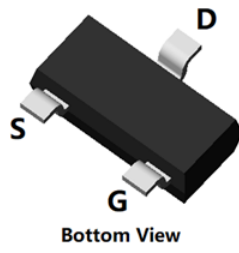
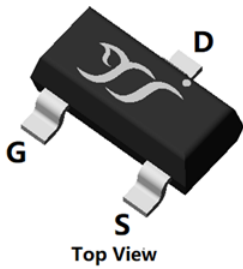
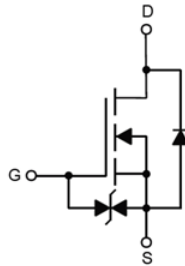


## N-Channel Enhancement Mode Field Effect Transistor



**SOT-23**



### Product Summary

- $V_{DS}$  60V
- $I_D$  2.4A
- $R_{DS(ON)}$  ( at  $V_{GS}=10V$  ) < 105m $\Omega$
- $R_{DS(ON)}$  ( at  $V_{GS}=4.5V$  ) < 125m $\Omega$
- ESD Protected Up to 1KV(HBM)

### General Description

- High density cell design for low  $R_{DS(ON)}$
- High Speed switching
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

### Applications

- PWM applications
- Power management
- Load switch

### Limiting Values

Parameter	Conditions	Symbol	Min	Max	Unit	
Drain-source Voltage		$V_{DS}$	-	60	V	
Gate-source Voltage		$V_{GS}$	-20	20		
Continuous Drain Current (Note 1,2)	Steady-State	$I_D$	$T_A=25^\circ C, V_{GS}=10V$	-	2.4	A
			$T_A=100^\circ C, V_{GS}=10V$	-	1.5	
Pulsed Drain Current	$T_A=25^\circ C, t_p \leq 10\mu s$	$I_{DM}$	-	10		
Maximum Body-Diode Continuous Current	$T_A=25^\circ C$	$I_S$		1.3		
Total Power Dissipation (Note 1,2)	Steady-State	$P_D$	$T_A=25^\circ C$	-	1.25	W
			$T_A=100^\circ C$	-	0.5	
Junction and Storage Temperature Range		$T_J, T_{STG}$	-55	150	$^\circ C$	

### Thermal Resistance

Parameter	Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient (Note 2)	$R_{\theta JA}$	-	100	$^\circ C/W$

### Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
YJL2310AJK	F2	10K	3000	30000	120000	7" reel



# YJL2310AJK

## ■ Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
<b>Static Parameter</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A, T_j=25^\circ C$	60	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=60V, V_{GS}=0V, T_j=25^\circ C$	-	-	1	$\mu A$
		$V_{DS}=60V, V_{GS}=0V, T_j=150^\circ C$	-	-	100	
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V, T_j=25^\circ C$	-	-	$\pm 10$	$\mu A$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A, T_j=25^\circ C$	1.1	1.6	2.1	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=2A, T_j=25^\circ C$	-	81	105	$m\Omega$
		$V_{GS}=4.5V, I_D=1A, T_j=25^\circ C$	-	92	125	$m\Omega$
Diode Forward Voltage	$V_{SD}$	$I_S=1.3A, V_{GS}=0V, T_j=25^\circ C$	-	0.78	1.2	V
Gate Resistance	$R_G$	$f=1MHz, T_j=25^\circ C$	-	6.4	-	$\Omega$
<b>Dynamic Parameters</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=30V, V_{GS}=0V, f=1MHz, T_j=25^\circ C$	-	320	-	$pF$
Output Capacitance	$C_{oss}$		-	20	-	
Reverse Transfer Capacitance	$C_{rss}$		-	16	-	
<b>Switching Parameters</b>						
Total Gate Charge	$Q_g$	$V_{GS}=10V, V_{DS}=30V, I_D=2A, T_j=25^\circ C$	-	6.4	-	$nC$
Gate-Source Charge	$Q_{gs}$		-	1.1	-	
Gate-Drain Charge	$Q_{gd}$		-	1.3	-	
Reverse Recovery Charge	$Q_{rr}$	$I_F=2A, di/dt=100A/\mu s, V_{GS}=0V, V_R=30V, T_j=25^\circ C$	-	8	-	$nC$
Reverse Recovery Time	$t_{rr}$		-	12	-	ns
Turn-on Delay Time	$t_{D(on)}$	$V_{GS}=10V, V_{DS}=30V, I_D=2A, R_{GEN}=6\Omega, T_j=25^\circ C$	-	4.9	-	$ns$
Turn-on Rise Time	$t_r$		-	3.6	-	
Turn-off Delay Time	$t_{D(off)}$		-	16	-	
Turn-off Fall Time	$t_f$		-	4.4	-	

