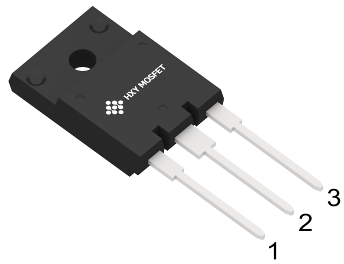
HUAXUANYANG HXY
ELECTRONICS CO.,LTD

G2R1000MT17D

SiC Power MOSFET N-Channel Enhancement Mode

Features

- Effectively lower down Tj and Rth,high anti-EMI ability
- High Blocking Voltage with Low $R_{DS(on)}$
- Easy to Parallel and Simple to Drive
- Ultra-low Drain-Gate capacitance
- Halogen Free, RoHS Compliant



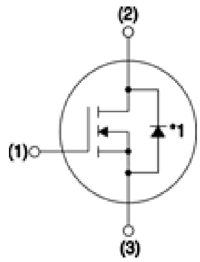
TO-3PF

Benefits

- Higher system efficiency
- Reduce cooling requirements
- Increase power density
- Increase system switching frequency

Applications

- Auxiliary Power Supplies Switch
- Mode Power Supplies
- High-Voltage Capacitive Loads



(1) Gate
(2) Drain
(3) Source

Ordering Part Number	Package	Brand
G2R1000MT17D	TO-3PF	HXY MOSFET

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

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{DSmax}	Drain-Source Voltage	1700	V	V_{GS}=0V, I_D=100μA	
V_{GSmax}	Gate-Source Voltage	-8/+22	V	Absolute maximum values	
V_{GSop}	Gate-Source Voltage	-4/+18	V	Recommended operational values	
I_D	Continuous Drain Current	5.0	A	V_{GS}=20V, T_c=25˚C	Fig. 19
		3.5		V_{GS}=20V, T_c=100˚C	
$I_{D(pulse)}$	Pulsed Drain Current	15	A	Pulse width t_p limited by T_{Jmax}	Fig. 22
P_D	Power Dissipation	69	W	T_c=25˚C, T_J=150˚C	Fig. 20
T_J, T_{STG}	Operating Junction and Storage Temperature	-55 to +150	˚C		
T_L	Solder Temperature, 1.6mm from case for 10s	260	˚C		
M_d	Mounting Torque, (M3 or 6-32 screw)	1	Nm		
		8.8	lbf-in		

Electrical Characteristics (T_C = 25˚C unless other

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	2.0	2.8	4.3	V	V_{DS} = V_{GS}, I_D = 0.5 mA	Fig. 11
			2.4		V	V_{DS} = V_{GS}, I_D = 0.5 mA, T_J = 150 °C	
I_{DSS}	Zero Gate Voltage Drain Current		0.01	10	μA	V_{DS} = 1.7 kV, V_{GS} = 0 V	
I_{GSS}	Gate-Source Leakage Current			100	nA	V_{GS} = 18 V, V_{DS} = 0 V	
$R_{DS(on)}$	Drain-Source On-State Resistance		0.80	1.4	Ω	V_{GS} = 18 V, I_D = 2 A	Fig. 4,5,6
			1.4			V_{GS} = 18 V, I_D = 2 A, T_J = 150 °C	
g_{fs}	Transconductance		1.04		S	V_{DS}= 18 V, I_{DS}= 2 A	Fig. 7
			1.09			V_{DS}= 18 V, I_{DS}= 2 A, T_J = 150 °C	
C_{iss}	Input Capacitance		215		pF	V_{GS} = 0 V V_{DS} = 1000 V f = 1 MHz V_{AC} = 25 mV	Fig. 17,18
C_{oss}	Output Capacitance		19				
C_{rss}	Reverse Transfer Capacitance		2.2				
E_{oss}	C_{oss} Stored Energy		10.2		μJ		Fig 16
E_{ON}	Turn-On Switching Energy		89		μJ	V_{DS} = 1.2 kV, V_{GS} = -5/20 V I_D = 2 A, $R_{G(ext)}$ = 2.5 Ω, L= 1478 μH, T_J = 150 °C	Fig. 26
E_{OFF}	Turn Off Switching Energy		14				
$t_{d(on)}$	Turn-On Delay Time		5		ns	V_{DD} = 1.2 kV, V_{GS} = -5/20 V I_D = 2 A, $R_{G(ext)}$ = 2.5 Ω, R_L = 600 Ω Timing relative to V_{DS} Per IEC60747-8-4 pg 83	Fig. 27
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 MHz, V_{AC} = 25 mV	
Q_{gs}	Gate to Source Charge		4		nC	V_{DS} = 1.2 kV, V_{GS} = -5/20 V I_D = 2 A Per IEC60747-8-4 pg 21	Fig. 12
Q_{gd}	Gate to Drain Charge		12				
Q_g	Total Gate Charge		22				

