

Features

- -20V/-0.65A,
 $R_{DS(ON)} = 410m\Omega(Typ.)@V_{GS} = -4.5V$
 $R_{DS(ON)} = 580m\Omega(Typ.)@V_{GS} = -2.5V$
 $R_{DS(ON)} = 900m\Omega(Typ.)@V_{GS} = -1.8V$
- Low $R_{DS(ON)}$
- Super High Dense Cell Design
- Reliable and Rugged
- ESD Protected (HBM>2000V)

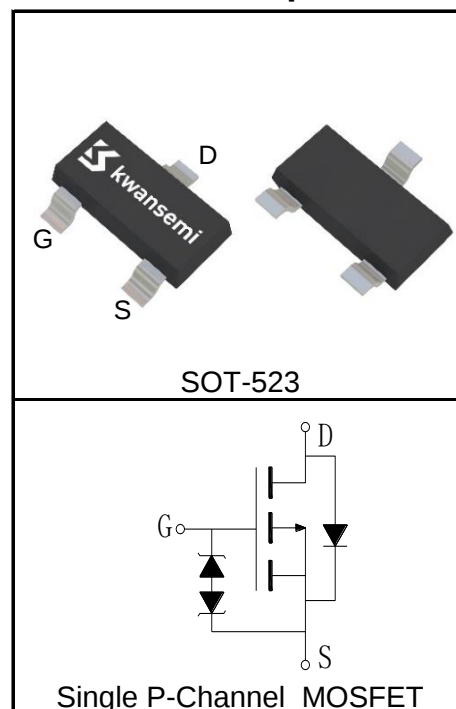
Applications

- Load Switch
- Battery Management



Halogen-Free

Pin Description



Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
Common Ratings ($T_A = 25^\circ\text{C}$ Unless Otherwise Noted)			
V_{DSS}	Drain-Source Voltage	-20	V
V_{GSS}	Gate-Source Voltage	± 12	
T_{Jmax}	Maximum Junction Temperature	150	$^\circ\text{C}$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to 150	$^\circ\text{C}$
I_S	Diode Continuous Forward Current	$T_A = 25^\circ\text{C}$ -0.33	A
Mounted on Large Heat Sink			
$I_{DP}^{①}$	Pulse Drain Current	$T_A = 25^\circ\text{C}$ -1	A
$I_D^{②}$	Continuous Drain Current($V_{GS} = -4.5V$)	$T_A = 25^\circ\text{C}$ -0.65	A
		$T_A = 70^\circ\text{C}$ -0.52	
P_D	Maximum Power Dissipation	$T_A = 25^\circ\text{C}$ 0.3	W
		$T_A = 70^\circ\text{C}$ 0.19	
T_L	Maximum Lead Temperature for Soldering Purposes(1/8" from case for 10 s)	260	$^\circ\text{C}$
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	415	$^\circ\text{C/W}$
Drain-Source Avalanche Ratings			
$E_{AS}^{④}$	Avalanche Energy, Single Pulsed	1	mJ

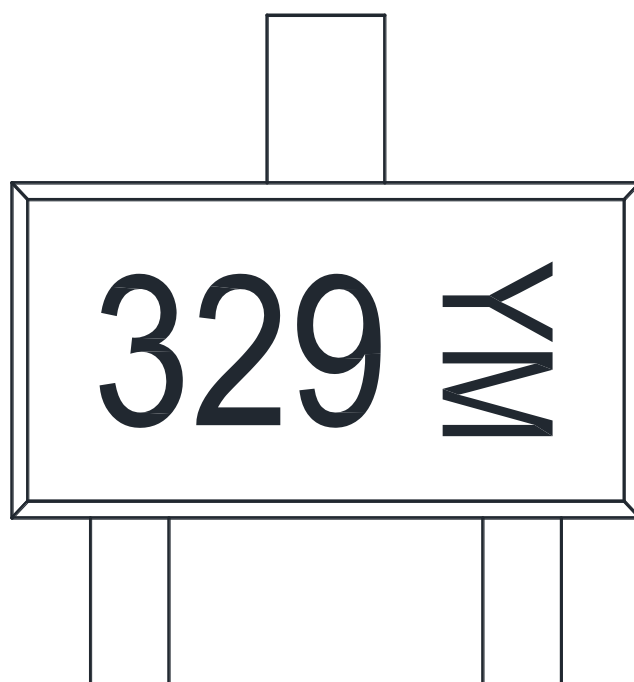
Electrical Characteristics ($T_A=25^{\circ}\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Condition	Rating			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =-250μA	-20			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-20V, V _{GS} =0V			-1	μA
		T _J =125°C			-30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	-0.5	-0.7	-1	V
I _{GSS}	Gate Leakage Current	V _{GS} =±12V, V _{DS} =0V			±10	μA
R _{DS(ON)} ^⑤	Drain-Source On-state Resistance	V _{GS} =-4.5V, I _{DS} =-0.65A		410	500	mΩ
		V _{GS} =-2.5V, I _{DS} =-0.55A		580	750	mΩ
		V _{GS} =-1.8V, I _{DS} =-0.45A		900	1200	mΩ
Diode Characteristics						
V _{SD} ^⑤	Diode Forward Voltage	I _{SD} =-0.65A, V _{GS} =0V		-0.9	-1.2	V
t _{rr}	Reverse Recovery Time	I _{SD} =-0.65A, dI _{SD} /dt=-100A/μs		13		ns
Q _{rr}	Reverse Recovery Charge			18		nC
Dynamic Characteristics ^⑥						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz		3.8		KΩ
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-10V, Frequency=1.0MHz		23		pF
C _{oss}	Output Capacitance			10		
C _{rss}	Reverse Transfer Capacitance			4		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =-10V, I _{DS} =-0.65A, V _{GEN} =-4.5V, R _G =6Ω		7		ns
t _r	Turn-on Rise Time			5		
t _{d(OFF)}	Turn-off Delay Time			28		
t _f	Turn-off Fall Time			8		
Gate Charge Characteristics ^⑥						
Q _g	Total Gate Charge	V _{DS} =-10V, V _{GS} =-4.5V, I _{DS} =-0.65A		0.78		nC
Q _{gs}	Gate-Source Charge			0.13		
Q _{gd}	Gate-Drain Charge			0.26		

