# Low Barrier Silicon Schottky Diodes

## MSS30-xxx-x Series
Rev. V3

### Features

- $V_F$, $R_D$ and $C_J$ Matching Options
- Chip, Beam Lead and Packaged Devices
- Hi-Rel Screening per MIL-PRF-19500 and MIL-PRF-38534 Available

### Description

The MSS30-xxx-x Series of Schottky diodes are fabricated on N-Type epitaxial substrates using proprietary processes that yield the highest FCOs in the industry. Optimum mixer performance is obtained with LO power of -3 dBm to +3 dBm per diode.

## Chip

### Electrical Specifications: $T_A$ = 25°C

| Model | Configuration | $V_F$ Typ. V | $V_{BR}$ Min. V | $C_J$ Typ. / Max. pF | $R_S$ Typ. Ω | $R_D$ Max. Ω | $F_{CO}$ Typ. GHz | Outline |
|---|---|---|---|---|---|---|---|---|
| MSS30-046-C15 | Single Junction | 0.29 | 2 | 0.10 / 0.12 | 10 | 18 | 160 | C15 |
| MSS30-050-C15 | Single Junction | 0.27 | 2 | 0.15 / 0.18 | 6 | 15 | 175 | C15 |
| Test Conditions | | $I_F$ = 1 mA | $I_R$ = 10 µA | $V_R$ = 0 V F = 1 MHz | I = 5 mA | | | |

## Beam Lead

### Electrical Specifications: $T_A$ = 25°C

| Model | Configuration | $V_F$ Typ. V | $V_{BR}$ Min. V | $C_J$ Typ. / Max. pF | $R_S$ Typ. Ω | $R_D$ Max. Ω | $F_{CO}$ Typ. GHz | Outline |
|---|---|---|---|---|---|---|---|---|
| MSS30-142-B10B | Single Junction | 0.29 | 2 | 0.07 / 0.10 | 13 | 22 | 175 | B10B |
| MSS30-148-B10B | Single Junction | 0.27 | 2 | 0.12 / 0.15 | 7 | 15 | 190 | B10B |
| MSS30-154-B10B | Single Junction | 0.25 | 2 | 0.22 / 0.25 | 3 | 12 | 240 | B10B |
| MSS30-242-B20 | Series Tee | 0.29 | 2 | 0.07 / 0.10 | 13 | 22 | 175 | B20 |
| MSS30-248-B20 | Series Tee | 0.27 | 2 | 0.12 / 0.15 | 7 | 15 | 190 | B20 |
| MSS30-254-B20 | Series Tee | 0.25 | 2 | 0.22 / 0.25 | 3 | 12 | 240 | B20 |
| MSS30-346-B21 | Anti Parallel Pair | 0.27 | - | 0.27 / 0.30 | 11 | 16 | 55 | B21 |
| MSS30-442-B41 | Ring Quad | 0.29 | 2 | 0.07 / 0.10 | 13 | 22 | 175 | B41 |
| MSS30-448-B41 | Ring Quad | 0.27 | 2 | 0.12 / 0.15 | 7 | 15 | 190 | B41 |
| MSS30-454-B40 | Ring Quad | 0.25 | 2 | 0.22 / 0.25 | 3 | 12 | 240 | B40 |
| Test Conditions | | $I_F$ = 1 mA | $I_R$ = 10 µA | $V_R$ = 0 V F = 1 MHz | I = 5 mA | | | |

