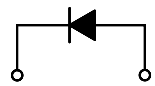
Silicon Carbide Schottky Diode

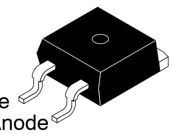
650 V, 30 A

FFSB3065B-F085



Cathode Anode

Schottky Diode



D²PAK2 (TO−263−2L)
CASE 418BK

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.

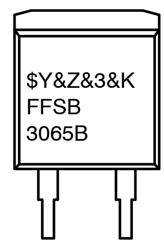
Features

- Max Junction Temperature 175°C
- Avalanche Rated 144 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

MARKING DIAGRAM



$Y	= ON Semiconductor Logo
&Z	= Assembly Plant Code
&3	= Numeric Date Code
&K	= Lot Code
FFSB3065B	= 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)		144	mJ
I_F	Continuous Rectified Forward Current @ T_C < 25°C		73	A
	Continuous Rectified Forward Current @ T_C < 139°C		30	
$I_{F, Max}$	Non-Repetitive Peak Forward Surge Current	T_C = 25°C, 10 μs	1100	A
		T_C = 150°C, 10 μs	1000	A
$I_{F,SM}$	Non-Repetitive Forward Surge Current T_C = 25°C	Half-Sine Pulse, t_p = 8.3 ms	120	A
Ptot	Power Dissipation	T_C = 25°C	246	W
		T_C = 150°C	41	W
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 144 mJ is based on starting T_J = 25°C, L = 0.5 mH, I_{AS} = 24 A, V = 50 V.

THERMAL CHARACTERISTICS

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max	0.61	°C/W

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
V_F	Forward Voltage	I_F = 30 A, T_C = 25°C	–	1.38	1.7	V
		I_F = 30 A, T_C = 125°C	–	1.6	2.0	
		I_F = 30 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	120	
Q_C	Total Capacitive Charge	V = 400 V	–	74	–	nC
C	Total Capacitance	V_R = 1 V, f = 100 kHz	–	1280	–	pF
		V_R = 200 V, f = 100 kHz	–	139	–	
		V_R = 400 V, f = 100 kHz	–	108	–	

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*
FFSB3065B−F085	FFSB3065B	D^2PAK−3 (Pb-Free / Halogen Free)	800 / 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°C unless otherwise noted)

