

Silicon Carbide Schottky Diode

650 V, 30 A

FFSB3065B-F085

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

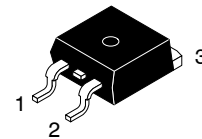
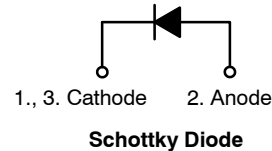
Applications

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



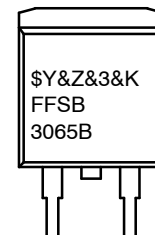
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**D²PAK2 (TO-263-2L)
CASE 418BK**

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.

FFSB3065B–F085

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
P _{tot}	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 _{θJC}	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 ² PAK–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

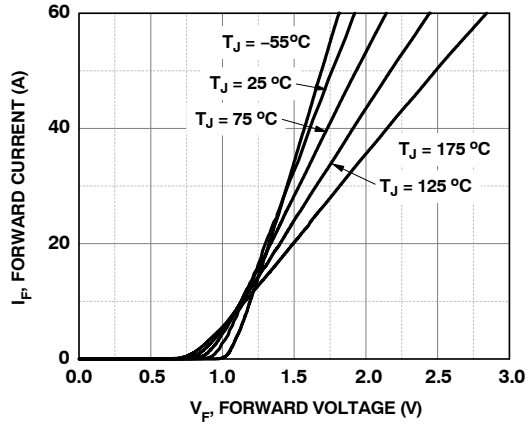
(T_J = 25°C unless otherwise noted)

