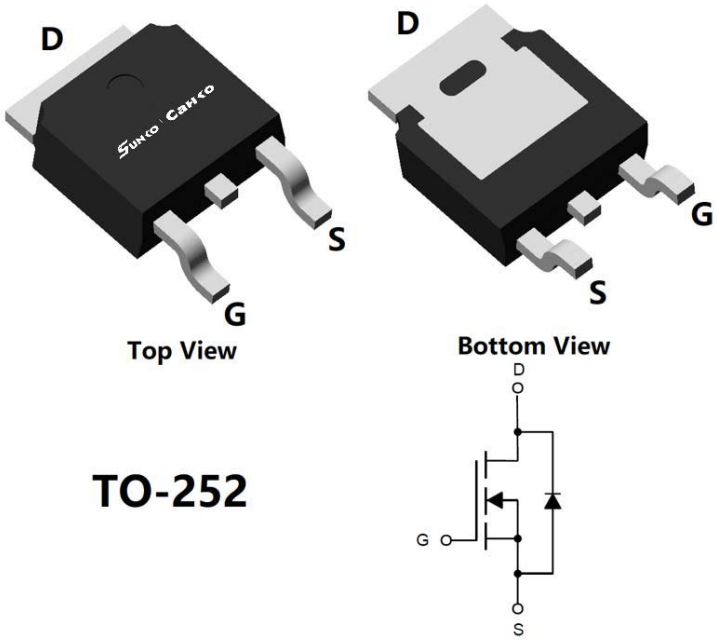
N-Channel Enhancement Mode Field Effect Transistor



Product Summary

- V_{DS} 20V
- I_D 30A
- $R_{DS(ON)}$(at V_{GS}=4.5V) ＜8mohm
- $R_{DS(ON)}$(at V_{GS}=2.5V) ＜9mohm
- $R_{DS(ON)}$(at V_{GS}=1.8V) ＜14mohm
- 100% ∇V_{DS} Tested
- 100% EAS Tested

General Description

- Trench Power MV MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- High current load applications
- Load switch
- Hard switched and high frequency circuits
- Uninterruptible power supply

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

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	20	V
Gate-source Voltage		V_{GS}	±10	V
Drain Current	T_C=25℃	I_D	30	A
	T_C=100℃		19	
Pulsed Drain Current [A]		I_{DM}	125	A
Total Power Dissipation	T_C=25℃	P_D	25	W
	T_C=100℃		10	W
Single Pulse Avalanche Energy[B]		E_{AS}	64	mJ
Thermal Resistance Junction-to-Case		$R_{\theta JC}$	5	℃/ 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
SCD30N02A	F1/F2 SC	D30N02A	2500	/	25000	13“ reel

■ 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	20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V,V_{GS}=0V			1	μA
		V_{DS}=20V,V_{GS}=0V, Tj=150℃			100	
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±10V, V_{DS}=0V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D=250μA	0.45	0.62	1.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=15A		5.6	8	mΩ
		V_{GS}=2.5V, I_D=7A		7.1	9	
		V_{GS}=1.8V, I_D=3A		10	14	
Diode Forward Voltage	V_{SD}	I_S=15A,V_{GS}=0V			1.2	V
Gate resistance	R_G	f=1MHz		1.7		Ω
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{DS}=10V,V_{GS}=0V,f=1MHZ		1650		pF
Output Capacitance	C_{oss}			266		
Reverse Transfer Capacitance	C_{rss}			206		
Switching Parameters						
Total Gate Charge	Q_g	V_{GS}=10V,V_{DS}=10V,I_D=30A		46.8		nC
Gate-Source Charge	Q_{gs}			4.6		
Gate-Drain Charge	Q_{gd}			7.3		
Reverse Recovery Chrage	Q_{rr}	I_F=30A, di/dt=100A/us		5.8		
Reverse Recovery Time	t_{rr}			19.5		ns
Turn-on Delay Time	$t_{D(on)}$	V_{GS}=10V, V_{DS}=10V, I_D=30A R_{GEN}=3Ω		13		
Turn-on Rise Time	t_r			110		
Turn-off Delay Time	$t_{D(off)}$			40		
Turn-off fall Time	t_f			105		

