DATA SHEET
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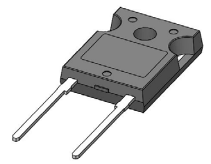
Silicon Carbide (SiC) Schottky Diode – EliteSiC, 50 A, 650 V, D2, TO-247-2L

FFSH5065B-F155



TO−247−2LD
CASE 340DC

Description

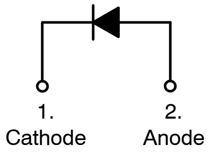
Silicon Carbide (SiC) Schottky Diodes use a completely new technology that provides superior switching performance and higher reliability compared to Silicon. No reverse recovery current, temperature independent switching characteristics, and excellent thermal performance sets Silicon Carbide as the 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 225 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

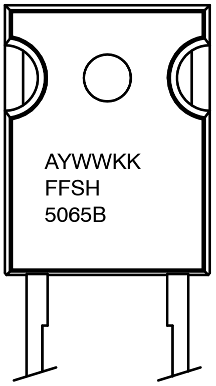
Applications

- General Purpose
- SMPS, Solar Inverters, UPS
- Power Switching Circuit



Schottky Diode

MARKING DIAGRAM



A = Assembly Plant Code
YWW = Date Code (Year & Week)
ZZ = Lot Code
FFSH5065B = Specific Device Code

ORDERING INFORMATION

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

ABSOLUTE MAXIMUM RATINGS (T_C = 25°C unless otherwise noted)

Symbol	Parameter		Value	Unit
V_{RRM}	Peak Repetitive Reverse Voltage		650	V
E_{AS}	Single Pulse Avalanche Energy (Note 1)		225	mJ
I_F	Continuous Rectified Forward Current	@ T_C < 132°C	50	A
		@ T_C < 135°C	48	
$I_{F, Max}$	Non−Repetitive Peak Forward Surge Current	T_C = 25°C, 10 μs	1358	A
		T_C = 150°C, 10 μs	1281	
$I_{F, SM}$	Non−Repetitive Forward Surge Current T_C = 25°C	Half−Sine Pulse, t_p = 8.3 ms	189	A
P_{tot}	Power Dissipation	T_C = 25°C	301	W
		T_C = 150°C	50	
T_J,T_{STG}	Operating and Storage Temperature Range		−55 to +175	°C
	TO247 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 225 mJ is based on starting T_J = 25°C, L = 0.5 mH, I_{AS} = 30 A, V = 100 V

THERMAL CHARACTERISTICS

Symbol	Parameter	Ratings	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max	0.5	°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 = 50 A, T_C = 25°C	–	1.38	1.7	V
		I_F = 50 A, T_C = 125°C	–	1.6	2.0	
		I_F = 50 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	–	120	–	nC
C	Total Capacitance	V_R = 1 V, f = 100 kHz	–	2030	–	pF
		V_R = 300 V, f = 100 kHz	–	187	–	
		V_R = 600 V, f = 100 kHz	–	167	–	

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	Shipping
FFSH5065B−F155	FFSH5065B	TO−247−2LD (Pb−Free/Halogen Free)	30 Units/Tube

