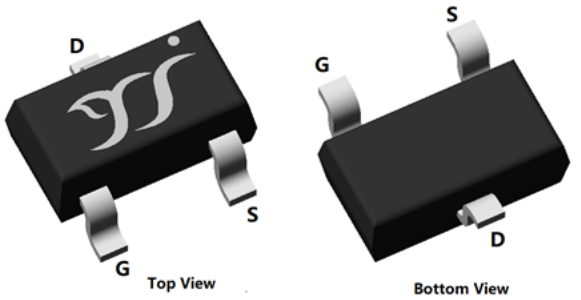
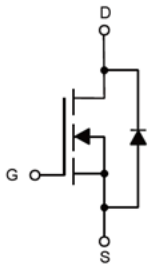
N-Channel Enhancement Mode Field Effect Transistor



SOT-23-3L



Product Summary

- V_{DS} 100V
- I_D 1.8A
- $R_{DS(ON)}$(at V_{GS}=10V) ＜140mΩ
- $R_{DS(ON)}$(at V_{GS}=4.5V) ＜180mΩ

General Description

- Split Gate Trench 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

- DC-DC convertor
- Power management functions

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

Parameter			Symbol	Limit	Unit
Drain-source Voltage			V_{DS}	100	V
Gate-source Voltage			V_{GS}	±20	V
Continuous Drain Current (Note 1,2)	Steady-State	T_A=25℃, V_{GS}= 10V	I_D	1.8	A
		T_A=100℃, V_{GS}= 10V		1.1	
Pulsed Drain Current	T_C=25℃, t_p=100μs		I_{DM}	15	A
Total Power Dissipation (Note 1,2)	Steady-State	T_A=25℃	P_D	0.96	W
		T_A=100℃		0.38	
Junction and Storage Temperature Range			T_J ,T_{STG}	-55～+150	℃

■Thermal resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient (Note 2)	Steady-State	$R_{\theta JA}$	105	130	℃/W

■ Ordering Information (Example)

PREFERED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
YJL140G10ALJ	F2	140G10.	3000	30000	120000	7“ 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	100	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=100V, V_{GS}=0V	-	-	1	μA
		V_{DS}=100V, V_{GS}=0V, Tj=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	1.8	2.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=1.8A	-	115	140	mΩ
		V_{GS}=4.5V, I_D=1A	-	133	180	mΩ
Diode Forward Voltage	V_{SD}	I_S=1.8A, V_{GS}=0V	-	-	1.2	V
Gate resistance	R_G	f=1MHz	-	21.5	-	Ω
Maximum Body-Diode Continuous Current	I_S		-	-	1.8	A
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{DS}=50V, V_{GS}=0V, f=1MHz	-	134	-	pF
Output Capacitance	C_{oss}		-	30	-	
Reverse Transfer Capacitance	C_{rss}		-	2.7	-	
Switching Parameters						
Total Gate Charge	Q_g	V_{GS}=10V, V_{DS}=50V, I_D=1.8A	-	2.4	-	nC
Gate-Source Charge	Q_{gs}		-	0.15	-	
Gate-Drain Charge	Q_{gd}		-	0.55	-	
Reverse Recovery Charge	Q_{rr}	I_F=1.8A, di/dt=100A/us	-	28.7	-	nC
Reverse Recovery Time	t_{rr}		-	45.4	-	ns
Turn-on Delay Time	$t_{D(on)}$	V_{GS}=10V, V_{DD}=50V, I_D=1.8A R_{GEN}=3Ω	-	3.5	-	ns
Turn-on Rise Time	t_r		-	14.9	-	
Turn-off Delay Time	$t_{D(off)}$		-	13.2	-	
Turn-off fall Time	t_f		-	20.8	-	

Note：

1. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
2. The value of $R_{\theta JA}$ is measured with the device mounted on the 40mm*40mm*1.1mm single layer FR-4 PCB board with 1 in^2 pad of 2oz. Copper, in the still air environment with TA =25℃.The maximum allowed junction temperature of 150℃. The value in any given application depends on the user's specific board design.