A. Pulse Test: Pulse Width≤300us,Duty cycle ≤2%.
B. T_j=25℃, V_{DD}=15V, V_G=5V, L=0.5mH, IAS=16A

■ Typical Performance Characteristics

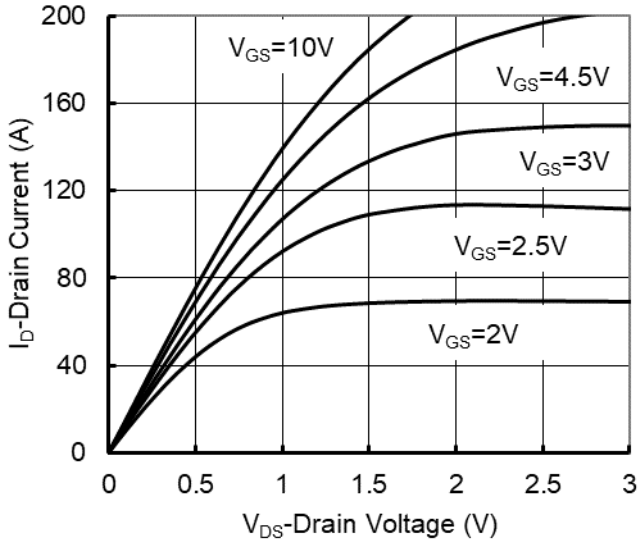


Figure1. Output Characteristics

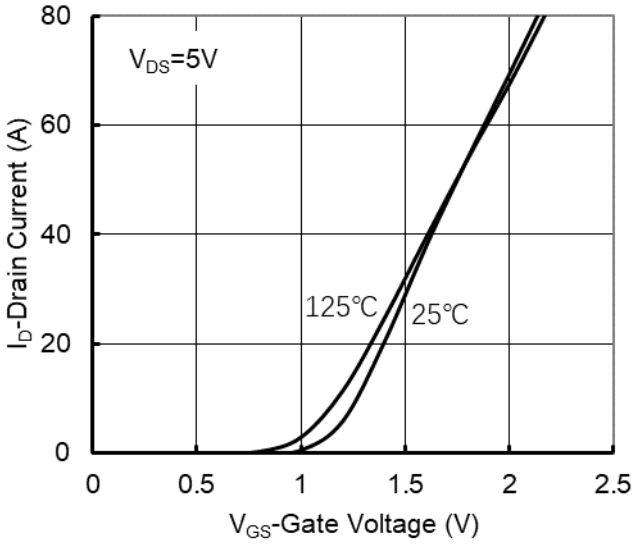


