

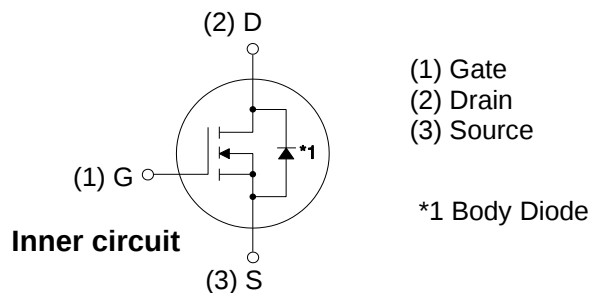
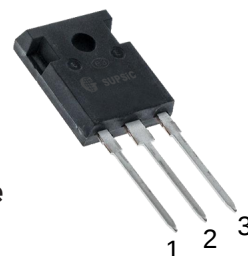
Features

- 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

T0-247-3
Package



Part Number	Marking	Package	V_{DS}	$I_D @ 25^\circ C$	$R_{DS(on)}$
GC3M0016120D	GC3M0016120	TO-247-3	1200 V	115 A	16 mΩ

Maximum Ratings

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 (dynamic)	-8/+19	V	AC (f > 1 Hz)
V_{GSop}	Gate - Source Voltage (static)	-4/+15	V	Static
I_D	Continuous Drain Current	115	A	$V_{GS} = 15 V, T_C = 25^\circ C$
		85		$V_{GS} = 15 V, T_C = 100^\circ C$
$I_{D(pulse)}$	Pulsed Drain Current	250	A	Pulse width t_p limited by T_{jmax}
P_D	Power Dissipation	556	W	$T_C = 25^\circ C, T_J = 175^\circ C$
T_J, T_{stg}	Operating Junction and Storage Temperature	-40 to +175	$^\circ C$	
T_L	Solder Temperature	260	$^\circ C$	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	1.8	2.5	3.6	V	$V_{DS} = V_{GS}, I_D = 23\text{ mA}$
			2.0		V	$V_{DS} = V_{GS}, I_D = 23\text{ mA}, T_J = 175^\circ\text{C}$
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	11.2	16	22.3	m Ω	$V_{GS} = 15\text{ V}, I_D = 75\text{ A}$
			28.8			$V_{GS} = 15\text{ V}, I_D = 75\text{ A}, T_J = 175^\circ\text{C}$
g_{fs}	Transconductance		53		S	$V_{DS} = 20\text{ V}, I_{DS} = 75\text{ A}$
			47			$V_{DS} = 20\text{ V}, I_{DS} = 75\text{ A}, T_J = 175^\circ\text{C}$
C_{iss}	Input Capacitance		6085		pF	$V_{GS} = 0\text{ V}, V_{DS} = 1000\text{ V}$ $f = 100\text{ KHz}$ $V_{AC} = 25\text{ mV}$
C_{oss}	Output Capacitance		230			
C_{rss}	Reverse Transfer Capacitance		13			
E_{oss}	C_{oss} Stored Energy		130		μJ	
E_{ON}	Turn-On Switching Energy (SiC Diode FWD)		4.64		mJ	$V_{DS} = 800\text{ V}, V_{GS} = -4\text{ V}/+15\text{ V}, I_D = 75\text{ A},$ $R_{G(ext)} = 5\Omega, L = 65.7\text{ }\mu\text{H}, T_J = 175^\circ\text{C}$
E_{OFF}	Turn Off Switching Energy (SiC Diode FWD)		2.93			
E_{ON}	Turn-On Switching Energy (Body Diode FWD)		7.79		mJ	$V_{DS} = 800\text{ V}, V_{GS} = -4\text{ V}/+15\text{ V}, I_D = 75\text{ A},$ $R_{G(ext)} = 5\Omega, L = 65.7\text{ }\mu\text{H}, T_J = 175^\circ\text{C}$
E_{OFF}	Turn Off Switching Energy (Body Diode FWD)		2.95			
$t_{d(on)}$	Turn-On Delay Time		174		ns	$V_{DD} = 800\text{ V}, V_{GS} = -4\text{ V}/15\text{ V}$ $R_{G(ext)} = 5\Omega, I_D = 75\text{ A}, L = 65.7\text{ }\mu\text{H}$ Timing relative to V_{DS} , Inductive load
t_r	Rise Time		28			
$t_{d(off)}$	Turn-Off Delay Time		84			
t_f	Fall Time		27			
$R_{G(int)}$	Internal Gate Resistance		2.6		Ω	$f = 1\text{ MHz}, V_{AC} = 25\text{ mV}$
Q_{gs}	Gate to Source Charge		70		nC	$V_{DS} = 800\text{ V}, V_{GS} = -4\text{ V}/15\text{ V}$ $I_D = 75\text{ A}$ Per IEC60747-8-4 pg 21
Q_{gd}	Gate to Drain Charge		60			
Q_g	Total Gate Charge		207			