Note:

- The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
- 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<sup>2</sup> pad of 2oz. Copper, in the still air environment with  $T_A=25^\circ C$ . The maximum allowed junction temperature of 150 $^\circ C$ . The value in any given application depends on the user's specific board design.



## Typical Electrical and Thermal Characteristics Diagrams

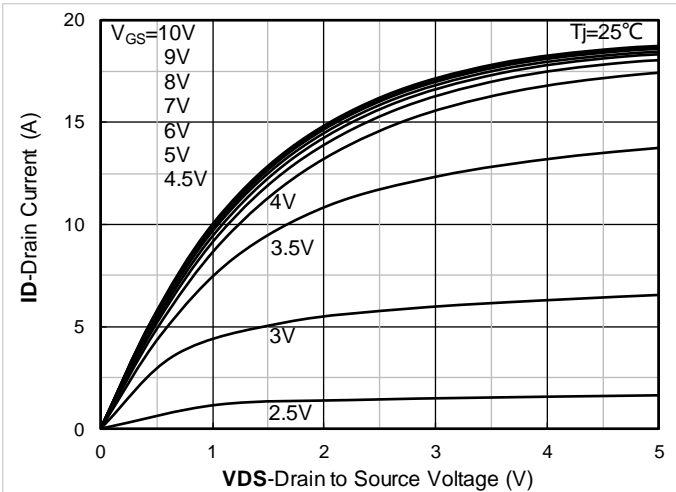


Figure 1. Output Characteristics; typical values

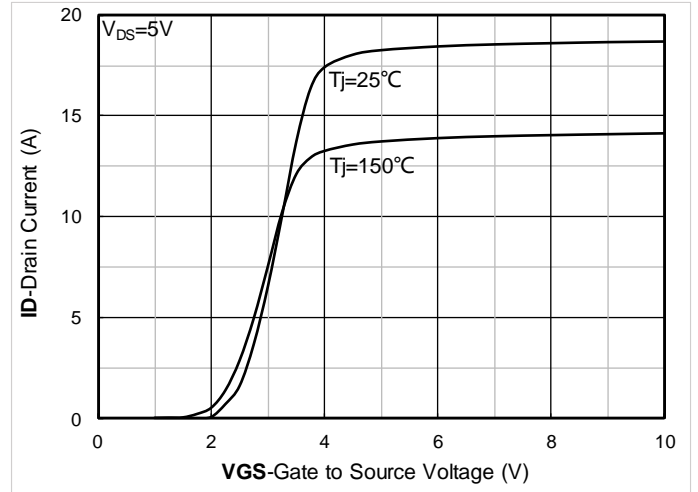