Reverse Diode Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_{SD}	Diode Forward Voltage	3.8		V	V_{GS} = - 5 V, I_{SD} = 1 A, T_J = 25 °C	Fig. 8, 9, 10
		3.3		V	V_{GS} = - 5 V, I_{SD} = 1 A, T_J = 150 °C	
I_S	Continuous Diode Forward Current		4	A	T_C= 25 °C	Note 1
t_{rr}	Reverse Recovery Time	30		ns	V_{GS} = - 5 V, I_{SD} = 2 A T_J= 150 °C V_R = 1.2 kV dif/dt = 1135 A/μs	Note 1
Q_{rr}	Reverse Recovery Charge	31		nC		
I_{rrm}	Peak Reverse Recovery Current	3		A		

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

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
$R_{θJC}$	Thermal Resistance from Junction to Case	2.0	2.3	°C/W		Fig. 21
$R_{θJA}$	Thermal Resistance from Junction to Ambient		50			

Typical Performance

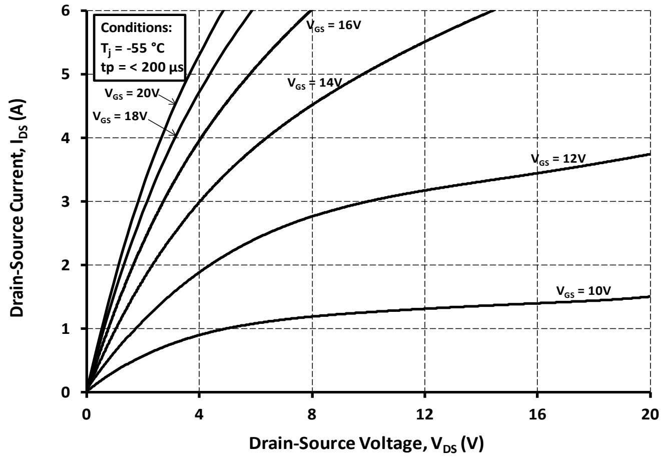


Figure 1. Output Characteristics T_J = -55 °C

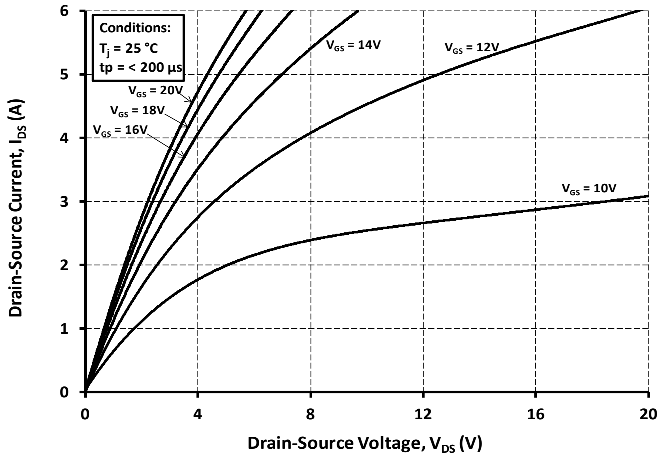


Figure 2. Output Characteristics T_J = 25 °C

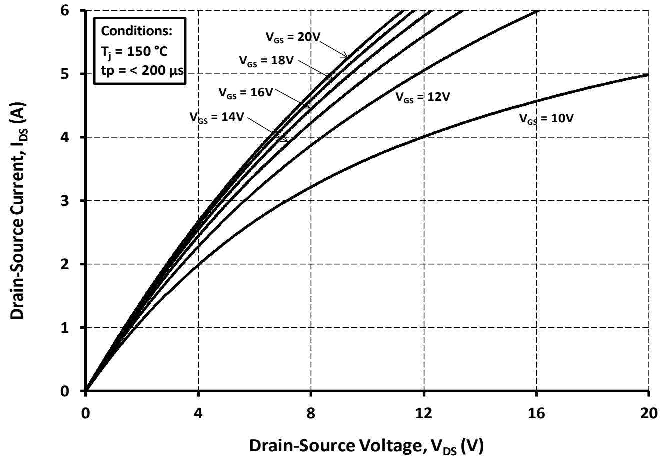


Figure 3. Output Characteristics T_J = 150 °C

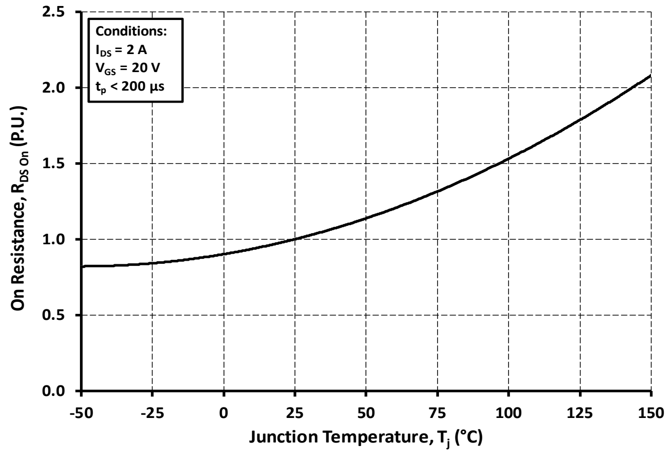


Figure 4. Normalized On-Resistance vs. Temperature

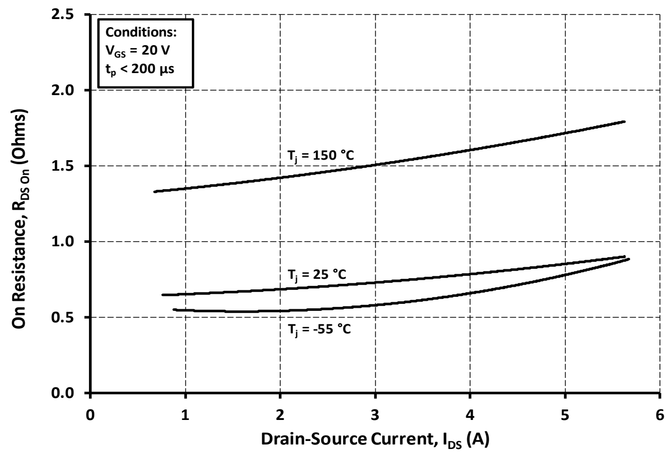


Figure 5. On-Resistance vs. Drain Current
For Various Temperatures

