

## 1200-V Direct WBG Diode

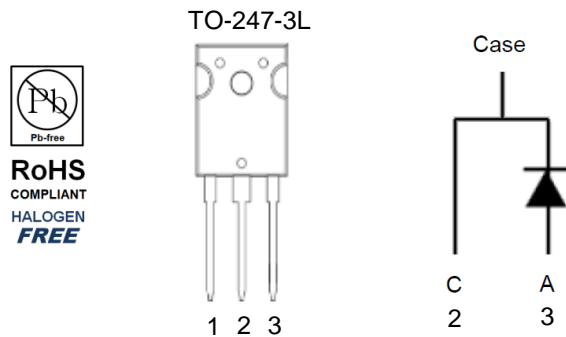
### Key Features:

- SiC performance
- Easy paralleling
- High current carrying capability
- Very low junction capacitance
- Highly stable  $V_F$  and  $Q_{RR}$  at elevated temperatures

### Typical Applications:

- Soft switching topologies
- Secondary side rectification

| PRODUCT SUMMARY |           |                 |
|-----------------|-----------|-----------------|
| $V_{BR}$ (V)    | $V_F$ (V) | $I_{F(AV)}$ (A) |
| 1200            | 1.85      | 20              |



| ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED) |                        |             |            |                           |
|---|------------------------|-------------|------------|---------------------------|
| Parameter   |                        | Symbol      | Limit      | Units                     |
| Cathode-Anode Voltage   |                        | $V_{BR}$    | 1200       | V                         |
| Diode Forward Current <sup>a d</sup>  | $T_C=25^\circ\text{C}$ | $I_{F(AV)}$ | 20 / 40    | A                         |
| Single Pulse Forward Current <sup>b</sup>                                   | $T_C=25^\circ\text{C}$ | $I_{FSM}$   | 90         | A                         |
| Joule Integral  |                        | $i^2t$      | 40         | $\text{A}^2\cdot\text{s}$ |
| Power Dissipation <sup>a d</sup>  | $T_C=25^\circ\text{C}$ | $P_D$       | 52 / 104   | W                         |
| Storage Temperature Range   |                        | $T_{stg}$   | -55 to 175 | $^\circ\text{C}$          |
| Operating Junction Temperature  |                        | $T_J$       | -40 to 175 | $^\circ\text{C}$          |

| THERMAL RESISTANCE RATINGS               |  |                 |            |                           |
|--|--|-----------------|------------|---------------------------|
| Parameter                                |  | Symbol          | Maximum    | Units                     |
| Maximum Junction-to-Ambient <sup>c</sup> |  | $R_{\theta JA}$ | 40         | $^\circ\text{C}/\text{W}$ |
| Maximum Junction-to-Case <sup>d</sup>    |  | $R_{\theta JC}$ | 2.9 / 1.45 |                           |

### Notes

- Package Limited
- Pulse width limited by maximum junction temperature
- Surface Mounted on 1" x 1" FR4 Board.
- Per leg / Per device

