Silicon Carbide Schottky Diode

650 V, 6 A

FFSM0665A

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 and cost.

Features

- Max Junction Temperature 175°C
- Avalanche Rated 20 mJ
- High Surge Current Capacity
- Positive Temperature Coefficient
- Ease of Paralleling
- No Reverse Recovery/No Forward Recovery
- This Device is Pb−Free, Halogen Free/BFR Free and RoHS Compliant

Applications

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

ON Semiconductor®

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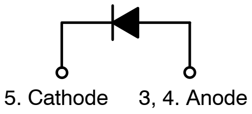
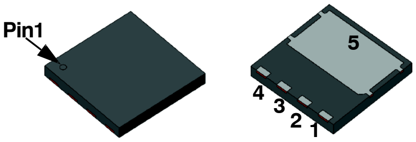
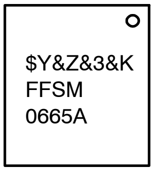


Schottky Diode



PQFN 8×8, 2P
CASE 483AP

MARKING DIAGRAM



$Y = ON Semiconductor Logo
&Z = Assembly Plant Code
&3 = Numeric Date Code
&K = Lot Code
FFSM0665A = 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)		20	mJ
I_F	Continuous Rectified Forward Current @ T_C < 150°C		6	A
	Continuous Rectified Forward Current @ T_C < 135°C		8	
$I_{F,\ Max}$	Non-Repetitive Peak Forward Surge Current	T_C = 25°C, 10 μs	430	A
		T_C = 150°C, 10 μs	415	A
$I_{F,SM}$	Non-Repetitive Forward Surge Current	Half-Sine Pulse, t_p = 8.3 ms	42	A
$I_{F,RM}$	Repetitive Forward Surge Current	Half-Sine Pulse, t_p = 8.3 ms	20	A
Ptot	Power Dissipation	T_C = 25°C	56	W
		T_C = 150°C	9.4	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 20 mJ is based on starting T_J = 25°C, L = 1 mH, I_{AS} = 9 A, V = 50 V.

THERMAL CHARACTERISTICS

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max	2.67	°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 = 6 A, T_C = 25°C	–	1.50	1.75	V
		I_F = 6 A, T_C = 125°C	–	1.6	2.0	
		I_F = 6 A, T_C = 175°C	–	1.72	2.4	
I_R	Reverse Current	V_R = 650 V, T_C = 25°C	–	–	200	μA
		V_R = 650 V, T_C = 125°C	–	–	400	
		V_R = 650 V, T_C = 175°C	–	–	600	
Q_C	Total Capacitive Charge	V = 400 V	–	22	–	nC
C	Total Capacitance	V_R = 1 V, f = 100 kHz	–	365	–	pF
		V_R = 400 V, f = 100 kHz	–	40	–	
		V_R = 800 V, f = 100 kHz	–	31	–	

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 Marking	Package	Shipping†
FFSM0665A	FFSM0665A	PQFN 8x8, 2P (Pb−Free/Halogen Free)	3000Units / 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)

