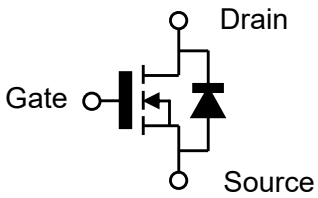
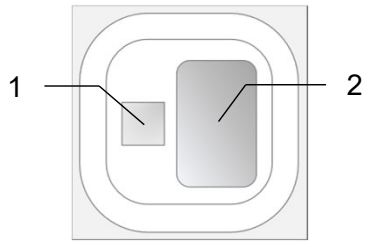
Silicon Carbide MOSFET

1800V SiC MOSFET – Falcon Series

Product Information:





Bare Chip

Terminal	Pad Arrangement
Gate	1
Drain	Backside
Source	2

Features

- Low Capacitance for Rapid Switching Behavior
- High Avalanche Endurance Capability
- High Blocking Voltage with Low Leakage Current
- Optimized for High Voltage Applications
- Strong Latch-up Hardness
- RoHS Compliant and Halogen Free

Benefits

- Higher System Efficiency
- Enable High Temperature Application
- Allow High Frequency Operation
- Realize Compact and Lightweight Systems
- Low V_{GS} Drivable
- High Reliability

Potential Applications

- Solid-State Relay
- Isolated Switch Control
- Pulsed Power Applications
- Battery Management Systems
- Sensor

Key Performance Parameters

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS} @$T_{j(max)}$	1800	V
Recommended Gate-Source Turn-On Voltage	V_{GS}	15~18	
Drain-Source On-State Resistance	$R_{DS(on)}$	7	Ω
Nominal Drain Current	I_D	100*	mA
Body Diode Forward Voltage	V_{SD}	2.2	V
Junction & Storage Temperature	T_j, T_{stg}	-55 to 175	°C

Part Number	Package	Marking
FF157K0	Bare Die	--
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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}	1800	--	--	V	V_{GS}=0V, I_D=100μA
Nominal Drain Current	I_D	--	--	100*	mA	V_{GS}=18V, T_C=25°C
Nominal Body Diode Current	I_S	--	--	100*		V_{GS}=0V, T_C=25˚C
Operate Gate Source Voltage	$V_{GS,\ op}$	-8~0	--	15~18	V	Recommended operating values
Transient Gate Source Voltage	$V_{GS,\ tran.}$	-10	--	22		Transient operating limit (AC f > 1Hz, pulse width < 100ns)
Junction Temperature	T_j	-55	--	175	˚C	--
Storage Temperature	T_{stg}	-55	--	175		
Processing Temperature	T_{Proc}	--	--	325	˚C	Within 10 minutes

* Assume Rth-jc thermal resistance of 10 K/W or less

Electrical Characteristics:

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
DC Characteristics (at T_j = 25˚C, unless otherwise specified)						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	1800 --	-- 1800	-- --	V	V_{GS}=0V, I_D=100μA, T_j=25˚C V_{GS}=0V, I_D=100μA, T_j=175˚C
Drain-Source On-State Resistance	$R_{DS(on)}$	--	7 17	13 --	Ω	V_{GS}=18V, I_D=100mA, T_j=25˚C V_{GS}=18V, I_D=100mA, T_j=175˚C
Gate-Source Threshold Voltage	V_{th}	2.0	3.0	5.5	V	V_{GS}=V_{DS} ,I_D=1mA
Zero Gate Voltage Drain Current	I_{DSS}	--	<1	10	μA	V_{DS}=1800V, V_{GS}=0V, T_j=25˚C
Gate-Source Leakage Current	I_{GSS}	--	--	100	nA	V_{GS}=18V, V_{DS}=0V
Body Diode Forward Voltage	V_{SD}	--	2.2	--	V	V_{GS}=0V, I_S=10mA, T_j=25˚C
AC Characteristics (at T_j = 25˚C, unless otherwise specified)						
Input Capacitance	C_{iss}	--	92	--	pF	V_{DS}=1200V, V_{GS}=0V, f=250kHz, V_{AC}=25mV
Output Capacitance	C_{oss}	--	12	--		
Reverse Capacitance	C_{rss}	--	2	--		
Internal Gate Resistance	$R_{G,\ int.}$	--	18	--	Ω	f=1MHz, V_{AC}=25mV

