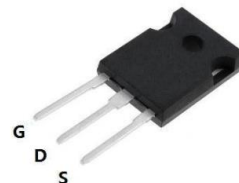


N-CHANNEL SiC POWER MOSFET

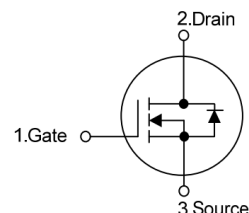
Features

- $R_{DS(on)}=80m\Omega$ (Typ.) @ $V_{GS}=20V, I_D=20A$
- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitance
- Easy to Parallel and Simple to Drive



Applications

- Automotive Auxiliary Motor Drive
- Automotive DC/DC Converter for EV/HEV
- Automotive On Board Charge



Key Performance and Package Parameters

Order codes	V_{DS}	I_D	$R_{DS(ON)}$, Typ	T_{vjmax}	Marking	Package
XC080M120A1S3-C	1200V	36A	80m Ω	150 $^{\circ}C$	C80M120A1C	TO247-3

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

Symbol	Parameter	Value	Units
V_{DSS}	Drain-Source Voltage	1200	V
V_{GSmax}	Absolute maximum Gate-Source Voltage	-10/+25	V
V_{GSop}	Recommended operational Gate-Source Voltage	-5/+20	V
I_D	Continuous Drain Current (T _c =25 $^{\circ}C$)	36	A
	Continuous Drain Current (T _c =100 $^{\circ}C$)	24	A
I_{DM}	Pulsed Drain Current	80	A
P_D	Maximum Power Dissipation (T _c =25 $^{\circ}C$)	192	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)	TO247-3	0.65	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	TO247-3	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	$V_{GS}=0V, I_{DS}=100\mu A$	1200	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=1200V, V_{GS}=0V$	---	---	100	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=20V, V_{DS}=0V$	---	---	250	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=5mA$	2.0	2.9	4.0	V
$R_{DS(ON)}$	Drain-Source On-state Resistance	$V_{GS}=20V, I_{DS}=20A$	---	80	98	$m\Omega$
Q_g	Total Gate Charge	$V_{DS}=800V$	---	71	---	nC
Q_{gs}	Gate-Source Charge	$V_{GS}=-5V/20V$	---	17	---	nC
Q_{gd}	Gate-Drain Charge	$I_{DS}=20A$	---	29	---	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=800V,$ $V_{GS}=-5V/20V$ $I_{DS}=20A, R_G=2.5\Omega$	---	15	---	ns
t_r	Rise Time		---	22	--	ns
$t_{d(off)}$	Turn-off Delay Time		---	24	---	ns
t_f	Fall Time		---	14	---	ns
C_{iss}	Input Capacitance	$V_{DS}=1000V$	---	1130	---	pF
C_{oss}	Output Capacitance	$f=1MHz$	---	92	---	pF
C_{rss}	Reverse Transfer Capacitance	$V_{AC}=25mV$	---	7.5	---	pF

Reverse Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
V_{SD}	Diode Forward Voltage	$I_{SD}=10A, V_{GS}=-5V$	---	4.3	---	V
t_{rr}	Diode Reverse Recovery Time	$V_R=800V,$	---	24	---	ns
Q_{rr}	Diode Reverse Recovery Charge	$V_{GS}=-5V$ $I_{SD}=20A$	---	152	---	nC
I_{rrm}	Peak Reverse Recovery Current	$di/dt=1950 A/\mu s$	---	10	---	A

