

GC2X15MPS12-247

1200V 30A SiC Schottky MPS™ Diode



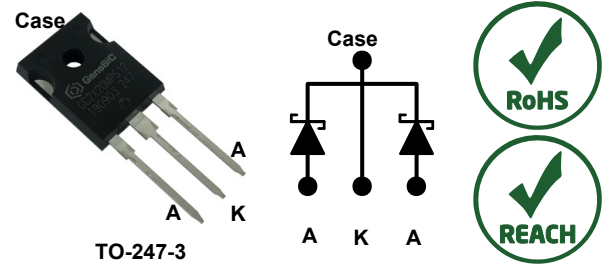
Silicon Carbide Schottky Diode

| | | |
|---|---|---------|
| V_{RRM} | = | 1200 V |
| $I_F (T_C = 100\text{ }^\circ\text{C})$ | = | 70 A * |
| Q_C | = | 70 nC * |

Features

- High Avalanche (UIS) Capability
- Enhanced Surge Current Capability
- Superior Figure of Merit Q_C/I_F
- Low Thermal Resistance
- 175 °C Maximum Operating Temperature
- Temperature Independent Switching Behavior
- Positive Temperature Coefficient of V_F
- Extremely Fast Switching Speed

Package



Advantages

- Low Standby Power Losses
- Improved Circuit Efficiency (Lower Overall Cost)
- Low Switching Losses
- Ease of Paralleling without Thermal Runaway
- Smaller Heat Sink Requirements
- Low Reverse Recovery Current
- Low Device Capacitance
- Low Reverse Leakage Current

Applications

- Boost Diode in Power Factor Correction (PFC)
- Switched Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Motor Drives
- Freewheeling / Anti-parallel Diode in Inverters
- Solar Inverters
- Electric Vehicles (EV) & DC Fast Charging
- Induction Heating & Welding

Absolute Maximum Ratings (At $T_C = 25\text{ }^\circ\text{C}$ Unless Otherwise Stated)

| Parameter | Symbol | Conditions | Values | Unit |
|---|----------------|---|------------|------------------|
| Repetitive Peak Reverse Voltage (Per Leg) | V_{RRM} | | 1200 | V |
| Continuous Forward Current (Per Leg / Per Device) | I_F | $T_C = 25\text{ }^\circ\text{C}, D = 1$ | 51 / 102 | A |
| | | $T_C = 100\text{ }^\circ\text{C}, D = 1$ | 35 / 70 | |
| | | $T_C = 158\text{ }^\circ\text{C}, D = 1$ | 15 / 30 | |
| Non-Repetitive Peak Forward Surge Current, Half Sine Wave (Per Leg) | $I_{F,SM}$ | $T_C = 25\text{ }^\circ\text{C}, t_P = 10\text{ ms}$ | 120 | A |
| | | $T_C = 150\text{ }^\circ\text{C}, t_P = 10\text{ ms}$ | 96 | |
| Repetitive Peak Forward Surge Current, Half Sine Wave (Per Leg) | $I_{F,RM}$ | $T_C = 25\text{ }^\circ\text{C}, t_P = 10\text{ ms}$ | 72 | A |
| | | $T_C = 150\text{ }^\circ\text{C}, t_P = 10\text{ ms}$ | 51 | |
| Non-Repetitive Peak Forward Surge Current (Per Leg) | $I_{F,max}$ | $T_C = 25\text{ }^\circ\text{C}, t_P = 10\text{ }\mu\text{s}$ | 600 | A |
| i^2t Value (Per Leg) | $\int i^2 dt$ | $T_C = 25\text{ }^\circ\text{C}, t_P = 10\text{ ms}$ | 72 | A ² s |
| Non-Repetitive Avalanche Energy (Per Leg) | E_{AS} | $L = 1.7\text{ mH}, I_{AS} = 15\text{ A}$ | 190 | mJ |
| Diode Ruggedness (Per Leg) | dV/dt | $V_R = 0 \sim 960\text{ V}$ | 200 | V/ns |
| Power Dissipation (Per Leg / Per Device) | P_{tot} | $T_C = 25\text{ }^\circ\text{C}$ | 259 / 518 | W |
| Operating and Storage Temperature | T_j, T_{stg} | | -55 to 175 | °C |