Electrical Characteristics Diagrams

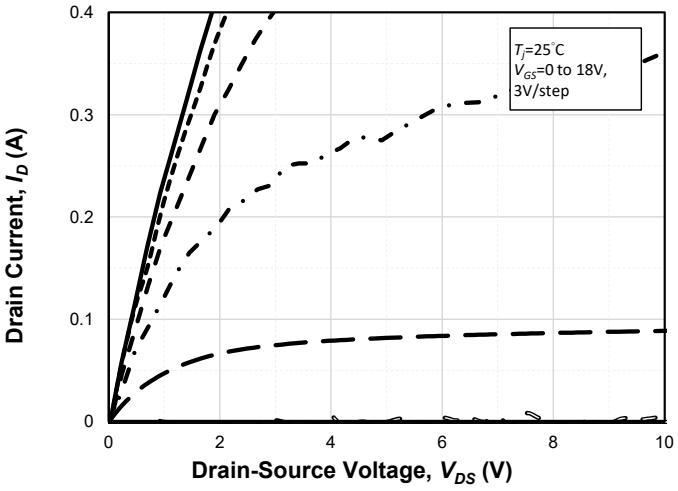

Fig. 1 Typical Output Characteristics at T_j=25˚C

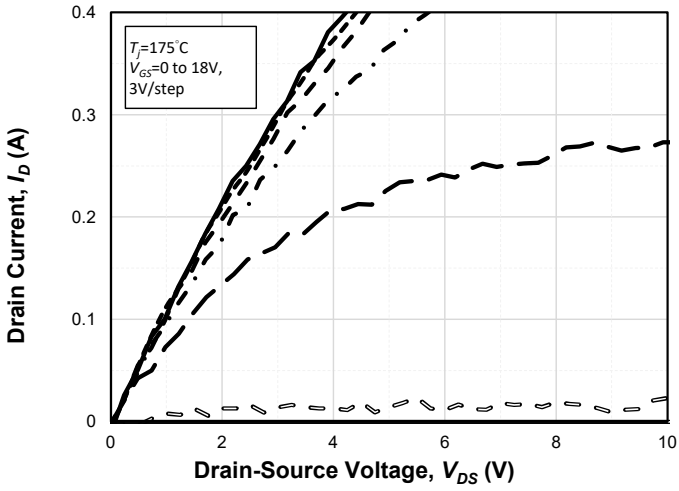

Fig. 2 Typical Output Characteristics at T_j=175˚C

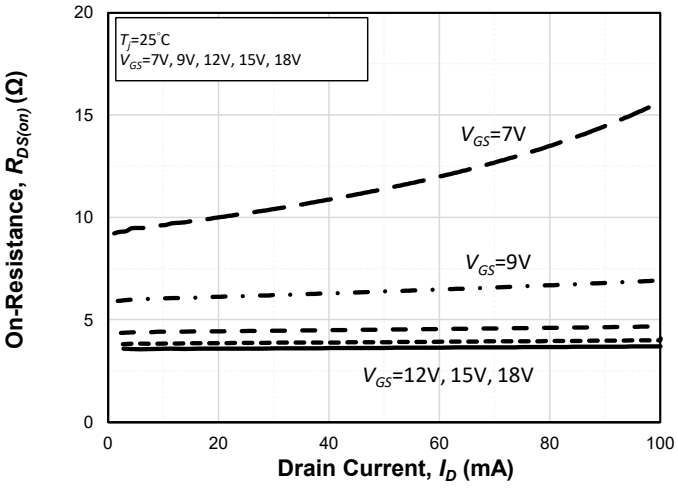

Fig. 3 Typ. $R_{DS(on)}$ vs. I_D with Various V_{GS}