## Packaged

## Electrical Specifications: $T_A$ = 25°C

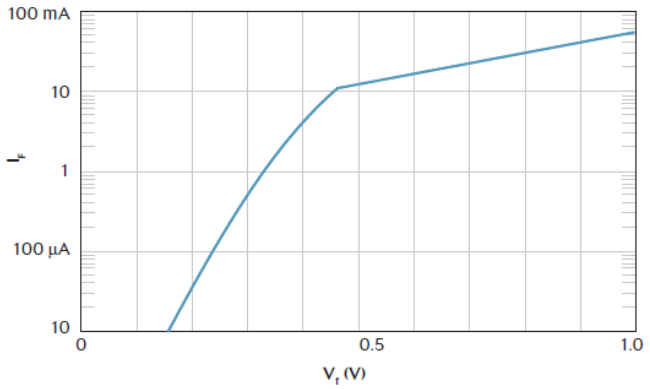
| Model | Configuration | $V_F$ Typ. V | $V_{BR}$ Min. V | $C_T$ Typ. / Max. pF | $R_S$ Typ. Ω | $R_D$ Max. Ω | $F_{CO}$ Typ. GHz | Outline |
|---|---|---|---|---|---|---|---|---|
| MSS30-046-P55 | Single Junction | 0.29 | 2 | 0.23 / 0.30 | 10 | 18 | 160 | P55 |
| MSS30-046-P86 | Single Junction | 0.29 | 2 | 0.27 / 0.33 | 10 | 18 | 160 | P86 |
| MSS30-050-P55 | Single Junction | 0.27 | 2 | 0.28 / 0.35 | 6 | 15 | 175 | P55 |
| MSS30-050-P86 | Single Junction | 0.27 | 2 | 0.32 / 0.38 | 6 | 15 | 175 | P86 |
| MSS30-142-E25 | Single Junction | 0.29 | 2 | 0.20 / 0.26 | 13 | 22 | 175 | E25 |
| MSS30-142-H20 | Single Junction | 0.29 | 2 | 0.25 / 0.31 | 13 | 22 | 175 | H20 |
| MSS30-148-E25 | Single Junction | 0.27 | 2 | 0.25 / 0.31 | 7 | 15 | 190 | E25 |
| MSS30-148-H20 | Single Junction | 0.27 | 2 | 0.30 / 0.36 | 7 | 15 | 190 | H20 |
| MSS30-154-E25 | Single Junction | 0.25 | 2 | 0.35 / 0.41 | 3 | 12 | 240 | E25 |
| MSS30-154-H20 | Single Junction | 0.25 | 2 | 0.40 / 0.46 | 3 | 12 | 240 | H20 |
| MSS30-242-E35 | Series Tee | 0.29 | 2 | 0.15 / 0.21 | 13 | 22 | 175 | E35 |
| MSS30-242-H30 | Series Tee | 0.29 | 2 | 0.25 / 0.31 | 13 | 22 | 175 | H30 |
| MSS30-248-E35 | Series Tee | 0.27 | 2 | 0.25 / 0.31 | 7 | 15 | 190 | E35 |
| MSS30-248-H30 | Series Tee | 0.27 | 2 | 0.30 / 0.36 | 7 | 15 | 190 | H30 |
| MSS30-254-E35 | Series Tee | 0.25 | 2 | 0.35 / 0.41 | 3 | 12 | 240 | E35 |
| MSS30-254-H30 | Series Tee | 0.25 | 2 | 0.40 / 0.46 | 3 | 12 | 240 | H30 |
| MSS30-346-E25 | Anti-Parallel Pair | 0.27 | - | 0.35 / 0.40 | 11 | 16 | 55 | E25 |
| MSS30-346-H20 | Anti-Parallel Pair | 0.27 | - | 0.45 / 0.50 | 11 | 16 | 55 | H20 |
| MSS30-442-E45 | Ring Quad | 0.29 | 2 | 0.15 / 0.21 | 13 | 22 | 175 | E45 |
| MSS30-448-E45 | Ring Quad | 0.27 | 2 | 0.20 / 0.26 | 7 | 15 | 190 | E45 |
| MSS30-454-E45 | Ring Quad | 0.25 | 2 | 0.25 / 0.31 | 3 | 12 | 240 | E45 |
| MSS30-454-H40 | Ring Quad | 0.25 | 2 | 0.25 / 0.31 | 3 | 12 | 240 | H40 |
| Test Conditions | | $I_F$ = 1 mA | $I_R$ = 10 µA | $V_R$ = 0 V<br>F = 1 MHz | I = 5 mA | | | |

