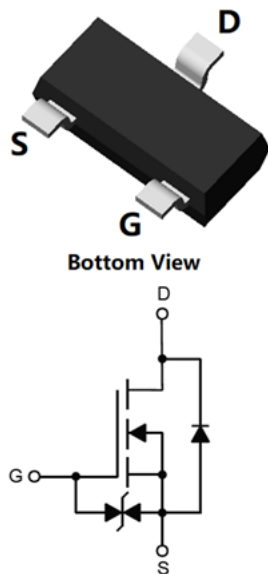
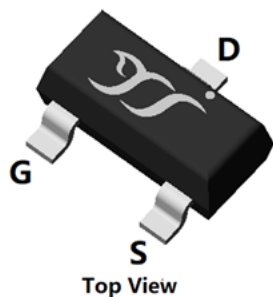


N-Channel Enhancement Mode Field Effect Transistor



SOT-23

Product Summary

- V_{DS} 40V
- I_D 4.6A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) $<30m\Omega$
- $R_{DS(ON)}$ (at $V_{GS}=4.5V$) $<42m\Omega$
- ESD Protected Up to 2KV (HBM)

General Description

- Low $R_{DS(ON)}$ & FOM
- Extremely low switching loss
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free
- Part no. with suffix "Q" means AEC-Q101 qualified

Applications

- Relay driver
- High-speed line driver
- Low-side load switch
- Switching circuits

Limiting Values

Parameter	Conditions		Symbol	Min	Max	Unit
Drain-source Voltage			V_{DS}	-	40	V
Gate-source Voltage			V_{GS}	-20	20	
Continuous Drain Current (Note 1,2)	Steady-State	$T_A=25^{\circ}\text{C}, V_{GS}=10\text{V}$	I_D	-	4.6	A
		$T_A=100^{\circ}\text{C}, V_{GS}=10\text{V}$		-	3.2	
Pulsed Drain Current	$T_A=25^{\circ}\text{C}, t_p \leq 10\mu\text{s}$		I_{DM}	-	18.4	
Maximum Body-Diode Continuous Current	$T_A=25^{\circ}\text{C}$		I_S		1	
Total Power Dissipation (Note 1,2)	Steady-State	$T_A=25^{\circ}\text{C}$	P_D	-	1.25	W
		$T_A=100^{\circ}\text{C}$		-	0.62	
Junction and Storage Temperature Range			T_J, T_{STG}	-55	175	$^{\circ}\text{C}$

Thermal Resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient (Note 2)	Steady-State	$R_{\theta JA}$	-	120	$^\circ C/W$



■ Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _b =250μA, T _j =25°C	40	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =40V, V _{GS} =0V, T _j =25°C	-	-	1	μA
		V _{DS} =40V, V _{GS} =0V, T _j =125°C	-	-	100	
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V, T _j =25°C	-	-	±10	μA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA, T _j =25°C	1.3	1.7	2.3	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V, I _b =4.6A, T _j =25°C	-	23	30	mΩ
		V _{GS} =4.5V, I _D =2.5A, T _j =25°C	-	30	42	mΩ
Diode Forward Voltage	V _{SD}	I _S =4.6A, V _{GS} =0V, T _j =25°C	-	0.85	1.2	V
Gate Resistance	R _G	f=1MHz, T _j =25°C	-	1.5	-	Ω
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V, f=1MHz, T _j =25°C	-	692	-	pF
Output Capacitance	C _{oss}		-	56	-	
Reverse Transfer Capacitance	C _{rss}		-	47	-	
Switching Parameters						
Total Gate Charge	Q _g	V _{GS} =10V, V _{DS} =20V, I _D =4.6A, T _j =25°C	-	14.1	-	nC
Gate-Source Charge	Q _{gs}		-	2.1	-	
Gate-Drain Charge	Q _{gd}		-	3.2	-	
Reverse Recovery Charge	Q _{rr}	I _F =4.6A, di/dt=100A/μs, V _{GS} =0V, V _R =20V, T _j =25°C	-	9	-	nC
Reverse Recovery Time	t _{rr}		-	13.8	-	ns
Turn-on Delay Time	t _{D(on)}	V _{GS} =10V, V _{DS} =20V, I _D =4.6A, R _{GEN} =3Ω, T _j =25°C	-	7	-	ns
Turn-on Rise Time	t _r		-	2.8	-	
Turn-off Delay Time	t _{D(off)}		-	19	-	
Turn-off Fall Time	t _f		-	3.1	-	

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 in² pad of 2oz. Copper, in the still air environment with $T_A=25^\circ C$. The maximum allowed junction temperature of 175 $^\circ C$. The value in any given application depends on the user's specific board design.