Figure 1. Forward Characteristics

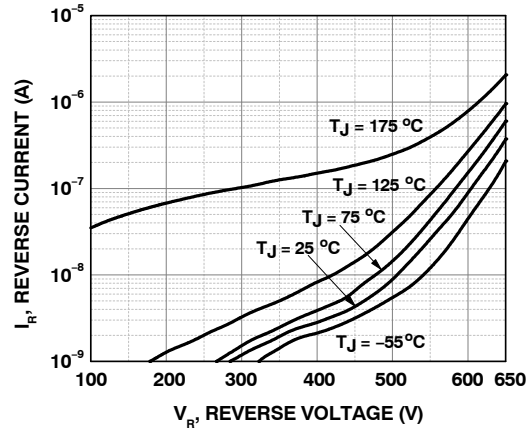


Figure 2. Reverse Characteristics

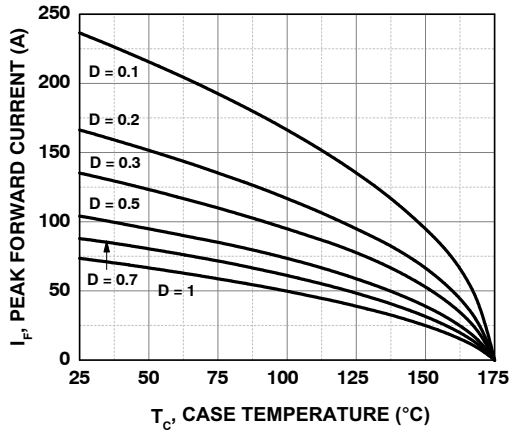


Figure 3. Current Derating

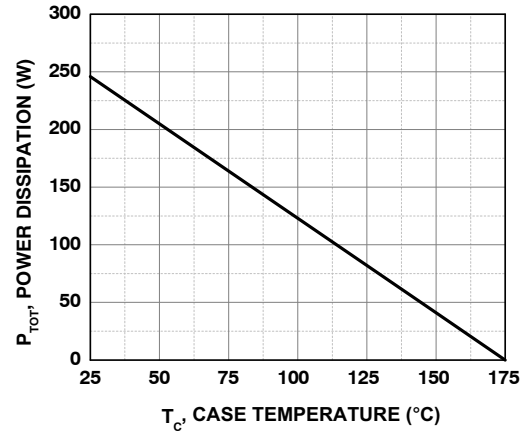


Figure 4. Power Derating

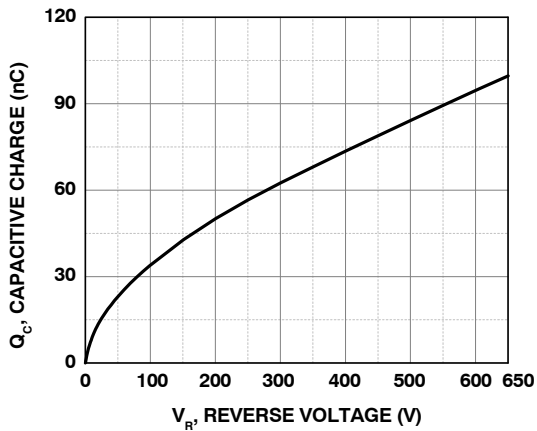


Figure 5. Capacitive Charge vs. Reverse Voltage

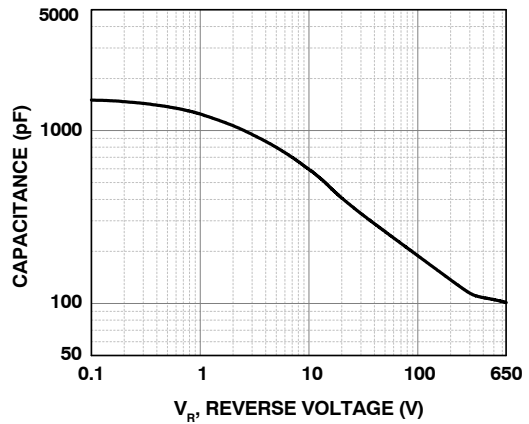


Figure 6. Capacitance vs. Reverse Voltage

TYPICAL CHARACTERISTICS

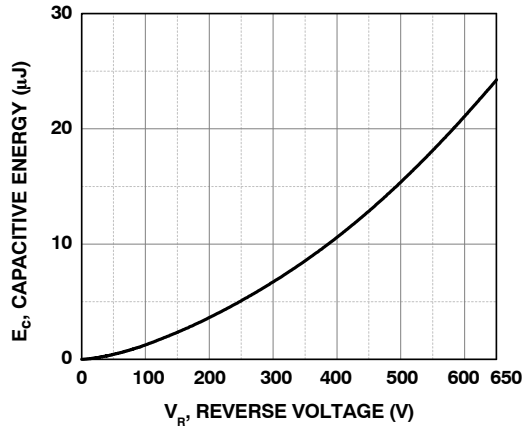
(T_J = 25°C unless otherwise noted)

Figure 7. Capacitance Stored Energy

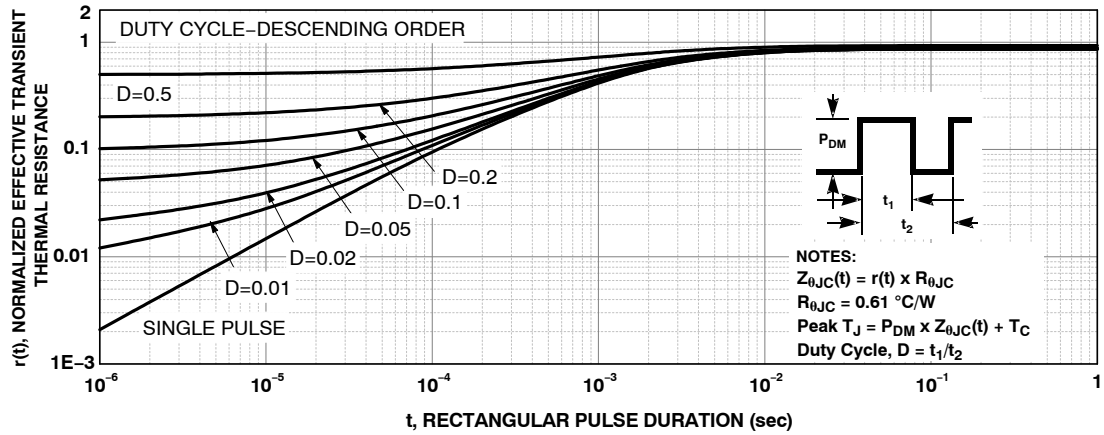


Figure 8. Junction-to-Case Transient Thermal Response Curve

TEST CIRCUIT AND WAVEFORMS

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

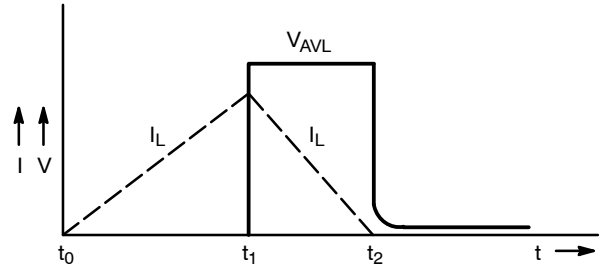
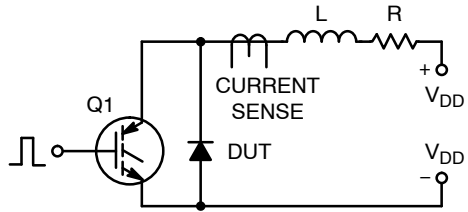
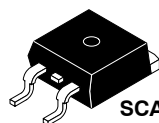


