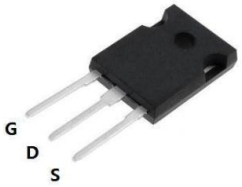
N-CHANNEL SiC POWER MOSFET

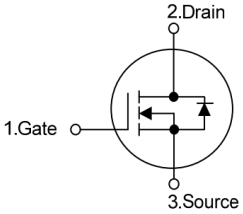
Features

- $R_{DS(on)}$=80mΩ(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

- Renewable Energy
- DC/DC converters
- EV Battery Chargers
- Switch Mode Power Supplies
- Solar Inverters



Key Performance and Package Parameters

Order codes	V_{DS}	I_D	$R_{DS(ON)}$, Typ	T_{vjmax}	Marking	Package
XC080M120A1S3-A	1200V	20A	80mΩ	150℃	C80M120A1A	TO247-3

Absolute Maximum Ratings (T_c= 25 ˚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 ℃)	41	A
I_{DM}	Pulsed Drain Current	80	A
P_D	Maximum Power Dissipation (T_C=25 ℃)	240	W
T_J	Operating Junction Temperature Range	-55 to 150	℃
T_{STG}	Storage Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Conditions	Max.	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Steady State)	TO247-3	0.52	˚C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	TO247-4	35.7	˚C/W

Electrical Characteristics (T_c= 25˚C unless otherwise specified.)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}= 0V, I_{DS}= 100uA	1200	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=1200V, V_{GS}=0V	---	1	100	uA
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	2.3	4.0	V
$R_{DS(ON)}$	Drain-Source On-state Resistance	V_{GS}=20V, I_{DS}=20A	--	80	90	mΩ
Q_g	Total Gate Charge	V_{DS}=800V V_{GS}=-5V/20V I_{DS}=20A	---	92	---	nC
Q_{gs}	Gate-Source Charge		---	15	---	nC
Q_{gd}	Gate-Drain Charge		---	45	---	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=800V, V_{GS}=-5V/20V I_{DS}=20A, R_G=2.5Ω	---	18	---	ns
t_r	Rise Time		---	25	--	ns
$t_{d(off)}$	Turn-off Delay Time		---	28	---	ns
t_f	Fall Time		---	19	---	ns
C_{iss}	Input Capacitance	V_{DS}=1000V f = 1MHz	---	1601	---	pF
C_{oss}	Output Capacitance		---	88	---	pF
C_{rss}	Reverse Transfer Capacitance		---	28	---	pF

Reverse Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
V_{SD}	Diode Forward Voltage	I_{SD}=10A, V_{GS}=-5V	---	5.8	---	V
t_{rr}	Diode Reverse Recovery Time	V_R=800V, I_{SD}=20A di/dt=795.4 A/us	---	34	---	ns
Q_{rr}	Diode Reverse Recovery Charge		---	80	---	nC
I_{rrm}	Peak Reverse Recovery Current		---	5.3	---	A

