

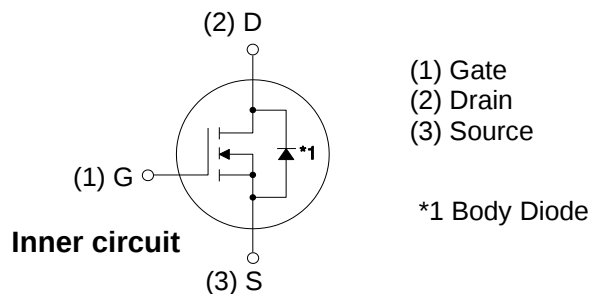
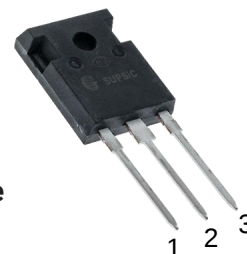
Features

- 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	$R_{DS(on)}$
GC3M0021120D	GC3M0021120	TO-247-3	1200 V	81 A	21 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 (dynamic)	-8/+19	V	AC ($f > 1\text{ Hz}$)
V_{GSop}	Gate - Source Voltage (static)	-4/+15	V	Static
I_D	Continuous Drain Current	81	A	$V_{GS} = 15\text{ V}$, $T_C = 25^\circ\text{C}$
		56		$V_{GS} = 15\text{ V}$, $T_C = 100^\circ\text{C}$
$I_{D(pulse)}$	Pulsed Drain Current	200	A	Pulse width t_p limited by T_{jmax}
P_D	Power Dissipation	473	W	$T_C = 25^\circ\text{C}$, $T_J = 175^\circ\text{C}$
T_J, T_{stg}	Operating Junction and Storage Temperature	-40 to +175	°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

Note (1): When using MOSFET Body Diode $V_{GSmax} = -4\text{V}/+19\text{V}$

Note (2): MOSFET can also safely operate at 0/+15 V

Note (3): Die limits are 100A (25°C) and 74A (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	$V_{GS} = 0\text{ V}, I_D = 100\text{ }\mu\text{A}$
$V_{GS(th)}$	Gate Threshold Voltage	1.8	2.5	3.6	V	$V_{DS} = V_{GS}, I_D = 17.7\text{ mA}$
			2.0		V	$V_{DS} = V_{GS}, I_D = 17.7\text{ mA}, T_J = 175^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current		1	50	μA	$V_{DS} = 1200\text{ V}, V_{GS} = 0\text{ V}$
I_{GSS}	Gate-Source Leakage Current		10	250	nA	$V_{GS} = 15\text{ V}, V_{DS} = 0\text{ V}$
$R_{DS(on)}$	Drain-Source On-State Resistance	14.7	21	28.8	m Ω	$V_{GS} = 15\text{ V}, I_D = 50\text{ A}$
			38			$V_{GS} = 15\text{ V}, I_D = 50\text{ A}, T_J = 175^\circ\text{C}$
g_{fs}	Transconductance		35		S	$V_{DS} = 20\text{ V}, I_{DS} = 50\text{ A}$
			33			$V_{DS} = 20\text{ V}, I_{DS} = 50\text{ A}, T_J = 175^\circ\text{C}$
C_{iss}	Input Capacitance		4816		pF	$V_{GS} = 0\text{ V}, V_{DS} = 1000\text{ V}$ $f = 100\text{ KHz}$ $V_{AC} = 25\text{ mV}$
C_{oss}	Output Capacitance		180			
C_{rss}	Reverse Transfer Capacitance		12			
E_{oss}	C_{oss} Stored Energy		99			
E_{ON}	Turn-On Switching Energy (SiC Diode FWD)		3.05		mJ	$V_{DS} = 800\text{ V}, V_{GS} = -4\text{ V}/+15\text{ V}, I_D = 50\text{ A},$ $R_{G(ext)} = 5\Omega, L = 65.7\text{ }\mu\text{H}, T_J = 175^\circ\text{C}$
E_{OFF}	Turn Off Switching Energy (SiC Diode FWD)		1.67			
E_{ON}	Turn-On Switching Energy (Body Diode FWD)		4.65		mJ	$V_{DS} = 800\text{ V}, V_{GS} = -4\text{ V}/+15\text{ V}, I_D = 50\text{ A},$ $R_{G(ext)} = 5\Omega, L = 65.7\text{ }\mu\text{H}, T_J = 175^\circ\text{C}$
E_{OFF}	Turn Off Switching Energy (Body Diode FWD)		1.58			
$t_{d(on)}$	Turn-On Delay Time		142		ns	$V_{DD} = 800\text{ V}, V_{GS} = -4\text{ V}/15\text{ V}$ $R_{G(ext)} = 2.5\Omega, L = 65.7\text{ }\mu\text{H}$ Timing relative to VDS, Inductive load
t_r	Rise Time		27			
$t_{d(off)}$	Turn-Off Delay Time		72			
t_f	Fall Time		25			
$R_{G(int)}$	Internal Gate Resistance		3.3		Ω	$f = 1\text{ MHz}, V_{AC} = 25\text{ mV}$
Q_{gs}	Gate to Source Charge		51		nC	$V_{DS} = 800\text{ V}, V_{GS} = -4\text{ V}/15\text{ V}$ $I_D = 50\text{ A}$ Per IEC60747-8-4 pg 21
Q_{gd}	Gate to Drain Charge		54			
Q_g	Total Gate Charge		160			