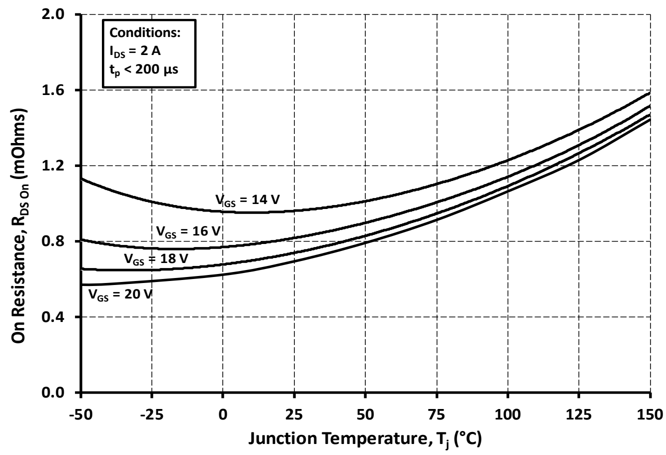


Figure 6. On-Resistance vs. Temperature
For Various Gate Voltage

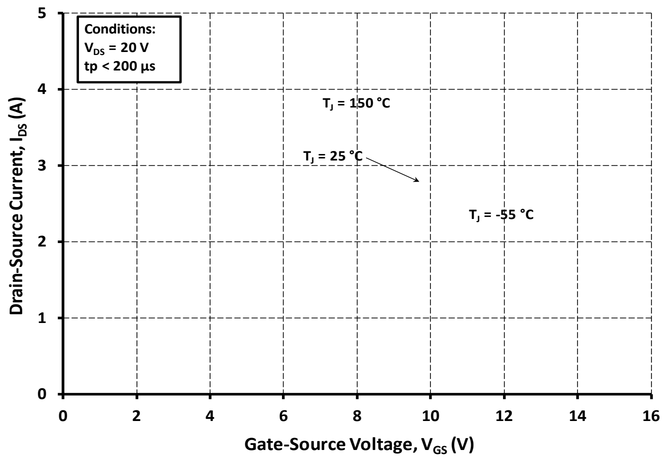


Figure 7. Transfer Characteristic for Various Junction Temperatures

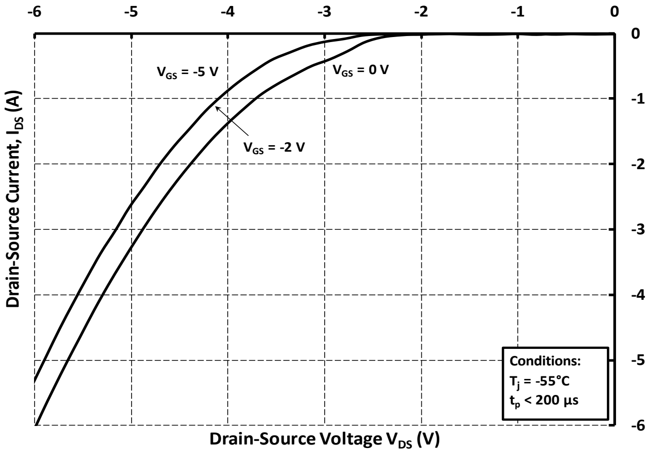


Figure 8. Body Diode Characteristic at -55 °C

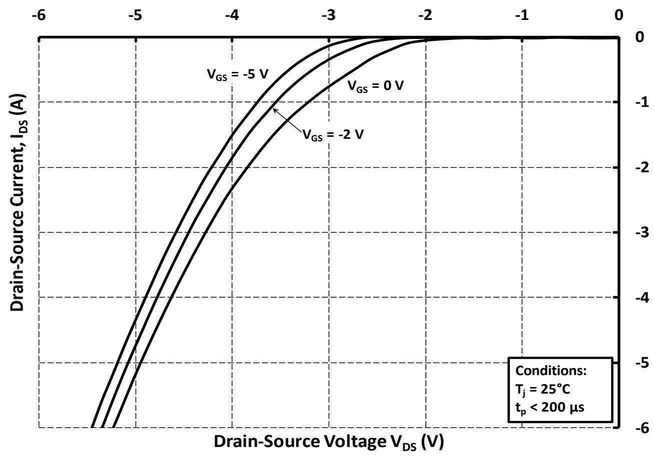


Figure 9. Body Diode Characteristic at 25 °C

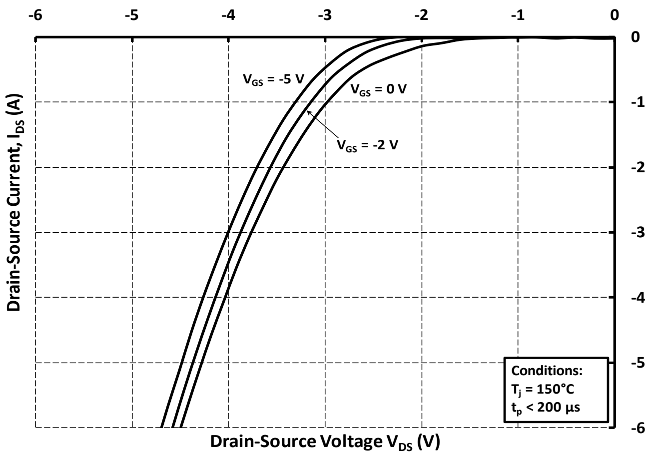


Figure 10. Body Diode Characteristic at 150 °C

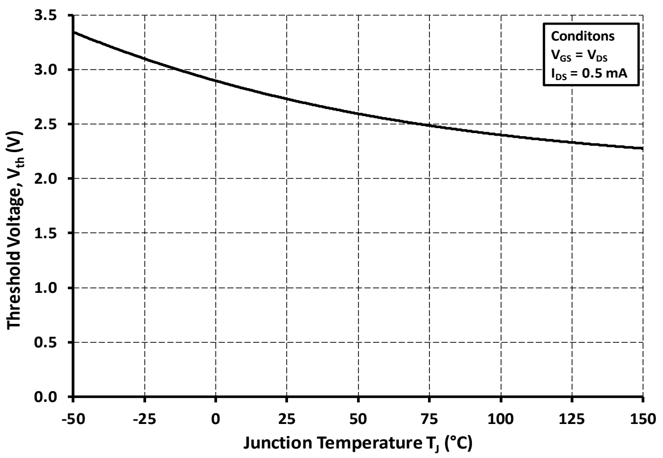


Figure 11. Threshold Voltage vs. Temperature

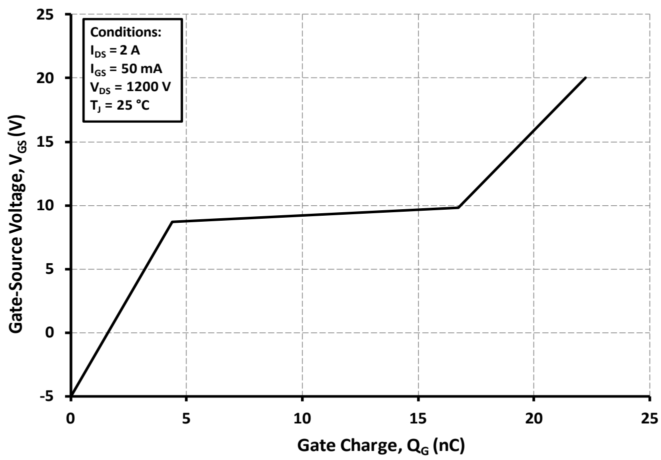


