



N-Channel SiC Power MOSFET

TO-247-3L (*Prefix :W)

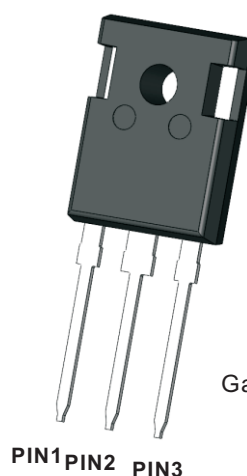
V_{DS}	1200V
$I_D@25^{\circ}C$	60A
$R_{DS(on)}$	40 m Ω

DESCRIPTION

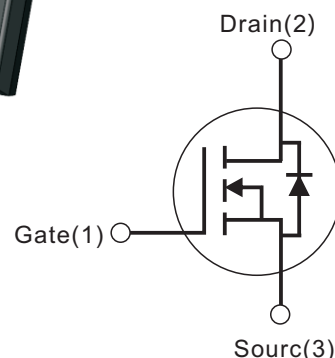
- 3rd Generation Sic Mosfet Technology
- High Blocking Voltage With Low On-resistance
- High-speed Switching With Low Capacitances
- Halogen Free, Rohs Compliant.

Features

- Reduce switching losses and minimize gate ringing
- Higher system efficiency
- Reduce cooling requirements
- Increase power density
- Increase system switching frequency



ROHS
COMPLIANT



SYMBOL

ABSOLUTE MAXIMUM RATINGS (TA=25°C, unless otherwise specified)

PARAMETER	Symbols	RATINGS	Test Conditions	Units
Drain-Source Voltage	V_{DSS}	1200	$V_{GS}=0V, I_D=100\mu A$	V
Gate-Source Voltage	V_{GS}	-8/+22	Absolute maximum values	V
Continuous Drain Current	I_D	60	$V_{GS}=18V, T_c=25^{\circ}C$	A
Continuous Drain Current	I_D	40	$V_{GS}=18V, T_c=100^{\circ}C$	A
Pulsed Drain Current (Note 1)	$I_{D(Pulse)}$	100	Pulse width t_p limited by T_{jmax}	A
Power Dissipation	P_D	250	$T_c=25^{\circ}C$	W
Operating junction and storage temperature	T_j, T_{stg}	-55 ~ +175		$^{\circ}C$

Notes: 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

Thermal Resistance

PARAMETER	Symbols	RATINGS	Units
Thermal resistance, junction – case.	R_{thJC}	0.6	$^{\circ}C/W$
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	40	$^{\circ}C/W$



ELECTRICAL CHARACTERISTICS (TA=25°C, unless otherwise specified)

PARAMETER	Symbols	TEST CONDITIONS	Min	Typ	Max	Units
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=100\mu A$	1200			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=1200V, V_{GS}=0V$			100	uA
		$V_{DS}=1200V, V_{GS}=0V, T_j=175^\circ C$			500	
Gate- Source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=18V$			200	nA
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=10mA$	2.0	3.2	4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=18V, I_D=33A, T_j=25^\circ C$		40	50	mΩ
		$V_{GS}=18V, I_D=33A, T_j=175^\circ C$		60		
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	$V_{GS}=0V, V_{DS}=1000V$		2900		pF
Output Capacitance	C_{OSS}	$f=1MHz$		118		pF
Reverse Transfer Capacitance	C_{RSS}	$V_{AC}=25mV$		11.6		pF
Gate resistance	R_G	$f=1MHz, V_{AC}=25mV$		2.1		Ω
Transconductance $T_c=25^\circ C$	g_{fs}	$V_{DS}=20V, I_D=33A$		20		S
Turn-On Energy (Body Diode)	E_{ON}	$V_{DS}=800V, V_{GS}=-5/18V,$		1.2		mJ
Turn-Off Energy (Body Diode)	E_{OFF}	$I_D=33A, L=80\mu H$		0.44		mJ
Total Gate Charge (Note 1)	Q_G	$V_{DS}=800V$		128		nC
Gate-Source Charge	Q_{GS}	$V_{GS}=-5V/18V$		40		nC
Gate-Drain Charge	Q_{GD}	$I_D=33A$		37		nC
Turn-On Delay Time (Note 1)	$t_{D(ON)}$	$V_{DS}=800V, V_{GS}=-5/18V,$		60		ns
Turn-On Rise Time	t_R	$I_D=33A, R_G=2.5\Omega$		140		ns
Turn-Off Delay Time	$t_{D(OFF)}$	Timing relative to V_{DS}		50		ns
Turn-Off Fall Time	t_F			42		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Maximum Body-Diode Continuous Current	I_S	$T_j=25^\circ C$			60	A
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	$I_{SD}=20A, V_{GS}=-5V$		3.6		V
Reverse Recovery Time (Note 1)	t_{rr}	$I_F=33A, V_{GS}=-5V, di/dt$		37		ns
Reverse Recovery Charge	Q_{rr}	$=1200A/\mu s, V_R=800V$		165		uC

Notes:

1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.



