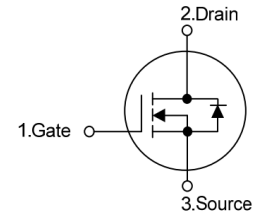
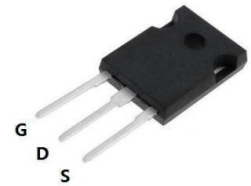


# N-CHANNEL SiC POWER MOSFET

## Features

- $R_{DS(on)}=65m\Omega$ (Typ.) @  $V_{GS}=15V, I_D=20A$
- 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
XC065M090A1S3-A	900V	36A	65m $\Omega$	150 $^{\circ}C$	XC65M90A1A	TO247-3

## Absolute Maximum Ratings (T<sub>c</sub>= 25 $^{\circ}C$ unless otherwise specified.)

Symbol	Parameter	Value	Units
$V_{DSS}$	Drain-Source Voltage	900	V
$V_{GSmax}$	Absolute maximum Gate-Source Voltage	-8/+19	V
$I_D$	Continuous Drain Current ( T <sub>C</sub> =25 $^{\circ}C$ )	36	A
	Continuous Drain Current ( T <sub>C</sub> =100 $^{\circ}C$ )	23	A
$I_{DM(pulse)}$	Pulsed Drain Current,Pulse width t <sub>p</sub> limited by T <sub>jmax</sub>	90	A
$P_D$	Maximum Power Dissipation ( T <sub>C</sub> =25 $^{\circ}C$ )	125	W
$T_J$	Operating Junction Temperature Range	-55 to 150	$^{\circ}C$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^{\circ}C$

## Thermal Data

Symbol	Parameter	Conditions	Max.	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Steady State)	TO247	1.0	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	TO247	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	$V_{GS}=0V, I_{DS}=100\mu A$	900	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=900V, V_{GS}=0V$	---	1	100	$\mu A$
$I_{GSS}$	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	2.1	3.5	V
$R_{DS(ON)}$	Drain-Source On-state Resistance	$V_{GS}=15V, I_{DS}=20A$	---	65	78	m $\Omega$
$Q_g$	Total Gate Charge	$V_{DS}=400V$	---	35	---	nC
$Q_{gs}$	Gate-Source Charge	$V_{GS}=-4V/15V$	---	9	---	nC
$Q_{gd}$	Gate-Drain Charge	$I_{DS}=20A$	---	13	---	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=400V,$	---	45	---	ns
$t_r$	Rise Time	$V_{GS}=-4V/15V$	---	13	--	ns
$t_{d(off)}$	Turn-off Delay Time	$I_{DS}=20A, R_G=2.5\Omega$	---	20	---	ns
$t_f$	Fall Time		---	8	---	ns
$C_{iss}$	Input Capacitance	$V_{DS}=600V$	---	760	---	pF
$C_{oss}$	Output Capacitance	$V_{GS}=0V$	---	66	---	pF
$C_{rss}$	Reverse Transfer Capacitance	$f=1MHz$	---	5	---	pF
$E_{ON}$	Turn-On Switching Energy (Body Diode)	$V_{DS}=400V,$ $V_{GS}=-4/15V,$ $I_D=20A,$	---	343	---	$\mu J$
$E_{OFF}$	Turn Off Switching Energy (Body Diode)	$R_G=2.5\Omega$ $L=65.7\mu H$ $T_J=150^{\circ}\text{C}$	---	46	---	$\mu J$

**Reverse Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
$V_{SD}$	Diode Forward Voltage	$I_{SD}=10A, V_{GS}=-4V$	---	4.4	---	V
$I_S$	Continuous Diode Forward Current	$V_{GS}=-4V, T_c=25^{\circ}\text{C}$	---	---	23.5	A
$t_{rr}$	Diode Reverse Recovery Time	$V_R=400V,$	---	26	---	ns
$Q_{rr}$	Diode Reverse Recovery Charge	$I_{SD}=20A,$ $di_f/dt=900A/s$	---	145	---	nC
$I_{rrm}$	Peak Reverse Recovery Current	$V_{GS}=-4V$	---	8	---	A

