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Silicon Carbide Schottky Diode

650 V, 20 A



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FFSM2065B

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
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

Applications

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

ABSOLUTE MAXIMUM RATINGS

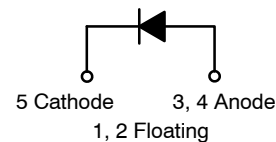
($T_C = 25^\circ\text{C}$, Unless otherwise specified)

Symbol	Parameter	Value	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 @ $T_C < 143^\circ\text{C}$	20	A	
	Continuous Rectified Forward Current @ $T_C < 135^\circ\text{C}$	23.4		
$I_{F, Max}$	Non-Replicative Peak Forward Surge Current	$T_C = 25^\circ\text{C}$, 10 μs	630	A
		$T_C = 150^\circ\text{C}$, 10 μs	524	
$I_{F, SM}$	Non-Replicative Forward Surge Current	Half-Sine Pulse, $t_p = 8.3 \text{ ms}$, $T_C = 25^\circ\text{C}$	77	A
P_{tot}	Power Dissipation	$T_C = 25^\circ\text{C}$	160	W
		$T_C = 150^\circ\text{C}$	27	
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +175	$^\circ\text{C}$	

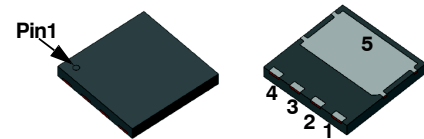
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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

V_{RRM}	I_F
650 V	20 A

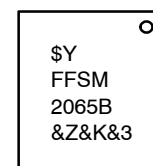


Schottky Diode



PQFN 8x8, 2P
CASE 483AP

MARKING DIAGRAM



$\$Y$ = ON Semiconductor Logo
 $\&Z$ = Assembly Plant Code
 $\&K$ = Lot Code
 $\&3$ = Numeric Date Code
 FFSM2065B = Specific Device Code

ORDERING INFORMATION

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

FFSM2065B

THERMAL CHARACTERISTICS

Symbol	Parameter	Ratings	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	0.94	$^{\circ}\text{C}/\text{W}$

PACKAGE MARKING AND ORDERING INFORMATION

Part Number	Top Marking	Package	Shipping [†]
FFSM2065B	FFSM2065B	PQFN 8X8, 2P (Halogen Free)	3000 Units / 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

ELECTRICAL CHARACTERISTICS $T_J = 25^{\circ}\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F = 20\text{ A}, T_J = 25^{\circ}\text{C}$		1.38	1.7	V
		$I_F = 20\text{ A}, T_J = 125^{\circ}\text{C}$		1.6		
		$I_F = 20\text{ A}, T_J = 150^{\circ}\text{C}$		1.67		
I_R	Reverse Current	$V_R = 650\text{ V}, T_J = 25^{\circ}\text{C}$		0.5	40	μA
		$V_R = 650\text{ V}, T_J = 125^{\circ}\text{C}$		1	80	
		$V_R = 650\text{ V}, T_J = 175^{\circ}\text{C}$		2	160	
Q_C	Total Capacitive Charge	$V = 400\text{ V}$		51		nC
C	Total Capacitance	$V_R = 1\text{ V}, f = 100\text{ kHz}$		866		pF
		$V_R = 200\text{ V}, f = 100\text{ kHz}$		80		
		$V_R = 400\text{ V}, f = 100\text{ kHz}$		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.

TYPICAL CHARACTERISTICS

($T_J = 25^\circ\text{C}$ Unless Otherwise Noted)