■ Typical Electrical and Thermal Characteristics Diagrams

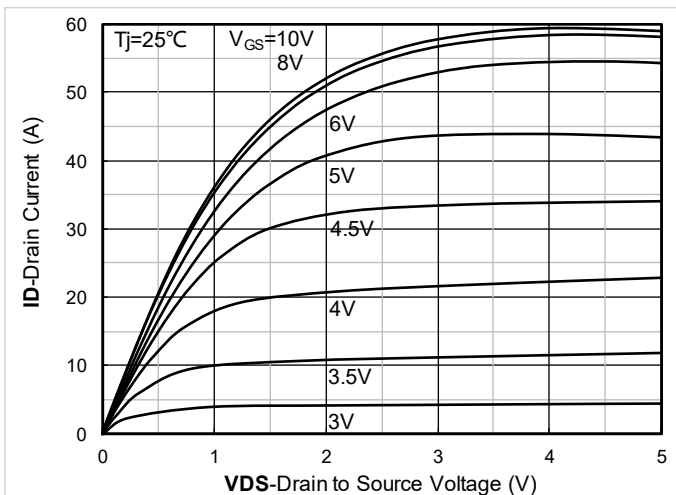


Figure 1. Output Characteristics; typical values

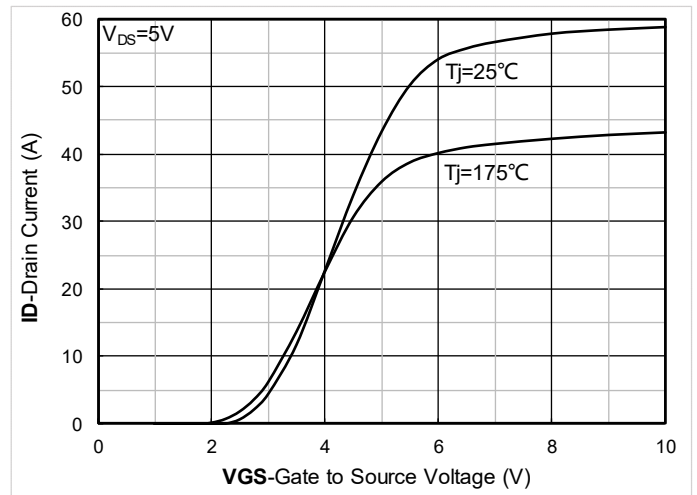


Figure 2. Transfer Characteristics; typical values

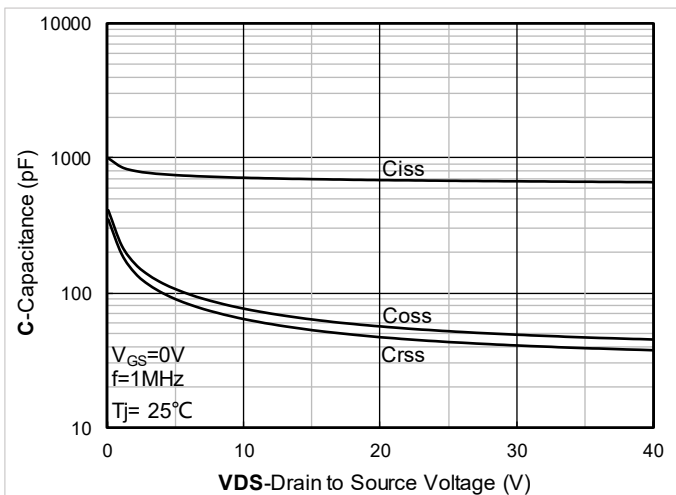


Figure 3. Capacitance Characteristics; typical values

