Silicon Carbide (SiC) Schottky Diode – EliteSiC, 20 A, 650 V, D2, TO-220-2L

FFSP2065B-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.

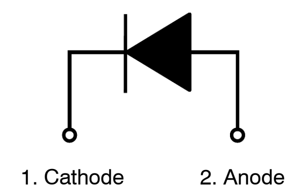
Features

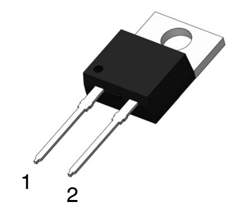
- Max Junction Temperature 175°C
- Avalanche Rated 94 mJ
- High Surge Current Capacity
- Positive Temperature Coefficient
- Ease of Paralleling
- No Reverse Recovery / No Forward Recovery
- AEC−Q101 Qualified and PPAP Capable
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

Applications

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

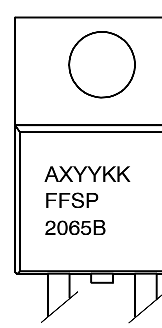
ELECTRICAL CONNECTION





TO−220−2LD
CASE 340BB

MARKING DIAGRAM



A	= Assembly Plant Code
XYY	= Date Code (Year & Week)
KK	= Lot Traceability Code
FFSP2065B	= Specific Device Code

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

ABSOLUTE MAXIMUM RATINGS

(T_C = 25°C, Unless otherwise specified)

Symbol	Parameter		FFSP2065B−F085	Unit
V_{RRM}	Peak Repetitive Reverse Voltage		650	V
E_{AS}	Single Pulse Avalanche Energy (Note 1)		94	mJ
I_F	Continuous Rectified Forward Current @ T_C < 141°C		20	A
	Continuous Rectified Forward Current @ T_C < 135°C		22.5	
$I_{F, Max}$	Non−Repetitive Peak Forward Surge Current	T_C = 25°C, 10 μs	882	A
		T_C = 150°C, 10 μs	798	
$I_{F, SM}$	Non−Repetitive Forward Surge Current	Half−Sine Pulse, t_p = 8.3 ms	84	A
P_{tot}	Power Dissipation	T_C = 25°C	150	W
		T_C = 150°C	25	
T_J, T_{STG}	Operating and Storage Temperature Range		−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.

1. E_{AS} of 94 mJ is based on starting T_J = 25°C, L = 0.5 mH, I_{AS} = 19.4 A, V = 50 V.

THERMAL CHARACTERISTICS

Symbol	Parameter	Ratings	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	1.0	°C/W

ELECTRICAL CHARACTERISTICS T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	I_F = 20 A, T_C = 25°C	–	1.38	1.7	V
		I_F = 20 A, T_C = 125°C	–	1.6	2.0	
		I_F = 20 A, T_C = 175°C	–	1.72	2.4	
I_R	Reverse Current	V_R = 650 V, T_C = 25°C	–	0.5	40	μA
		V_R = 650 V, T_C = 125°C	–	1	80	
		V_R = 650 V, T_C = 175°C	–	2	160	
Q_C	Total Capacitive Charge	V = 400 V	–	51	–	nC
C	Total Capacitance	V_R = 1 V, f = 100 kHz	–	866	–	pF
		V_R = 200 V, f = 100 kHz	–	80	–	
		V_R = 400 V, f = 100 kHz	–	70	–	

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.

PACKAGE MARKING AND ORDERING INFORMATION

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FFSP2065B−F085	FFSP2065B	TO−220−2LD	Tube	N/A	N/A	50 Units