Typical Characteristics

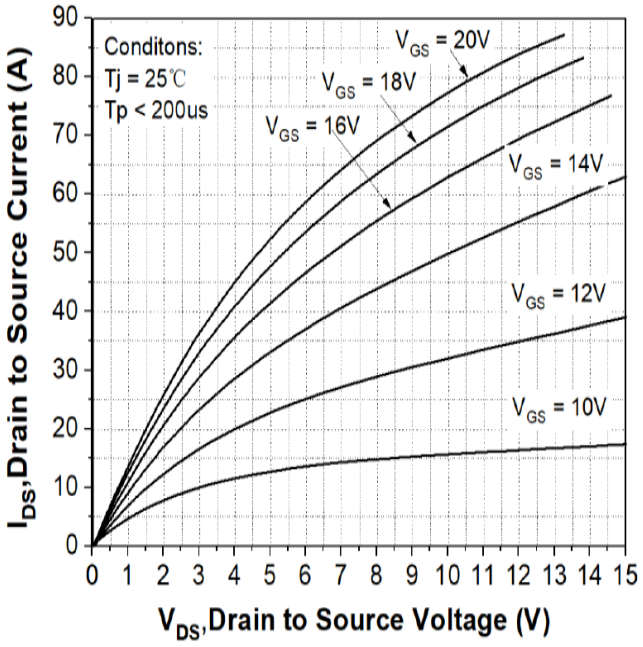


Fig.1 Output Characteristics

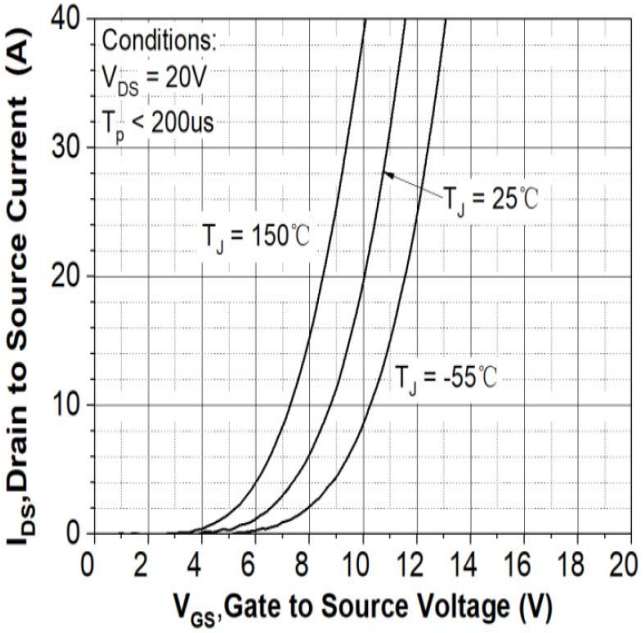


Fig.2 Output Characteristics

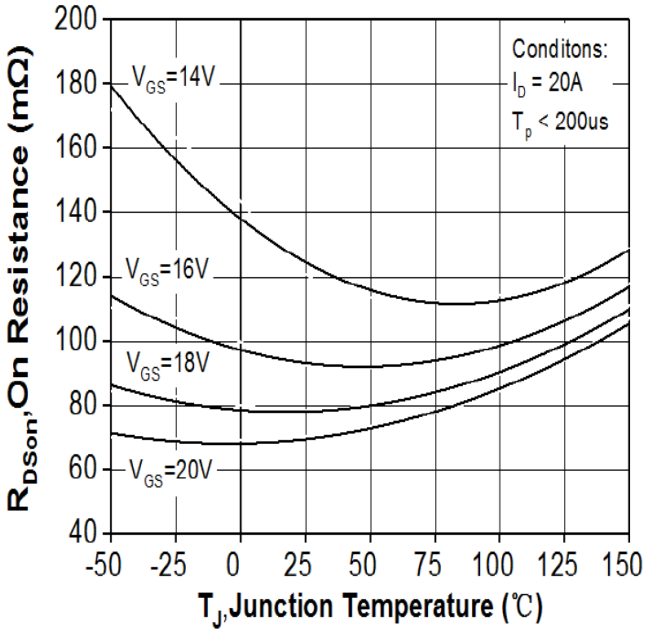


Fig.3 Drain-Source On Resistance

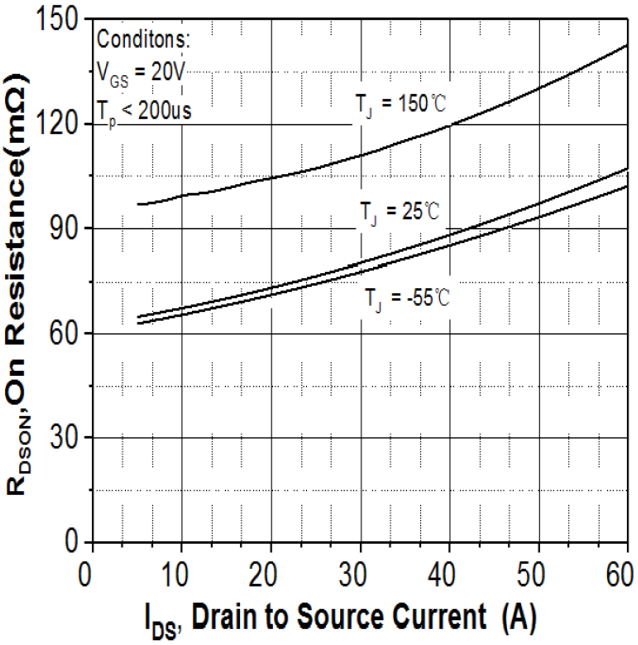