Typical Characteristics

Fig.1 Typical forward Output characteristics at $T_J=25^\circ\text{C}$

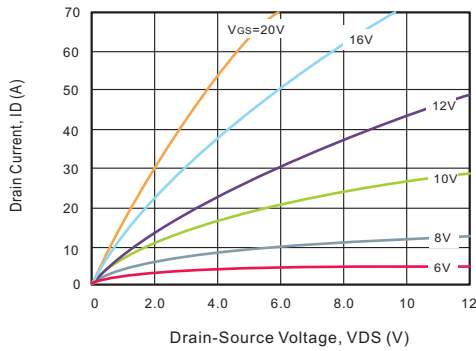


Fig.2 Typical forward Output characteristics at $T_J=175^\circ\text{C}$

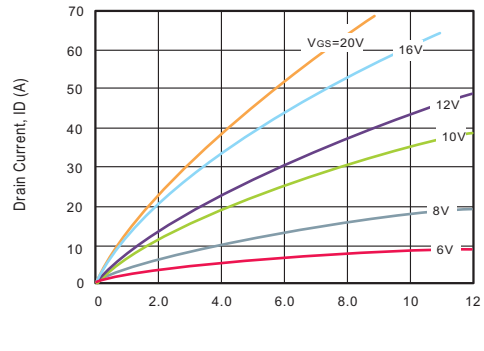


Fig.3 On-Resistance vs. Gate Voltage for various Temperature

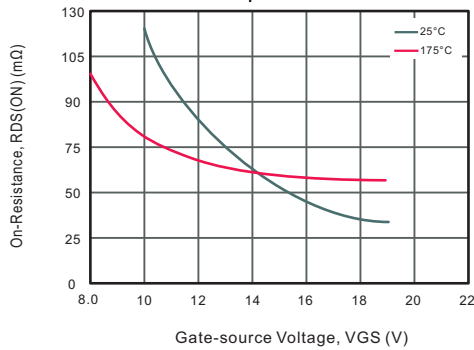


Fig.4 Threshold Voltage vs. Temperature