* Per Device

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Electrical Characteristics (Per Leg)

| Parameter | Symbol | Conditions | Values | | | Unit |
|-------------------------|--------|---|--|------|------|---------------|
| | | | Min. | Typ. | Max. | |
| Diode Forward Voltage | V_F | $I_F = 15 \text{ A}, T_j = 25 \text{ }^\circ\text{C}$ | | 1.5 | 1.8 | V |
| | | $I_F = 15 \text{ A}, T_j = 175 \text{ }^\circ\text{C}$ | | 2 | 2.4 | |
| Reverse Current | I_R | $V_R = 1200 \text{ V}, T_j = 25 \text{ }^\circ\text{C}$ | | 2 | 10 | μA |
| | | $V_R = 1200 \text{ V}, T_j = 175 \text{ }^\circ\text{C}$ | | 20 | 100 | |
| Total Capacitive Charge | Q_C | $I_F \leq I_{F,MAX}$ $di_F/dt = 200 \text{ A}/\mu\text{s}$ $T_j = 175 \text{ }^\circ\text{C}$ | $V_R = 400 \text{ V}$ | 25 | | nC |
| | | | $V_R = 800 \text{ V}$ | 35 | | |
| Switching Time | t_s | | $V_R = 400 \text{ V}$ $V_R = 800 \text{ V}$ | < 10 | | ns |
| Total Capacitance | C | $V_R = 1 \text{ V}, f = 1 \text{ MHz}$ | | 813 | | pF |
| | | $V_R = 800 \text{ V}, f = 1 \text{ MHz}$ | | 52 | | |

Thermal / Mechanical Characteristics

| | | | | | | |
|-------------------------------------|------------|----------|--|------|-----|---------------------------|
| Thermal Resistance, Junction - Case | R_{thJC} | | | 0.58 | | $^\circ\text{C}/\text{W}$ |
| Weight | W_T | | | 6.1 | | g |
| Mounting Torque | T_M | M3 Screw | | | 1.1 | Nm |

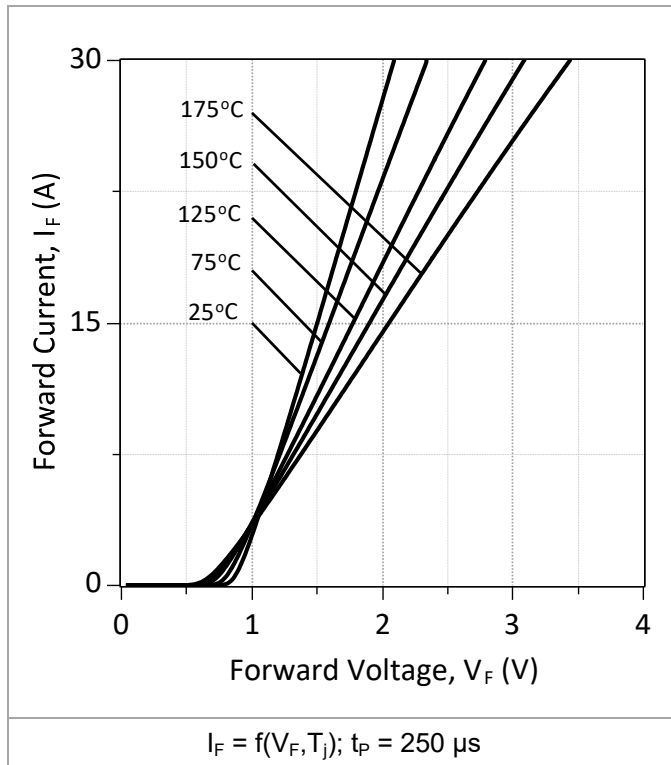


Figure 1: Typical Forward Characteristics (Per Leg)

