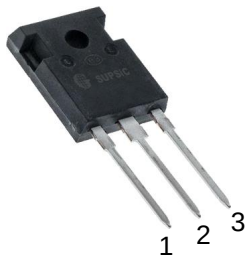
Features

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

Parameter	Rating	Units
V_{DS}	**1200**	V
$I_{D\ @\ 25^{\circ}C}$	**82**	A
$R_{DS(on)}$	**21**	m Ω

Applications

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



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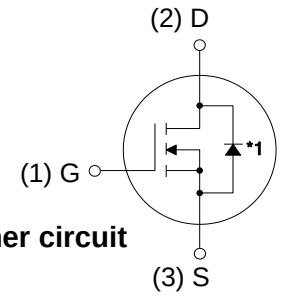
Package



Inner circuit

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

*1 Body Diode

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

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{DSmax}	Drain - Source Voltage	1200	V	V_{GS} = 0 V, I_D = 100 μA	
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	82	A	V_{GS} = 15 V, T_C = 25˚C	
		56		V_{GS} = 15 V, T_C = 100˚C	
$I_{D(pulse)}$	Pulsed Drain Current	200	A	Pulse width t_P limited by T_{jmax}	
P_D	Power Dissipation	469	W	T_C=25˚C, T_J = 175 ˚C	
T_J , T_{stg}	Operating Junction and Storage Temperature	-40 to +175	˚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} = -4V/+19V
Note (2): MOSFET can also safely operate at 0/+15 V
Note (3): Die limits are 100A (25°C) and 74A (100°C)

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	1200			V	V_{GS} = 0 V, I_D = 100 µA	
$V_{GS(th)}$	Gate Threshold Voltage	1.8	2.5	3.6	V	V_{DS} = V_{GS}, I_D = 17.7 mA	
			2.0		V	V_{DS} = V_{GS}, I_D = 17.7 mA, T_J = 175ºC	
I_{DSS}	Zero Gate Voltage Drain Current		1	50	µA	V_{DS} = 1200 V, V_{GS} = 0 V	
I_{GSS}	Gate-Source Leakage Current		10	250	nA	V_{GS} = 15 V, V_{DS} = 0 V	
$R_{DS(on)}$	Drain-Source On-State Resistance	14.7	21	28.8	mΩ	V_{GS} = 15 V, I_D = 50 A	
			38			V_{GS} = 15 V, I_D = 50 A, T_J = 175ºC	
g_{fs}	Transconductance		35		S	V_{DS}= 20 V, I_{DS}= 50 A	
			33			V_{DS}= 20 V, I_{DS}= 50 A, T_J = 175ºC	
C_{iss}	Input Capacitance		4763		pF	V_{GS} = 0 V, V_{DS} = 800 V f = 100 KHz V_{AC} = 25 mV	
C_{oss}	Output Capacitance		180				
C_{rss}	Reverse Transfer Capacitance		12				
E_{oss}	C_{oss} Stored Energy		99		µJ		
E_{ON}	Turn-On Switching Energy (SiC Diode FWD)		3.05		mJ	V_{DS} = 800 V, V_{GS} = -4 V/+15 V, I_D = 50 A, $R_{G(ext)}$ = 5Ω, L= 65.7 µH, T_J = 175ºC	
E_{OFF}	Turn Off Switching Energy (SiC Diode FWD)		1.67				
E_{ON}	Turn-On Switching Energy (Body Diode FWD)		4.65		mJ	V_{DS} = 800 V, V_{GS} = -4 V/+15 V, I_D = 50 A, $R_{G(ext)}$ = 5Ω, L= 65.7 µH, T_J = 175ºC	
E_{OFF}	Turn Off Switching Energy (Body Diode FWD)		1.58				
$t_{d(on)}$	Turn-On Delay Time		142		ns	V_{DD} = 800 V, V_{GS} = -4 V/15 V $R_{G(ext)}$ = 2.5 Ω, L= 65.7 µH Timing relative to VDS, Inductive load	
t_r	Rise Time		27				
$t_{d(off)}$	Turn-Off Delay Time		72				
t_f	Fall Time		25				
$R_{G(int)}$	Internal Gate Resistance		3.3		Ω	f = 1 MHz, V_{AC} = 25 mV	
Q_{gs}	Gate to Source Charge		51		nC	V_{DS} = 800 V, V_{GS} = -4 V/15 V I_D = 50 A Per IEC60747-8-4 pg 21	
Q_{gd}	Gate to Drain Charge		54				
Q_g	Total Gate Charge		158				

Reverse Diode Characteristics (T^C = 25˚C unless otherwise specified)

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_{SD}	Diode Forward Voltage	4.6		V	V_{GS} = -4 V, I_{SD} = 25 A, T_J = 25 °C	
		4.2		V	V_{GS} = -4 V, I_{SD} = 25 A, T_J = 175 °C	
I_S	Continuous Diode Forward Current		90	A	V_{GS} = -4 V, T_C = 25˚C	
$I_{S, pulse}$	Diode pulse Current		200	A	V_{GS} = -4 V, pulse width t_P limited by T_{jmax}	
t_{rr}	Reverse Recover time	81		ns	V_{GS} = -4 V, I_{SD} = 50 A, V_R = 800 V dif/dt = 1000 A/µs, T_J = 175 °C	
Q_{rr}	Reverse Recovery Charge	879		nC		
I_{rrm}	Peak Reverse Recovery Current	19		A		

Thermal Characteristics

Symbol	Parameter	Typ.	Unit	Test Conditions	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.32	°C/W		
$R_{\theta JA}$	Thermal Resistance From Junction to Ambient	40			