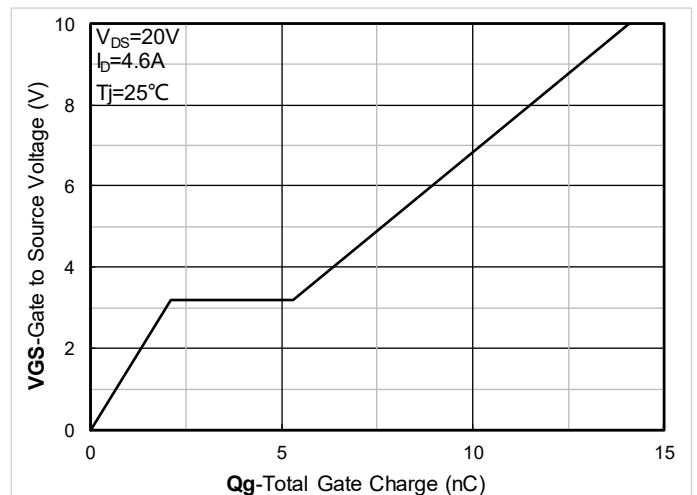


Figure 4. Gate Charge; typical values

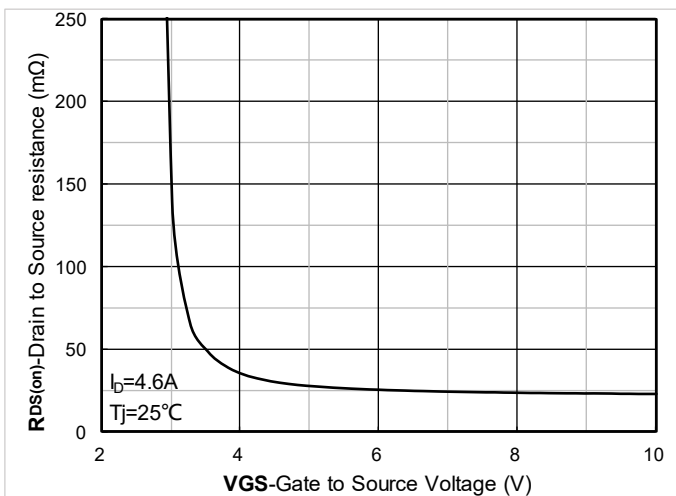


Figure 5. On-Resistance vs. Gate to Source Voltage; typical values

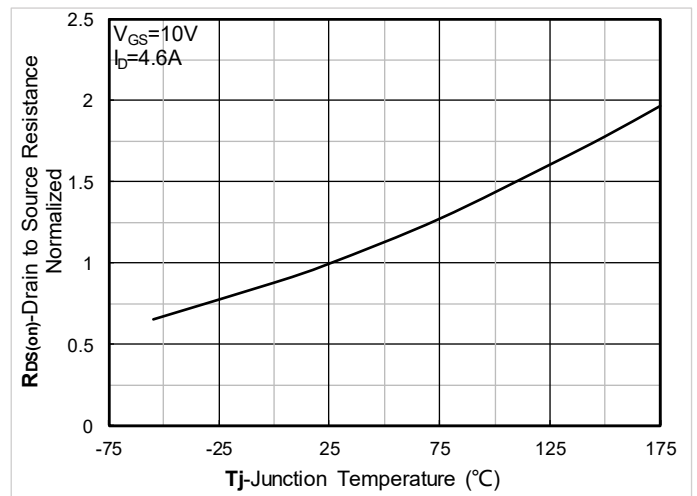


Figure 6. Normalized On-Resistance

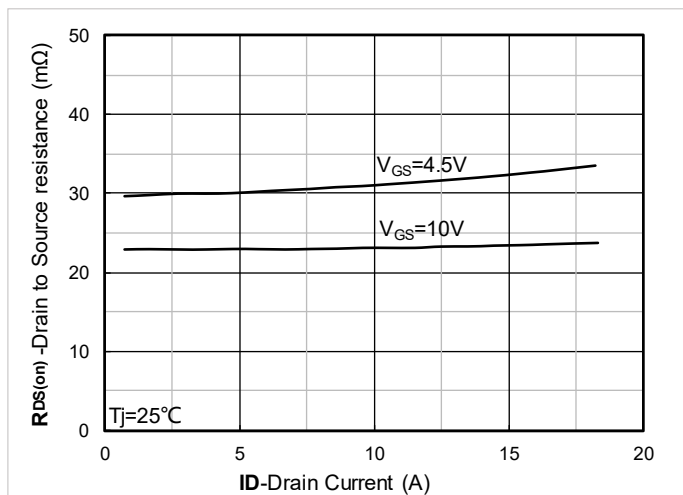


Figure 7. $R_{DS(on)}$ vs. Drain Current; typical values