Figure2. Transfer Characteristics

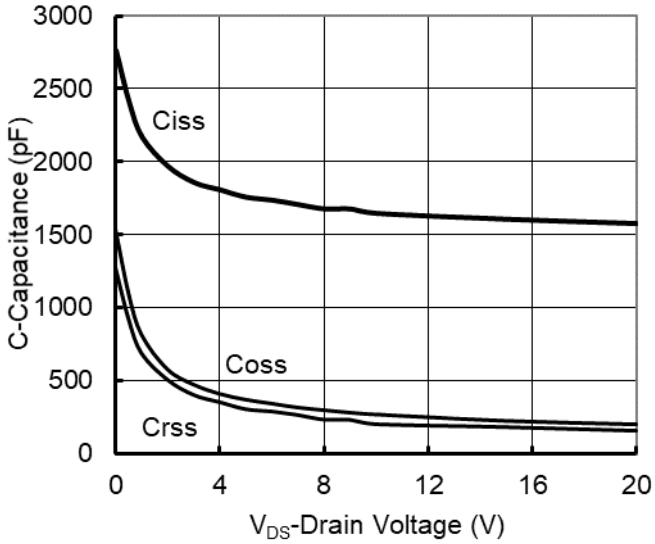


Figure3. Capacitance Characteristics

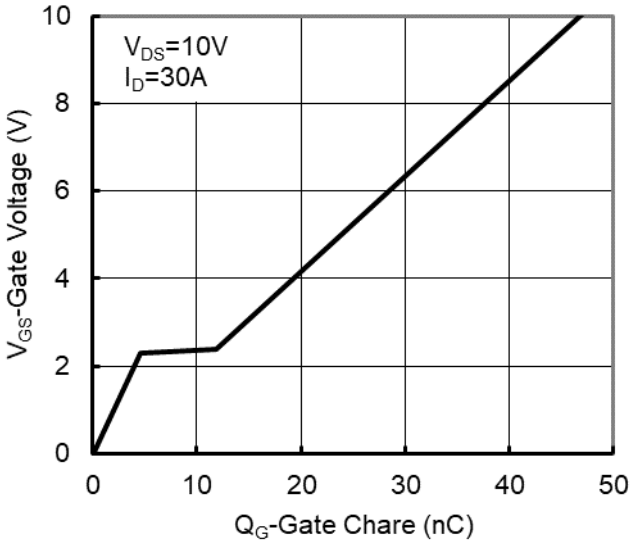


Figure4. Gate Charge

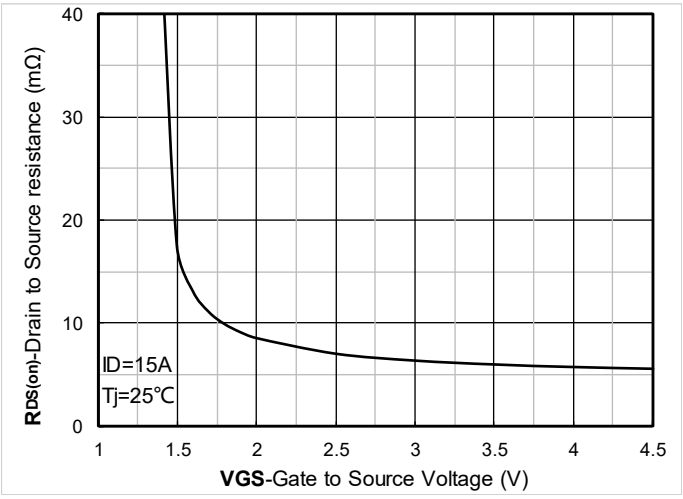


Figure5. On-Resistance vs Gate to Source Voltage