### Typical Characteristics

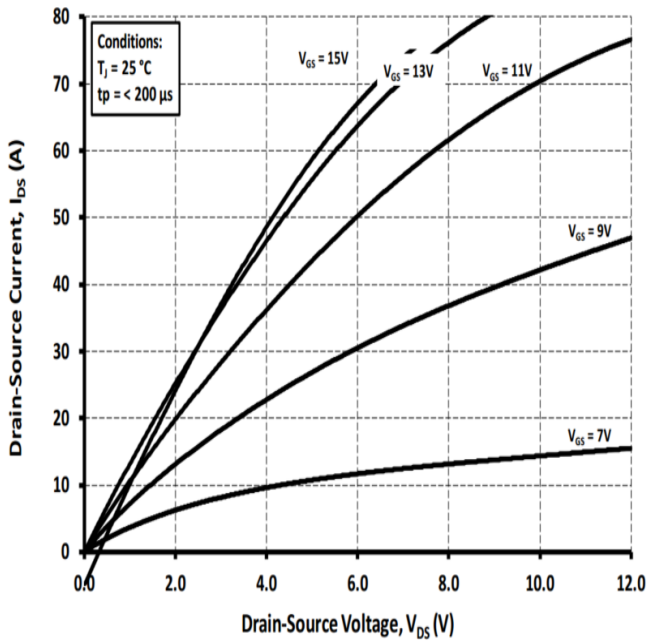


Fig.1 Output Characteristics

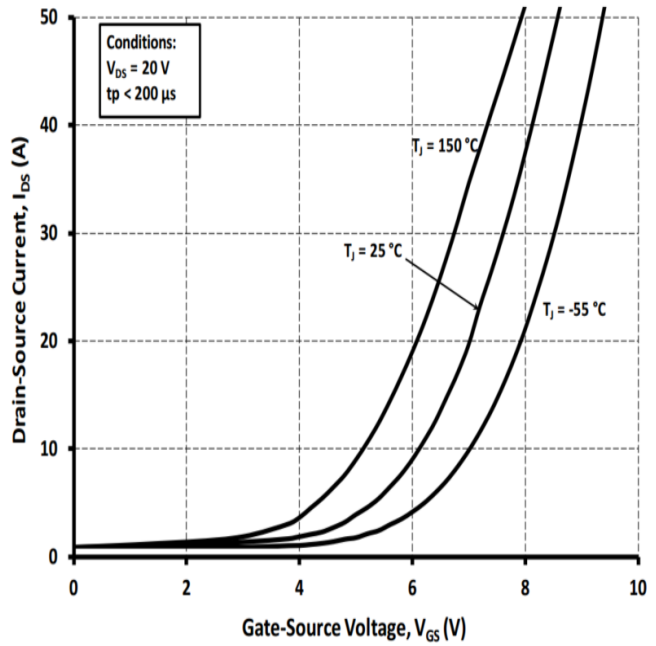


Fig.2 Output Characteristics

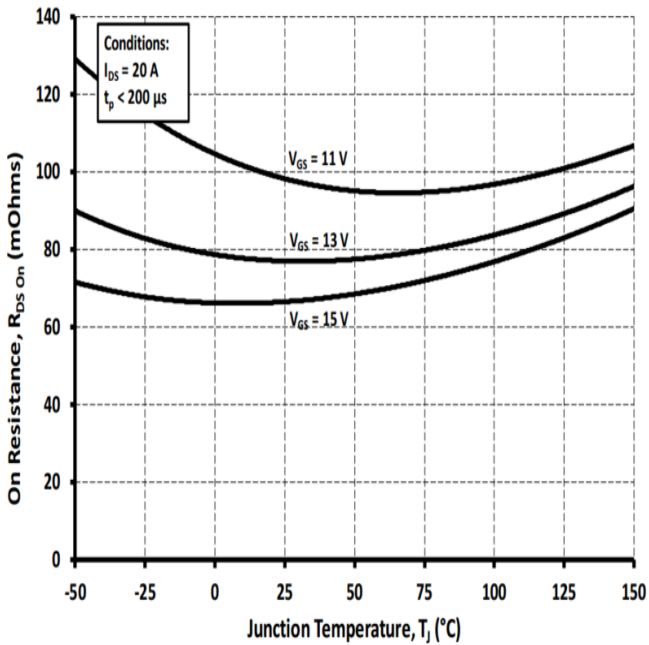


Fig.3 Drain-Source On Resistance

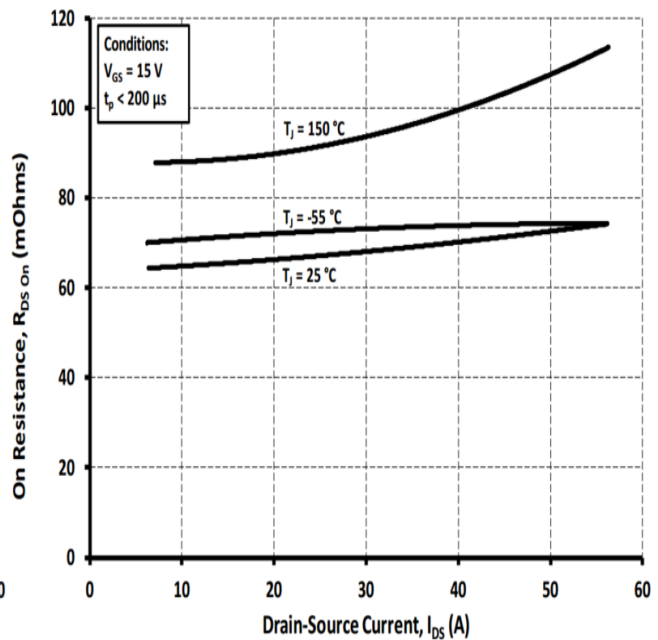


Fig.4 Drain-Source On Resistance