Typical Performance

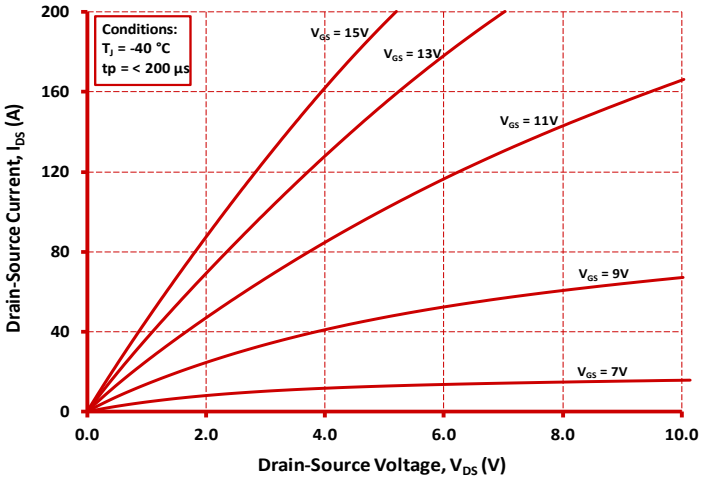


Figure 1. Output Characteristics T_J = -40 °C

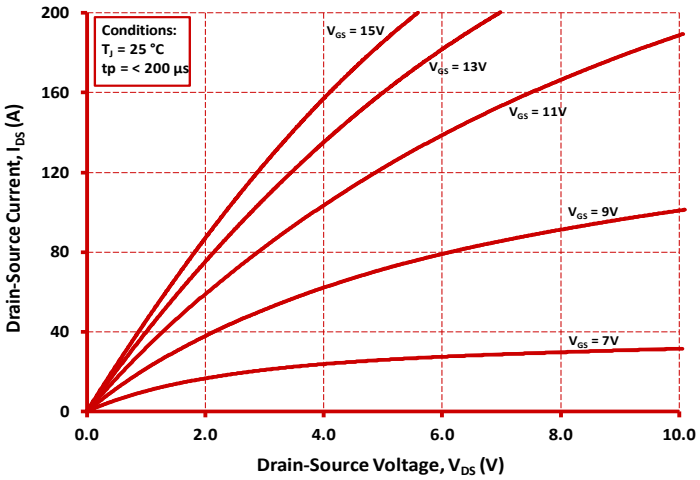


Figure 2. Output Characteristics T_J = 25 °C

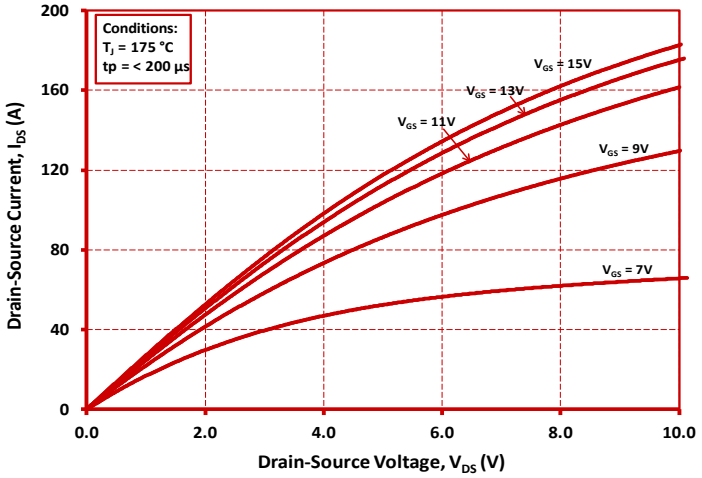


Figure 3. Output Characteristics T_J = 175 °C

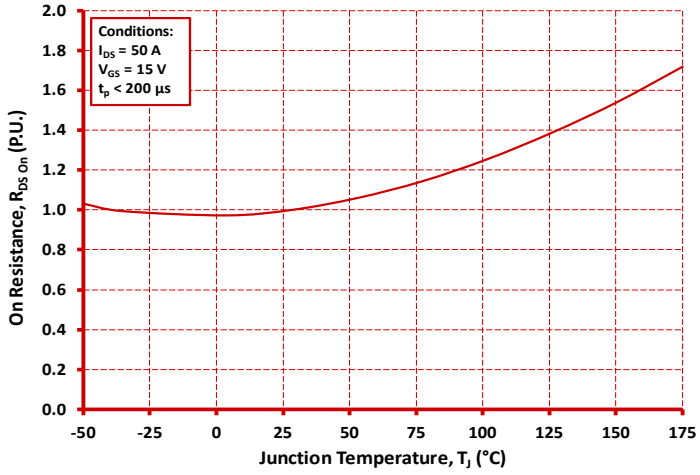


Figure 4. Normalized On-Resistance vs. Temperature

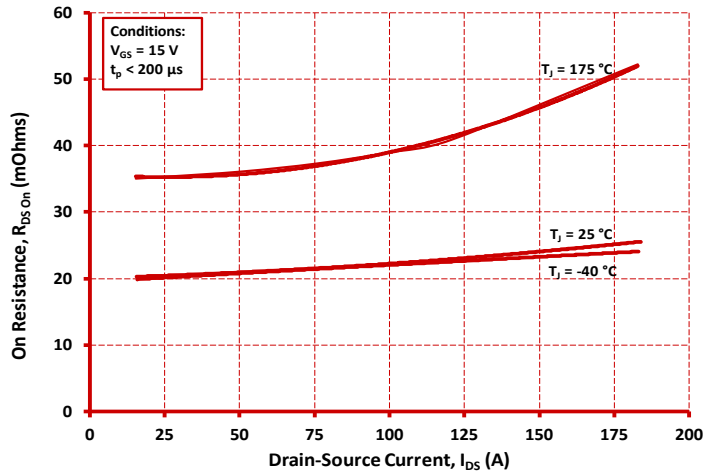


