勝 特 力 材 料 886-3-5753170
胜特力电子(上海) 86-21-34970699
胜特力电子(深圳) 86-755-83298787
Http://www.100y.com.tw

V_{DS}	1700 V
$I_{D\ @\ 25°C}$	4.9 A
$R_{DS(on)}$	1.0 Ω

C2M1000170D

Silicon Carbide Power MOSFET
Z-FET™ MOSFET

N-Channel Enhancement Mode

Features

- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low $R_{DS(on)}$
- Easy to Parallel and Simple to Drive
- Resistant to Latch-Up
- Halogen Free, RoHS Compliant

Benefits

- Higher System Efficiency
- Increased System Switching Frequency
- Reduced Cooling Requirements
- Increased System Reliability

Applications

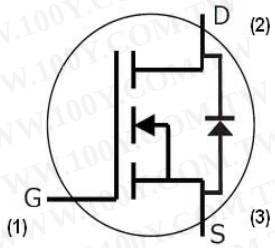
- Auxiliary Power Supplies
- Switch Mode Power Supplies

Package

TO-247-3

Halogen-Free

RoHS COMPLIANT



Part Number	Package
C2M1000170D	TO-247-3

Maximum Ratings (T_C = 25 °C unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
$I_{DS\ (DC)}$	Continuous Drain Current	4.9	A	V_{GS} = 20 V, T_C = 25 °C	Fig. 14
		3.0		V_{GS} = 20 V, T_C = 100 °C	
$I_{DS\ (pulse)}$	Pulsed Drain Current	5.0	A	Pulse width t_P limited by T_{jmax} T_C = 25 °C	Fig. 16
V_{GS}	Gate Source Voltage	-10/+25	V		
P_{tot}	Power Dissipation	69	W	T_C=25 °C, T_J = 150 °C	Fig. 13
T_J , T_{stg}	Operating Junction and Storage Temperature	-55 to +150	°C		
T_L	Solder Temperature	260	°C	1.6 mm (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°C unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	1700			V	V_{GS} = 0 V, I_D = 100 µA	
$V_{GS(th)}$	Gate Threshold Voltage	1.8	2.4		V	V_{DS} = V_{GS}, I_D = 100 µA	Fig. 9
		1.4	1.8		V	V_{DS} = V_{GS}, I_D = 100 µA T_J = 150 °C	
I_{DSS}	Zero Gate Voltage Drain Current			60	µA	V_{DS} = 1700 V, V_{GS} = 0 V	
				120		V_{DS} = 1700 V, V_{GS} = 0 V T_J=150 °C	
I_{GSS}	Gate-Source Leakage Current			0.25	µA	V_{GS} = 20 V, V_{DS} = 0 V	
$R_{DS(on)}$	Drain-Source On-State Resistance		0.95	1.4	Ω	V_{GS} = 20 V, I_D = 2 A	Fig. 6, 7, 8
			2.1	3.2		V_{GS} = 20 V, I_D = 2 A, T_J = 150 °C	
g_{fs}	Transconductance		0.9		S	V_{DS}= 20 V, I_{DS}= 2 A	Fig. 5
			0.8			V_{DS}= 20 V, I_{DS}= 2 A, T_J = 150 °C	
C_{iss}	Input Capacitance		191		pF	V_{GS} = 0 V V_{DS} = 1000 V f = 1 MHz V_{AC} = 25 mV	Fig. 12
C_{oss}	Output Capacitance		12				
C_{rss}	Reverse Transfer Capacitance		1.3				
E_{oss}	C_{oss} Stored Energy		6.0		µJ		Fig 10
$t_{d(on)v}$	Turn-On Delay Time		9		ns	V_{DD} = 1000 V, V_{GS} = -5/20 V I_D = 2 A $R_{G(ext)}$ = 0 Ω, R_L = 500 Ω Timing relative to V_{DS}	Fig. 7
t_{rv}	Rise Time		46				
$t_{d(off)v}$	Turn-Off Delay Time		15				
t_{fv}	Fall Time		9				
R_G	Internal Gate Resistance		24.8		Ω	f = 1 MHz, V_{AC} = 25 mV, ESR of C_{ISS}	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	1.7	1.8	°C/W		Fig. 15

