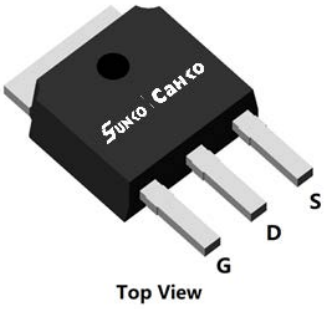
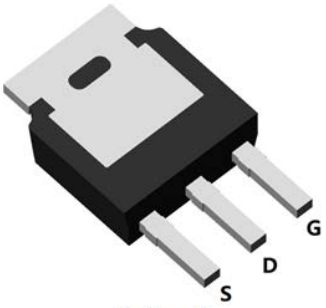
N-Channel Enhancement Mode Field Effect Transistor

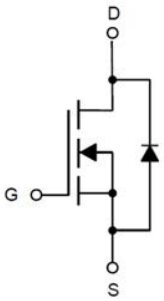


Top View



Bottom View

TO-251



Product Summary

- V_{DS} 60V
- I_D 20A
- $R_{DS(ON)}$(at V_{GS}= 10V) ＜43mohm
- $R_{DS(ON)}$(at V_{GS}= 4.5V) ＜47mohm
- 100% EAS Tested
- 100% ▽V_{DS} Tested

General Description

- Trench Power MV MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- DC-DC Converters
- Power management functions
- Backlighting

■ Absolute Maximum Ratings (T_A=25℃unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	60	V
Gate-source Voltage		V_{GS}	±20	V
Drain Current	T_C=25℃	I_D	20	A
	T_C=100℃		12	
Pulsed Drain Current [A]		I_{DM}	60	A
Total Power Dissipation	T_C=25℃	P_D	28	W
	T_C=100℃		11	W
Single Pulse Avalanche Energy [B]		E_{AS}	30.25	mJ
Thermal Resistance Junction-to-Case [C]		$R_{\theta JC}$	4.4	℃/ W
Junction and Storage Temperature Range		T_J ,T_{STG}	-55～+150	℃

■ Ordering Information (Example)

PREFERED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
SCR20N06A	B1	SCR20N06A	75	/	22500	Tube

■ Electrical Characteristics (T_J=25℃ unless otherwise noted)

Parameter	Symbol	Conditions		Min	Typ	Max	Units
Static Parameter							
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}= 0V, I_D=250μA		60			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V,V_{GS}=0V	T_J=25℃			1	μA
			T_J=150℃			100	
Gate-Body Leakage Current	I_{GSS}	V_{GS}= ±20V, V_{DS}=0V				±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D=250μA		1.0	1.5	2.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}= 10V, I_D=20A			29	43	mΩ
		V_{GS}= 4.5V, I_D=10A			31	47	
Diode Forward Voltage	V_{SD}	I_S=10A,V_{GS}=0V			0.8	1.2	V
Maximum Body-Diode Continuous Current	I_S					20	A
Dynamic Parameters							
Input Capacitance	C_{iss}	V_{DS}=30V,V_{GS}=0V,f=1MHZ			1018		pF
Output Capacitance	C_{oss}				70		
Reverse Transfer Capacitance	C_{rss}				62		
Switching Parameters							
Total Gate Charge	Q_g	V_{GS}=10V,V_{DS}=30V,I_D=10A			26		nC
Gate-Source Charge	Q_{gs}				5.4		
Gate-Drain Charge	Q_{gd}				6.5		
Reverse Recovery Charge	Q_{rr}	I_F=20A, di/dt=500A/us			11.7		
Reverse Recovery Time	t_{rr}				23		ns
Turn-on Delay Time	$t_{D(on)}$	V_{GS}=10V,V_{DD}=30V, I_D=2A,R_L=1Ω R_{GEN}=3Ω			10		
Turn-on Rise Time	t_r				20		
Turn-off Delay Time	$t_{D(off)}$				29		
Turn-off fall Time	t_f				22		

A. Pulse Test: Pulse Width≤300us,Duty cycle ≤2%.

B. T_j=25℃, V_{DD}=40V, V_G=10V, L=0.5mH, IAS=11A

C. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance, where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design, while $R_{\theta JA}$ is determined by the board design. The maximum rating presented here is based on mounting on a 1 in 2 pad of 2oz copper.