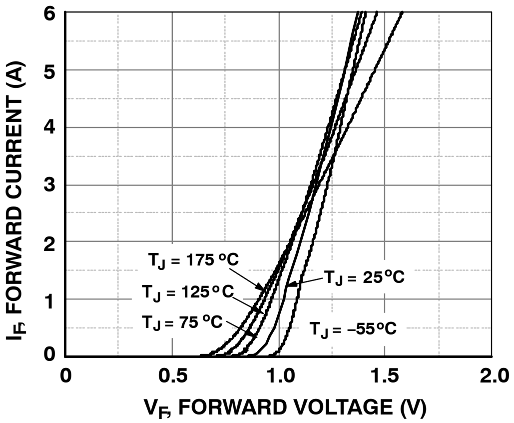


Figure 1. Forward Characteristics

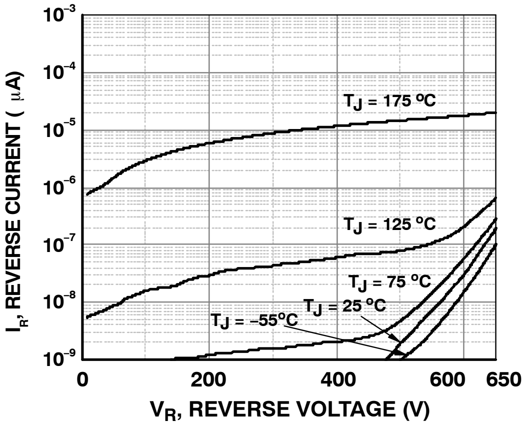


Figure 2. Reverse Characteristics

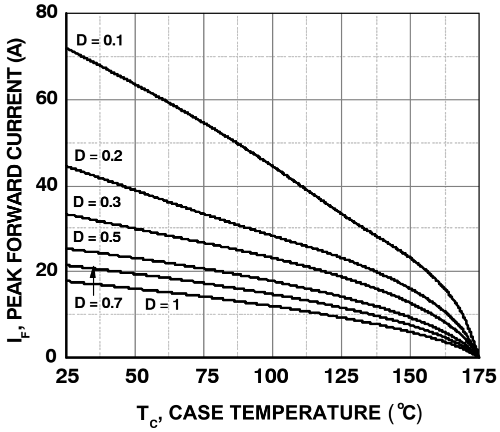


Figure 3. Current Derating

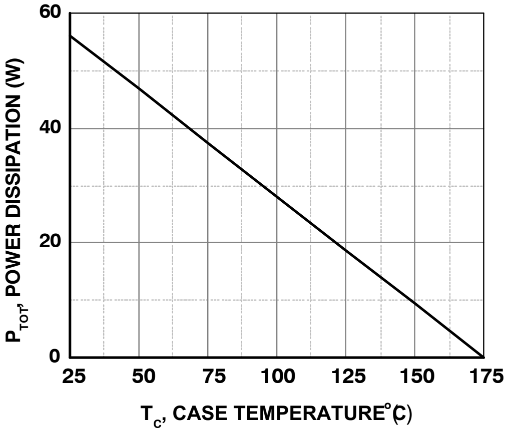


Figure 4. Power Derating

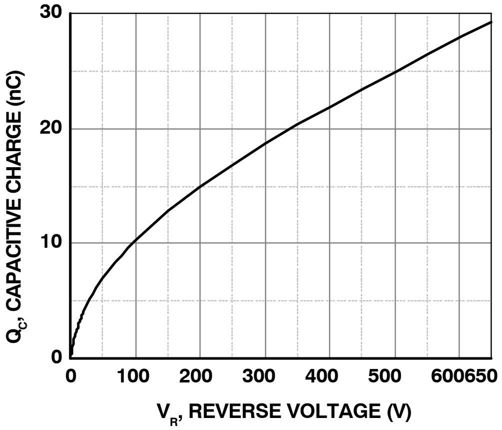


Figure 5. Capacitive Charge vs. Reverse Voltage

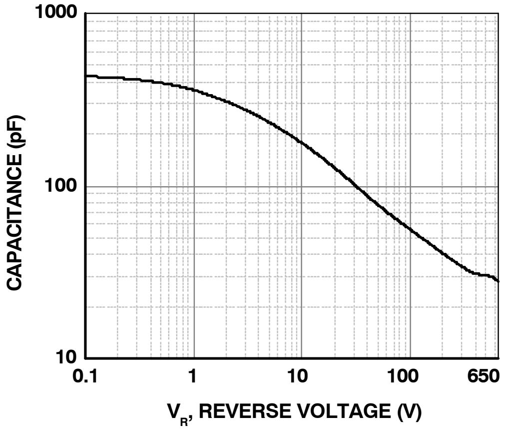


Figure 6. Capacitance vs. Reverse Voltage

TYPICAL CHARACTERISTICS

(T_J = 25°C unless otherwise noted)