## Electrical Characteristics

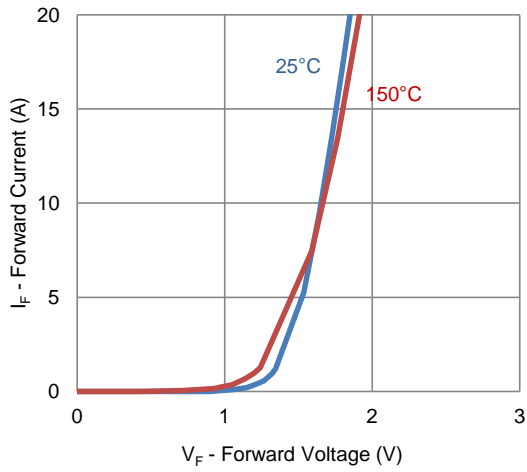
| Parameter                       | Symbol    | Test Conditions   | Min  | Typ  | Max | Unit |
|---------------------------------|-----------|---|------|------|-----|------|
| <b>Static</b>                   |           |   |      |      |     |      |
| Forward Voltage <sup>a</sup>    | $V_F$     | $I_F = 20 \text{ A}$  |      | 1.85 |     | V    |
|                                 |           | $I_F = 20 \text{ A}, T_J = 150^\circ\text{C}$   |      | 1.92 |     |      |
| Repetitive Peak Reverse Voltage | $V_{RRM}$ | $T_J = -40^\circ\text{C to } 150^\circ\text{C}$   | 1200 |      |     | V    |
| Junction Capacitance            | $C_J$     | $V_R = 200 \text{ V}, V_{\text{sine}} = 0.6 V_{\text{eff}},$<br>$f = 100 \text{ kHz}$             |      | 12   |     | pF   |
| Reverse Leakage Current         | $I_R$     | $V_R = 1200 \text{ V}$  |      |      | 10  | uA   |
|                                 |           | $V_R = 1200 \text{ V}, T_J = 120^\circ\text{C}$   |      |      | 60  | uA   |
| <b>Dynamic <sup>b</sup></b>     |           |   |      |      |     |      |
| Reverse Recovery Time           | $T_{rr}$  | $I_F = 20 \text{ A}, dI/dt = 100 \text{ A/us},$<br>$V_R = 800 \text{ V}, T_J = 25^\circ\text{C}$  |      | 84   |     | ns   |
| Reverse Recovery Charge         | $Q_{rr}$  |   |      | 213  |     | nC   |
| Peak Recovery Current           | $I_{RRM}$ |   |      | 4.3  |     | A    |
| Reverse Recovery Time           | $T_{rr}$  | $I_F = 20 \text{ A}, dI/dt = 100 \text{ A/us},$<br>$V_R = 800 \text{ V}, T_J = 150^\circ\text{C}$ |      | 82   |     | ns   |
| Reverse Recovery Charge         | $Q_{rr}$  |   |      | 197  |     | nC   |
| Peak Recovery Current           | $I_{RRM}$ |   |      | 3.9  |     | A    |
| Reverse Recovery Time           | $T_{rr}$  | $I_F = 20 \text{ A}, dI/dt = 500 \text{ A/us},$<br>$V_R = 800 \text{ V}, T_J = 25^\circ\text{C}$  |      | 47   |     | ns   |
| Reverse Recovery Charge         | $Q_{rr}$  |   |      | 482  |     | nC   |
| Peak Recovery Current           | $I_{RRM}$ |   |      | 17.9 |     | A    |
| Reverse Recovery Time           | $T_{rr}$  | $I_F = 20 \text{ A}, dI/dt = 500 \text{ A/us},$<br>$V_R = 800 \text{ V}, T_J = 150^\circ\text{C}$ |      | 45   |     | ns   |
| Reverse Recovery Charge         | $Q_{rr}$  |   |      | 435  |     | nC   |
| Peak Recovery Current           | $I_{RRM}$ |   |      | 15.9 |     | A    |

## Notes

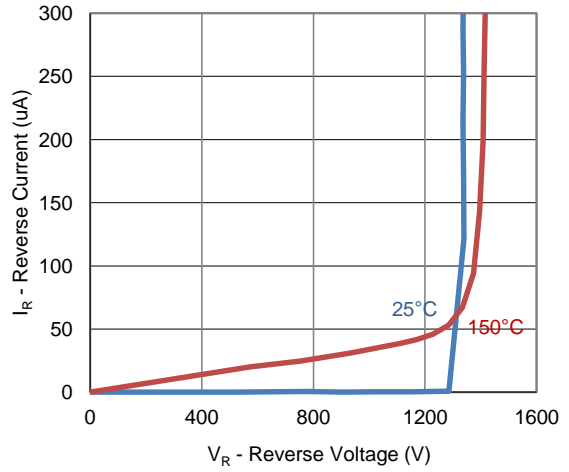
- Pulse test:  $PW \leq 300\mu\text{s}$  duty cycle  $\leq 2\%$ .
- Guaranteed by design, not subject to production testing.