■ Typical Performance Characteristics

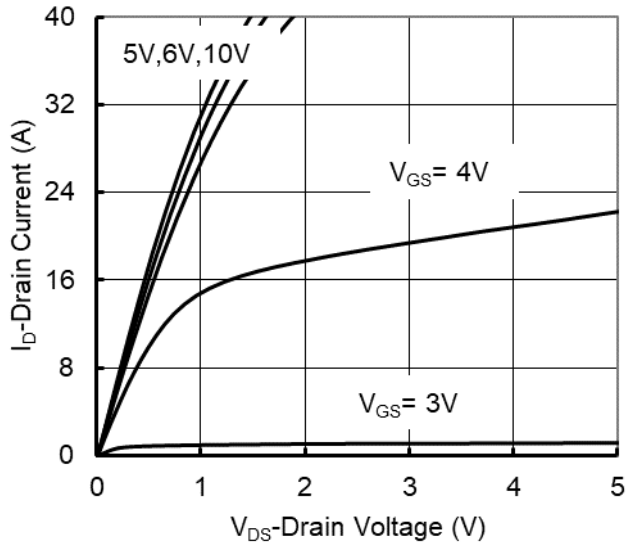


Figure 1. Output Characteristics

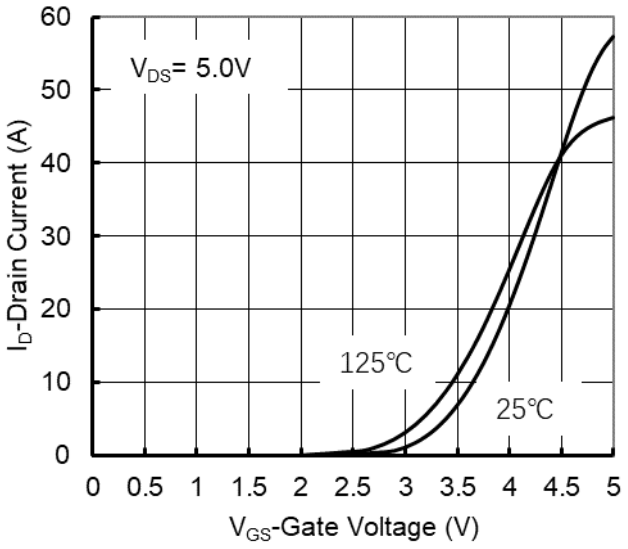


Figure 2. Transfer Characteristics

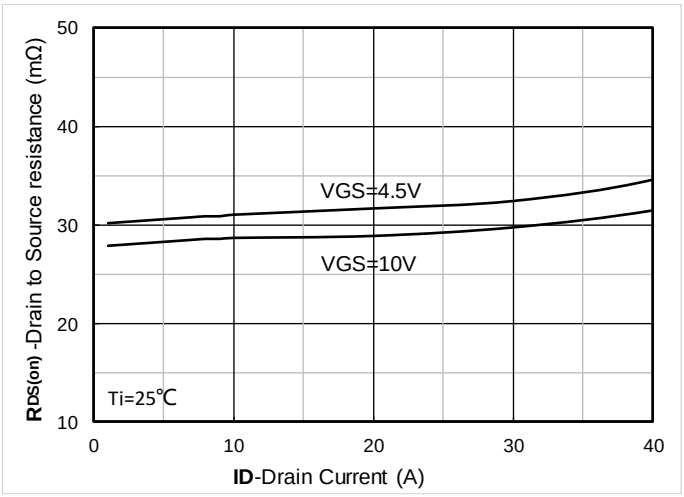


