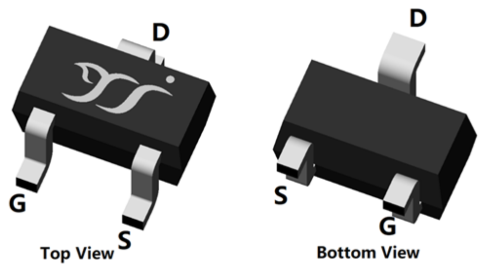
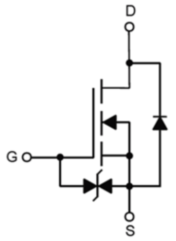
N-Channel Enhancement Mode Field Effect Transistor



SOT-523



Product Summary

● V_{DS}	30V
● I_D	150mA
● $R_{DS(ON)}$(at V_{GS}=10V)	＜2.5Ω
● $R_{DS(ON)}$(at V_{GS}=4.5V)	＜3Ω
● Gate-Source ESD Rating Up to 2KV (HBM)	

General Description

- Trench Power LV MOSFET technology
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free
- Part no. with suffix “Q” means AEC-Q101 qualified

Applications

- Power management
- Portable equipment

■ Limiting Values

Parameter	Conditions		Symbol	Min	Max	Unit
Drain-source Voltage			V_{DS}	-	30	V
Gate-source Voltage			V_{GS}	-20	20	
Continuous Drain Current (Note 1,2)	Steady-State	T_A=25℃,V_{GS}=10V	I_D	-	150	mA
		T_A=100℃,V_{GS}=10V		-	95	
Pulsed Drain Current	T_A=25℃,t_p≤10μs		I_{DM}	-	800	
Maximum Body-Diode Continuous Current	T_A=25℃		I_S		150	
Total Power Dissipation (Note 1,2)	Steady-State	T_A=25℃	P_D	-	205	mW
		T_A=100℃		-	80	
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	$R_{θJA}$	-	600	℃/W

■ Ordering Information (Example)

PREFERED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
2SK3019KEJQ	F2	KN	3000	30000	120000	7“ reel

■ Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_D=250μA,Tj=25℃	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V,V_{GS}=0V,Tj=25℃	-	-	1	μA
		V_{DS}=30V,V_{GS}=0V,Tj=150℃	-	-	100	
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V,Tj=25℃	-	-	±10	uA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA,Tj=25℃	0.6	1.0	1.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V,I_D=150mA,Tj=25℃	-	1.7	2.5	Ω
		V_{GS}=4.5V,I_D=100mA,Tj=25℃	-	2	3	Ω
Diode Forward Voltage	V_{SD}	I_S=150mA,V_{GS}=0V,Tj=25℃	-	-	1.3	V
Gate Resistance	R_G	f=1MHz,Tj=25℃	-	150	-	Ω
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{DS}=15V,V_{GS}=0V,f=1MHz,Tj=25℃	-	11	-	pF
Output Capacitance	C_{oss}		-	5	-	
Reverse Transfer Capacitance	C_{rss}		-	2.5	-	
Switching Parameters						
Total Gate Charge	Q_g	V_{GS}=10V,V_{DS}=15V,I_D=1A,Tj=25℃	-	1.22	-	nC
Gate-Source Charge	Q_{gs}		-	0.48	-	
Gate-Drain Charge	Q_{gd}		-	0.2	-	
Reverse Recovery Charge	Q_{rr}	I_F=1A,di/dt=100A/μs,V_{GS}=0V,V_R=15V, Tj=25℃	-	4.4	-	nC
Reverse Recovery Time	t_{rr}		-	14	-	ns
Turn-on Delay Time	$t_{D(on)}$	V_{GS}=10V,V_{DS}=15V,I_D=1A,R_{GEN}=2.3Ω, Tj=25℃	-	3	-	ns
Turn-on Rise Time	t_r		-	19	-	
Turn-off Delay Time	$t_{D(off)}$		-	7	-	
Turn-off Fall Time	t_f		-	20	-	