Figure 5. On-Resistance vs. Drain Current
For Various Temperatures

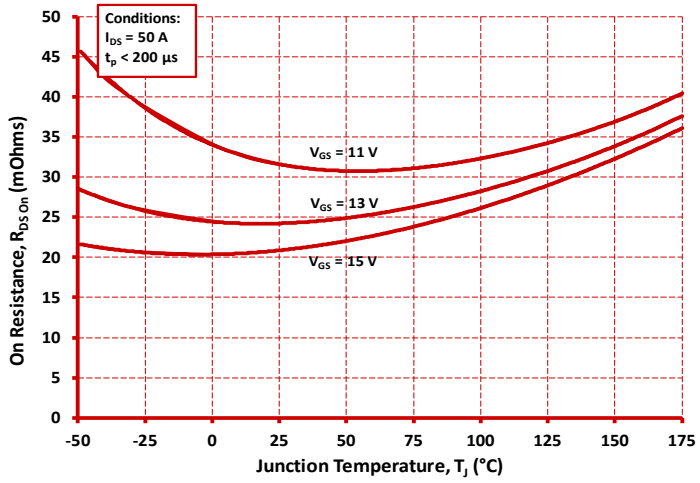


Figure 6. On-Resistance vs. Temperature
For Various Gate Voltage

Typical Performance

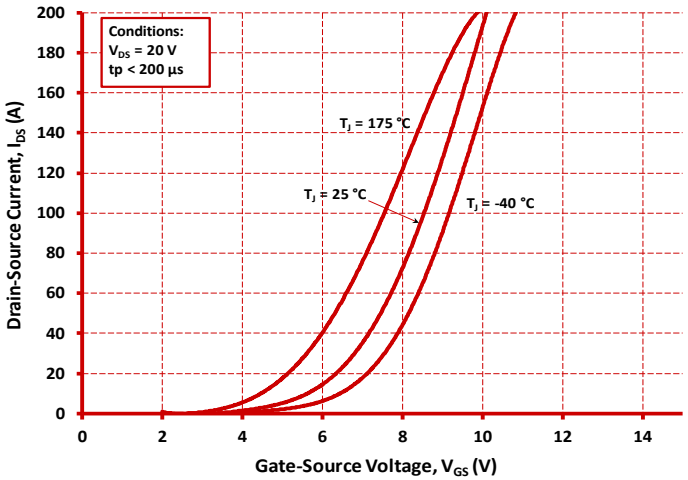


Figure 7. Transfer Characteristic for Various Junction Temperatures

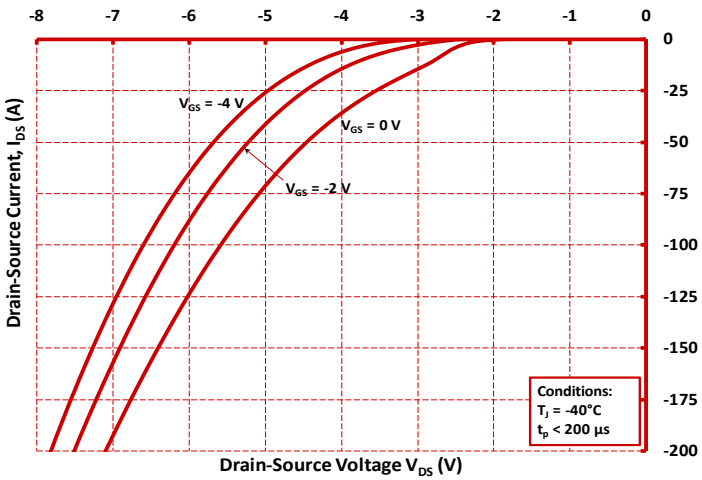


Figure 8. Body Diode Characteristic at -40 °C

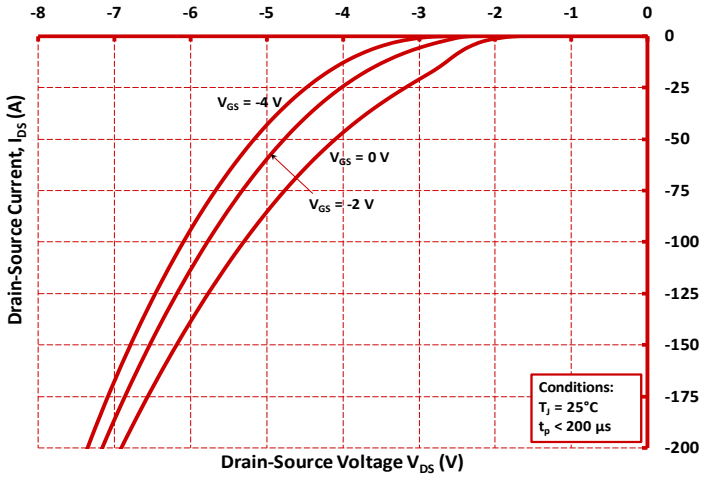