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

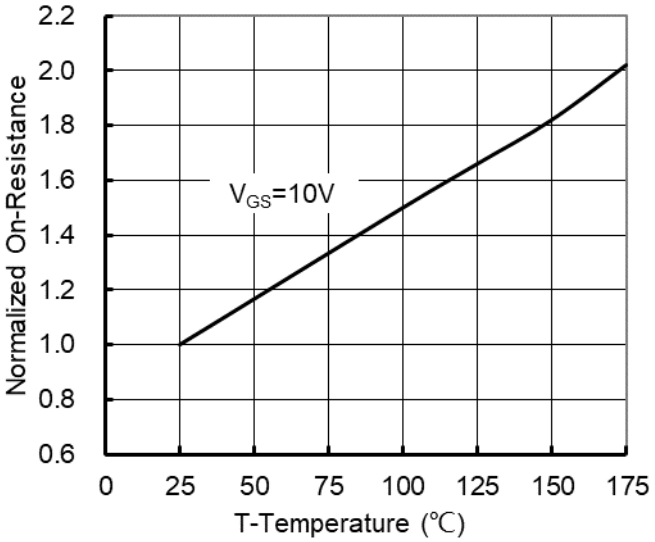


Figure 4. On-Resistance vs. Junction Temperature

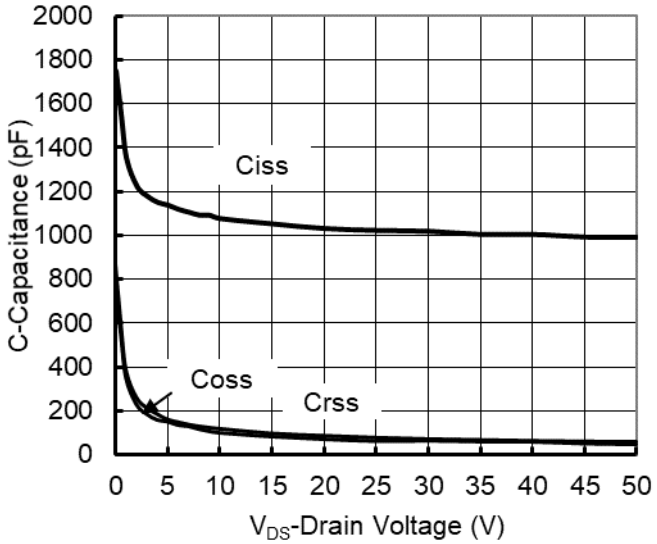


Figure 5. Capacitance Characteristics