Typical Characteristics

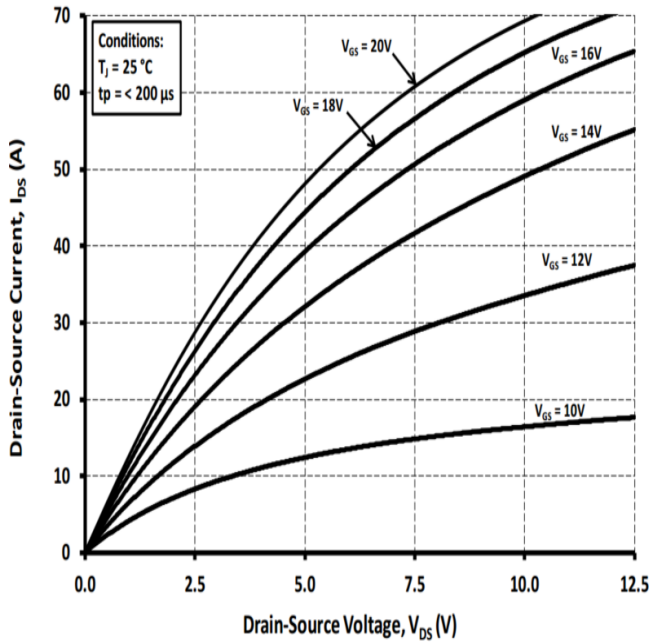


Fig.1 Output Characteristics

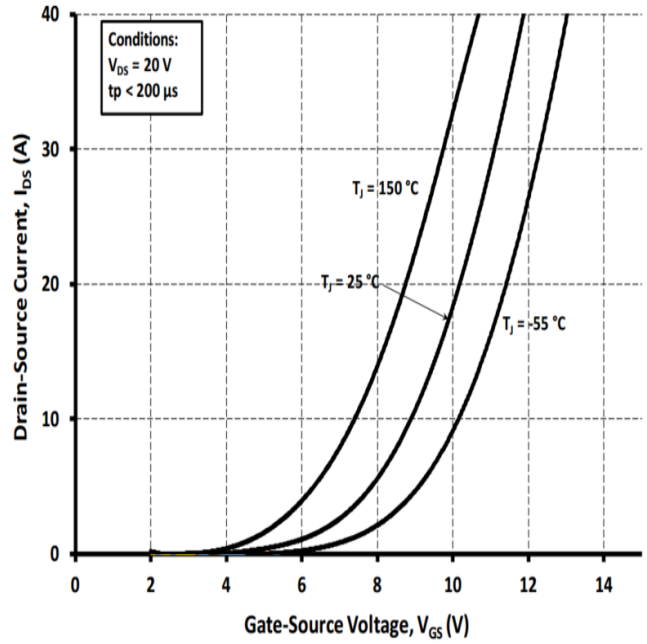


Fig.2 Output Characteristics

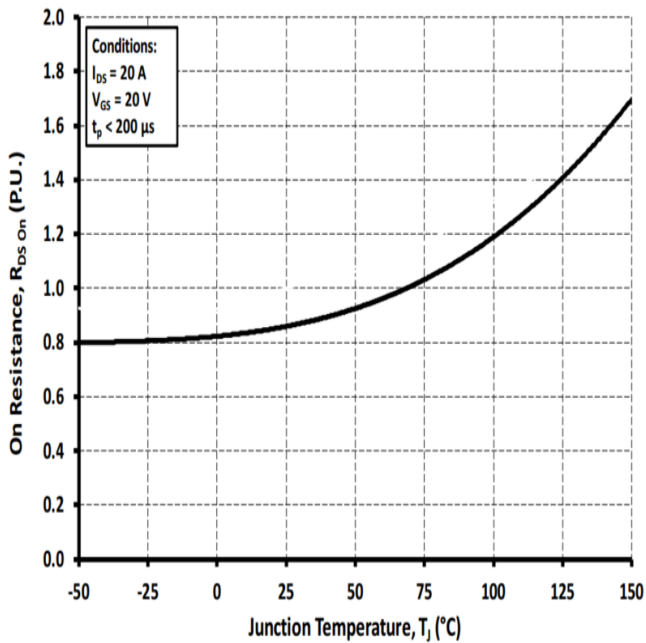


Fig.3 Drain-Source On Resistance vs. Junction Temperature