Fig.4 Drain-Source On Resistance

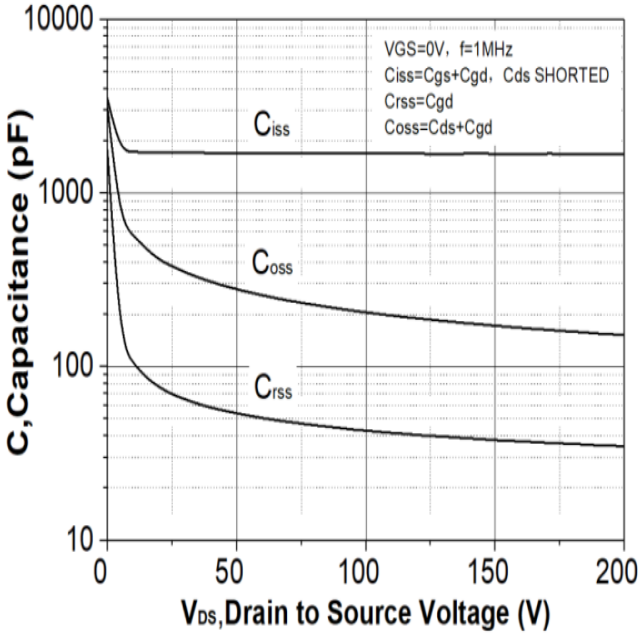


Fig.5 Capacitances（Voltage 0-200V）

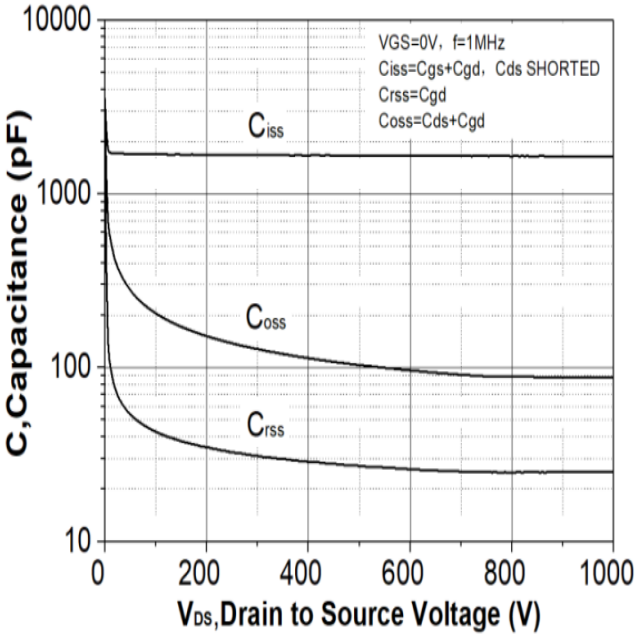


Fig.6 Capacitances（Voltage 0-1000V）

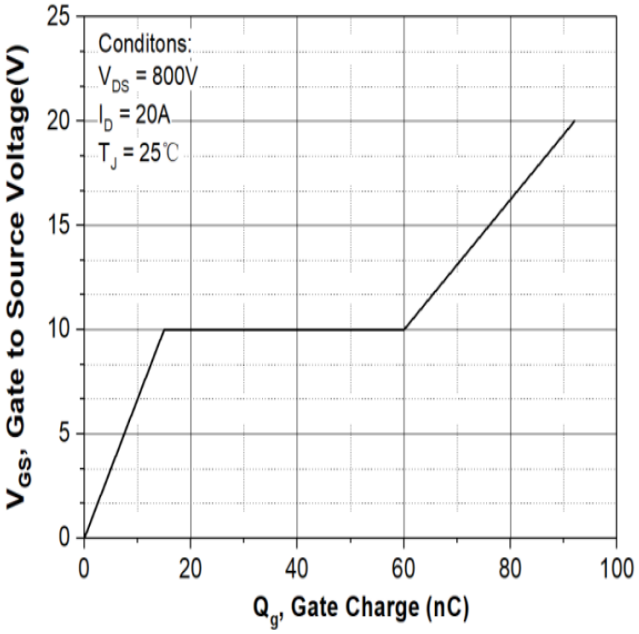


Fig.7 Gate charge characteristic

