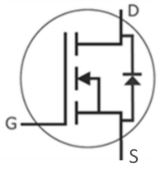
700V, 220mΩ，N-Channel SiC Power MOSFET

Features

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitance
- Easy to Parallel and Simple to Drive
- 15V / 0V V_{GS} compatible with most flyback controllers

Package





RoHS

Benefits

- Higher System Efficiency
- Reduced Cooling Requirements
- Increased Power Density
- Increased System Switching Frequency

Applications

- Solar and UPS inverters
- On Board Charger
- High voltage DC/DC converters
- Switched mode power supplies
- Load switch
- LED/LCD/PDP TV and monitor Lighting

Part Number	Package	Marking
ASMC070T220L1	TO-252-2L	ASMC070T220L1

Maximum Ratings (T_C=25℃ unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{DSmax}	Drain-Source Voltage	700	V	V_{GS}=0V, I_D=100μA	
V_{GSmax}	Gate-Source Voltage	-10/+23	V	Absolute maximum values	
V_{GSop}	Gate-Source Voltage	-5…0/+15…18	V	Recommended operational values	
I_D	Continuous Drain Current	12	A	V_{GS}=15V, T_c=25℃	Fig. 19
		8.4		V_{GS}=15V, T_c=100℃	
		13.6		V_{GS}=18, T_c=25℃	
		9.6		V_{GS}=18V, T_c=100℃	
$I_{D(pulse)}$	Pulsed Drain Current	34	A	Pulse width t_p limited by T_{Jmax}	
P_D	Power Dissipation	43	W	T_C=25℃, T_J=175℃	Fig. 20
T_J, T_{STG}	Operating Junction and Storage Temperature	-55 to +175	℃		
T_L	Solder Temperature, 1.6mm from case for 10s	260	℃		

Electrical Characteristics (T_C=25℃ unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	700	/	/	V	V_{GS}=0V, I_D=100μA	
$V_{GS(th)}$	Gate Threshold Voltage	2.4	3.2	4.0	V	V_{DS}=V_{GS}, I_D=1.4mA	Fig. 11
		/	2.4	/		V_{DS}=V_{GS}, I_D=1.4mA, T_J=175℃	
I_{DSS}	Zero Gate Voltage Drain Current	/	1	10	μA	V_{DS}=700V, V_{GS}=0V	
I_{GSS+}	Gate-Source Leakage Current	/	10	50	nA	V_{DS}=0V, V_{GS}=20V	
I_{GSS-}	Gate-Source Leakage Current	/	10	50	nA	V_{DS}=0V, V_{GS}=-8V	
$R_{DS(on)}$	Drain-Source On-State Resistance	/	300	400	mΩ	V_{GS}=15V, I_D=5A	Fig. 4,5,6
		/	330	/	mΩ	V_{GS}=15V, I_D=5A, T_J=175℃	
		/	220	310	mΩ	V_{GS}=18V, I_D=5A	
		/	245	/	mΩ	V_{GS}=18V, I_D=5A, T_J=175℃	
g_{fs}	Transconductance	/	3.1	/	S	V_{DS}=20V, I_{DS}=5A	Fig. 7
		/	2.8	/		V_{DS}=20V, I_{DS}=5A, T_J=175℃	
C_{iss}	Input Capacitance	/	224	/	pF	V_{GS}=0V V_{DS}=400V f=1MHz	Fig. 17,18
C_{oss}	Output Capacitance	/	10.5	/			
C_{rss}	Reverse Transfer Capacitance	/	1.1	/			
E_{oss}	C_{oss} Stored Energy	/	1.3	/	μJ	V_{AC}=25mV	Fig. 16
E_{ON}	Turn-On Switching Energy	/	12	/	μJ	V_{DS}=400V, V_{GS}=0V/15V	
E_{OFF}	Turn-Off Switching Energy	/	8	/		I_D=5A, $R_{G(ext)}$=2.5Ω, L=100μH	
$t_{d(on)}$	Turn-On Delay Time	/	5.5	/	ns	V_{DS}=400V, V_{GS}=0V/15V, I_D=5A $R_{G(ext)}$=2.5Ω	
t_r	Rise Time	/	4.3	/			
$t_{d(off)}$	Turn-Off Delay Time	/	9.1	/			
t_f	Fall Time	/	7.3	/			
$R_{G(int)}$	Internal Gate Resistance	/	20	/	Ω	f=1MHz, V_{AC}=25mV	
Q_{GS}	Gate to Source Charge	/	2.3	/	nC	V_{DS}=400V V_{GS}=0V/15V I_D=5A	Fig. 12
Q_{GD}	Gate to Drain Charge	/	1.9	/			
Q_G	Total Gate Charge	/	6.3	/			