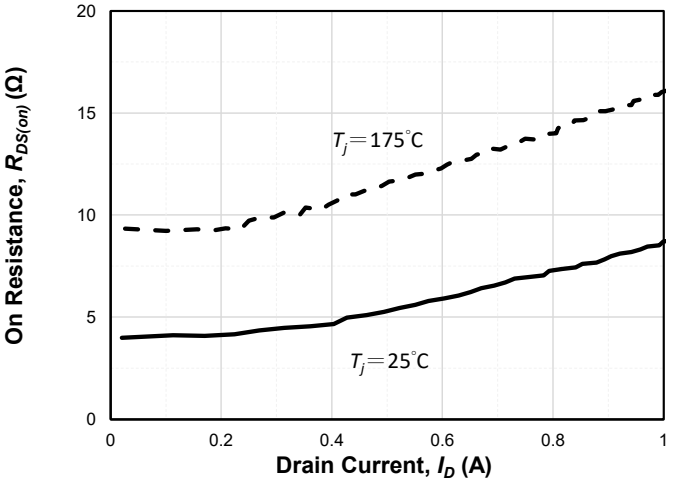

Fig. 4 Typ. $R_{DS(on)}$ vs. I_D with Various T_j, V_{GS}=18V

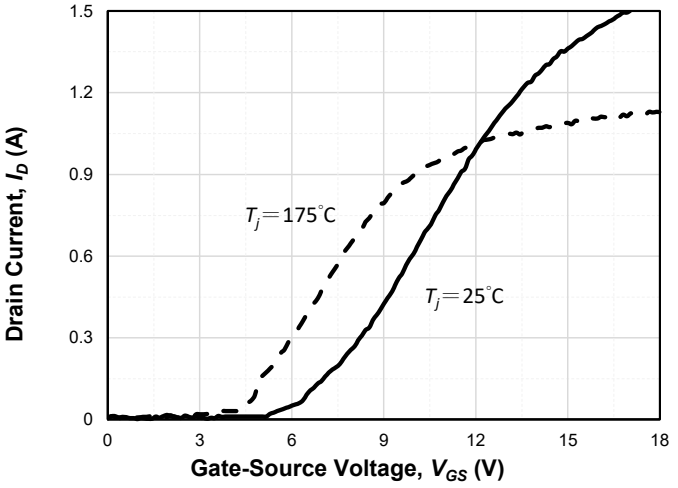

Fig. 5 Typ. I_D vs. V_{GS} with Various T_j, V_{DS}=20V

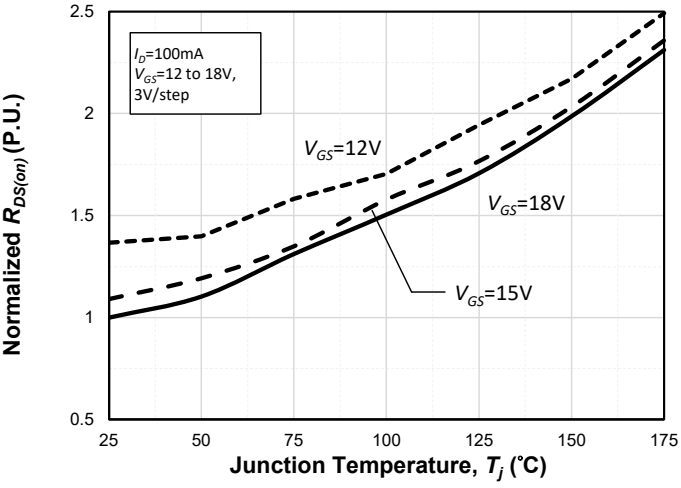

Fig. 6 Normalized $R_{DS(on)}$ vs. T_j with Various V_{GS}