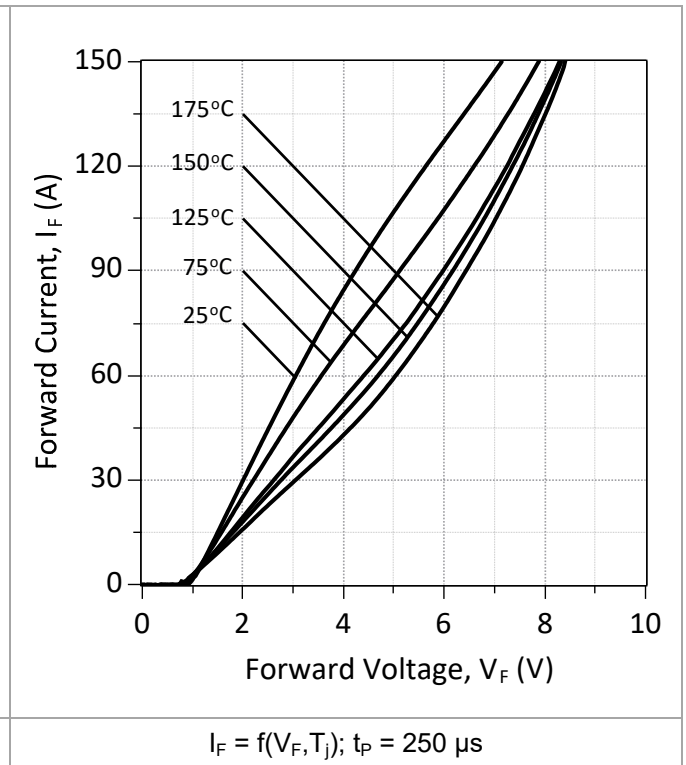


Figure 2: Typical High Current Forward Characteristics (Per Leg)

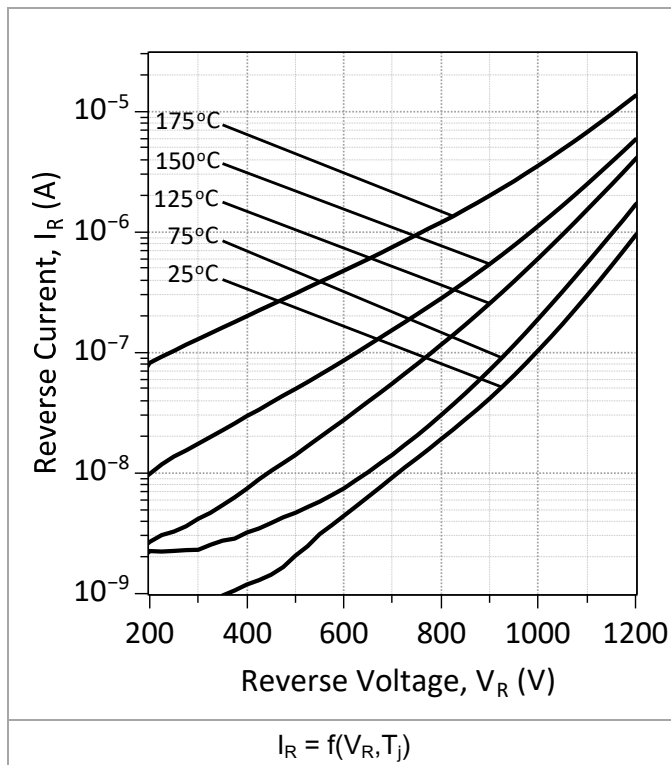


Figure 3: Typical Reverse Characteristics (Per Leg)

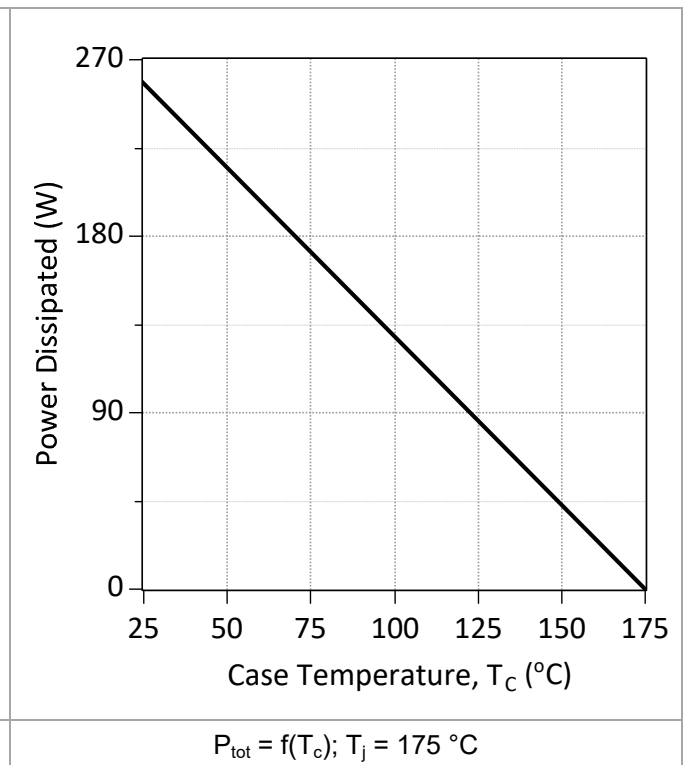


Figure 4: Power Derating Curve (Per Leg)