Reverse Diode Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_{SD}	Diode Forward Voltage	4.2	/	V	V_{GS}=-5V, I_{SD}=2.5A, T_J=25℃	Fig. 8,9,10
		3.6	/		V_{GS}=-5V, I_{SD}=2.5A, T_J=175℃	
I_S	Continuous Diode Forward Current	/	8	A	T_C=25℃	
t_{rr}	Reverse Recover Time	8.2	/	ns	V_R=400V, I_{SD}=2.5A	
Q_{rr}	Reverse Recovery Charge	14.1	/	nC		
I_{rrm}	Peak Reverse Recovery Current	0.9	/	A		

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	3.5	/	℃/W		
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient	/	40			

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Typical Performance

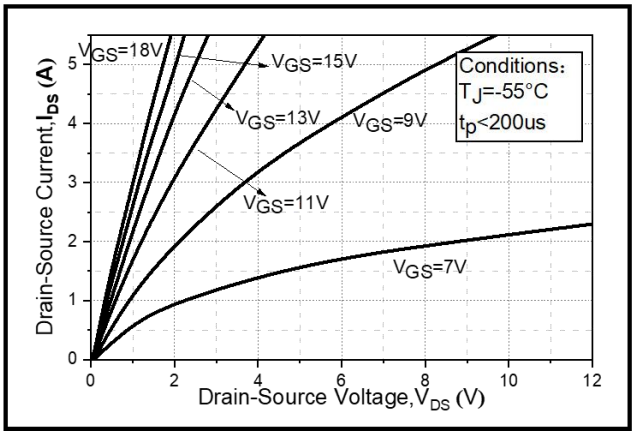


Figure 1. Output Characteristics T_J = -55℃

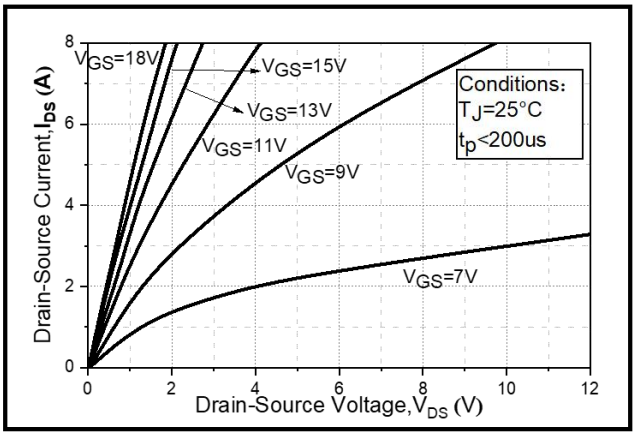


Figure 2. Output Characteristics T_J = 25℃

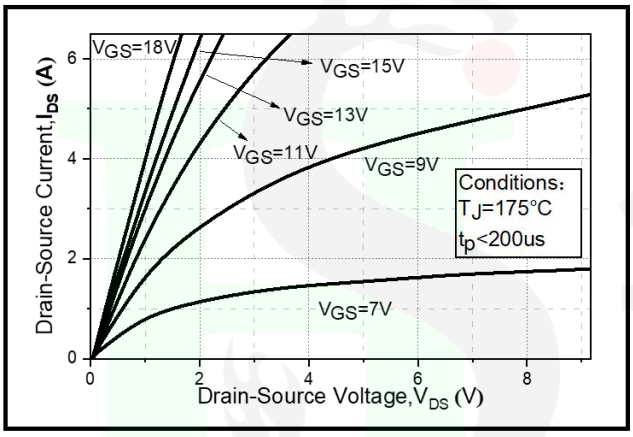


Figure 3. Output Characteristics T_J = 175℃

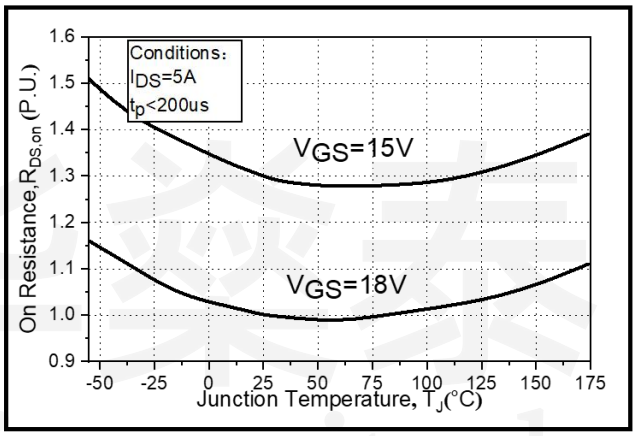


Figure 4. Normalized On-Resistance vs. Temperature

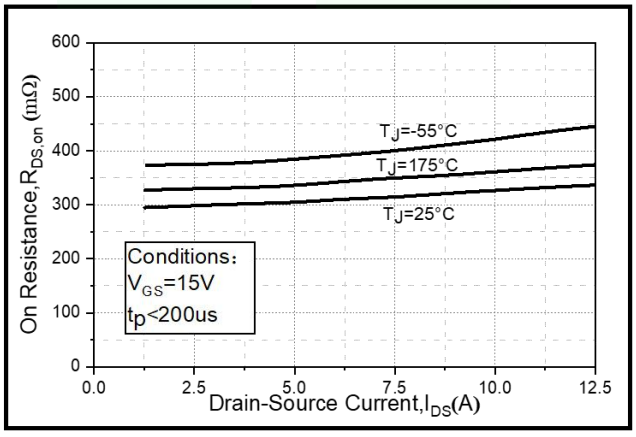


Figure 5. On-Resistance vs. Drain Current For Various Temperatures

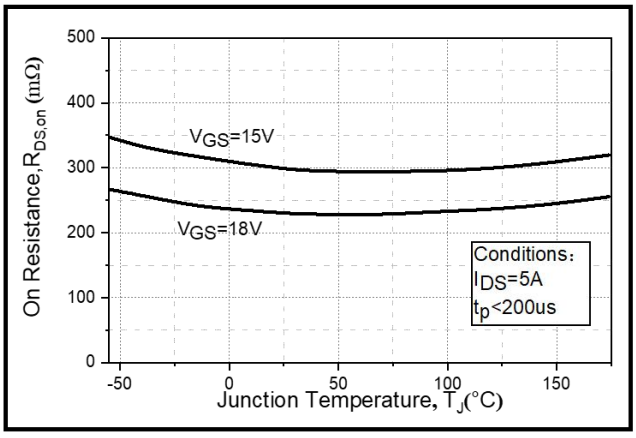


Figure 6. On Resistance vs. Temperature For Various Gate Voltage

