

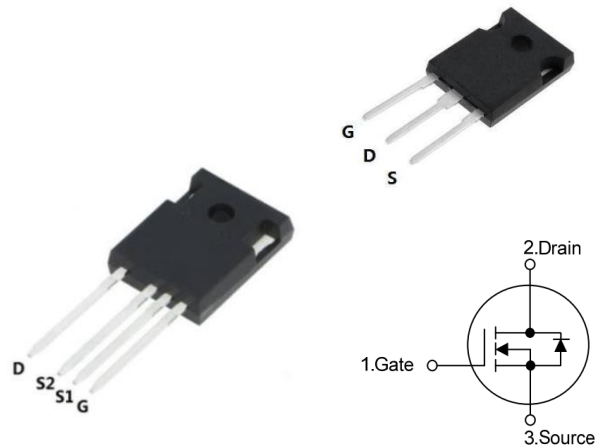
N-CHANNEL SiC POWER MOSFET

Features

- $R_{DS(on)}=16m\Omega$ (Typ.) @ $V_{GS}=18V, I_D=75A$
- 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



Key Performance and Package Parameters

Order codes	V_{DS}	I_D	$R_{DS(ON)}$, Typ	T_{vjmax}	Marking	Package
XD016B120AV1S3	1200V	115A	16m Ω	175 $^{\circ}C$	D16B120AV1	TO247-3
XD016B120AV1S5	1200V	115A	16m Ω	175 $^{\circ}C$	D16B120AV1	TO247-4

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	-8/+22	V
V_{GSop}	Recommended operational Gate-Source Voltage	-4/+18	V
I_D	Continuous Drain Current ($T_c=25^{\circ}C$)	115	A
I_{DM}	Pulsed Drain Current	250	A
P_D	Maximum Power Dissipation ($T_c=25^{\circ}C$)	582	W
T_J	Operating Junction Temperature Range	-55 to 175	$^{\circ}C$
T_{STG}	Storage Temperature Range	-55 to 175	$^{\circ}C$

Thermal Data

Symbol	Parameter	Conditions	Max.	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Steady State)	TO247-3	0.23	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Steady State)	TO247-4	0.23	$^{\circ}C/W$

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	μA
I_{GSS+}	Gate-Source Leakage Current	$V_{GS} = 22V, V_{DS} = 0V$	---	10	250	nA
I_{GSS-}	Gate-Source Leakage Current	$V_{GS} = -8V, V_{DS} = 0V$	---	10	250	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_{DS} = 23mA$	1.9	2.6	4.0	V
$R_{DS(ON)}$	Drain-Source On-state Resistance	$V_{GS} = 18V, I_{DS} = 75A$	--	16	21	m Ω
Q_g	Total Gate Charge	$V_{DS} = 800V$	---	242	---	nC
Q_{gs}	Gate-Source Charge	$V_{GS} = -4V/18V$	---	60	---	nC
Q_{gd}	Gate-Drain Charge	$I_{DS} = 40A$	---	44	---	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 800V,$	---	150	---	ns
t_r	Rise Time	$V_{GS} = -4V/18V$	---	38	--	ns
$t_{d(off)}$	Turn-off Delay Time	$I_{DS} = 40A, R_G = 2.5\Omega$	---	108	---	ns
t_f	Fall Time	$R_L = 20\Omega$	---	35	---	ns
C_{iss}	Input Capacitance	$V_{DS} = 1000V$	---	4300	---	pF
C_{oss}	Output Capacitance	$V_{GS} = 0V$	---	236	---	pF
C_{rss}	Reverse Transfer Capacitance	$f = 1MHz, V_{AC} = 25mV$	---	35	---	pF

Reverse Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
V_{SD}	Diode Forward Voltage	$I_{SD} = 10A, V_{GS} = -4V$	---	4.5	---	V
t_{rr}	Diode Reverse Recovery Time	$V_R = 800V, I_{SD} = 40A$	---	55	---	ns
Q_{rr}	Diode Reverse Recovery Charge		---	278	---	nC
I_{rrm}	Peak Reverse Recovery Current		---	8.9	---	A

