

Silicon Carbide (SiC) Schottky Diode – EliteSiC, 10 A, 650 V, D2, DPAK

FFSD1065B

Description

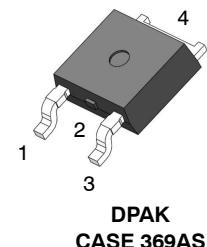
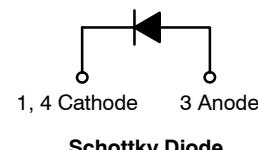
Silicon Carbide (SiC) Schottky Diodes use a completely new technology that provides superior switching performance and higher reliability compared to Silicon. No reverse recovery current, temperature independent switching characteristics, and excellent thermal performance sets Silicon Carbide as the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

Features

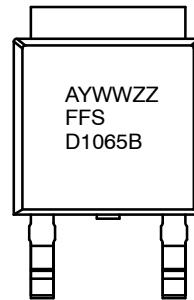
- Max Junction Temperature 175°C
- Avalanche Rated 49 mJ
- High Surge Current Capacity
- Positive Temperature Coefficient
- Ease of Paralleling
- No Reverse Recovery/No Forward Recovery
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

Applications

- General Purpose
- SMPS, Solar Inverter, UPS
- Power Switching Circuits



MARKING DIAGRAM



A = Assembly Plant Code
YWW = Date Code (Year & Week)
ZZ = Lot Code
FFSD1065B = Specific Device Code

ORDERING INFORMATION

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

FFSD1065B

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter		Value	Unit
V_{RRM}	Peak Repetitive Reverse Voltage		650	V
E_{AS}	Single Pulse Avalanche Energy (Note 1)		49	mJ
I_F	Continuous Rectified Forward Current @ $T_C < 150^\circ\text{C}$		10	A
	Continuous Rectified Forward Current @ $T_C < 135^\circ\text{C}$		13.5	
$I_{F, Max}$	Non-Repetitive Peak Forward Surge Current	$T_C = 25^\circ\text{C}, 10 \mu\text{s}$	650	A
		$T_C = 150^\circ\text{C}, 10 \mu\text{s}$	570	A
$I_{F,SM}$	Non-Repetitive Forward Surge Current $T_C = 25^\circ\text{C}$		45	A
P_{tot}	Power Dissipation	$T_C = 25^\circ\text{C}$	98	W
		$T_C = 150^\circ\text{C}$	16	W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +175	°C
	TO-247 Mounting Torque, M3 Screw		60	Ncm

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 49 mJ is based on starting $T_J = 25^\circ\text{C}$, $L = 0.5 \text{ mH}$, $I_{AS} = 14 \text{ A}$, $V = 50 \text{ V}$.

THERMAL CHARACTERISTICS

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max	1.53	°C/W

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
V_F	Forward Voltage	$I_F = 10 \text{ A}, T_C = 25^\circ\text{C}$	–	1.38	1.7	V
		$I_F = 10 \text{ A}, T_C = 125^\circ\text{C}$	–	1.6	2.0	
		$I_F = 10 \text{ A}, T_C = 175^\circ\text{C}$	–	1.72	2.4	
I_R	Reverse Current	$V_R = 650 \text{ V}, T_C = 25^\circ\text{C}$	–	0.5	40	μA
		$V_R = 650 \text{ V}, T_C = 125^\circ\text{C}$	–	1	80	
		$V_R = 650 \text{ V}, T_C = 175^\circ\text{C}$	–	2	160	
Q_C	Total Capacitive Charge	$V = 400 \text{ V}$	–	25	–	nC
C	Total Capacitance	$V_R = 1 \text{ V}, f = 100 \text{ kHz}$	–	424	–	pF
		$V_R = 300 \text{ V}, f = 100 \text{ kHz}$	–	39	–	
		$V_R = 600 \text{ V}, f = 100 \text{ kHz}$	–	35	–	

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.