Typical Performance

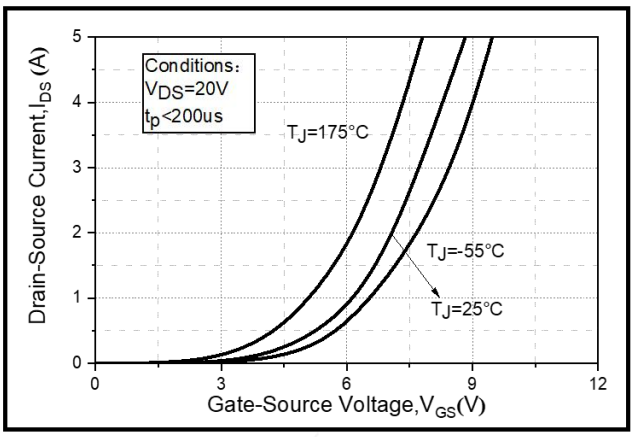


Figure 7. Transfer Characteristic for Various Junction Temperatures

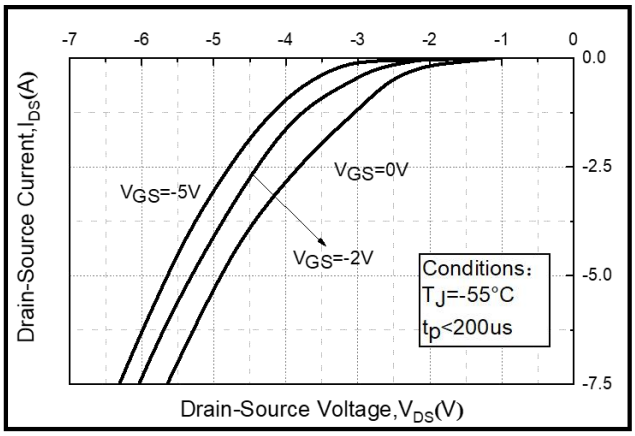


Figure 8. Body Diode Characteristic at -55℃

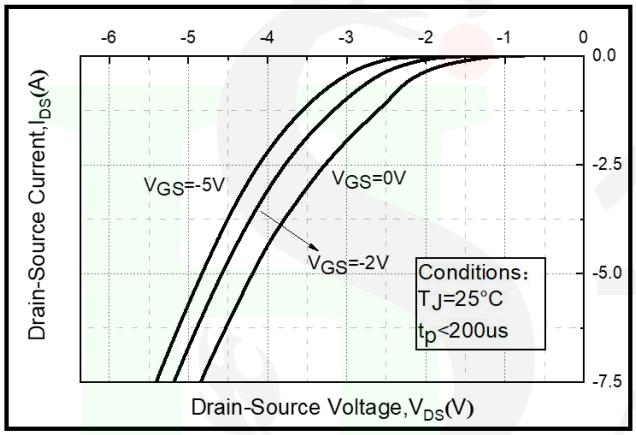


Figure 9. Body Diode Characteristic at 25℃

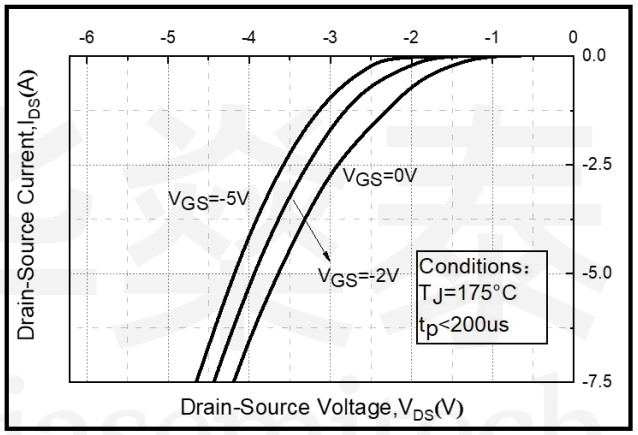


Figure 10. Body Diode Characteristic at 175℃

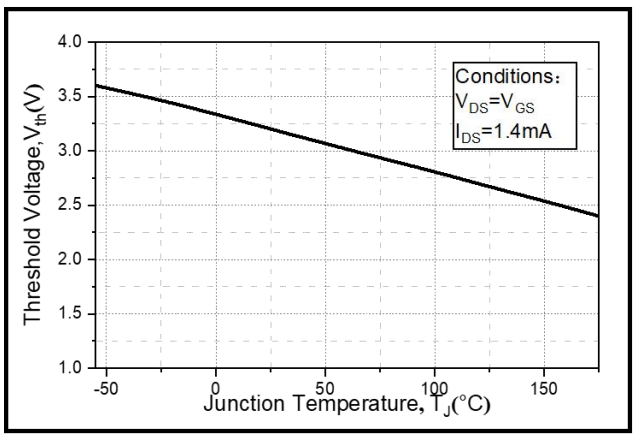


Figure 11. Threshold Voltage vs. Temperature

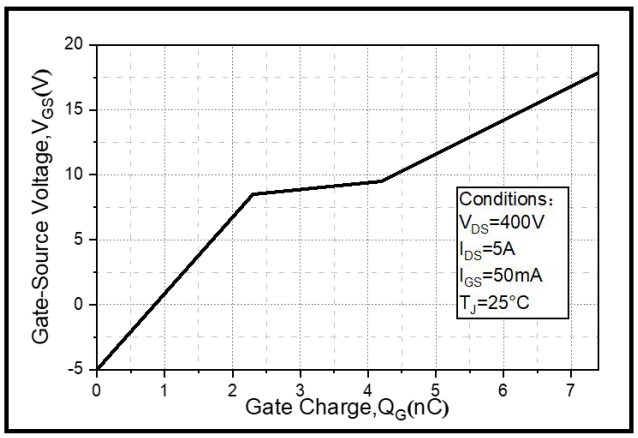


Figure 12. Gate Charge Characteristics