Typical Characteristics

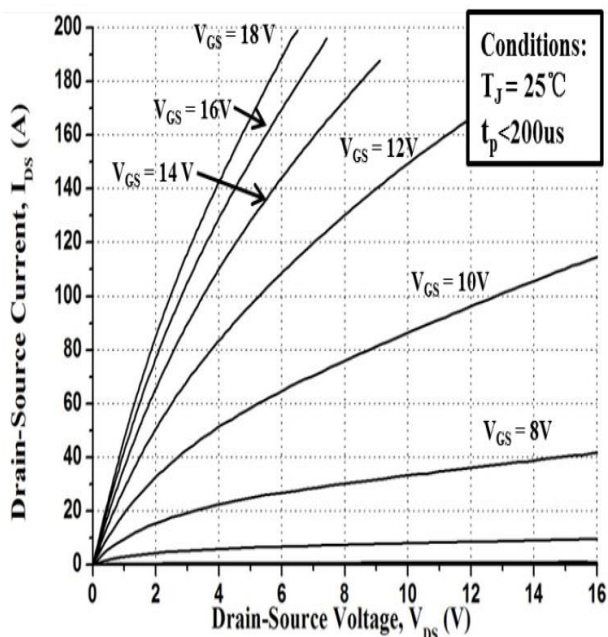


Fig.1 Output Characteristics

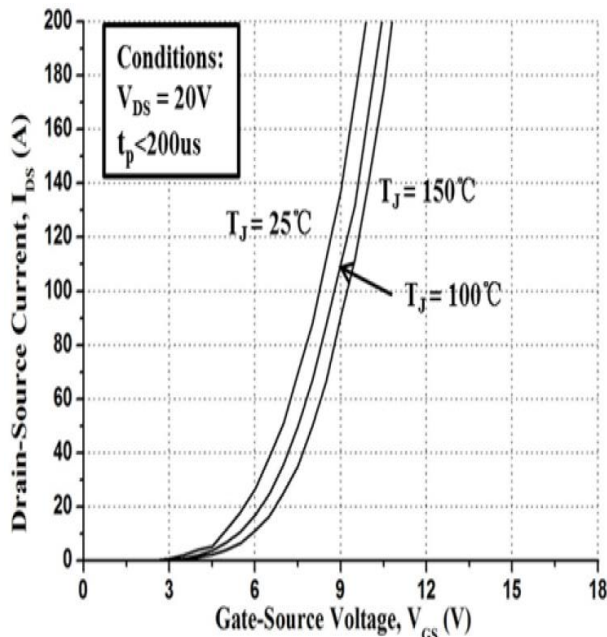


Fig.2 Output Characteristics

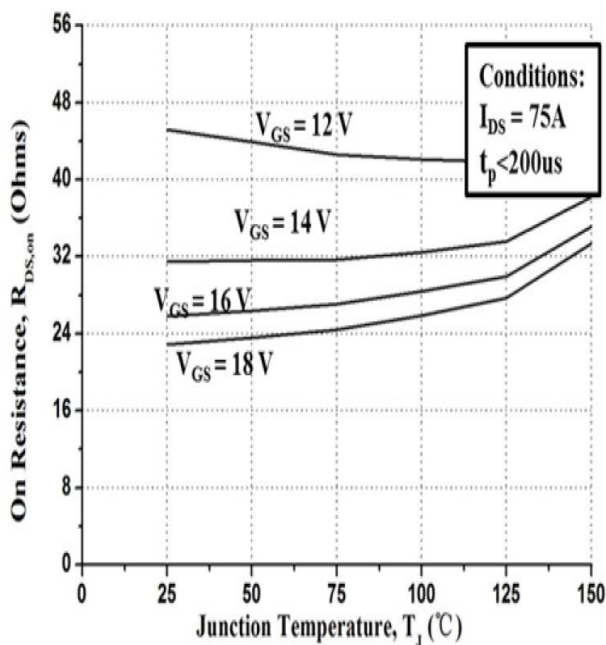


