# Silicon Carbide (SiC) Schottky Diode – EliteSiC, 6 A, 650 V, D2, DPAK

# FFSD0665B-F085

Silicon Carbide (SiC) Schottky Diodes use a completely new technology that provides superior switching performance and higher reliability compared to Silicon. No reverse recovery current, temperature independent switching characteristics, and excellent thermal performance sets Silicon Carbide as the next generation of power semiconductor. System benefits include highest efficiency, faster operating frequency, increased power density, reduced EMI, and reduced system size and cost.

### Features

- Max Junction Temperature 175°C
- Avalanche Rated 24.5 mJ
- High Surge Current Capacity
- Positive Temperature Coefficient
- Ease of Paralleling
- No Reverse Recovery / No Forward Recovery
- AEC−Q101 Qualified and PPAP Capable
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

### Applications

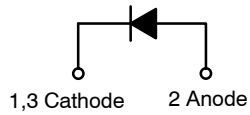
- Automotive HEV−EV Onboard Chargers
- Automotive HEV−EV DC−DC Converters

**MAXIMUM RATINGS** ($T_J$ = 25°C unless otherwise noted)

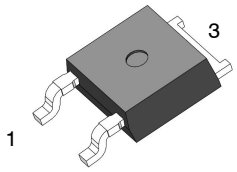
| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Peak Repetitive Reverse Voltage | | $V_{RRM}$ | 650 | V |
| Single Pulse Avalanche Energy ($T_J$ = 25°C, $I_{L(pk)}$ = 9.9 A, L = 0.5 mH, V = 50 V) | | $E_{AS}$ | 24.5 | mJ |
| Continuous Rectified Forward Current | $T_C$ < 154 | $I_F$ | 6.0 | A |
| | $T_C$ < 135 | | 9.1 | |
| Non−Repetitive Peak Forward Surge Current | $T_C$ = 25°C, $t_P$ = 10 µs | $I_{FM}$ | 493 | A |
| | $T_C$ = 150°C, $t_P$ = 10 µs | | 442 | |
| Non−Repetitive Forward Surge Current (Half−Sine Pulse) | $T_C$ = 25°C $t_P$ = 8.3 ms | $I_{FSM}$ | 28 | A |
| Power Dissipation | $T_C$ = 25°C | $P_{tot}$ | 75 | W |
| | $T_C$ = 150°C | | 12.5 | |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | −55 to +175 | °C |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

| $V_{RRM}$ | $I_F$ |
|---|---|
| 650 V | 6.0 A |

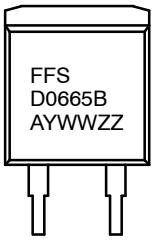



**Schottky Diode**




**DPAK**
**CASE 369AS**

### MARKING DIAGRAM




| | |
|---|---|
| FFSD0665B | = Specific Device Code |
| A | = Assembly Location |
| Y | = Year |
| WW | = Work Week |
| ZZ | = Assembly Lot Code |

### ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

## THERMAL RESISTANCE

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance, Junction−to−Case | 2.0 | °C/W |

## ELECTRICAL CHARACTERISTICS

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **ON CHARACTERISTICS** | | | | | | |
| $V_F$ | Forward Voltage | $I_F$ = 6.0 A, $T_J$ = 25°C | – | 1.38 | 1.7 | V |
| | | $I_F$ = 6.0 A, $T_J$ = 125°C | – | 1.53 | 2.0 | |
| | | $I_F$ = 6.0 A, $T_J$ = 175°C | – | 1.67 | 2.4 | |
| $I_R$ | Reverse Current | $V_R$ = 650 V, $T_J$ = 25°C | – | 0.5 | 40 | μA |
| | | $V_R$ = 650 V, $T_J$ = 125°C | – | 1.0 | 80 | |
| | | $V_R$ = 650 V, $T_J$ = 175°C | – | 2.0 | 160 | |
| **CHARGES, CAPACITANCES & GATE RESISTANCE** | | | | | | |
| $Q_C$ | Total Capacitive Charge | $V_C$ = 400 V | – | 16 | – | nC |
| $C_{tot}$ | | $V_R$ = 1 V, f = 100 kHz | – | 259 | – | pF |
| | | $V_R$ = 200 V, f = 100 kHz | – | 29 | – | |
| | | $V_R$ = 400 V, f = 100 kHz | – | 22 | – | |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