Typical Performance

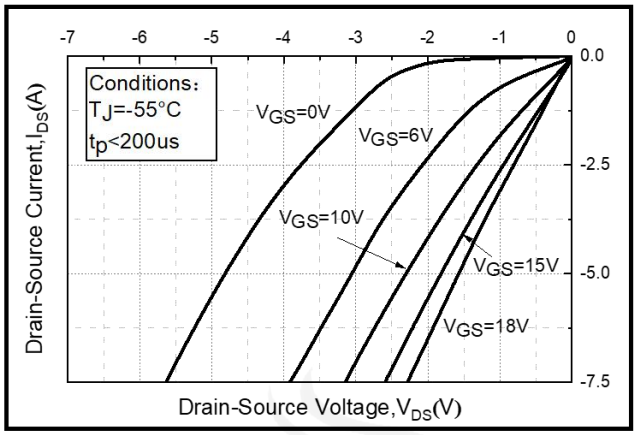


Figure 13. 3rd Quadrant Characteristic at -55℃

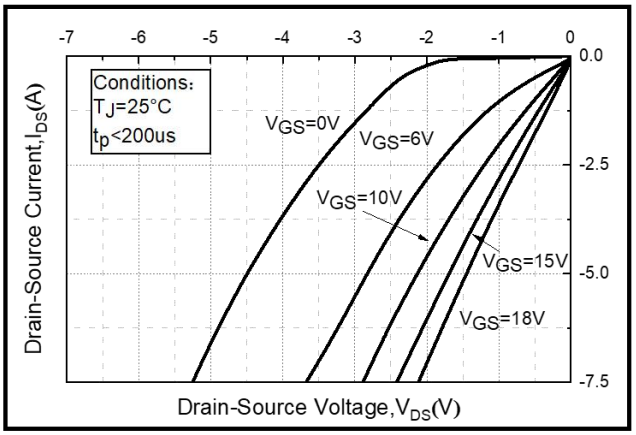


Figure 14. 3rd Quadrant Characteristic at 25℃

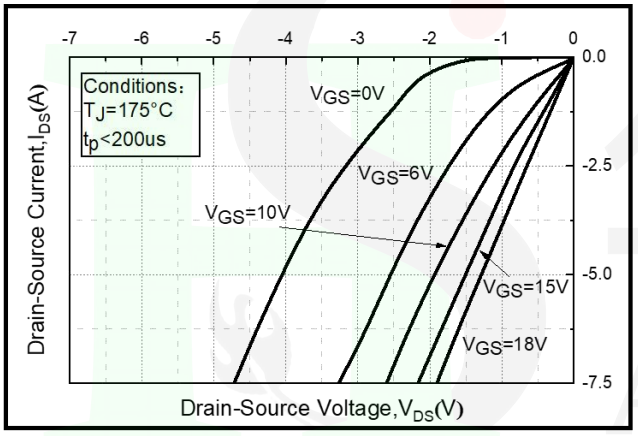


Figure 15. 3rd Quadrant Characteristic at 175℃

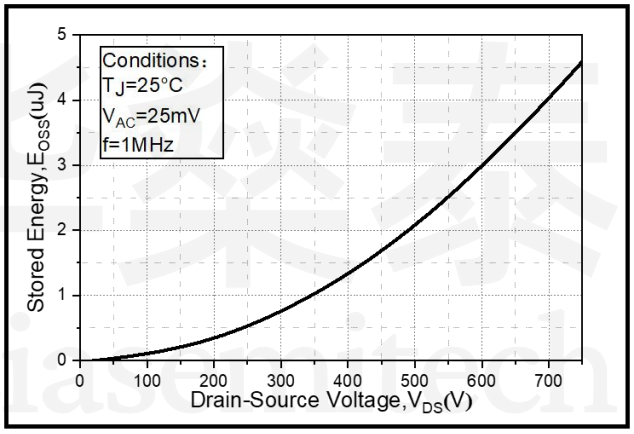


Figure 16. Output Capacitor Stored Energy

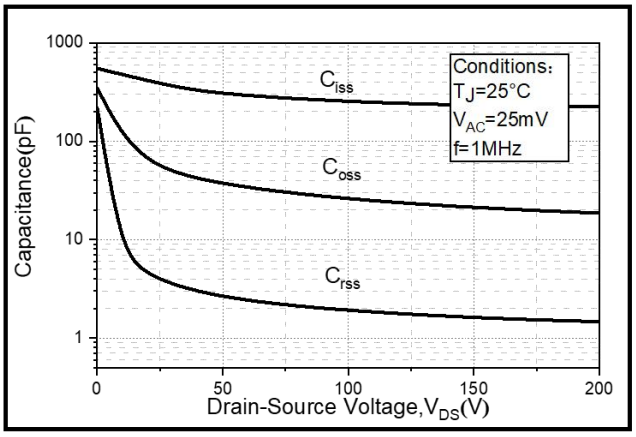


Figure 17. Capacitances vs. Drain-Source Voltage (0 - 200V)

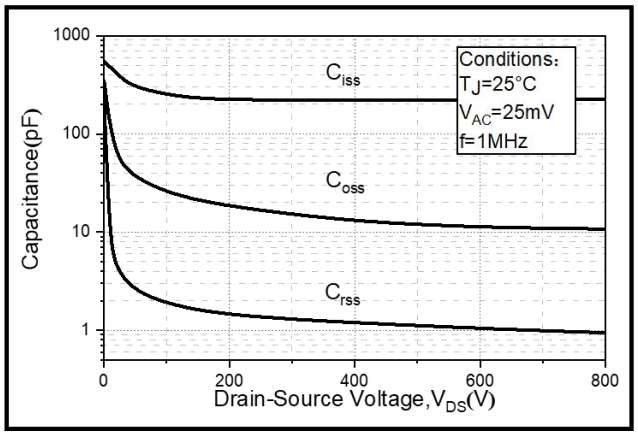


Figure 18. Capacitances vs. Drain-Source Voltage (0 - 800V)