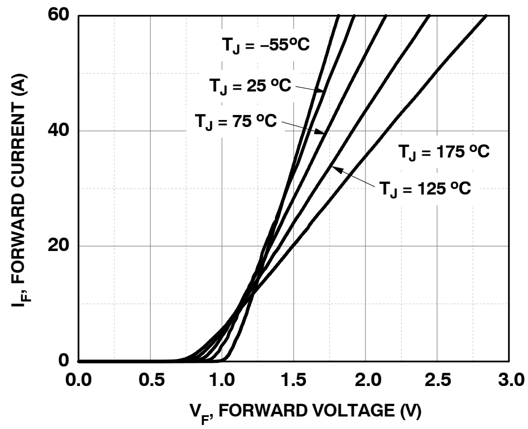


Figure 1. Forward Characteristics

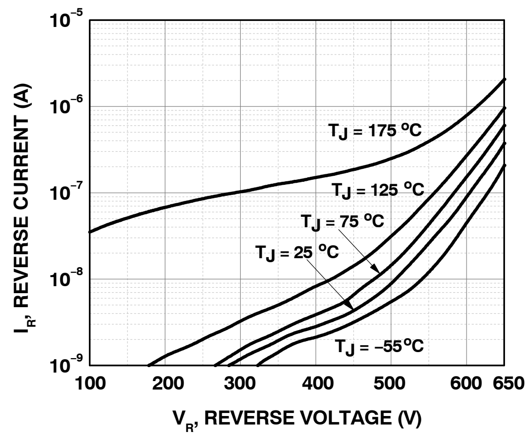


Figure 2. Reverse Characteristics

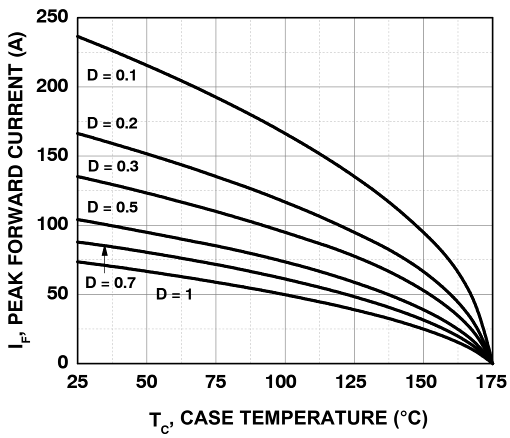


Figure 3. Current Derating

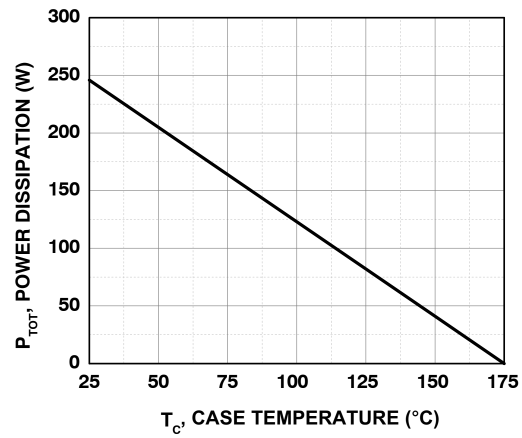


Figure 4. Power Derating

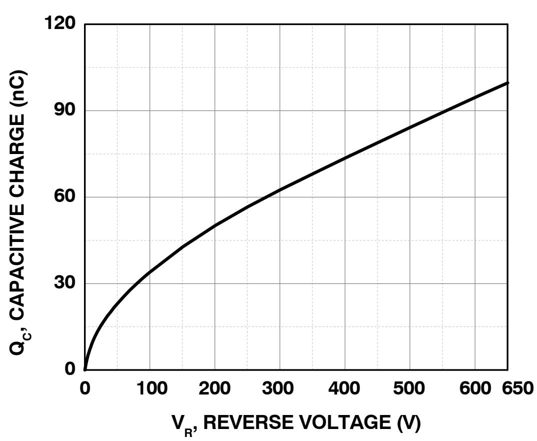


Figure 5. Capacitive Charge vs. Reverse Voltage

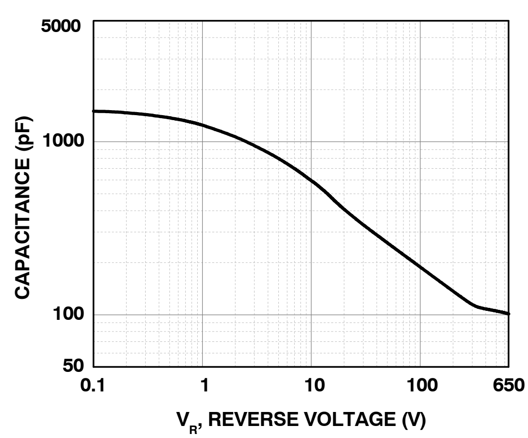


Figure 6. Capacitance vs. Reverse Voltage

TYPICAL CHARACTERISTICS

(T_J = 25°C unless otherwise noted)