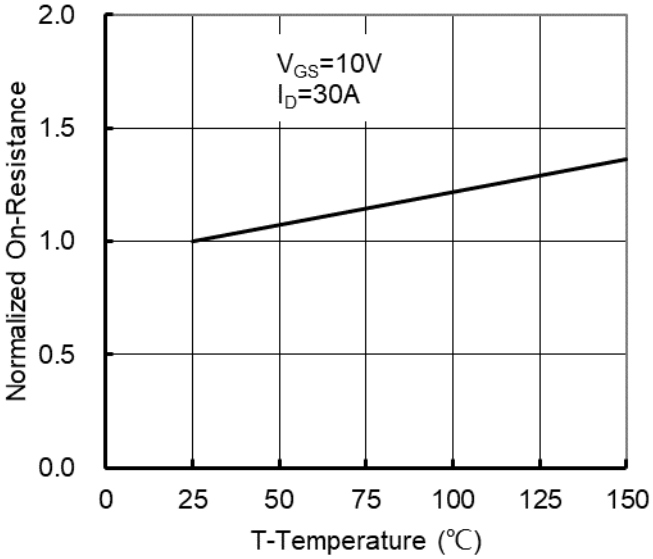


Figure6. On-Resistance vs. Junction Temperature

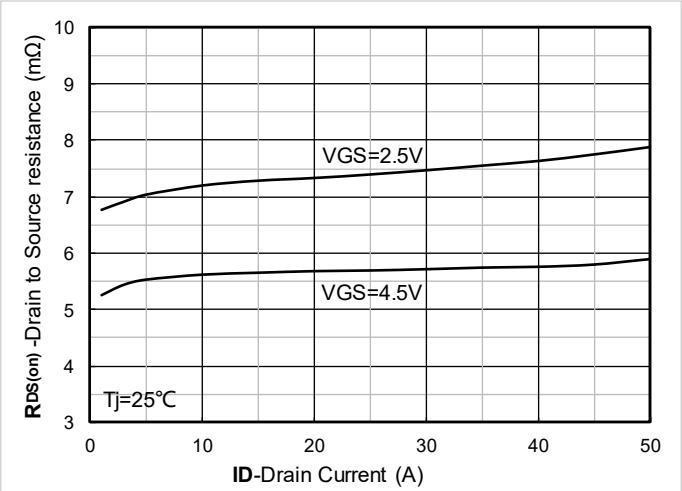


Figure 7. $R_{DS(on)}$ VS Drain Current

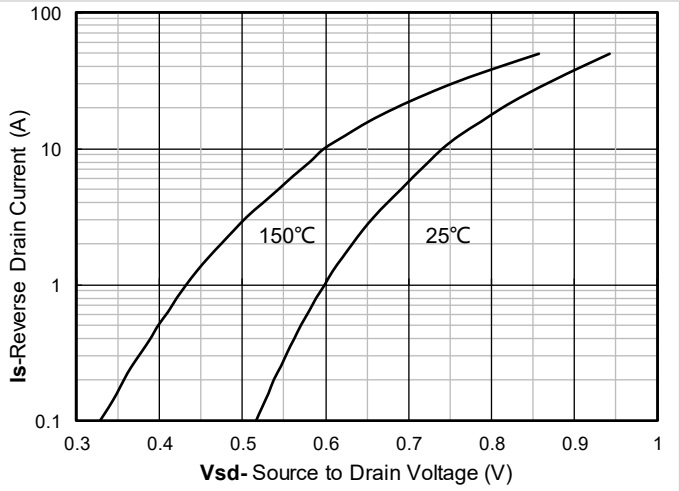


Figure 8. Forward characteristics of reverse diode