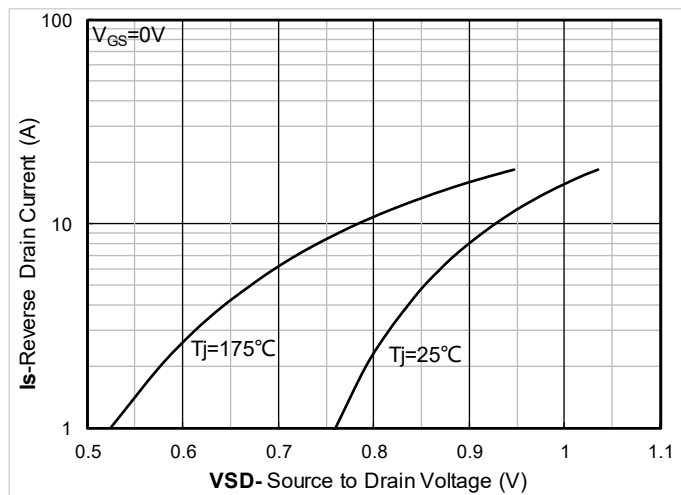


Figure 8. Forward characteristics of reverse diode; typical values

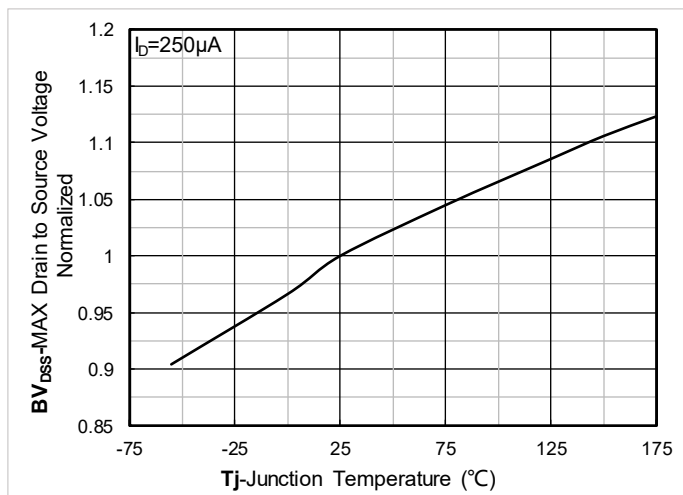


Figure 9. Normalized breakdown voltage

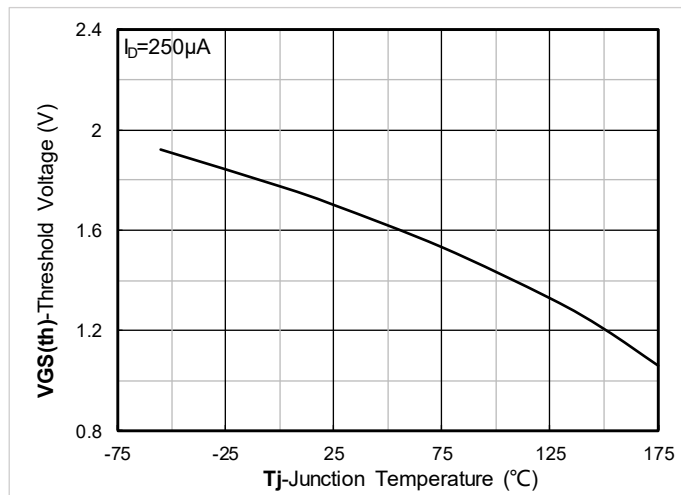


Figure 10. Gate Threshold voltage; typical values

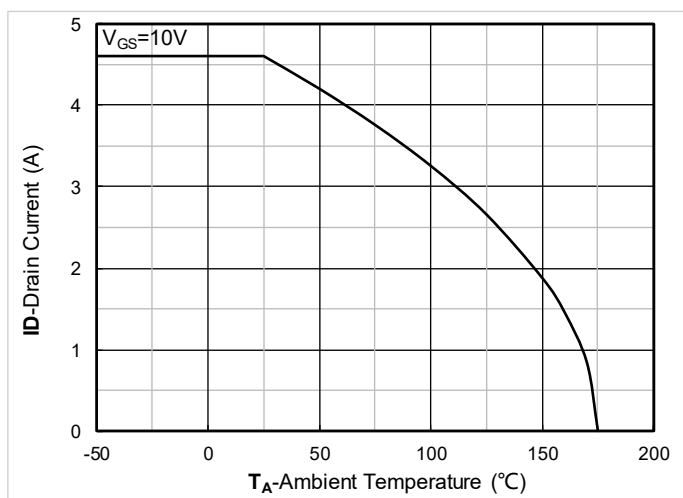


Figure 11. Current dissipation

