

Features

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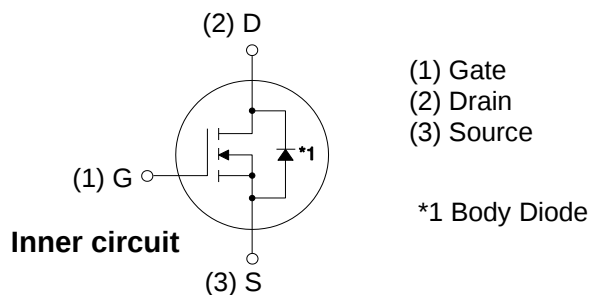
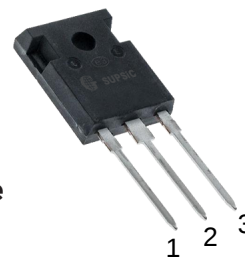
- 1) Low on-resistance
- 2) Fast switching speed
- 3) Fast reverse recovery
- 4) Easy to parallel
- 5) Simple to drive
- 6) Pb-free lead plating ; RoHS compliant

Applications

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



T0-247-3
Package



Part Number	Marking	Package	V_{DS}	$I_D @ 25^\circ\text{C}$	$R_{DS(on)}$
GC2M1000170D	GC2M1000170	T0247-3	1700 V	5.0 A	0.8 Ω

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

Symbol	Parameter	Value	Unit	Test Conditions
V_{DSmax}	Drain - Source Voltage	1700	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	5.0	A	$V_{GS} = 20\text{ V}, T_c = 25^\circ\text{C}$
		3.5		$V_{GS} = 20\text{ V}, T_c = 100^\circ\text{C}$
$I_{D(pulse)}$	Pulsed Drain Current	15	A	Pulse width t_p limited by T_{jmax}
P_D	Power Dissipation	69	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	$^\circ\text{C}$	
T_L	Solder Temperature	260	$^\circ\text{C}$	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	1700			V	$V_{GS} = 0\text{ V}, I_D = 100\text{ }\mu\text{A}$
$V_{GS(th)}$	Gate Threshold Voltage	2.0	2.8	4	V	$V_{DS} = V_{GS}, I_D = 0.5\text{ mA}$
			2.4		V	$V_{DS} = V_{GS}, I_D = 0.5\text{ mA}, T_J = 150^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current		1	100	μA	$V_{DS} = 1.7\text{ kV}, V_{GS} = 0\text{ V}$
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		0.80	1.4	Ω	$V_{GS} = 20\text{ V}, I_D = 2\text{ A}$
			1.4			$V_{GS} = 20\text{ V}, I_D = 2\text{ A}, T_J = 150^\circ\text{C}$
g_{fs}	Transconductance		1.04		S	$V_{DS} = 20\text{ V}, I_{DS} = 2\text{ A}$
			1.09			$V_{DS} = 20\text{ V}, I_{DS} = 2\text{ A}, T_J = 150^\circ\text{C}$
C_{iss}	Input Capacitance		216		pF	$V_{GS} = 0\text{ V}$
C_{oss}	Output Capacitance		19			$V_{DS} = 1000\text{ V}$
C_{rss}	Reverse Transfer Capacitance		2.2			$f = 1\text{ MHz}$
E_{oss}	C_{oss} Stored Energy		10.2			$V_{AC} = 25\text{ mV}$
E_{ON}	Turn-On Switching Energy		89		μJ	$V_{DS} = 1.2\text{ kV}, V_{GS} = -5/20\text{ V}$
E_{OFF}	Turn Off Switching Energy		14			$I_D = 2\text{ A}, R_{G(ext)} = 2.5\text{ }\Omega,$ $L = 1478\text{ }\mu\text{H}, T_J = 150^\circ\text{C}$
$t_{d(on)}$	Turn-On Delay Time		5		ns	$V_{DD} = 1.2\text{ kV}, V_{GS} = -5/20\text{ V}$ $I_D = 2\text{ A}, R_{G(ext)} = 2.5\text{ }\Omega, R_L = 600\text{ }\Omega$ Timing relative to V_{DS} Per IEC60747-8-4 pg 83
t_r	Rise Time		19			
$t_{d(off)}$	Turn-Off Delay Time		14			
t_f	Fall Time		63			
$R_{G(int)}$	Internal Gate Resistance		24.8		Ω	$f = 1\text{ MHz}, V_{AC} = 25\text{ mV}$
Q_{gs}	Gate to Source Charge		4		nC	$V_{DS} = 1.2\text{ kV}, V_{GS} = -5/20\text{ V}$ $I_D = 2\text{ A}$ Per IEC60747-8-4 pg 21
Q_{gd}	Gate to Drain Charge		12			
Q_g	Total Gate Charge		22			