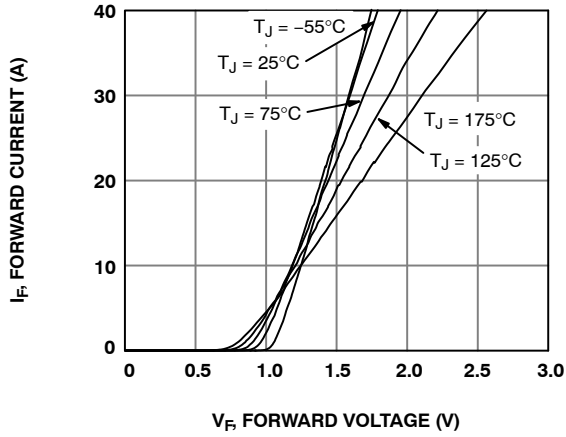


Figure 1. Forward Characteristics

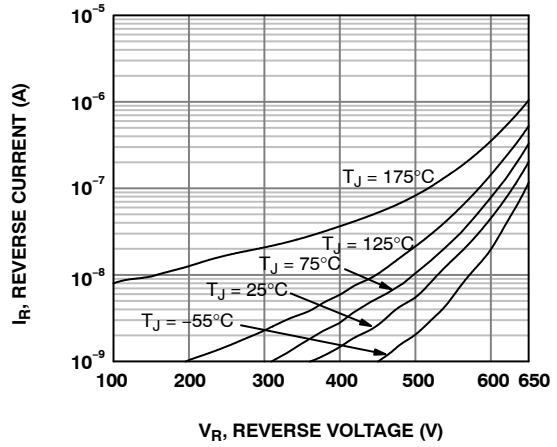


Figure 2. Reverse Characteristics

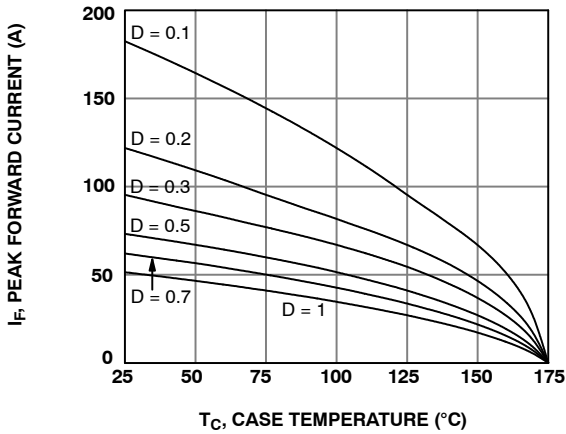


Figure 3. Current Derating

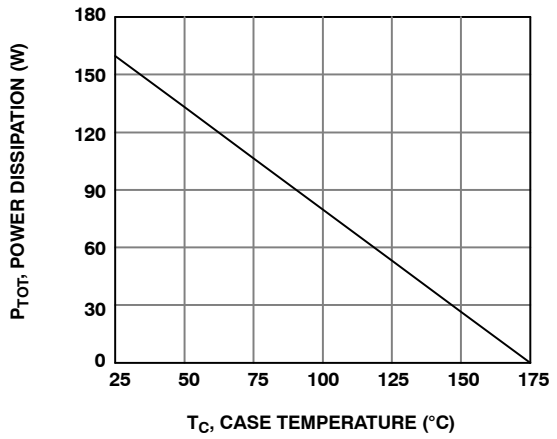


Figure 4. Power Dissipation

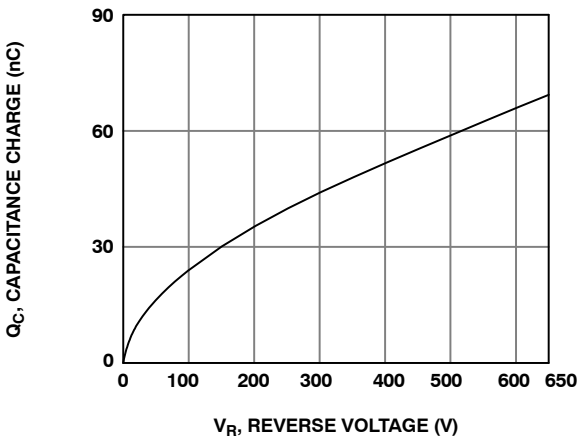


Figure 5. Capacitance Charge vs. Reverse Voltage

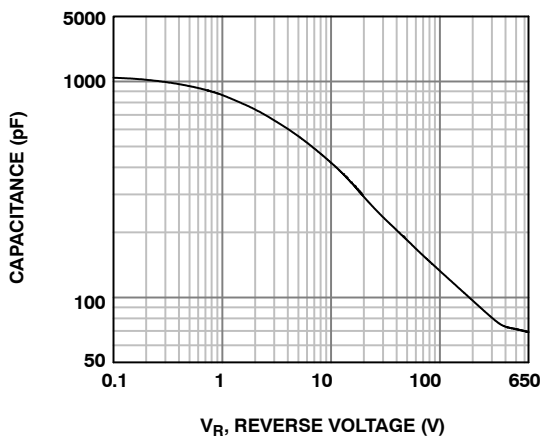


Figure 6. Capacitance vs. Reverse Voltage

FFSM2065B

TYPICAL CHARACTERISTICS (continued)