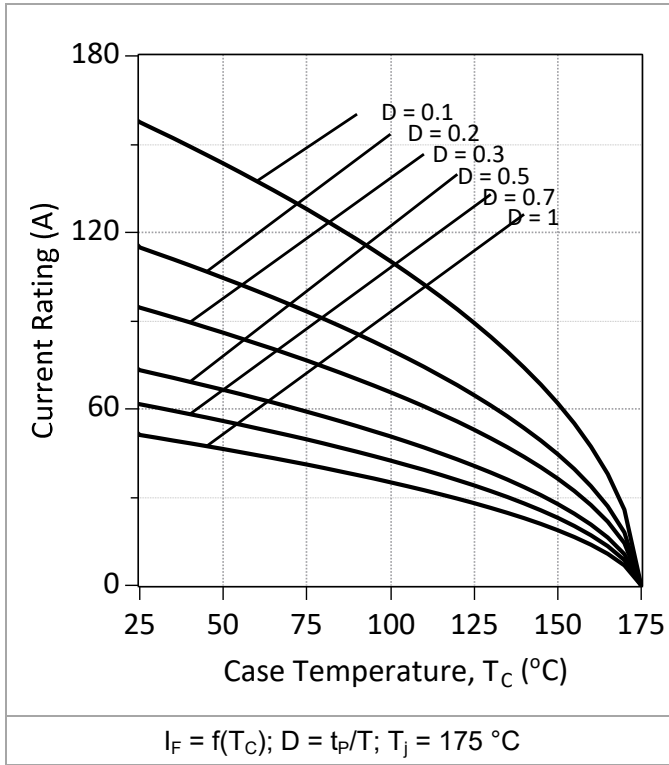


Figure 5: Current Derating Curves (Per Leg)

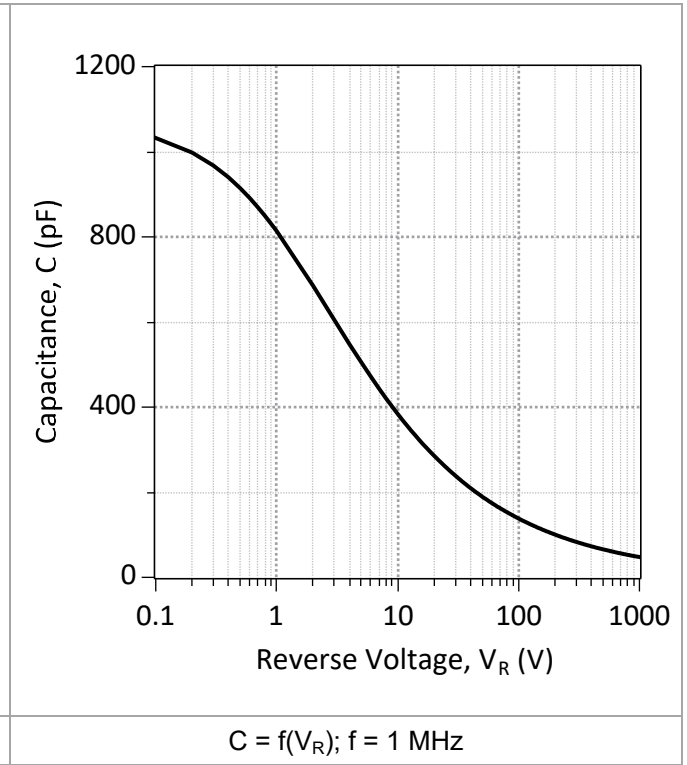


Figure 6: Typical Junction Capacitance vs. Reverse Voltage Characteristics (Per Leg)