Figure 9. Body Diode Characteristic at 25 °C

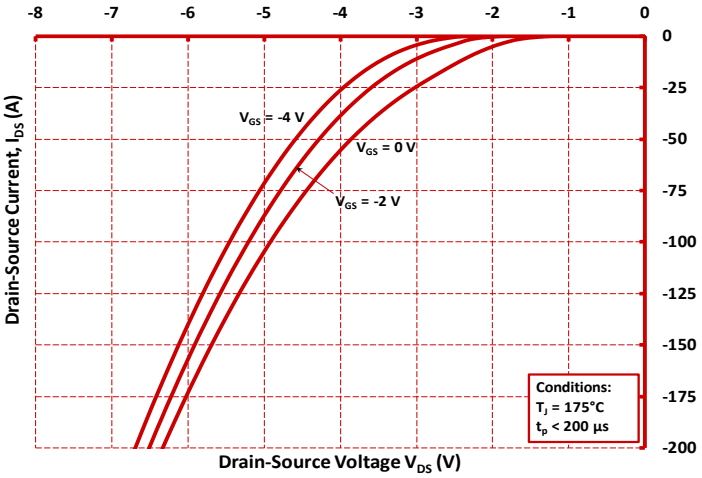


Figure 10. Body Diode Characteristic at 175 °C

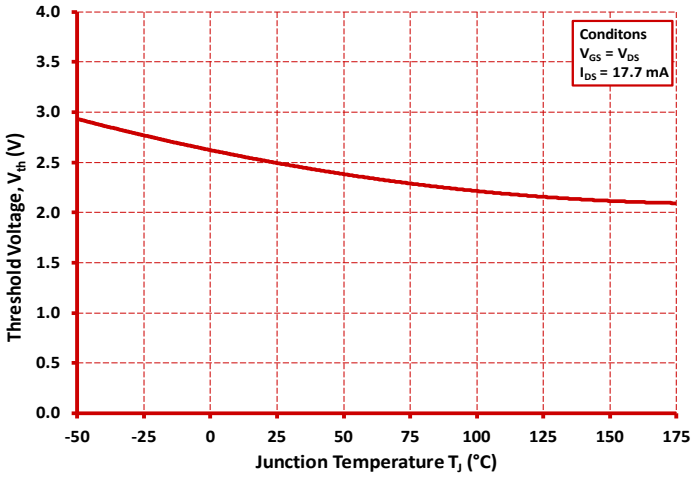


Figure 11. Threshold Voltage vs. Temperature

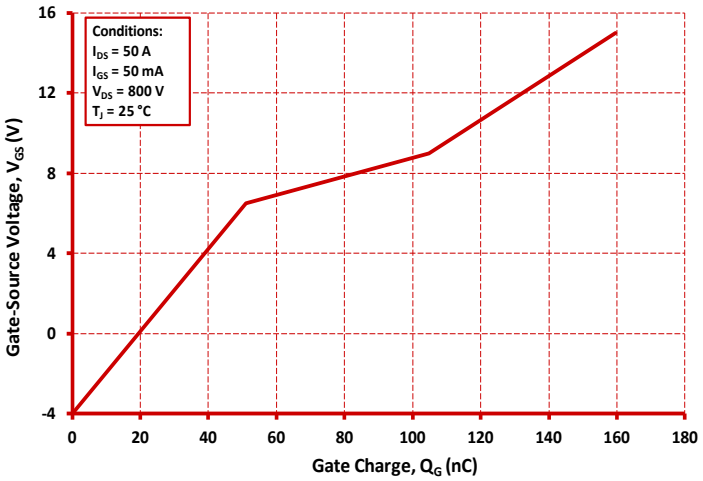


Figure 12. Gate Charge Characteristics

Typical Performance

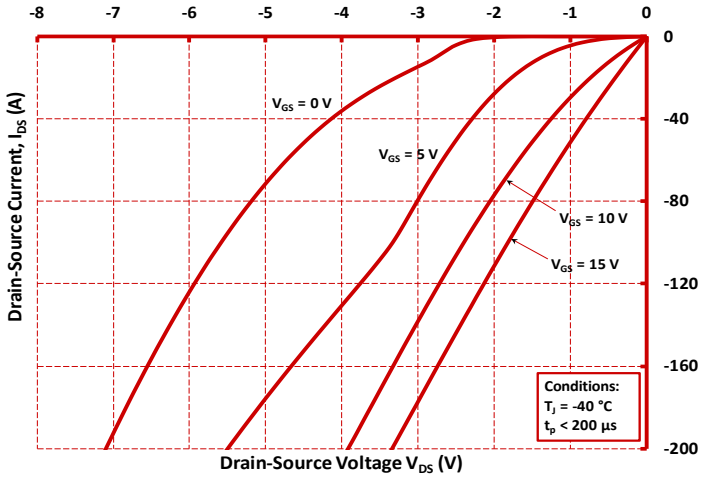


Figure 13. 3rd Quadrant Characteristic at -40 °C

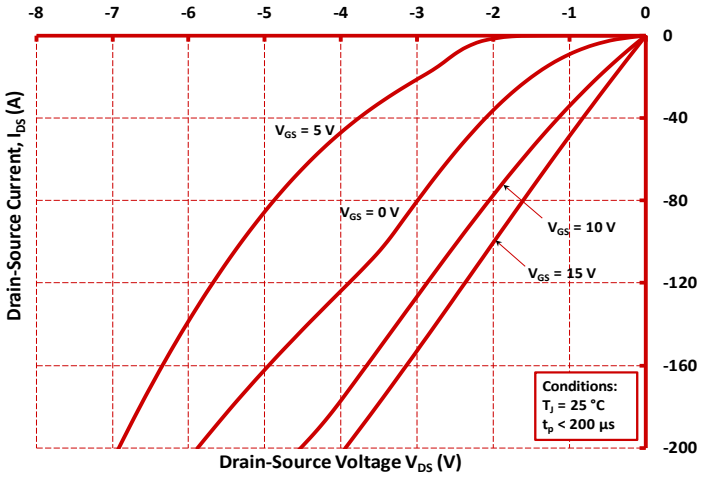