## Absolute Maximum Ratings

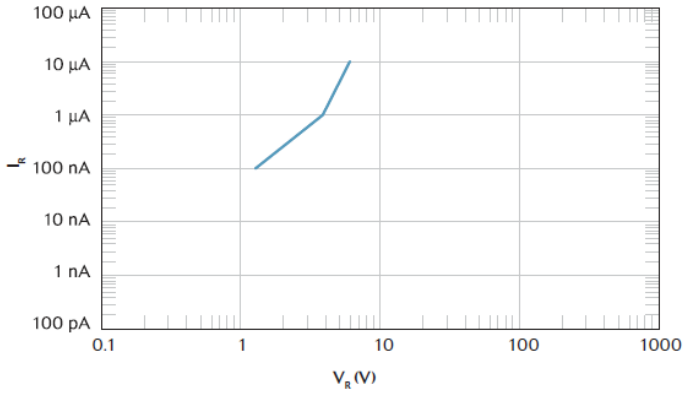
| Parameters | Rating |
|---|---|
| Reverse Voltage | Rated $V_{BR}$ |
| Forward Current | 50 mA |
| Power Dissipation | 100 mW, per junction @ $T_A$ = 25°C,<br>derate linearly to 0 @ $T_A$ = +150°C |
| Operating Temperature | -65°C to +150°C |
| Storage Temperature | -65°C to +150°C |
| Soldering Temperature (packaged) | +230°C for 5 seconds |
| Beam Lead Pull Strength | 4 G minimum |

