

Features

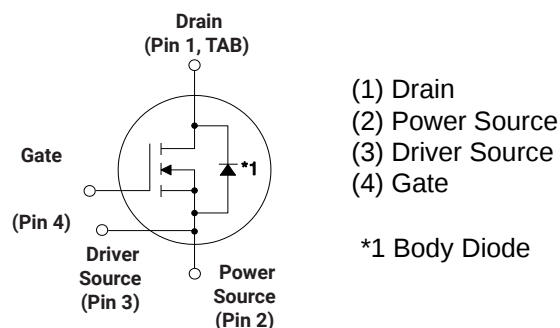
- 1) Low on-resistance
- 2) Fast switching speed
- 3) Fast reverse recovery
- 4) Easy to parallel
- 5) Simple to drive
- 6) Pb-free lead plating ; RoHS compliant

Applications

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



Inner circuit



Part Number	Marking	Package	V_{DS}	I_D @ 25°C	$R_{DS(on)}$
GC3M0021120K	GC3M0021120	TO247-4	1200 V	100 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	100	A	$V_{GS} = 15\text{ V}, T_C = 25^\circ\text{C}$
		74		$V_{GS} = 15\text{ V}, T_C = 100^\circ\text{C}$
$I_{D(pulse)}$	Pulsed Drain Current	200	A	Pulse width t_p limited by T_{jmax}
P_D	Power Dissipation	469	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

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

**SUPSiC®****Electrical Characteristics** ($T_c = 25^\circ\text{C}$ unless otherwise specified)无锡国晶微半导体技术有限公司
Wuxi Gwok Semiconductor Co.,Ltd**GC3M0021120K**
Silicon Carbide Power MOSFET
N-Channel Enhancement Mode

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		21	28.8	$\text{m}\Omega$	$V_{GS} = 15\text{ V}, I_D = 50\text{ A}$
			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		4823		pF	$V_{GS} = 0\text{ V}, V_{DS} = 1000\text{ V}$ $f = 1\text{ MHz}$ $V_{AC} = 25\text{ mV}$
C_{oss}	Output Capacitance		183			
C_{rss}	Reverse Transfer Capacitance		12			
E_{oss}	C_{oss} Stored Energy		99			
E_{ON}	Turn-On Switching Energy (SiC Diode FWD)		0.69		mJ	$V_{DS} = 800\text{ V}, V_{GS} = -4\text{ V}/+15\text{ V}, I_D = 50\text{ A},$ $R_{G(ext)} = 2.5\Omega, L = 157\text{ }\mu\text{H}, T_J = 175^\circ\text{C}$
E_{OFF}	Turn Off Switching Energy (SiC Diode FWD)		0.42			
E_{ON}	Turn-On Switching Energy (Body Diode FWD)		1.58		mJ	$V_{DS} = 800\text{ V}, V_{GS} = -4\text{ V}/+15\text{ V}, I_D = 50\text{ A},$ $R_{G(ext)} = 2.5\Omega, L = 157\text{ }\mu\text{H}, T_J = 175^\circ\text{C}$
E_{OFF}	Turn Off Switching Energy (Body Diode FWD)		0.34			
$t_{d(on)}$	Turn-On Delay Time		29		ns	$V_{DD} = 800\text{ V}, V_{GS} = -4\text{ V}/15\text{ V}$ $R_{G(ext)} = 2.5\Omega,$ $L = 157\text{ }\mu\text{H}$
t_r	Rise Time		33			
$t_{d(off)}$	Turn-Off Delay Time		57			
t_f	Fall Time		14			
$R_{G(int)}$	Internal Gate Resistance		3.3		Ω	$f = 1\text{ MHz}, V_{AC} = 25\text{ mV}$
Q_{gs}	Gate to Source Charge		49		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		50			
Q_g	Total Gate Charge		162			