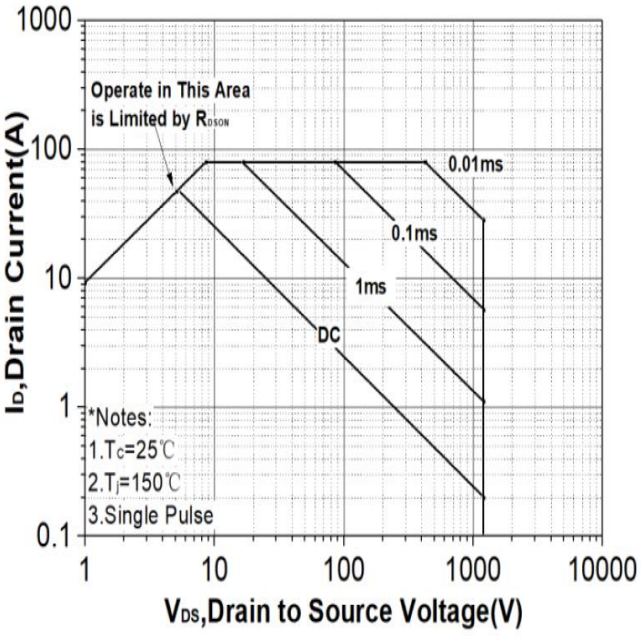


Fig.8 Safe Operating Area

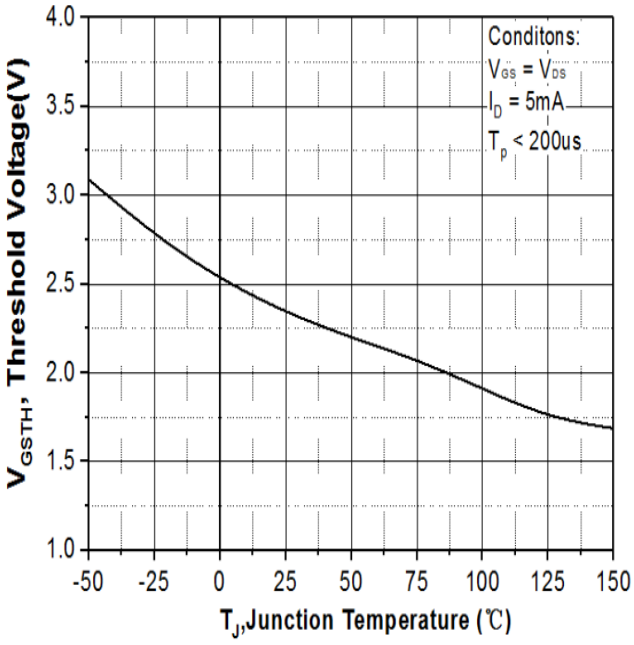


Fig.9 Threshold Voltage vs.Temperature

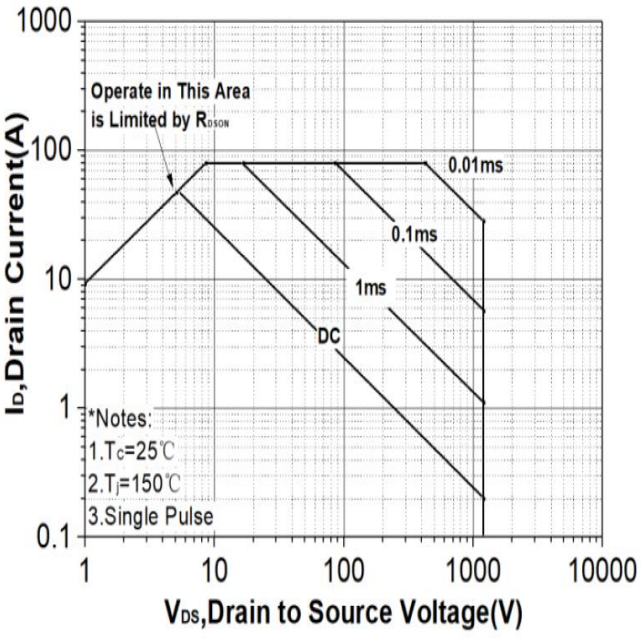
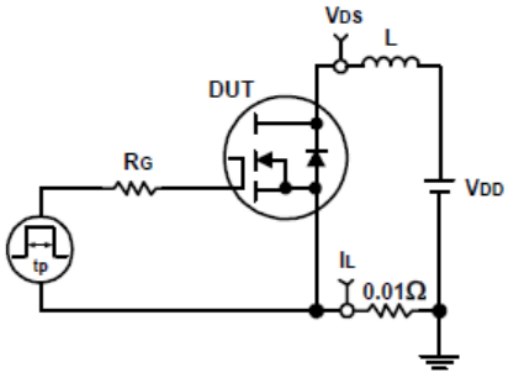
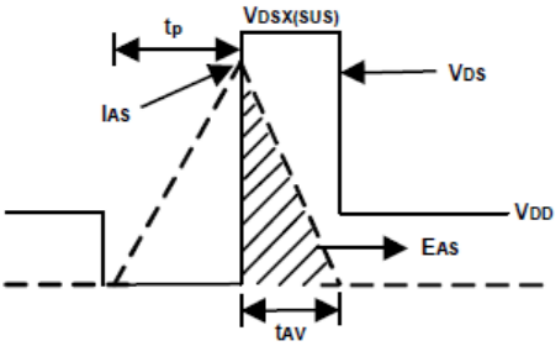