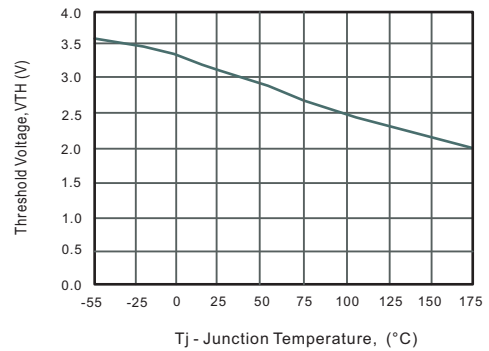


Fig.5 On-Resistance vs. Junction Temperature

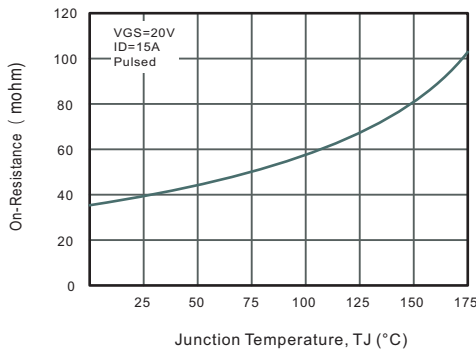


Fig.6 Diode Forward Voltage vs. Current

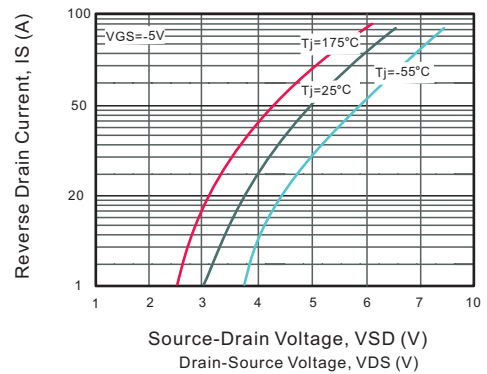


Fig.7 Capacitance Characteristics

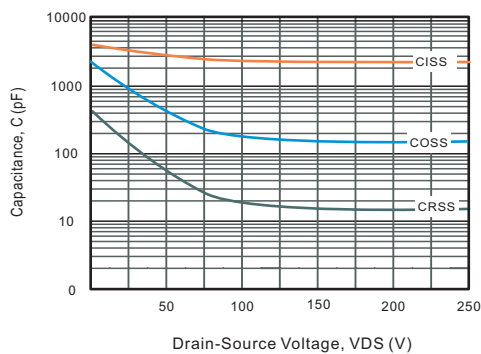
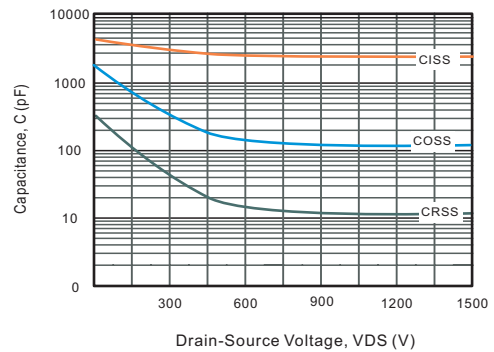
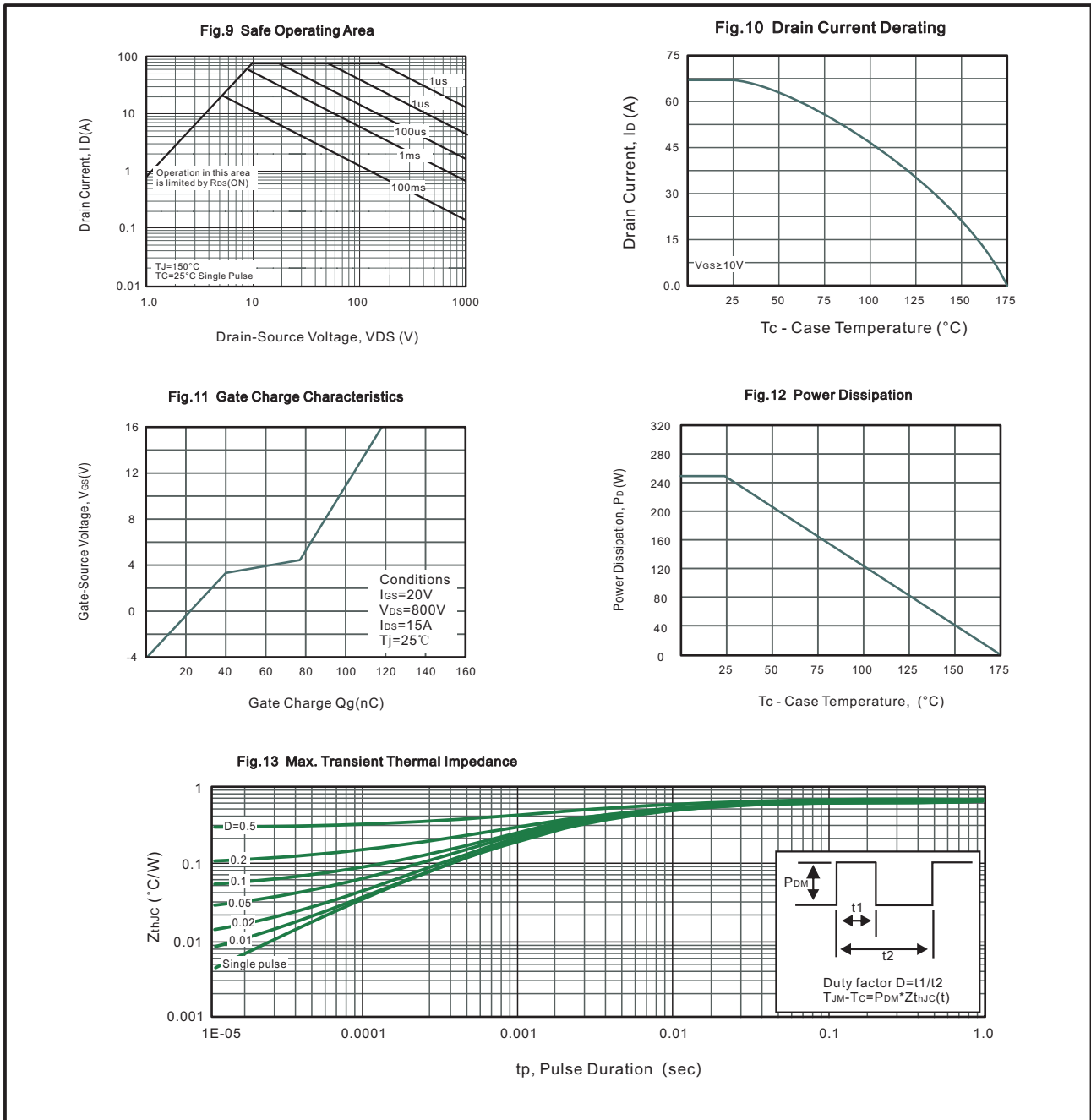