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 T_A=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

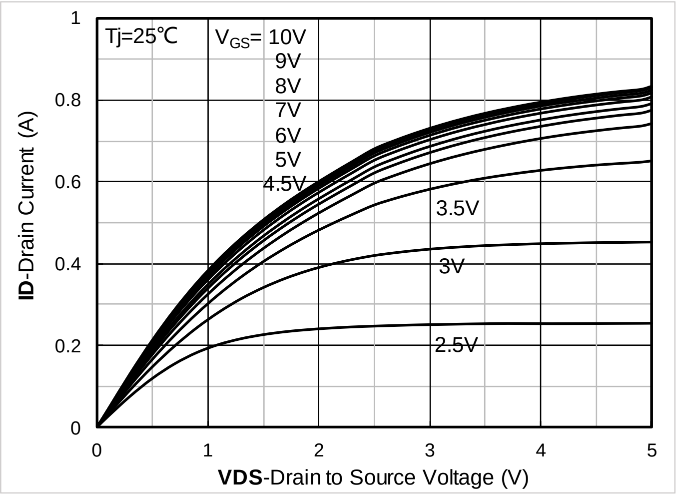


Figure 1. Output Characteristics; typical values

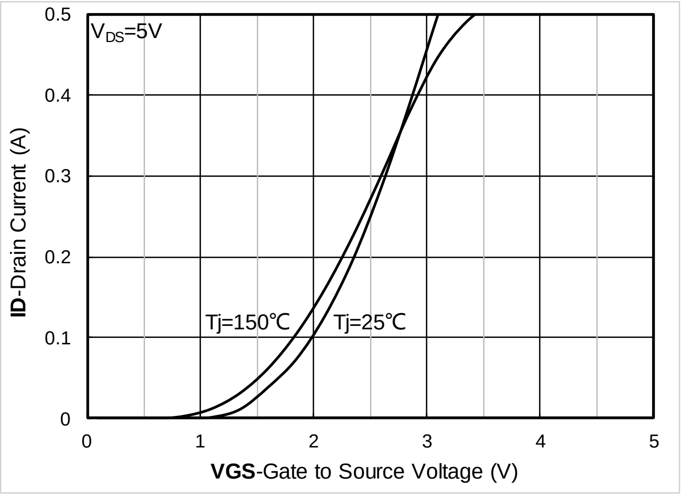


Figure 2. Transfer Characteristics; typical values

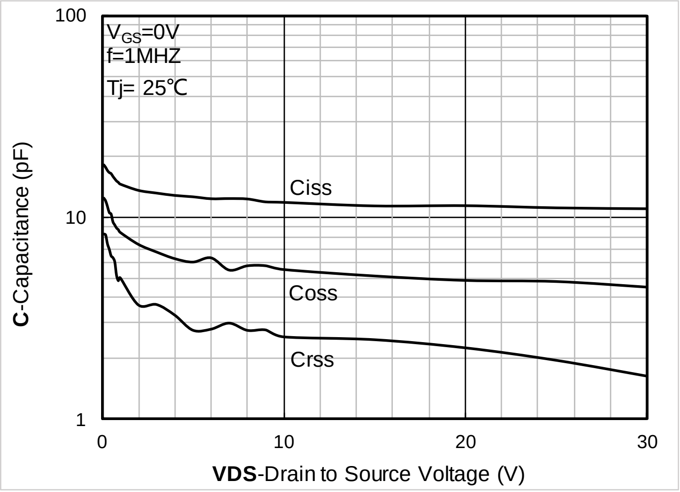


