



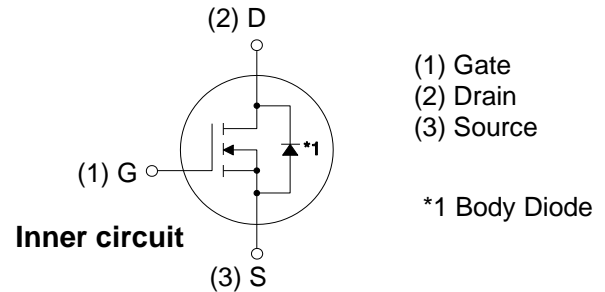
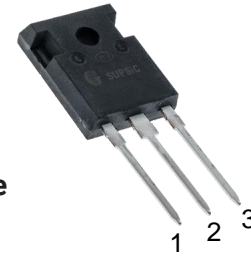
Features

- 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}	$I_D @ 25^\circ C$	$R_{DS(on)}$
GC2M0025120D	GC2M0025120	TO-247-3	1200 V	90 A	25 m Ω

Maximum Ratings ($T_c = 25^\circ C$ unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions
V_{DSmax}	Drain - Source Voltage	1200	V	$V_{GS} = 0 V, I_D = 100 \mu A$
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	90	A	$V_{GS} = 20 V, T_C = 25^\circ C$
		60		$V_{GS} = 20 V, T_C = 100^\circ C$
$I_{D(pulse)}$	Pulsed Drain Current	250	A	Pulse width t_p limited by T_{jmax}
P_D	Power Dissipation	378	W	$T_c = 25^\circ C, T_J = 150^\circ C$
T_J, T_{stg}	Operating Junction and Storage Temperature	-55 to +150	$^\circ C$	
T_L	Solder Temperature	260	$^\circ C$	1.6mm (0.063") from case for 10s
M_d	Mounting Torque	1	Nm lbf-in	M3 or 6-32 screw
		8.8		

Note (1): Die limits are 90A (25°C) and 60A (100°C)

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	$V_{GS} = 0\text{ V}, I_D = 100\ \mu\text{A}$
$V_{GS(th)}$	Gate Threshold Voltage	2.0	2.6	4	V	$V_{DS} = V_{GS}, I_D = 15\text{mA}$
			2.3		V	$V_{DS} = V_{GS}, I_D = 15\text{mA}, T_J = 150^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current		2	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		25	34	m Ω	$V_{GS} = 20\text{ V}, I_D = 50\text{ A}$
			41			$V_{GS} = 20\text{ V}, I_D = 50\text{ A}, T_J = 150^\circ\text{C}$
g_{fs}	Transconductance		24.6		S	$V_{DS} = 20\text{ V}, I_{DS} = 50\text{ A}$
			24			$V_{DS} = 20\text{ V}, I_{DS} = 50\text{ A}, T_J = 150^\circ\text{C}$
C_{iss}	Input Capacitance		3142		pF	$V_{GS} = 0\text{ V}$
C_{oss}	Output Capacitance		223			$V_{DS} = 1000\text{ V}$
C_{rss}	Reverse Transfer Capacitance		9			$f = 1\text{ MHz}$
E_{oss}	C_{oss} Stored Energy		128			$V_{AC} = 25\text{ mV}$
E_{ON}	Turn-On Switching Energy (Body Diode)		2.18		mJ	$V_{DS} = 800\text{ V}, V_{GS} = -5/20\text{ V},$ $I_D = 50\text{A}, R_{G(ext)} = 2.5\Omega, L = 99\ \mu\text{H}$ FWD = Internal Body Diode of MOSFET
E_{OFF}	Turn Off Switching Energy (Body Diode)		0.68			
E_{ON}	Turn-On Switching Energy (External SiC Diode)		1.14		mJ	$V_{DS} = 800\text{ V}, V_{GS} = -5/20\text{ V},$ $I_D = 50\text{A}, R_{G(ext)} = 2.5\Omega, L = 99\ \mu\text{H}$ FWD = External SiC Diode
E_{OFF}	Turn Off Switching Energy (External SiC Diode)		0.8			
$t_{d(on)}$	Turn-On Delay Time		15		ns	$V_{DD} = 800\text{ V}, V_{GS} = -5/20\text{ V}$ $I_D = 50\text{ A},$ $R_{G(ext)} = 2.5\ \Omega,$ Inductive Load Timing relative to V_{DS} Per IEC60747-8-4 pg 83
t_r	Rise Time		58			
$t_{d(off)}$	Turn-Off Delay Time		33			
t_f	Fall Time		17			
$R_{G(int)}$	Internal Gate Resistance		1.0		Ω	$f = 1\text{ MHz}, V_{AC} = 25\text{ mV}, \text{ESR of } C_{iss}$
Q_{gs}	Gate to Source Charge		46		nC	$V_{DS} = 800\text{ V}, V_{GS} = -5/20\text{ V}$ $I_D = 50\text{ A}$ Per IEC60747-8-4 pg 21
Q_{gd}	Gate to Drain Charge		71.5			
Q_g	Total Gate Charge		194			

