

# N-CHANNEL SiC POWER MOSFET

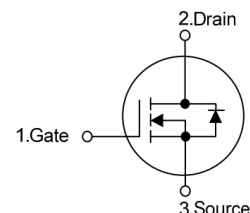
## Features

- $R_{DS(on)}=160m\Omega$ (Typ.) @  $V_{GS}=20V, I_D=10A$
- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitance
- Easy to Parallel and Simple to Drive



## Applications

- Power supplies
- DC/DC converters
- Motor drives
- Pulsed Power applications



## Key Performance and Package Parameters

Order codes	$V_{DS}$	$I_D$	$R_{DS(ON)}$ , Typ	$T_{vjmax}$	Marking	Package
XD160B120AV1G3	1200V	18A	0.16 $\Omega$	150 $^{\circ}C$	D160B120AV1	TO252

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

Symbol	Parameter	Value	Units
$V_{DSS}$	Drain-Source Voltage	1200	V
$V_{GSmax}$	Gate-Source Voltage	-10/+25	V
$V_{GSop}$	Gate-Source Voltage	-5/+20	V
$I_D$	Continuous Drain Current ( $T_c=25^{\circ}C$ )	18	A
$I_{DM}$	Pulsed Drain Current	30	A
$P_D$	Maximum Power Dissipation ( $T_c=25^{\circ}C$ )	104	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)	TO252	1.2	$^{\circ}C/W$

**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	$V_{DS}=1200V, V_{GS}=0V$	---	1	100	$\mu A$
$I_{GSS}$	Gate Leakage Current, Forward	$V_{GS}=25V, V_{DS}=0V$	---	1	250	nA
	Gate Leakage Current, Reverse	$V_{GS}=-10V, V_{DS}=0V$	---	---	250	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=2.5mA$	2.0	2.4	4.0	V
$R_{DS(ON)}$	Drain-Source On-state Resistance	$V_{GS}=20V, I_{DS}=10A$	--	160	196	$m\Omega$
$Q_g$	Total Gate Charge	$V_{DS}=800V$	---	49	---	nC
$Q_{gs}$	Gate-Source Charge	$V_{GS}=-5V/20V$	---	16	---	nC
$Q_{gd}$	Gate-Drain Charge	$I_{DS}=10A$	---	11	---	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=800V,$	---	8	---	ns
$t_r$	Rise Time	$V_{GS}=-5V/20V$	---	9	--	ns
$t_{d(off)}$	Turn-off Delay Time	$I_{DS}=10A, R_G=2.5\Omega$	---	14	---	ns
$t_f$	Fall Time		---	10	---	ns
$C_{iss}$	Input Capacitance	$V_{DS}=1000V$	---	890	---	pF
$C_{oss}$	Output Capacitance	$V_{GS}=0V$	---	54	---	pF
$C_{rss}$	Reverse Transfer Capacitance	$f=1MHz$	---	8.5	---	pF

**Reverse Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
$V_{SD}$	Diode Forward Voltage	$I_{SD}=5A, V_{GS}=-5V$	4.2	---	---	V
$t_{rr}$	Diode Reverse Recovery Time	$V_R=800V,$ $I_{SD}=10A,$ $di_f/dt=1000A/s$	---	28	---	ns
$Q_{rr}$	Diode Reverse Recovery Charge		---	50	---	nC
$I_{rrm}$	Peak Reverse Recovery Current		---	3	---	A