Figure 3. Capacitance Characteristics; typical values

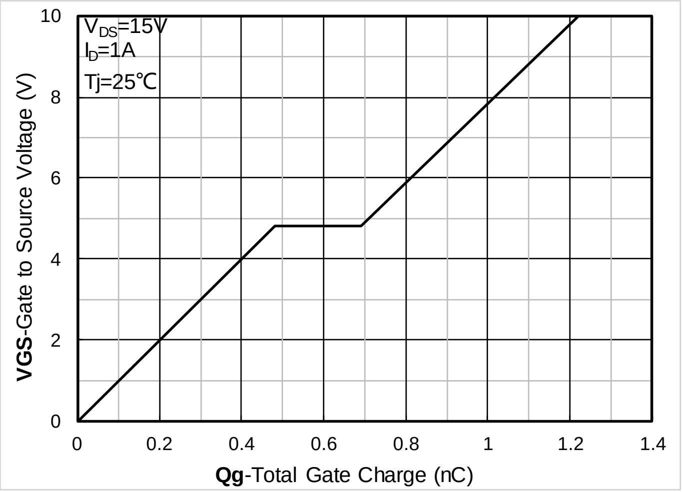


Figure 4. Gate Charge; typical values

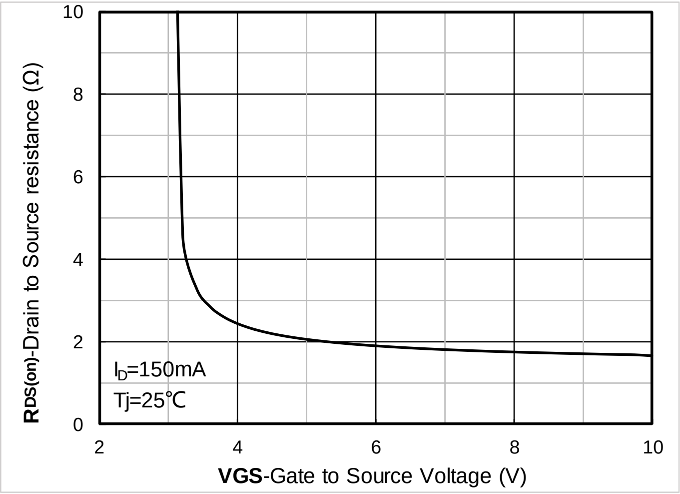


Figure 5. On-Resistance vs. Gate to Source Voltage; typical values

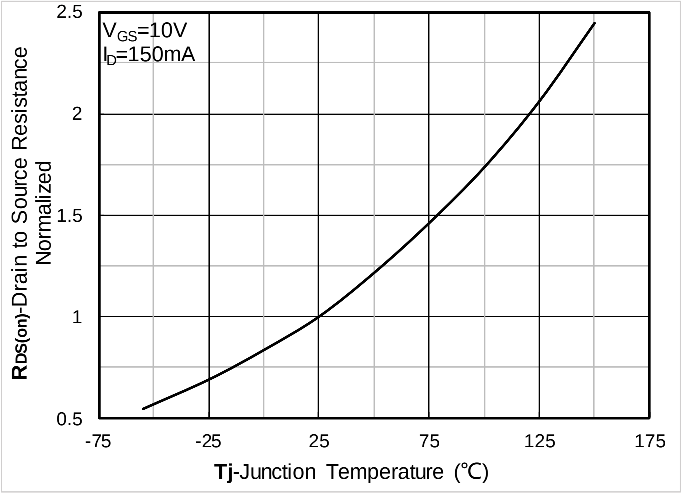
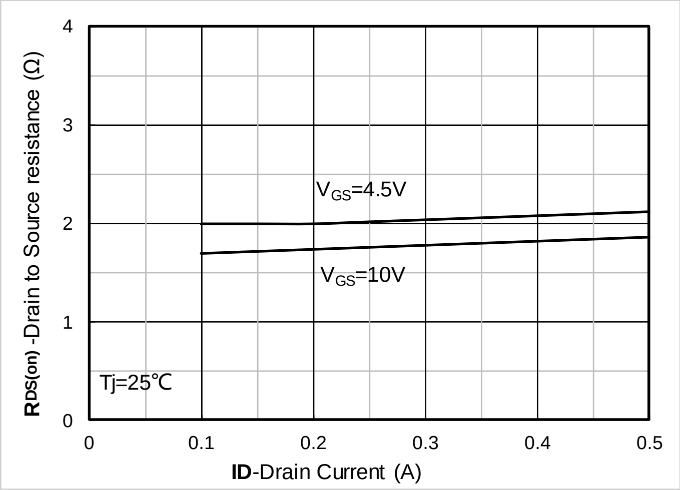