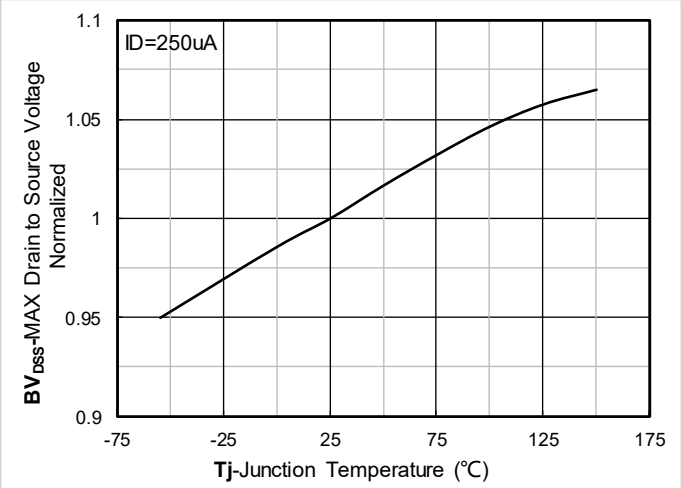


Figure 9. Normalized breakdown voltage

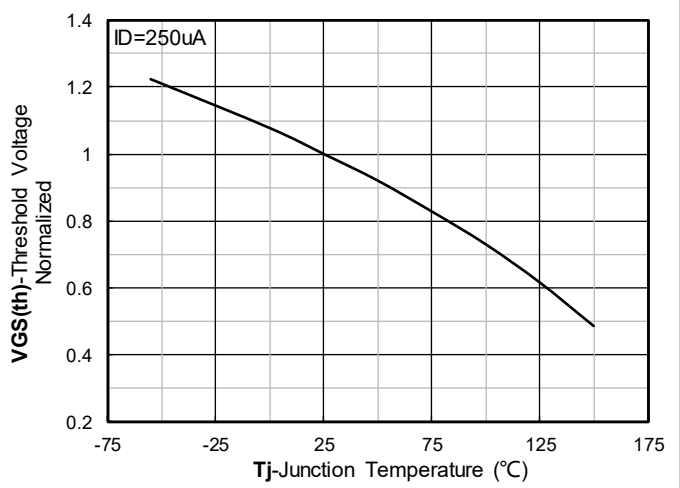


Figure 10. Normalized Threshold voltage

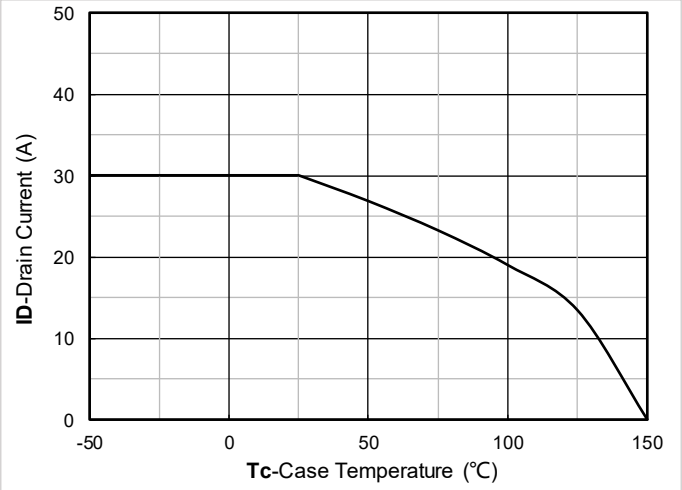


Figure 11. Current dissipation

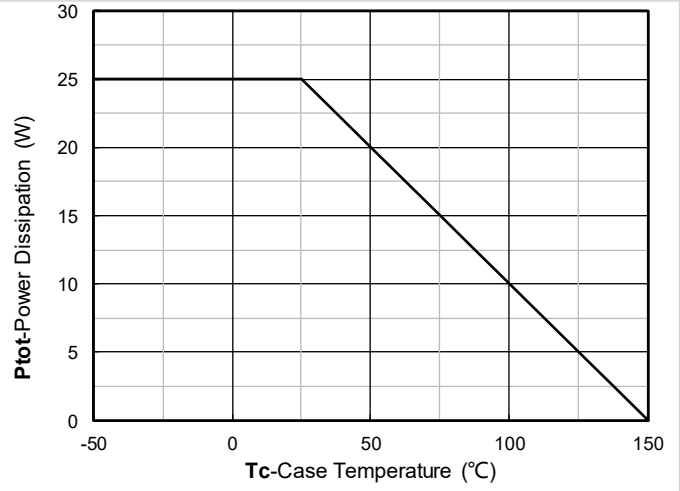


