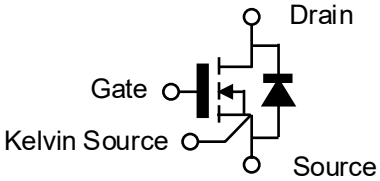
Silicon Carbide MOSFET

650V, 65mΩ SiC MOSFET – Falcon Series

Product Information:



PDFN 8x8

Features

- Optimized $R_{DS(on)}$ with Rapid Switching Behavior
- Compatible with Standard Gate Drivers
- Clean Kelvin-Source Switching Pin-out
- High Avalanche Endurance Capability
- Optimized for High Power Density Applications
- RoHS Compliant and Halogen Free

Terminal	Packaging Type
	PDFN 8x8
Gate	1
Drain	5
Kelvin Source	2
Source	3, 4

Benefits

- Higher System Efficiency
- Increase Parallel Device Convenience
- Enable High Temperature Application
- Allow High Frequency Operation
- Realize Compact and Lightweight Systems
- High Reliability

Potential Applications

- Switching Mode Power Supply
- PFC & DC/DC Converter
- Portable Adaptor
- EV On Board Charger
- Renewable Energy
- Power Inverter & Motor Driver

Key Performance Parameters

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS} @ $T_{j(max)}$	700	V
Recommended Gate-Source Turn-On Voltage	V_{GS}	12~18	
Drain-Source On-State Resistance	$R_{DS(on)}$	65	mΩ
Continuous Drain Current	I_D	15	A
Pulse Drain Current	$I_{D,\ pulse}$		
Power Dissipation	P_{tot}	175	W
Avalanche Energy	E_{AS}	250	mJ
Gate Charge	Q_G	27.8	nC
Output Capacitive Charge	Q_{oss}	30.4	
Junction & Storage Temperature	T_j, T_{stg}	-55 to 175	°C

Part Number	Package	Marking
FF06080M2G	PDFN 8x8	FF06080M2

For further information about comparable products, please contact (www.fastsic.com).

Maximum Ratings: (T_j = 25°C, unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Voltage	V_{DSS}	650	--	--	V	V_{GS}=0V, I_D=1mA
Continuous Drain Current	I_D	--	15 8	--	A	V_{GS}=15V, T_C=25°C V_{GS}=15V, T_C=100°C
Pulse Drain Current	$I_{D,\ pulse}$	--	TBD	--		Per SOA
Continuous Body Diode Current	I_S	--	10	--		V_{GS}=0V, T_C=25°C
Avalanche Energy, Single Pulse	E_{AS}	--	--	250	mJ	L=25mH
Operate Gate Source Voltage	$V_{GS,\ op}$	-8~0	--	12~18	V	Recommended operating values
Transient Gate Source Voltage	$V_{GS,\ tran.}$	-9	--	19		Transient operating limit (AC f > 1Hz, pulse width < 100ns)
Power Dissipation	P_{tot}	--	150	--	W	T_c =25°C
Junction Temperature	T_j	-55	--	175	°C	--
Storage Temperature	T_{stg}	-55	--	175		
Soldering Temperature	T_L	--	--	260		

Electrical Characteristics:

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
DC Characteristics (at T_j = 25°C, unless otherwise specified)						
Drain-source Breakdown Voltage	$V_{(BR)DSS}$	650	--	--	V	V_{GS}=0V, I_D=1mA, T_j=25°C
Drain-Source On-State Resistance	$R_{DS(on)}$	-- -- --	94 75 65	-- -- --	mΩ	V_{GS}=12V, I_D=8A, T_j=25°C V_{GS}=15V, I_D=8A, T_j=25°C V_{GS}=18V, I_D=8A, T_j=25°C
Gate-Source Threshold Voltage	V_{th}	--	2.5	--	V	V_{GS}=V_{DS}, I_D=8mA
Zero Gate Voltage Drain Current	I_{DSS}	--	1	1000	μA	V_{DS}=650V, V_{GS}=0V, T_j=25°C
Gate-Source Leakage Current	I_{GSS}	--	--	100	nA	V_{GS}=15V, V_{DS}=0V
Body Diode Forward Voltage	V_{SD}	-- --	2.65 2.45	-- --	V	V_{GS}=0V, I_S=4A, T_j=25°C V_{GS}=0V, I_S=4A, T_j=175°C
AC Characteristics (at T_j = 25°C, unless otherwise specified)						
Input Capacitance	C_{iss}	--	1030	--	pF	V_{DS}=400V, V_{GS}=0V, f=250kHz, V_{AC}=25mV
Output Capacitance	C_{oss}	--	48	--		
Reverse Capacitance	C_{rss}	--	3.2	--		
Effective Output Capacitance, energy related	$C_{o(er)}$[1]	--	65	--		
Effective Output Capacitance, time related	$C_{o(tr)}$[2]	--	85	--		
C_{oss} Stored Energy	E_{oss}	--	4	--	μJ	
Output Capacitive Charge	Q_{oss}	--	30.4	--	nC	
Internal Gate Resistance	$R_{G,\ int.}$	--	5.5	--	Ω	f=1MHz, V_{AC}=25mV

[1] $C_{o(er)}$ is a fixed capacitance that gives the same stored energy as C_{oss} while V_{DS} is rising from 0 to 400V.
[2] $C_{o(tr)}$ is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 to 400V.