Fig.3 Drain-Source On Resistance

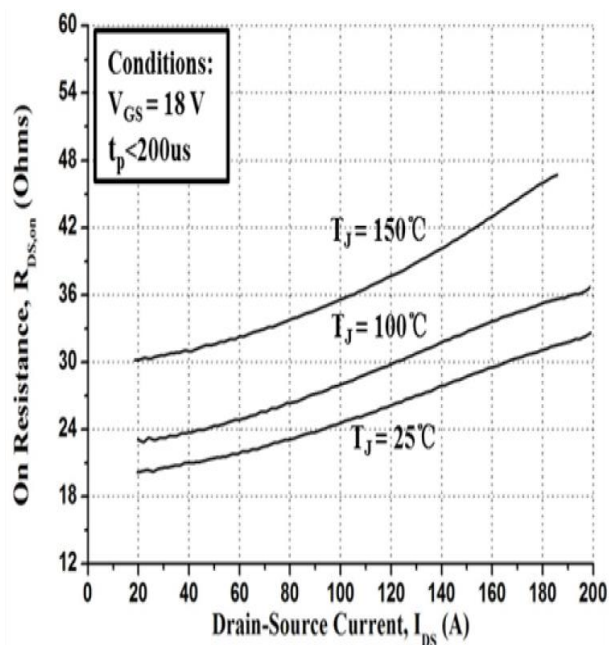


Fig.4 Drain-Source On Resistance

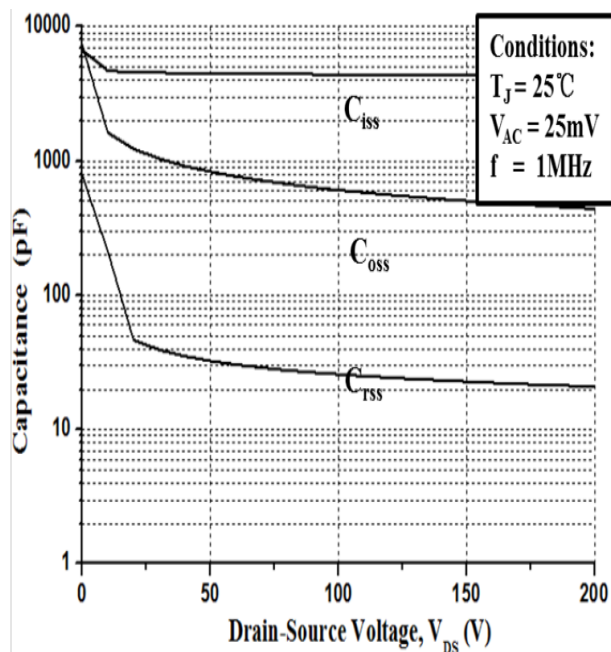


Fig.5 Capacitances (Voltage 0-200V)