Gate Charge Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
Q_{gs}	Gate to Source Charge	2.7		nC	V_{DS} = 1000 V, V_{GS} = -5/20 V I_D = 1 A Per JEDEC24 pg 27	Fig. 18
Q_{gd}	Gate to Drain Charge	5.4				
Q_g	Gate Charge Total	13				

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Typical Performance

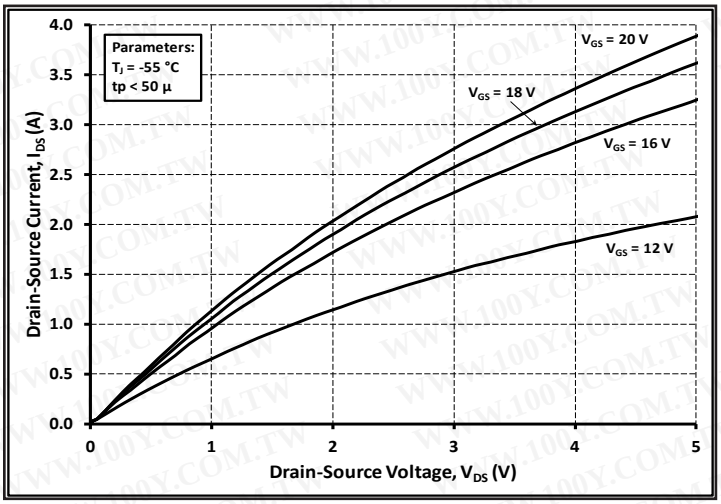