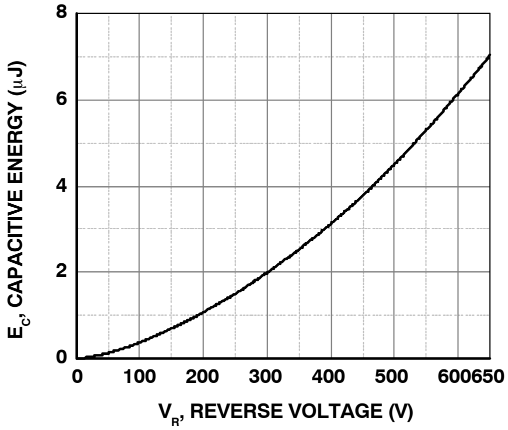


Figure 7. Capacitance Stored Energy

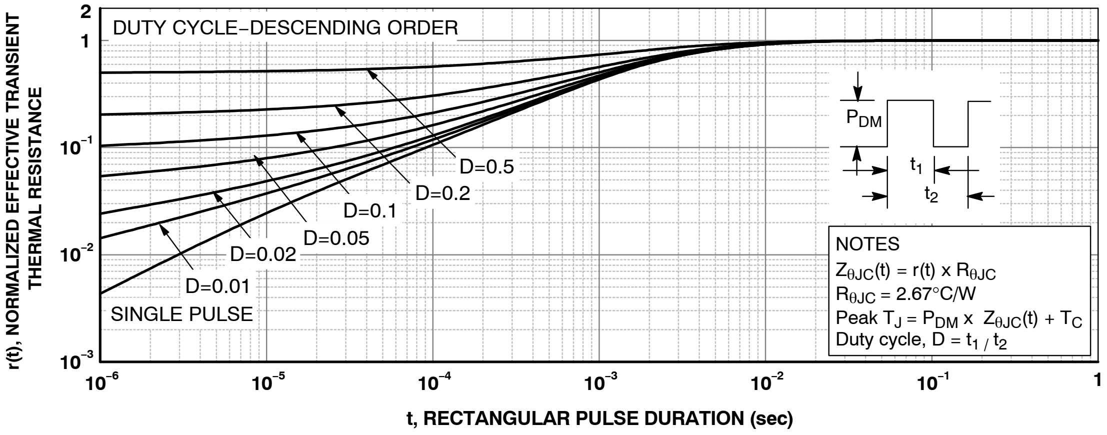


Figure 8. Junction-to-Case Transient Thermal Response Curve

TEST CIRCUIT AND WAVEFORMS

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

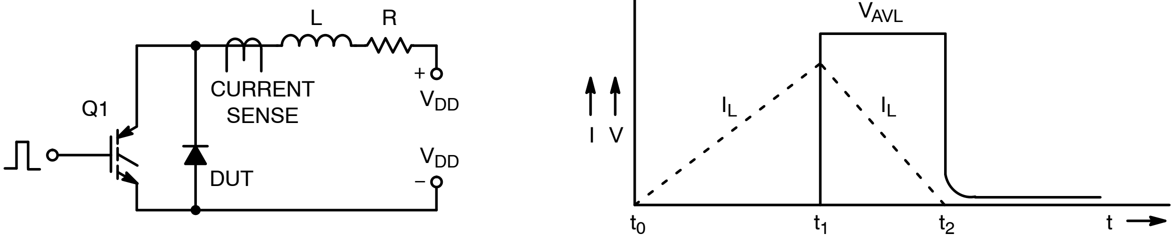


Figure 9. Unclamped Inductive Switching Test Circuit & Waveform