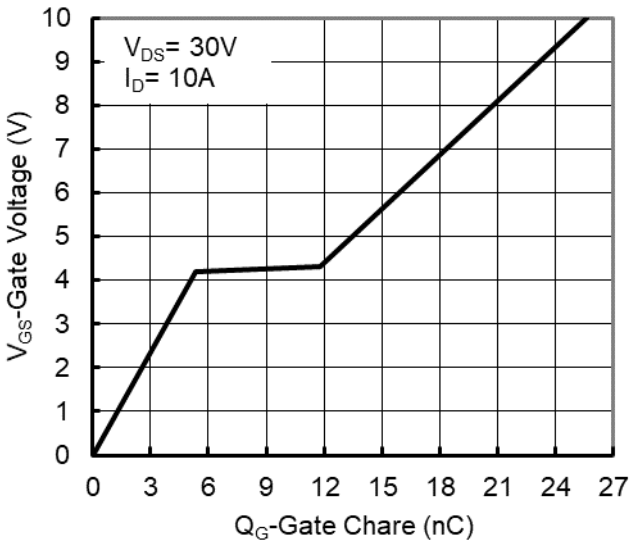


Figure 6. Gate Charge

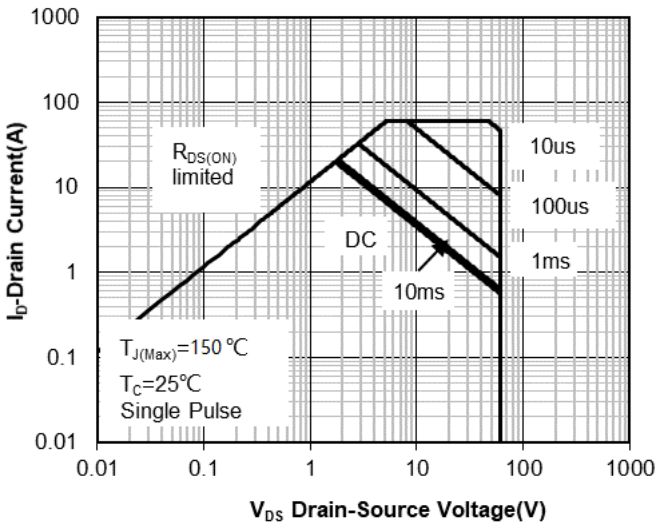


Figure 7. Safe Operation Area

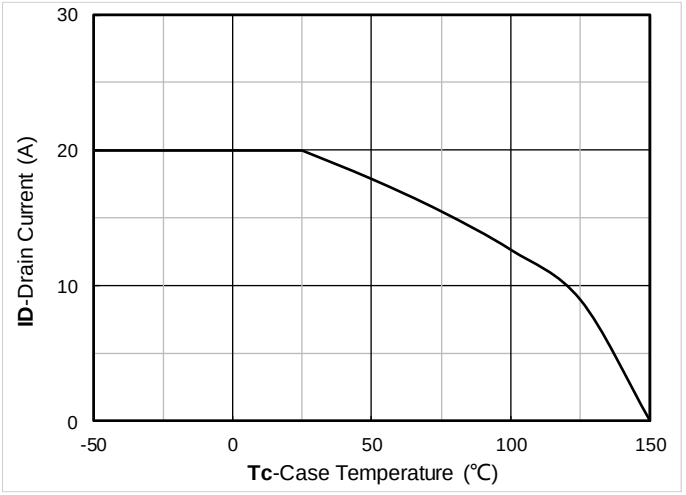


Figure 8. Maximum Continuous Drain Current vs Case Temperature