### Typical Characteristics

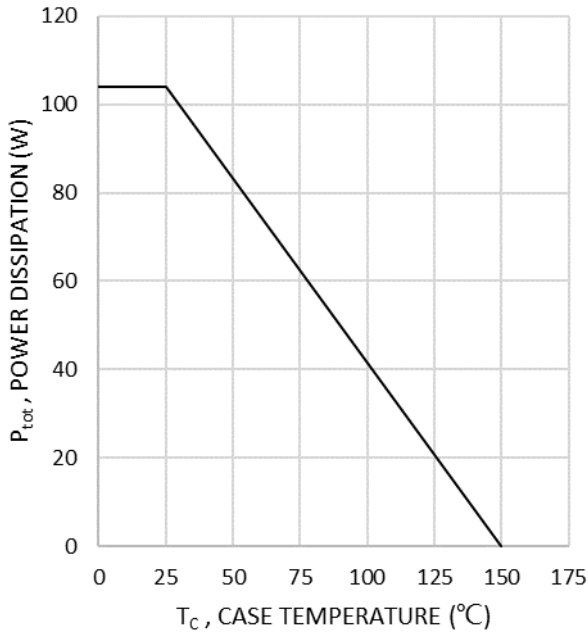


Fig.1 Power Dissipation

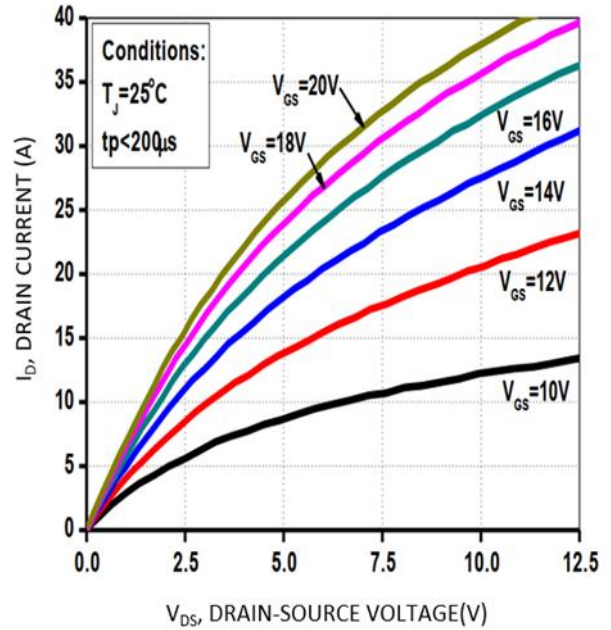


Fig.2 Output Characteristics

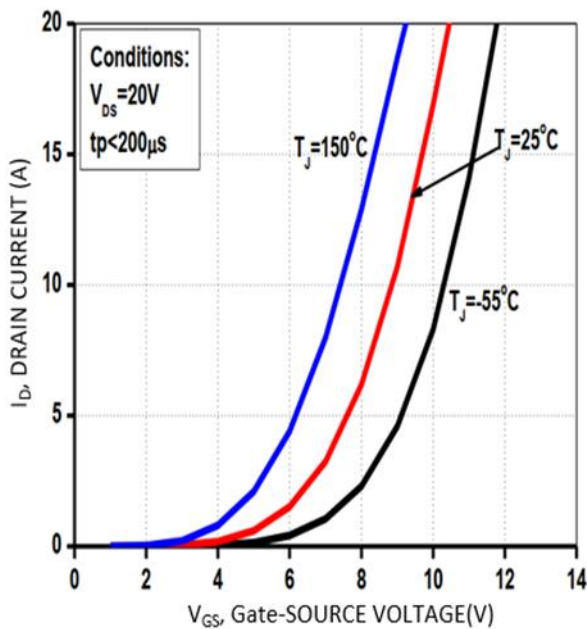


Fig.3 Output Characteristics

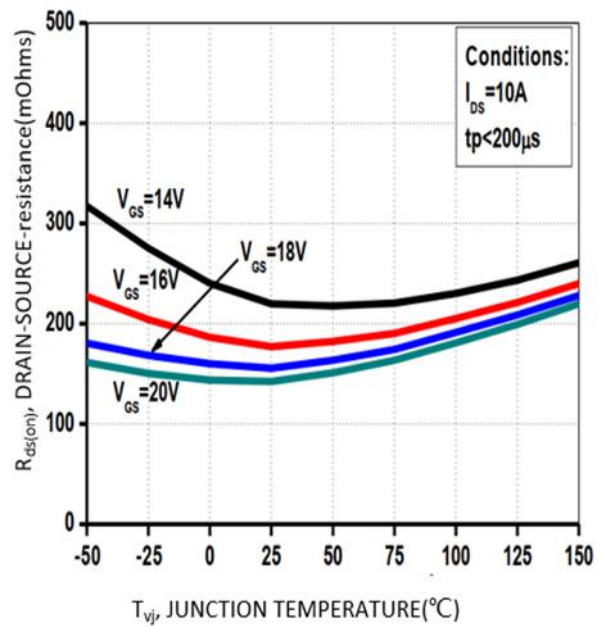


Fig.4 Drain-Source On Resistance

