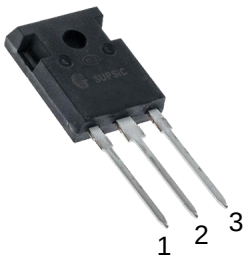
GC2M0080120D
Silicon Carbide Power MOSFET
N-Channel Enhancement Mode

Features

1) Low on-resistance
2) Fast switching speed
3) Fast reverse recovery
4) Easy to parallel
5) Simple to drive
6) Pb-free lead plating ; RoHS compliant



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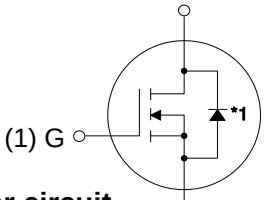
Package

Applications

- Solar inverters
- DC/DC converters
- Switch mode power supplies
- Induction heating



Inner circuit

(1) Gate
(2) Drain
(3) Source

*1 Body Diode

Part Number	Marking	Package	V_{DS}	$I_{D\ @\ 25°C}$	$R_{DS(on)}$
GC2M0080120D	GC2M0080120	TO-247-3	1200 V	36 A	80 mΩ

Maximum Ratings (T_C = 25 ˚C unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions
V_{DSmax}	Drain - Source Voltage	1200	V	V_{GS} = 0 V, I_D = 100 μA
V_{GSmax}	Gate - Source Voltage	-10/+25	V	Absolute maximum values
V_{GSop}	Gate - Source Voltage	-5/+20	V	Recommended operational values
I_D	Continuous Drain Current	36	A	V_{GS} = 20 V, T_C = 25˚C
		24		V_{GS} = 20 V, T_C = 100˚C
$I_{D(pulse)}$	Pulsed Drain Current	80	A	Pulse width t_P limited by T_{jmax}
P_D	Power Dissipation	192	W	T_C=25˚C, T_J = 150 ˚C
T_J , T_{stg}	Operating Junction and Storage Temperature	-55 to +150	˚C	
T_L	Solder Temperature	260	˚C	1.6mm (0.063") from case for 10s
M_d	Mounting Torque	1 8.8	Nm lbf-in	M3 or 6-32 screw

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Electrical Characteristics (T_C = 25˚C unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	1200			V	V_{GS} = 0 V, I_D = 100 µA
$V_{GS(th)}$	Gate Threshold Voltage	2.0	2.9	4	V	V_{DS} = V_{GS}, I_D = 5 mA
			2.4		V	V_{DS} = V_{GS}, I_D = 5 mA, T_J = 150ºC
I_{DSS}	Zero Gate Voltage Drain Current		1	100	µA	V_{DS} = 1200 V, V_{GS} = 0 V
I_{GSS}	Gate-Source Leakage Current			250	nA	V_{GS} = 20 V, V_{DS} = 0 V
$R_{DS(on)}$	Drain-Source On-State Resistance		80	98	mΩ	V_{GS} = 20 V, I_D = 20 A
			144			V_{GS} = 20 V, I_D = 20A, T_J = 150ºC
g_{fs}	Transconductance		10		S	V_{DS}= 20 V, I_{DS}= 20 A
			9			V_{DS}= 20 V, I_{DS}= 20 A, T_J = 150ºC
C_{iss}	Input Capacitance		1135		pF	V_{GS} = 0 V V_{DS} = 1000 V f = 1 MHz V_{AC} = 25 mV
C_{oss}	Output Capacitance		93			
C_{rss}	Reverse Transfer Capacitance		7.5			
E_{oss}	C_{oss} Stored Energy		50		µJ	
E_{AS}	Avalanche Energy, Single Pluse		1		J	I_D = 20A, V_{DD} = 50V
E_{ON}	Turn-On Switching Energy		523		µJ	V_{DS} = 800 V, V_{GS} = -5/20 V, I_D = 20A, $R_{G(ext)}$ = 2.5Ω, L= 156 µH
E_{OFF}	Turn Off Switching Energy		72			
$t_{d(on)}$	Turn-On Delay Time		15		ns	V_{DD} = 800 V, V_{GS} = -5/20 V I_D = 20 A, $R_{G(ext)}$ = 2.5 Ω, R_L = 40 Ω, Timing relative to V_{DS} Per IEC60747-8-4 pg 83
t_r	Rise Time		22			
$t_{d(off)}$	Turn-Off Delay Time		24			
t_f	Fall Time		14			
$R_{G(int)}$	Internal Gate Resistance		3.9		Ω	f = 1 MHz, V_{AC} = 25 mV
Q_{gs}	Gate to Source Charge		17		nC	V_{DS} = 800 V, V_{GS} = -5/20 V I_D = 20 A Per IEC60747-8-4 pg 21
Q_{gd}	Gate to Drain Charge		29			
Q_g	Total Gate Charge		71			