Figure 6. Normalized On-Resistance



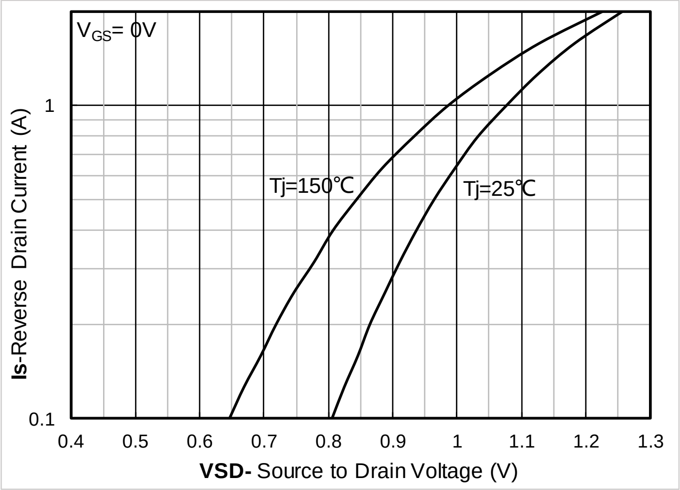
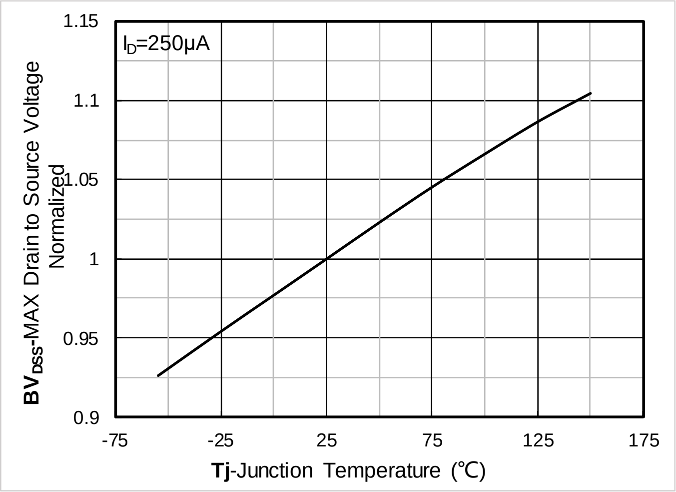