■Typical Electrical and Thermal Characteristics Diagrams

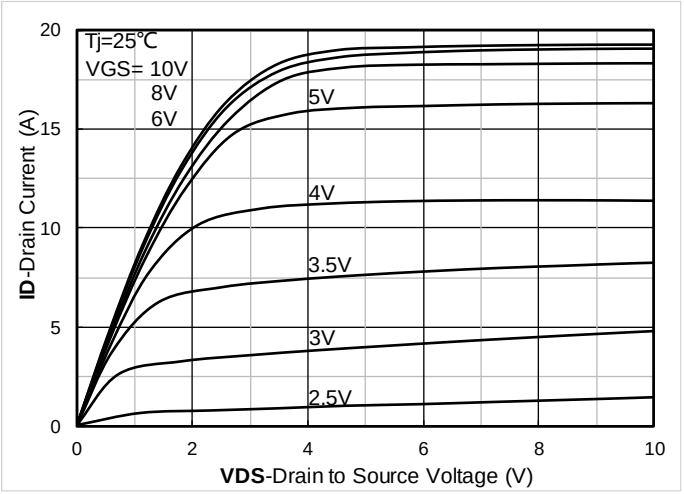


Figure 1. Output Characteristics

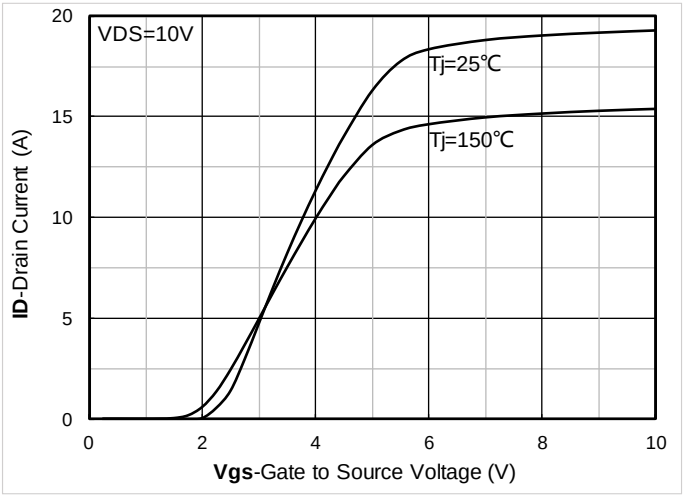


Figure 2. Transfer Characteristics

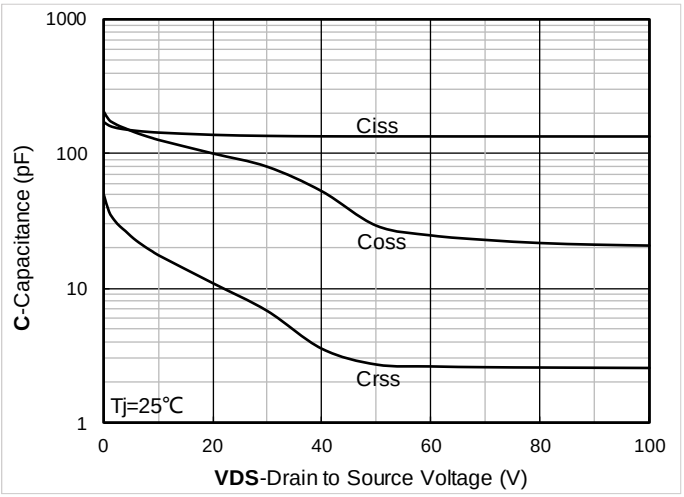


Figure 3. Capacitance Characteristics

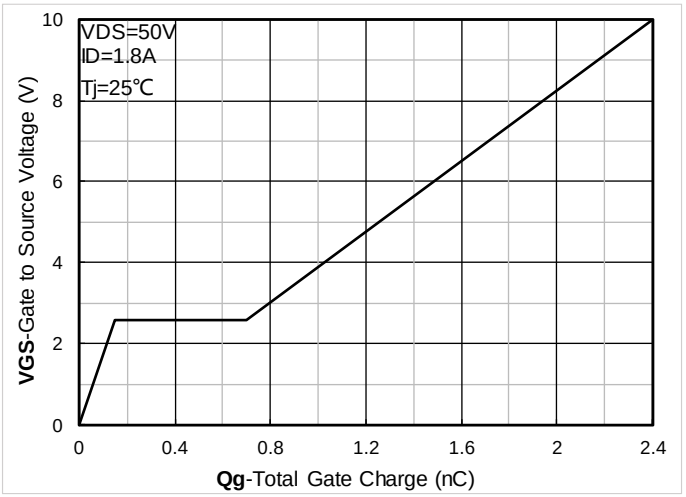


Figure 4. Gate Charge

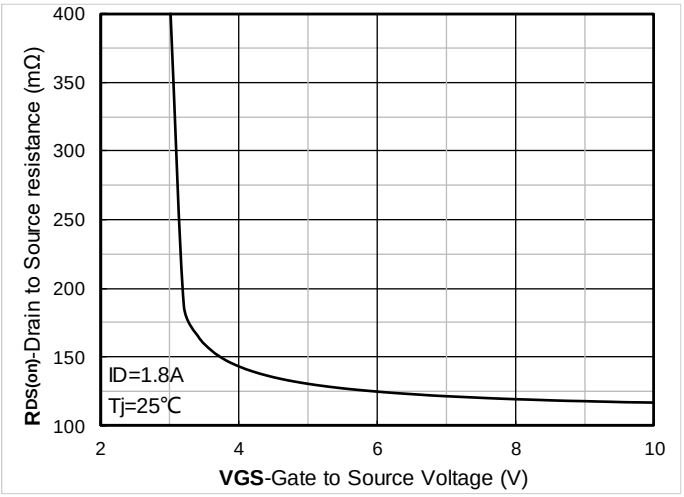


Figure 5. On-Resistance vs Gate to Source Voltage