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

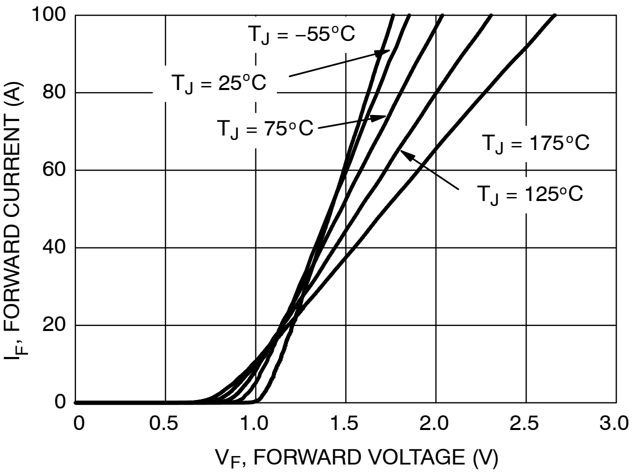


Figure 1. Forward Characteristics

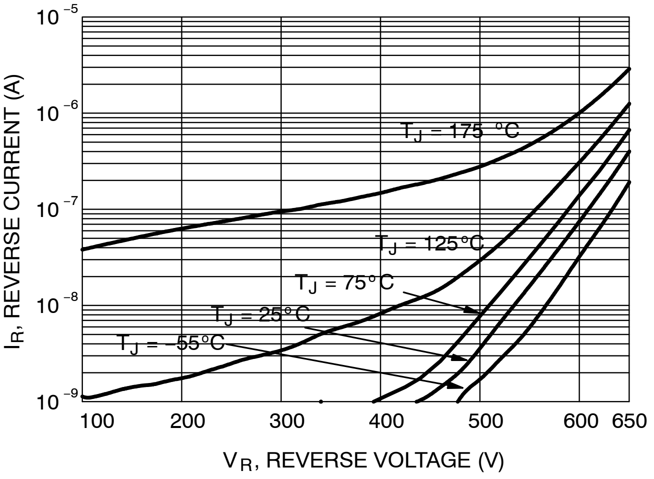


Figure 2. Reverse Characteristics

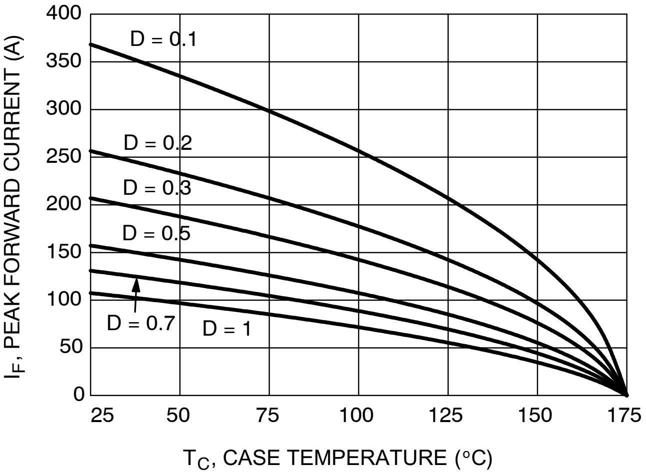


Figure 3. Current Derating

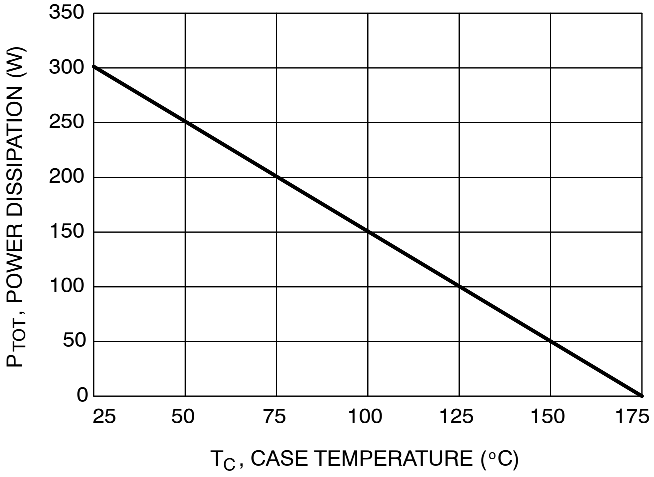


Figure 4. Power Derating

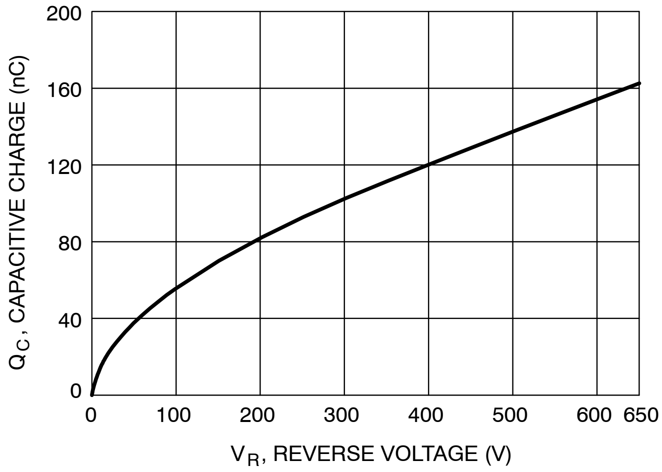


Figure 5. Capacitive Charge vs. Reverse Voltage

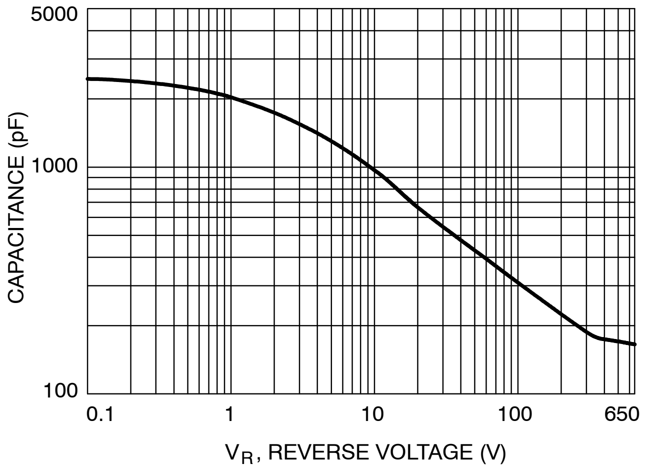


Figure 6. Capacitance vs. Reverse Voltage