Figure 14. 3rd Quadrant Characteristic at 25 °C

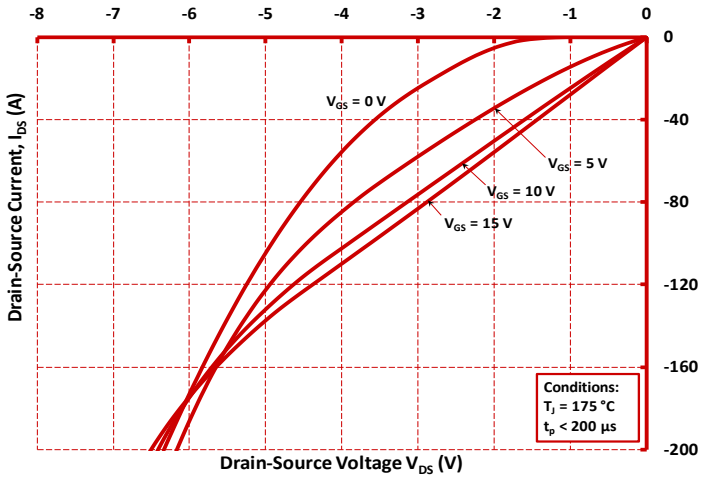


Figure 15. 3rd Quadrant Characteristic at 175 °C

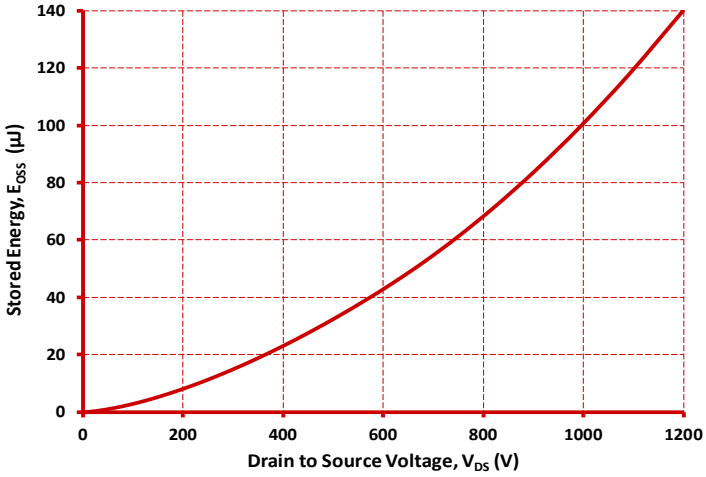


Figure 16. Output Capacitor Stored Energy

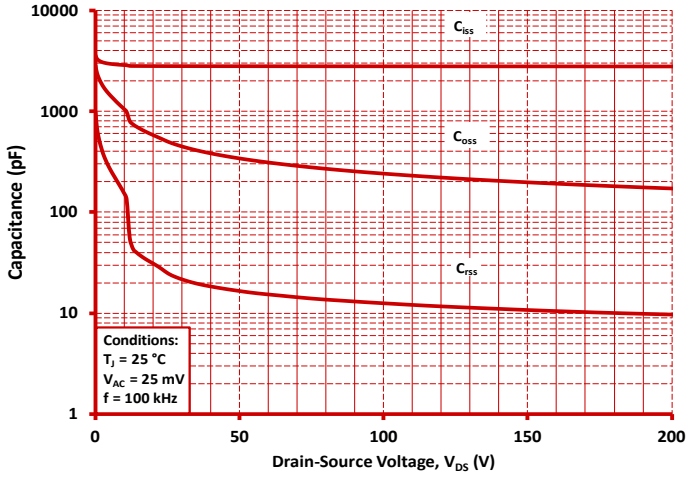


Figure 17. Capacitances vs. Drain-Source Voltage (0 - 200V)

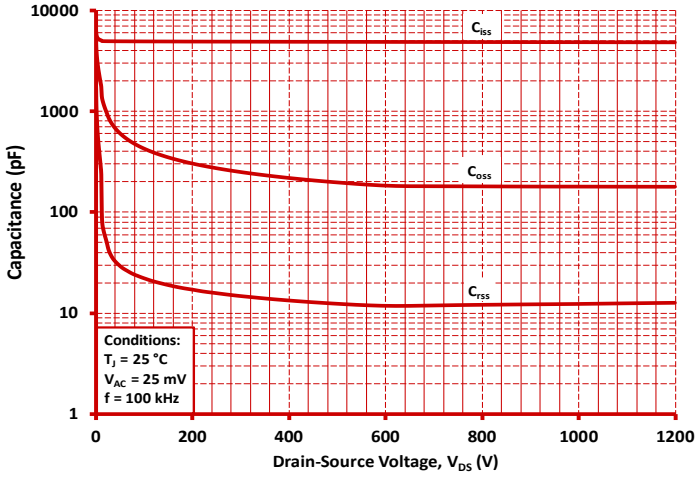


Figure 18. Capacitances vs. Drain-Source Voltage (0 - 1000V)