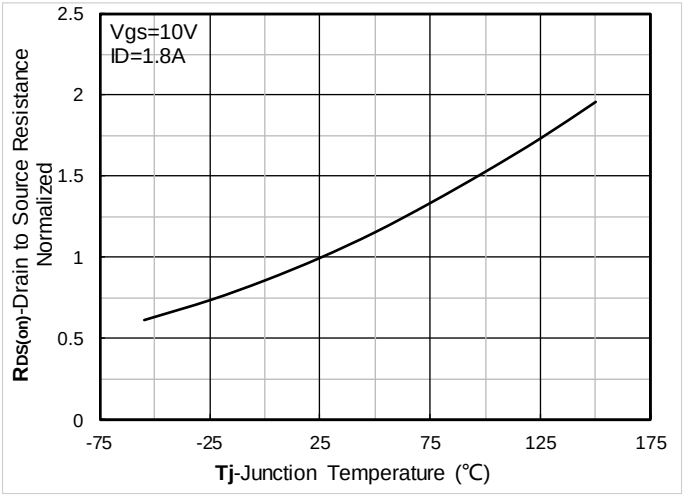


Figure 6. Normalized On-Resistance

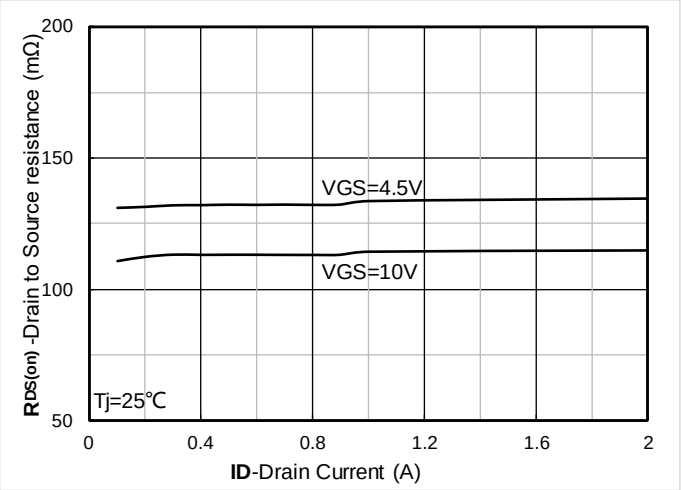


Figure 7. $R_{DS(on)}$ VS Drain Current

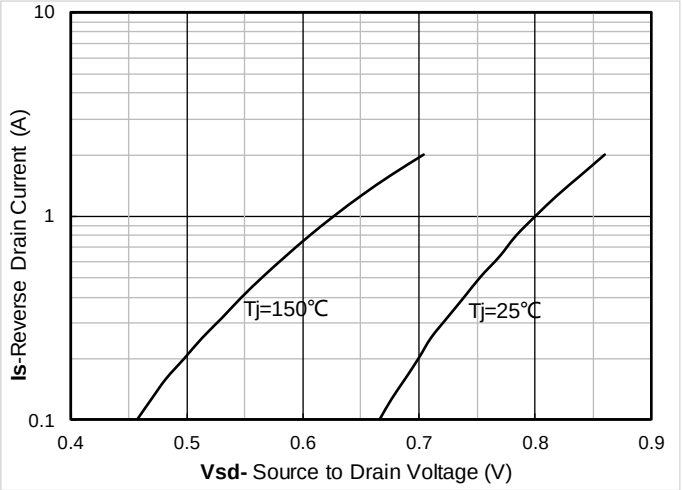


Figure 8. Forward characteristics of reverse diode

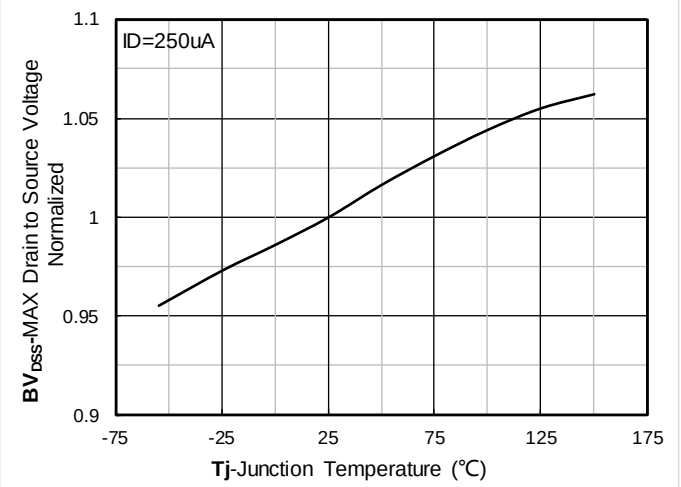


Figure 9. Normalized breakdown voltage

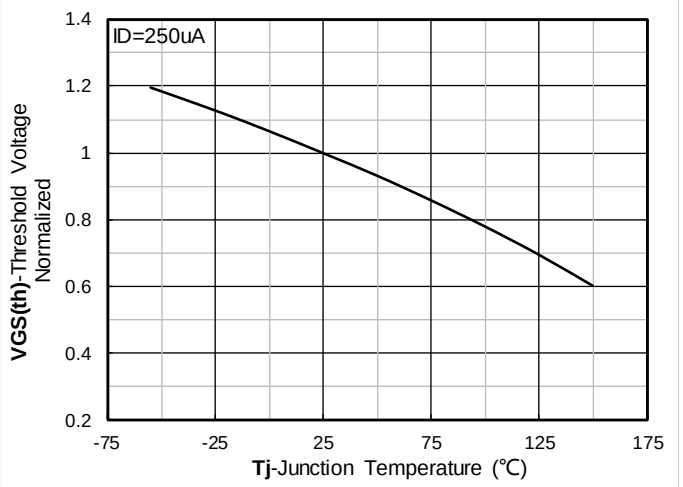


Figure 10. Normalized Threshold voltage

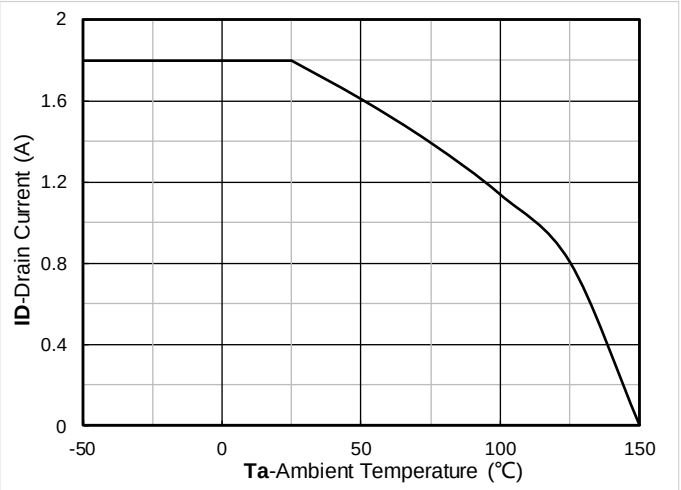