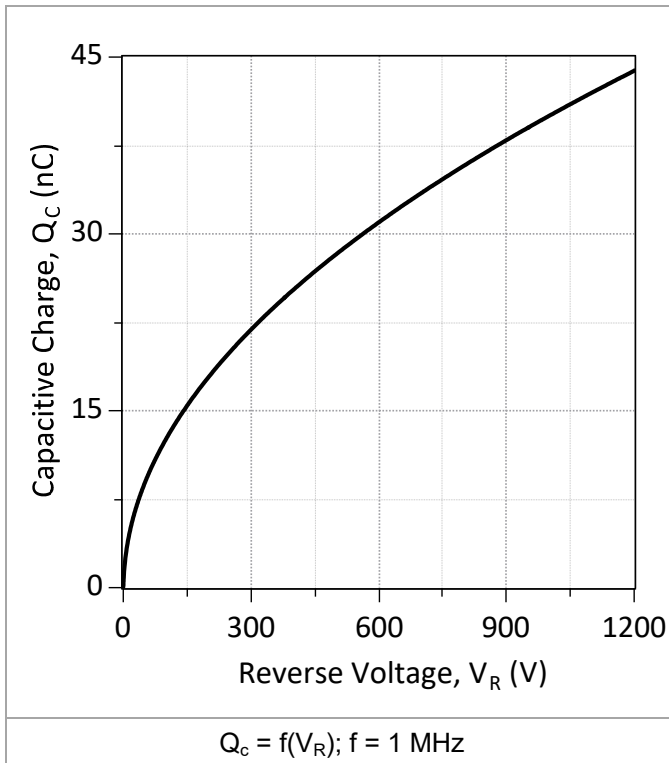


Figure 7: Typical Capacitive Charge vs. Reverse Voltage Characteristics (Per Leg)

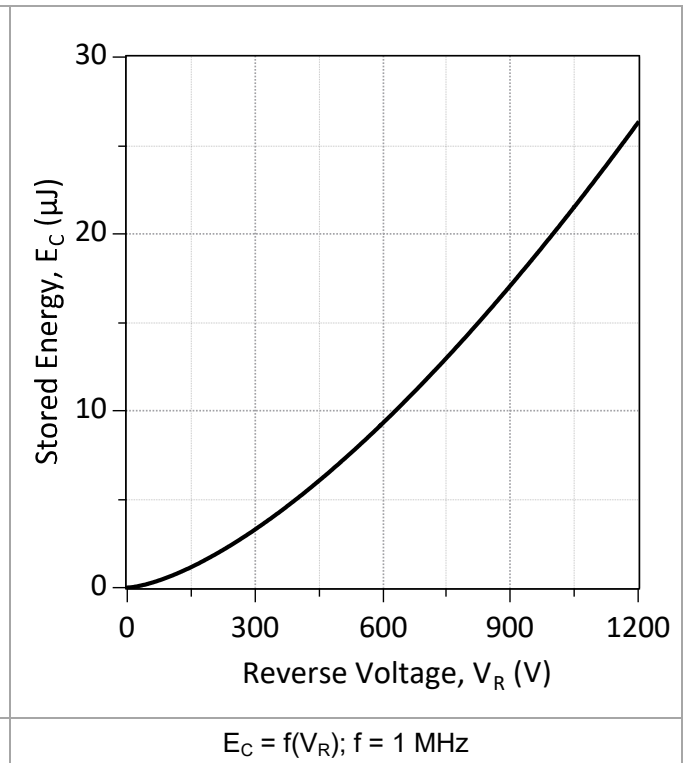


Figure 8: Typical Capacitive Energy vs. Reverse Voltage Characteristics (Per Leg)