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

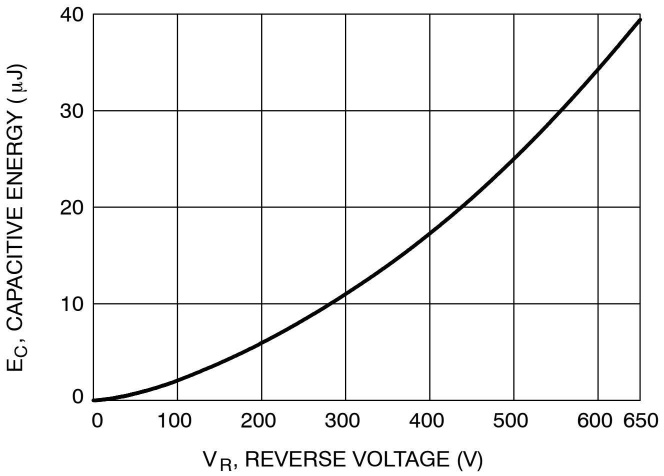
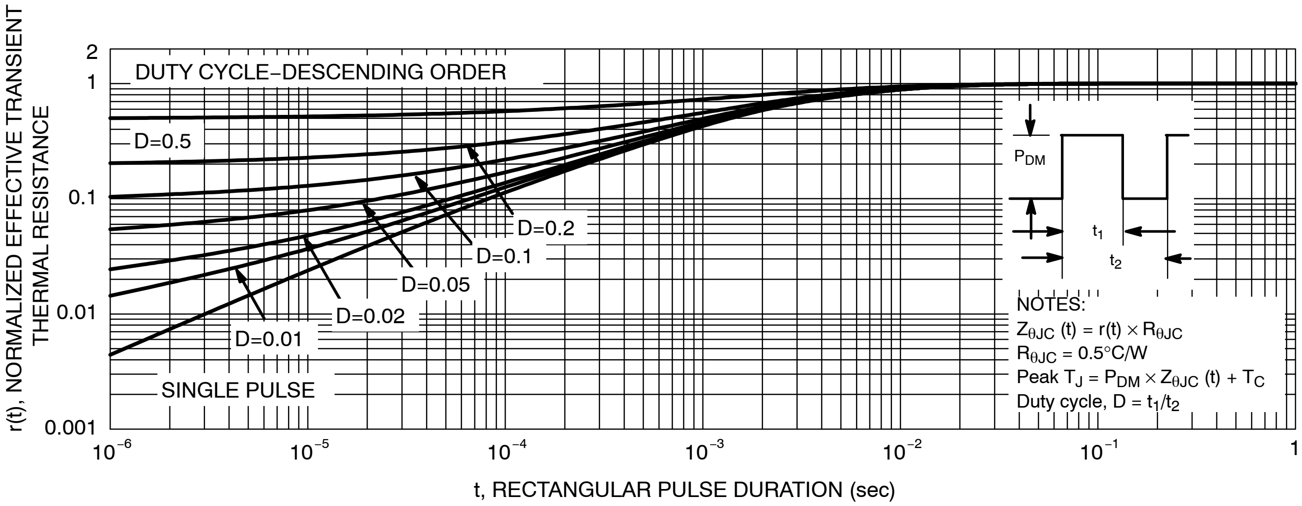


Figure 7. Capacitance Stored Energy



NOTES:
$Z_{\theta JC}$ (t) = r(t) × $R_{\theta JC}$
$R_{\theta JC}$ = 0.5°C/W
Peak $T_J = P_{DM} \times Z_{\theta JC}$ (t) + T_C
Duty cycle, D = t_1/t_2

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

TEST CIRCUIT AND WAVEFORMS

L = 0.5 mH
R < 0.1 Ω
V_{DD} = 100 V
EAVL = 1/2LI2 [$V_{R(AVL)}$ / ($V_{R(AVL)} - V_{DD}$)]
Q1 = IGBT (BV_{CES} > DUT $V_{R(AVL)}$)