Figure 7. RDS(on) vs. Drain Current; typical values

Figure 8. Forward characteristics of reverse diode; typical values



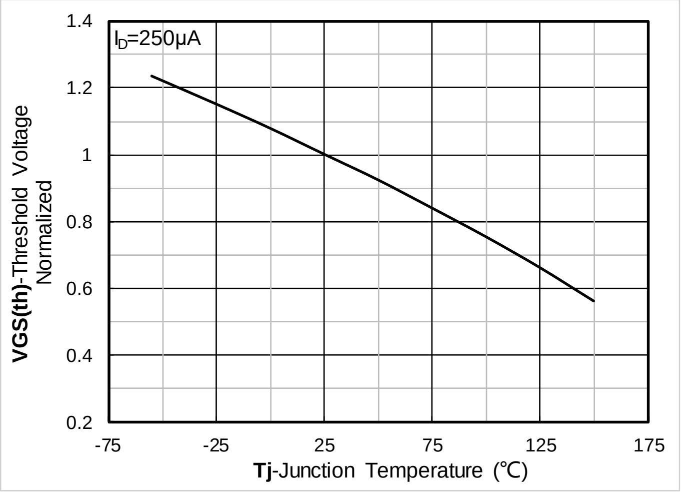
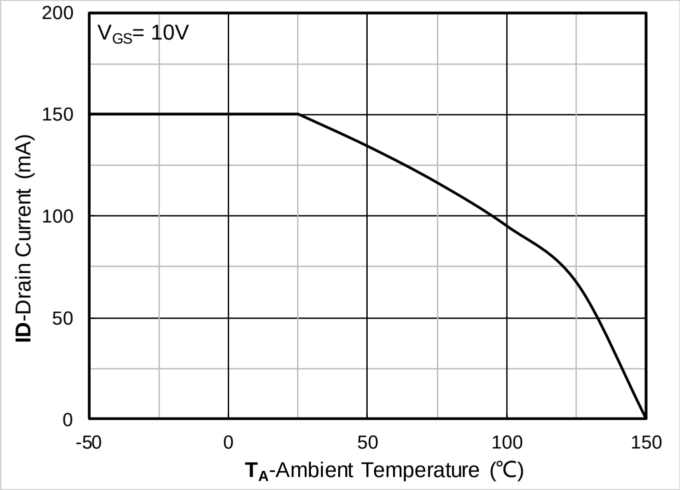