Electrical Characteristics Diagrams

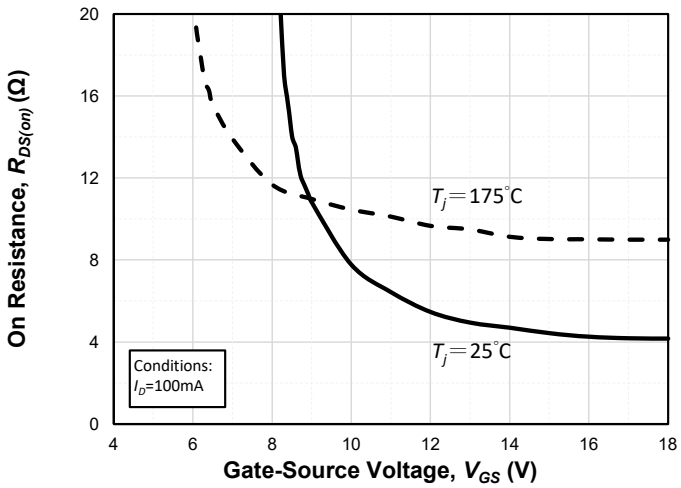

Fig. 7 Typ. $R_{DS(on)}$ vs. V_{GS} with Various T_j

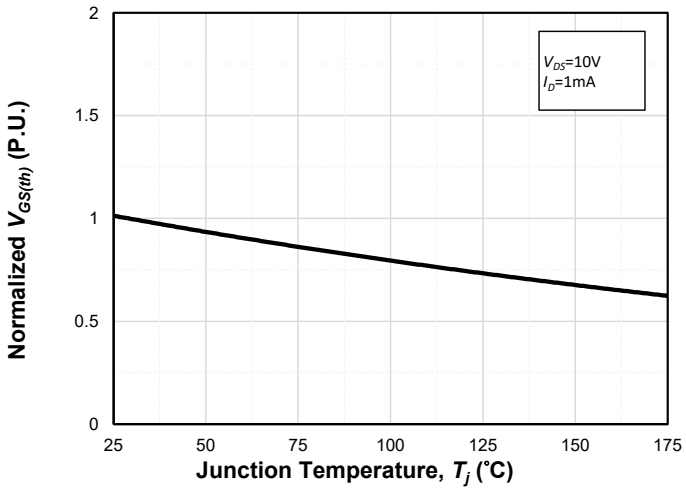

Fig. 8 Normalized V_{th} vs. T_j

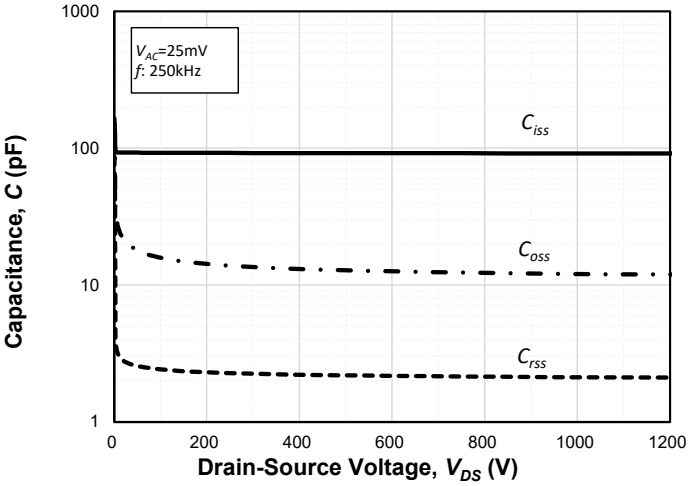

Fig. 9 Typ. Capacitance vs. V_{DS} at f_{sw}=250kHz, V_{DS}≤1200V