

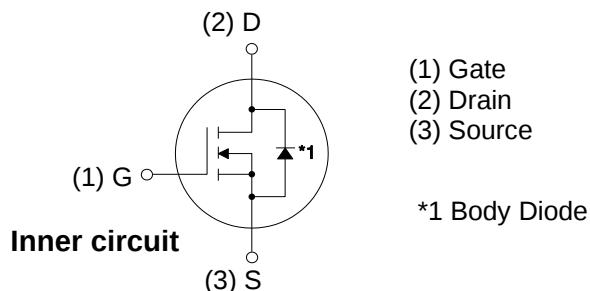
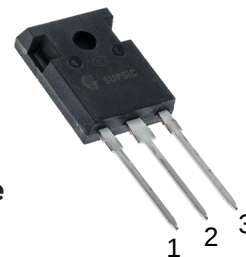
Features

- 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	$R_{DS(on)}$
GC3M0065090D	GC3M0065090	TO-247-3	900 V	36 A	65 mΩ

Maximum Ratings ($T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions
V_{DSmax}	Drain - Source Voltage	900	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	36	A	$V_{GS} = 15\text{ V}, T_C = 25^\circ\text{C}$
		23		$V_{GS} = 15\text{ V}, T_C = 100^\circ\text{C}$
$I_{D(pulse)}$	Pulsed Drain Current	90	A	Pulse width t_p limited by T_{jmax}
E_{AS}	Avalanche energy, Single pulse	110	mJ	$I_D = 22\text{ A}, V_{DD} = 50\text{ V}$
P_D	Power Dissipation	125	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

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

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	900			V	$V_{GS} = 0\text{ V}, I_D = 100\text{ }\mu\text{A}$
$V_{GS(th)}$	Gate Threshold Voltage	1.8	2.1	3.5	V	$V_{DS} = V_{GS}, I_D = 5\text{ mA}$
			1.6		V	$V_{DS} = V_{GS}, I_D = 5\text{ mA}, T_J = 150^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current		1	100	μA	$V_{DS} = 900\text{ V}, V_{GS} = 0\text{ V}$
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		65	78	m Ω	$V_{GS} = 15\text{ V}, I_D = 20\text{ A}$
			90			$V_{GS} = 15\text{ V}, I_D = 20\text{ A}, T_J = 150^\circ\text{C}$
g_{fs}	Transconductance		16		S	$V_{DS} = 20\text{ V}, I_{DS} = 20\text{ A}$
			13			$V_{DS} = 20\text{ V}, I_{DS} = 20\text{ A}, T_J = 150^\circ\text{C}$
C_{iss}	Input Capacitance		760		pF	$V_{GS} = 0\text{ V}, V_{DS} = 600\text{ V}$ $f = 1\text{ MHz}$ $V_{AC} = 25\text{ mV}$
C_{oss}	Output Capacitance		66			
C_{rss}	Reverse Transfer Capacitance		5.0			
E_{oss}	C_{oss} Stored Energy		16			
E_{ON}	Turn-On Switching Energy (Body Diode FWD)		343		μJ	$V_{DS} = 400\text{ V}, V_{GS} = -4\text{ V}/15\text{ V}, I_D = 20\text{ A},$ $R_{G(ext)} = 2.5\text{ }\Omega, L = 65.7\text{ }\mu\text{H}, T_J = 150^\circ\text{C}$
E_{OFF}	Turn Off Switching Energy (Body Diode FWD)		46			
$t_{d(on)}$	Turn-On Delay Time		45		ns	$V_{DD} = 400\text{ V}, V_{GS} = -4\text{ V}/15\text{ V}$ $I_D = 20\text{ A}, R_{G(ext)} = 2.5\text{ }\Omega,$ Timing relative to V_{DS} Inductive load
t_r	Rise Time		13			
$t_{d(off)}$	Turn-Off Delay Time		20			
t_f	Fall Time		8			
$R_{G(int)}$	Internal Gate Resistance		3.5		Ω	$f = 1\text{ MHz}, V_{AC} = 25\text{ mV}$
Q_{gs}	Gate to Source Charge		9		nC	$V_{DS} = 400\text{ V}, V_{GS} = -4\text{ V}/15\text{ V}$ $I_D = 20\text{ A}$ Per IEC60747-8-4 pg 21
Q_{gd}	Gate to Drain Charge		13			
Q_g	Total Gate Charge		35			