Figure 12. Power dissipation

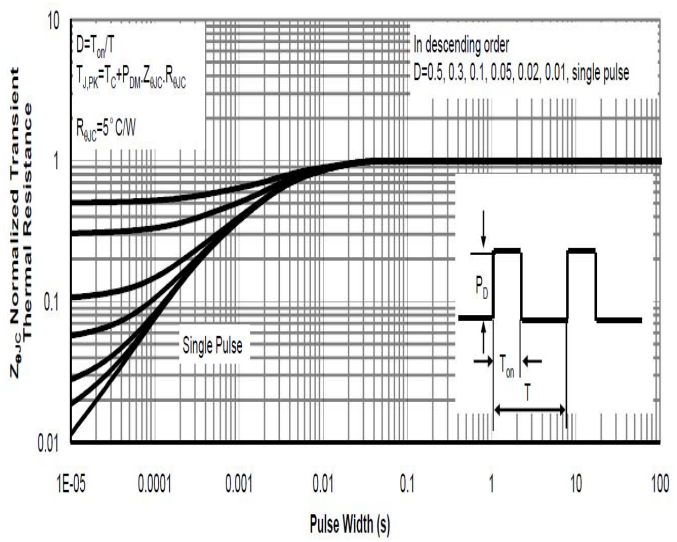


Figure 13. Normalized Maximum Transient Thermal Impedance

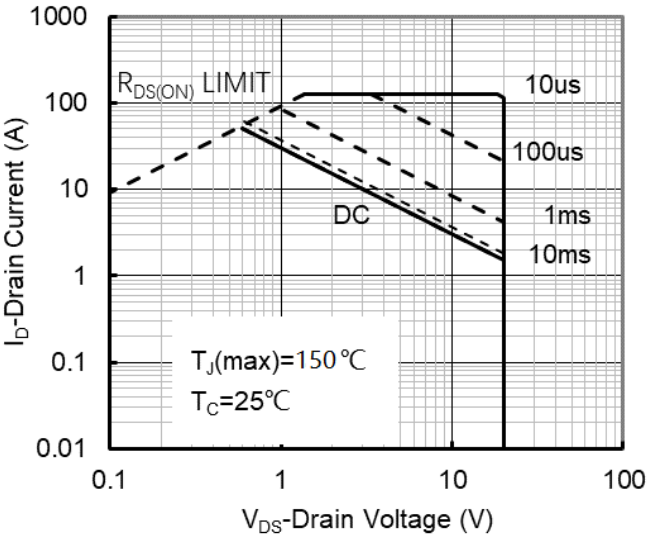
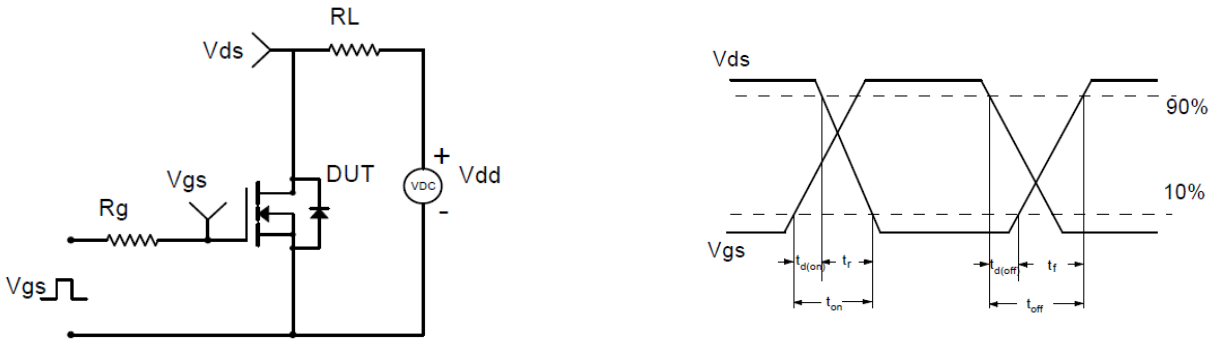
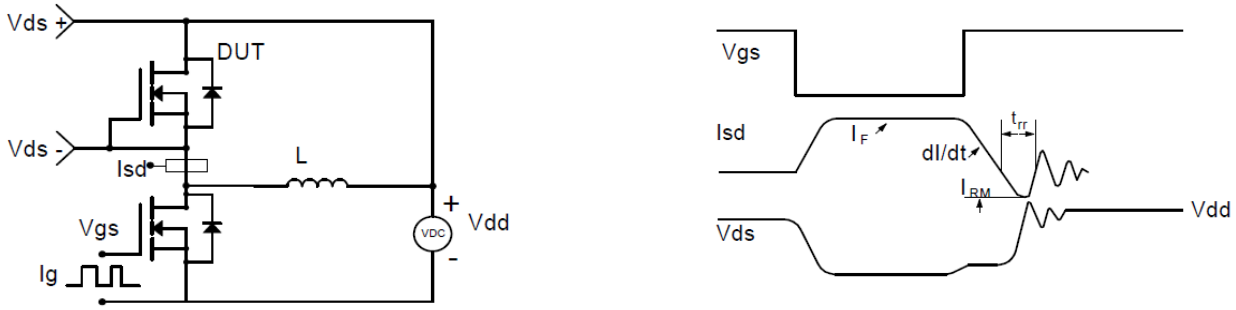