## PART MARKING AND ORDERING INFORMATION

| Part Number | Top Mark | Package | Packing Method† | Reel Size | Tape Width | Quantity |
|---|---|---|---|---|---|---|
| FFSD0665B−F085 | FFSD0665B | DPAK | Tape & Reel | 330 mm | 16 mm | 2500 units |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

## TYPICAL CHARACTERISTICS

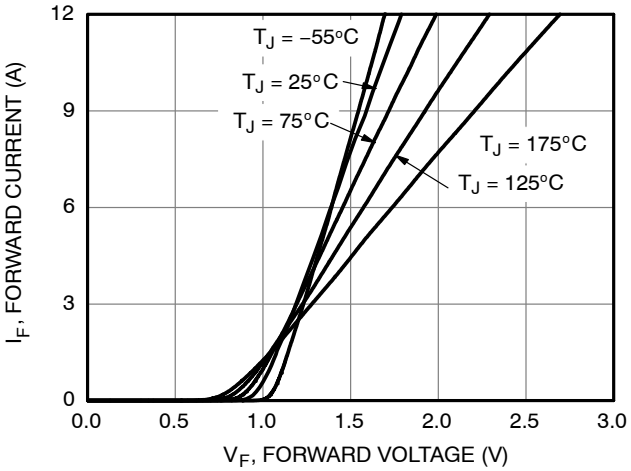