- Notes:
- ① Pulse width limited by safe operating area.
 - ② Calculated continuous current based on maximum allowable junction temperature.
 - ③ When mounted on 1 inch square copper board, $t \leq 10\text{sec}$. The value in any given application depends on the user's specific board design.
 - ④ Limited by T_{Jmax} , Starting $T_J = 25^{\circ}\text{C}$, $I_{ASmax} = -2A$, $L = 0.5\text{mH}$, $V_{DD} = -10V$, $R_G = 25\Omega$, $V_{GS} = -4.5V$. Part not recommended for use above this value.
 - ⑤ Pulse test; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
 - ⑥ Guaranteed by design, not subject to production testing.

Ordering and Marking Information

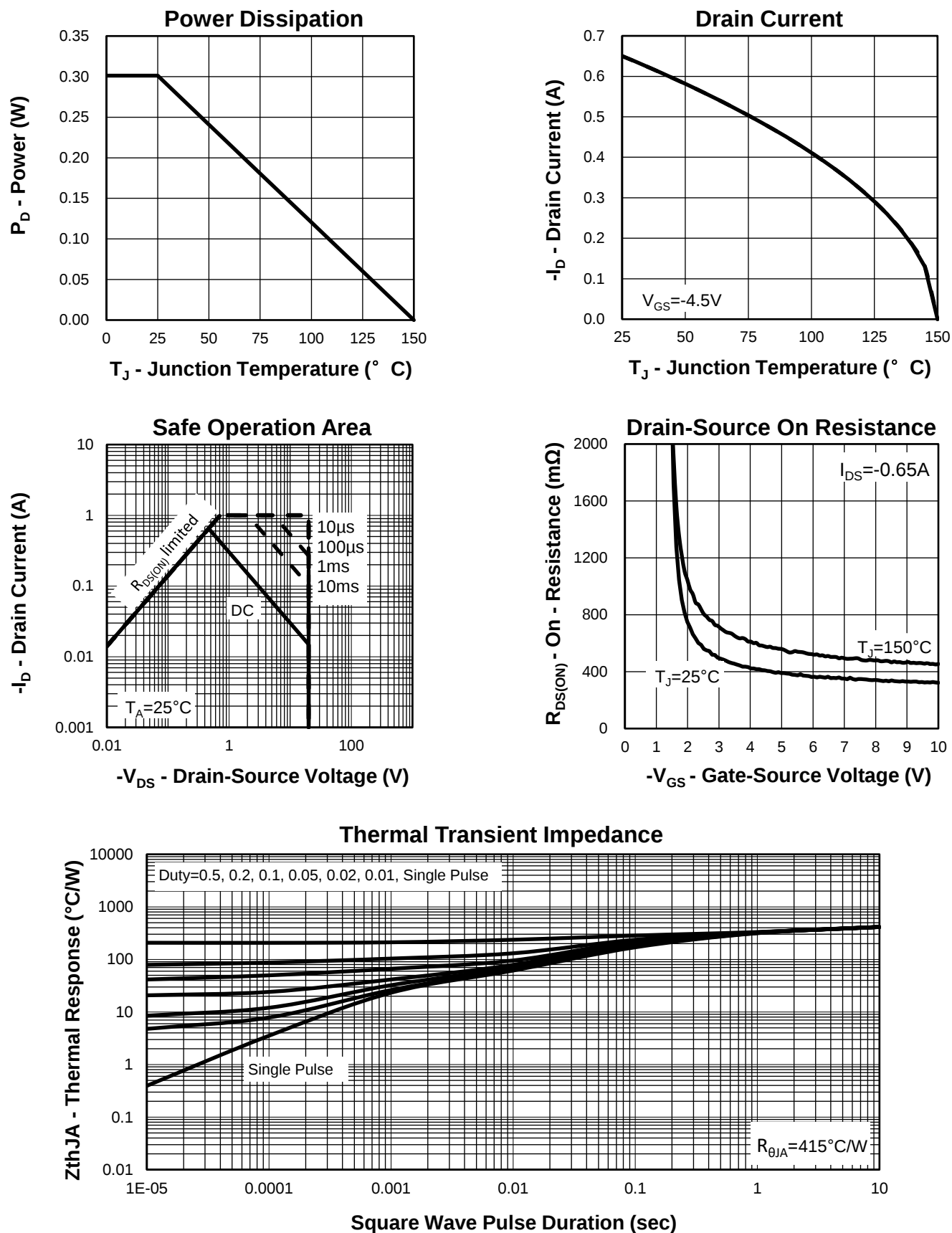
Device	Package	Packaging	Quantity	Reel Size	Tape width
KS23290XA5	SOT-523	Tape&Reel	3000	7"	8mm