Figure 11. Current dissipation

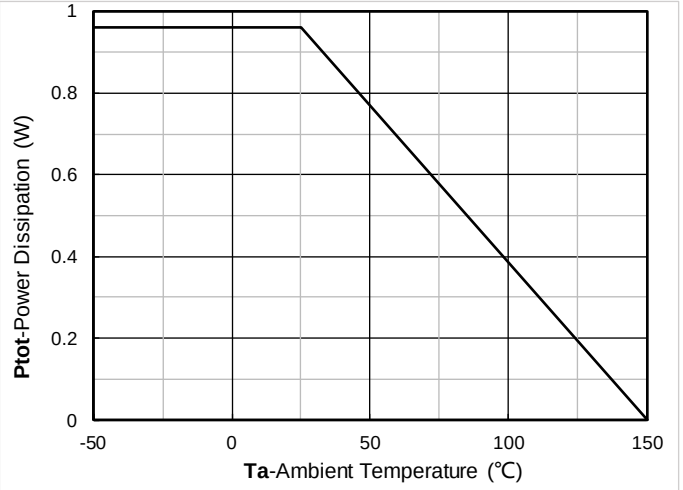


Figure 12. Power dissipation

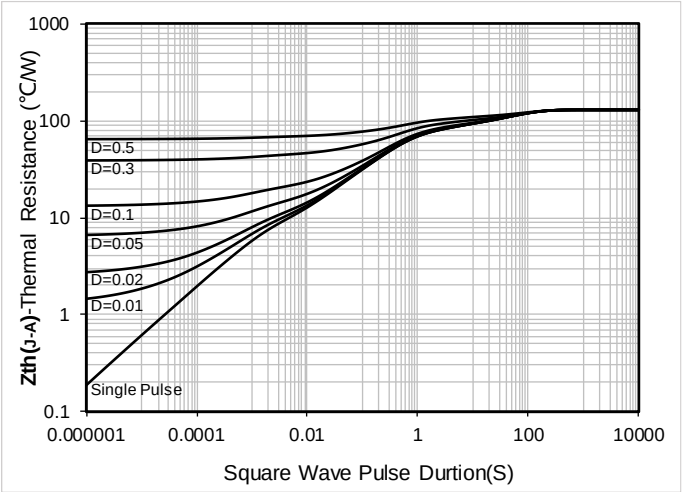


Figure 13. Maximum Transient Thermal Impedance

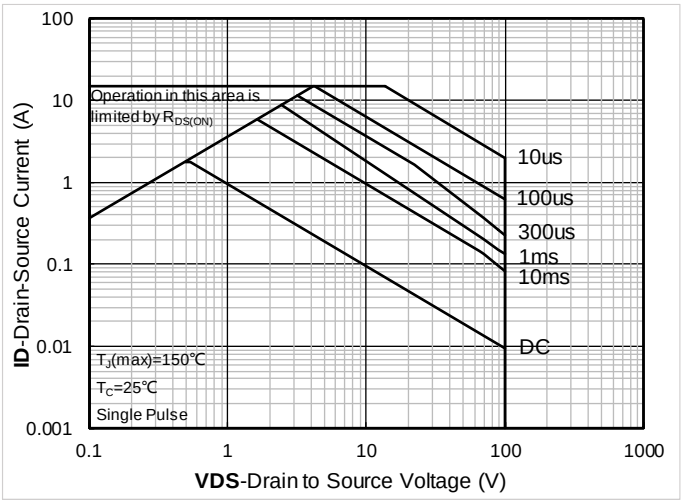


Figure 14. Safe Operation Area

■ Test Circuits & Waveforms

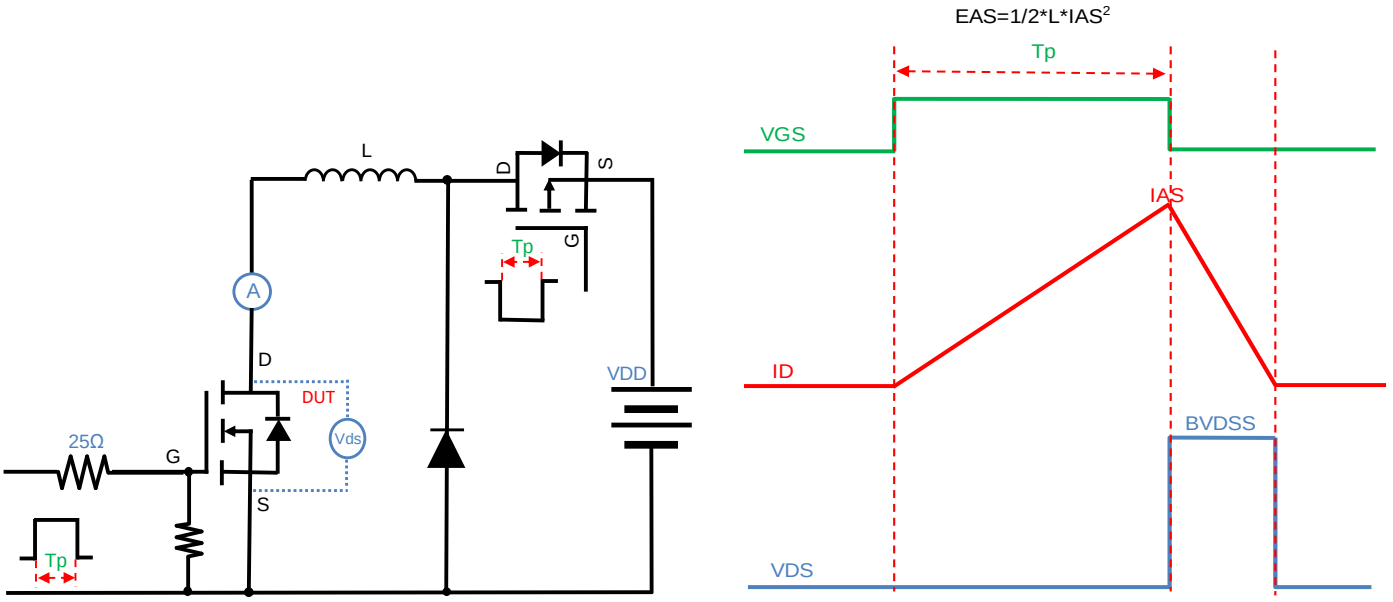


Figure A. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

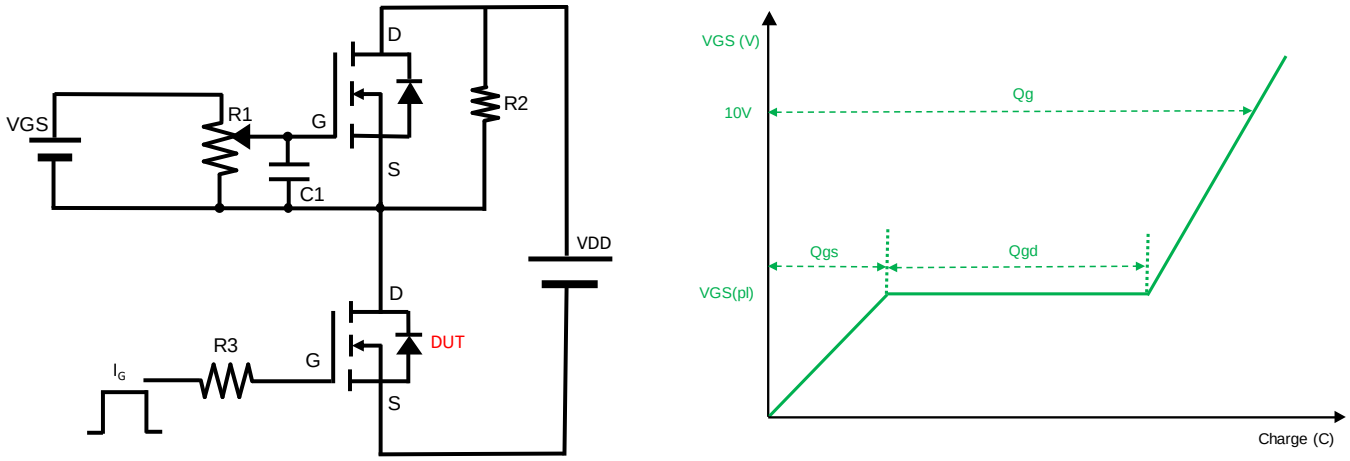