Figure 1. Typical Output Characteristics T_J = -55 °C

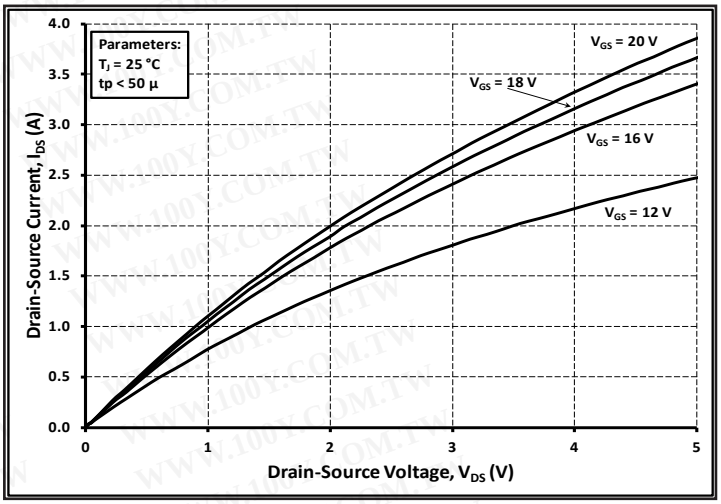


Figure 2. Typical Output Characteristics T_J = 25 °C

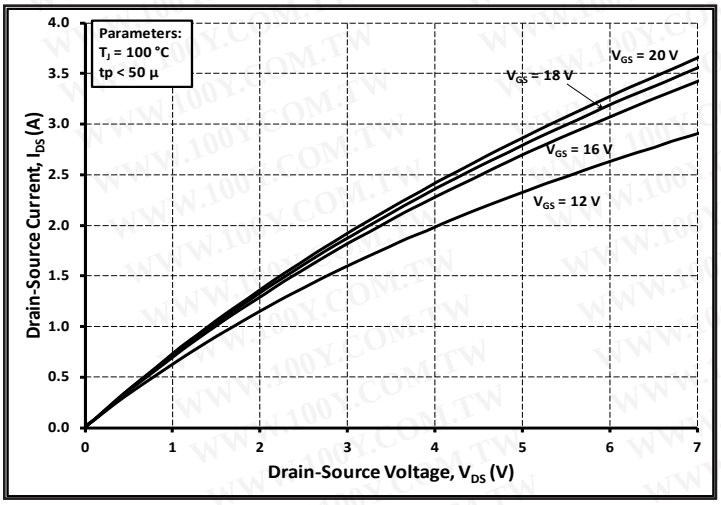


Figure 3. Typical Output Characteristics T_J = 100 °C

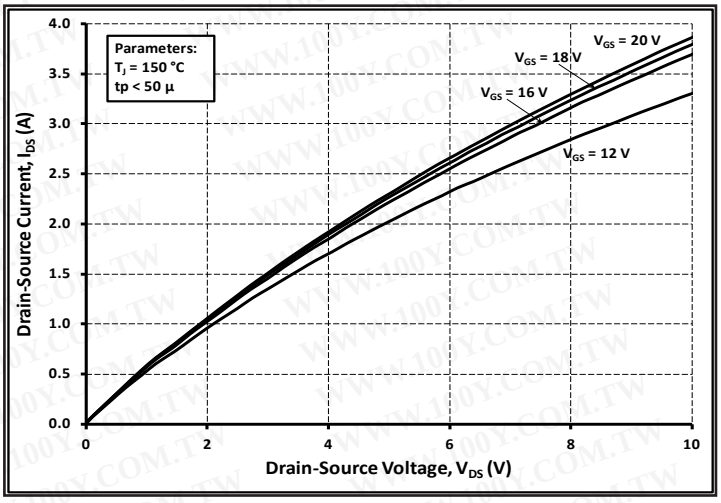


Figure 4. Typical Output Characteristics T_J = 150 °C

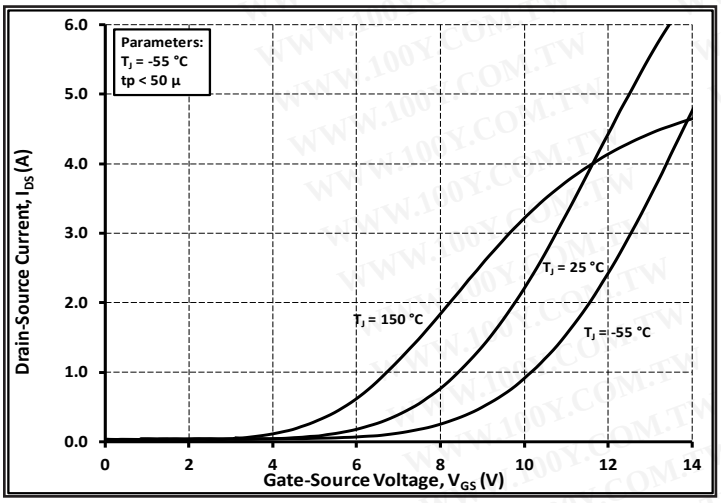


