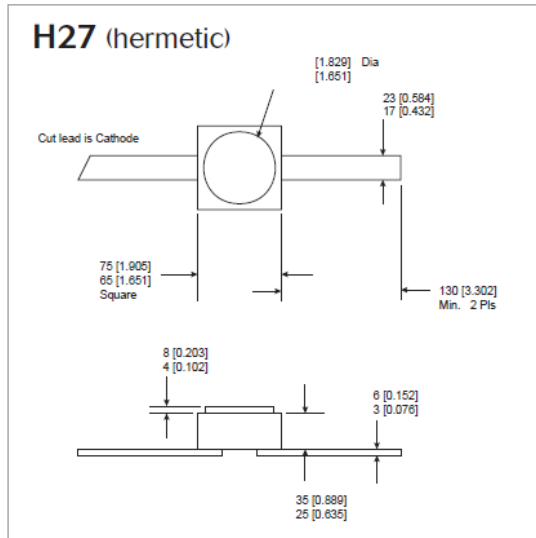
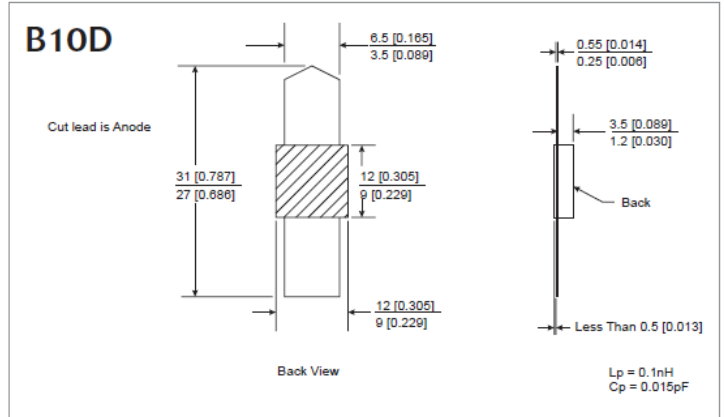
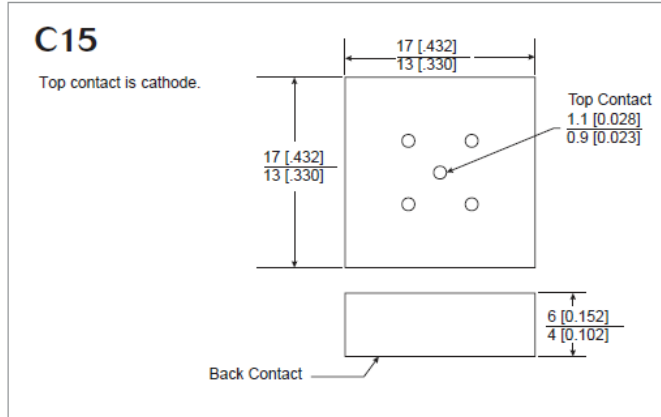
Detector Output vs. Temperature



## Zero Bias Schottky Diodes

Rev. V2

### Outline Drawings



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