

Silicon Carbide (SiC) Schottky Diode – EliteSiC, 8 A, 650 V, D1, Power88

FFSM0865A

Description

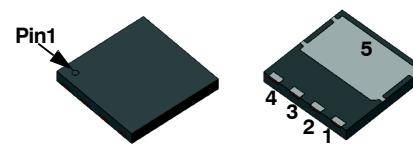
Silicon Carbide (SiC) Schottky Diodes use a completely new technology that provides superior switching performance and higher reliability compared to Silicon. No reverse recovery current, temperature independent switching characteristics, and excellent thermal performance sets Silicon Carbide as the 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

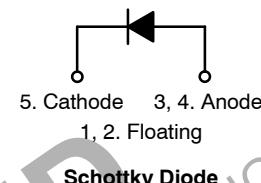
- Max Junction Temperature 175°C
- Avalanche Rated 37 mJ
- High Surge Current Capacity
- Positive Temperature Coefficient
- Ease of Paralleling
- No Reverse Recovery/No Forward Recovery
- This Device is Pb-Free, Halogen Free/BFR Free and RoHS Compliant

Applications

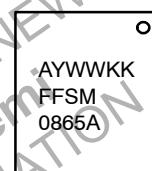
- General Purpose
- SMPS, Solar Inverter, UPS
- Power Switching Circuits



PQFN 8x8, 2P
(Power88)
CASE 483AP



MARKING DIAGRAM



- = Assembly Plant Code
- = Date Code (Year & Week)
- = Lot Traceability Code
- = Specific Device Code

ORDERING INFORMATION

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

FFSM0865A

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter		Value	Unit
V_{RRM}	Peak Repetitive Reverse Voltage		650	V
E_{AS}	Single Pulse Avalanche Energy (Note 1)		37	mJ
I_F	Continuous Rectified Forward Current @ $T_C < 145^\circ\text{C}$		8	A
	Continuous Rectified Forward Current @ $T_C < 135^\circ\text{C}$		9.6	
$I_{F, Max}$	Non-Repetitive Peak Forward Surge Current	$T_C = 25^\circ\text{C}, 10 \mu\text{s}$	550	A
		$T_C = 150^\circ\text{C}, 10 \mu\text{s}$	520	A
$I_{F,SM}$	Non-Repetitive Forward Surge Current		49	A
$I_{F,RM}$	Repetitive Forward Surge Current		25	A
P_{tot}	Power Dissipation	$T_C = 25^\circ\text{C}$	64	W
		$T_C = 150^\circ\text{C}$	11	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 37 mJ is based on starting $T_J = 25^\circ\text{C}$, $L = 1 \text{ mH}$, $I_{AS} = 8.7 \text{ A}$, $V = 50 \text{ V}$.

THERMAL CHARACTERISTICS

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max	2.35	°C/W

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

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
V_F	Forward Voltage	$I_F = 8 \text{ A}, T_C = 25^\circ\text{C}$	-	1.50	1.75	V
		$I_F = 8 \text{ A}, T_C = 125^\circ\text{C}$	-	1.6	2.0	
		$I_F = 8 \text{ A}, T_C = 175^\circ\text{C}$	-	1.72	2.4	
I_R	Reverse Current	$V_R = 650 \text{ V}, T_C = 25^\circ\text{C}$	-	-	200	μA
		$V_R = 650 \text{ V}, T_C = 125^\circ\text{C}$	-	-	400	
		$V_R = 650 \text{ V}, T_C = 175^\circ\text{C}$	-	-	600	
Q_C	Total Capacitive Charge	$V = 400 \text{ V}$	-	27	-	nC
C	Total Capacitance	$V_R = 1 \text{ V}, f = 100 \text{ kHz}$	-	463	-	pF
		$V_R = 200 \text{ V}, f = 100 \text{ kHz}$	-	48	-	
		$V_R = 400 \text{ V}, f = 100 \text{ kHz}$	-	38	-	