Figure 12. Gate Charge Characteristics

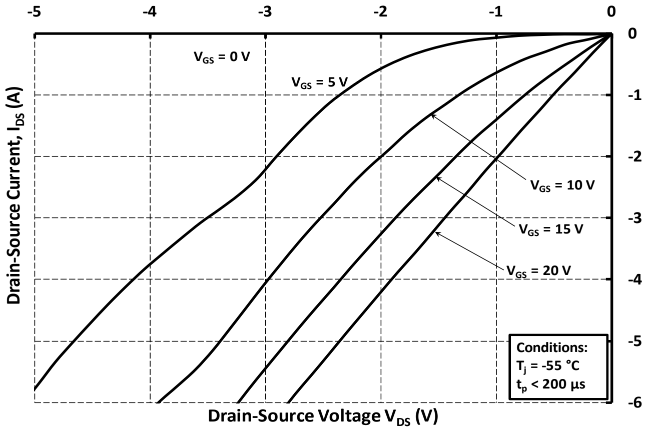


Figure 13. 3rd Quadrant Characteristic at -55 °C

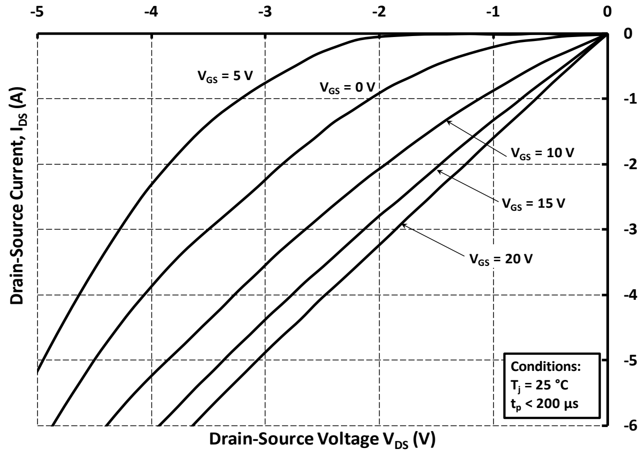


Figure 14. 3rd Quadrant Characteristic at 25 °C

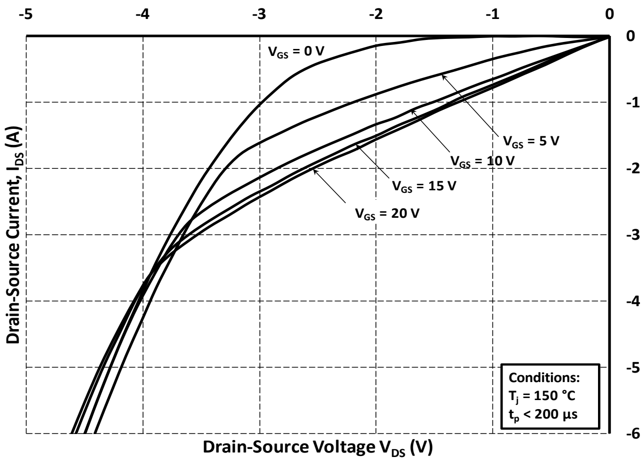


Figure 15. 3rd Quadrant Characteristic at 150 °C

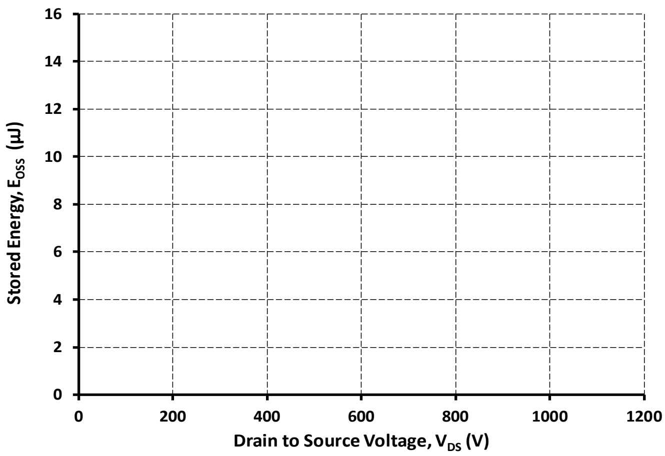


Figure 16 Output Capacitor Stored Energy

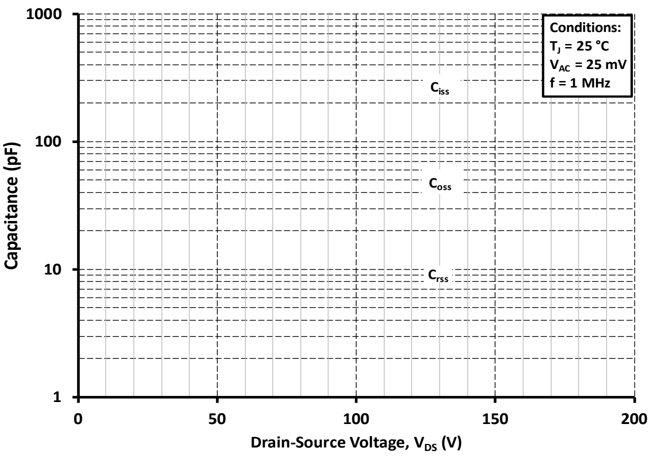


Figure 17. Capacitances vs. Drain-Source Voltage (0-200 V)

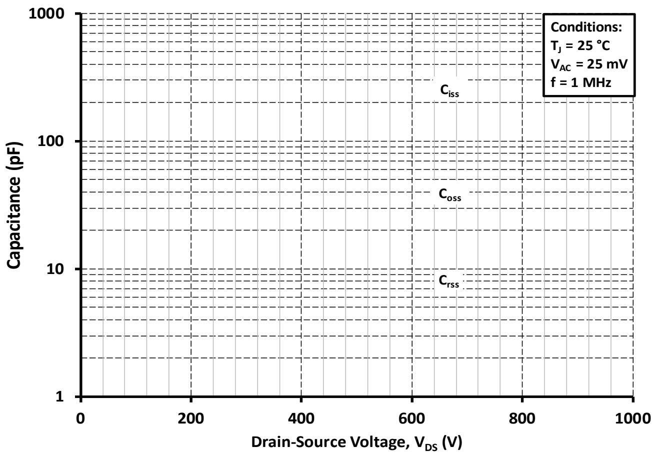


Figure 18. Capacitances vs. Drain-Source Voltage (0-1000 V)