## Typical Performance Curves: $T_A$ = 25°C

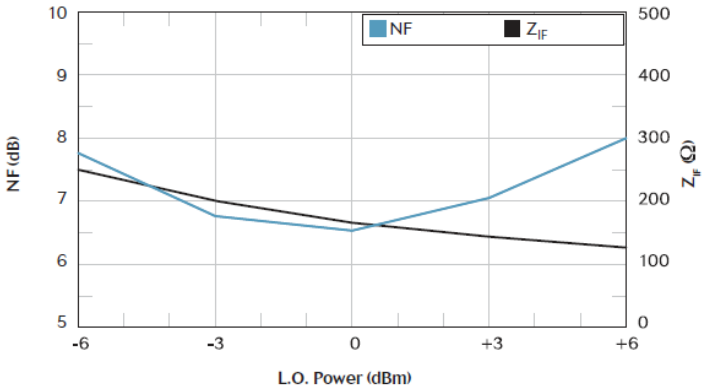
Forward Voltage vs. Current



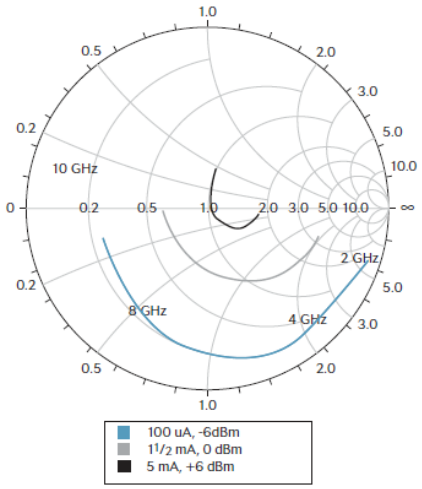

Reverse Current vs. Voltage




NF & $Z_{IF}$ vs. LO Power

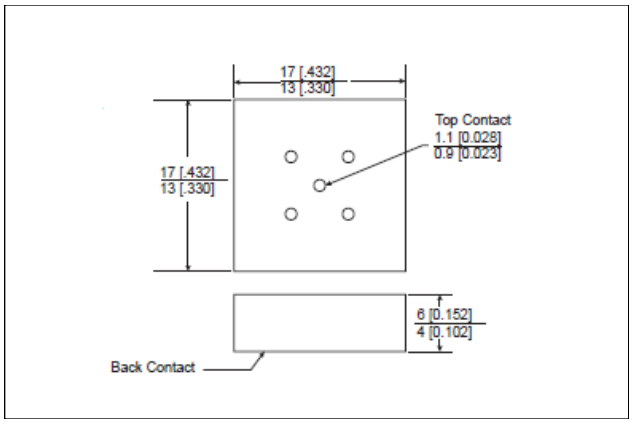



Smith Chart - 50 Ω Reference

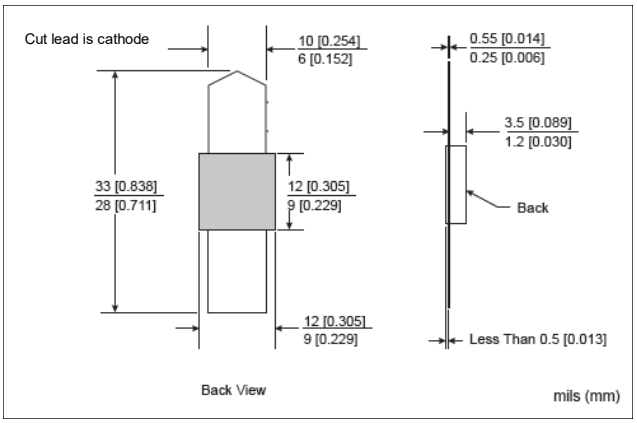


## Outline Drawings

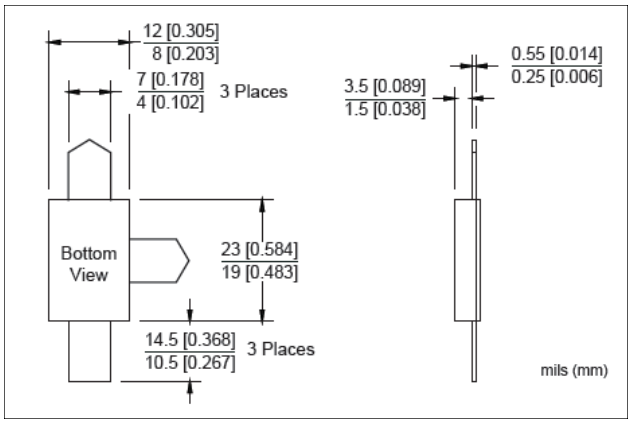
### C15



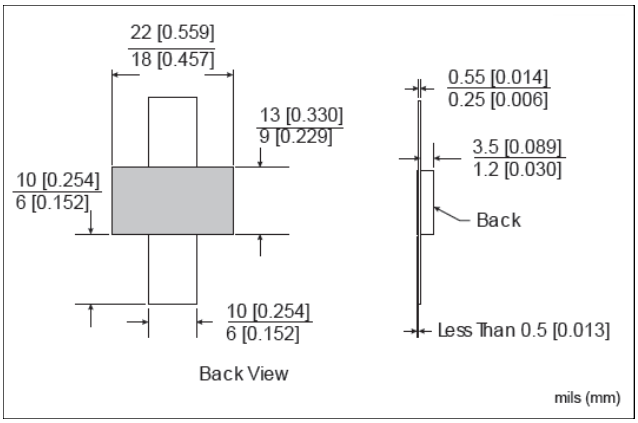

### B10B



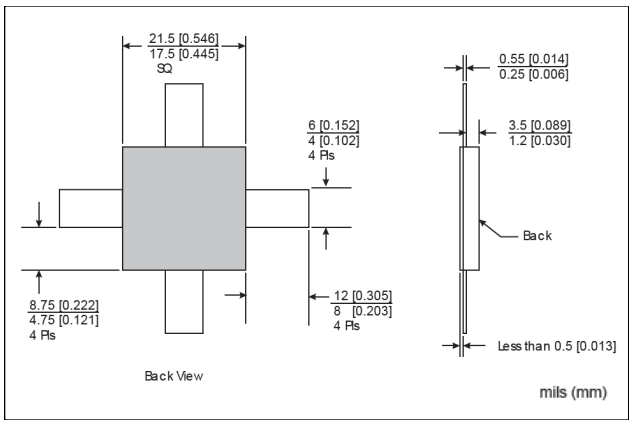