Figure 9. Unclamped Inductive Switching Test Circuit & Waveform

MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

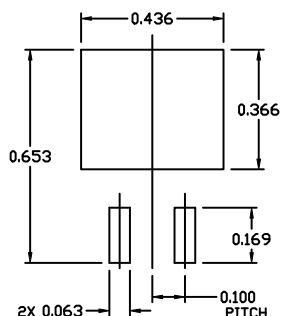
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SCALE 1:1

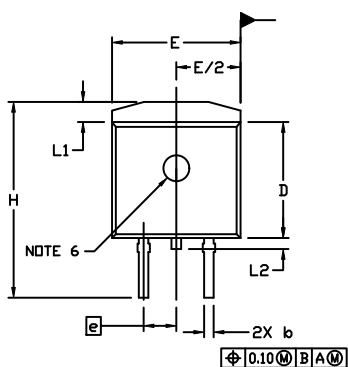
D²PAK-3 (TO-263, 3-LEAD) CASE 418AJ ISSUE E

DATE 25 OCT 2019



RECOMMENDED MOUNTING FOOTPRINT

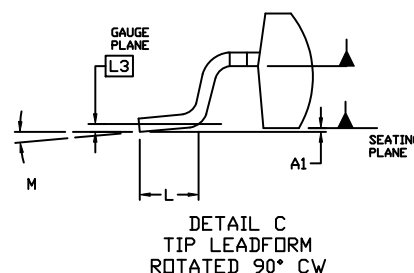
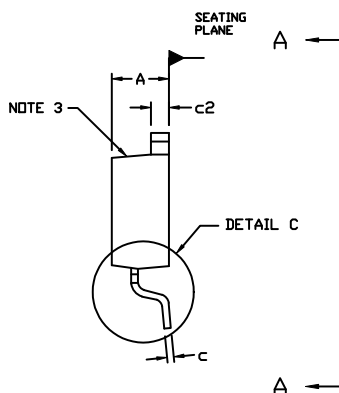
■ For additional information on our Pb-free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SD-106/D.



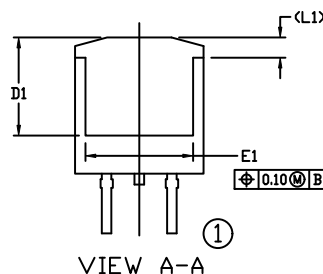
NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: INCHES
3. CHAMFER OPTIONAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.005 PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY AT DATUM H.
5. THERMAL PAD CONTOUR IS OPTIONAL WITHIN DIMENSIONS E, L1, D1, AND E1.
6. OPTIONAL MOLD FEATURE.
7. ①, ② ... OPTIONAL CONSTRUCTION FEATURE CALL OUTS.

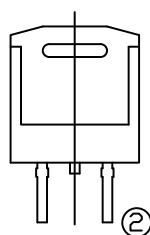
DIM	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	0.160	0.190	4.06	4.83
A1	0.000	0.010	0.00	0.25
b	0.020	0.039	0.51	0.99
c	0.012	0.029	0.30	0.74
c2	0.045	0.065	1.14	1.65
D	0.330	0.380	8.38	9.65
D1	0.260	---	6.60	---
E	0.380	0.420	9.65	10.67
E1	0.245	---	6.22	---
e	0.100	BSC	2.54	BSC
H	0.575	0.625	14.60	15.88
L	0.070	0.110	1.78	2.79
L1	---	0.066	---	1.68
L2	---	0.070	---	1.78
L3	0.010	BSC	0.25	BSC
M	-8°	8°	-8°	8°



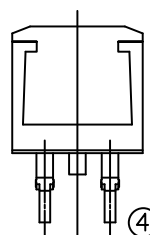
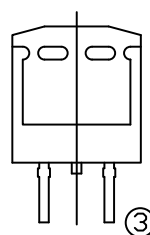
DETAIL C
TIP LEADFORM
ROTATED 90° CW



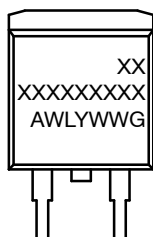
VIEW A-A



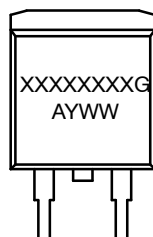
VIEW A-A
OPTIONAL CONSTRUCTIONS



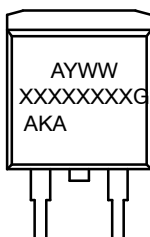
GENERIC MARKING DIAGRAMS*



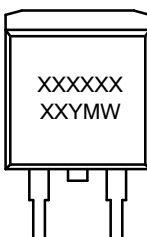
IC



Standard



Rectifier



SSG

XXXXXX = Specific Device Code
A = Assembly Location
WL = Wafer Lot
Y = Year
WW = Work Week
W = Week Code (SSG)
M = Month Code (SSG)
G = Pb-Free Package
AKA = Polarity Indicator