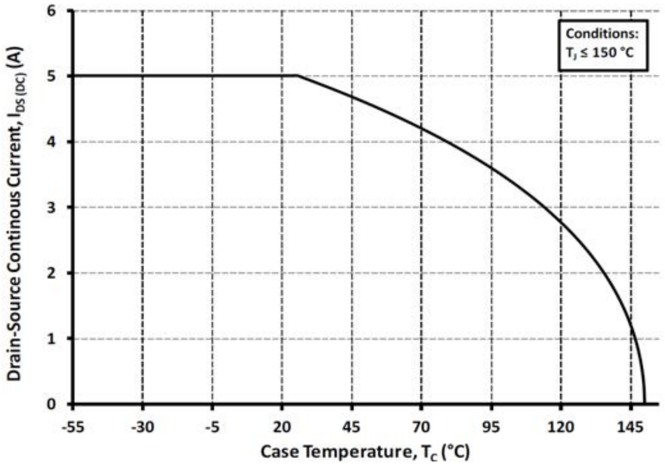


Figure 19. Continuous Drain Current Derating vs.
Case Temperature

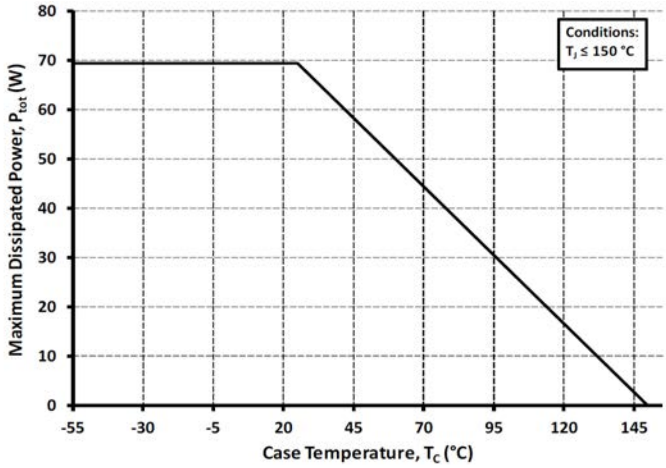


Figure 20. Maximum Power Dissipation Derating Vs
Case Temperature

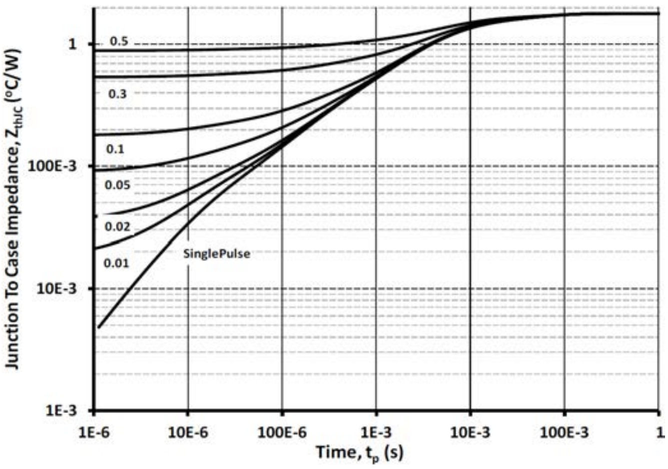


Figure 21. Transient Thermal Impedance
(Junction - Case)

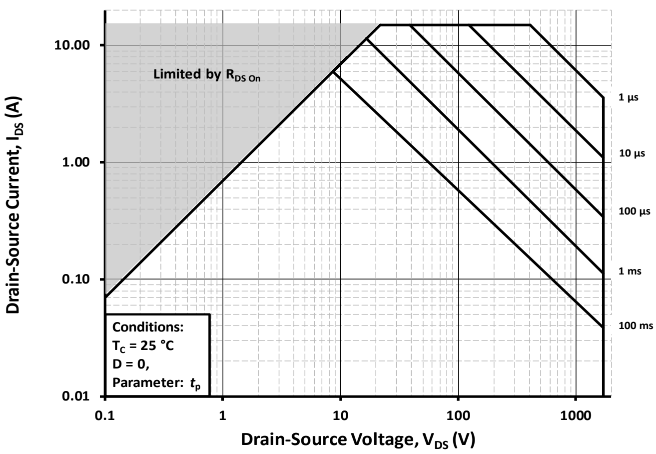


Figure 22. Safe Operating Area

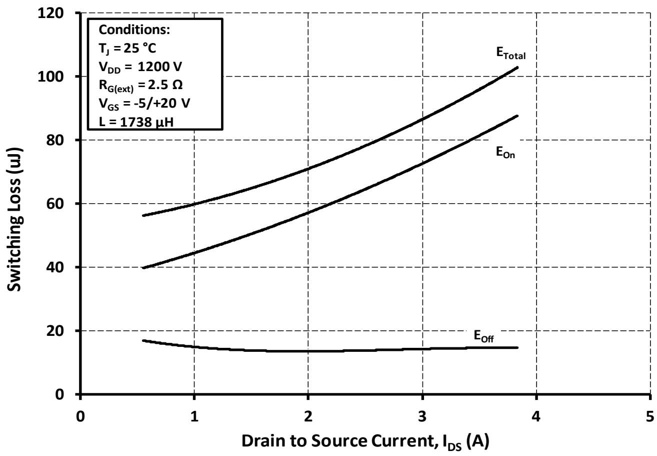


Figure 23. Clamped Inductive Switching Energy vs.
Drain Current (V_{DD} = 1200V)