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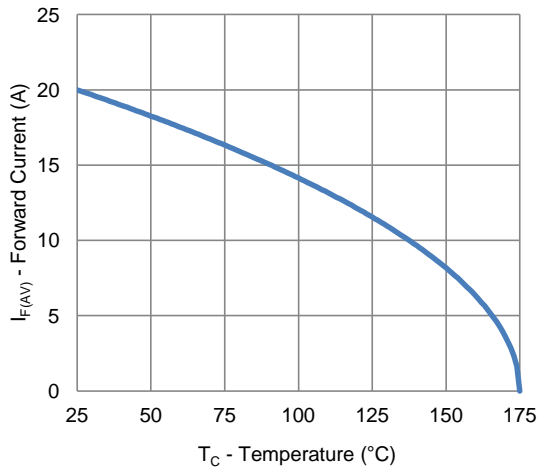
Typical Electrical Characteristics



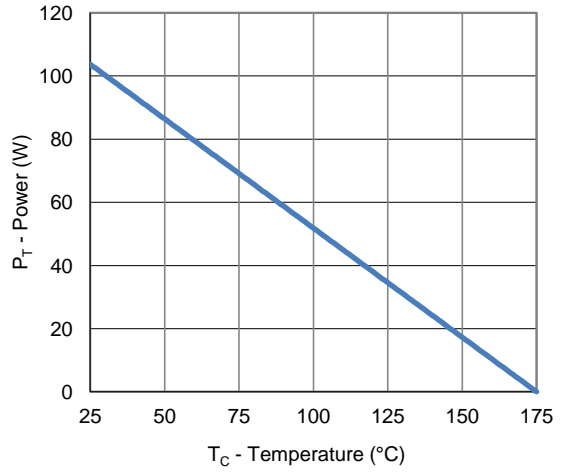
1. Forward Characteristics



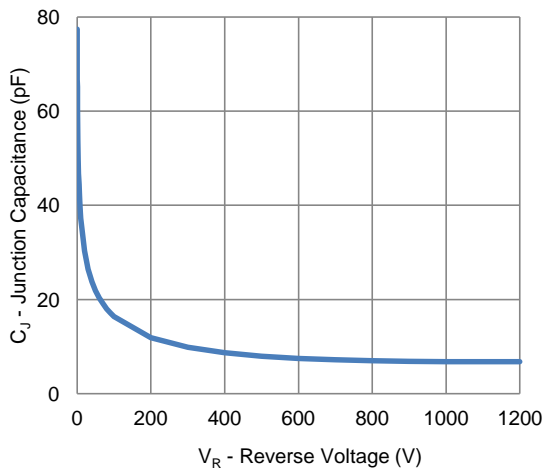
2. Reverse Characteristics



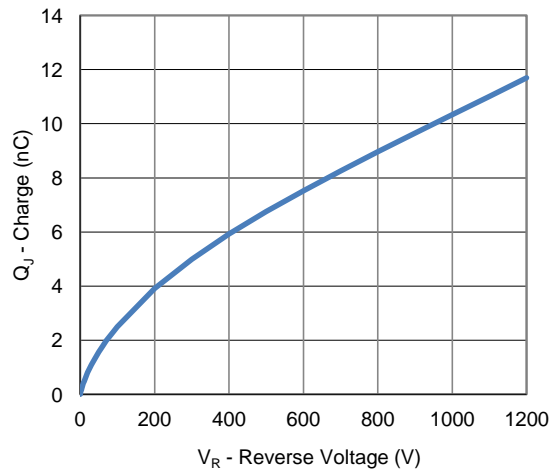
3. Current Derating



4. Power Derating

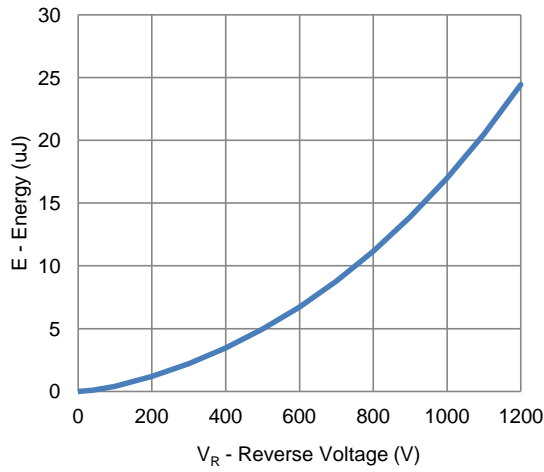


5. Junction Capacitance vs. Reverse Voltage

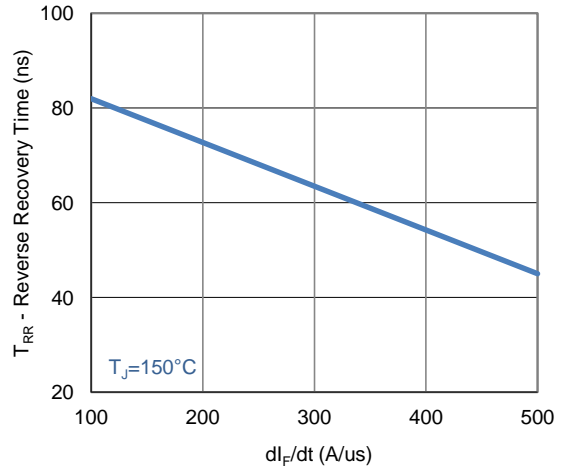


6. Total Capacitance Charge vs. Reverse Voltage

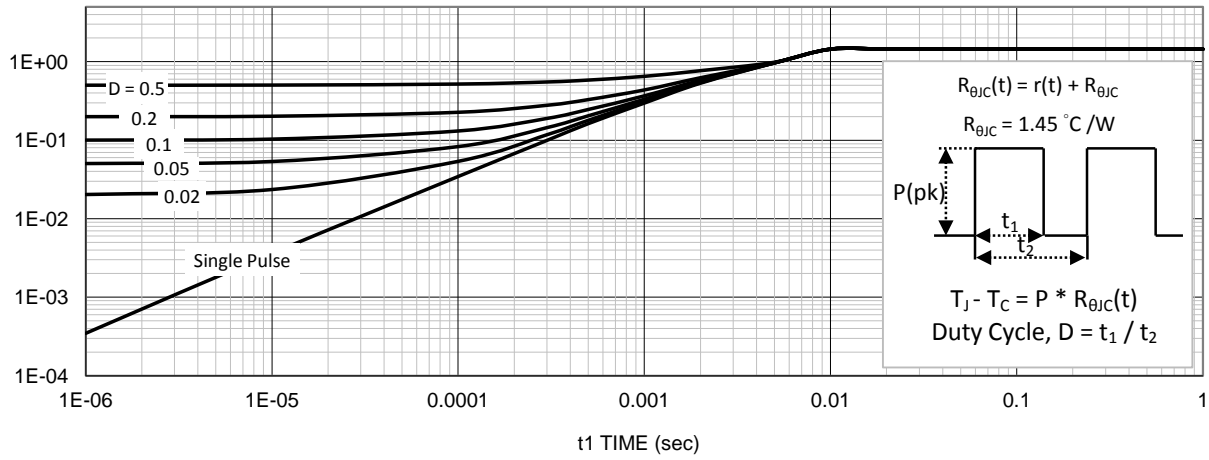
Typical Electrical Characteristics



7. Capacitance Stored Energy vs. Reverse Voltage

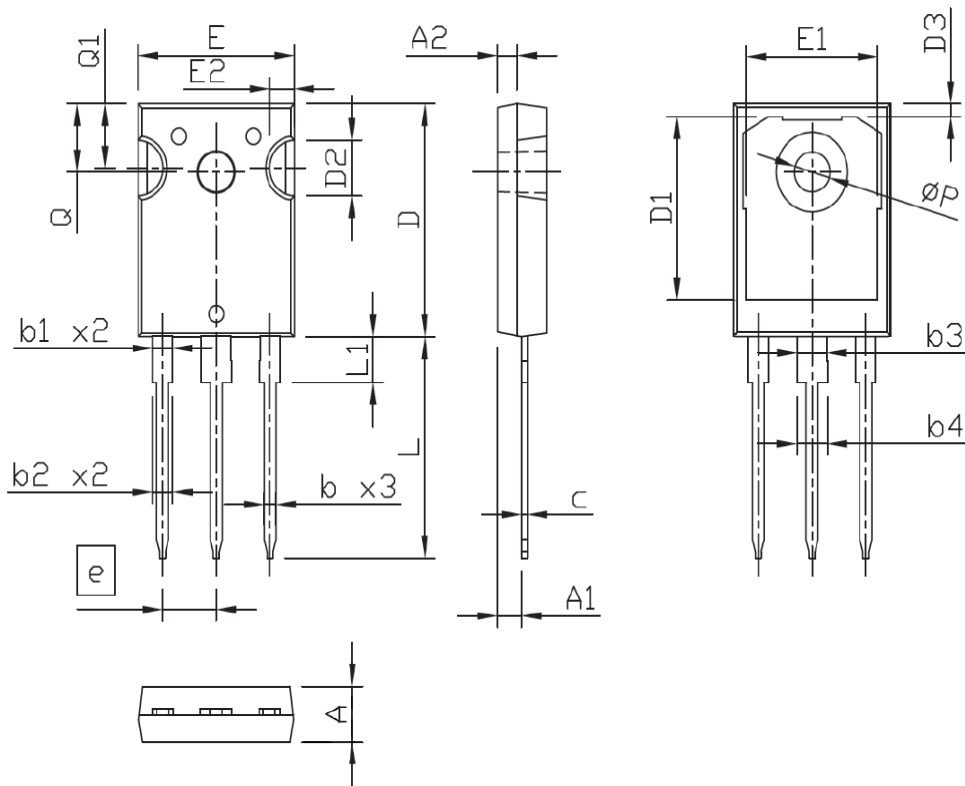


8. Reverse Recovery Time vs. di\_F/dt



