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# Silicon Carbide Schottky Diode

## 650 V, 6 A

### FFSM0665B

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 24.5 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

#### MAXIMUM RATINGS (T<sub>J</sub> = 25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Repetitive Reverse Voltage	V <sub>RRM</sub>	650	V
Single Pulse Avalanche Energy (T <sub>J</sub> = 25°C, I <sub>L(pk)</sub> = 9.9 A, L = 0.5 mH, V = 50 V)	E <sub>AS</sub>	24.5	mJ
Continuous Rectified Forward Current	I <sub>F</sub>	T <sub>C</sub> < 154	6.0
		T <sub>C</sub> < 135	9.1
Non-Repetitive Peak Forward Surge Current	I <sub>FM</sub>	T <sub>C</sub> = 25°C, t <sub>p</sub> = 10 μs	292
		T <sub>C</sub> = 150°C, t <sub>p</sub> = 10 μs	262
Non-Repetitive Forward Surge Current (Half-Sine Pulse)	I <sub>FSM</sub>	28	A
Power Dissipation	P <sub>tot</sub>	T <sub>C</sub> = 25°C	75
		T <sub>C</sub> = 150°C	12.5
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-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.

#### THERMAL RESISTANCE

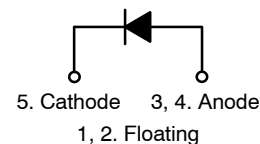
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	R <sub>θJC</sub>	2.0	°C/W



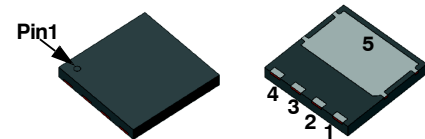
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V <sub>RRM</sub>	I <sub>F</sub>
650 V	6.0 A

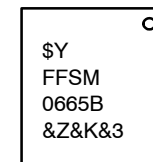


Schottky Diode



PQFN 8x8, 2P  
CASE 483AP

#### MARKING DIAGRAM



\$Y = ON Semiconductor Logo  
 FFSM0665B = Specific Device Code  
 &Z = Assembly Plant Code  
 &3 = Numeric Date Code  
 &K = Lot Code

#### ORDERING INFORMATION

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

## FFSM0665B

### ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
<b>ON CHARACTERISTICS</b>						
V <sub>F</sub>	Forward Voltage	I <sub>F</sub> = 6.0 A, T <sub>J</sub> = 25°C		1.43	1.7	V
		I <sub>F</sub> = 6.0 A, T <sub>J</sub> = 125°C		1.62		
		I <sub>F</sub> = 6.0 A, T <sub>J</sub> = 175°C		1.69		
I <sub>R</sub>	Reverse Current	V <sub>R</sub> = 650 V, T <sub>J</sub> = 25°C		0.5	40	μA
		V <sub>R</sub> = 650 V, T <sub>J</sub> = 125°C		1.0	80	
		V <sub>R</sub> = 650 V, T <sub>J</sub> = 175°C		2.0	160	

### CHARGES, CAPACITANCES & GATE RESISTANCE

Q <sub>C</sub>	Total Capacitive Charge	V <sub>C</sub> = 400 V		16		nC
C <sub>tot</sub>		V <sub>R</sub> = 1 V, f = 100 kHz		259		pF
		V <sub>R</sub> = 200 V, f = 100 kHz		29		
		V <sub>R</sub> = 400 V, f = 100 kHz		22		

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.

### PART MARKING AND ORDERING INFORMATION

Part Number	Top Mark	Package	Packing Method <sup>†</sup>	Quantity
FFSM0665B	FFSM0665B	PQFN 8X8, 2P (Halogen Free)	Tape & Reel	3000 units

<sup>†</sup>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)