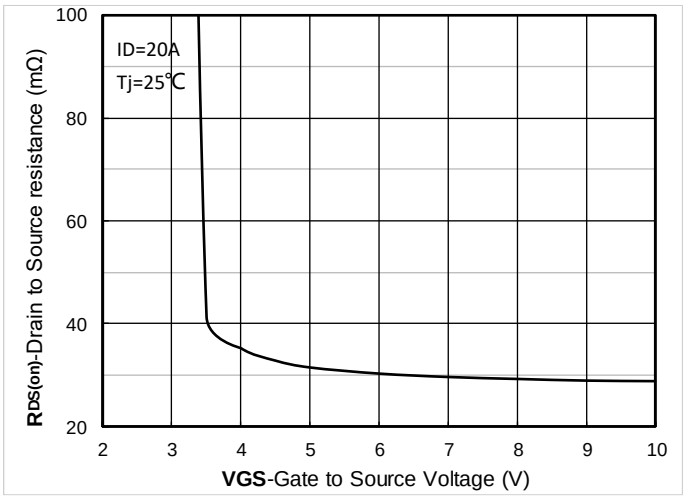


Figure 9. On-Resistance vs Gate to Source Voltage

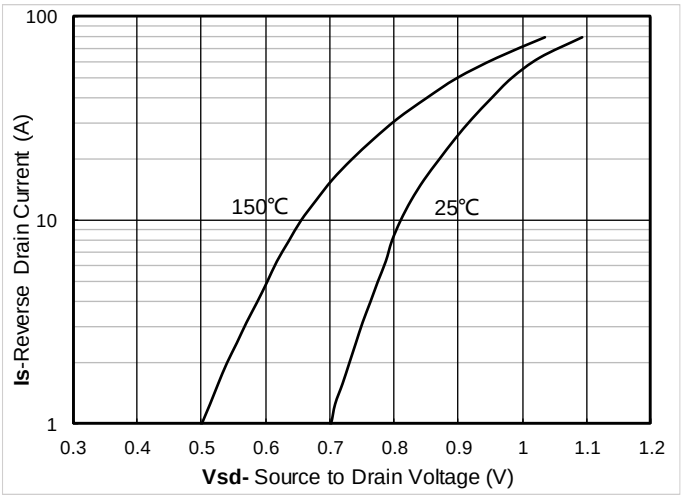


Figure 10. Forward characteristics of reverse diode

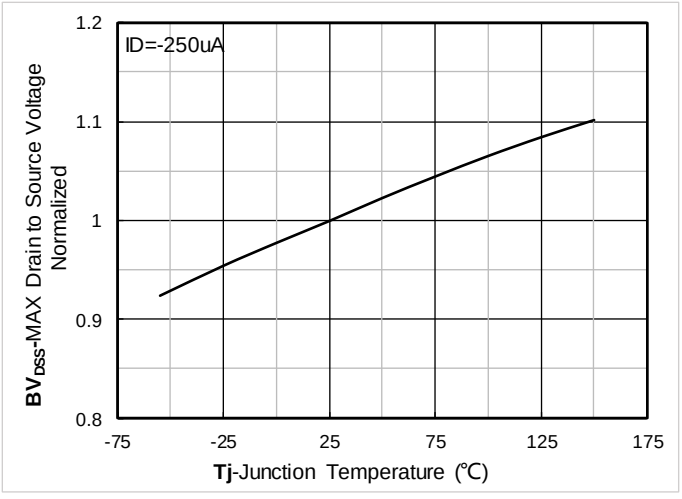