**Figure 1. Forward Characteristics**

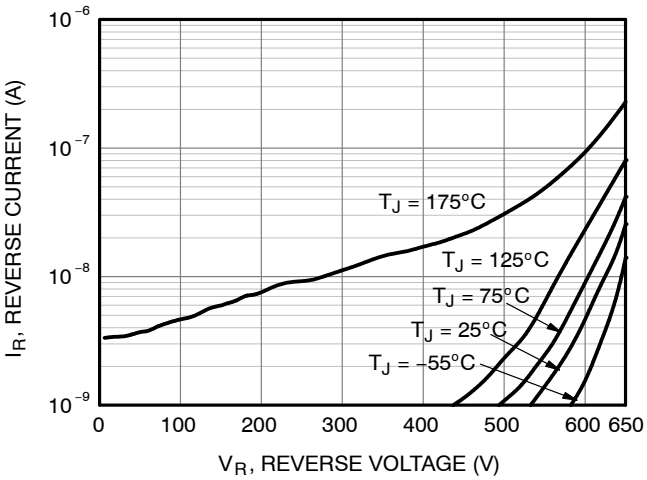



**Figure 2. Reverse Characteristics**

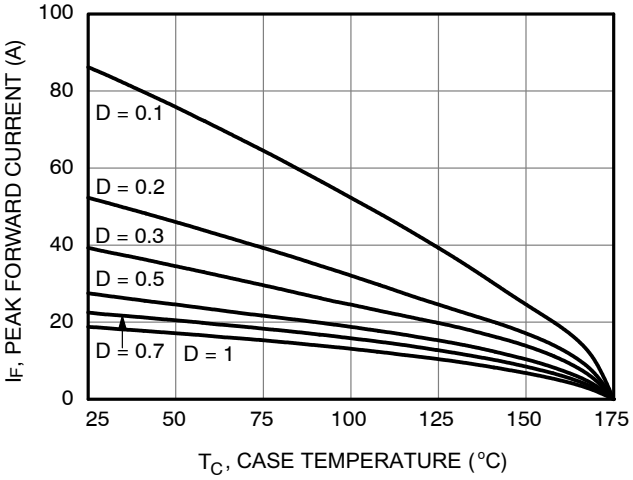



**Figure 3. Current Derating**

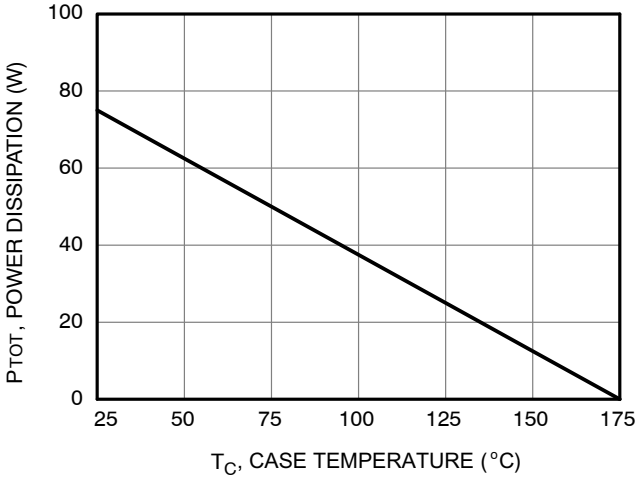



**Figure 4. Power Derating**

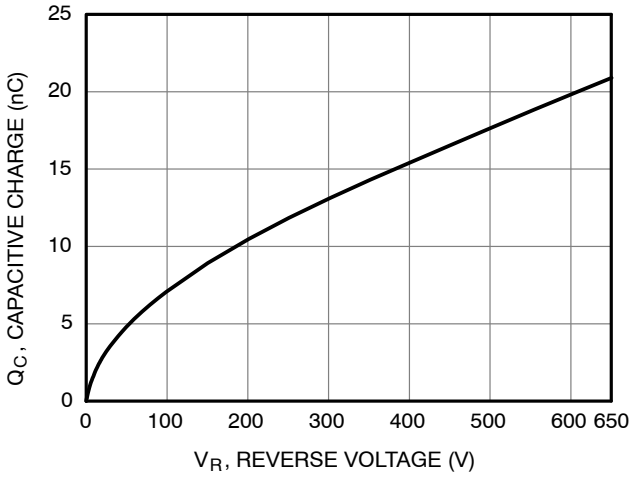