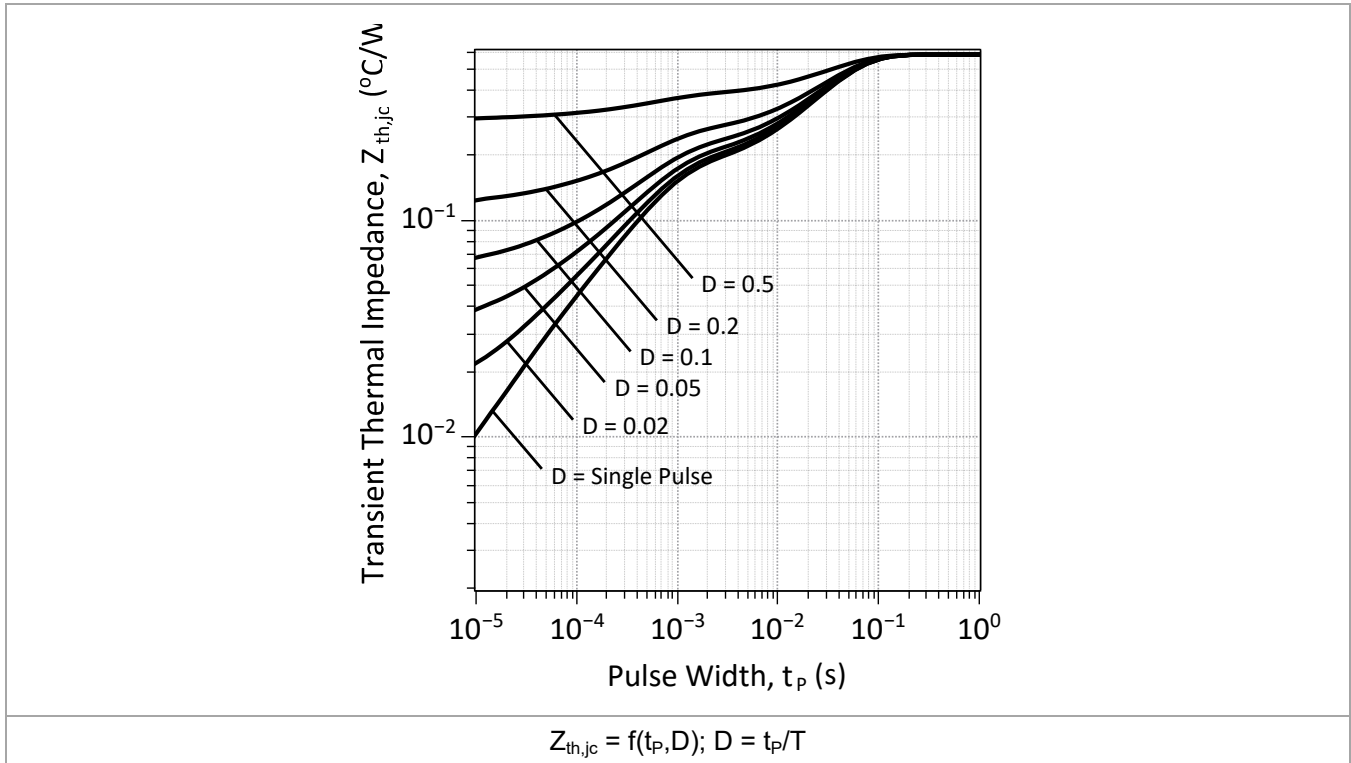


Figure 9: Transient Thermal Impedance (Per Leg)

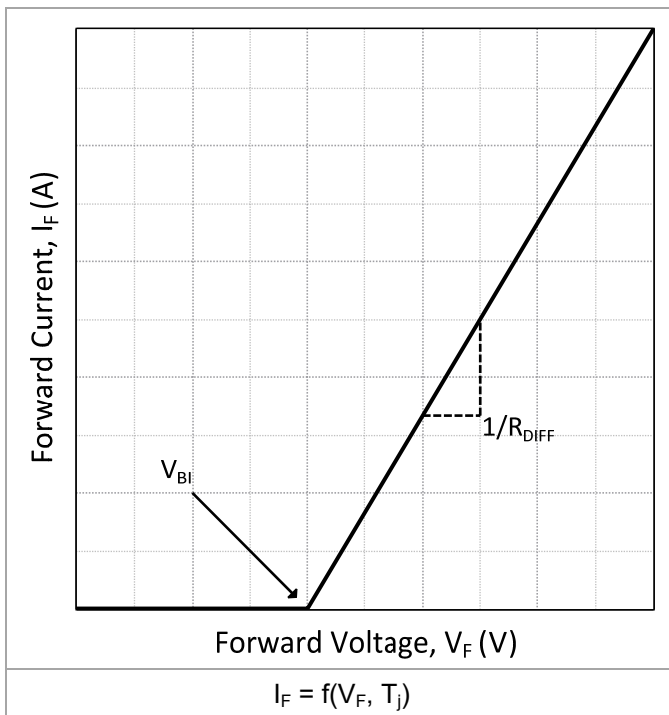


Figure 10: Forward Curve Model (Per Leg)

$$I_F = (V_F - V_{Bi})/R_{DIFF} \text{ (A)}$$

Built-In Voltage (V_{Bi}):

$$V_{Bi}(T_j) = m \cdot T_j + n \text{ (V)},$$

$$m = -1.48e-03, n = 0.95$$

Differential Resistance (R_{DIFF}):