Figure 2. Transfer Characteristics; typical values

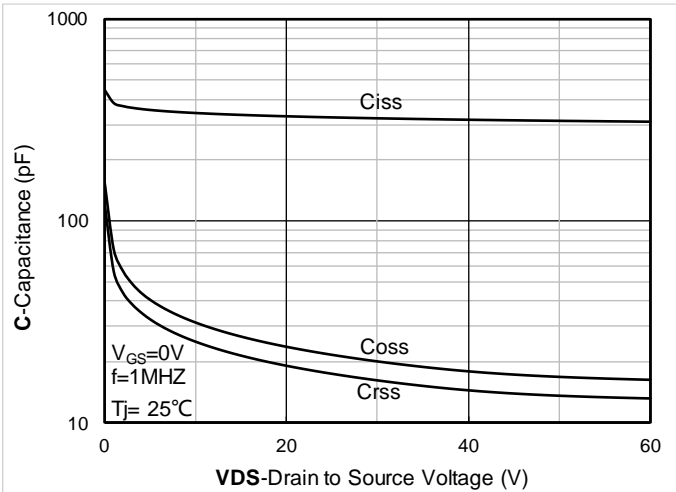


Figure 3. Capacitance Characteristics; typical values

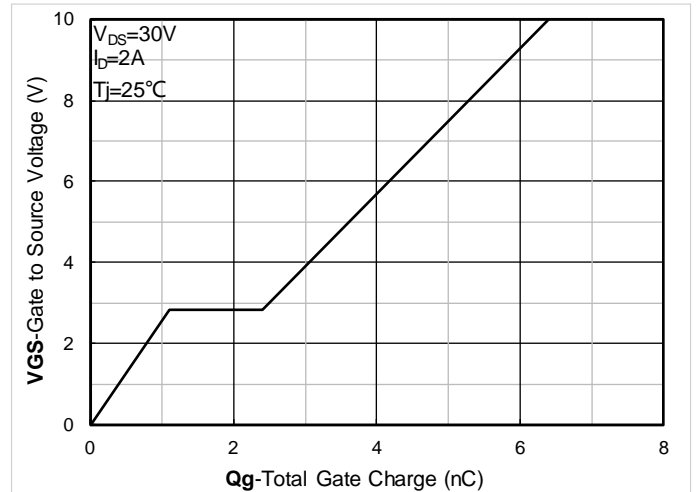


Figure 4. Gate Charge; typical values

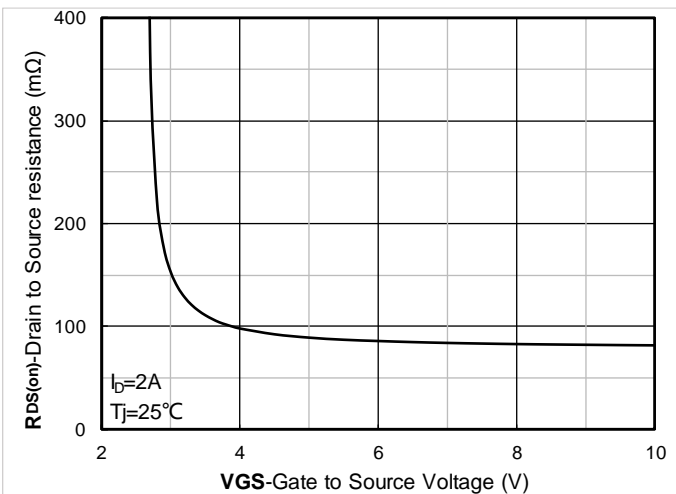


Figure 5. On-Resistance vs. Gate to Source Voltage; typical values

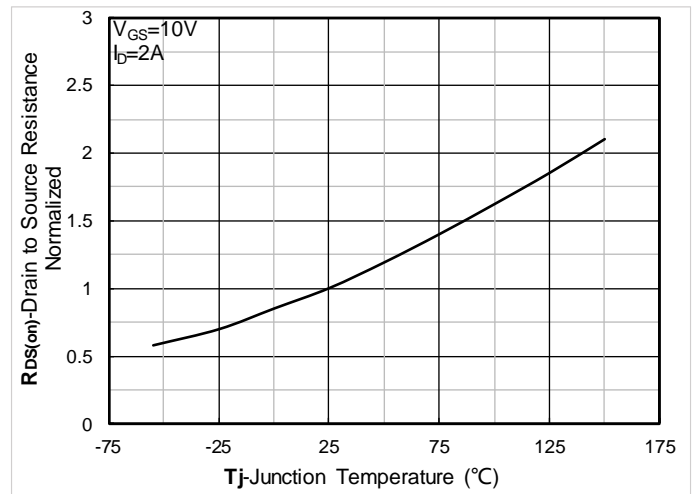


Figure 6. Normalized On-Resistance



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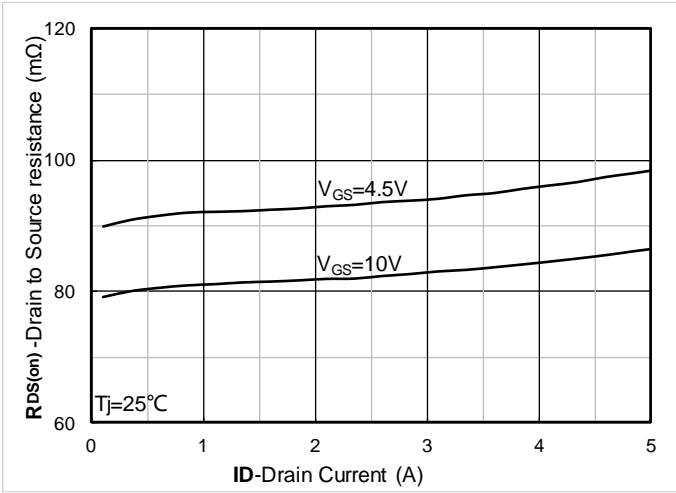