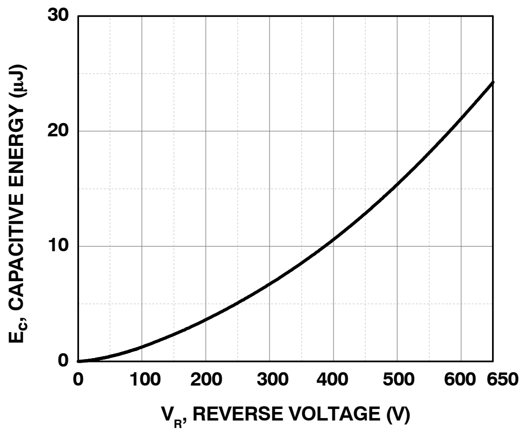


Figure 7. Capacitance Stored Energy

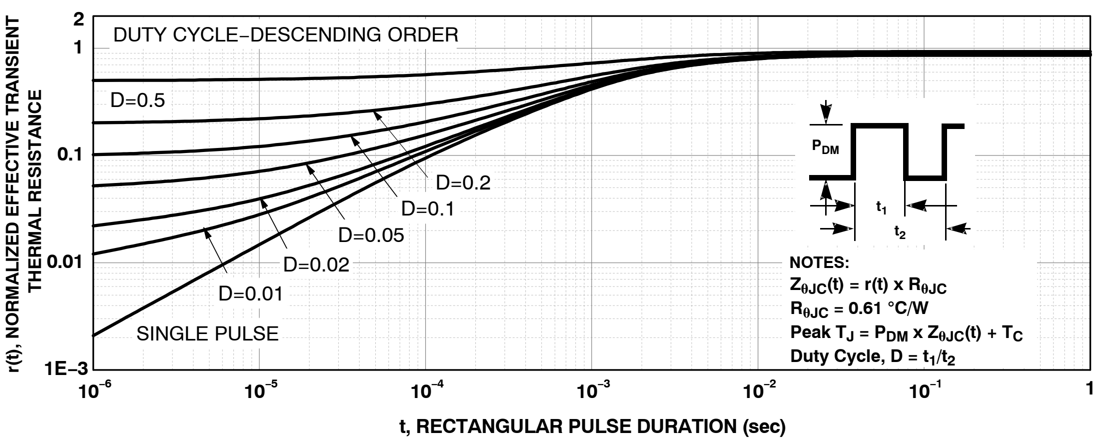


Figure 8. Junction-to-Case Transient Thermal Response Curve

TEST CIRCUIT AND WAVEFORMS

$L = 0.5$ mH
$R < 0.1\ \Omega$
$V_{DD} = 50$ V
$EAVL = 1/2LI2\ [V_{R(AVL)} / (V_{R(AVL)} - V_{DD})]$
$Q1 = IGBT\ (BV_{CES} > DUT\ V_{R(AVL)})$

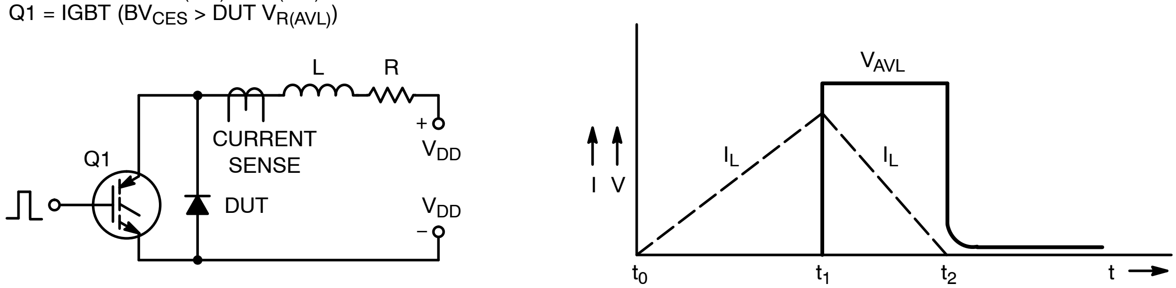
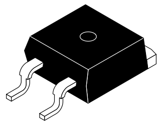


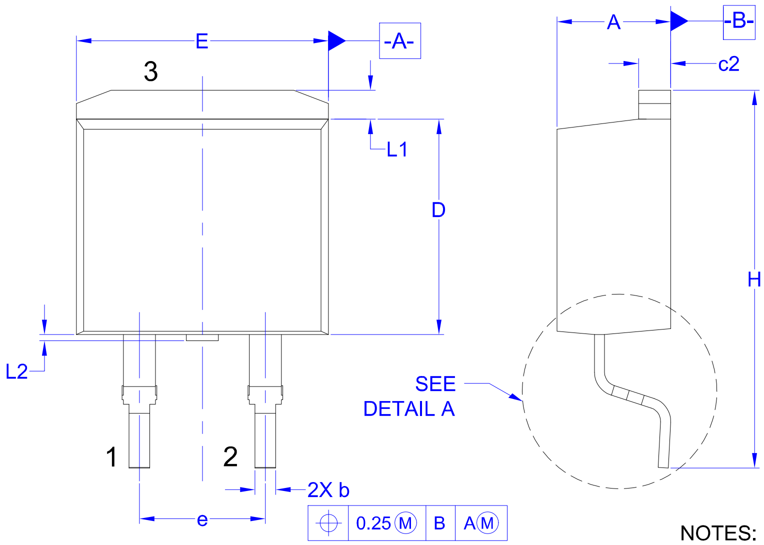
Figure 9. Unclamped Inductive Switching Test Circuit & Waveform