**Figure 5. Capacitive Charge vs. Reverse Voltage**

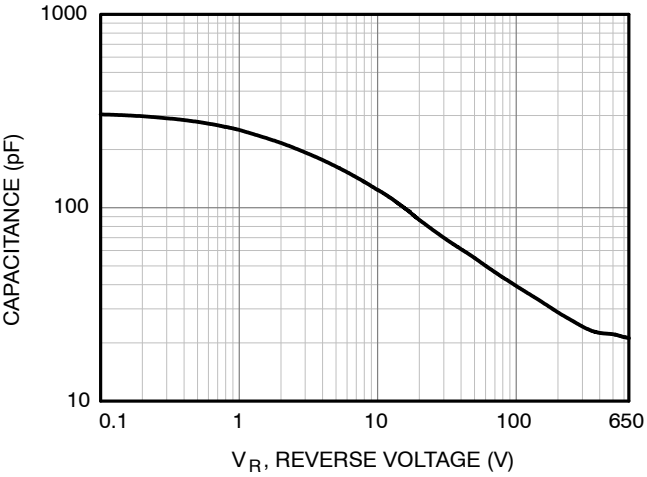



**Figure 6. Capacitance vs. Reverse Voltage**

## TYPICAL CHARACTERISTICS

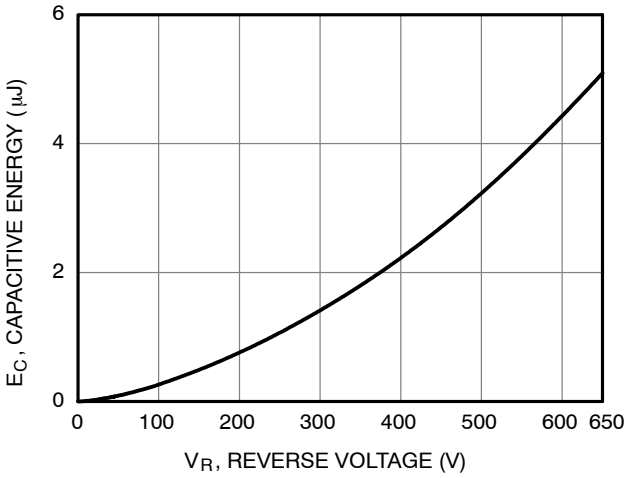



**Figure 7. Capacitance Stored Energy**

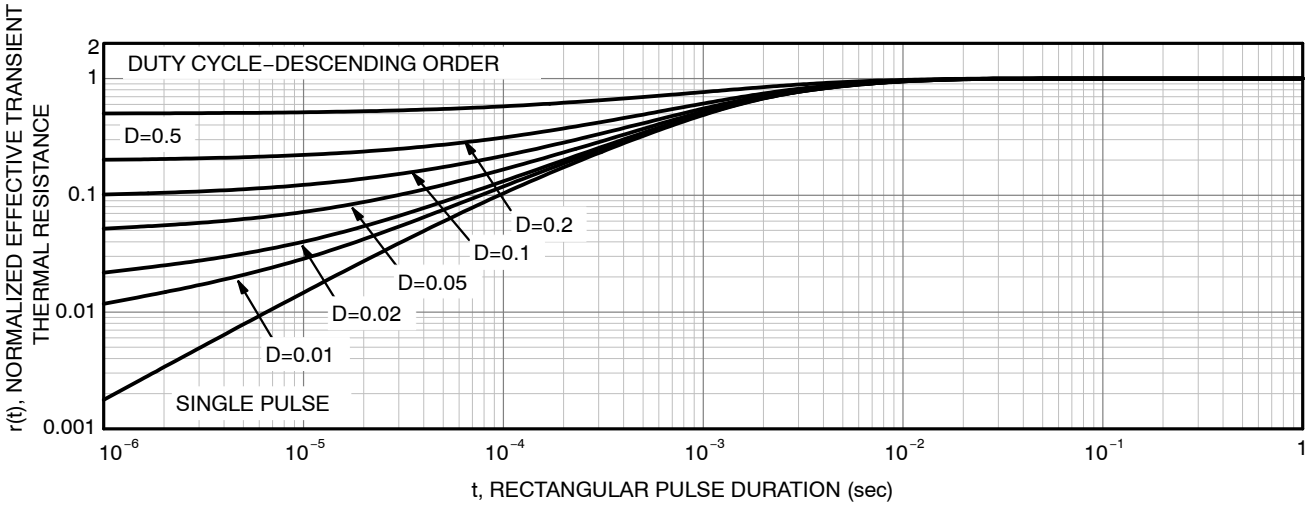
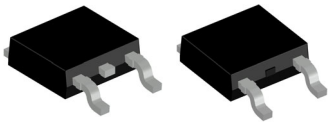