ORDERING INFORMATION

Part Number	Top Marking	Package	Shipping*
FFSD1065B	FFSD1065B	DPAK (Pb-Free / Halogen Free)	2500 / Tape & Reel

*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
($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

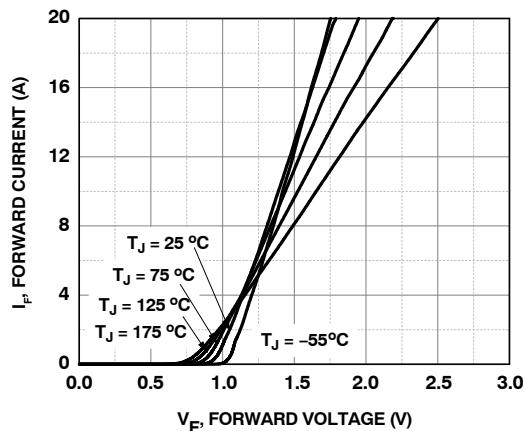


Figure 1. Forward Characteristics

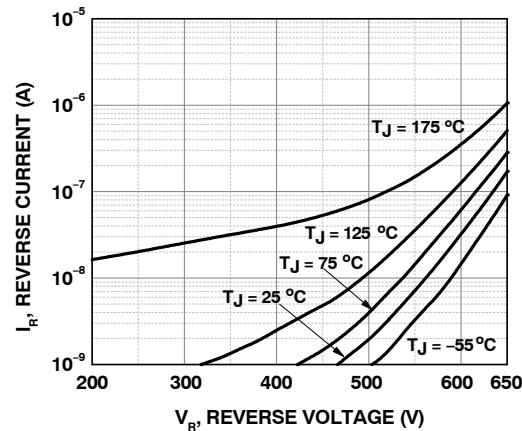


Figure 2. Reverse Characteristics

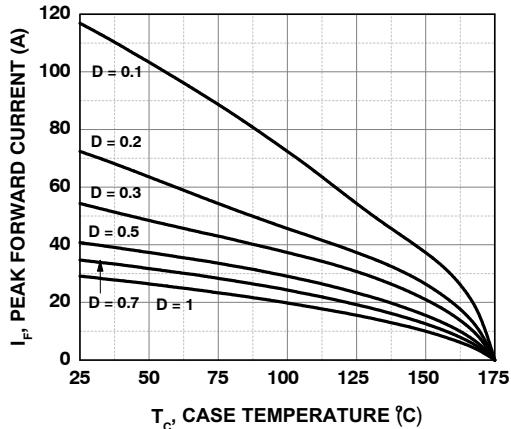


Figure 3. Current Derating

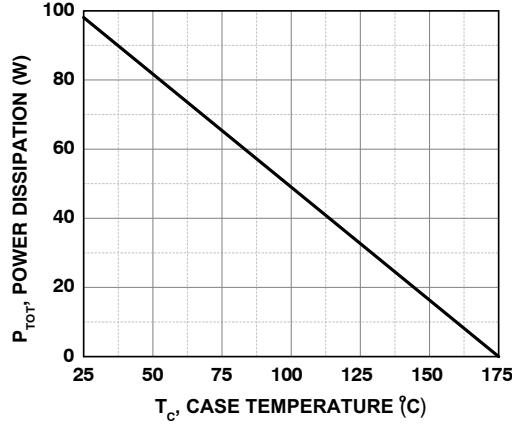


Figure 4. Power Derating

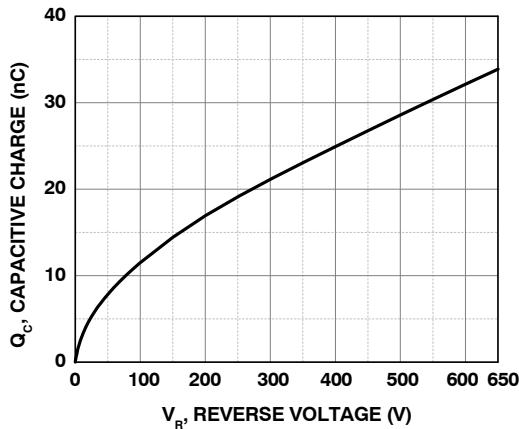