Typical Performance

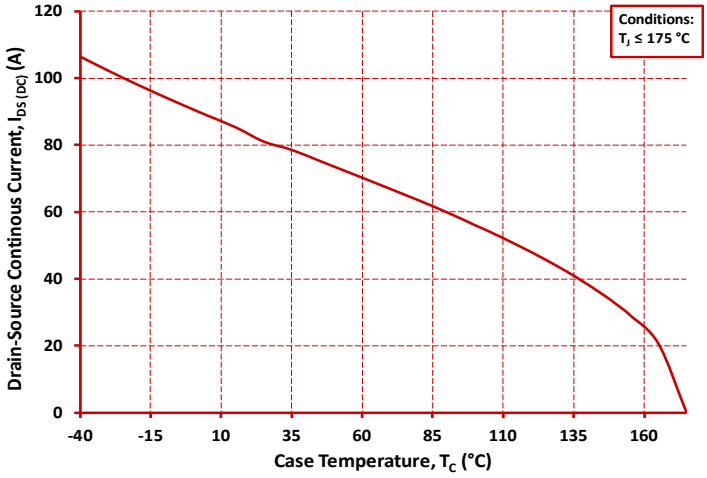


Figure 19. Continuous Drain Current Derating vs. Case Temperature

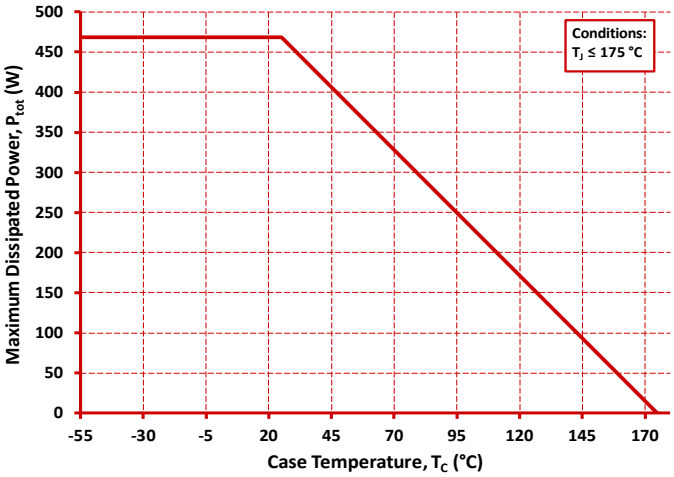


Figure 20. Maximum Power Dissipation Derating vs. Case Temperature

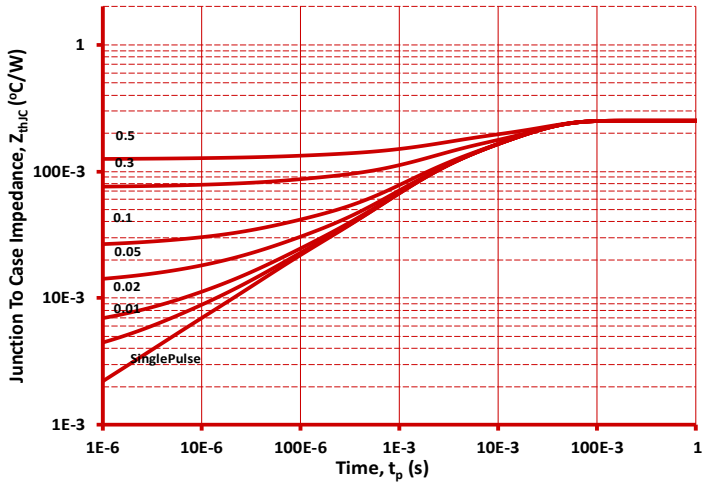


Figure 21. Transient Thermal Impedance (Junction - Case)

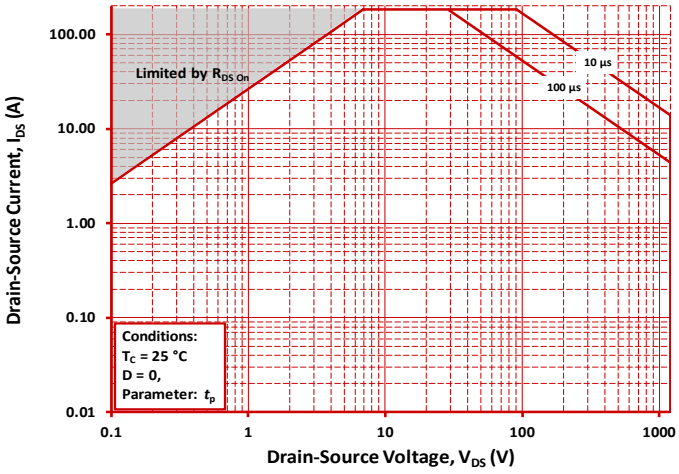


Figure 22. Safe Operating Area

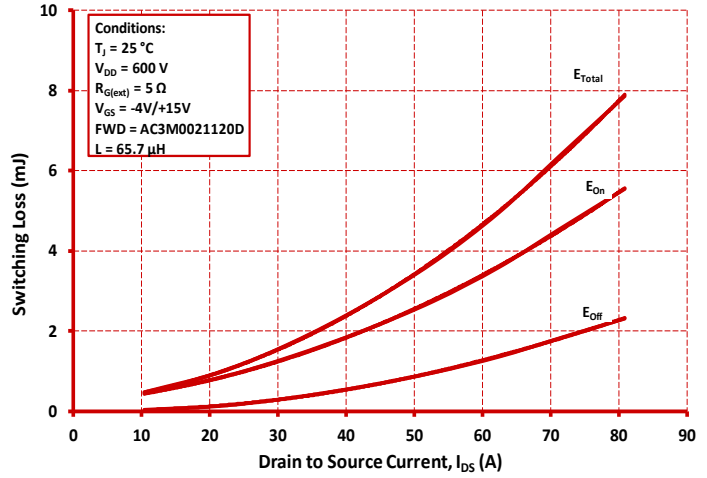


Figure 23. Clamped Inductive Switching Energy vs. Drain Current (V_{DD} = 600V)

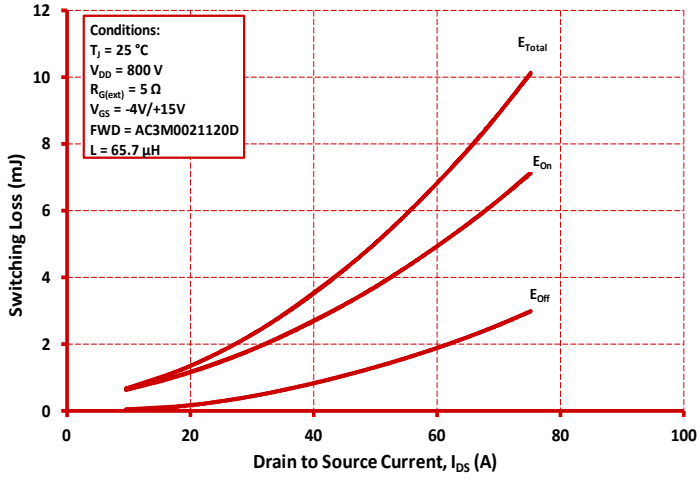


Figure 24. Clamped Inductive Switching Energy vs. Drain Current (V_{DD} = 800V)

