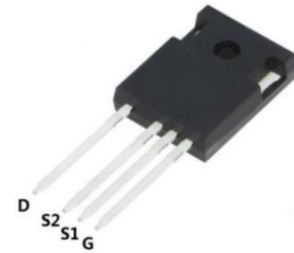


N-CHANNEL SiC POWER MOSFET

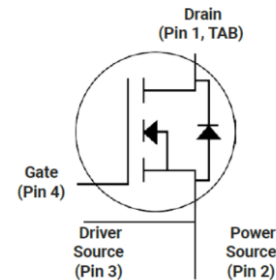
Features

- $R_{DS(on)}=60m\Omega$ (Typ.) @ $V_{GS}=15V, I_D=13.2A$
- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitance
- Fast intrinsic diode with low reverse recovery



Applications

- Solar inverters
- DC/DC converters
- Motor drives
- Switch Mode Power Supplies



Key Performance and Package Parameters

Order codes	V_{DS}	I_D	$R_{DS(ON)}$, Typ	T_{vjmax}	Marking	Package
XC060M065A1S5-A	650V	37A	60m Ω	175 $^{\circ}C$	C60M65A1A	TO247-4

Absolute Maximum Ratings ($T_c=25^{\circ}C$ unless otherwise specified.)

Symbol	Parameter	Value	Units
V_{DSS}	Drain-Source Voltage	650	V
V_{GSmax}	Absolute maximum Gate-Source Voltage	-8/+19	V
I_D	Continuous Drain Current ($T_c=25^{\circ}C$)	37	A
	Continuous Drain Current ($T_c=100^{\circ}C$)	27	A
$I_{DM(pulse)}$	Pulsed Drain Current, Pulse width t_p limited by T_{jmax}	99	A
P_D	Maximum Power Dissipation ($T_c=25^{\circ}C$)	150	W
T_J	Operating Junction Temperature Range	-40 to 175	$^{\circ}C$
T_{STG}	Storage Temperature Range	-40 to 175	$^{\circ}C$

Thermal Data

Symbol	Parameter	Conditions	Max.	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Steady State)	TO247-4	0.99	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	TO247-4	40	$^{\circ}C/W$

Electrical Characteristics ($T_c = 25^\circ\text{C}$ unless otherwise specified.)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_{DS} = 100\mu A$	650	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 650V, V_{GS} = 0V$	---	1	50	μA
I_{GSS}	Gate Leakage Current, Forward	$V_{GS} = 15V, V_{DS} = 0V$	---	10	250	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_{DS} = 5mA$	1.8	2.3	3.6	V
$R_{DS(ON)}$	Drain-Source On-state Resistance	$V_{GS} = 15V, I_{DS} = 13.2A$	42	60	79	m Ω
Q_g	Total Gate Charge	$V_{DS} = 400V$	---	46	---	nC
Q_{gs}	Gate-Source Charge	$V_{GS} = -4V/15V$	---	13	---	nC
Q_{gd}	Gate-Drain Charge	$I_{DS} = 13.2A$	---	17	---	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 400V,$	---	8	---	ns
t_r	Rise Time	$V_{GS} = -4V/15V$	---	11	--	ns
$t_{d(off)}$	Turn-off Delay Time	$I_{DS} = 13.2A, R_G = 2.5\Omega$	---	17	---	ns
t_f	Fall Time		---	5	---	ns
C_{iss}	Input Capacitance	$V_{DS} = 600V$	---	1020	---	pF
C_{oss}	Output Capacitance	$V_{GS} = 0V$	---	80	---	pF
C_{rss}	Reverse Transfer Capacitance	$f = 1MHz$	---	9	---	pF
E_{ON}	Turn-On Switching Energy (Body Diode)	$V_{DS} = 400V,$ $V_{GS} = -4/15V,$ $I_D = 13.2A,$ $R_G = 2.5\Omega$	---	70	---	μJ
E_{OFF}	Turn Off Switching Energy (Body Diode)	$L = 135\mu H$ $T_J = 175^\circ C$ FWD = Internal Body Diode of MOSFET	---	5	---	μJ
E_{ON}	Turn-On Switching Energy (External Diode)	$V_{DS} = 400V,$ $V_{GS} = -4/15V,$ $I_D = 13.2A,$ $R_G = 2.5\Omega$	---	67	---	μJ
E_{OFF}	Turn Off Switching Energy (External Diode)	$L = 135\mu H$ $T_J = 175^\circ C$ FWD = External SiC DIODE	---	6	---	μJ