TYPICAL CHARACTERISTICS T_J = 25°C UNLESS OTHERWISE NOTED

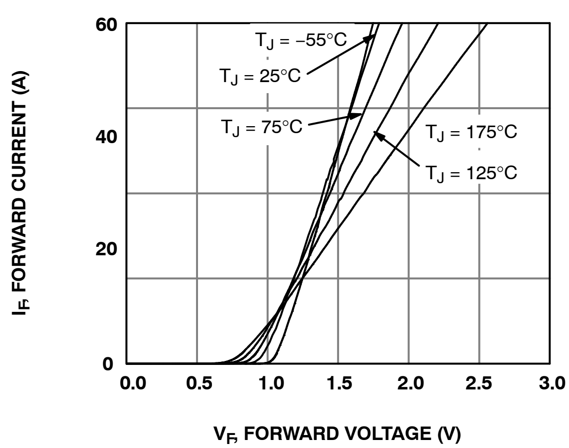


Figure 1. Forward Characteristics

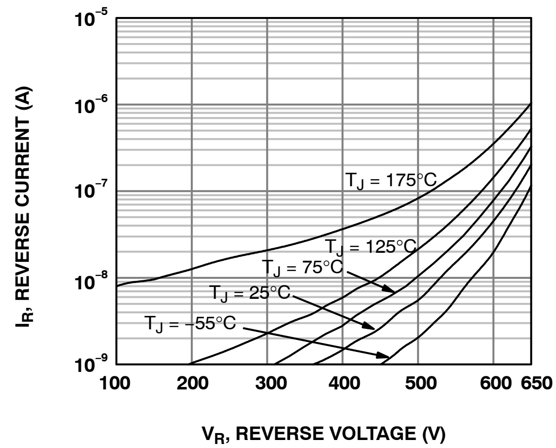


Figure 2. Reverse Characteristics

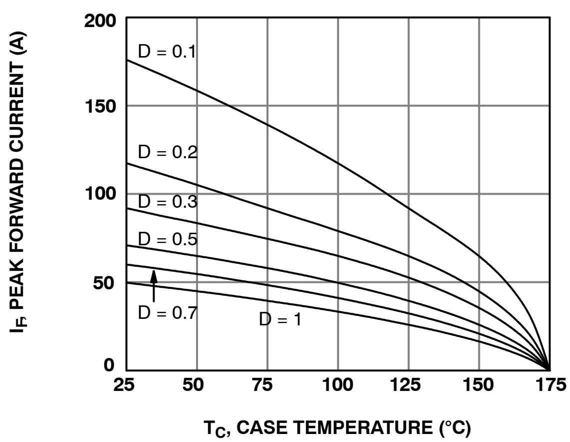


Figure 3. Current Derating

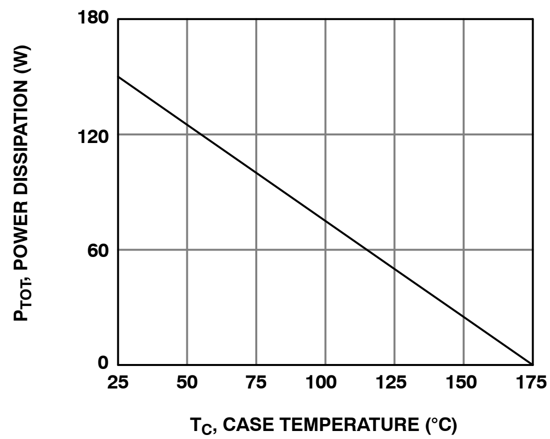


Figure 4. Power Dissipation

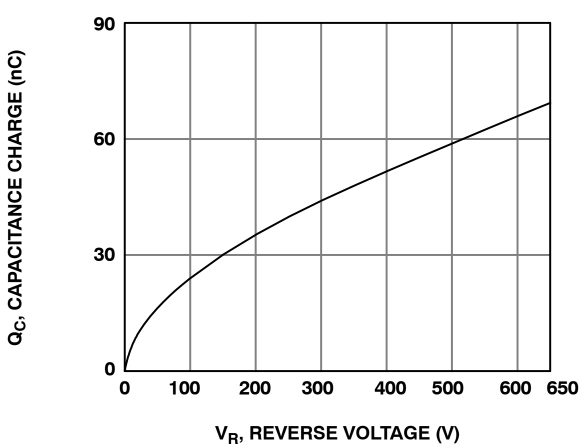


Figure 5. Capacitance Charge vs. Reverse Voltage

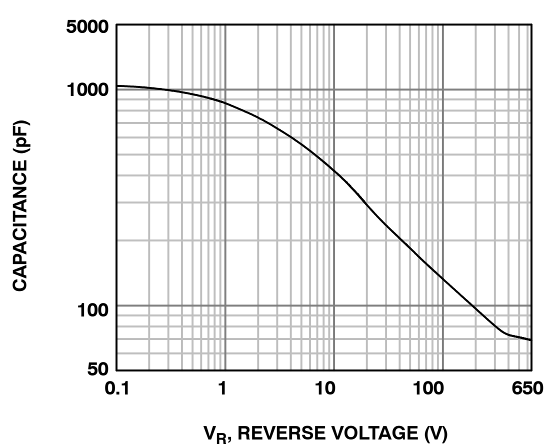


Figure 6. Capacitance vs. Reverse Voltage

TYPICAL CHARACTERISTICS T_J = 25°C UNLESS OTHERWISE NOTED (CONTINUED)

