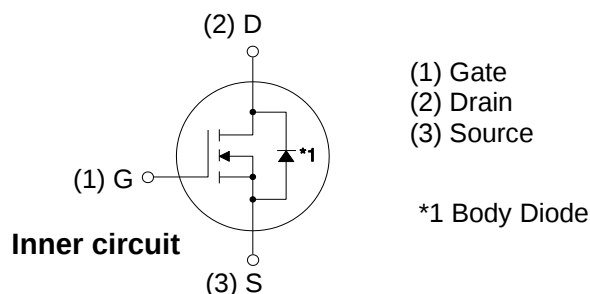
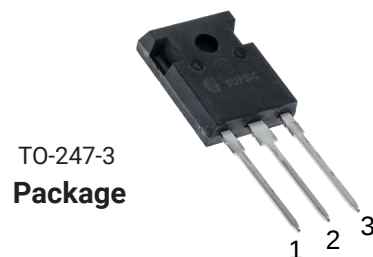


Features

- 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



Part Number	Marking	Package	V_{DS}	I_D @ 25°C	$R_{DS(on)}$
GC2M0040120D	GC2M0040120	TO-247-3	1200 V	55 A	40 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	55	A	$V_{GS} = 20\text{ V}$, $T_C = 25^\circ\text{C}$
		36		$V_{GS} = 20\text{ V}$, $T_C = 100^\circ\text{C}$
$I_{D(pulse)}$	Pulsed Drain Current	160	A	Pulse width t_p limited by T_{jmax}
P_D	Power Dissipation	278	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	1.6mm (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	3.2	4	V	$V_{DS} = V_{GS}, I_D = 10\text{ mA}$
			2.4		V	$V_{DS} = V_{GS}, I_D = 10\text{ mA}, T_J = 150^\circ\text{C}$
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		44	52	m Ω	$V_{GS} = 20\text{ V}, I_D = 40\text{ A}$
			82			$V_{GS} = 20\text{ V}, I_D = 40\text{ A}, T_J = 150^\circ\text{C}$
g_{fs}	Transconductance		18.2		S	$V_{DS} = 20\text{ V}, I_{DS} = 40\text{ A}$
			17.2			$V_{DS} = 20\text{ V}, I_{DS} = 40\text{ A}, T_J = 150^\circ\text{C}$
C_{iss}	Input Capacitance		2446		pF	$V_{GS} = 0\text{ V}$
C_{oss}	Output Capacitance		176			$V_{DS} = 1000\text{ V}$
C_{rss}	Reverse Transfer Capacitance		11			$f = 1\text{ MHz}$
E_{oss}	C_{oss} Stored Energy		89		μJ	$V_{AC} = 25\text{ mV}$
E_{ON}	Turn-On Switching Energy (Body Diode)		1.7		mJ	$V_{DS} = 800\text{ V}, V_{GS} = -5/20\text{ V}$
E_{OFF}	Turn Off Switching Energy (Body Diode)		0.4			$I_D = 40\text{ A}, R_{G(ext)} = 2.5\Omega, L = 99\text{ }\mu\text{H}$
E_{ON}	Turn-On Switching Energy (External SiC Diode)		1.3			$V_{DS} = 800\text{ V}, V_{GS} = -5/20\text{ V}$
E_{OFF}	Turn Off Switching Energy (External SiC Diode)		0.4			$I_D = 40\text{ A}, R_{G(ext)} = 2.5\Omega, L = 99\text{ }\mu\text{H}$
$t_{d(on)}$	Turn-On Delay Time		13		ns	$V_{DD} = 800\text{ V}, V_{GS} = -5/20\text{ V}$
t_r	Rise Time		61			$I_D = 40\text{ A}$
$t_{d(off)}$	Turn-Off Delay Time		25			$R_{G(ext)} = 2.5\Omega, R_L = 20\Omega$
t_f	Fall Time		13			Timing relative to V_{DS} Per IEC60747-8-4 pg 83
$R_{G(int)}$	Internal Gate Resistance		1.8		Ω	$f = 1\text{ MHz}, V_{AC} = 25\text{ mV}$
Q_{gs}	Gate to Source Charge		34		nC	$V_{DS} = 800\text{ V}, V_{GS} = -5/20\text{ V}$
Q_{gd}	Gate to Drain Charge		42			$I_D = 40\text{ A}$
Q_g	Total Gate Charge		120			Per IEC60747-8-4 pg 21