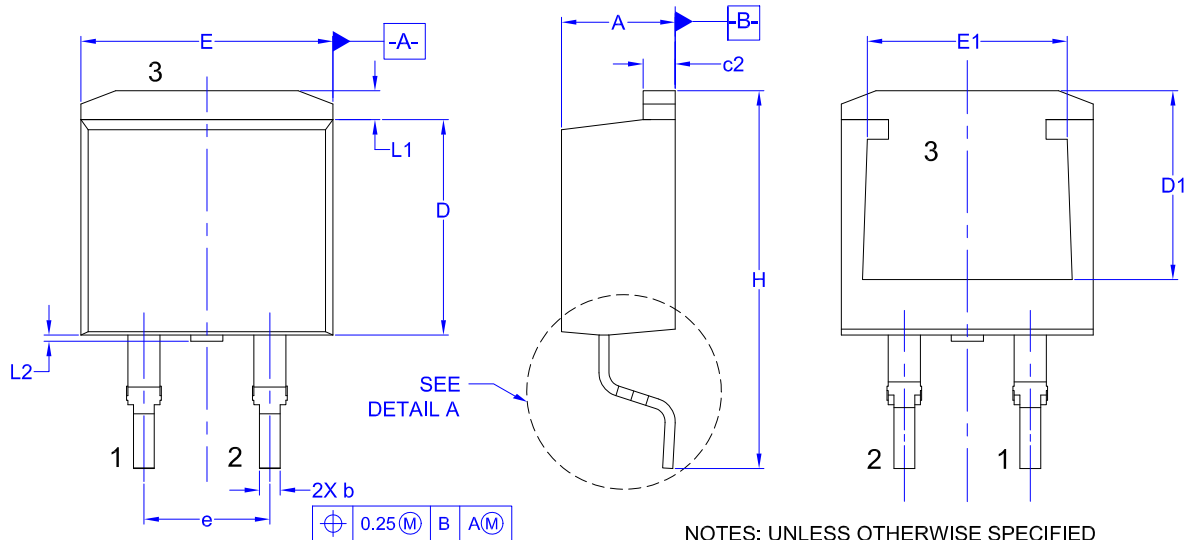
*This information is generic. Please refer to device data sheet for actual part marking. Pb-free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

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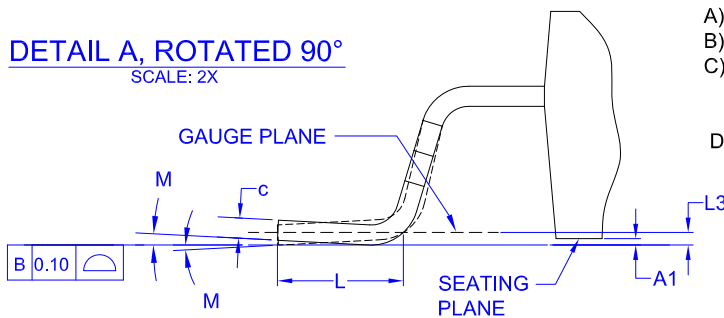
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D²PAK2 (TO-263-2L) CASE 418BK ISSUE O

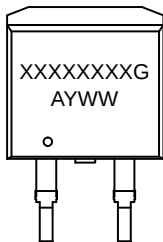
DATE 02 AUG 2018



DETAIL A, ROTATED 90°
SCALE: 2X

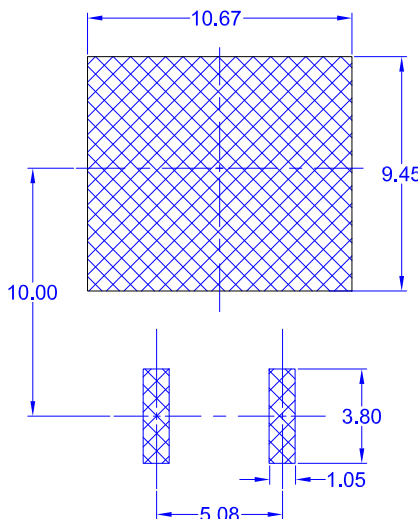


GENERIC MARKING DIAGRAM*



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

NOTES: UNLESS OTHERWISE SPECIFIED

- A) ALL DIMENSIONS ARE IN MILLIMETERS.
- B) REFERENCE JEDEC, TO-263, VARIATION AB.
- C) 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°

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