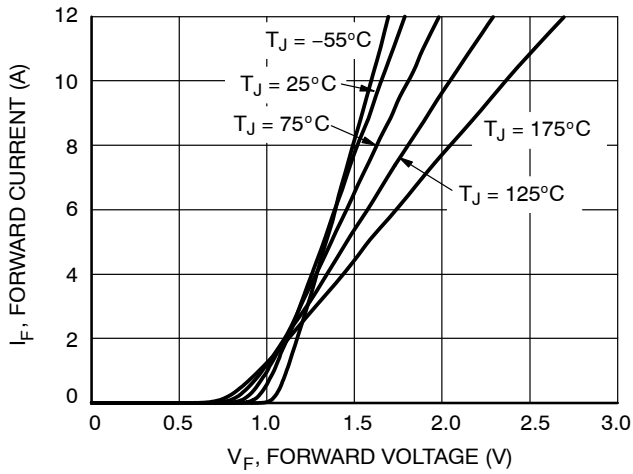


Figure 1. Forward Characteristics

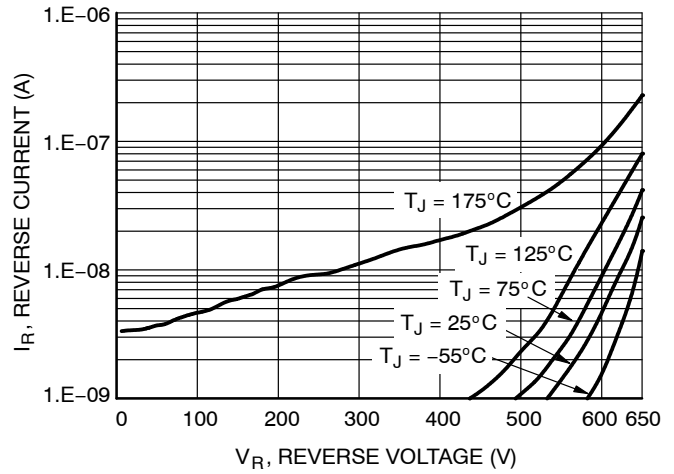


Figure 2. Reverse Characteristics

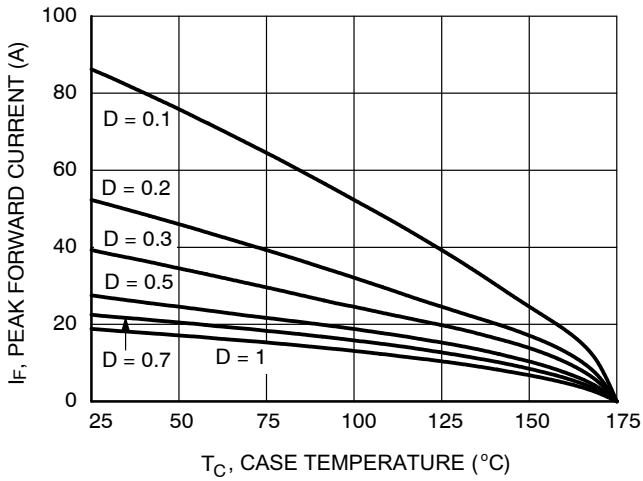


Figure 3. Current Derating

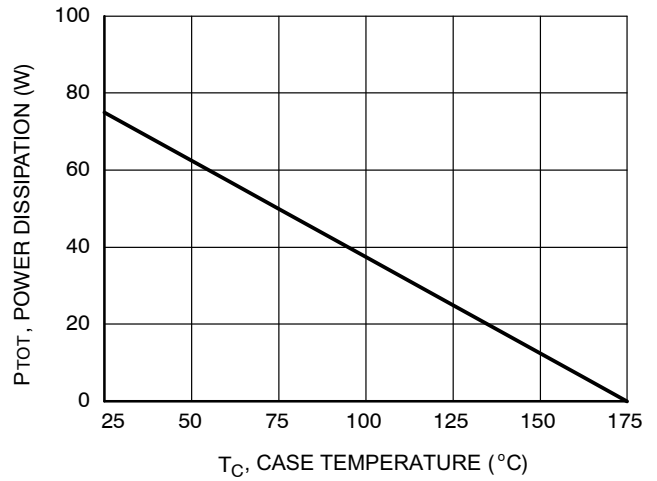


Figure 4. Power Derating

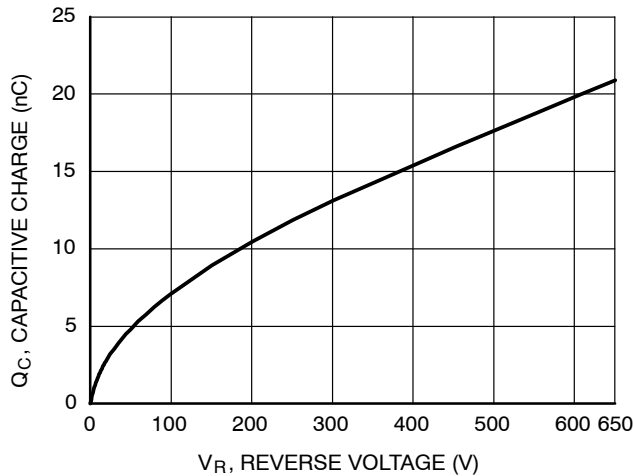


Figure 5. Capacitive Charge vs. Reverse Voltage

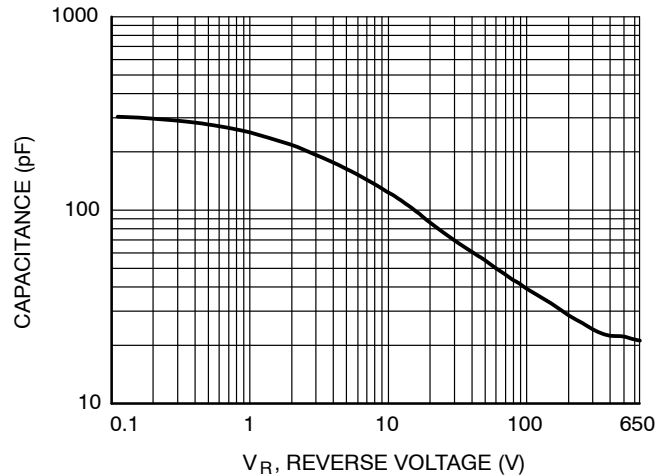