Figure 5. Capacitive Charge vs. Reverse Voltage

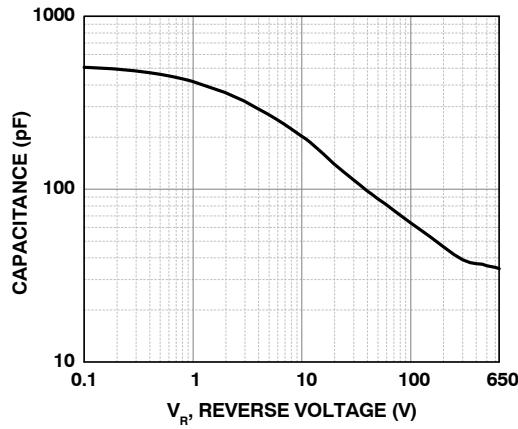


Figure 6. Capacitance vs. Reverse Voltage

TYPICAL CHARACTERISTICS (CONTINUED)
($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

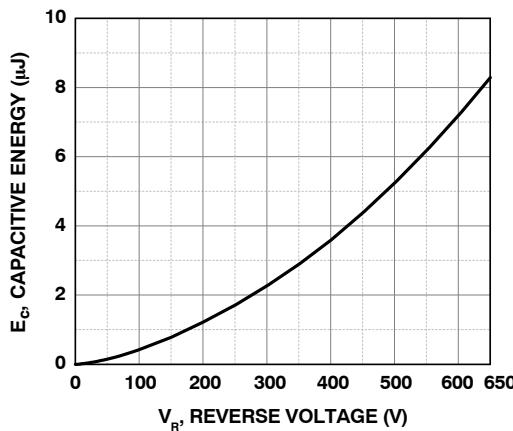


Figure 7. Capacitance Stored Energy

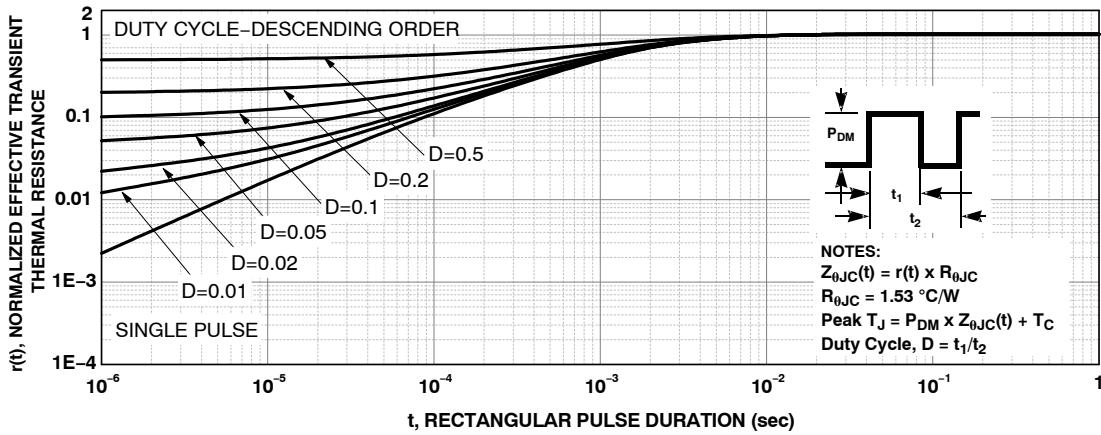


Figure 8. Junction-to-Case Transient Thermal Response Curve

TEST CIRCUIT AND WAVEFORMS

$L = 0.5 \text{ mH}$
 $R < 0.1 \Omega$
 $V_{DD} = 50 \text{ V}$
 $EAVL = 1/2LI^2 [V_{R(AVL)} / (V_{R(AVL)} - V_{DD})]$
 $Q1 = \text{IGBT } (BV_{CES} > \text{DUT } V_{R(AVL)})$