Figure 5. Typical Transfer Characteristics

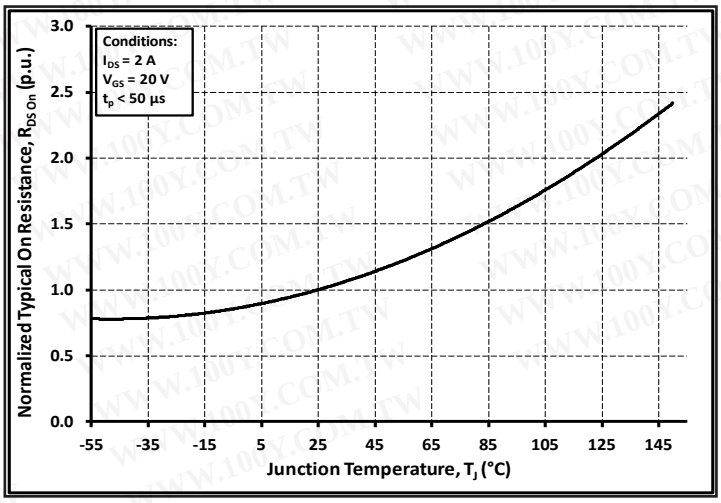


Figure 6. Normalized On-Resistance vs. Temperature

Typical Performance

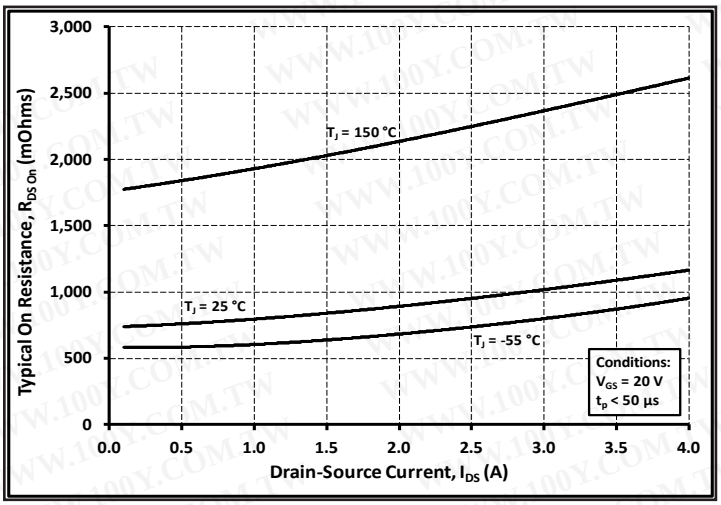


Figure 7. Typical On-Resistance vs. Drain Current

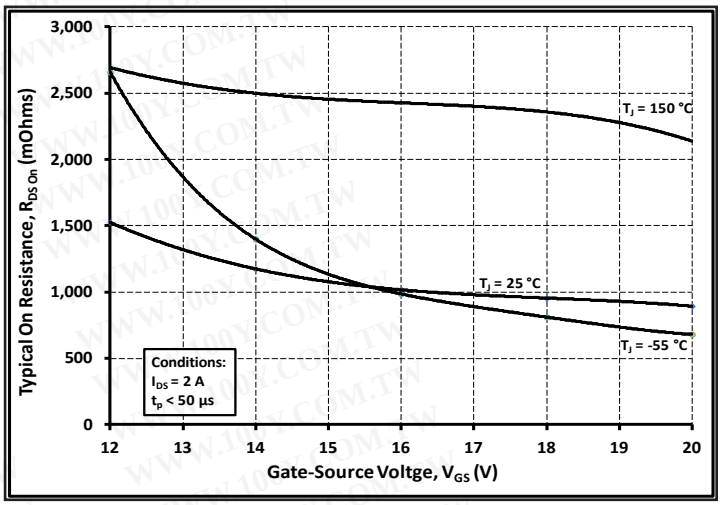


Figure 8. Typical On-Resistance vs. Gate Voltage