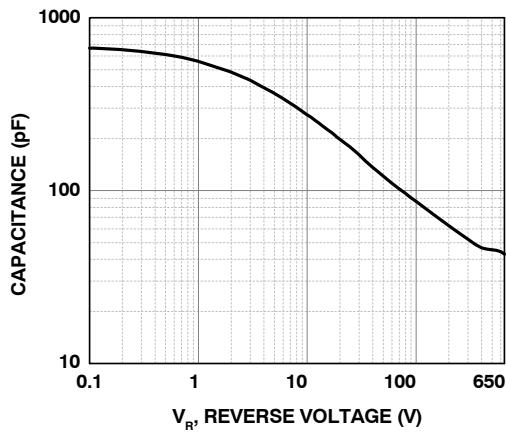
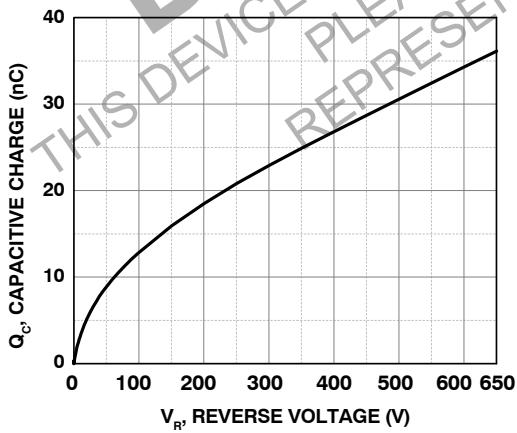
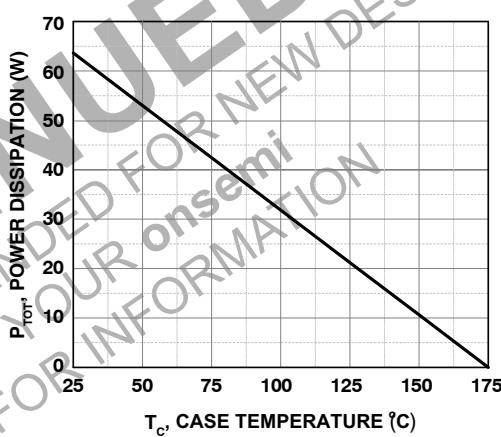
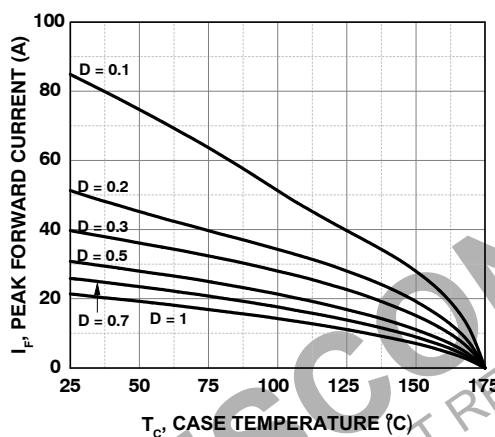
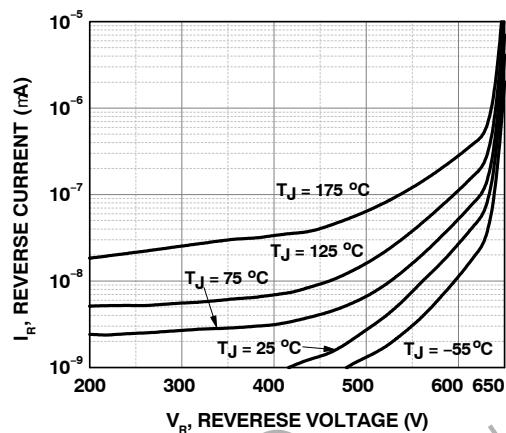
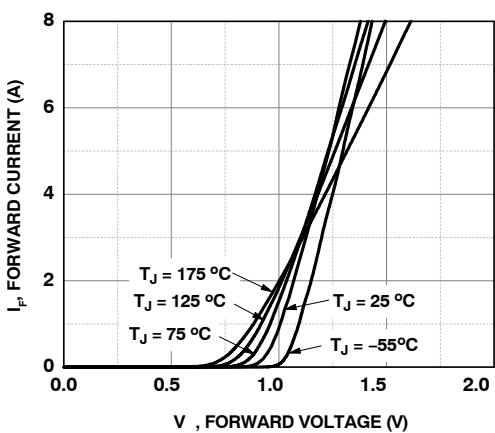
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