Figure 7. RDS(on) vs. Drain Current; typical values

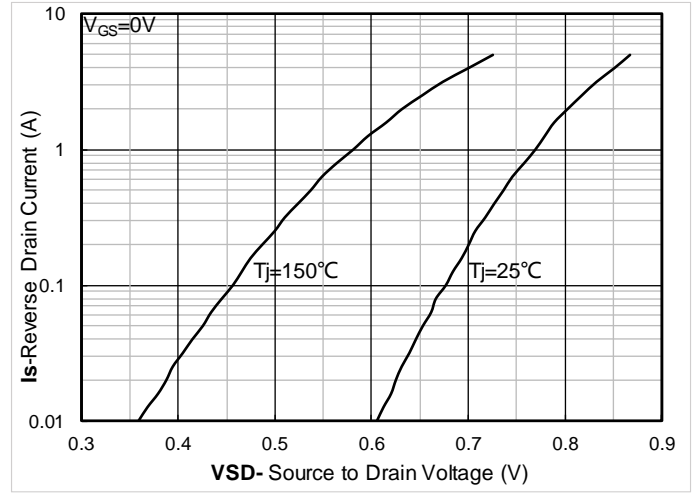


Figure 8. Forward characteristics of reverse diode; typical values

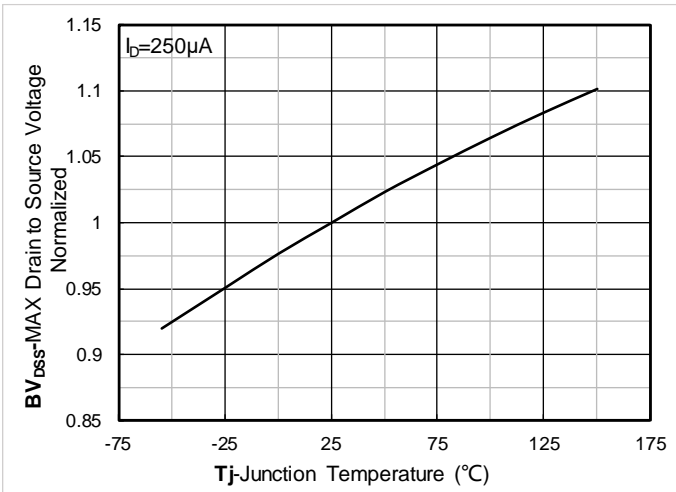


Figure 9. Normalized breakdown voltage

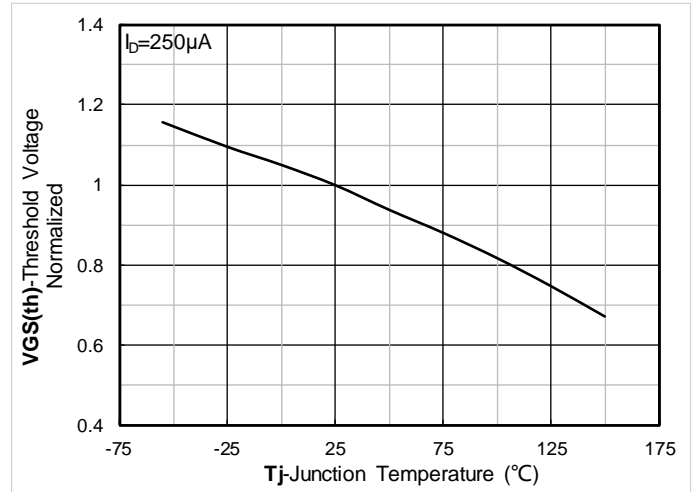