Typical Performance

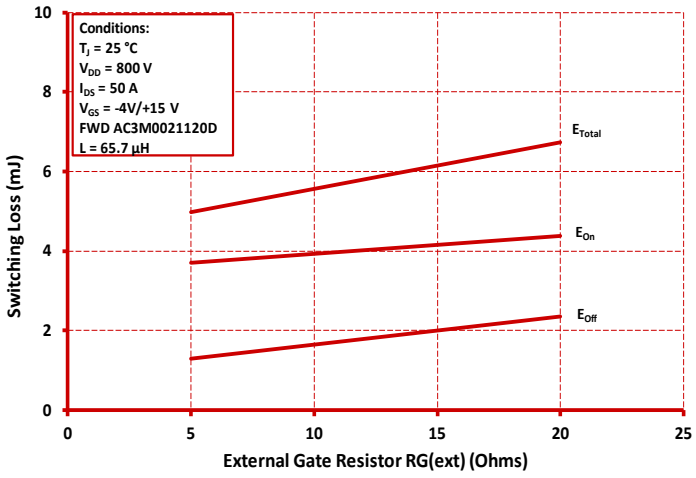


Figure 25. Clamped Inductive Switching Energy vs. $R_{G(ext)}$

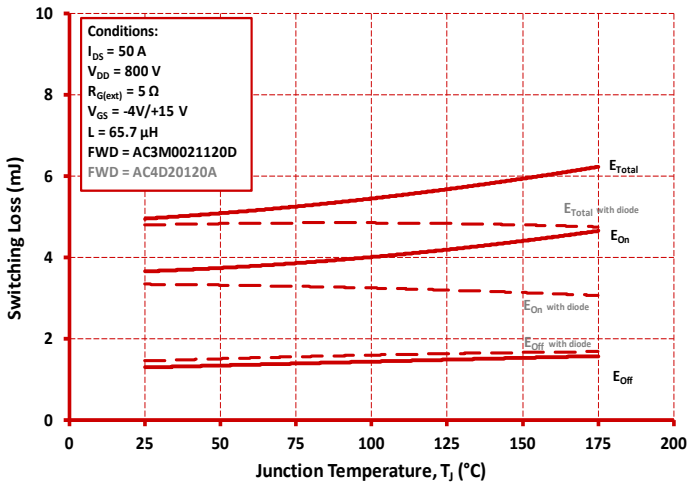


Figure 26. Clamped Inductive Switching Energy vs. Temperature

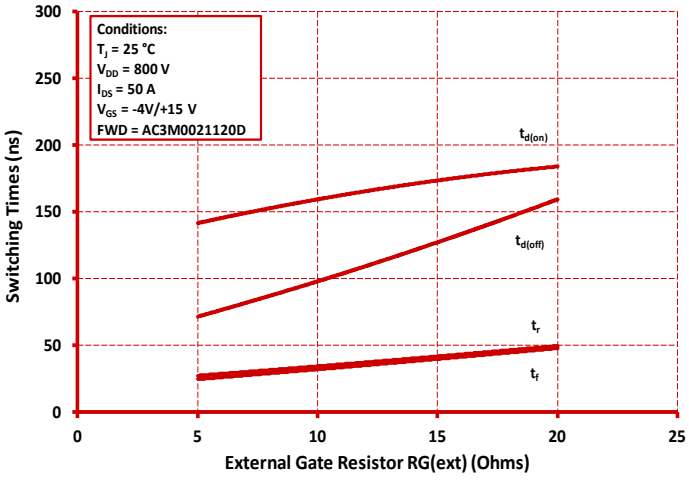


Figure 27. Switching Times vs. $R_{G(ext)}$

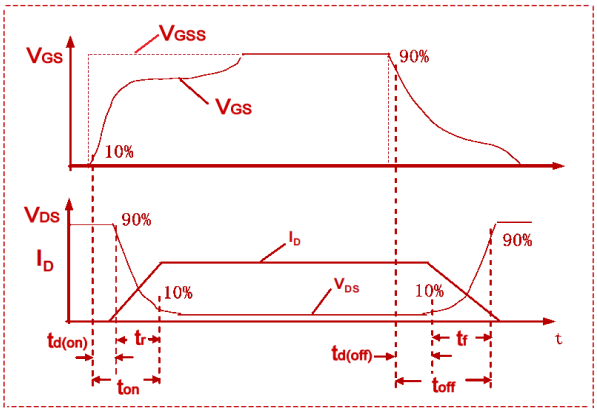


Figure 28. Switching Times Defnition

Test Circuit Schematic

Fig.29 Switching Time Measurement Circuit

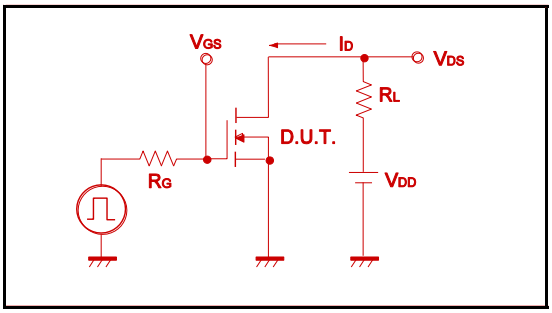


Fig.30 Switching Waveforms

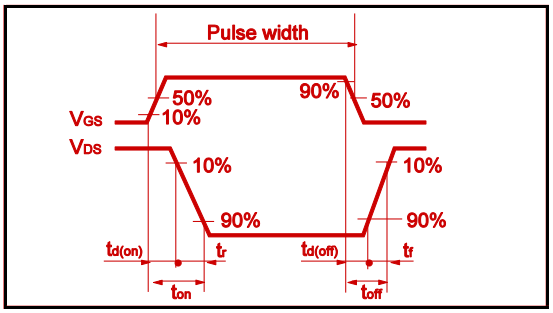


Fig.30-1 Gate Charge Measurement Circuit

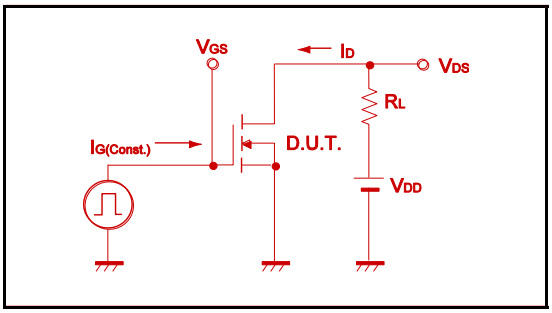


Fig.30-2 Gate Charge Waveform