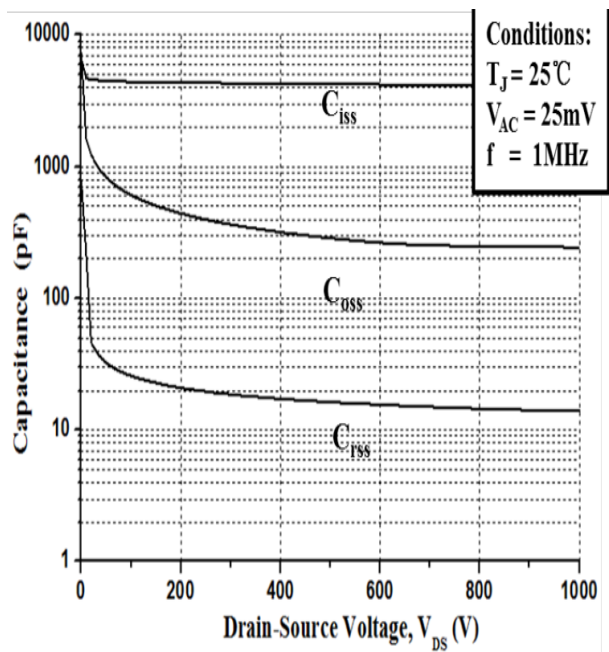
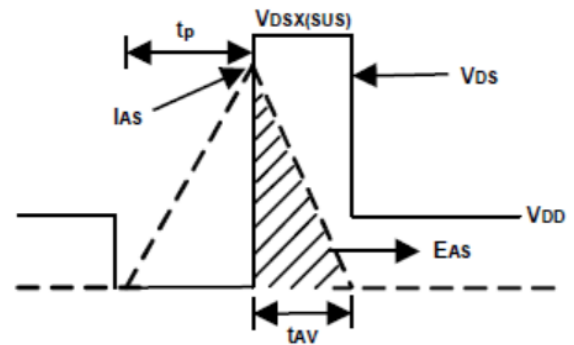
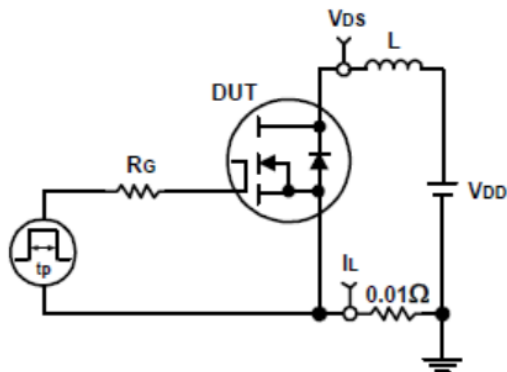
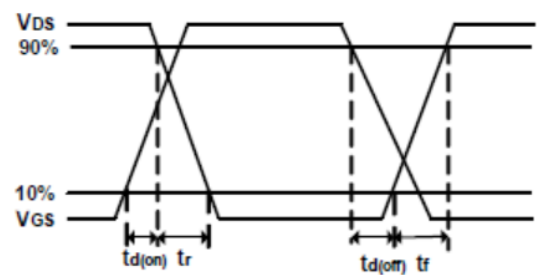
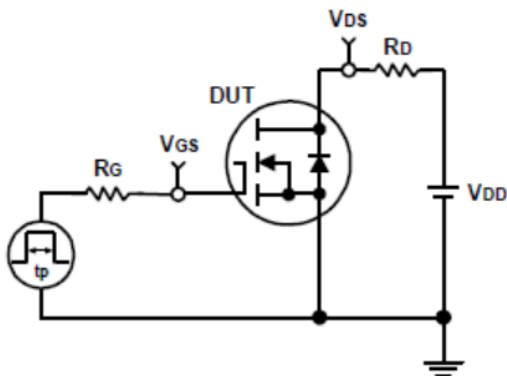


Fig.6 Capacitances (Voltage 0-1000V)

Avalanche Test Circuit and Waveforms

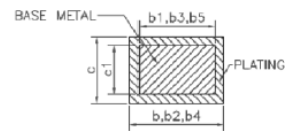
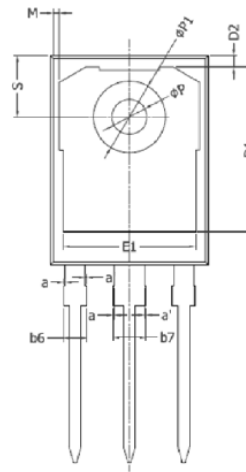
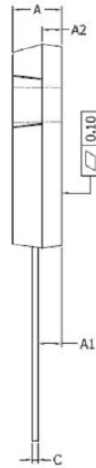
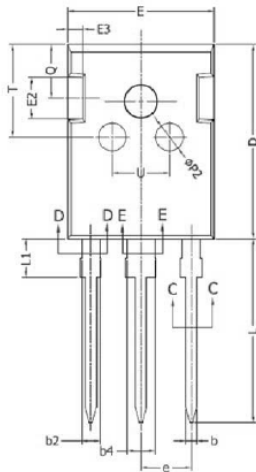