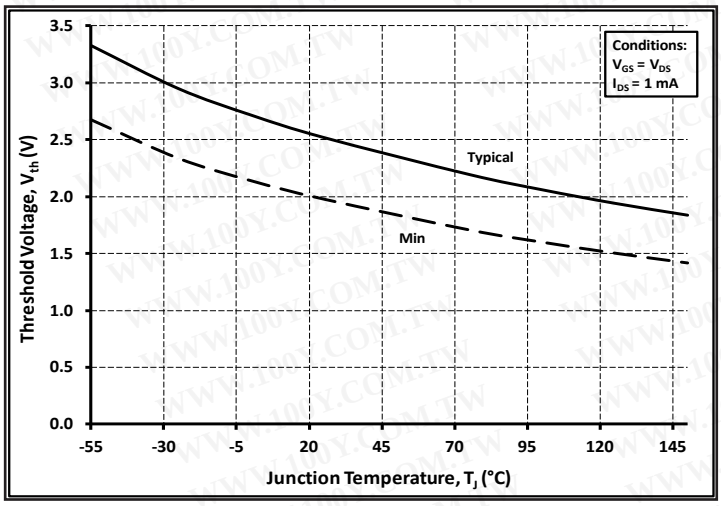


Figure 9. Typical Threshold Voltage vs. Temperature

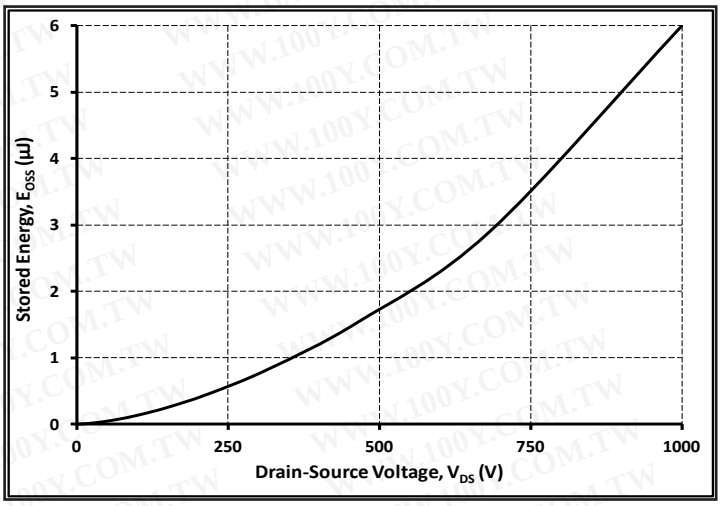


Figure 10. Typical transfer Characteristics

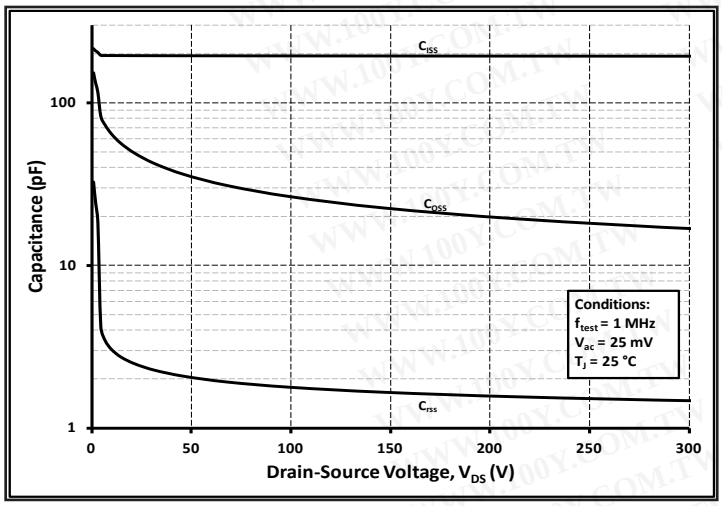


Figure 11. Typical Capacitances vs Drain Voltage (0-300 V)

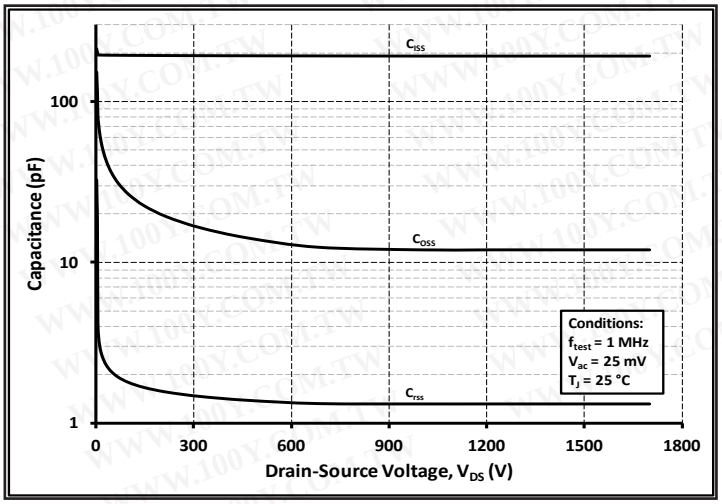


Figure 12. Typical Capacitances vs Drain Voltage (0-1200 V)