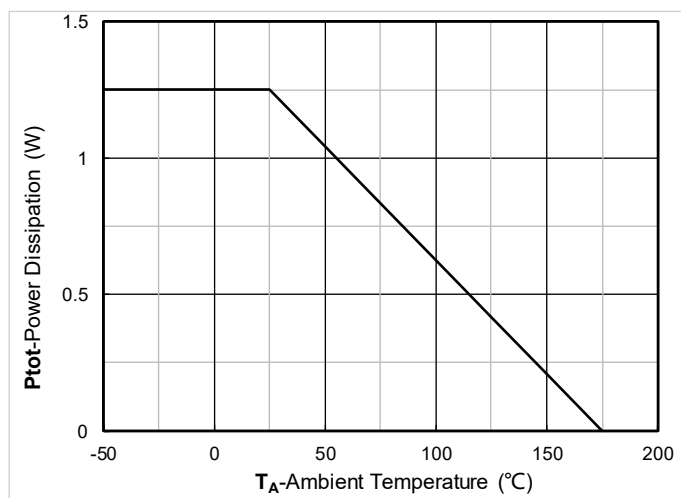


Figure 12. Power dissipation

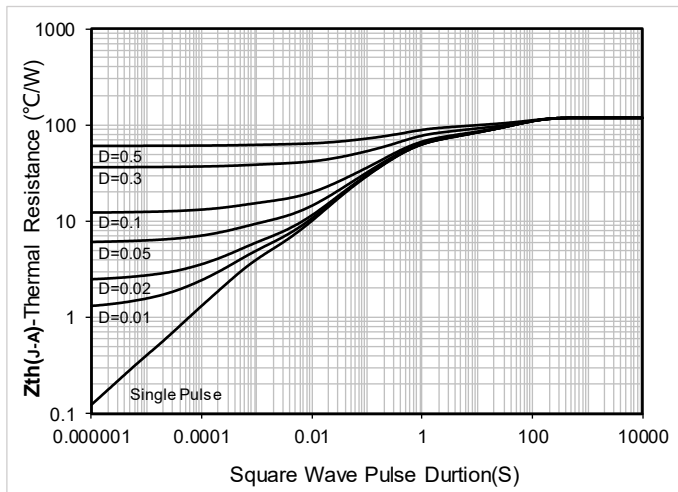


Figure 13. Maximum Transient Thermal Impedance

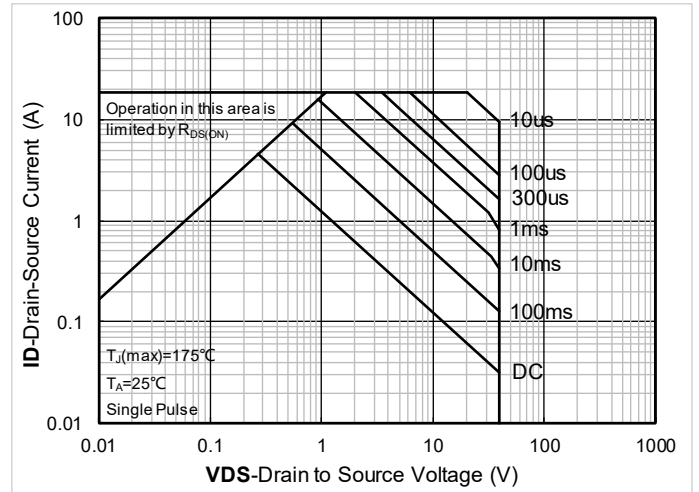


Figure 14. Safe Operation Area

■ Test Circuits & Waveforms

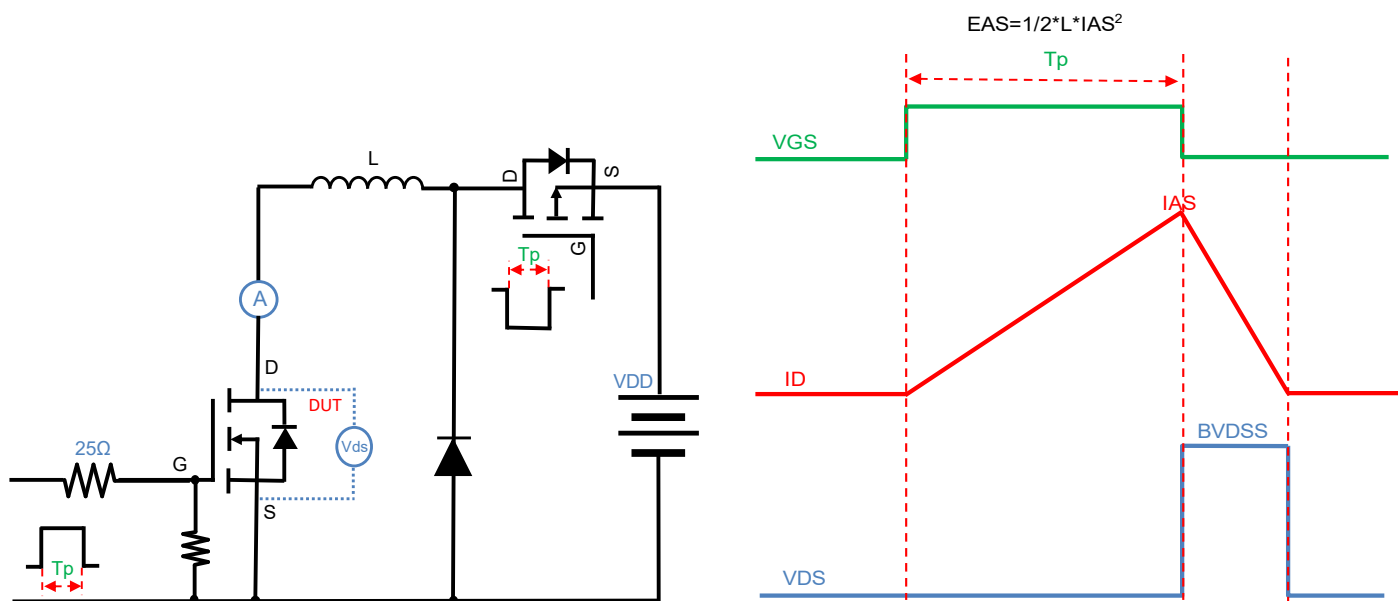


Figure A. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