Figure 10. Normalized Threshold voltage

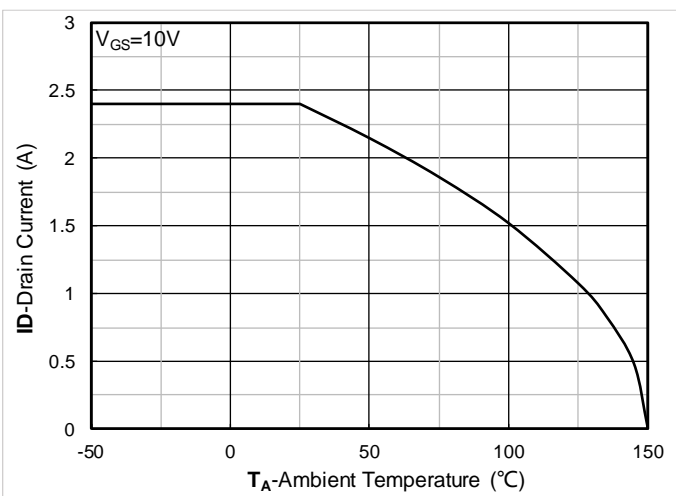


Figure 11. Current dissipation

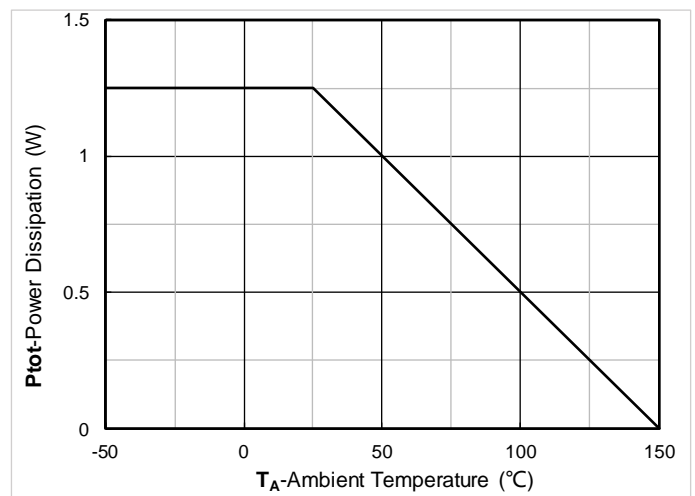


Figure 12. Power dissipation



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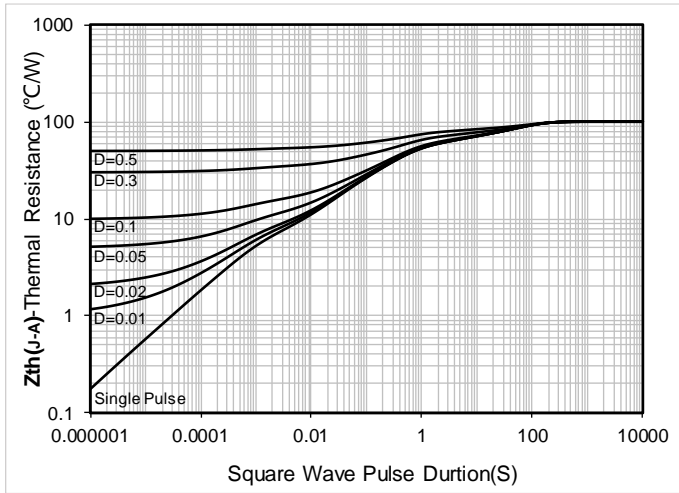