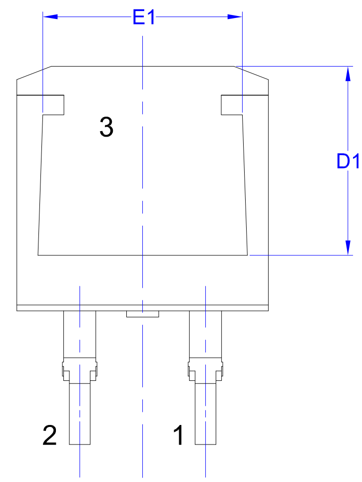
onsemi

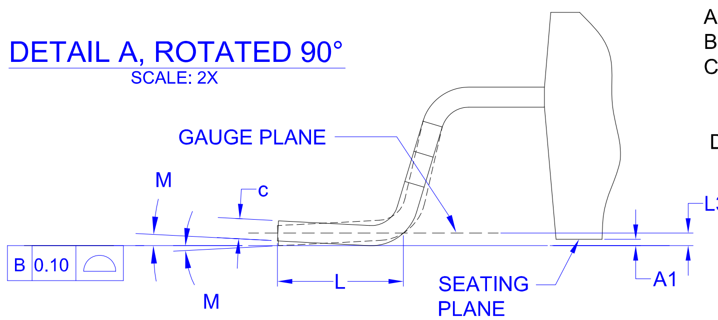


D2PAK2 (TO−263−2L)
CASE 418BK
ISSUE O

DATE 02 AUG 2018



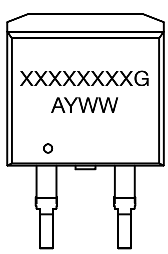




NOTES: UNLESS OTHERWISE SPECIFIED
A) ALL DIMENSIONS ARE IN MILLIMETERS.
B) REFERENCE JEDEC, TO-263, VARIATION AB.
C) DIMENSIONING AND TOLERANCING PER DIMENSIONING AND TOLERANCING PER ASME Y14.5 - 2009.
D) LANDPATTERN RECOMMENDATION PER IPC TO254P1524X482-3N

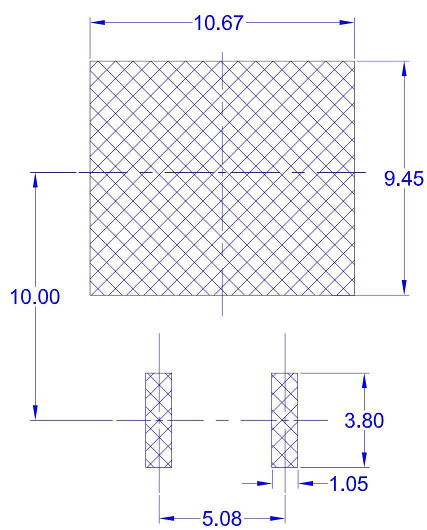
DIM	MILLIMETERS		
	MIN	NOM	MAX
A	4.06	4.57	4.83
A1	0.00	0.10	0.25
b	0.51	0.81	0.99
c	0.30	0.407	0.74
c2	1.14	1.30	1.65
D	8.38	8.69	9.65
D1	7.30	7.80	8.30
E	9.65	10.16	10.67
E1	8.00	8.62	9.00
e	5.08 BSC		
H	14.60	15.35	15.88
L	1.78	2.54	2.79
L1	0.90	1.29	1.68
L2	0.00	0.15	0.25
L3	0.25 BSC		
M	0°	4°	8°

GENERIC MARKING DIAGRAM*



XXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
G = Pb−Free Package

*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.



LAND PATTERN RECOMMENDATION
UNLESS NOTED, ALL DIMS TYPICAL

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DESCRIPTION:	D2PAK2 (TO−263−2L)	PAGE 1 OF 1

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Email Requests to: orderlit@onsemi.com

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For additional information, please contact your local Sales Representative