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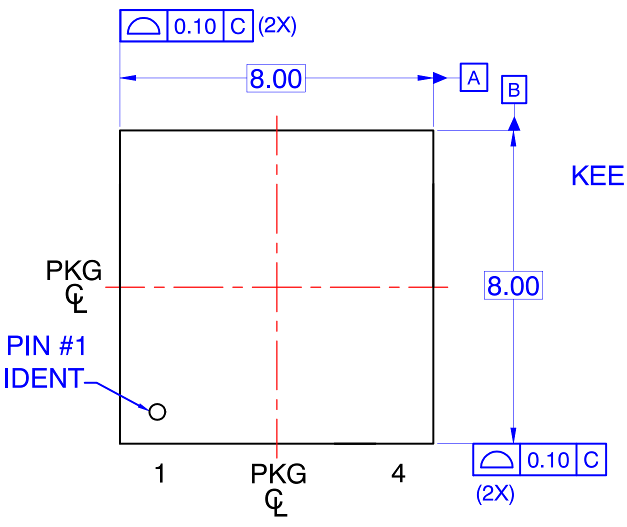
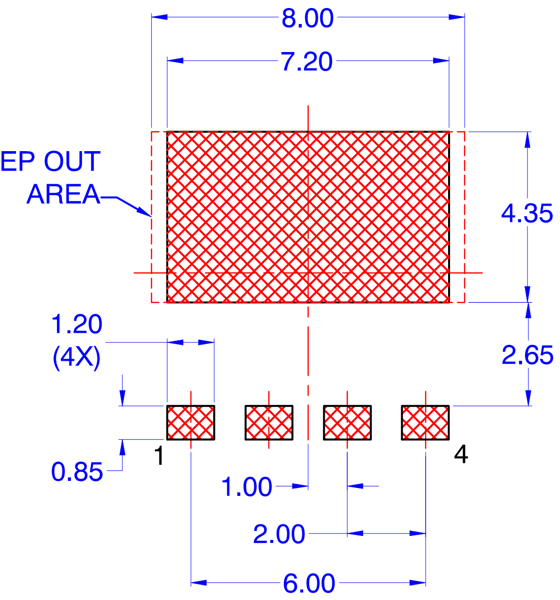
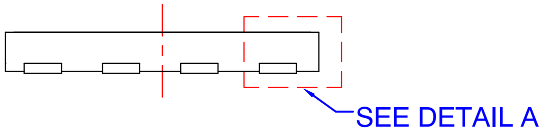


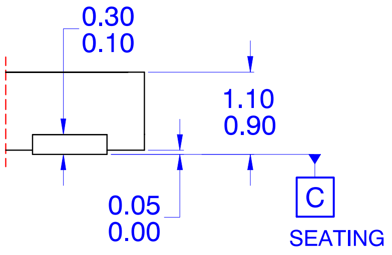
TOP VIEW



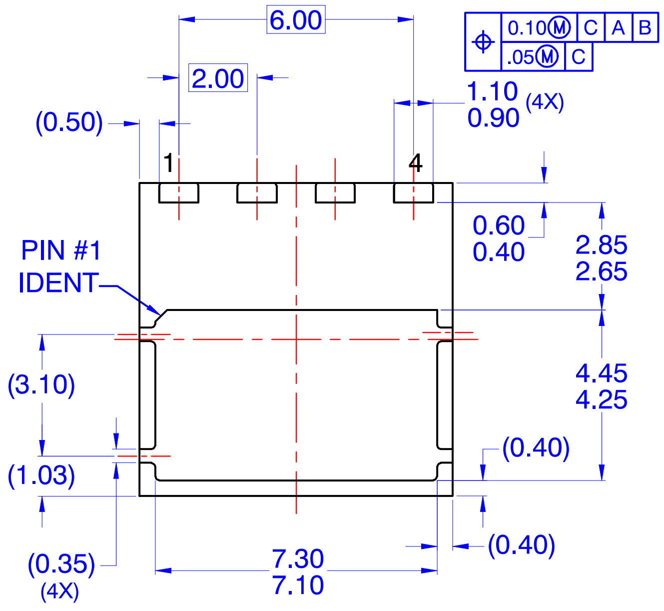
LAND PATTERN RECOMMENDATION



FRONT VIEW



DETAIL A
SCALE: 2X



BOTTOM VIEW

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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