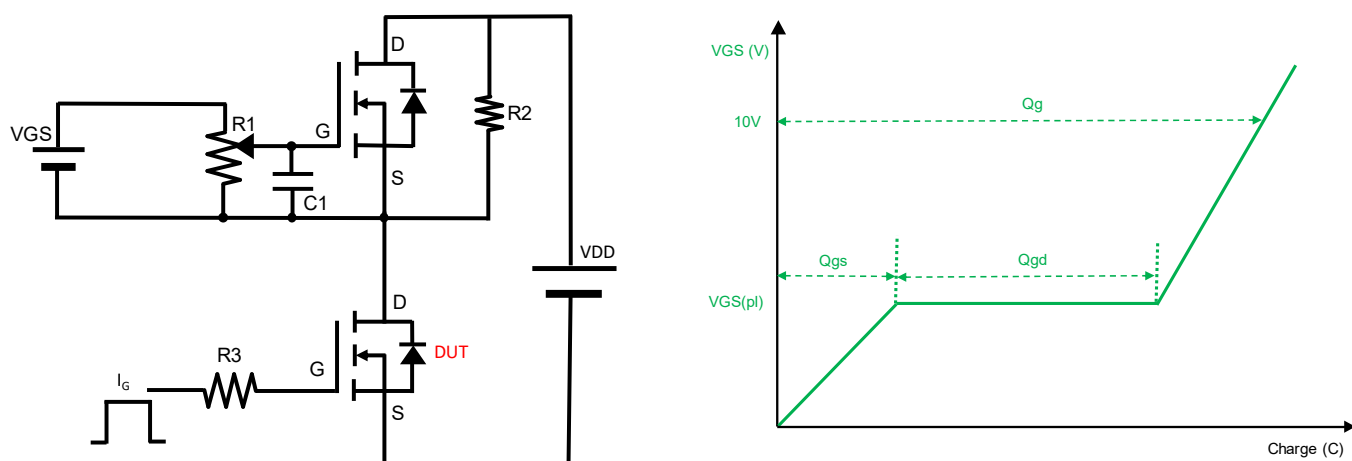


Figure B. Gate Charge Test Circuit & Waveform

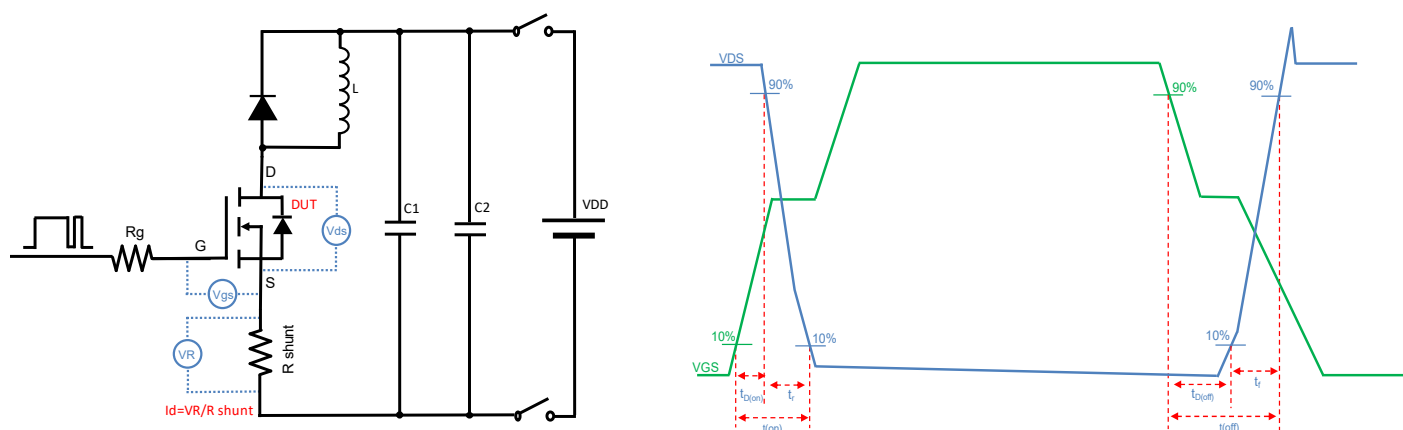


Figure C. Resistive Switching Test Circuit & Waveform

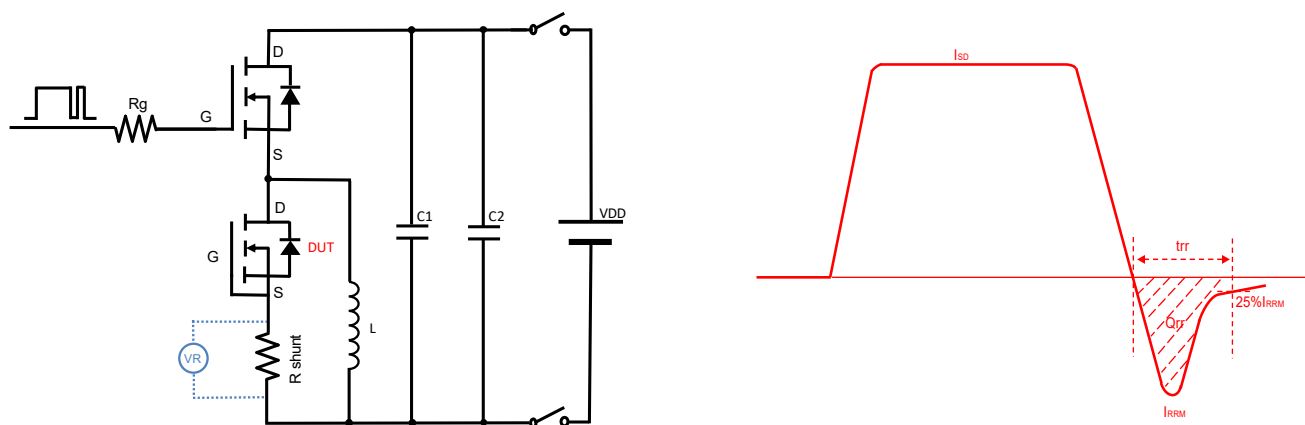
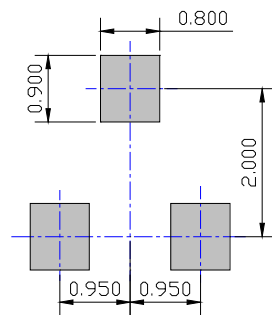
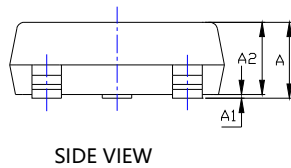
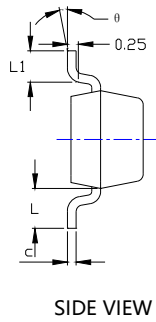