Reverse Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
V_{SD}	Diode Forward Voltage	$I_{SD}=6.6A, V_{GS}=-4V$	---	5.1	---	V
I_S	Continuous Diode Forward Current	$V_{GS}=-4V, T_C=25^\circ C$	---	---	23	A
t_{rr}	Diode Reverse Recovery Time	$V_R=400V,$ $I_{SD}=13.2A,$ $di_f/dt=4500A/s$	---	11	---	ns
Q_{rr}	Diode Reverse Recovery Charge		---	151	---	nC
I_{rrm}	Peak Reverse Recovery Current		---	27	---	A
t_{rr}	Diode Reverse Recovery Time	$V_R=400V,$ $I_{SD}=13.2A,$ $di_f/dt=2400A/s$	---	16	---	ns
Q_{rr}	Diode Reverse Recovery Charge		---	110	---	nC
I_{rrm}	Peak Reverse Recovery Current		---	12	---	A

Typical Characteristics

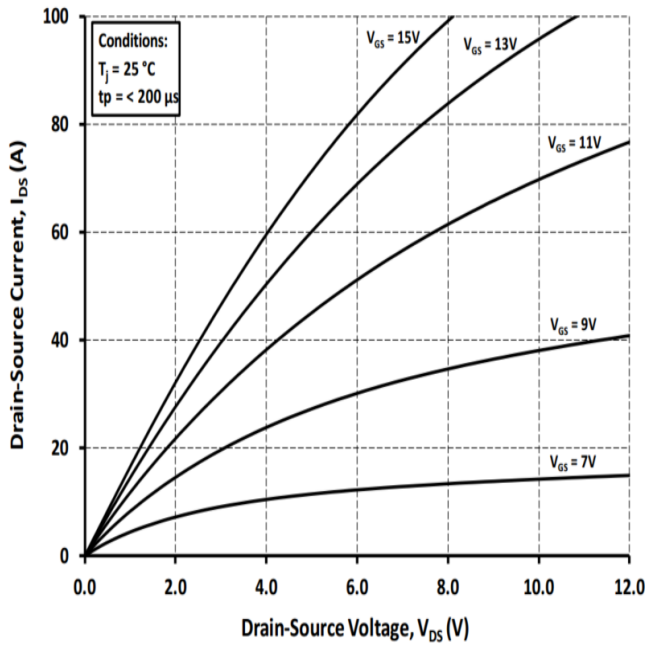


Fig.1 Output Characteristics

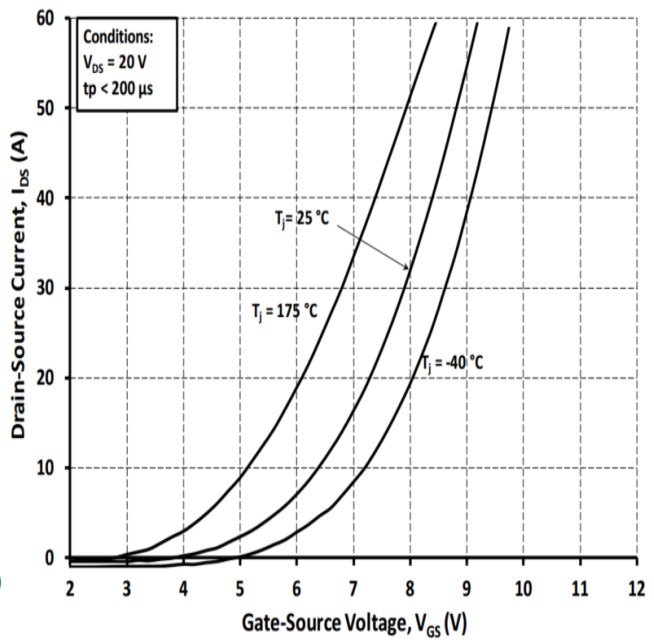


Fig.2 Output Characteristics

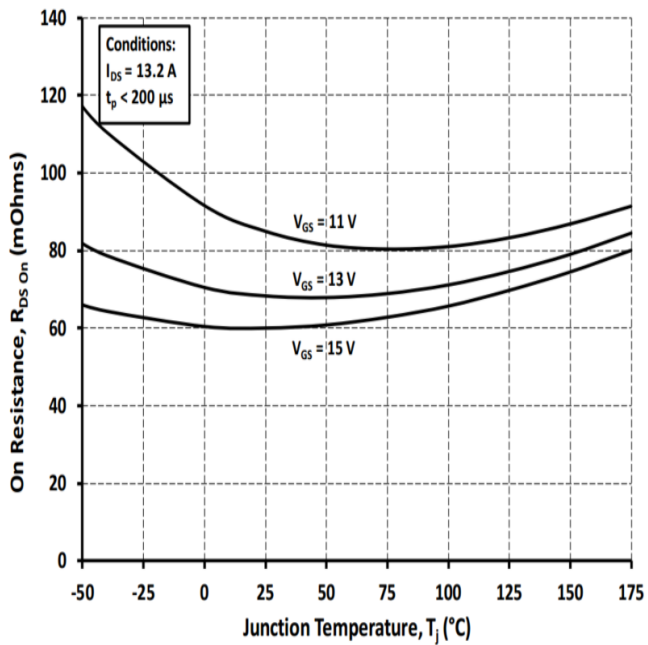


Fig.3 Drain-Source On Resistance

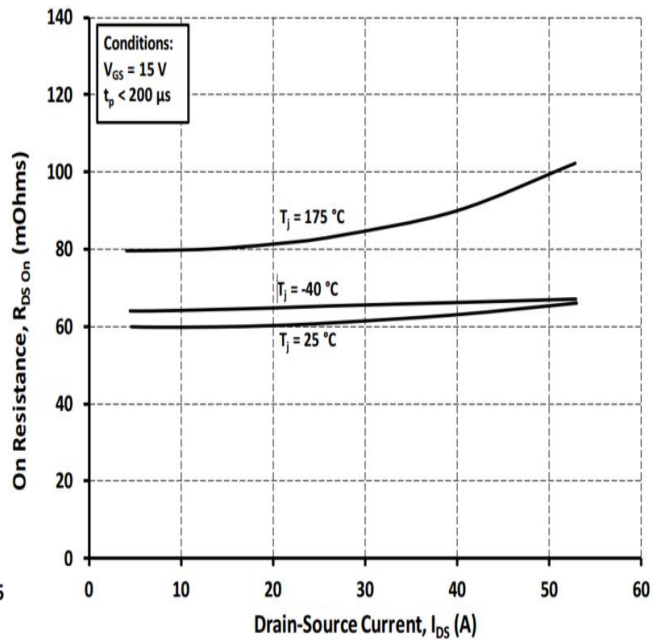