Figure B. Gate Charge Test Circuit & Waveform

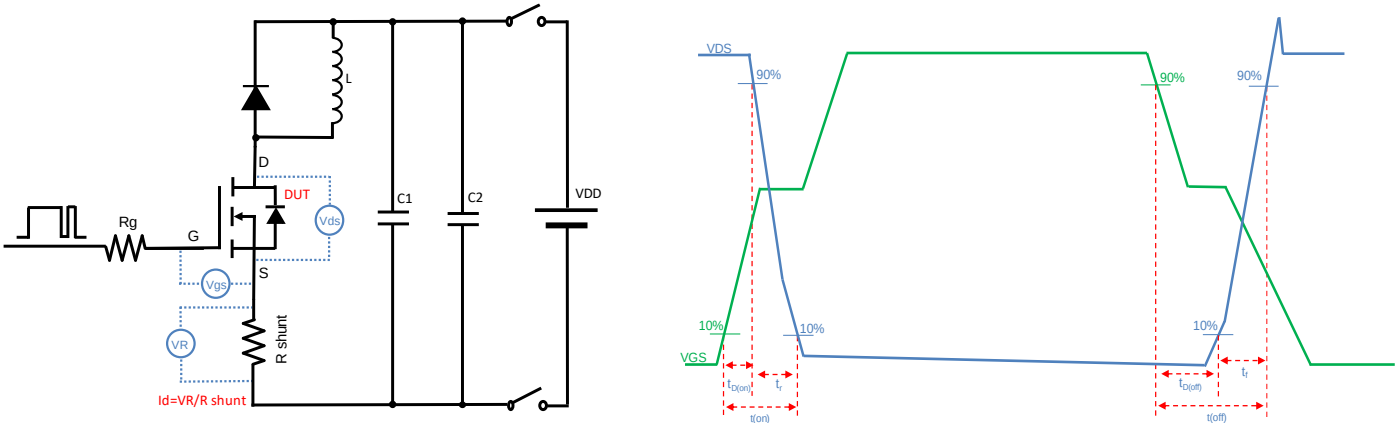


Figure C. Resistive Switching Test Circuit & Waveform

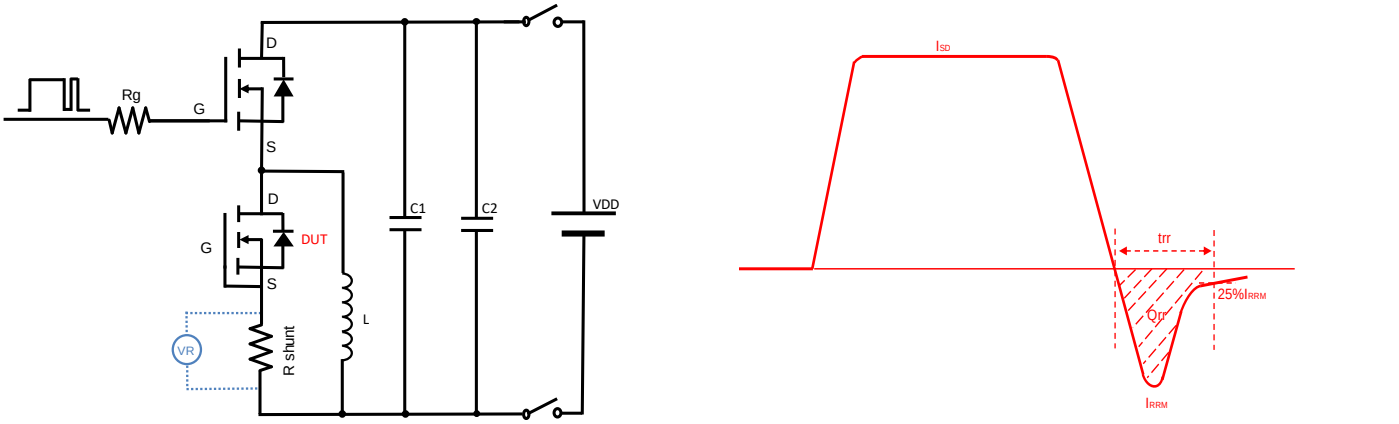
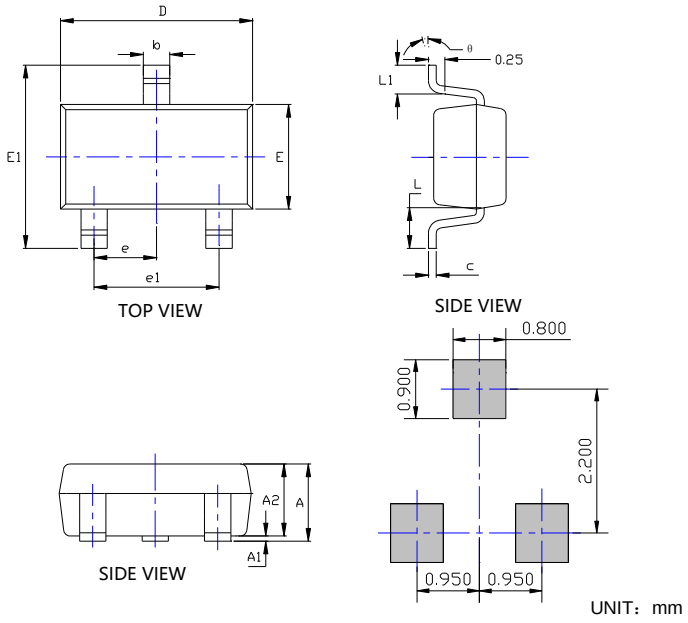


Figure D. Diode Recovery Test Circuit & Waveform

■ SOT-23-3L Package information



SUGGESTED SOLDER PAD LAYOUT

DIMENSIONS						
SYMBOL	INCHES			Millimeter		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.041	---	0.049	1.050	---	1.250