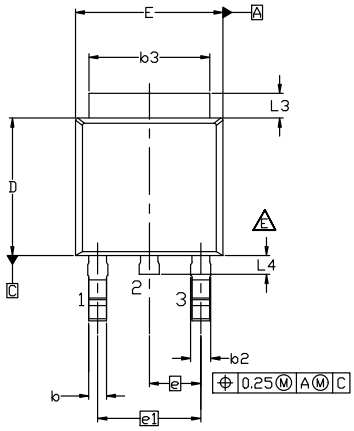

**Figure 8. Junction−to−Case Transient Thermal Response**

# MECHANICAL CASE OUTLINE
## PACKAGE DIMENSIONS

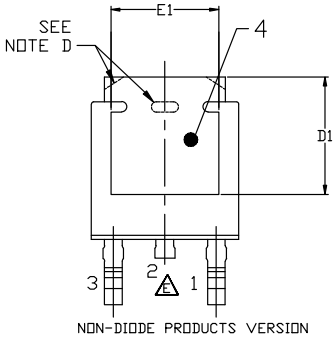


**DPAK3 6.10x6.54x2.29, 4.57P**
CASE 369AS
ISSUE B

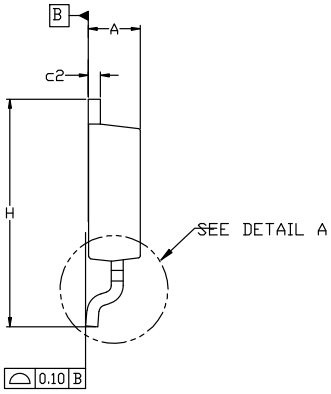
DATE 20 DEC 2023



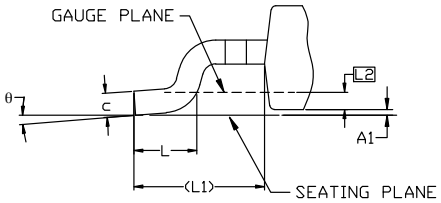

NON-DIODE PRODUCTS VERSION




NON-DIODE PRODUCTS VERSION

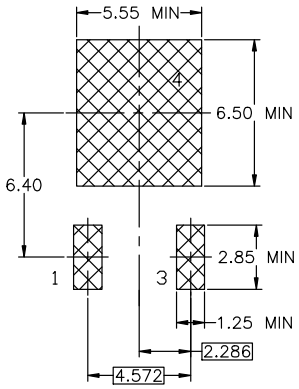



NOTES: UNLESS OTHERWISE SPECIFIED
A) THIS PACKAGE CONFORMS TO JEDEC, TO-252, ISSUE F, VARIATION AA.
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONING AND TOLERANCING PER ASME Y14.5M-2018.
D) SUPPLIER DEPENDENT MOLD LOCKING HOLES OR CHAMFERED CORNERS OR EDGE PROTRUSION.
E) FOR DIODE PRODUCTS, L4 IS 0.25 MM MAX PLASTIC BODY STUB WITHOUT CENTER LEAD.
F) DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
G) LAND PATTERN RECOMMENDATION IS BASED ON IPC7351A STD TO228P991X239-3N.




DETAIL A
(ROTATED -90°)
SCALE: 12X

| DIM | MILLIMETERS | | |
|---|---|---|---|
| | MIN. | NOM. | MAX. |
| A | 2.18 | 2.29 | 2.39 |
| A1 | 0.00 | – | 0.127 |
| b | 0.64 | 0.77 | 0.89 |
| b2 | 0.76 | 0.95 | 1.14 |
| b3 | 5.21 | 5.34 | 5.46 |
| c | 0.45 | 0.53 | 0.61 |
| c2 | 0.45 | 0.52 | 0.58 |
| D | 5.97 | 6.10 | 6.22 |
| D1 | 5.21 | --- | --- |
| E | 6.35 | 6.54 | 6.73 |
| E1 | 4.32 | --- | --- |
| e | 2.286 BSC | | |
| e1 | 4.572 BSC | | |
| H | 9.40 | 9.91 | 10.41 |
| L | 1.40 | 1.59 | 1.78 |
| L1 | 2.90 REF | | |
| L2 | 0.51 BSC | | |
| L3 | 0.89 | 1.08 | 1.27 |
| L4 | --- | --- | 1.02 |
| θ | 0° | --- | 10° |




LAND PATTERN RECOMMENDATION

*FOR ADDITIONAL INFORMATION ON OUR PB-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

**GENERIC MARKING DIAGRAM***


*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

XXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
ZZ = Assembly Lot Code

| | | | |
|---|---|---|---|
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| **DESCRIPTION:** | **DPAK3 6.10x6.54x2.29, 4.57P** | | **PAGE 1 OF 1** |

## ADDITIONAL INFORMATION

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