Figure 9. Normalized breakdown voltage

Figure 10. Normalized Threshold voltage



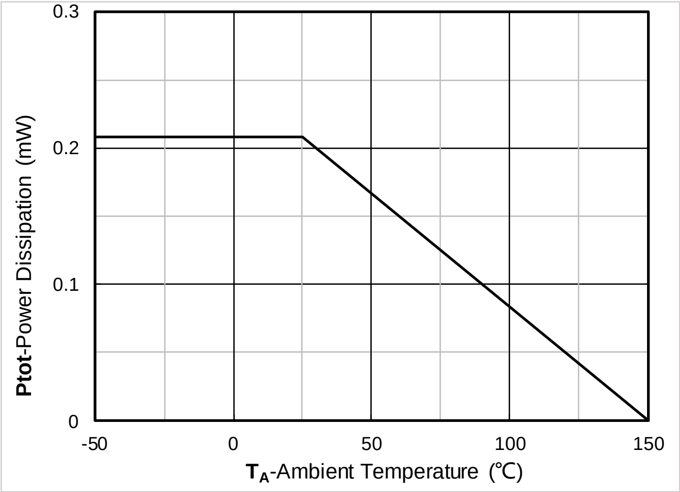


Figure 11. Current dissipation

Figure 12. Power dissipation

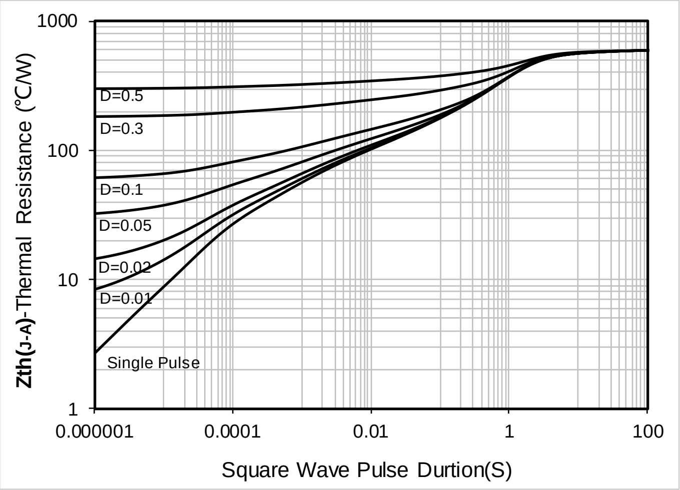


Figure 13. Maximum Transient Thermal Impedance

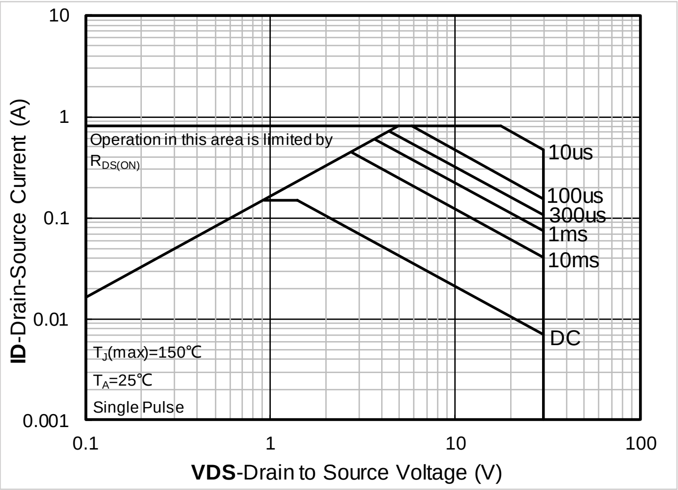


Figure 14. Safe Operation Area

■ Test Circuits & Waveforms

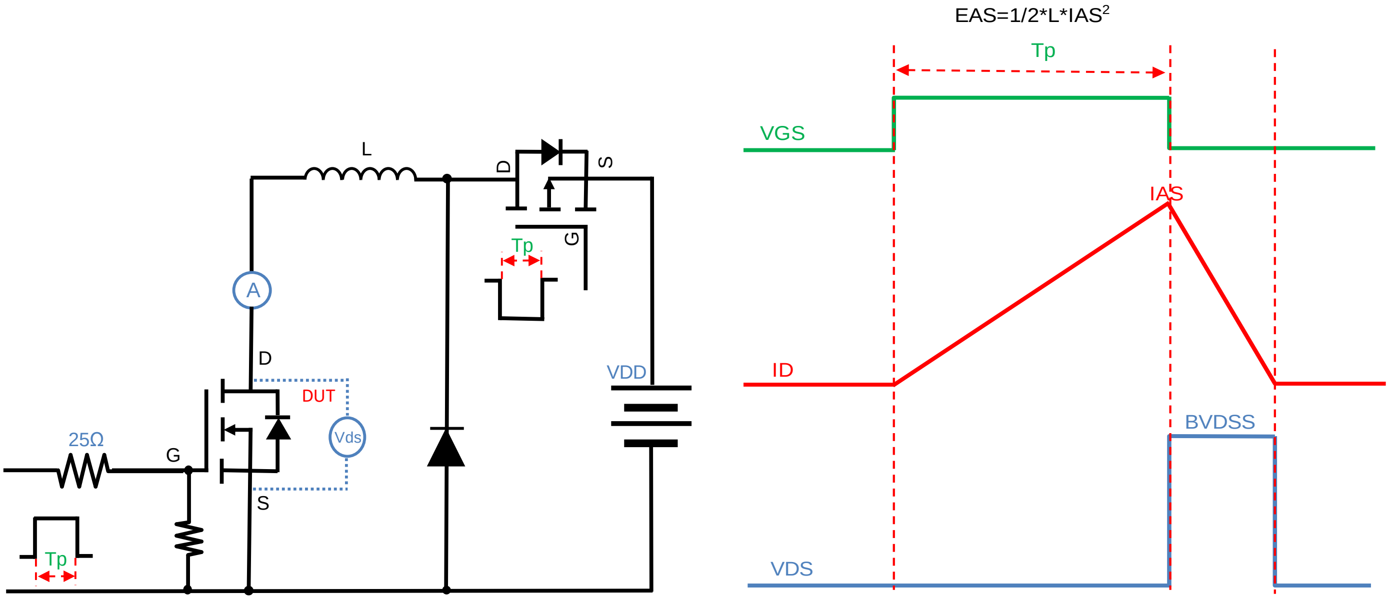


Figure A. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

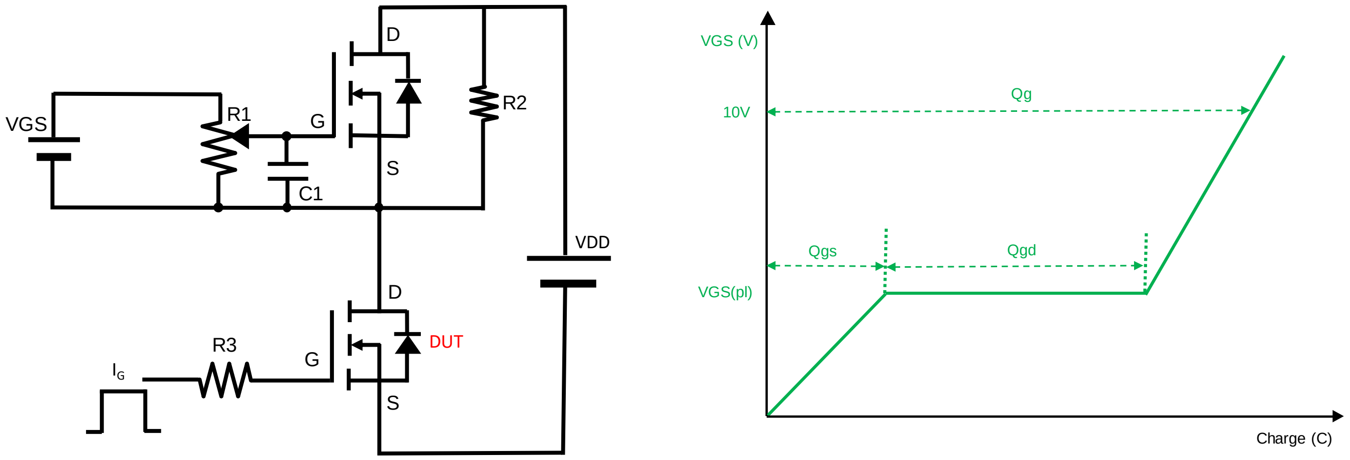