Switching Time Test Circuit and Waveforms



Package Information

TO-247-3



SECTION C-C,D-D & E-E

COMMON DIMENSIONS
(UNITS OF MEASURE =MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	4.90	5.00	5.10
A1	2.31	2.41	2.51
A2	1.90	2.00	2.10
a	0	---	0.15
a'	0	---	0.15
b	1.16	---	1.26
b1	1.15	1.2	1.22
b2	1.96	---	2.06
b3	1.95	2.00	2.02
b4	2.96	---	3.06
b5	2.96	3.00	3.02
b6	---	---	2.25
b7	---	---	3.25
c	0.59	---	0.66
c1	0.58	0.60	0.62
D	20.90	21.00	21.10
D1	16.25	16.55	16.85
D2	1.05	1.17	1.35
E	15.70	15.80	15.90
E1	13.10	13.30	13.50
E2	4.40	4.50	4.60
E3	1.50	1.60	1.70
e	5.436 BSC		
L	19.80	19.92	20.10
L1	---	---	4.30
M	0.35	---	0.95
P	3.40	3.50	3.60
P1	7.00	---	7.40
P2	2.40	2.50	2.60
Q	5.60	---	6.00
S	6.05	6.15	6.25
T	9.80	---	10.20
U	6.00	---	6.40

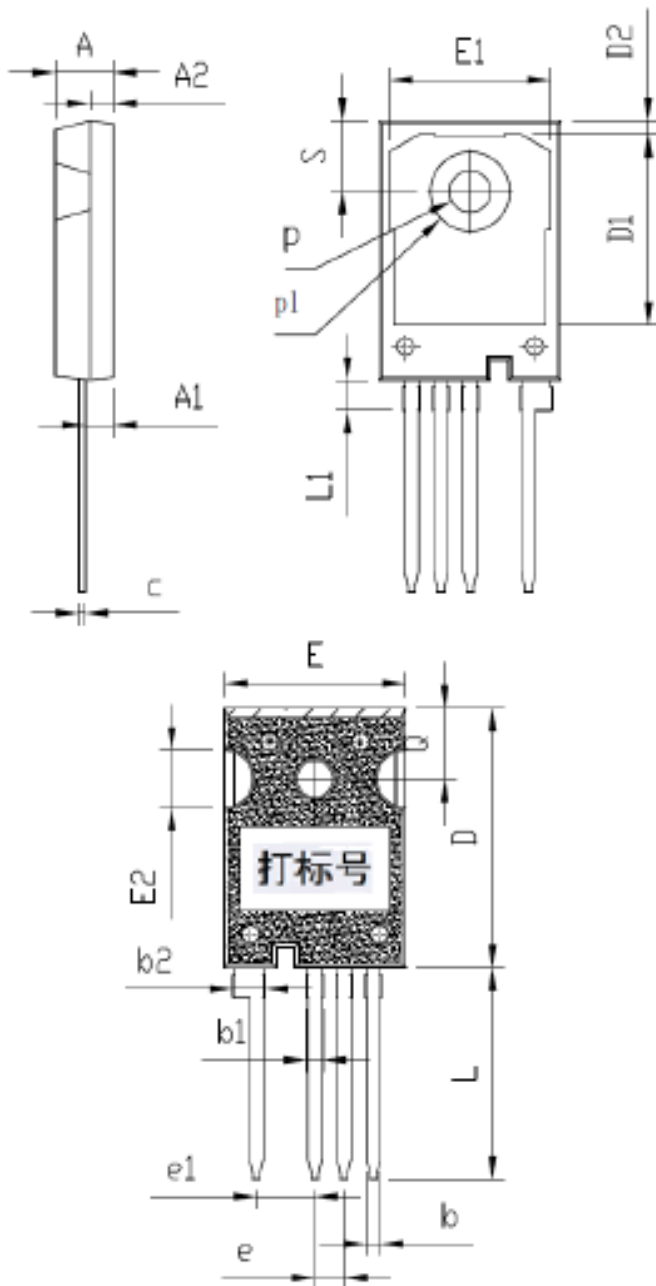
NOTES:

ALL DIMENSIONS REFER TO JEDEC STANDARD TO-247 AND DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.

EJECTION MARK DEPTH $0.10^{+0.15}_{-0.10}$

Package Information

TO-247-4



SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A		5.00	
A1		2.40	
A2		2.00	
b		1.20	
b1		1.30	
b2		2.65	
c		0.6	
D		22.54	
D1		16.50	
D2		1.17	
e		2.54	
e1		5.08	
E		15.80	
E1		14.00	
E2		5.00	
L		18.38	
L1		2.58	
p		3.60	
pl		6.80	
Q		6.15	
S		6.15	