Figure 13. Maximum Transient Thermal Impedance

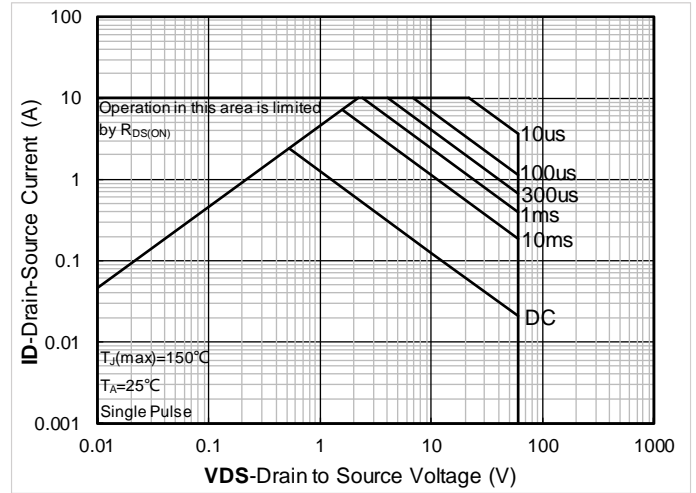


Figure 14. Safe Operation Area

## ■ Test Circuits & Waveforms

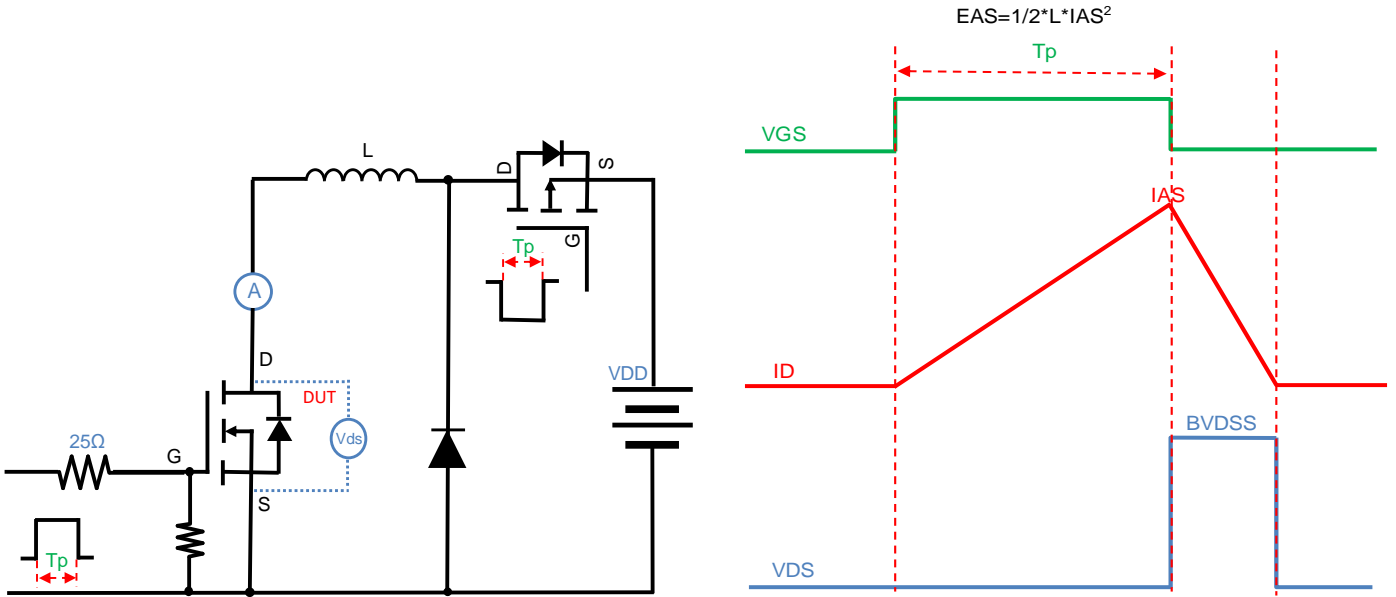


Figure A. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

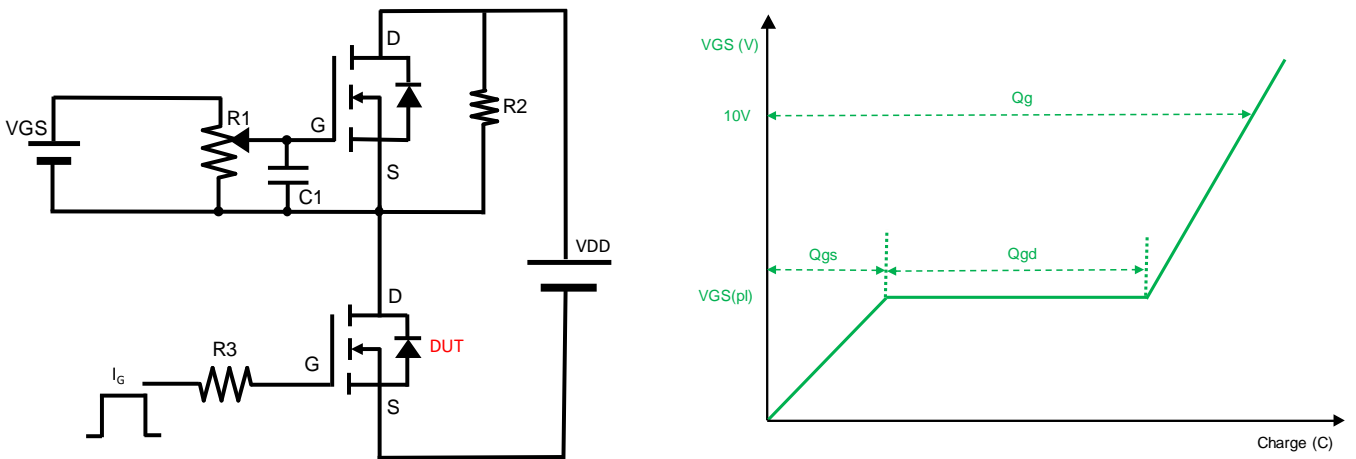


Figure B. Gate Charge Test Circuit & Waveform

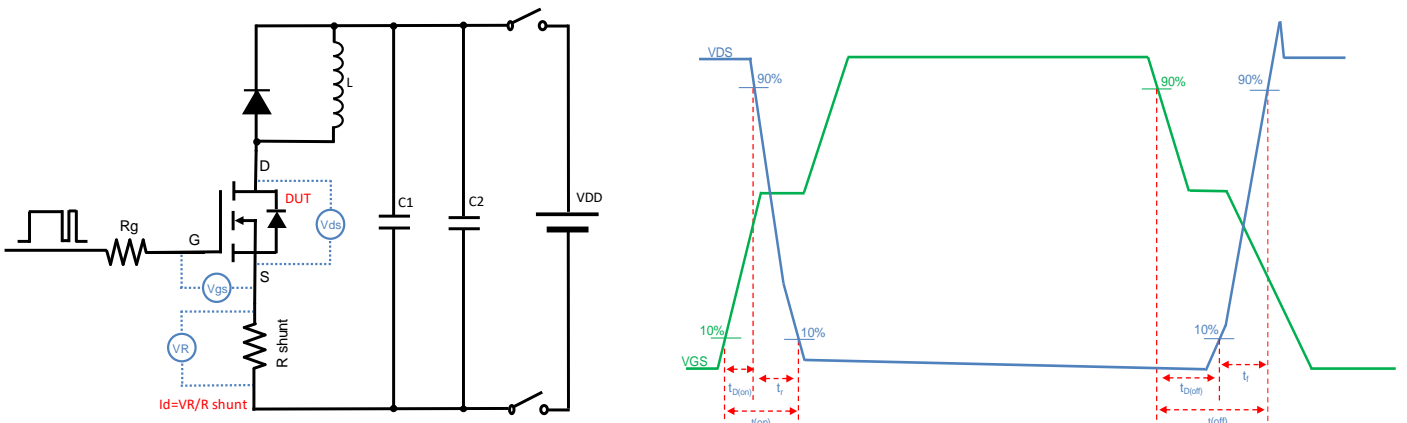


Figure C. Resistive Switching Test Circuit & Waveform

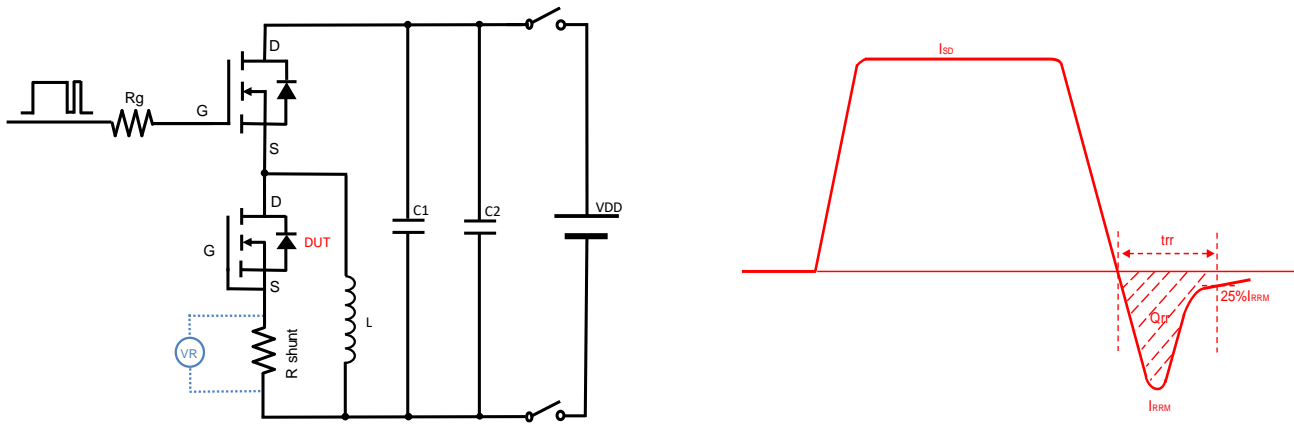