Figure 11. Normalized breakdown voltage

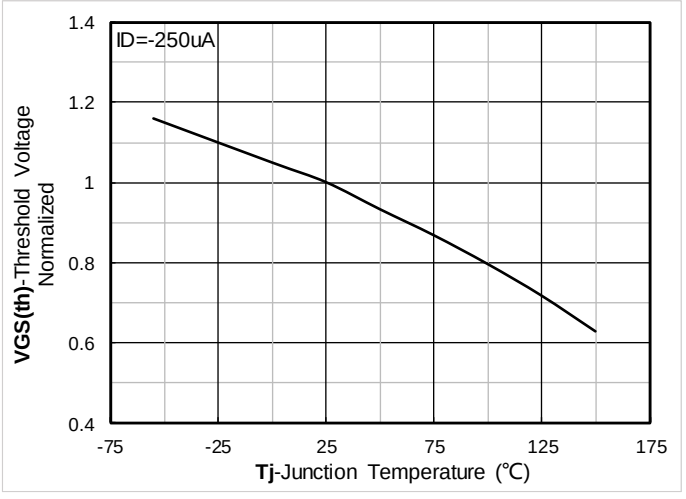


Figure 12. Normalized Threshold voltage

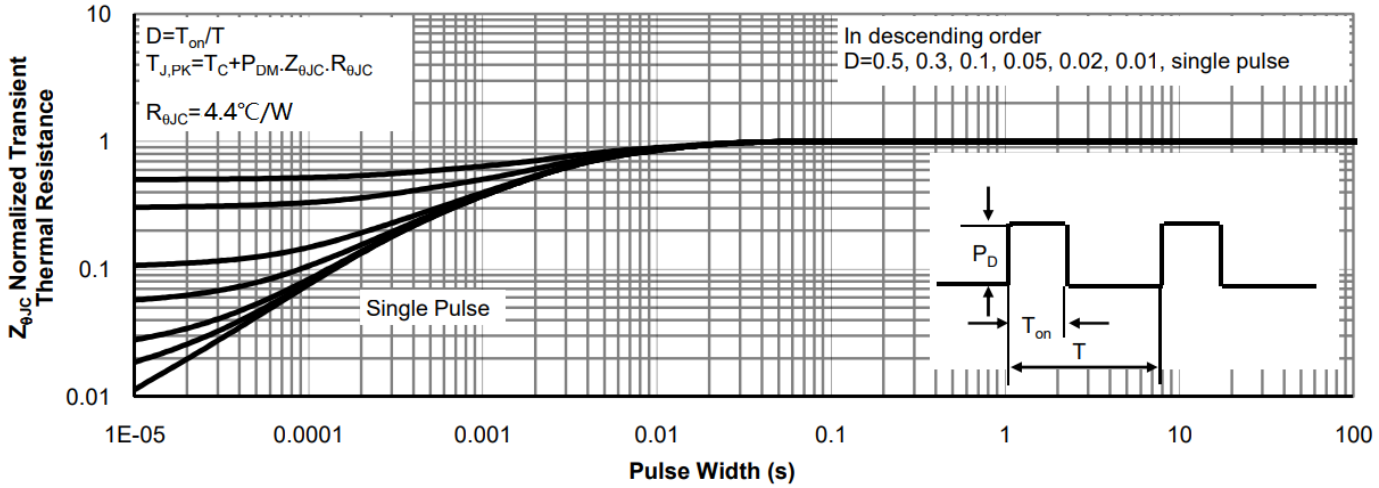
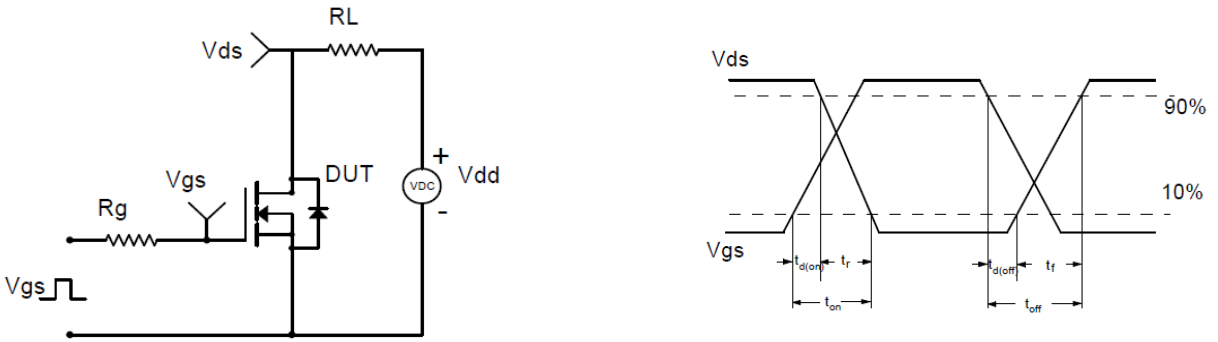
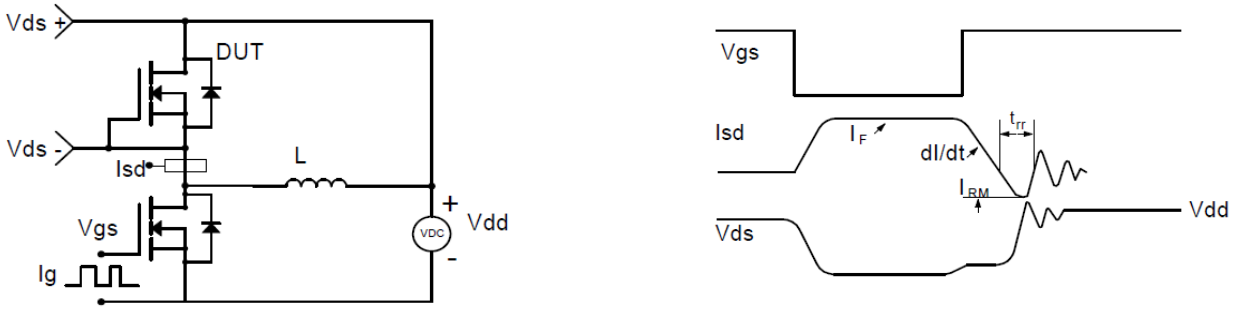