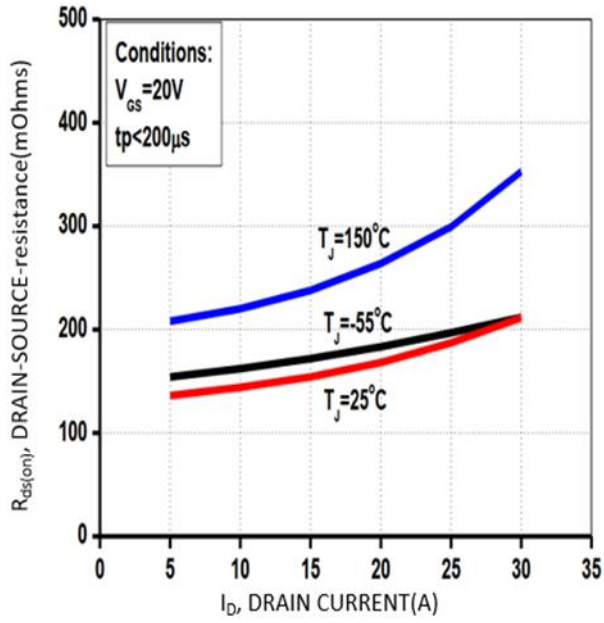


Fig.5 Drain-Source On Resistance

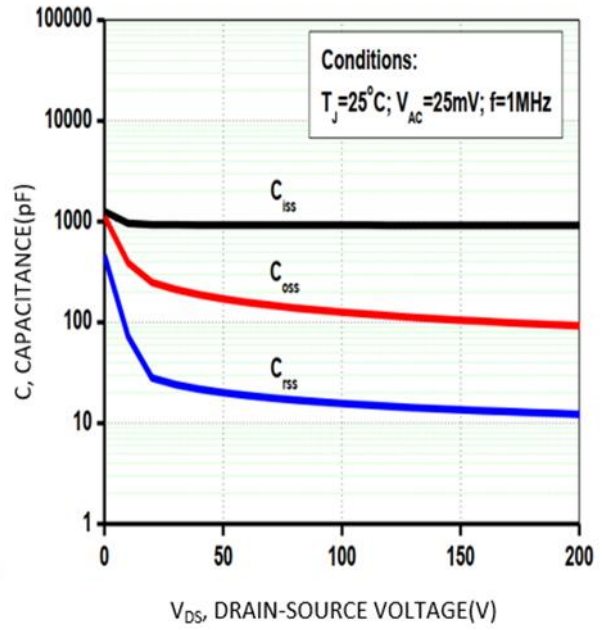


Fig.6 Capacitance

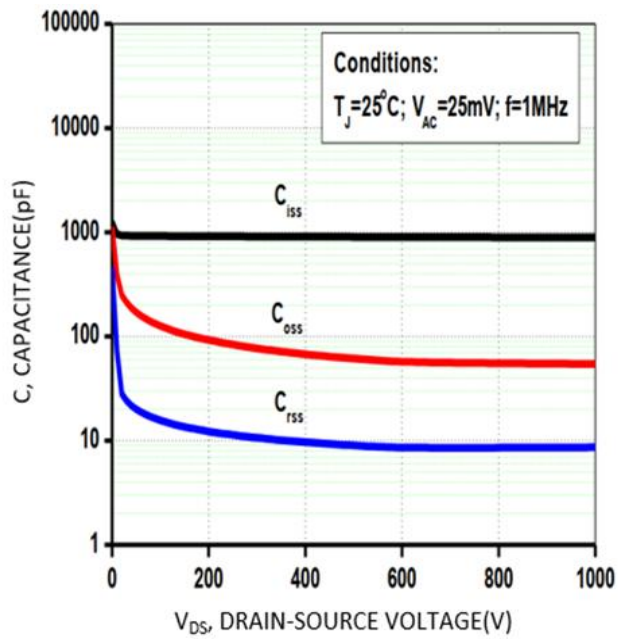
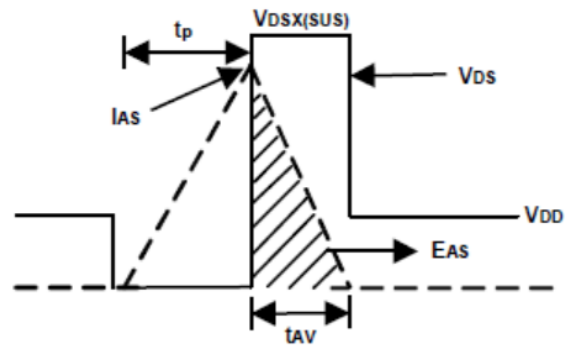
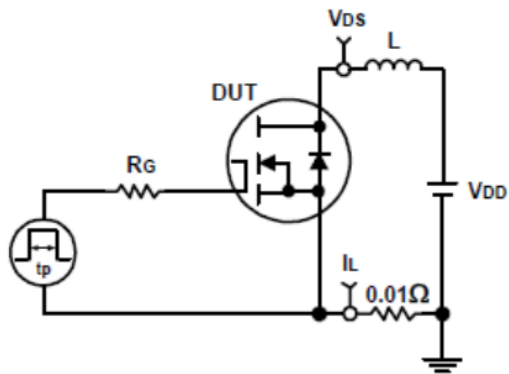
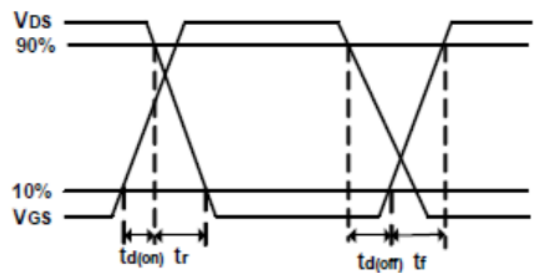
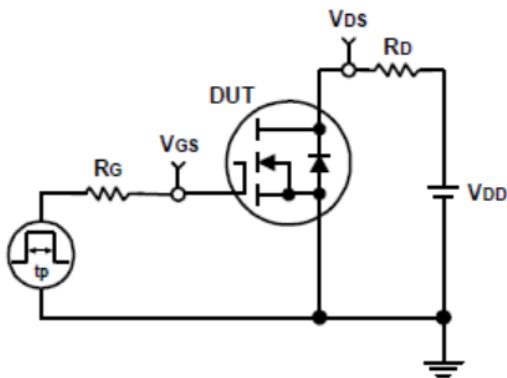