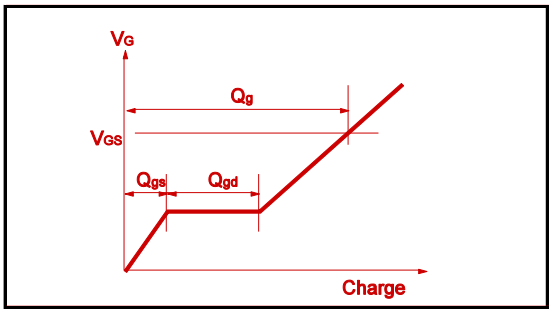


Fig.31-1 Switching Energy Measurement Circuit

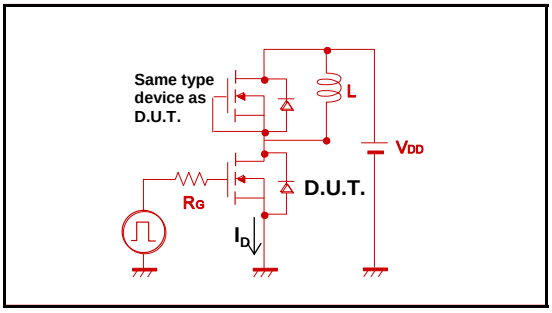


Fig.31-2 Switching Waveforms

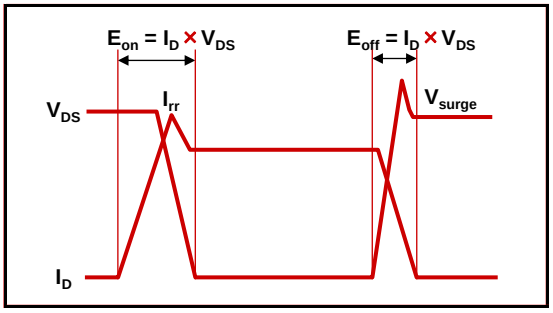


Fig.32-1 Reverse Recovery Time Measurement Circuit

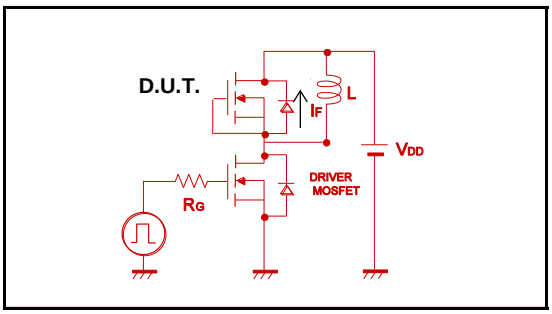
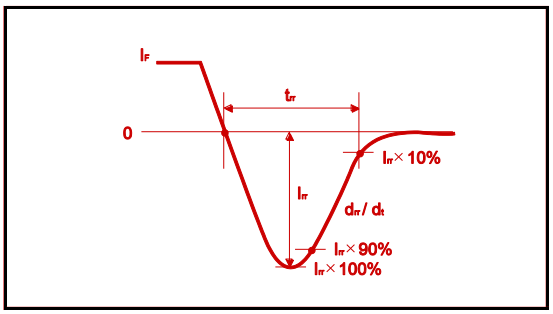
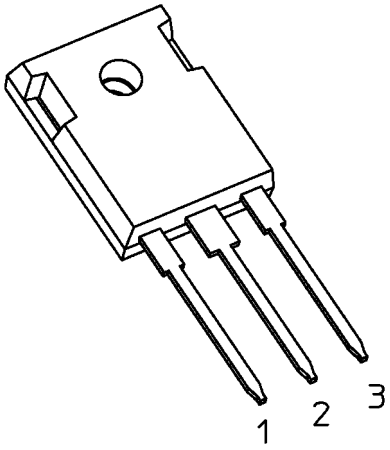


Fig.32-2 Reverse Recovery Waveform



Package Dimensions

Unit: mm



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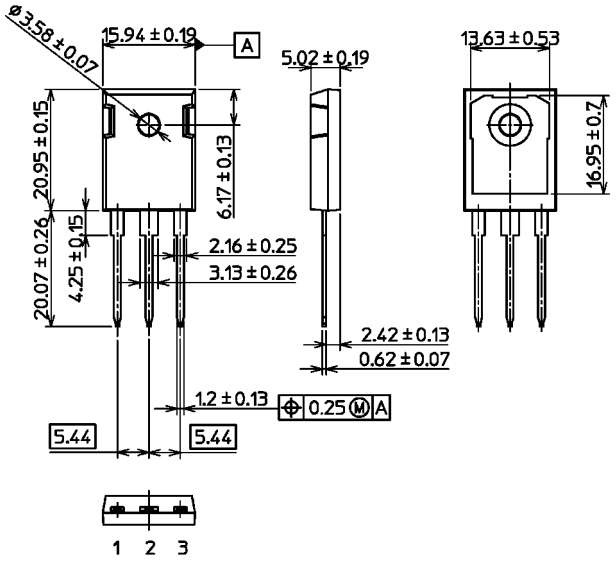
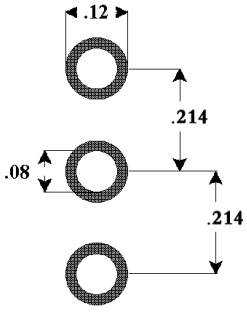


Recommended Solder Pad Layout



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