Fig.4 Drain-Source On Resistance

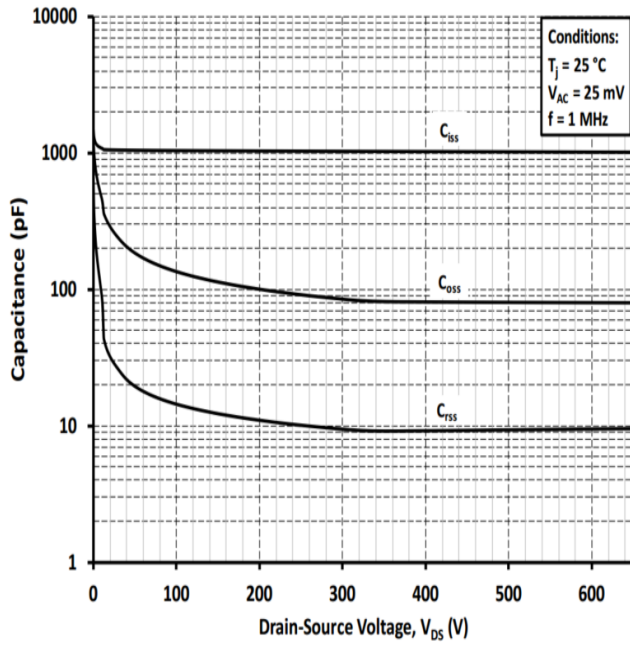


Fig.5 Capacitance

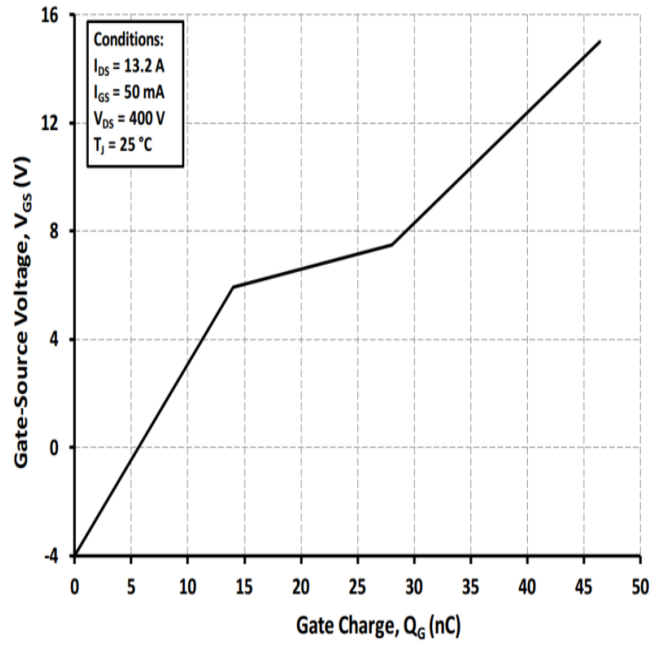
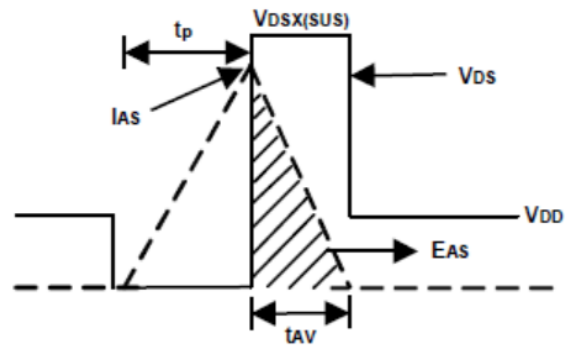
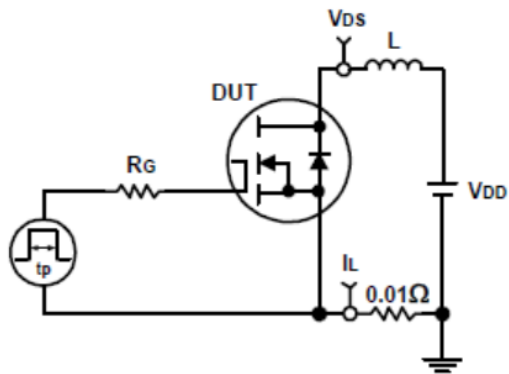
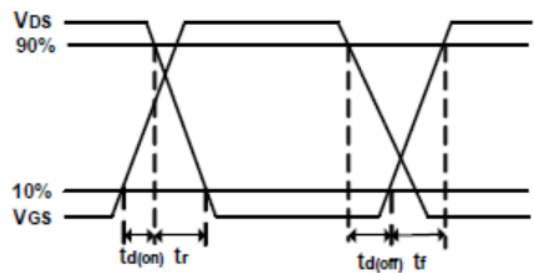
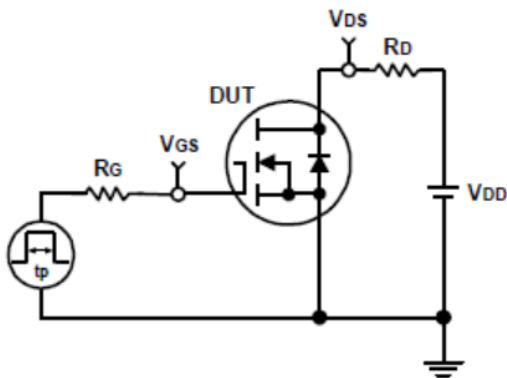


Fig.6 Gate Charge Characteristics

Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms



Package Information

TO-247-4