PACKAGE MARKING AND ORDERING INFORMATION

Part Number	Top Marking	Package	Shipping [†]
FFSM0865A	FFSM0865A	PQFN 8x8, 2P (Power88) (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.

TYPICAL CHARACTERISTICS
($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)



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($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

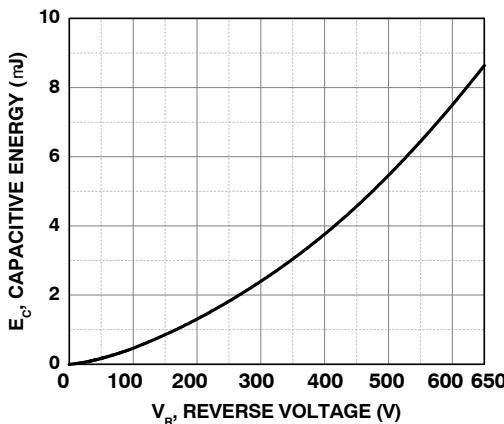


Figure 7. Capacitance Stored Energy

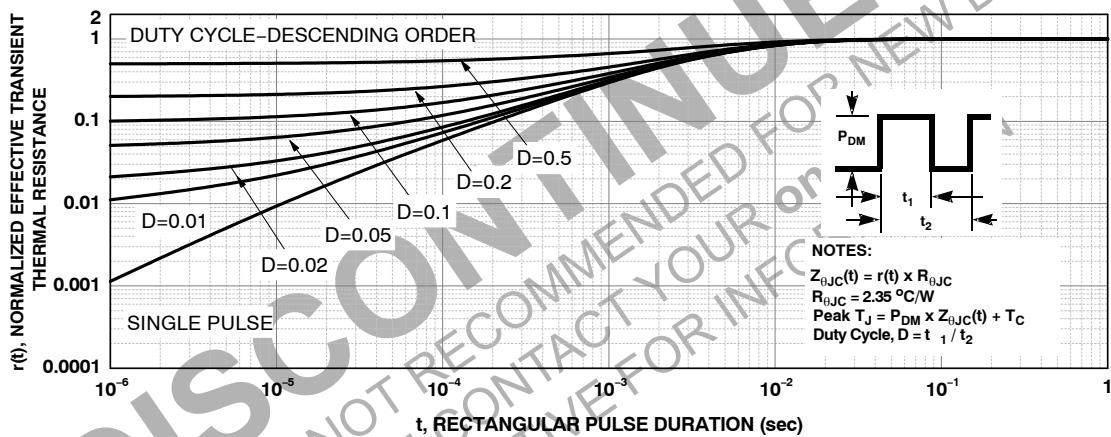


Figure 8. Junction-to-Case Transient Thermal Response Curve

TEST CIRCUIT AND WAVEFORMS

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

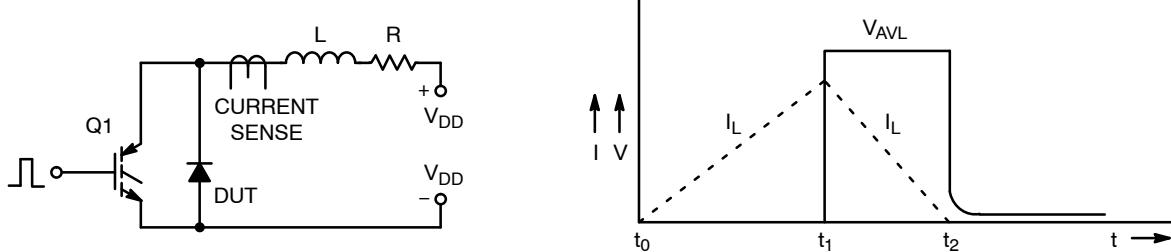
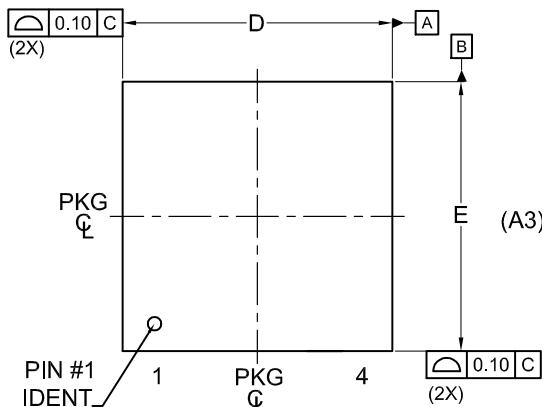


Figure 9. Unclamped Inductive Switching Test Circuit & Waveform

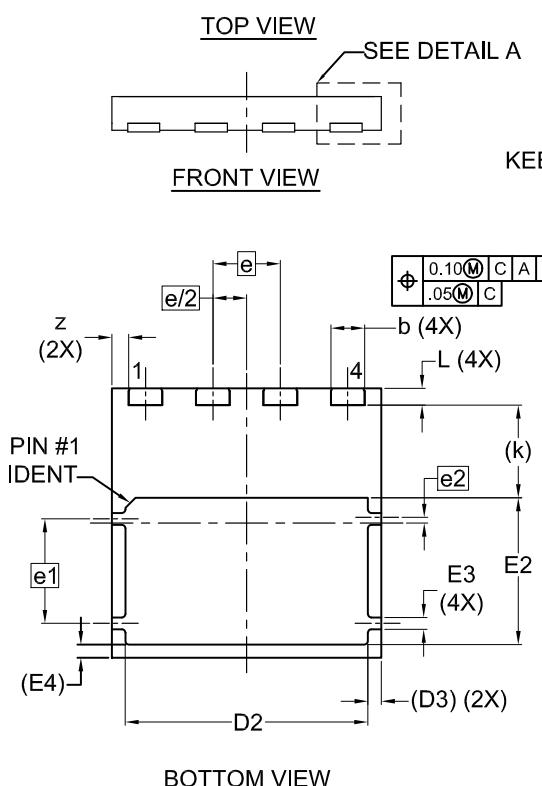
PQFN4 8X8, 2P
CASE 483AP
ISSUE A

DATE 06 JUL 2021

DETAIL A
SCALE: 2X

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. COPLANARITY APPLIES TO THE EXPOSED PADS AS WELL AS THE TERMINALS.
4. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.
5. SEATING PLANE IS DEFINED BY THE TERMINALS. "A1" IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT ON THE PACKAGE BODY.
6. IT IS RECOMMENDED TO HAVE NO TRACES OR VIAS WITHIN THE KEEP OUT AREA.



LAND PATTERN
RECOMMENDATION

*FOR ADDITIONAL INFORMATION ON OUR PB-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0.00	-	0.05
A3	0.20	REF	
b	0.90	1.00	1.10
D	7.90	8.00	8.10
D2	7.10	7.20	7.30
D3	0.40	REF	
E	7.90	8.00	8.10
E2	4.25	4.35	4.45
E3	0.25	0.35	0.45
E4	0.40	REF	
e	2.00	BSC	
e/2	1.00	BSC	
e1	3.10	BSC	
e2	0.17	BSC	
k	2.75	REF	
L	0.40	0.50	0.60

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