Typical Performance

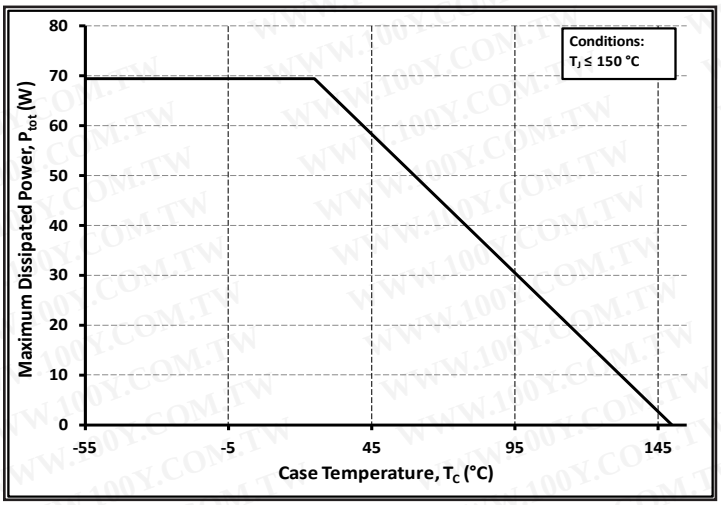


Figure 13. Power Dissipation Derating Curve

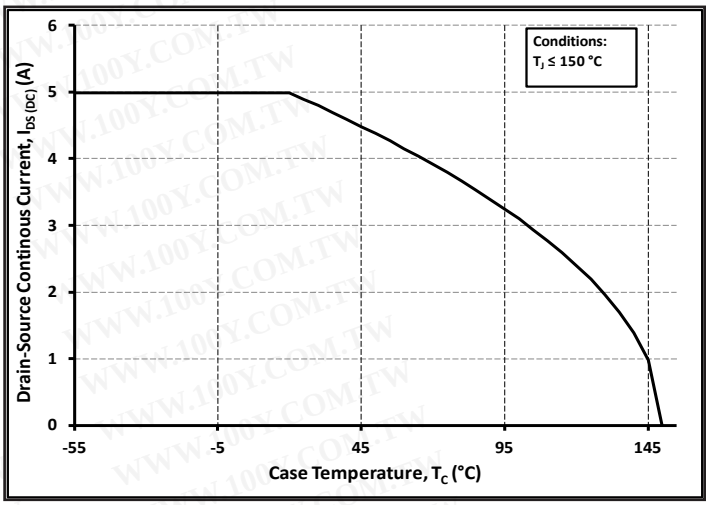


Figure 14. Continuous I_{DS} Current derating curve

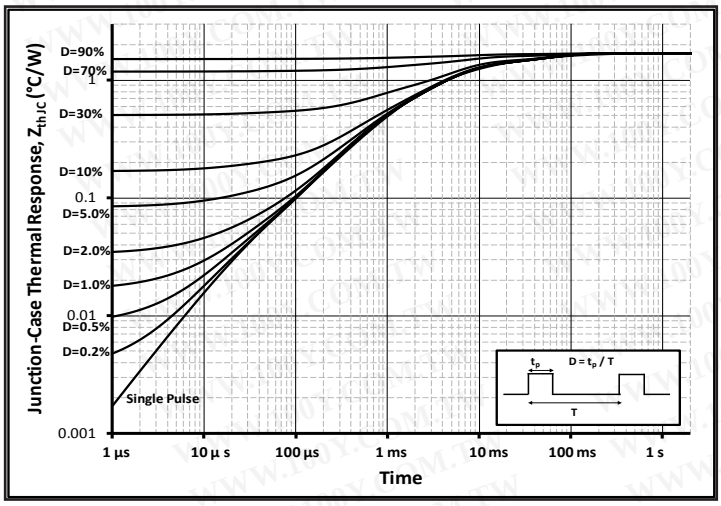


Figure 15. Typical Transient Thermal Impedance (Junction - Case) with Duty Cycle

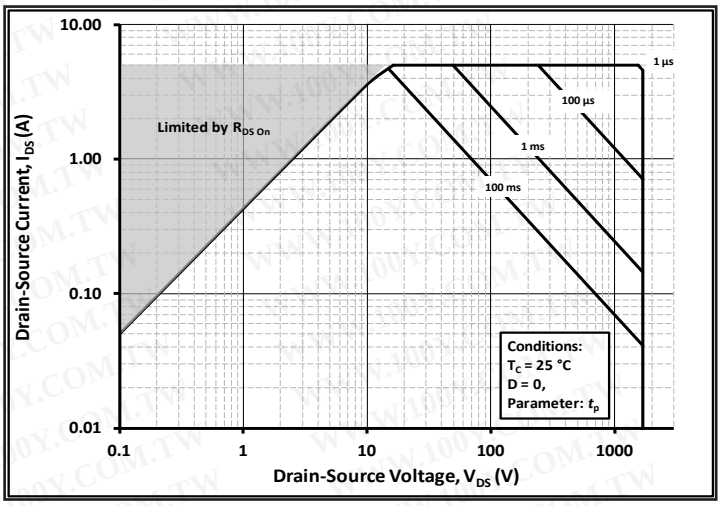


Figure 16. Safe Operating Area, T_J = 25 °C

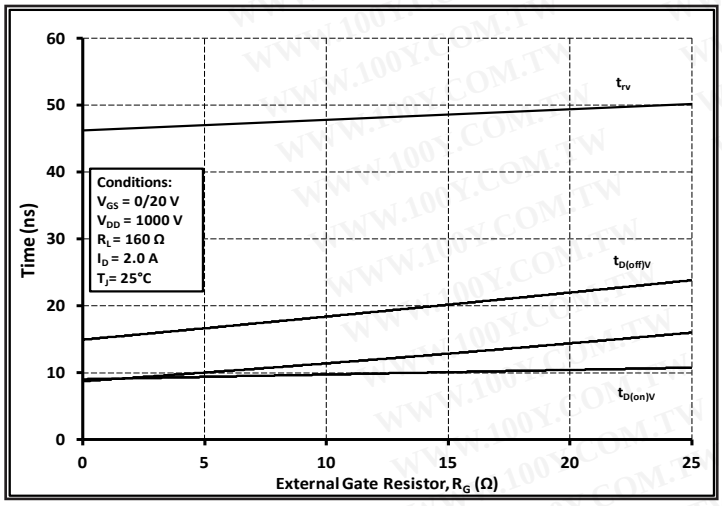


Figure 17. Resistive Switching Times vs. R_G

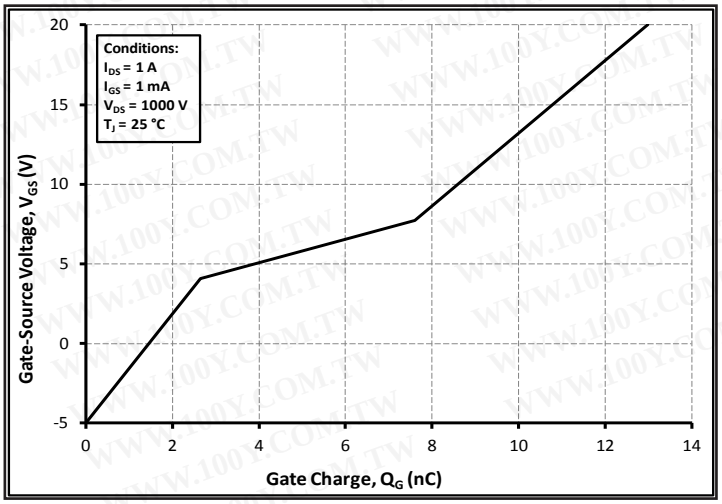


Figure 18. Typical Gate Charge

Typical Performance

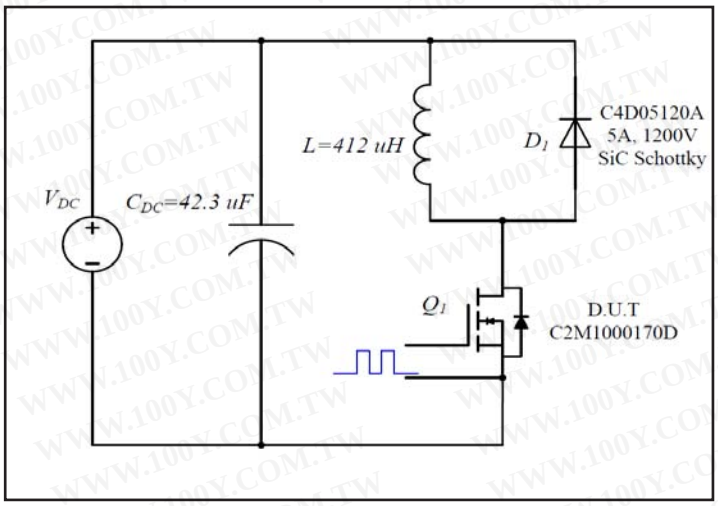