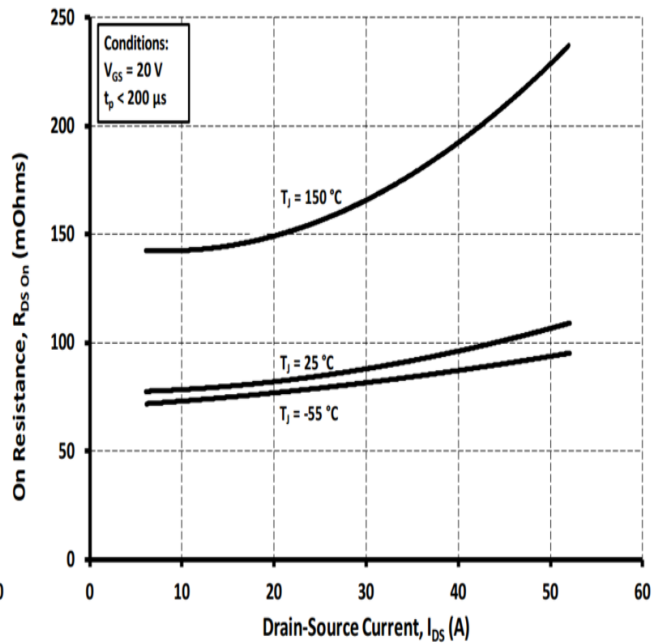


Fig.4 Drain-Source On Resistance vs Gate-to- Source Voltage

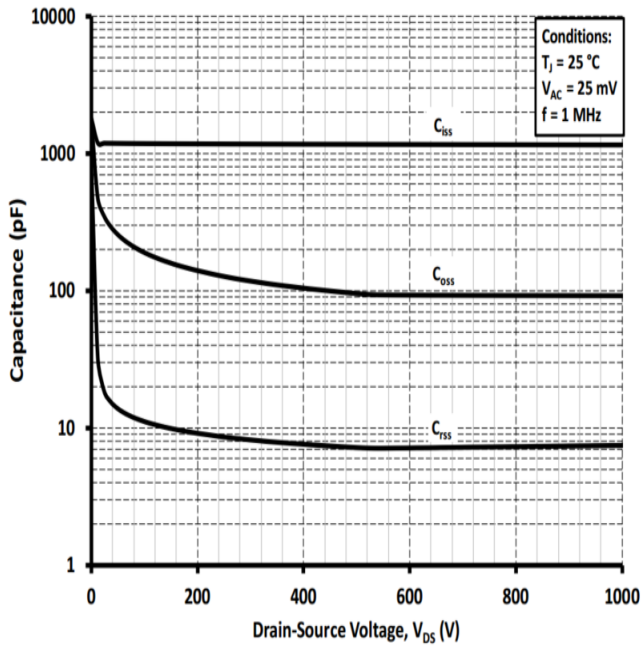


Fig.5 Capacitances

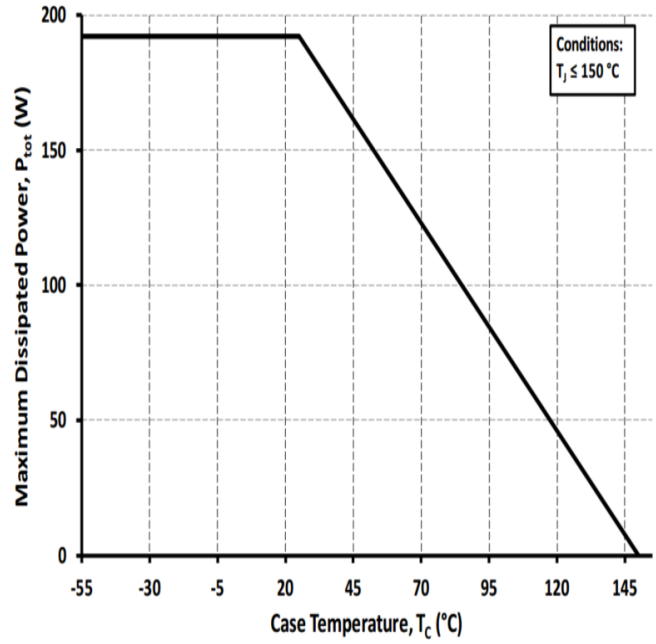


Fig.6 Maximum Power Dissipation Derating vs. Case Temperature

