



1700V 20mΩ N-Channel SiC Power MOSFET

Description

SiC Power MOSFET is new generation of high voltage MOSFET family that is utilizing a revolutionary semiconductor material – Silicon Carbide.

This new device has been tailored to minimize conduction loss, provide superior switching performance and robust avalanche capability, with benefits of efficiency improvement, higher frequency, increased power density and reduced cooling effort.

SiC Power MOSFET is suitable for various AC/DC power conversion in switching mode operation for higher efficiency. Such as solar inverter, EV charger, UPS, industrial power supply.

Features

- 175°C Max. junction temperature
- 1700V @Tc = 25 °C
- Typ. $R_{DS(on)} = 20m\Omega$
- Fast intrinsic diode with very low reverse recovery
- Switching behavior independent of temperature



TO-247-4L

Absolute Maximum Ratings

Symbol	Parameter	Values	Unit
BV_{DSS}	Drain-Source Voltage	1700	V
I_D	Drain Current -Continuous (Tc = 25°C) -Continuous (Tc = 100°C)	133 94	A
I_{DM}	Drain Current-Pulsed	270	A
V_{GSS}	Gate-Source Voltage(DC)	-10 / +23	V
	Recommended Operation Value	-5 / +18	V
P_D	Power Dissipation (Tc = 25°C)	714	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +175	°C

Thermal Characteristics

Symbol	Parameter	Values	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.21	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	40	°C/W



Electrical Characteristics Tc = 25°C unless otherwise noted

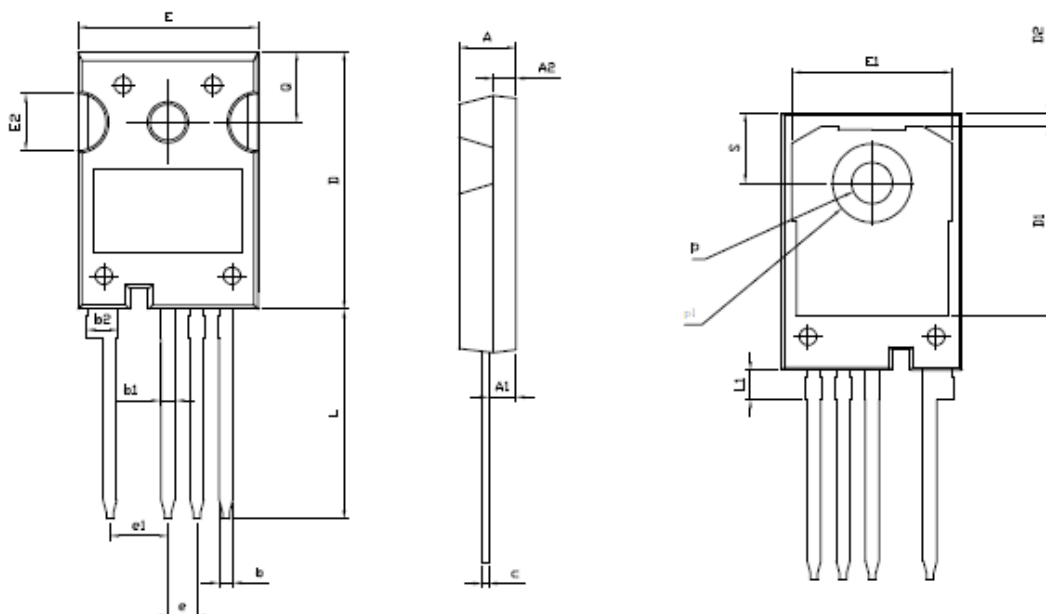
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250uA	1700	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 1700V, V _{GS} = 0V	-	1	100	μA
I _{GSS}	Gate-Source Leakage Current	V _{GS} = +20V, V _{DS} = 0V	-	10	100	nA
I _{GSS-}	Gate-Source Leakage Current	V _{GS} = -10V, V _{DS} = 0V	-	10	100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 30mA	2.0	2.8	4.0	V
		V _{DS} = V _{GS} , I _D = 30mA , T _J = 175°C	-	2.0	-	
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} = 18V, I _D = 75A	-	20	26	mΩ
		V _{GS} = 18V, I _D = 75A, T _J = 175°C	-	32	-	
g _{fs}	Transconductance	V _{DS} = 20V, I _D = 75A	-	45.4	-	S
		V _{DS} = 20V, I _D = 75A, T _J = 175°C	-	47.6	-	
C _{iss}	Input Capacitance	V _{GS} =0V,	-	7780	-	pF
C _{oss}	Output Capacitance	V _{DS} =1000V, f=100kHz,	-	183	-	
C _{rss}	Reverse Transfer Capacitance	V _{AC} =25mV	-	19	-	
Q _{gs}	Gate-Source Charge	V _{DS} = 1000V, V _{GS} = -5 / +18 V, I _D = 33 A		78		nC
Q _{gd}	Gate-Drain Charge			50		
Q _g	Total Gate Charge			362		

Reverse Diode Characteristics Tc = 25°C unless otherwise noted

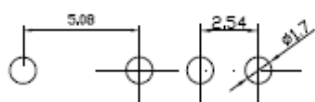
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{SD}	Diode Forward Voltage	V _{GS} = -5V, I _{SD} = 37.5A	-	3.9	-	V
		V _{GS} = -5V, I _{SD} = 37.5A, T _J = 175°C	-	3.6	-	
I _S	Continuous Diode Forward Current	Tc = 25°C	-	-	133	A
t _{rr}	Reverse Recover Time	V _R =1000V, I _{SD} =33A	-	44	-	ns
Q _{rr}	Reverse Recovery Charge		-	281	-	nC
I _{rrm}	Peak Reverse Recovery Current		-	10.6	-	A



TO-247-4L PACKAGE OUTLINE



RECOMMENDED LAND PATTERN



UNIT: mm

	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.25	2.40	2.45
A2	1.85	2.00	2.15
b	1.05	1.20	1.35
b1	1.00	1.30	1.60
b2	2.35	2.65	2.95
c	0.50	0.60	0.70
D	22.34	22.54	22.74
D1	16.00	16.50	17.00
D2	0.97	1.17	1.37
e	2.34	2.54	2.74
e1	4.88	5.08	5.28
E	15.60	15.80	16.00
E1	13.50	14.00	14.50
E2	4.80	5.00	5.20
L	18.08	18.38	18.68
L1	2.38	2.58	2.78
p	3.50	3.60	3.70
p1	6.60	6.80	7.00
Q	6.00	6.15	6.30
S	6.00	6.15	6.30