A1	0.000	---	0.008	0.000	---	0.200
A2	0.041	0.043	0.045	1.050	1.100	1.150
b	0.012	0.016	0.020	0.300	0.400	0.500
c	0.004	---	0.008	0.100	---	0.200
D	0.111	0.115	0.119	2.820	2.920	3.020
E	0.059	0.063	0.067	1.500	1.600	1.700
E1	0.104	0.110	0.116	2.650	2.800	2.950
e	0.037TYP			0.950TYP		
e1	0.071	0.075	0.079	1.800	1.900	2.000
L	0.024REF			0.600REF		
L1	0.012	0.018	0.024	0.300	0.450	0.600
θ	0°	---	8°	0°	---	8°

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.

Disclaimer

The information presented in this document is for reference only. Yangzhou Yangjie Electronic Technology Co., Ltd. reserves the right to make changes without notice for the specification of the products displayed herein to improve reliability, function or design or otherwise.

The product listed herein is designed to be used with ordinary electronic equipment or devices, and not designed to be used with equipment or devices which require high level of reliability and the malfunction of with would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), Yangjie or anyone on its behalf, assumes no responsibility or liability for any damages resulting from such improper use of sale.

This publication supersedes & replaces all information previously supplied. For additional information, please visit our website http://www.21yangjie.com , or consult your nearest Yangjie's sales office for further assistance.