SC160N120T8L

Silicon Carbide Power MOSFET N-Channe Enhancement Mode

Features

★Typ.$R_{DS(on)}$=160mΩ

★Ultra Low Gate Charge($Q_{G(tot)}$=49nC)

★Capacitance($C_{(oss)}$=54pF)

★100% UIL Tested

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ MAX	I_D MAX
1200V	160mΩ	18A

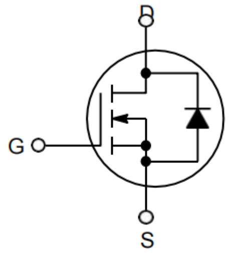
Typical Applications

★ UPS

★ DC/DC Converter

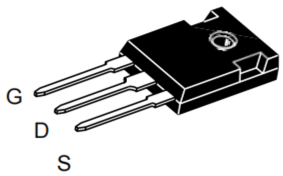
★ Boost Inverter

N–CHANNEL MOSFET



MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

Parameter			Symbol	Value	Unit
Drain–to–Source Voltage			V_{DSS}	1200	V
Gate–to–Source Voltage			V_{GS}	-10/+25	V
Recommended Operation Values of Gate–to–Source Voltage	T_C < 175°C		V_{GSop}	-5/+20	V
Continuous Drain Current $R_{\theta JC}$	Steady State	T_C = 25°C	I_D	18	A
Continuous Drain Current $R_{\theta JC}$	Steady State	T_C = 100°C	I_D	12	A
Power Dissipation $R_{\theta JC}$	Steady State	T_C = 150°C	P_D	125	W
Pulsed Drain Current (Note 2)	T_A = 25°C		I_{DM}	40	A
Operating Junction and Storage Temperature Range			T_J, T_{stg}	–55 to +175	°C
Source Current (Body Diode)			I_S	16	A



TO–247–3L
CASE 340CX

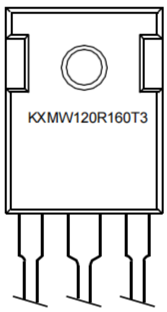
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL RESISTANCE MAXIMUMRATINGS

Parameter	Symbol	Value	Unit
Junction–to–Case (Note 1)	$R_{\theta JC}$	0.9	°C/W
Junction–to–Ambient (Note 1)	$R_{\theta JA}$	40	°C/W

1. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
2. Repetitive rating, limited by max junction temperature.

MARKING DIAGRAM



Static Electrical Characteristics

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain–to–Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} =0 V, I_D = 100 uA	1200	1250	1400	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V, V_{DS} = 1200 V, T_J = 25 °C	–	1	100	µA
		V_{GS} = 0 V, V_{DS} = 1200 V, T_J = 175 °C	–	2	250	
Gate–Source Leakage Current	I_{GSS}	V_{GS} = -10/+25V, V_{DS} = 0V	–	10	250	nA
Drain–Source On Resistance	$R_{DS(on)}$	V_{GS} = 20V, I_D = 50 A, T_J = 25 °C	–	160	196	mΩ
		V_{GS} = 20 V, I_D = 20 A, T_J = 175 °C	–	280	-	
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS} = V_{DS}, I_D = 15 mA	2	2.4	4	V