Typical Performance

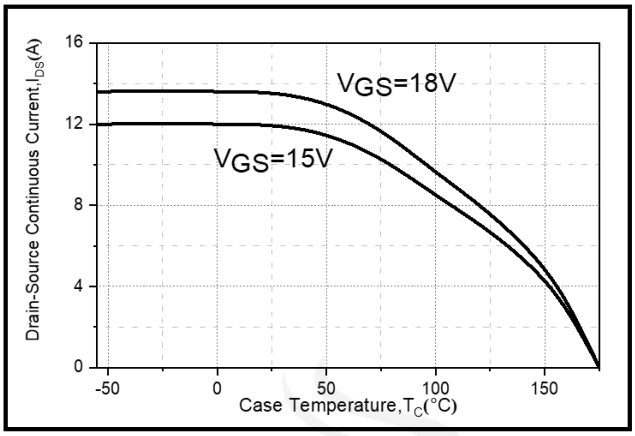


Figure 19. Continuous Drain Current vs. Case Temperature

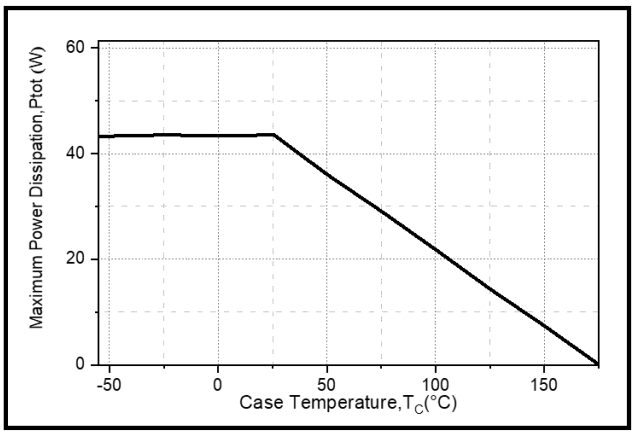


Figure 20. Maximum Power Dissipation vs. Case Temperature

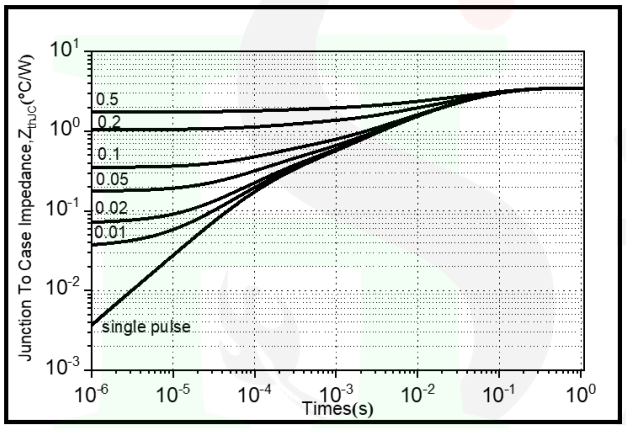


Figure 21. Transient Thermal Impedance(Junction - Case)

