

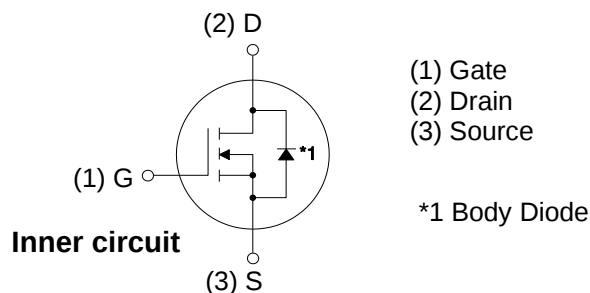
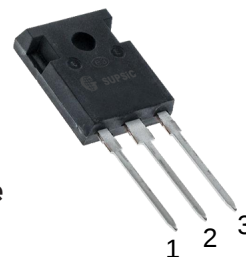
Features

- 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

Applications

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

TO-247-3
Package



Part Number	Marking	Package	V_{DS}	I_D @ 25°C	$R_{DS(on)}$
GC2M0280120D	GC2M0280120	TO247-3	1200 V	11 A	280 mΩ

Maximum Ratings ($T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions
V_{DSmax}	Drain - Source Voltage	1200	V	$V_{GS} = 0\text{ V}$, $I_D = 100\text{ }\mu\text{A}$
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	11	A	$V_{GS} = 20\text{ V}$, $T_C = 25^\circ\text{C}$
		7.5		$V_{GS} = 20\text{ V}$, $T_C = 100^\circ\text{C}$
$I_{D(pulse)}$	Pulsed Drain Current	20	A	Pulse width t_p limited by T_{jmax}
P_D	Power Dissipation	69.4	W	$T_C = 25^\circ\text{C}$, $T_J = 150^\circ\text{C}$
T_J, T_{stg}	Operating Junction and Storage Temperature	-55 to +150	°C	
T_L	Solder Temperature	260	°C	1.6 mm (0.063") from case for 10s
M_d	Mounting Torque	1 8.8	Nm lbf-in	M3 or 6-32 screw

Electrical Characteristics ($T_c = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	1200			V	$V_{GS} = 0\text{ V}, I_D = 100\text{ }\mu\text{A}$
$V_{GS(th)}$	Gate Threshold Voltage	2.0	3.1	4	V	$V_{DS} = V_{GS}, I_D = 1.25\text{mA}$
			2.7		V	$V_{DS} = V_{GS}, I_D = 1.25\text{mA}, T_J = 150^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current		1	100	μA	$V_{DS} = 1200\text{ V}, V_{GS} = 0\text{ V}$
I_{GSS}	Gate-Source Leakage Current			250	nA	$V_{GS} = 20\text{ V}, V_{DS} = 0\text{ V}$
$R_{DS(on)}$	Drain-Source On-State Resistance		320	370	m Ω	$V_{GS} = 20\text{ V}, I_D = 6\text{ A}$
			540			$V_{GS} = 20\text{ V}, I_D = 6\text{ A}, T_J = 150^\circ\text{C}$
g_{fs}	Transconductance		2.6		S	$V_{DS} = 20\text{ V}, I_{DS} = 6\text{ A}$
			2.5			$V_{DS} = 20\text{ V}, I_{DS} = 6\text{ A}, T_J = 150^\circ\text{C}$
C_{iss}	Input Capacitance		269		pF	$V_{GS} = 0\text{ V}$
C_{oss}	Output Capacitance		33			$V_{DS} = 1000\text{ V}$
C_{rss}	Reverse Transfer Capacitance		4			$f = 1\text{ MHz}$
E_{oss}	C_{oss} Stored Energy		17			$V_{AC} = 25\text{ mV}$
E_{ON}	Turn-On Switching Energy (Body Diode)		111		μJ	$V_{DS} = 800\text{ V}, V_{GS} = -5/20\text{ V},$ $I_D = 6\text{ A}, R_{G(ext)} = 2.5\Omega, L = 404\text{ }\mu\text{H}$ FWD = Internal Body Diode of MOSFET
E_{OFF}	Turn Off Switching Energy (Body Diode)		10			
E_{ON}	Turn-On Switching Energy (External Diode)		95		μJ	$V_{DS} = 800\text{ V}, V_{GS} = -5/20\text{ V},$ $I_D = 6\text{ A}, R_{G(ext)} = 2.5\Omega, L = 404\text{ }\mu\text{H}$ FWD = External SiC Diode
E_{OFF}	Turn Off Switching Energy (External Diode)		9.8			
$t_{d(on)}$	Turn-On Delay Time		6		ns	$V_{DD} = 800\text{ V}, V_{GS} = -5/20\text{ V}$ $I_D = 6\text{ A},$ $R_{G(ext)} = 2.5\Omega$, Inductive Load Timing relative to V_{DS} Per IEC60747-8-4 pg 21
t_r	Rise Time		19			
$t_{d(off)}$	Turn-Off Delay Time		10			
t_f	Fall Time		16			
$R_{G(int)}$	Internal Gate Resistance		10		Ω	$f = 1\text{ MHz}, V_{AC} = 25\text{ mV}, \text{ESR of } C_{ISS}$
Q_{gs}	Gate to Source Charge		6		nC	$V_{DS} = 800\text{ V}, V_{GS} = -5/20\text{ V}$ $I_D = 6\text{ A}$ Per IEC60747-8-4 pg 21
Q_{gd}	Gate to Drain Charge		7			
Q_g	Gate Charge Total		19			