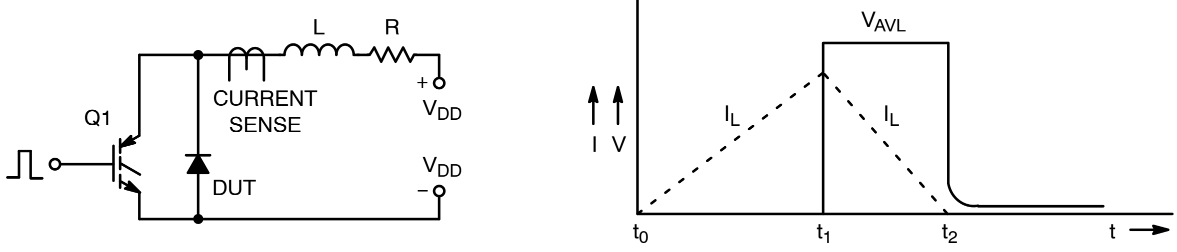
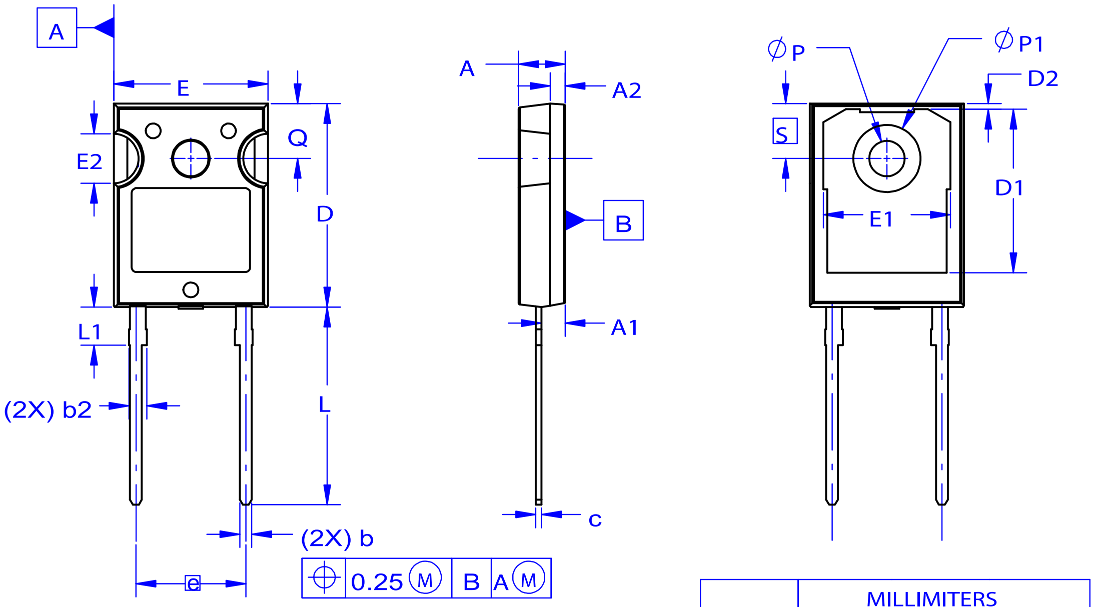


Figure 9. Unclamped Inductive Switching Test Circuit & Waveform

PACKAGE DIMENSIONS

TO−247−2LD
CASE 340DC
ISSUE O



NOTES:

A. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.
B. ALL DIMENSIONS ARE IN MILLIMETERS.
C. DIMENSION AND TOLERANCE AS PER ASME Y14.5-2009.
D. DIMENSION A1 TO BE MEASURED IN THE REGION DEFINED BY L1.
E. LEAD FINISH IS UNCONTROLLED IN THE REGION DEFINED BY L1.

DIM	MILLIMITERS		
	MIN	NOM	MAX
A	4.58	4.70	4.82
A1	2.20	2.40	2.60
A2	1.40	1.50	1.60
b	1.17	1.26	1.35
b2	1.60	1.72	1.84
c	0.51	0.61	0.71
D	20.32	20.57	20.82
D1	13.08	~	~
D2	0.51	0.93	1.35
E	15.37	15.62	15.87
E1	12.81	~	~
E2	4.96	5.08	5.20
e	~	11.12	~
L	19.75	20.00	20.25
L1	3.69	3.81	3.93
∅P	3.51	3.58	3.65
∅P1	6.60	6.80	7.00
Q	5.34	5.46	5.58
S	5.34	5.46	5.58

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