Reverse Diode Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_{SD}	Diode Forward Voltage	4.0		V	$V_{GS} = -5\text{ V}, I_{SD} = 20\text{ A}, T_J = 25\text{ }^{\circ}\text{C}$	Fig. 8, 9, 10
		3.6		V	$V_{GS} = -5\text{ V}, I_{SD} = 20\text{ A}, T_J = 150\text{ }^{\circ}\text{C}$	
I_S	Continuous Diode Forward Current		60	A	$T_C = 25\text{ }^{\circ}\text{C}$	Note 1
$I_{S, \text{pulse}}$	Diode Pulse Current		160	A	$V_{GS} = -5\text{ V}$, Pulse width t_P limited by T_{jmax}	
t_{rr}	Reverse Recovery Time	54		ns	$V_{GS} = -5\text{ V}, I_{SD} = 40\text{ A}, T_J = 25\text{ }^{\circ}\text{C}$ $VR = 800\text{ V}$ $dif/dt = 1000\text{ A}/\mu\text{s}$	Note 1
Q_{rr}	Reverse Recovery Charge	283		nC		
I_{rrm}	Peak Reverse Recovery Current	15		A		

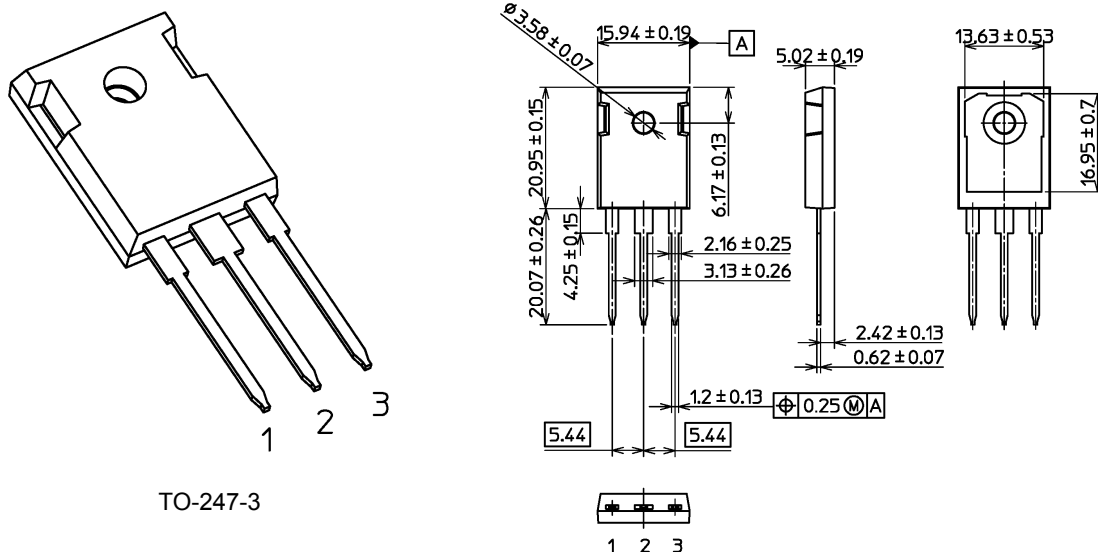
Note (1): When using SiC Body Diode the maximum recommended $V_{GS} = -5\text{V}$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.33	0.45	$^{\circ}\text{C}/\text{W}$		Fig. 21
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient		40			

Package Dimensions

Unit: mm



Recommended Solder Pad Layout