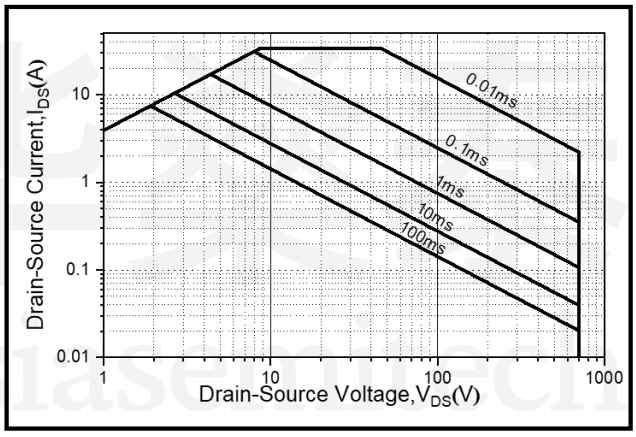


Figure22. Safe Operating Area

Test Circuit Schematic

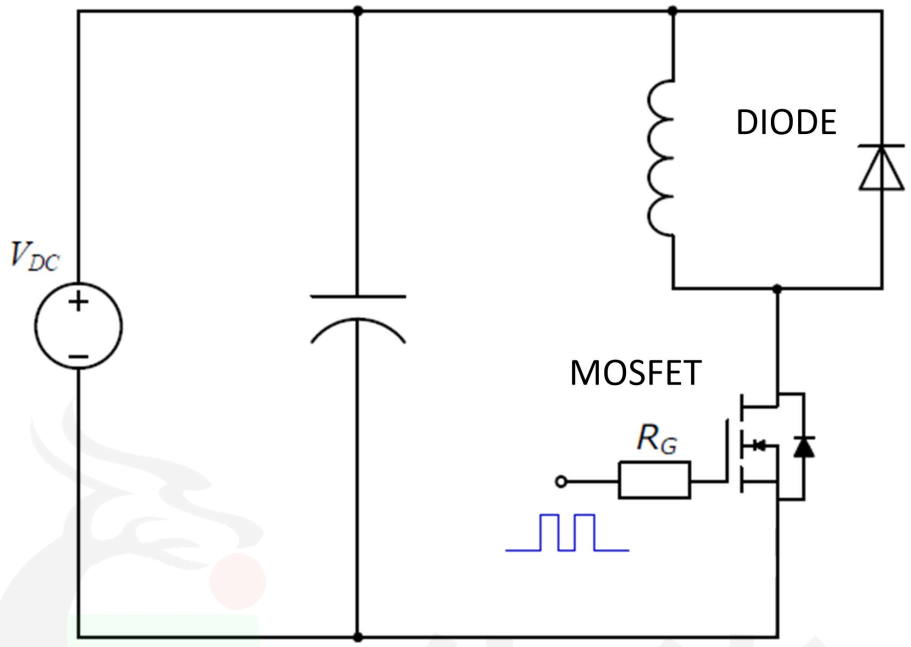
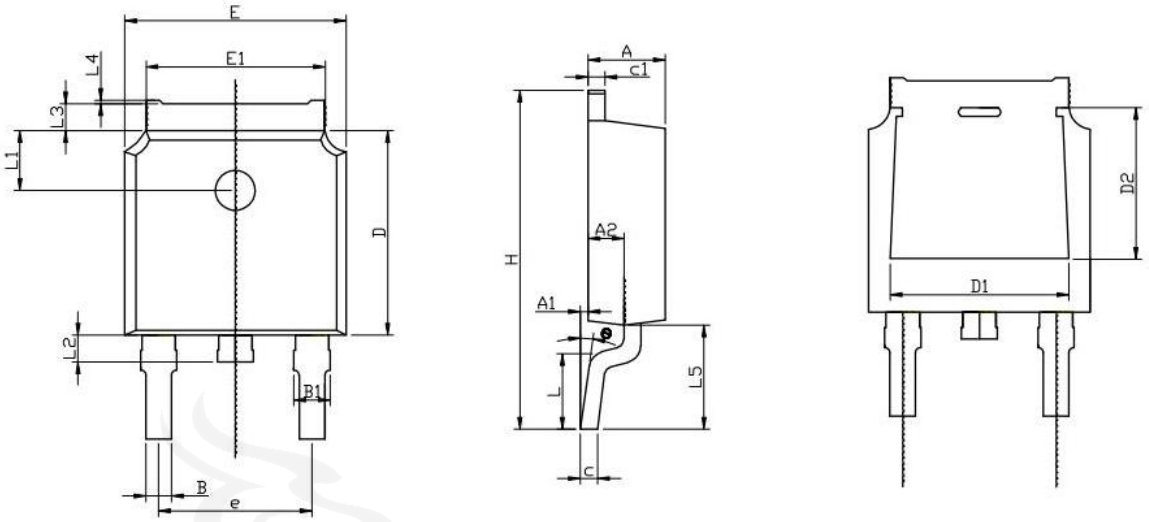
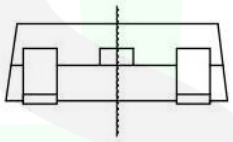


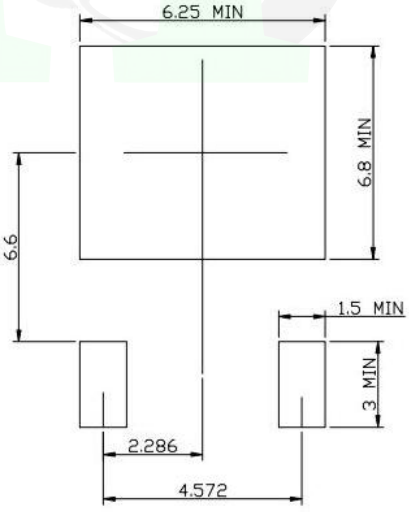
Figure 23. Clamped Inductive Switching Waveform Test Circuit

Package Dimensions





RECOMMENDED LAND PATTERN



	MIN	NOM	MAX
A	2.15	2.30	2.45
A1	0.05	0.10	0.20
A2	0.91	1.07	1.22
B	0.66	0.76	0.86
B1	0.93	1.08	1.23
C	0.40	0.50	0.60
C1	0.40	0.50	0.60
D	5.95	6.10	6.25
D1	-	4.8REF	-
D2	-	3.8REF	-
E	6.45	6.60	6.75
E1	5.12	5.32	5.52
L		1.65	
L1	1.58	1.78	1.98
L2	0.60	0.80	1.00
L3	0.70	0.85	1.00
L4	0.00	0.05	0.20
L5	2.80	3.10	3.40
H	9.80	10.10	10.40
θ	0°		8°
e		4.572REF	

UNIT: mm

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