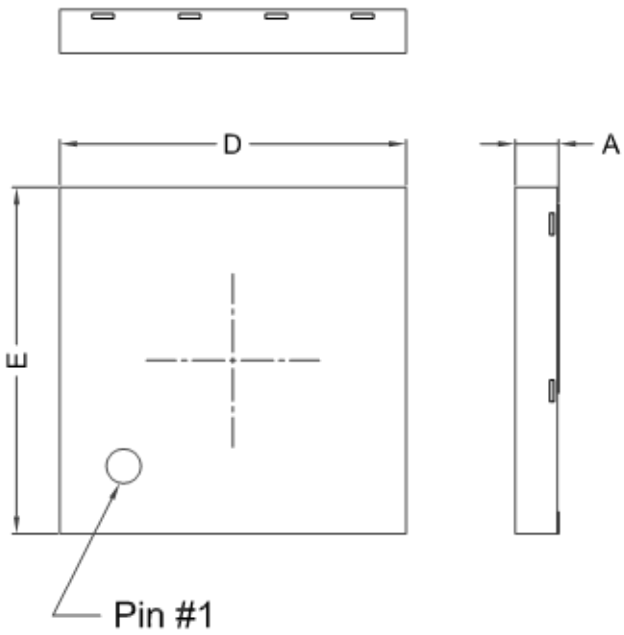
Switching Characteristics:

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Gate Characteristics						
Gate to Source Charge	Q_{GS}	--	7.4	--	nC	V_{DS}=400V, V_{GS}=0V/15V, I_D=8A
Gate to Drain Charge	Q_{GD}	--	8.3	--		
Total Gate Charge	Q_G	--	27.8	--		
Turn On Delay Time	$t_{d(on)}$	--		--	ns	V_{DS}=400V, I_D=8A, V_{GS}=-3/+15V, $R_{G,\,ext.}$= 4.7Ω FWD=Self
Rise Time	t_r	--		--		
Turn Off Delay Time	$t_{d(off)}$	--		--		
Fall Time	t_f	--		--		
Turn On Switching Energy	E_{on}	--	40	--	µJ	
Turn Off Switching Energy	E_{off}	--	6	--		
Body Diode Characteristics						
Reverse Recovery Charge	Q_{rr}	--	46.2	--	nC	V_{GS}=0V, I_S=8A, V_{DS}=400V, di/dt=--A/µs *Q_{rr} herein excluded the Q_{oss} value.
Reverse Recovery Time	t_{rr}	--		--	ns	
Peak Reverse Recovery Current	I_{rrm}	--		--	A	

Thermal Characteristics:

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Thermal Impedance, junction-case	$R_{th\text{-}jc}$	--	1.0	--	K/W	JESD-51-14
Thermal Impedance, junction-ambient	$R_{th\text{-}ja}$	--	40	--		Device on PCB, with 6 cm² of cooling area

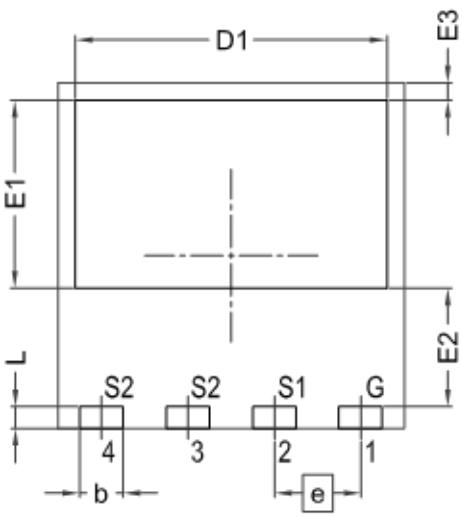
Package Outline (PDFN 8 x 8)

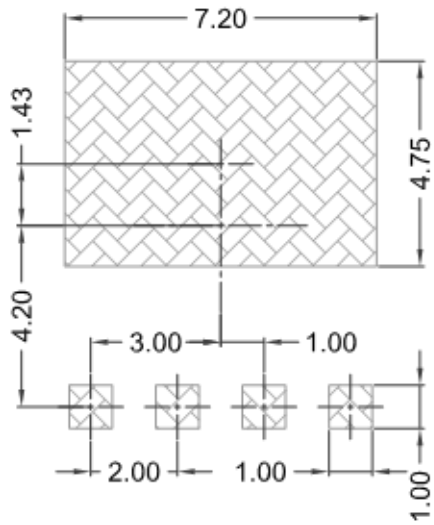


Symbol	Dimension (Millimeters)		
	Min.	Nom.	Max.
A	0.90	1.00	1.10
A1	0.00	-	0.05
b	0.90	1.00	1.10
c	0.10	0.20	0.30
D	7.90	8.00	8.10
D1	7.10	7.20	7.30
E	7.90	8.00	8.10
E1	4.25	4.35	4.45
E2	2.65	2.75	2.85
E3	0.30	0.40	0.50
e		2.00 BSC.	
L	0.40	0.50	0.60

Note:

1. All dimensions are in mm.
2. Dimensions are not inclusive burrs and mold flash.





Land Pattern (Only for reference)

Revision History

Date	Revision	Changes
2026.03	Tentative	First issue. All data is the target spec.

Important Note (Disclaimer)

Fast SiC Semiconductor Inc. (“FSS”) reserves the right to make changes and improvements to this product and the information provided in this document may be subject to change without prior notice. Buyers should contact FSS sales representatives to obtain the latest information on this product before placing order and are solely responsible for the selection and use of this product. In addition, any information given in this document is only intended to show the typical functions that can vary in different applications and shall not be regarded as a guarantee or warranty of conditions or characteristics.

This product is not designed or intended for use for applications in which the failure of the product could lead to personal injury, death or property damage, including but not limited to equipment used in medical systems, traffic communication or control systems, transportations (cars, ships, trains) and aerospace. FSS shall have no responsibility for any damages or injury arising from non-compliance with the recommended usage conditions provided herein.

Published by:
Fast SiC Semiconductor Inc.
Hsinchu, Taiwan