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	$V_{GS} = -4\text{ V}, I_{SD} = 37.5\text{ A}, T_J = 25^\circ\text{C}$
		4.2		V	$V_{GS} = -4\text{ V}, I_{SD} = 37.5\text{ A}, T_J = 175^\circ\text{C}$
I_S	Continuous Diode Forward Current		112	A	$V_{GS} = -4\text{ V}, T_c = 25^\circ\text{C}$
$I_{S, pulse}$	Diode pulse Current		250	A	$V_{GS} = -4\text{ V}$, pulse width t_p limited by T_{jmax}
t_{rr}	Reverse Recover time	96		ns	$V_{GS} = -4\text{ V}, I_{SD} = 75\text{ A}, V_R = 800\text{ V}$ $dif/dt = 900\text{ A}/\mu\text{s}, T_J = 175^\circ\text{C}$
Q_{rr}	Reverse Recovery Charge	604		nC	
I_{rrm}	Peak Reverse Recovery Current	15		A	
t_{rr}	Reverse Recover time	58		ns	$V_{GS} = -4\text{ V}, I_{SD} = 75\text{ A}, V_R = 800\text{ V}$ $dif/dt = 1400\text{ A}/\mu\text{s}, T_J = 175^\circ\text{C}$
Q_{rr}	Reverse Recovery Charge	672		nC	
I_{rrm}	Peak Reverse Recovery Current	22		A	

Thermal Characteristics

Symbol	Parameter	Typ.	Unit	Test Conditions
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.27	$^\circ\text{C}/\text{W}$	
$R_{\theta JA}$	Thermal Resistance From Junction to Ambient	40		



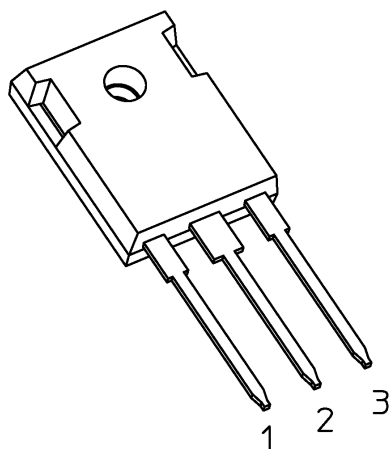
GC3M0016120D

Silicon Carbide Power MOSFET

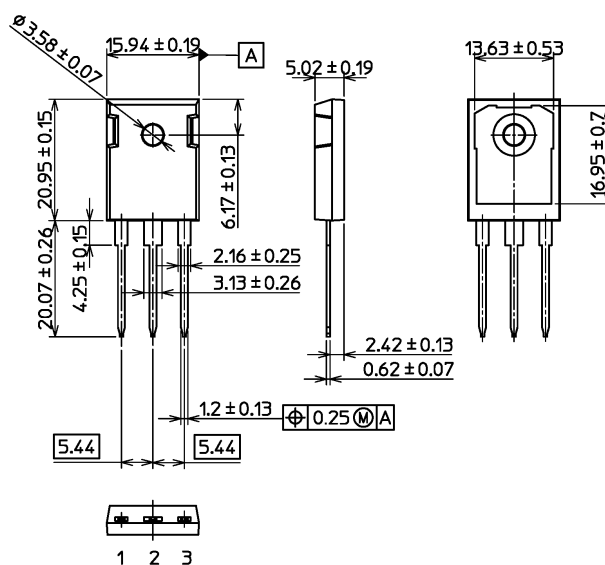
N-Channel Enhancement Mode

Package Dimensions

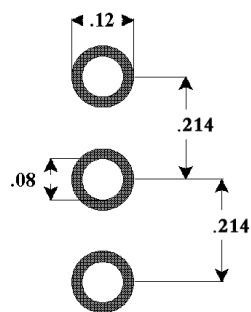
Unit: mm



TO-247-3



Recommended Solder Pad Layout



TO-247-3