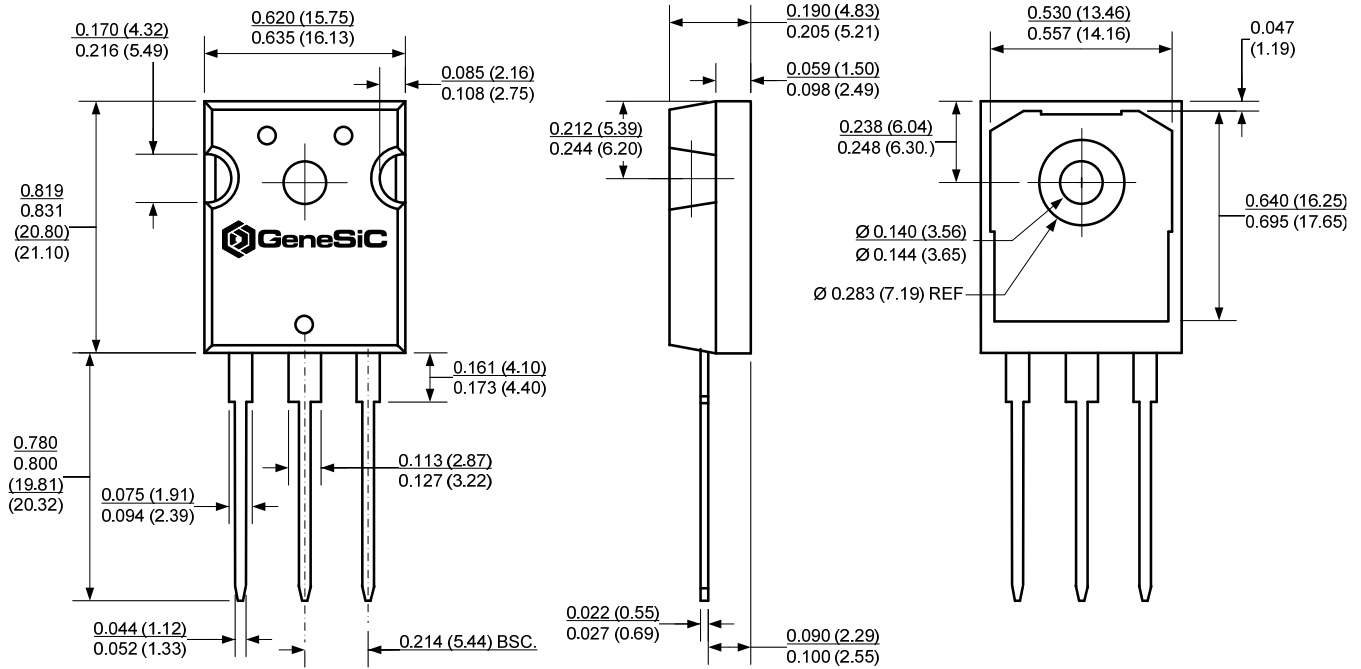
$$R_{DIFF}(T_j) = a \cdot T_j^2 + b \cdot T_j + c \text{ (}\Omega\text{);}$$

$$a = 1.22e-06, b = 7.24e-05, c = 0.035$$

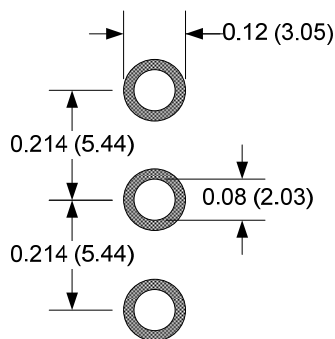
Package Dimensions

TO-247-3

Package Outline



Recommended Solder Pad Layout



NOTE

1. CONTROLLED DIMENSION IS INCH. DIMENSION IN BRACKET IS MILLIMETER.
2. DIMENSIONS DO NOT INCLUDE END FLASH, MOLD FLASH, MATERIAL PROTRUSIONS

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Наши контакты:

Телефон: +7 812 627 14 35

Электронная почта: sales@st-electron.ru

Адрес: 198099, Санкт-Петербург,
Промышленная ул, дом № 19, литера Н,
помещение 100-Н Офис 331