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

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions
V_{SD}	Diode Forward Voltage	4.6		V	$V_{GS} = -4\text{ V}, I_{SD} = 25\text{ A}, T_J = 25^\circ\text{C}$
		4.2		V	$V_{GS} = -4\text{ V}, I_{SD} = 25\text{ A}, T_J = 175^\circ\text{C}$
I_S	Continuous Diode Forward Current		90	A	$V_{GS} = -4\text{ V}, T_c = 25^\circ\text{C}$
$I_{S, pulse}$	Diode pulse Current		200	A	$V_{GS} = -4\text{ V},$ pulse width t_p limited by T_{jmax}
t_{rr}	Reverse Recover time	81		ns	$V_{GS} = -4\text{ V}, I_{SD} = 50\text{ A}, V_R = 800\text{ V}$ $\text{dif}/\text{dt} = 1000\text{ A}/\mu\text{s}, T_J = 175^\circ\text{C}$
Q_{rr}	Reverse Recovery Charge	879		nC	
I_{rrm}	Peak Reverse Recovery Current	19		A	

Thermal Characteristics

Symbol	Parameter	Typ.	Unit	Test Conditions
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.32	$^\circ\text{C}/\text{W}$	
$R_{\theta JA}$	Thermal Resistance From Junction to Ambient	40		



Package Dimensions

A perspective view of a 3-pin DIN connector. The connector has a rectangular body with a circular hole on the top surface. Three pins extend from the bottom, labeled 1, 2, and 3 from left to right.

Technical drawing of a 3-pin connector assembly. The drawing includes three views: a front view (top left), a side view (top right), and a bottom view (bottom center). Dimensions are given in millimeters.

Front View (Top Left):

- Top pin diameter: $\varnothing 3.58 \pm 0.07$
- Top pin length: 15.94 ± 0.19
- Top pin diameter at base: 6.17 ± 0.13
- Top pin diameter at base: 2.16 ± 0.25
- Top pin diameter at base: 3.13 ± 0.26
- Top pin diameter at base: 20.07 ± 0.26
- Top pin diameter at base: 4.25 ± 0.15
- Top pin diameter at base: 20.95 ± 0.15
- Top pin diameter at base: 5.44
- Top pin diameter at base: 5.44
- Top pin diameter at base: 1.2 ± 0.13
- Top pin diameter at base: $\varnothing 0.25 \text{ (M) A}$

Side View (Top Right):

- Top pin length: 5.02 ± 0.19
- Top pin diameter: 13.63 ± 0.53
- Top pin diameter: 16.95 ± 0.7
- Top pin diameter: 2.42 ± 0.13
- Top pin diameter: 0.62 ± 0.07

Bottom View (Bottom Center):

- Bottom pin diameter: 1
- Bottom pin diameter: 2
- Bottom pin diameter: 3

Copyright © 2021 Wuxi Gwok Semiconductor Co.,Ltd All rights reserved.