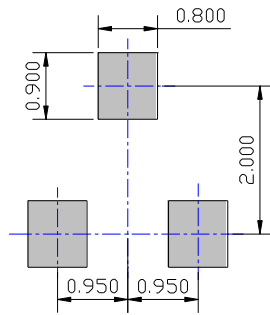
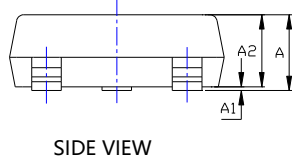
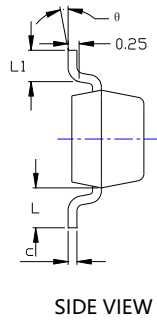
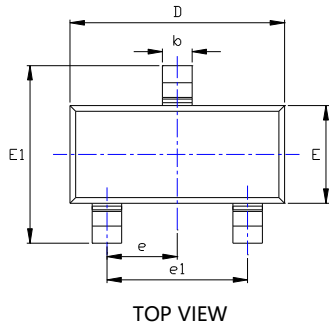


Figure D. Diode Recovery Test Circuit & Waveform



# YJL2310AJK

## ■ SOT-23 Package information



UNIT: mm

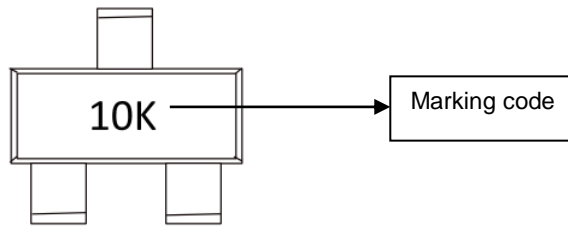
SYMBOL	DIMENSIONS			
	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A	0.035	0.045	0.900	1.150
A1	0.000	0.004	0.000	0.100
A2	0.035	0.041	0.900	1.050
b	0.012	0.020	0.300	0.500
c	0.004	0.008	0.100	0.200
D	0.110	0.118	2.800	3.000
E	0.047	0.055	1.200	1.400
E1	0.089	0.100	2.250	2.550
e	0.037 TYP		0.950 TYP	
e1	0.071	0.079	1.800	2.000
L	0.022 REF		0.550 REF	
L1	0.012	0.020	0.300	0.500
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.





## ■ Marking Information



Note:

1. All marking is at middle of the product body
2. All marking is in laser printing
3. 10K is marking code
4. Body color: Black



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