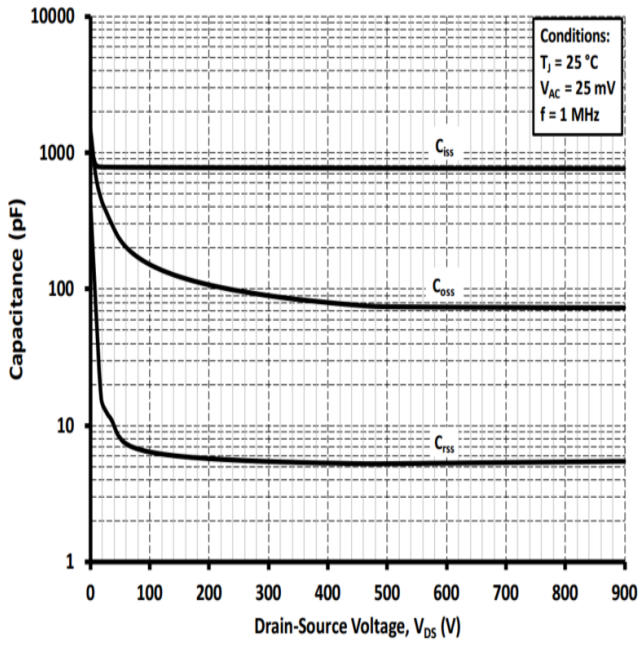


Fig.5 Capacitance

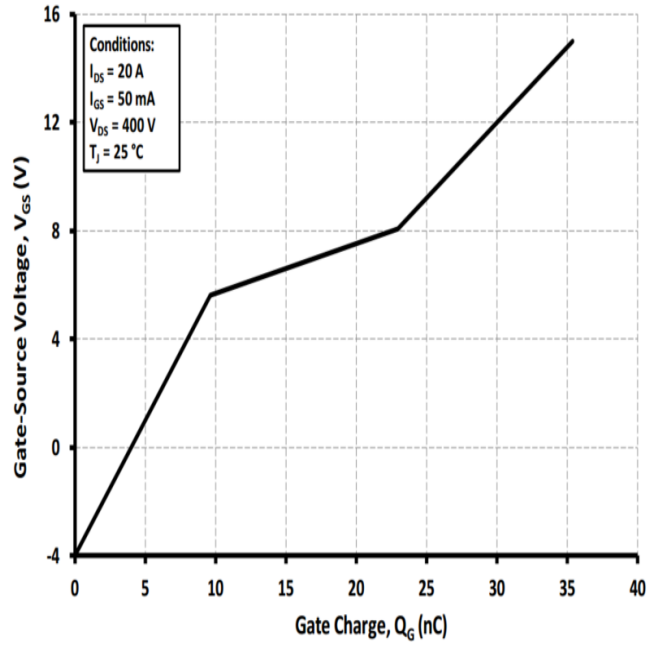
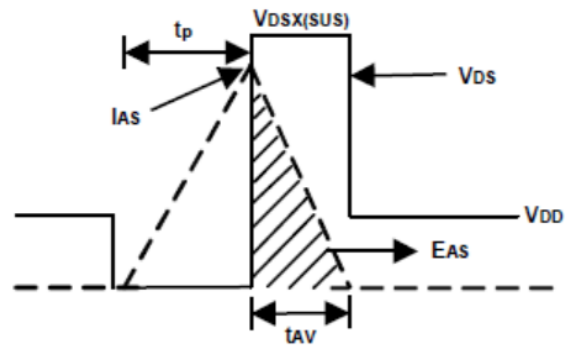
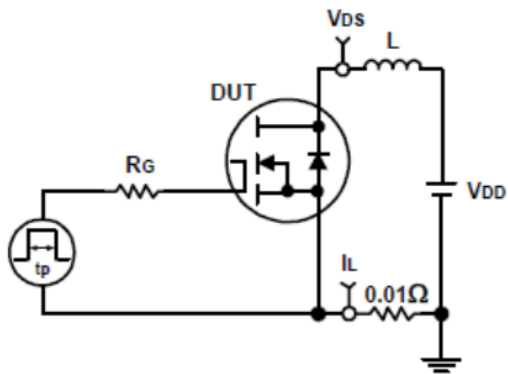


Fig.6 Gate Charge Characteristics

### Avalanche Test Circuit and Waveforms



### Switching Time Test Circuit and Waveforms