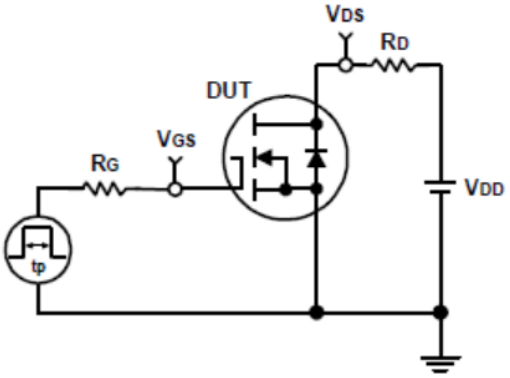
Fig.10 Output Capacitor Stored Energy

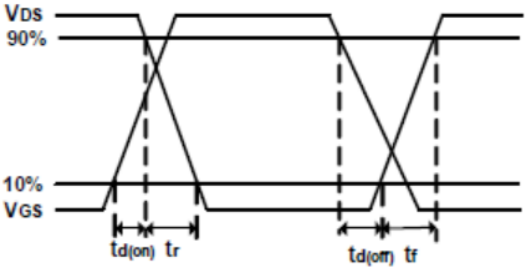
Avalanche Test Circuit and Waveforms





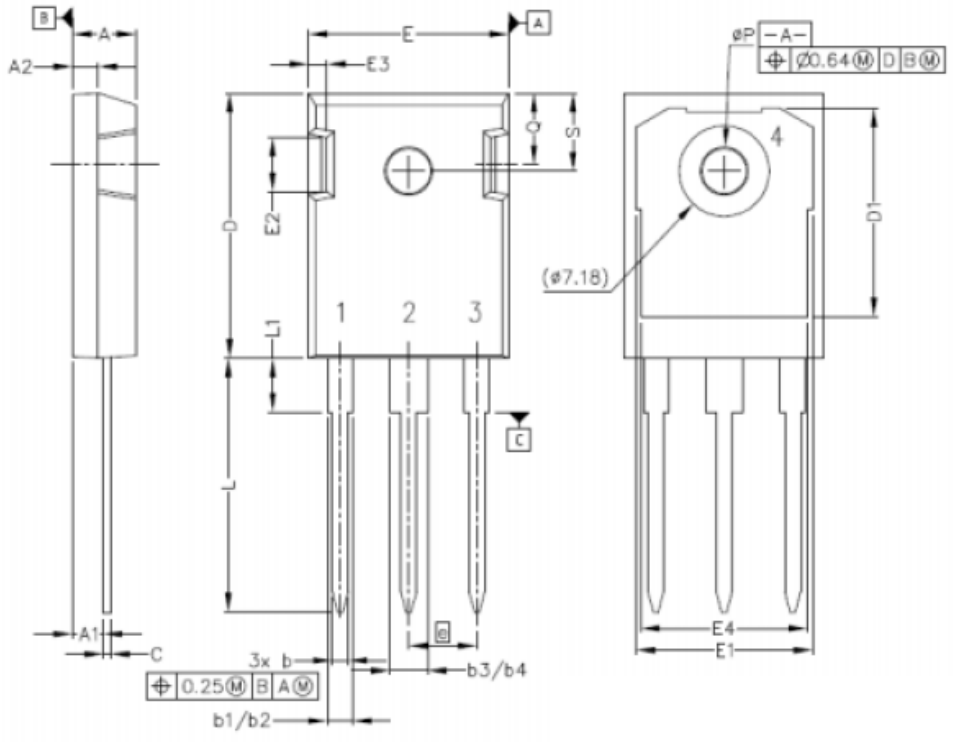
Switching Time Test Circuit and Waveforms





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 $0.10^{+0.15}_{-0.10}$