### B20



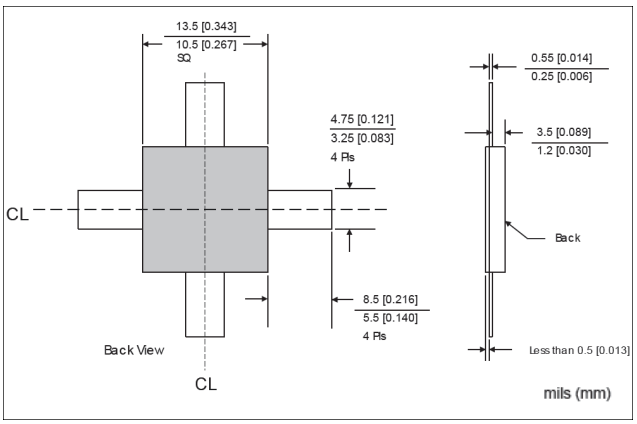

### B21



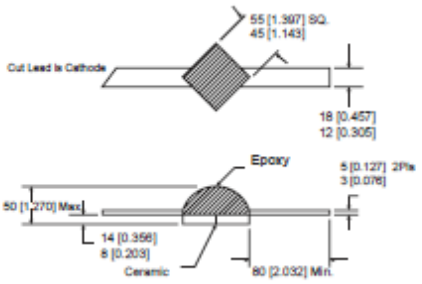

### B40



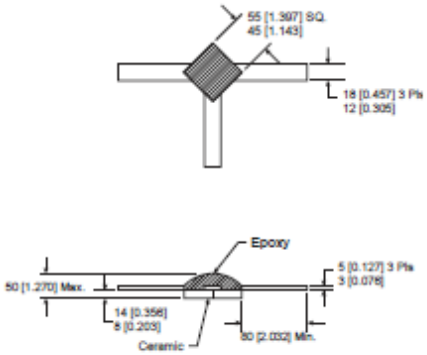

### B41



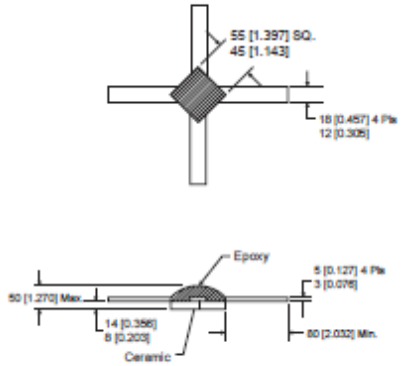
## E25 (non-hermetic)



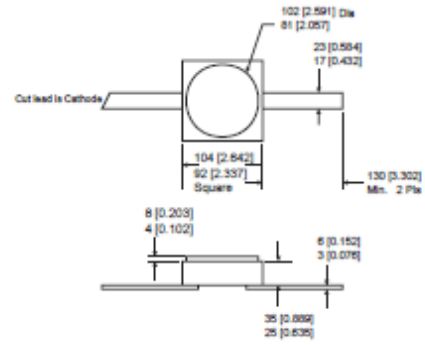

## E35 (non-hermetic)



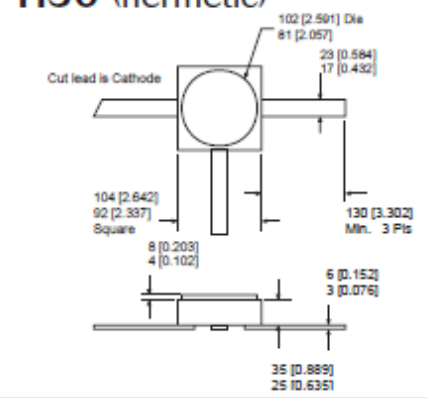

## E45 (non-hermetic)



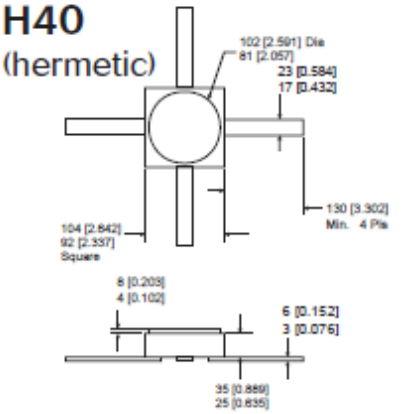

## H20 (hermetic)



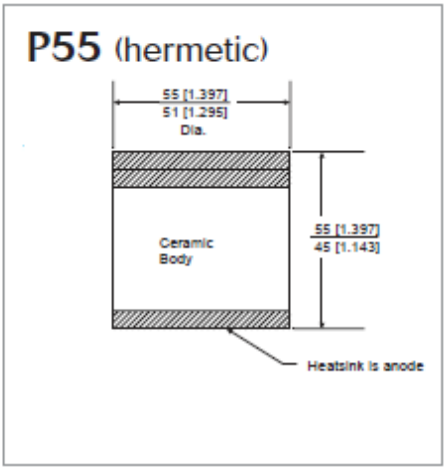

## H30 (hermetic)




## H40 (hermetic)




## P55 (hermetic)




## P86 (hermetic)