Figure B. Gate Charge Test Circuit & Waveform

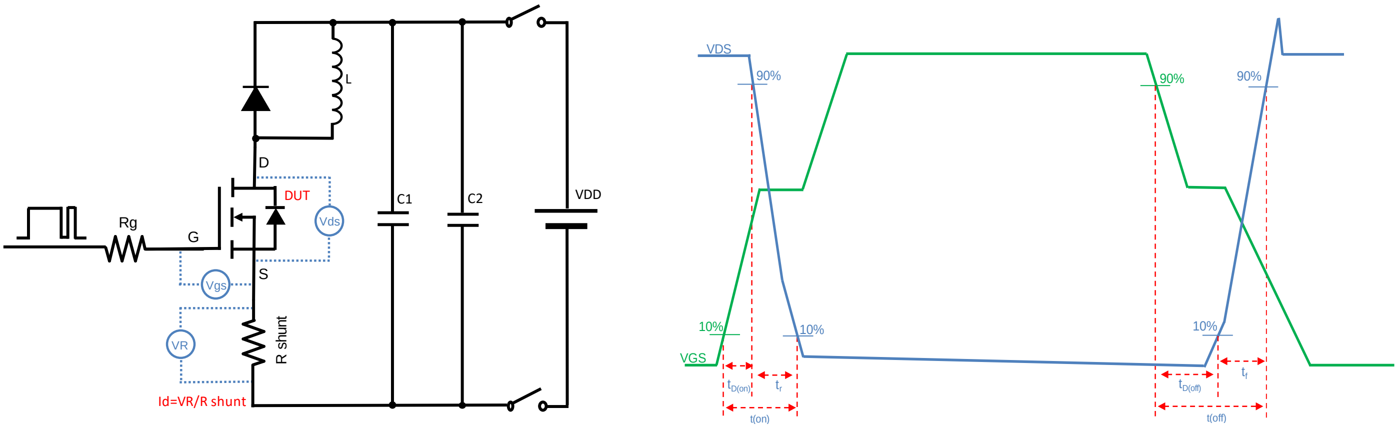


Figure C. Resistive Switching Test Circuit & Waveform

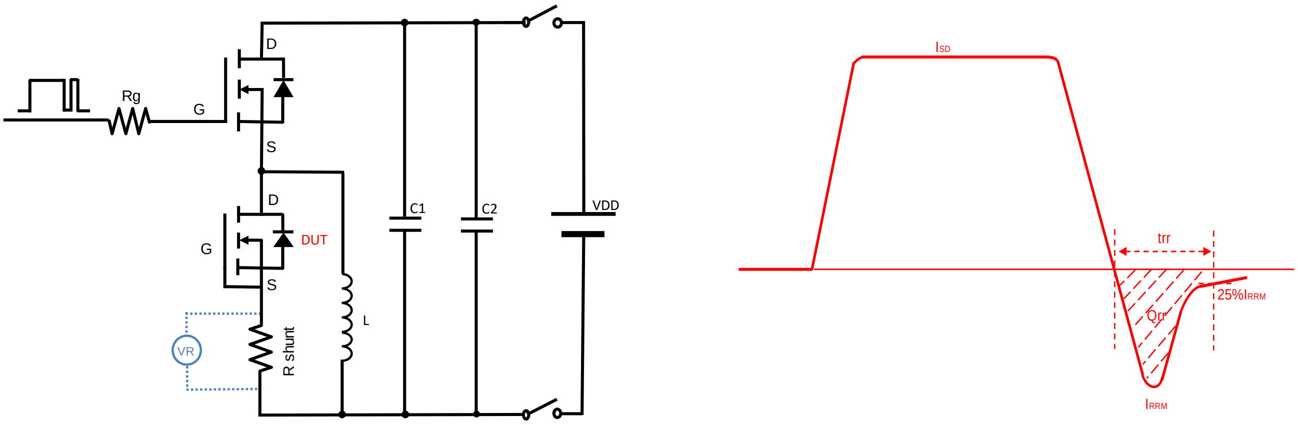
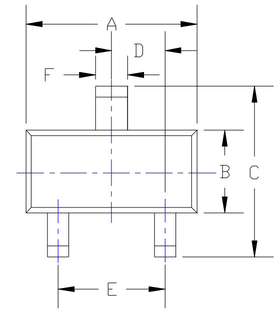
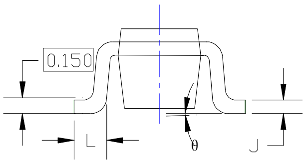


Figure D. Diode Recovery Test Circuit & Waveform

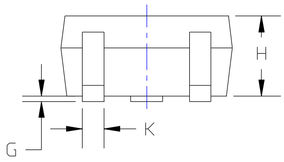
■ SOT-523 Package Information



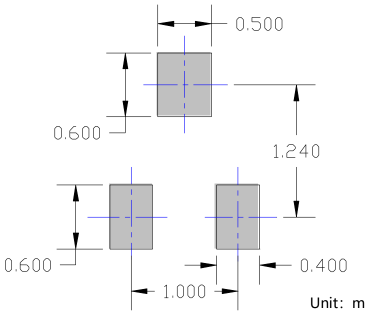
TOP VIEW



SIDE VIEW



SIDE VIEW



Unit: mm

Suggested Solder Pad Layout

SYMBOL	DIMENSIONS			
	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A	0.059	0.067	1.500	1.700
B	0.030	0.033	0.750	0.850
C	0.057	0.069	1.450	1.750
D	0.020TYP		0.500TYP	
E	0.035	0.043	0.900	1.100
F	0.010	0.018	0.250	0.450
G	0.000	0.004	0.000	0.100
H	0.024	0.031	0.600	0.800
J	0.004	0.008	0.100	0.200
K	0.006	0.014	0.150	0.350
L	0.010	0.018	0.260	0.460
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 automotive electronics,are not designed for use in medical, life-saving, lifesustaining,or military,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.