Fig.7 Capacitance

### Avalanche Test Circuit and Waveforms

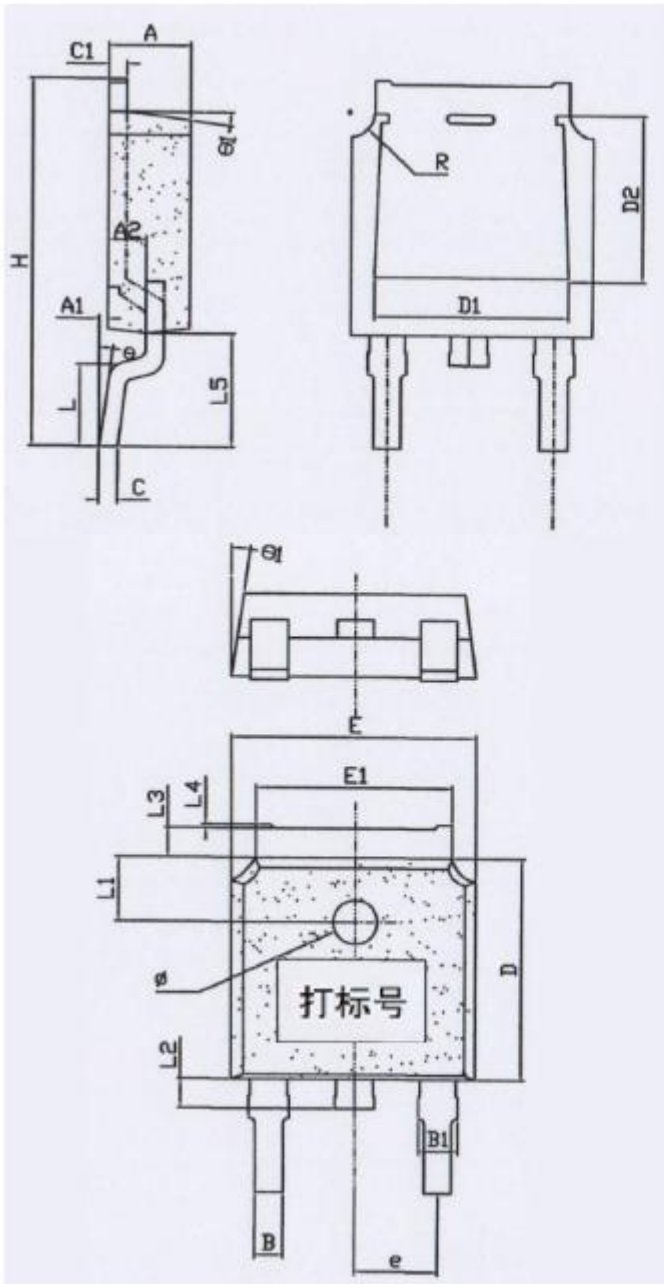


### Switching Time Test Circuit and Waveforms



**Package Information**

TO-252



SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	2.15	2.3	2.45
A1	0.05	0.1	0.2
A2	0.91	1.07	1.11
B	0.75	0.76	0.77
B1	1.02	1.08	1.14
C	0.45	0.5	0.6
C1	0.45	0.5	0.6
D	5.95	6.1	6.25
D1	-	3.4	-
D2	-	4.8	-
E	6.45	6.6	6.75
E1	5.32	5.42	5.52
L	-	1.65	-
L1	1.58	1.78	1.98
L2	0.6	0.8	1
L3	0.7	0.85	1
L4	0.05	0.05	0.2
L5	2.8	3.1	3.4
Φ	-	1.2	-
H	9.8	10.1	10.4
θ	0°		8°
θ1	5°	7°	8°
R		1.44	
e		2.286	
ΦDEP	0.05	0.1	0.2