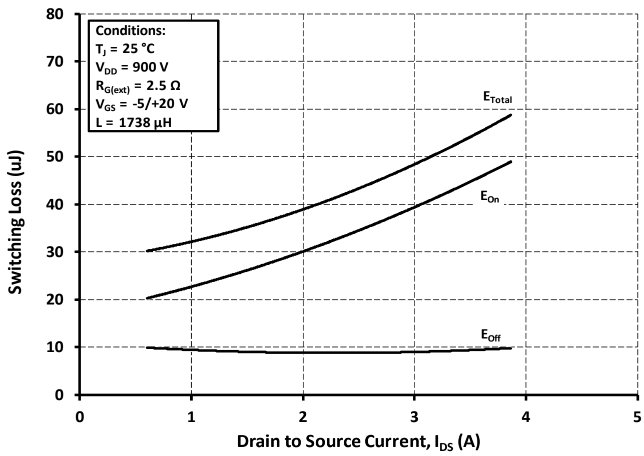


Figure 24. Clamped Inductive Switching Energy vs.
Drain Current (V_{DD} = 900 V)

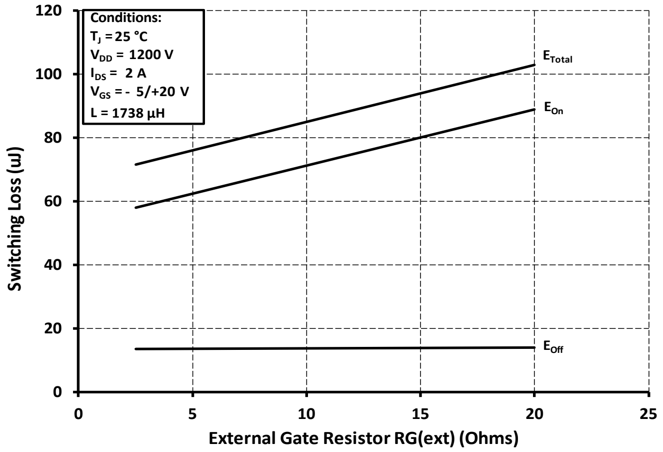


Figure 25. Clamped Inductive Switching Energy vs. $R_{G(ext)}$

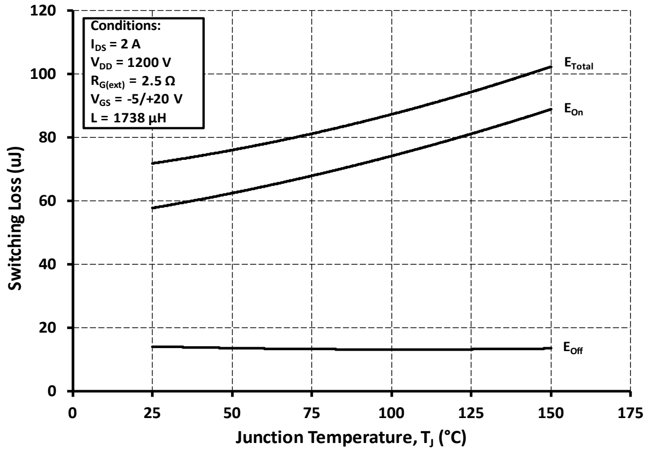


Figure 26. Clamped Inductive Switching Energy vs. Temperature

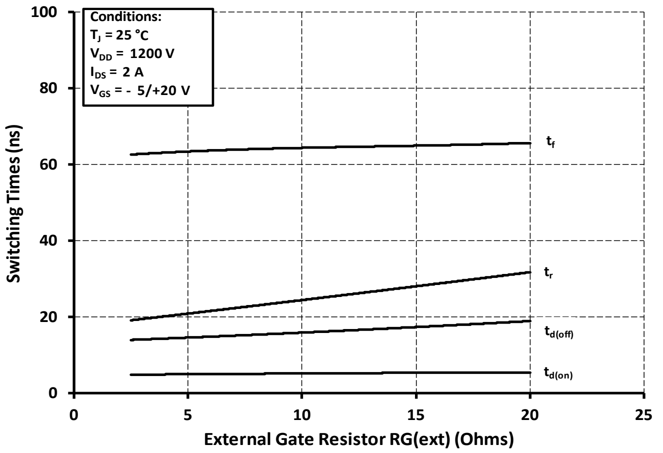


Figure 27. Switching Times vs. $R_{G(ext)}$

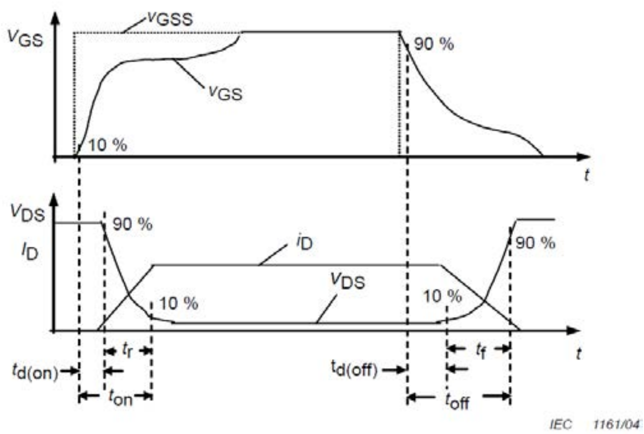