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

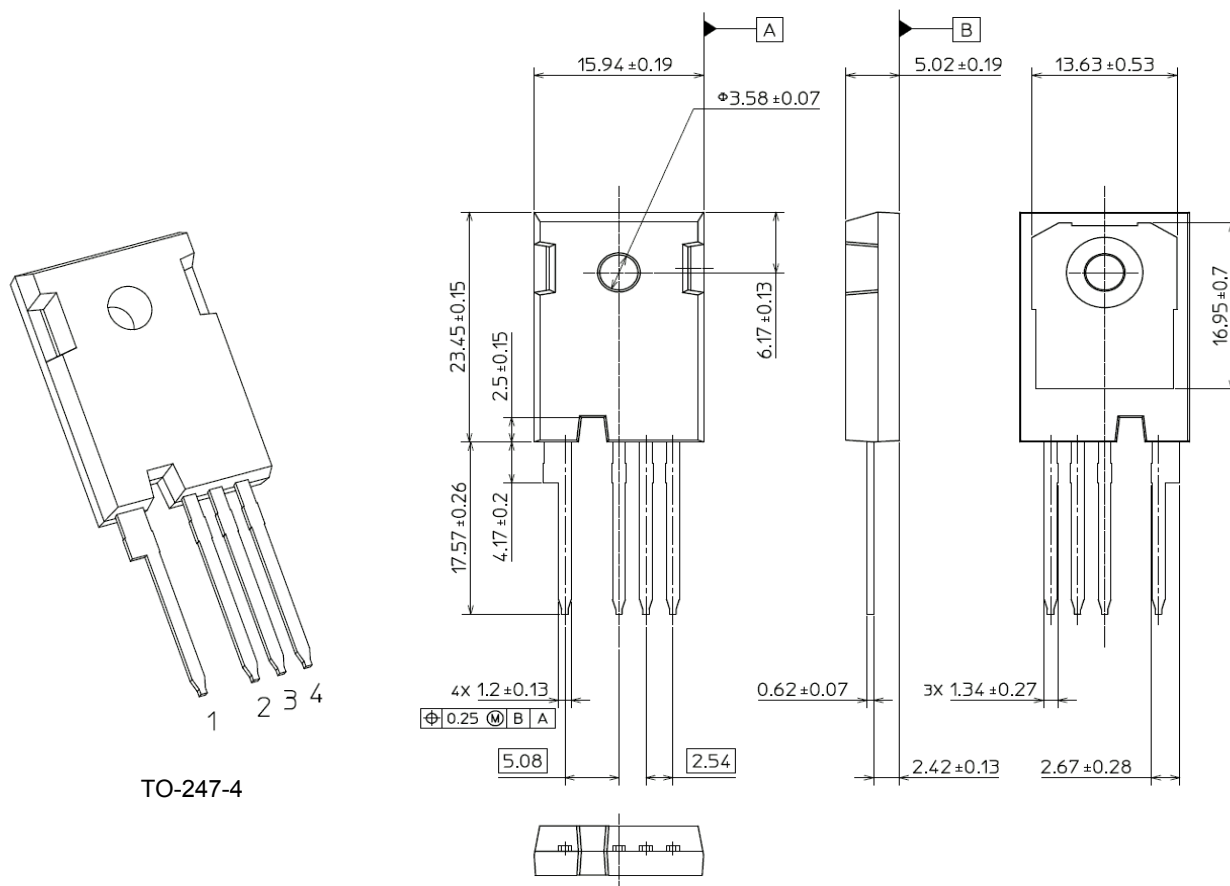
Symbol	Parameter	Typ.	Max.	Unit	Test Conditions
V_{SD}	Diode Forward Voltage	4.6		V	$V_{GS} = -4\text{ V}, I_{SD} = 25\text{ A}, T_J = 25^\circ\text{C}$
		4.2		V	$V_{GS} = -4\text{ V}, I_{SD} = 25\text{ A}, T_J = 175^\circ\text{C}$
I_S	Continuous Diode Forward Current		90	A	$V_{GS} = -4\text{ V}, T_c = 25^\circ\text{C}$
$I_{S, pulse}$	Diode pulse Current		200	A	$V_{GS} = -4\text{ V},$ pulse width t_p limited by T_{jmax}
t_{rr}	Reverse Recover time	34		ns	$V_{GS} = -4\text{ V}, I_{SD} = 50\text{ A}, V_R = 800\text{ V}$ $\text{dif}/\text{dt} = 2600\text{ A}/\mu\text{s}, T_J = 175^\circ\text{C}$
Q_{rr}	Reverse Recovery Charge	928		nC	
I_{rrm}	Peak Reverse Recovery Current	42		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

Unit: mm



Recommended Solder Pad Layout