($T_J = 25^\circ\text{C}$ Unless Otherwise Noted)

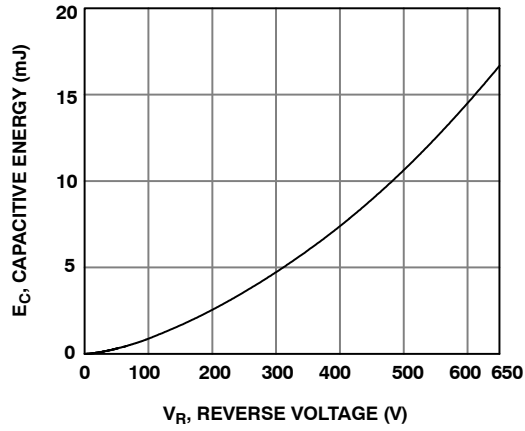


Figure 7. Capacitance Stored Energy

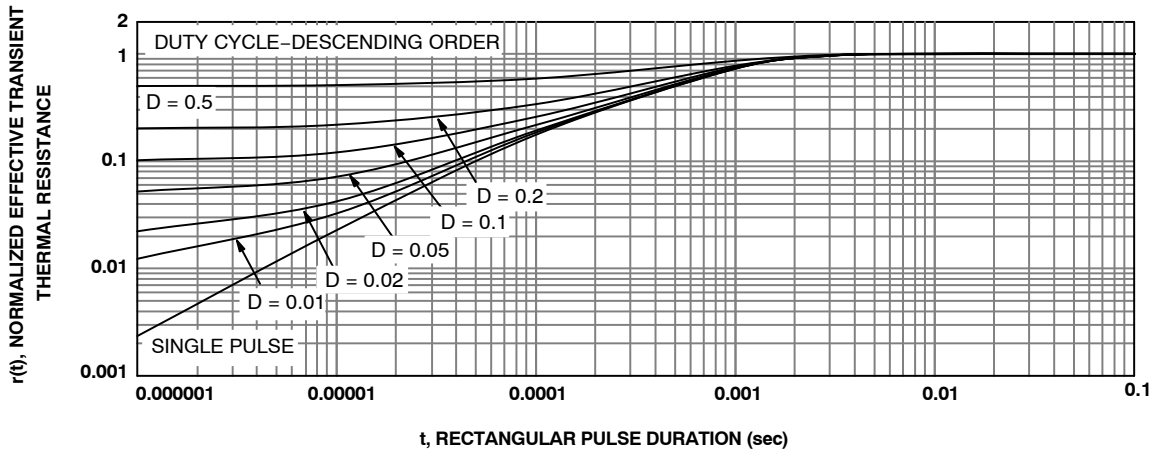
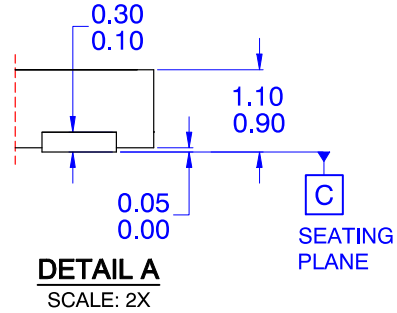
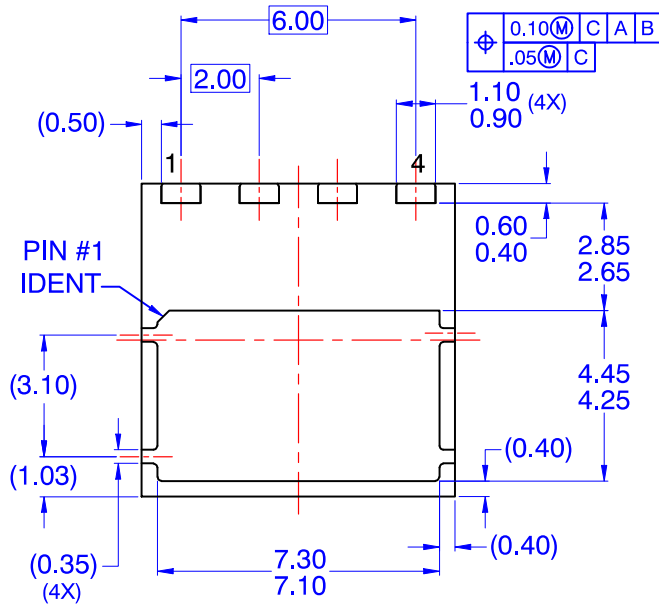
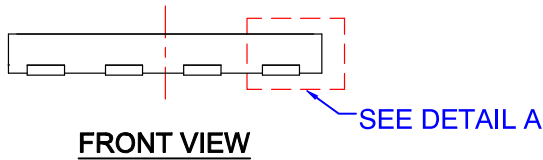
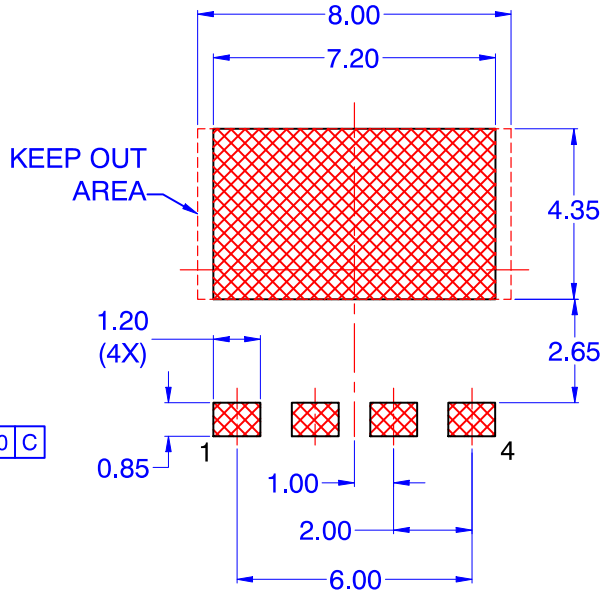
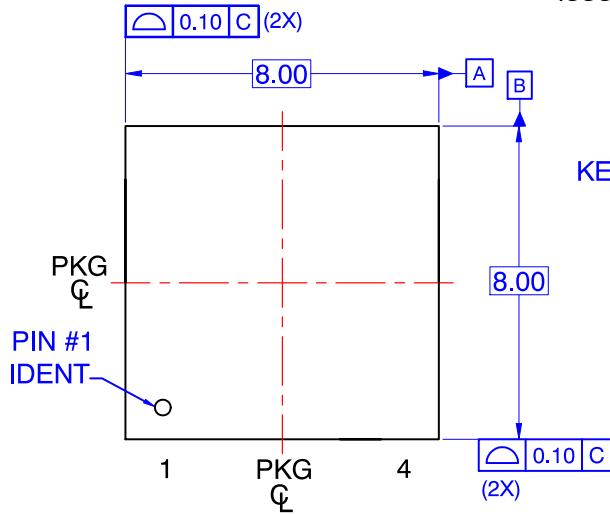


Figure 8. Junction-to-Case Transient Thermal Response Curve

FFSM2065B

PACKAGE DIMENSIONS

PQFN4 8X8, 2P
CASE 483AP
ISSUE O



- NOTES: UNLESS OTHERWISE SPECIFIED
- A) THIS PACKAGE IS NOT PRESENTLY REGISTERED WITH ANY STANDARDS COMMITTEE.
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 - C) ALL DIMENSIONS ARE IN MILLIMETERS.
 - D) DRAWING CONFORMS TO ASME Y14.5M-1994.

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