Figure 6. Capacitance vs. Reverse Voltage

# FFSM0665B

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

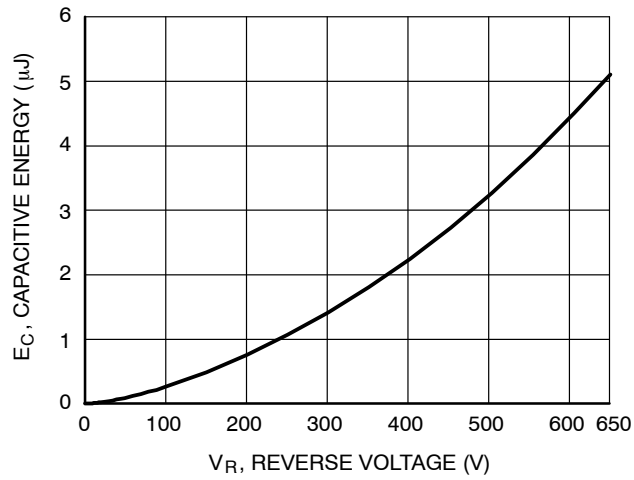


Figure 7. Capacitance Stored Energy

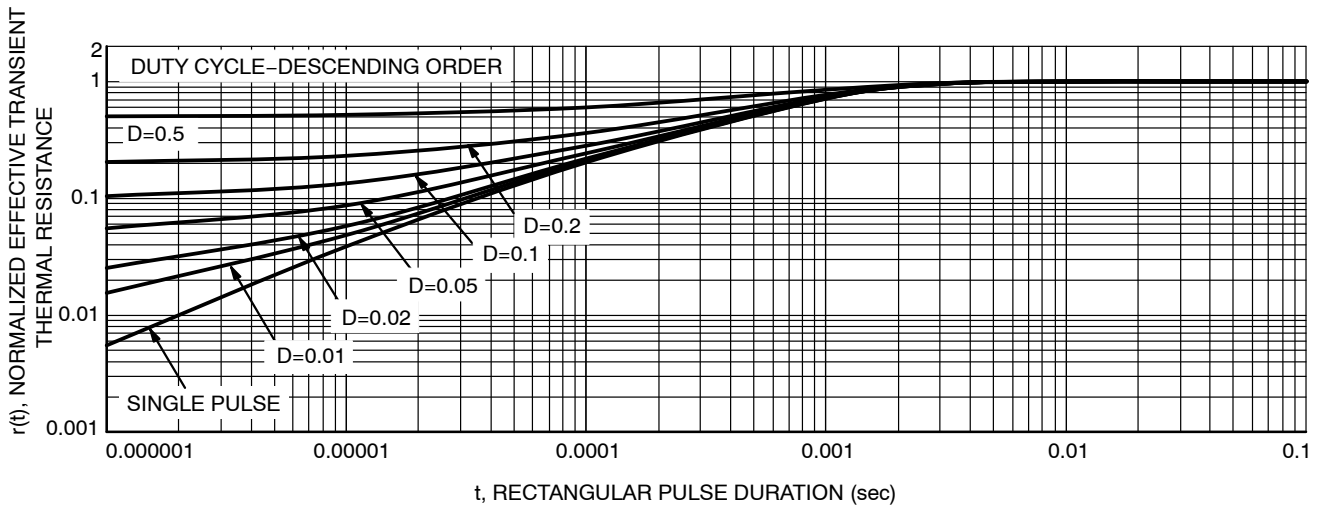
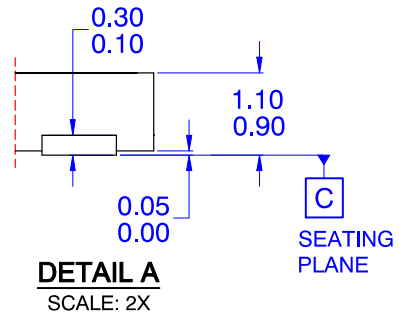
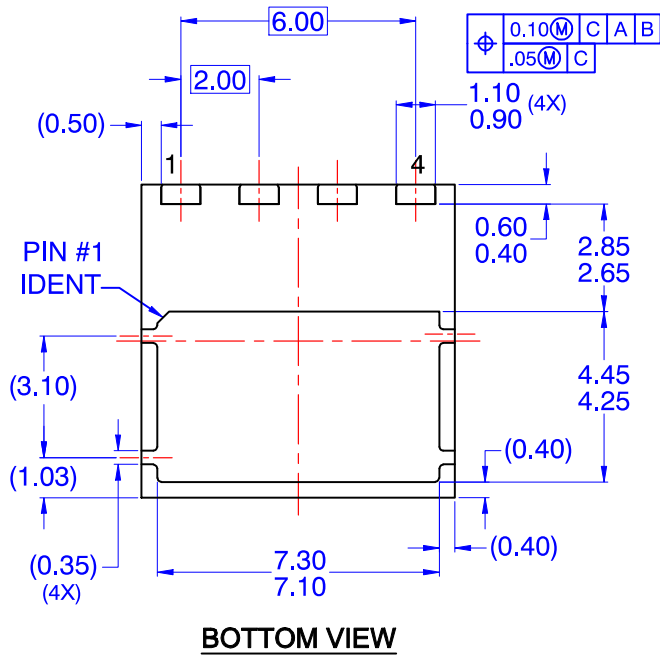
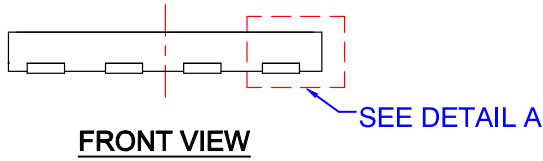
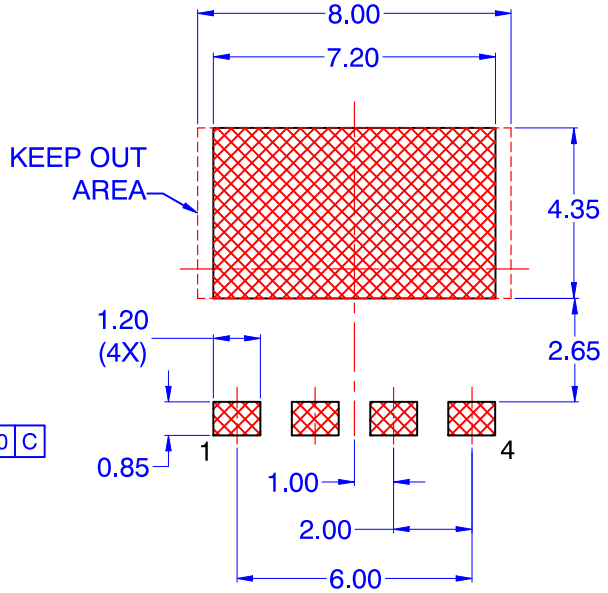
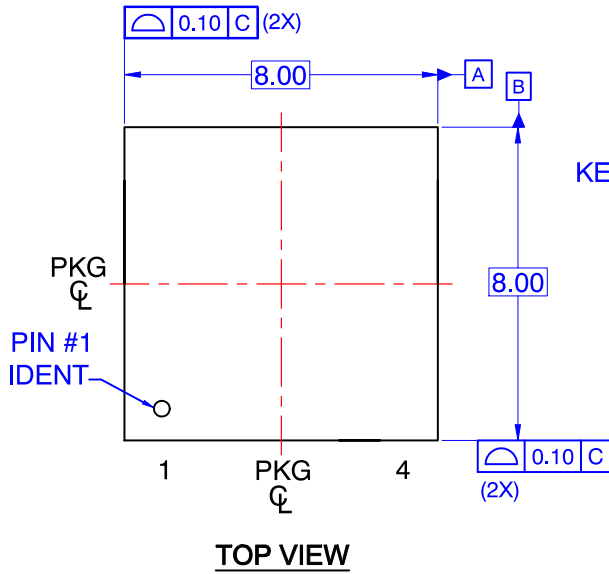


Figure 8. Junction-to-Case Transient Thermal Response


# FFSM0665B

## PACKAGE DIMENSIONS

PQFN4 8X8, 2P  
CASE 483AP  
ISSUE O



NOTES: UNLESS OTHERWISE SPECIFIED  
A) THIS PACKAGE IS NOT PRESENTLY REGISTERED WITH ANY STANDARDS COMMITTEE.  
B) DIMENSIONS ARE INCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR PROTRUSIONS.  
C) ALL DIMENSIONS ARE IN MILLIMETERS.  
D) DRAWING CONFORMS TO ASME Y14.5M-1994.

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