Figure 28. Switching Times Definition

Test Circuit Schematic

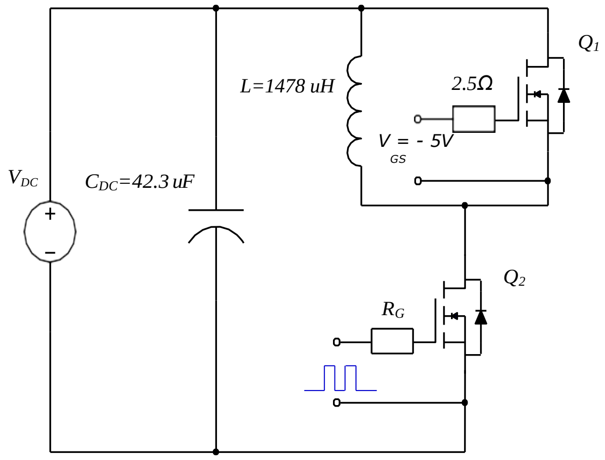


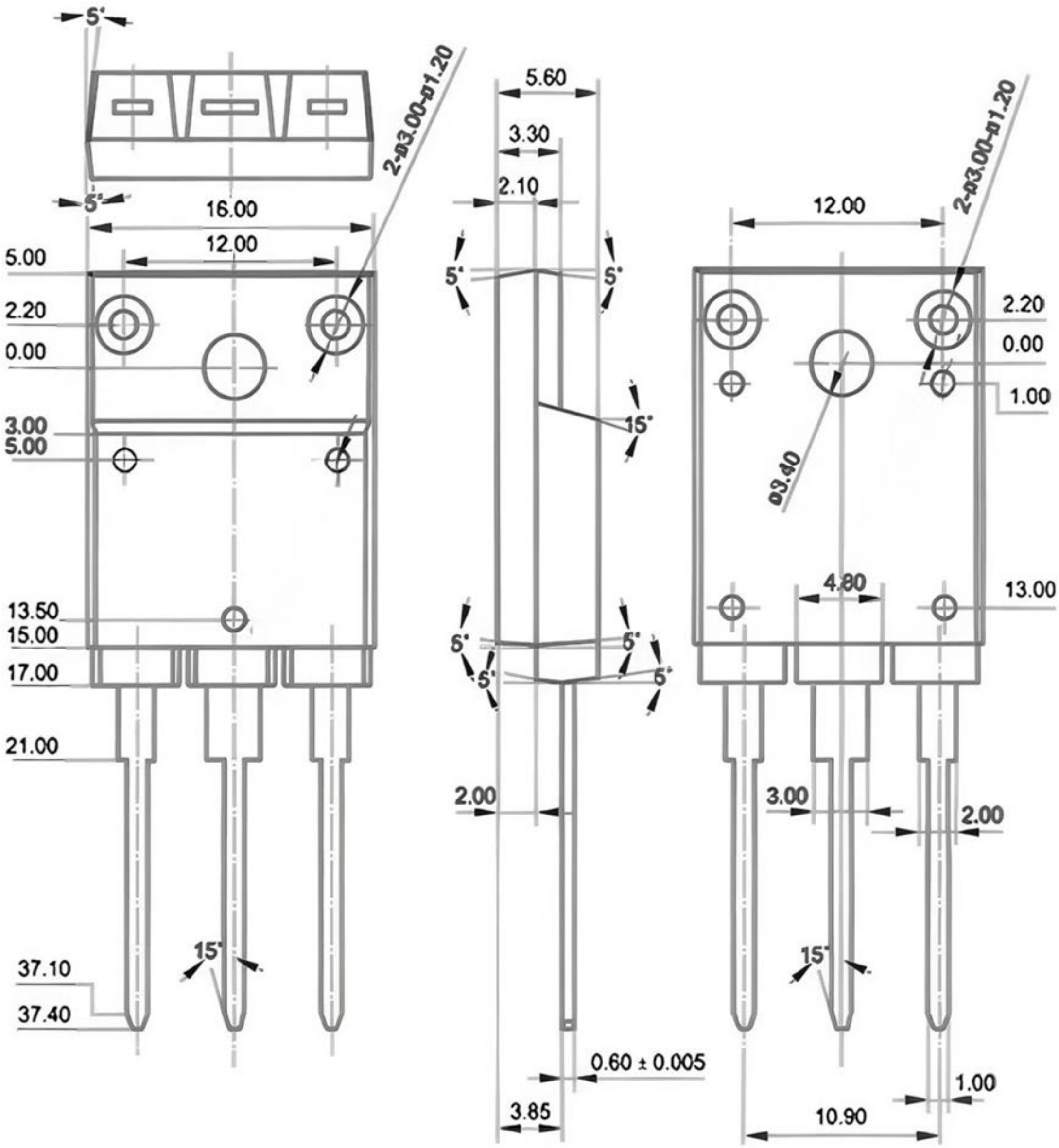
Figure 29. Clamped Inductive Switching
Waveform Test Circuit

ESD Ratings

ESD Test	Total Devices Sampled	Resulting Classification
ESD-HBM	All Devices Passed 4000V	3A (>4000V)
ESD-CDM	All Devices Passed 1000V	IV (>1000V)

Package Dimensions

Package TO-3PF



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