Fig.8 Capacitance Characteristics





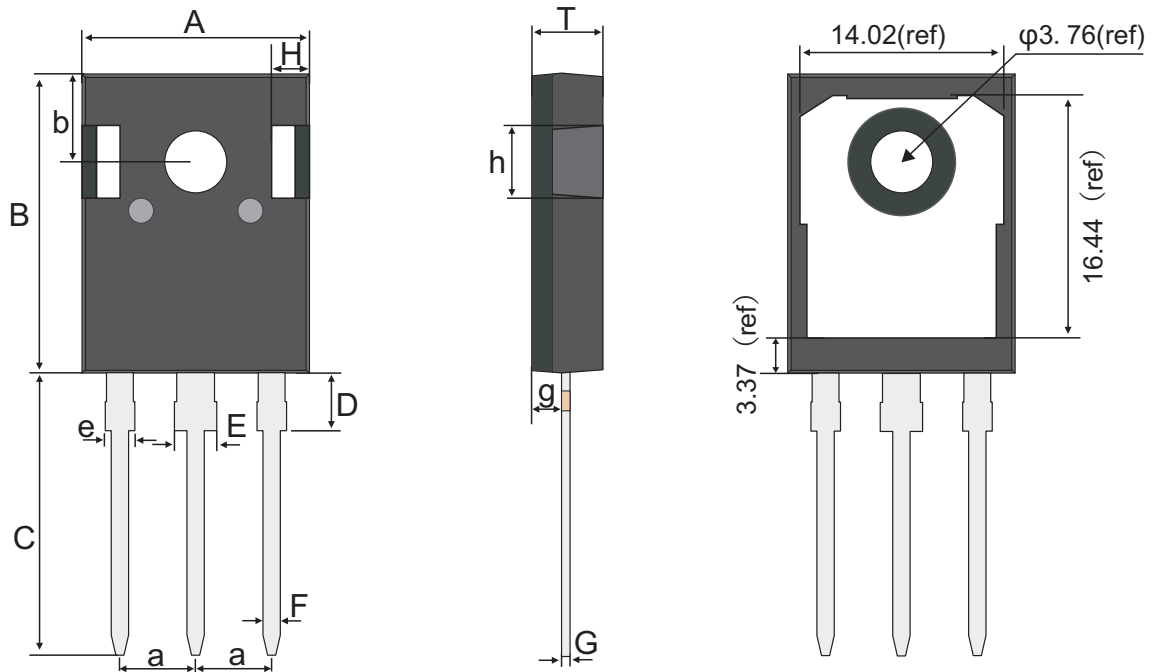
Typical Characteristics





Package Outline
Through Hole Package ; 3 leads

TO-247-3L



TO-247-3L mechanical data

UNIT		A	a	B	b	C	D	E	e	F	G	g	H	h	T
mm	max	16.01	5.54	21.18	6.26	20.2	4.25	3.25	2.2	1.3	0.7	2.49	2.71	5.37	5.2
	typ	15.81	5.44	20.98	6.16	20.0	4.15	3.10	2.05	1.2	0.6	2.39	2.51	5.17	5.0
	min	15.61	5.34	20.78	6.06	19.8	4.05	2.95	1.9	1.1	0.5	2.29	2.31	4.97	4.8
mil	max	630	218	834	246	795	167	128	87	51	28	98	107	211	205
	typ	622	214	826	243	787	163	122	81	47	24	94	99	204	197
	min	615	210	818	239	780	159	116	75	43	20	90	91	196	189

Marking

Type number	Marking code
SC040N120WH	SC040N120WH



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