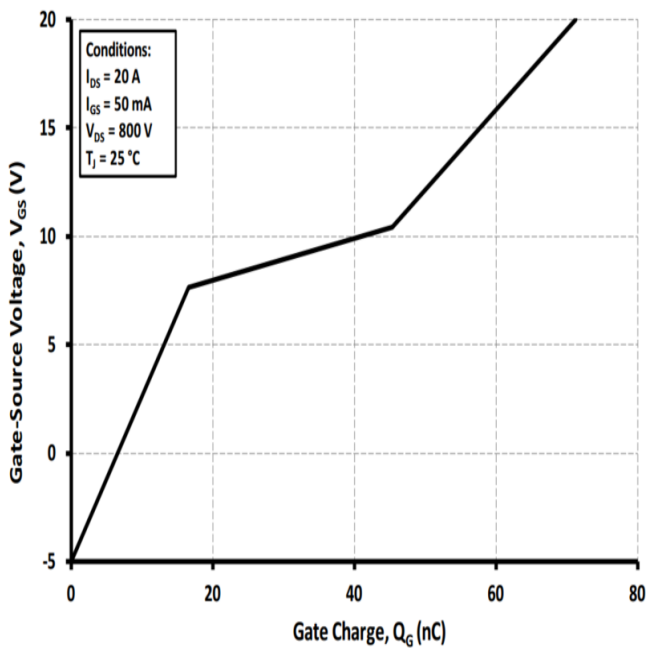


Fig.7 Gate charge characteristic

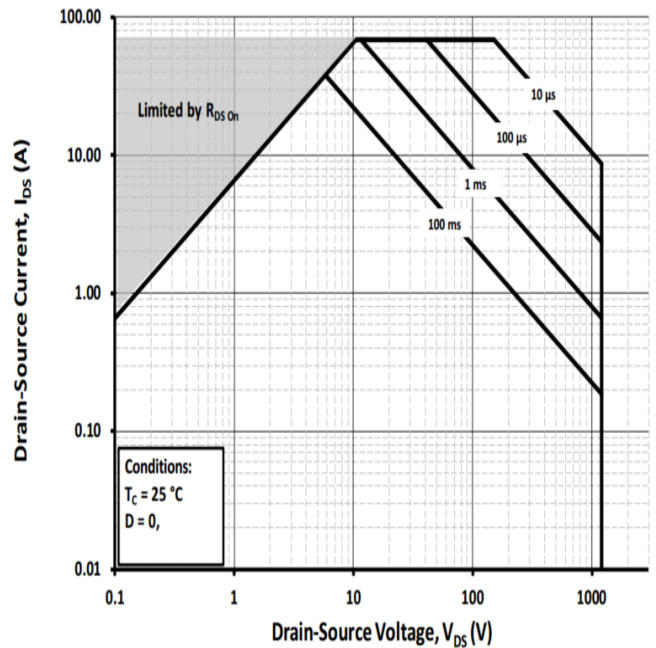
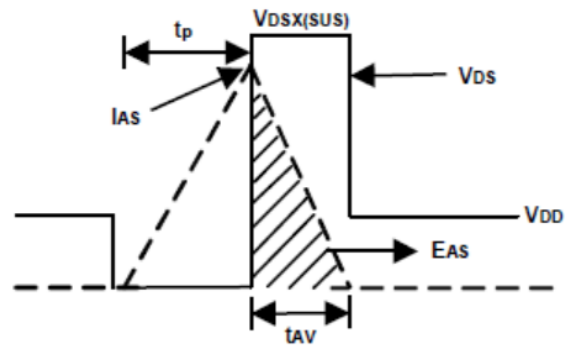
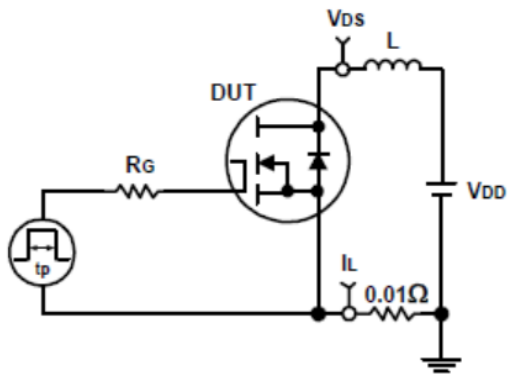
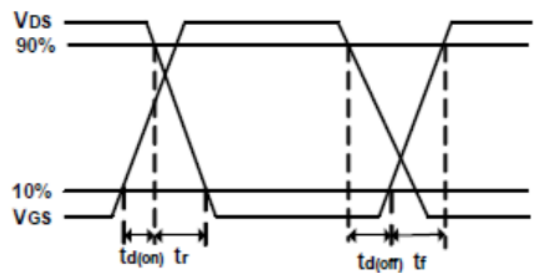
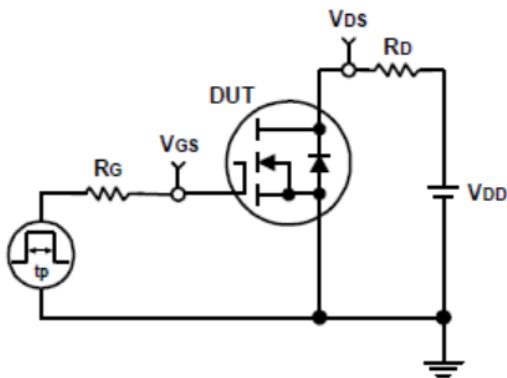