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

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions
V_{SD}	Diode Forward Voltage	4.4		V	$V_{GS} = -4\text{ V}, I_{SD} = 10\text{ A}$
		4.0		V	$V_{GS} = -4\text{ V}, I_{SD} = 10\text{ A}, T_J = 150^\circ\text{C}$
I_S	Continuous Diode Forward Current		23.5	A	$V_{GS} = -4\text{ V}$
$I_{S, pulse}$	Diode pulse Current		90	A	$V_{GS} = -4\text{ V},$ pulse width t_p limited by T_{jmax}
t_{rr}	Reverse Recovery time	26		ns	$V_{GS} = -4\text{ V}, I_{SD} = 20\text{ A}, V_R = 400\text{ V}$ $dif/dt = 900\text{ A}/\mu\text{s}, T_J = 150^\circ\text{C}$
Q_{rr}	Reverse Recovery Charge	145		nC	
I_{rrm}	Peak Reverse Recovery Current	8		A	

Thermal Characteristics

Symbol	Parameter	Max.	Unit	Test Conditions
$R_{\theta JC}$	Thermal Resistance from Junction to Case	1.0	$^\circ\text{C}/\text{W}$	
$R_{\theta JA}$	Thermal Resistance From Junction to Ambient	40		

Note (3): Turn-off and Turn-on switching energy and timing values measured using SiC MOSFET Body Diode



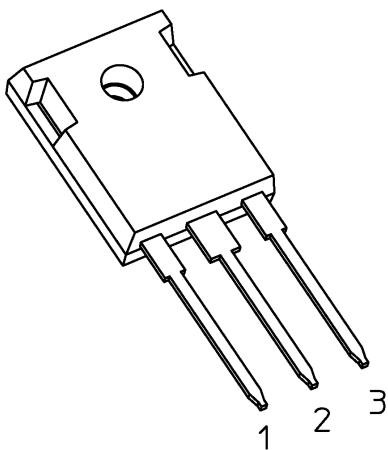
GC3M0065090D

Silicon Carbide Power MOSFET

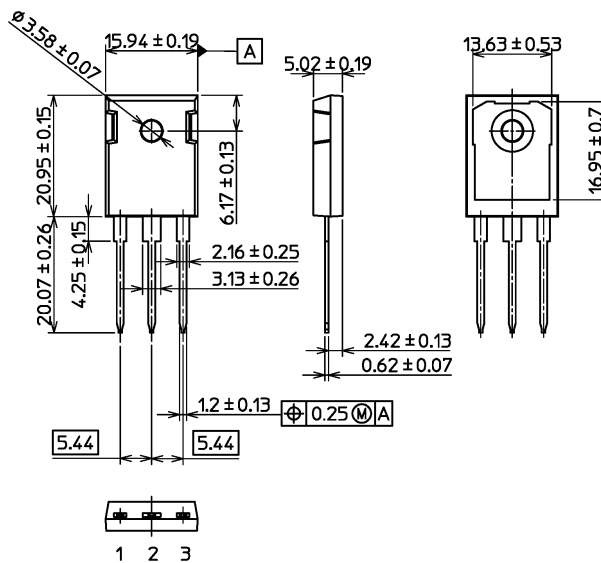
N-Channel Enhancement Mode

Package Dimensions

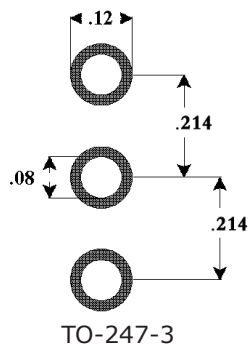
Unit: mm



TO-247-3



Recommended Solder Pad Layout



TO-247-3