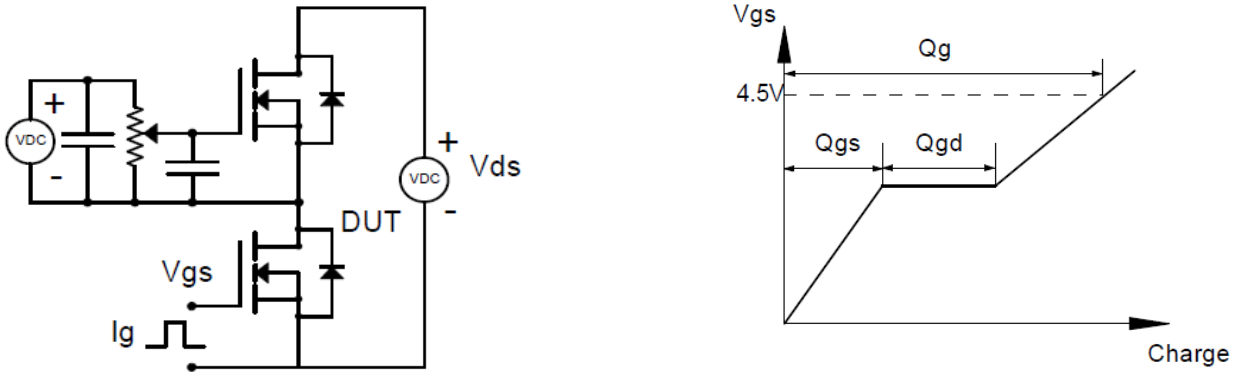
Figure 13. Normalized Maximum Transient Thermal Impedance



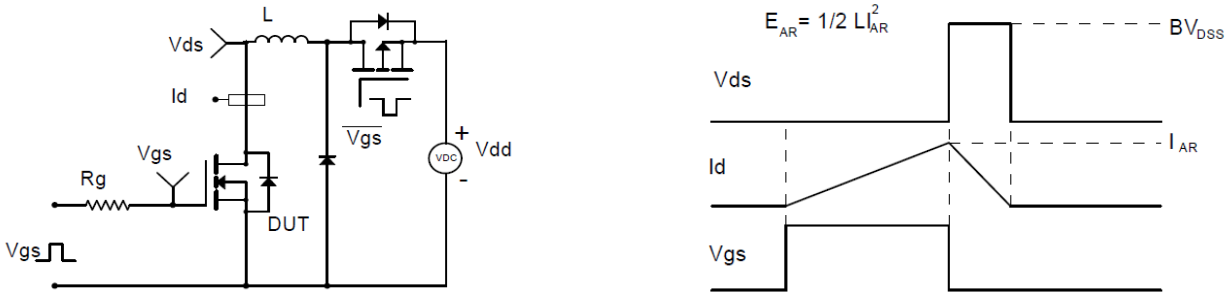
Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

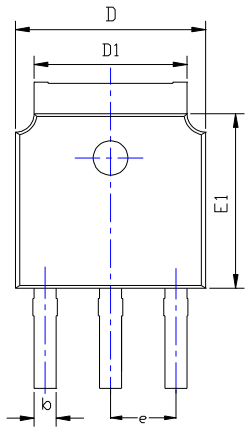


Gate Charge Test Circuit & Waveform

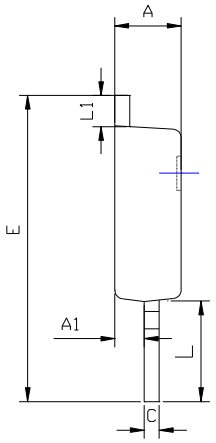


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

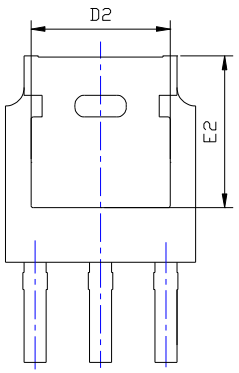
■ TO-251 Package Information



TOP VIEW



SIDE VIEW



BOTTOM VIEW

DIMENSIONS				
SYMBOL	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A	0.087	0.094	2.200	2.400
A1	0.035	0.043	0.900	1.100
b	0.026	0.034	0.660	0.860
c	0.018	0.023	0.460	0.580
D	0.256	0.264	6.500	6.700
D1	0.203	0.215	5.150	5.450
D2	0.181	0.195	4.600	4.950
E	0.409	0.453	10.400	11.500
E1	0.236	0.244	6.000	6.200
E2	0.213REF		5.400REF	
e	0.090BSC		2.286BSC	
L	0.138	0.169	3.500	4.300
L1	0.035	0.050	0.900	1.270

NOTE:
1.PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
2.TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.

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