9. Thermal Transient Junction to Ambient

Package Information



| SYMBOLS | DIMENSIONS IN MILLIMETERS |       |       |
|---------|---------------------------|-------|-------|
|         | MIN                       | NOM   | MAX   |
| A       | 4.90                      | 5.00  | 5.10  |
| A1      | 2.32                      | 2.42  | 2.52  |
| A2      | 1.90                      | 2.00  | 2.10  |
| b       | 1.17                      | 1.22  | 1.27  |
| b1      | 1.97                      | 2.02  | 2.07  |
| b2      | 2.00                      | 2.10  | 2.20  |
| b3      | 2.97                      | 3.02  | 3.07  |
| b4      | 3.00                      | 3.10  | 3.20  |
| c       | 0.59                      | 0.62  | 0.66  |
| D       | 20.90                     | 21.00 | 21.10 |
| D1      | 16.25                     | 16.55 | 16.85 |
| D2      | 5.00 TYP                  |       |       |
| D3      | 1.05                      | 1.20  | 1.35  |
| e       | 5.44 BSC                  |       |       |
| E       | 15.70                     | 15.80 | 15.90 |
| E1      | 13.06                     | 13.26 | 13.46 |
| E2      | 2.50 TYP                  |       |       |
| L       | 19.72                     | 19.92 | 20.12 |
| L1      | ---                       | ---   | 4.30  |
| Q       | 6.15 BSC                  |       |       |
| Q1      | 5.60                      | 5.80  | 6.00  |
| øP      | 3.55                      | 3.60  | 3.65  |