Figure 24. Clamped Inductive Switching Waveform Test Circuit

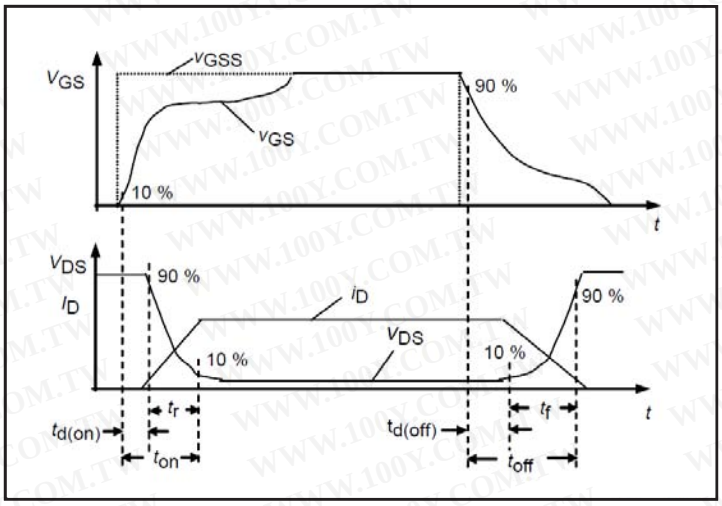


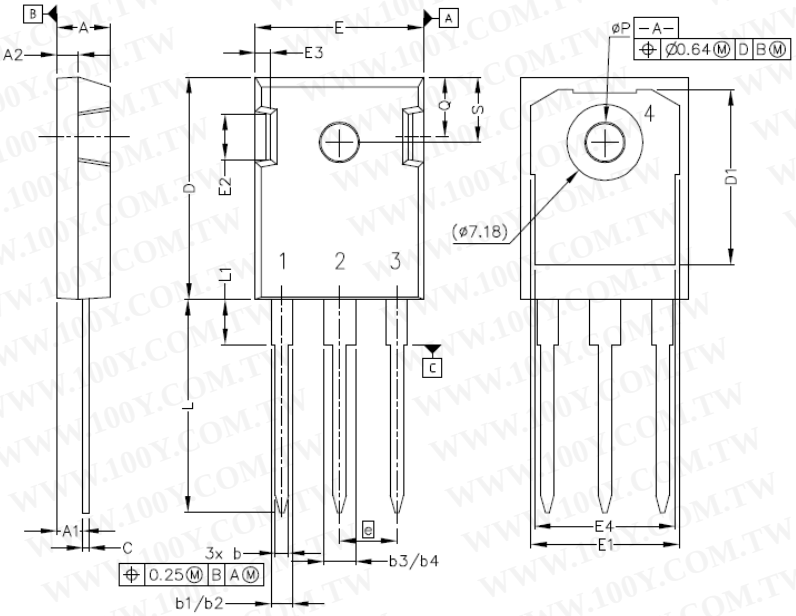
Figure 25. Switching Test Waveforms for Transition Times

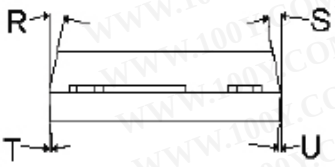
ESD Ratings

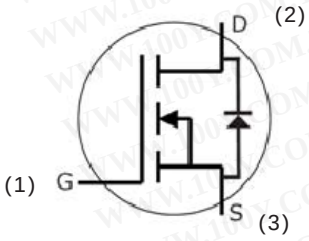
ESD Test	Total Devices Sampled	Resulting Classification
ESD-HBM	All Devices Passed 1000V	2 (>2000V)
ESD-MM	All Devices Passed 400V	C (>400V)
ESD-CDM	All Devices Passed 1000V	IV (>1000V)

Package Dimensions

Package TO-247-3

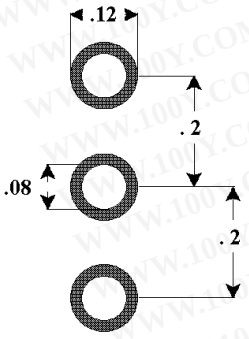






POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.042	.052	1.07	1.33
b1	.075	.095	1.91	2.41
b2	.075	.085	1.91	2.16
b3	.113	.133	2.87	3.38
b4	.113	.123	2.87	3.13
c	.022	.027	0.55	0.68
D	.819	.831	20.80	21.10
D1	.640	.695	16.25	17.65
D2	.037	.049	0.95	1.25
E	.620	.635	15.75	16.13
E1	.516	.557	13.10	14.15
E2	.145	.201	3.68	5.10
E3	.039	.075	1.00	1.90
E4	.487	.529	12.38	13.43
e	.214 BSC		5.44 BSC	
N	3		3	
L	.780	.800	19.81	20.32
L1	.161	.173	4.10	4.40
ØP	.138	.144	3.51	3.65
Q	.216	.236	5.49	6.00
S	.238	.248	6.04	6.30

Recommended Solder Pad Layout



TO-247-3

Part Number	Package	Marking
C2M1000170D	TO-247-3	C2M1000170

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