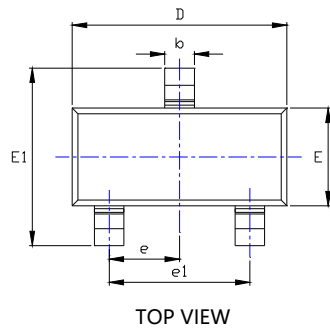


Figure D. Diode Recovery Test Circuit & Waveform



YJL030N04AKHQ

■ SOT-23 Package information



UNIT: mm

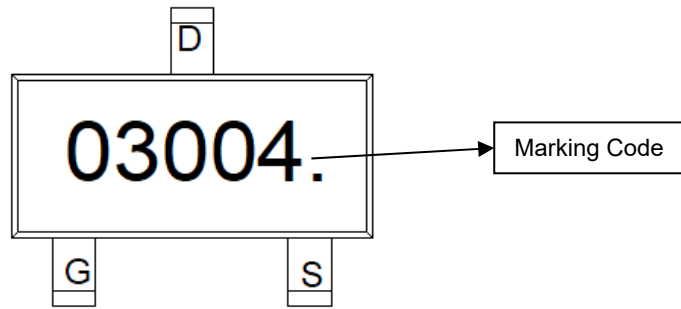
SYMBOL	DIMENSIONS			
	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A	0.035	0.045	0.900	1.150
A1	0.000	0.004	0.000	0.100
A2	0.035	0.041	0.900	1.050
b	0.012	0.020	0.300	0.500
c	0.004	0.008	0.100	0.200
D	0.110	0.118	2.800	3.000
E	0.047	0.055	1.200	1.400
E1	0.089	0.100	2.250	2.550
e	0.037TYP		0.950TYP	
e1	0.071	0.079	1.800	2.000
L	0.022REF		0.550REF	
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. 03004. is marking code
4. Body color: Black



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