Reverse Diode Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions
V_{SD}	Diode Forward Voltage	3.8		V	$V_{GS} = -5\text{ V}, I_{SD} = 1\text{ A}, T_J = 25^\circ\text{C}$
		3.3		V	$V_{GS} = -5\text{ V}, I_{SD} = 1\text{ A}, T_J = 150^\circ\text{C}$
I_S	Continuous Diode Forward Current		4	A	$T_c = 25^\circ\text{C}$
t_{rr}	Reverse Recovery Time	30		ns	$V_{GS} = -5\text{ V}, I_{SD} = 2\text{ A}, T_J = 150^\circ\text{C}$
Q_{rr}	Reverse Recovery Charge	31		nC	$V_R = 1.2\text{ kV}$ $\text{dif}/\text{dt} = 1135\text{ A}/\mu\text{s}$
I_{rrm}	Peak Reverse Recovery Current	3		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
$R_{\theta JC}$	Thermal Resistance from Junction to Case	1.7	1.8	$^\circ\text{C}/\text{W}$	
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient		40		

Measurement circuits

Fig.29-1 Switching Time Measurement Circuit

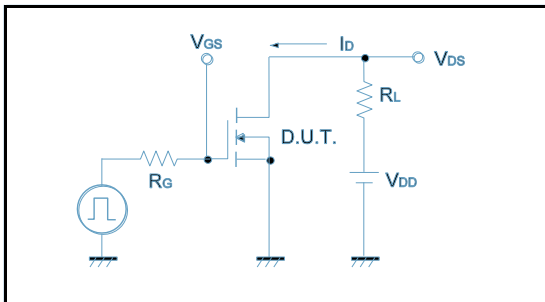


Fig.29-2 Switching Waveforms

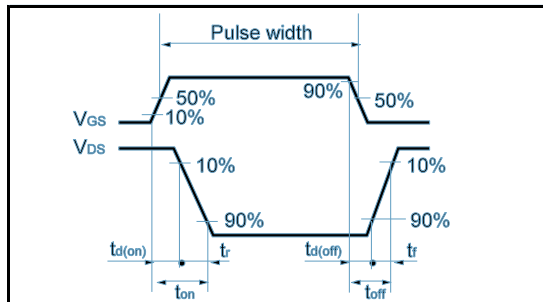


Fig.30-1 Gate Charge Measurement Circuit

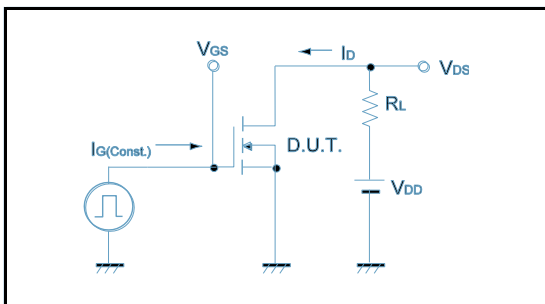


Fig.30-2 Gate Charge Waveform

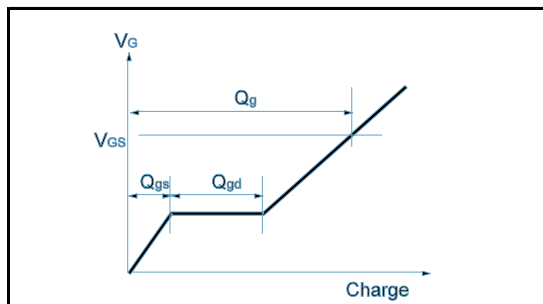


Fig.31-1 Switching Energy Measurement Circuit

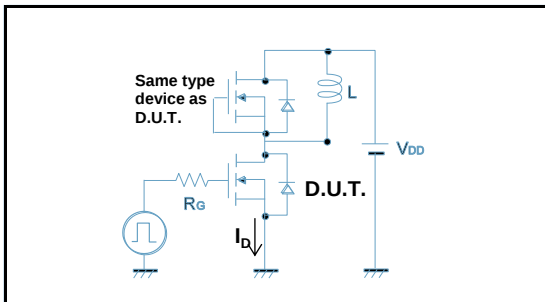


Fig.31-2 Switching Waveforms

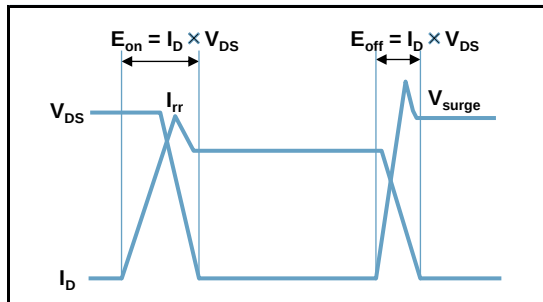
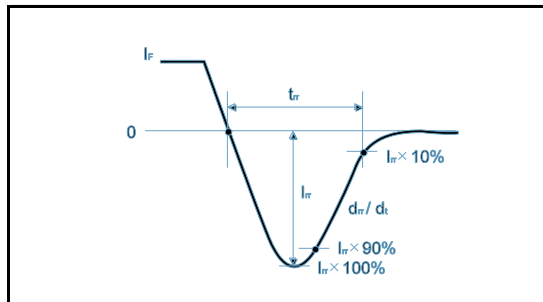
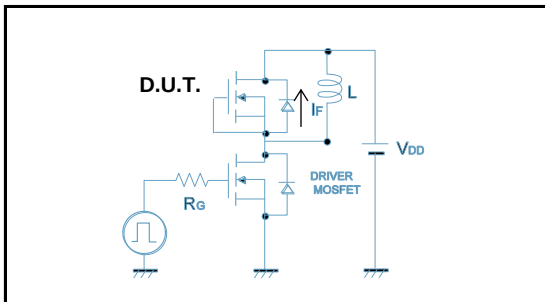
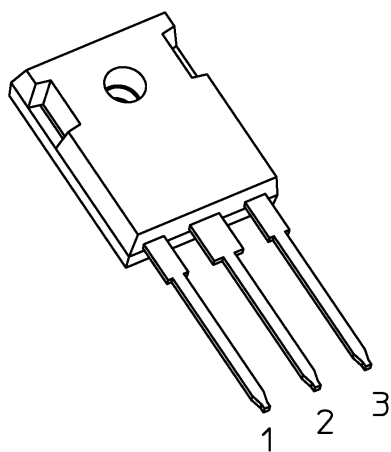


Fig.32-1 Reverse Recovery Time Measurement Circuit Fig.32-2 Reverse Recovery Waveform

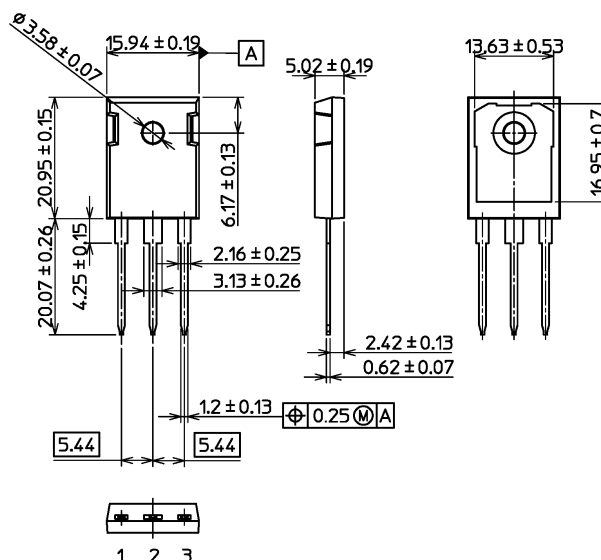


Package Dimensions

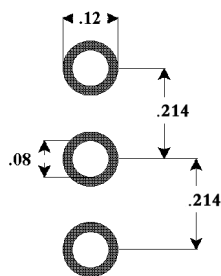
Unit: mm



TO-247-3



Recommended Solder Pad Layout



TO-247-3