Fig.8 Safe Operating Area

Avalanche Test Circuit and Waveforms

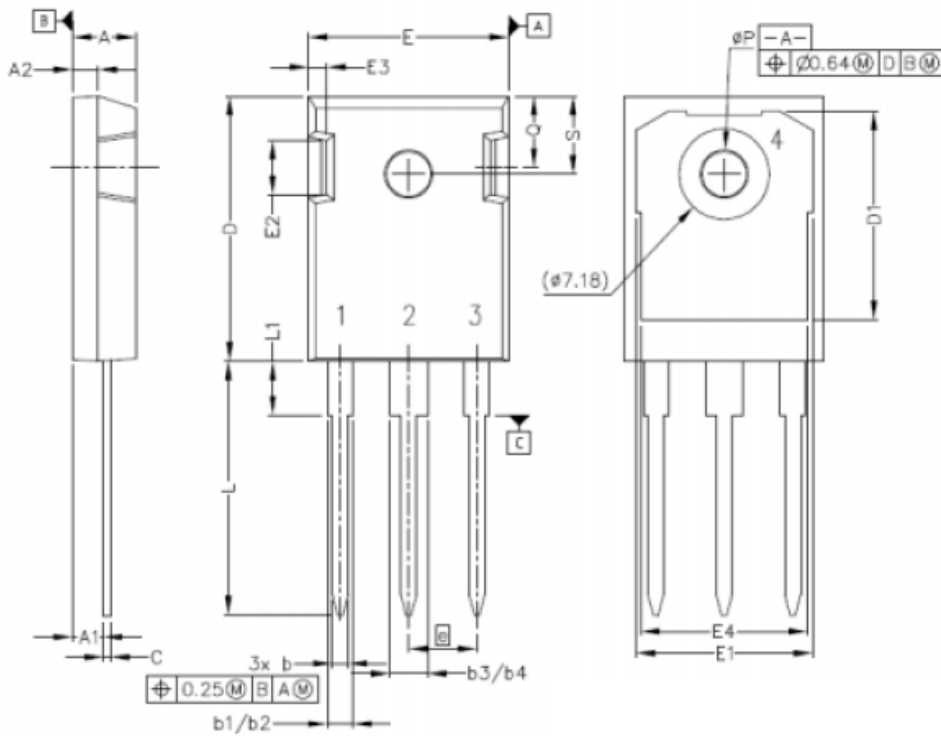


Switching Time Test Circuit and Waveforms



Package Information

TO-247-3



POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.042	.052	1.07	1.33
b1	.075	.095	1.91	2.41
b2	.075	.085	1.91	2.16
b3	.113	.133	2.87	3.38
b4	.113	.123	2.87	3.13
c	.022	.027	0.55	0.68
D	.819	.831	20.80	21.10
D1	.640	.695	16.25	17.65
D2	.037	.049	0.95	1.25
E	.620	.635	15.75	16.13
E1	.516	.557	13.10	14.15
E2	.145	.201	3.68	5.10
E3	.039	.075	1.00	1.90
E4	.487	.529	12.38	13.43
e	.214 BSC		5.44 BSC	
N	3		3	
L	.780	.800	19.81	20.32
L1	.161	.173	4.10	4.40
ØP	.138	.144	3.51	3.65
Q	.216	.236	5.49	6.00
S	.238	.248	6.04	6.30
T	9°	11°	9°	11°
U	9°	11°	9°	11°
V	2°	8°	2°	8°
W	2°	8°	2°	8°

NOTES:
 ALL DIMENSIONS REFER TO JEDEC STANDARD TO-247 AND DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
 EJECTION MARK DEPTH 0.10^{+0.15}_{-0.10}