Reverse Diode Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions
V_{SD}	Diode Forward Voltage	4.3		V	V_{GS} = - 5 V, I_{SD} = 10 A
		3.8		V	V_{GS} = - 5 V, I_{SD} = 10 A, T_J = 150 °C
I_S	Continuous Diode Forward Current		36	A	T_C = 25˚C
t_{rr}	Reverse Recover time	24		ns	V_{GS} = - 5 V, I_{SD} = 20 A, V_R = 800 V dif/dt = 1950 A/µs
Q_{rr}	Reverse Recovery Charge	152		nC	
I_{rrm}	Peak Reverse Recovery Current	10		A	

Note (1): When using SiC Body Diode the maximum recommended V_{GS} = -5V

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.60	0.65	°C/W	
$R_{\theta JA}$	Thermal Resistance From Junction to Ambient		40		

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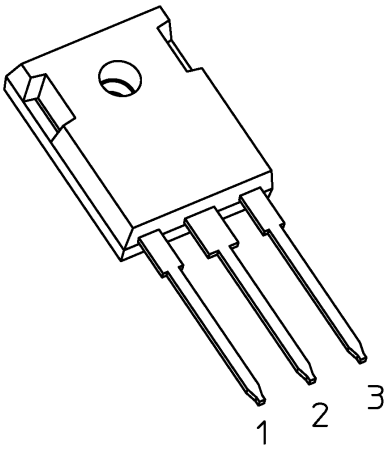
Package Dimensions

Unit: mm



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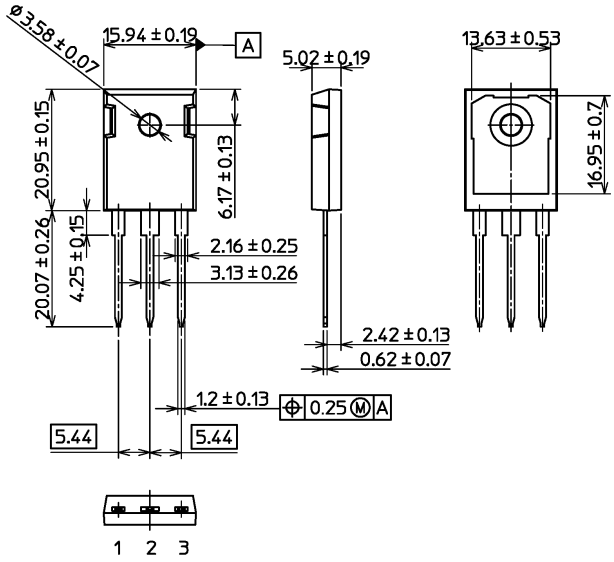
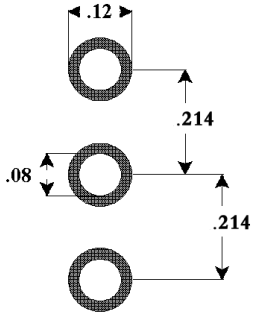


Recommended Solder Pad Layout



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