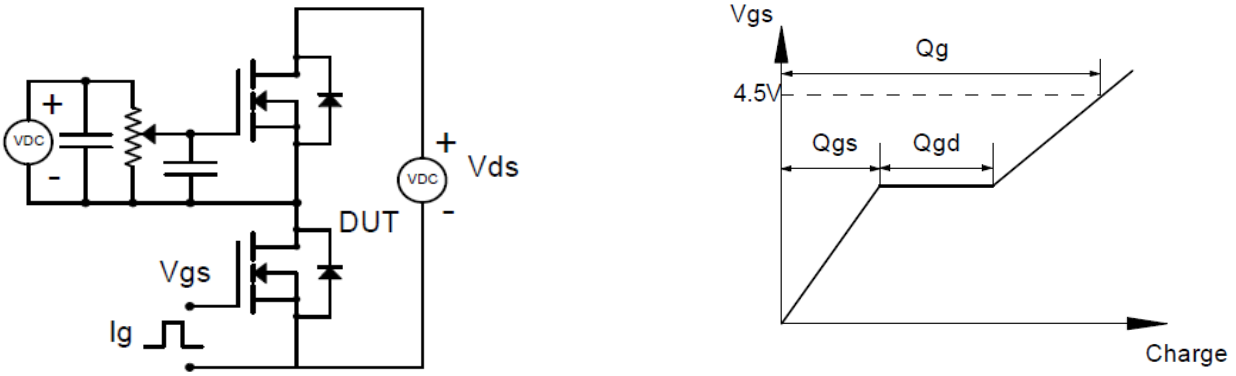
Figure 14. Safe Operation Area



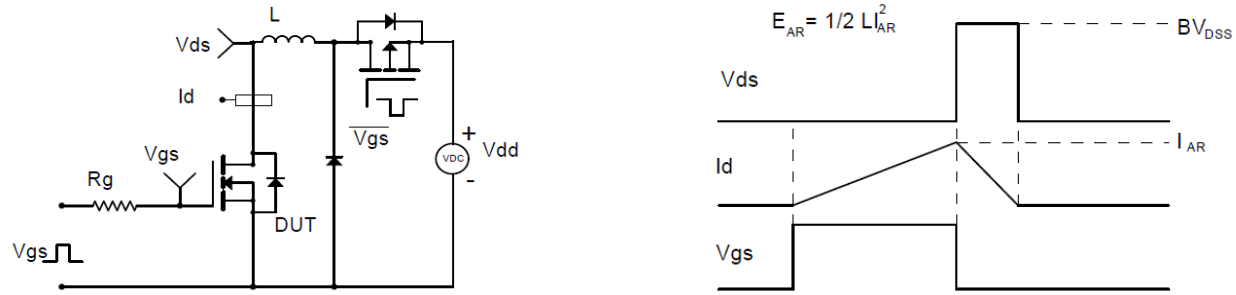
Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

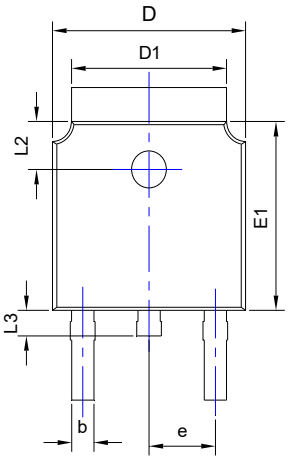


Gate Charge Test Circuit & Waveform

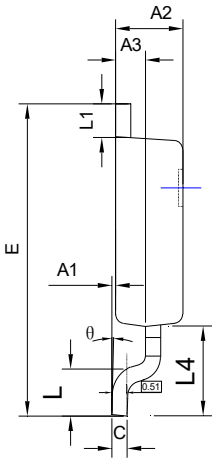


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

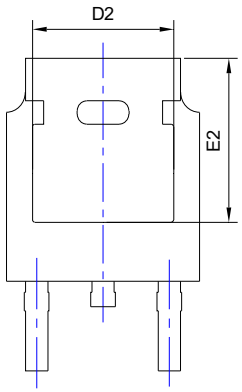
■ TO-252-B Package information



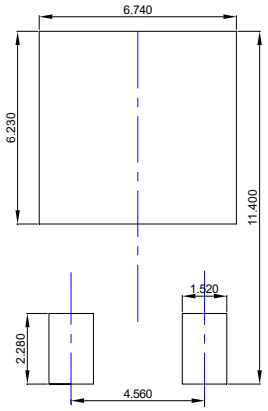
TOP VIEW



SIDE VIEW



BOTTOM VIEW



UNIT：mm

SUGGESTED SOLDER PAD LAYOUT

DIMENSIONS						
SYMBOL	INCHES			Millimeter		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A1	0.000	---	0.008	0.000	---	0.200
A2	0.087	0.091	0.094	2.200	2.300	2.400
A3	0.035	0.039	0.043	0.900	1.000	1.100
b	0.026	0.030	0.034	0.660	0.760	0.860
c	0.018	0.020	0.023	0.460	0.520	0.580
D	0.256	0.260	0.264	6.500	6.600	6.700
D1	0.203	0.209	0.215	5.150	5.300	5.450
D2	0.181	0.189	0.195	4.600	4.800	4.950
E	0.390	0.398	0.406	9.900	10.100	10.300
E1	0.236	0.240	0.244	6.000	6.100	6.200
E2	0.203	0.209	0.215	5.150	5.300	5.450
e	0.090BSC			2.286BSC		
L	0.049	0.059	0.069	1.250	1.500	1.750
L1	0.035	---	0.050	0.900	---	1.270
L2	0.055	---	0.075	1.400	---	1.900
L3	0.024	0.031	0.039	0.600	0.800	1.000
L4	0.114REF			2.900REF		
θ	0°	---	10°	0°	---	10°

NOTE:
1.PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
2.TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.
3.THE PAD LAYOUT IS FOR REFERENCE PURPOSES ONLY.

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