Reverse Diode Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions
V _{SD}	Diode Forward Voltage	4.1		V	V _{GS} = - 5 V, I _{SD} = 25 A
		3.5		V	V _{GS} = - 5 V, I _{SD} = 25 A, T _J = 150 °C
I _S	Continuous Diode Forward Current		90	A	V _{GS} = - 5 V, T _C = 25 °C
I _{S,pulse}	Diode Pulse Current		250	A	V _{GS} = - 5 V, Pulse width t _p limited by T _{Jmax}
t _{rr}	Reverse Recovery Time	33		ns	V _{GS} = - 5 V, I _{SD} = 50 A, T _J = 25 °C VR = 800 V dif/dt = 2180 A/μs
Q _{rr}	Reverse Recovery Charge	487		nC	
I _{rrm}	Peak Reverse Recovery Current	24		A	V _{GS} = - 5 V, I _{SD} = 50 A, T _J = 25 °C VR = 800 V dif/dt = 1320 A/μs
t _{rr}	Reverse Recovery Time	67		ns	
Q _{rr}	Reverse Recovery Charge	386		nC	
I _{rrm}	Peak Reverse Recovery Current	15		A	

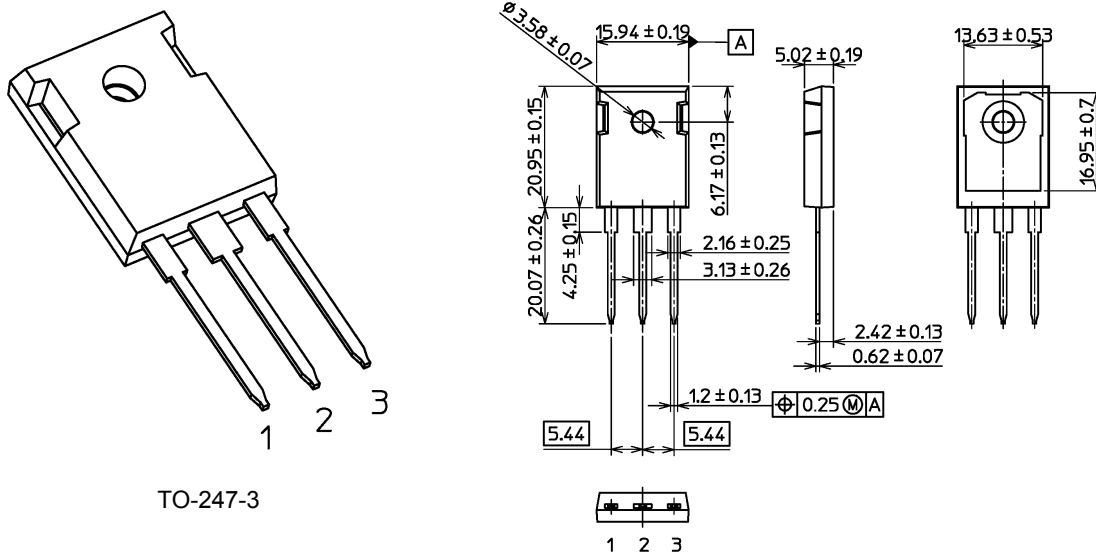
Note (2): When using SiC Body Diode the maximum recommended V_{GS} = -5V

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions
R _{θJC}	Thermal Resistance from Junction to Case	0.24	0.33	°C/W	
R _{θJA}	Thermal Resistance from Junction to Ambient		40		

Package Dimensions

Unit: mm



Recommended Solder Pad Layout