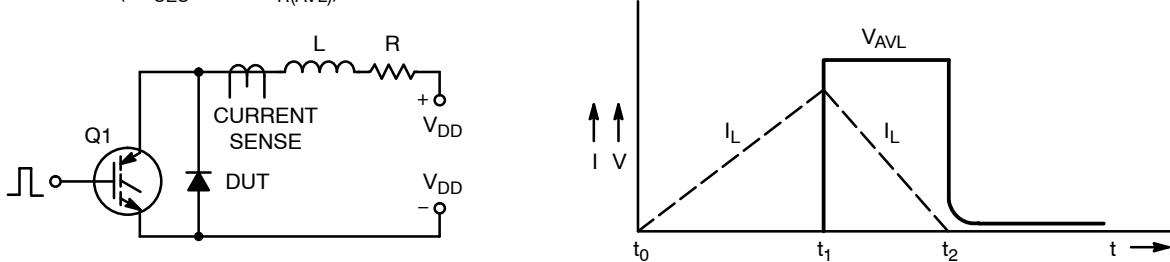
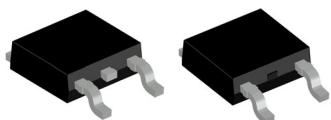
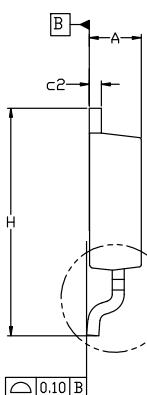
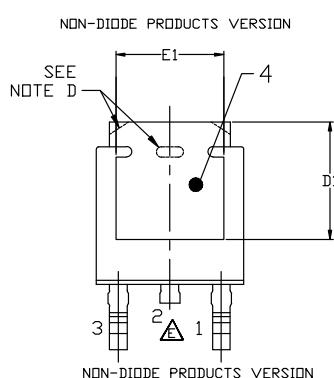
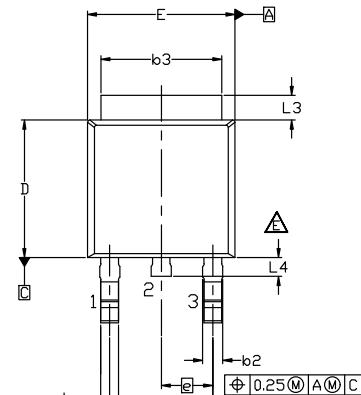


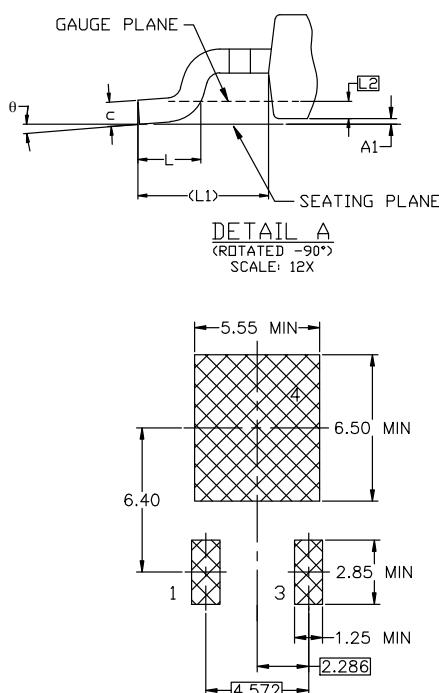
Figure 9. Unclamped Inductive Switching Test Circuit & Waveform


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

DATE 20 DEC 2023



NOTES: UNLESS OTHERWISE SPECIFIED
A) THIS PACKAGE CONFORMS TO JEDEC, TD-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
TD228P991X239-3N.



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***


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

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