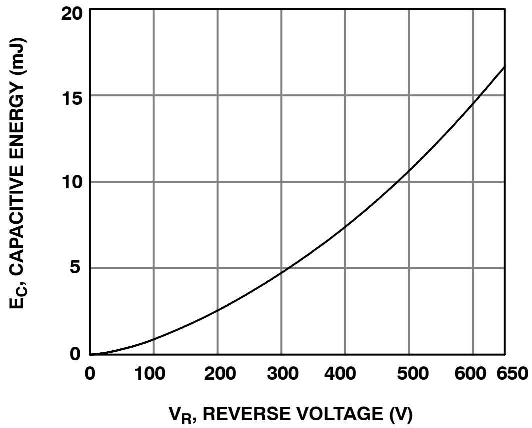


Figure 7. Capacitance Stored Energy

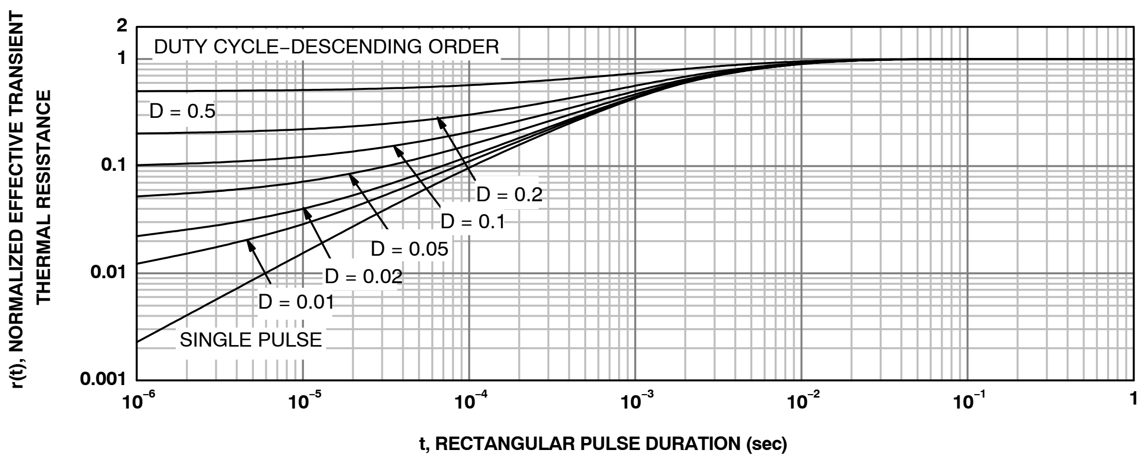


Figure 8. Junction−to−Case Transient Thermal Response Curve

TEST CIRCUIT AND WAVEFORMS

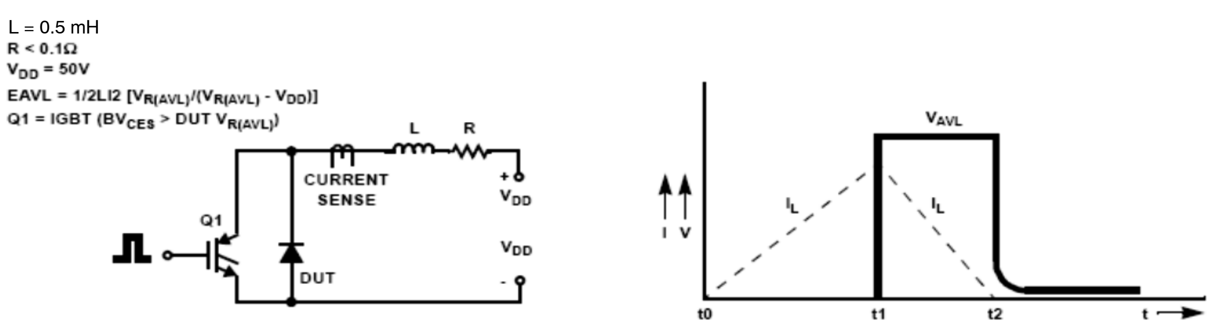
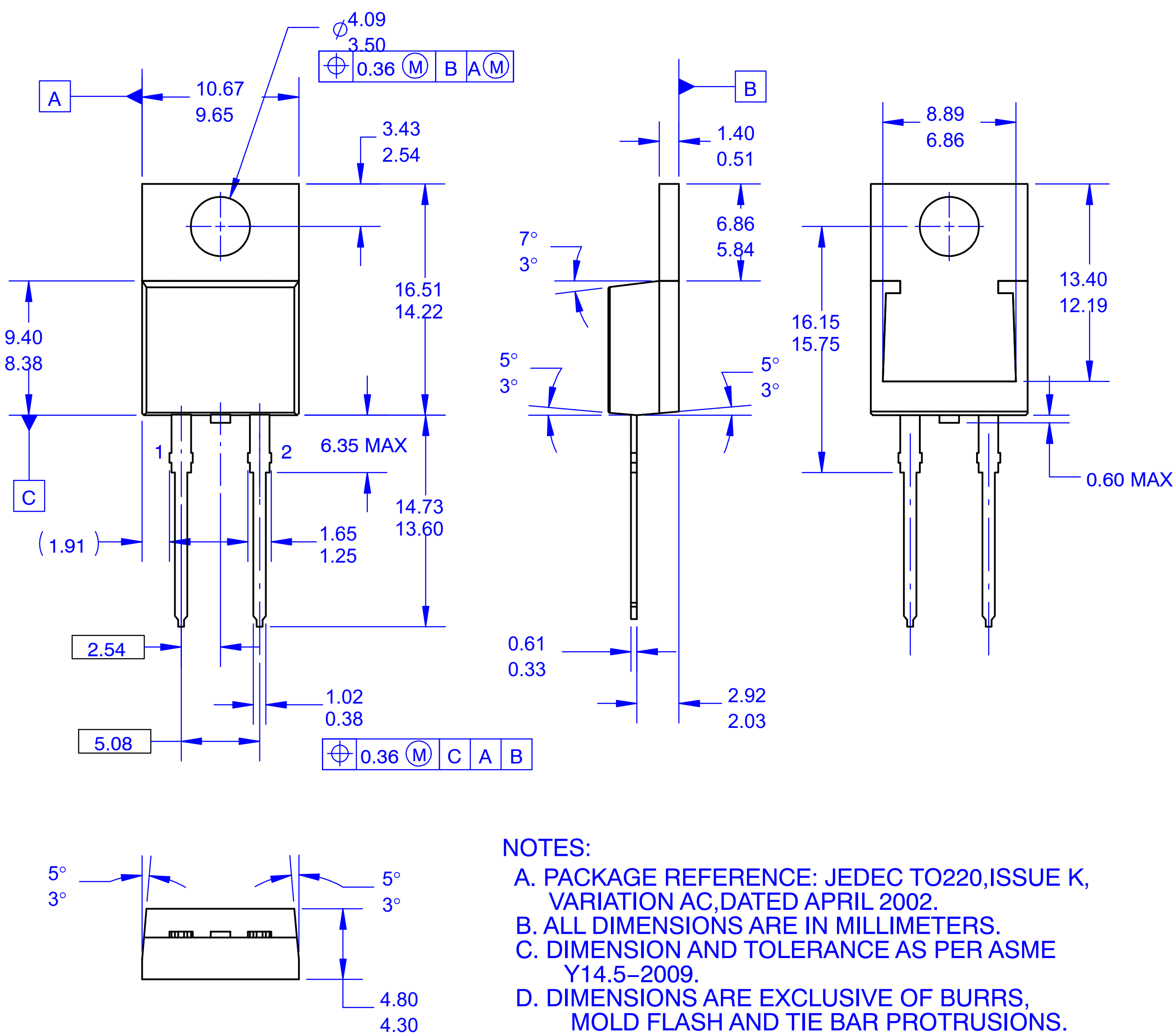


Figure 9. Unclamped Inductive Switching Test Circuit & Waveform

TO−220−2LD
CASE 340BB
ISSUE O

DATE 31 AUG 2016



NOTES:
A. PACKAGE REFERENCE: JEDEC TO220,ISSUE K, VARIATION AC,DATED APRIL 2002.
B. ALL DIMENSIONS ARE IN MILLIMETERS.
C. DIMENSION AND TOLERANCE AS PER ASME Y14.5−2009.
D. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.

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DESCRIPTION:	TO−220−2LD	PAGE 1 OF 1

ADDITIONAL INFORMATION

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