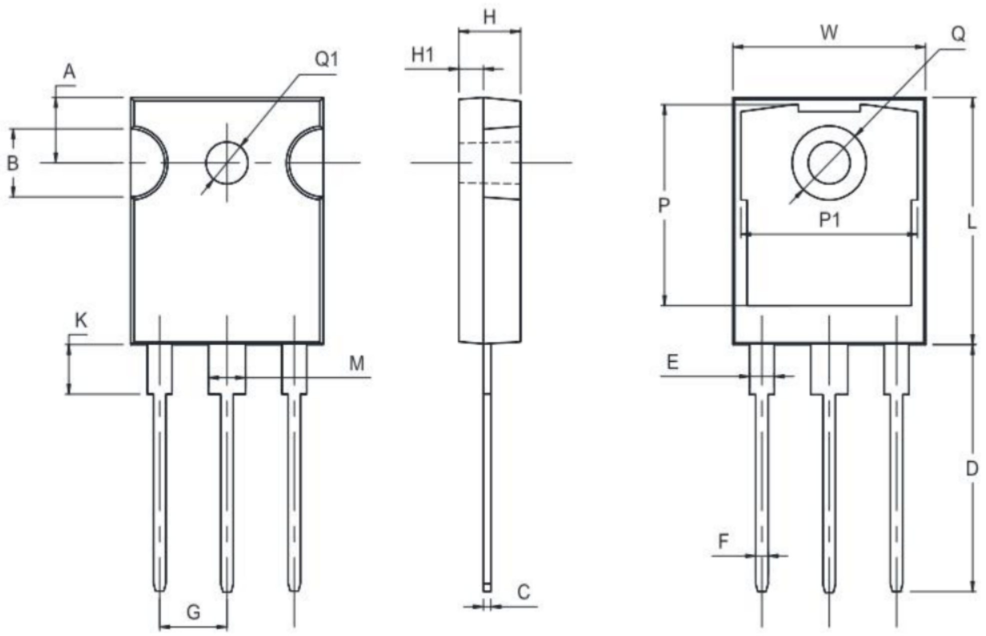
Dynamic Electrical Characteristics

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Capacitance	C_{ISS}	V_{GS} = 0 V, V_{DS} = 1000 V, f = 1 MHz, V_{AC} = 25 mV	–	890	–	pF
Output Capacitance	C_{OSS}		–	54	–	
Reverse Transfer Capacitance	C_{RSS}		–	8.5	–	
Turn-On Switching Loss	E_{ON}	V_{GS} = -5/20 V, V_{DS} = 800 V, I_D = 50A, R_G = 2.5 Ω, T_J = 175 °C Inductive Load	-	315	-	µJ
Turn-Off Switching Loss	E_{OFF}		-	63	-	
Total Gate Charge	$Q_{G(tot)}$	V_{GS} = −5/20 V, V_{DS} = 800 V, I_D = 50 A	–	49	–	nC
Gate–Source Charge	Q_{GS}		–	17	–	
Gate–Drain Charge	Q_{GD}		–	9	–	
Gate Resistance	R_G	f = 1 MHz, V_{AC} = 25 mV	–	5.5	–	Ω
Turn-On Delay Time	$t_{d(on)}$	V_{GS} = -5/20 V, V_{DS} = 800 V, I_D = 50A, T_J = 175 °C R_G = 2.5 Ω, R_L=16 Ω Inductive Load	–	8	–	ns
Rise Time	t_r		–	9	–	
Turn-Off Delay Time	$t_{d(off)}$		–	14	–	
Fall Time	t_f		–	9	–	

Reverse Diode Characteristics

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Continuous Drain–to–Source Diode Forward Current	I_{SD}	V_{GS} = 0 V, T_J = 25 °C	–	–	52	A
Forward Diode Voltage	V_{SD}	V_{GS} = -5 V, T_J = 25 °C, I_{SD} = 25 A	–	4.2	–	V
Pulsed Drain–to–Source Diode Forward Current (Note 2)	I_{SDM}	T_J = 25 °C	-	-	23	A
Reverse Recovery Time	t_{RR}	V_{GS} = −5 V, I_{SD} = 50 A, V_{DS} = 800 V, dI_S/dt = 1100 A/µs, T_J = 25 °C	–	28	–	ns
Reverse Recovery Charge	Q_{RR}		–	50	–	nC
Reverse Recovery Energy	E_{REC}		–	28	–	µJ
Peak Reverse Recovery Current	I_{RRM}		–		–	A

Package Outline Dimensions (Unit: mm) TO-247-3L



UNIT	A	B	C	D	E	F	G	W	H	H1	K	L	M	P
mm	6.5	5.2	0.7	20.3	2.2	1.3	5.7	16.2	5.3	2.4	4.45	21.3	3.2	16.6
	5.9	4.6	0.5	19.7	1.8	1.1	5.1	15.8	4.7	1.8	4.05	20.7	2.8	16.2

UNIT	P1	Q	Q1
mm	14.2	7.35	4.2
	13.8	7.05	3.6