Reverse Diode Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions
V_{SD}	Diode Forward Voltage	4.3		V	$V_{GS} = -5\text{ V}, I_{SD} = 3\text{ A}$
		3.8		V	$V_{GS} = -5\text{ V}, I_{SD} = 3\text{ A}, T_J = 150\text{ }^{\circ}\text{C}$
I_S	Continuous Diode Forward Current		12	A	$V_{GS} = -5\text{ V}, T_C = 25\text{ }^{\circ}\text{C}$
$I_{S, pulse}$	Diode Pulse Current		20		$V_{GS} = -5\text{ V}$, Pulse width t_p limited by T_{jmax}
t_{rr}	Reverse Recovery time	17		ns	$V_{GS} = -5\text{ V}, I_{SD} = 6\text{ A}, V_R = 800\text{ V}$ $dif/dt = 2985\text{ A}/\mu\text{s}$
Q_{rr}	Reverse Recovery Charge	48		nC	
I_{rrm}	Peak Reverse Recovery Current	5		A	
t_{rr}	Reverse Recovery time	25		ns	$V_{GS} = -5\text{ V}, I_{SD} = 6\text{ A}, V_R = 800\text{ V}$ $dif/dt = 1000\text{ A}/\mu\text{s}$
Q_{rr}	Reverse Recovery Charge	45		nC	
I_{rrm}	Peak Reverse Recovery Current	4		A	

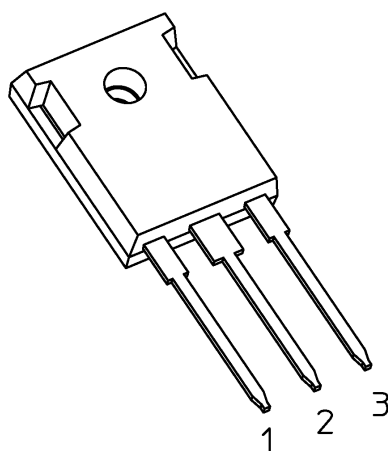
Note (1): When using SiC Body Diode the maximum recommended $V_{GS} = -5\text{ V}$

Thermal Characteristics

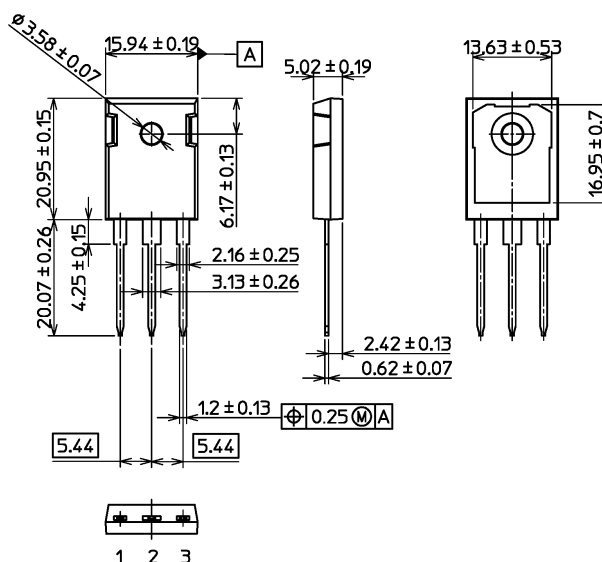
Symbol	Parameter	Typ.	Max.	Unit	Test Conditions
$R_{\theta JC}$	Thermal Resistance from Junction to Case	1.53	1.8	$^{\circ}\text{C}/\text{W}$	
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient		40		

Package Dimensions

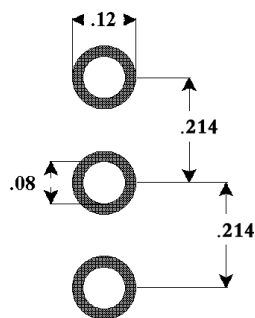
Unit: mm



TO-247-3



Recommended Solder Pad Layout



TO-247-3