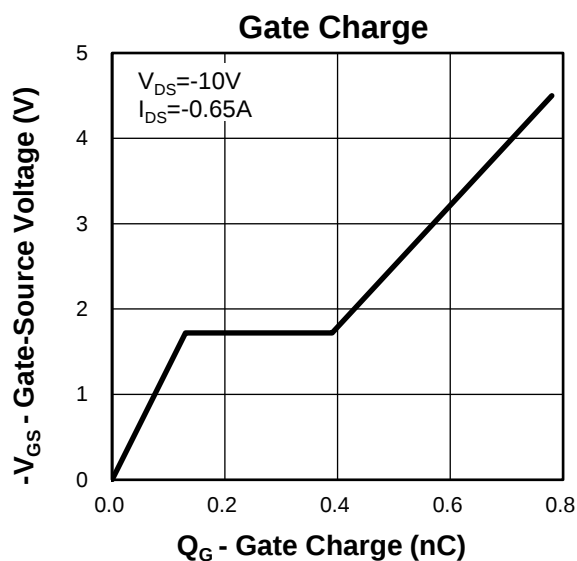
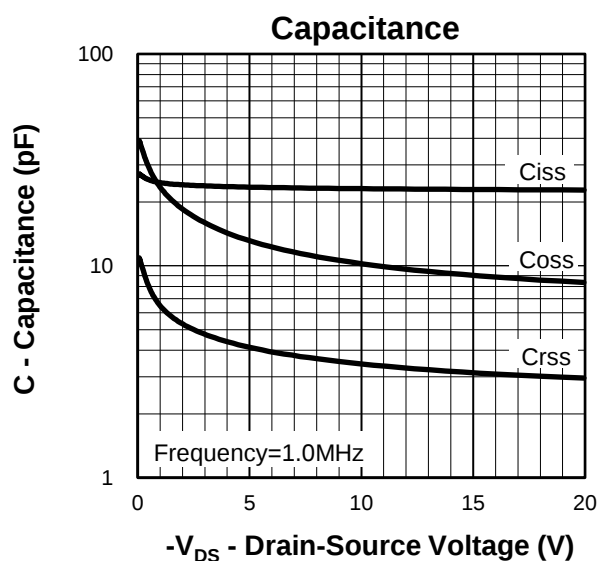
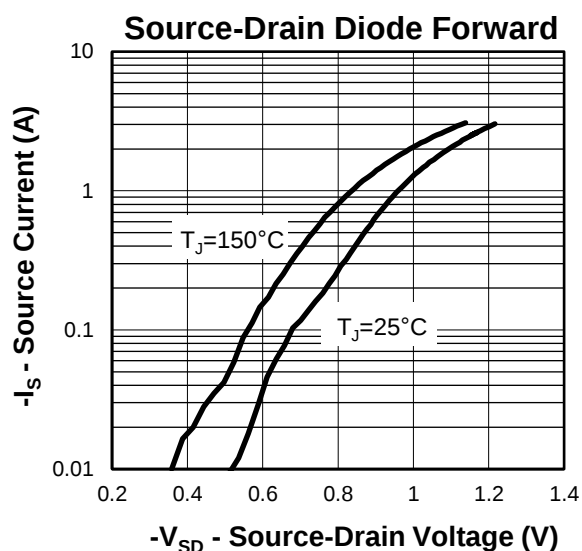
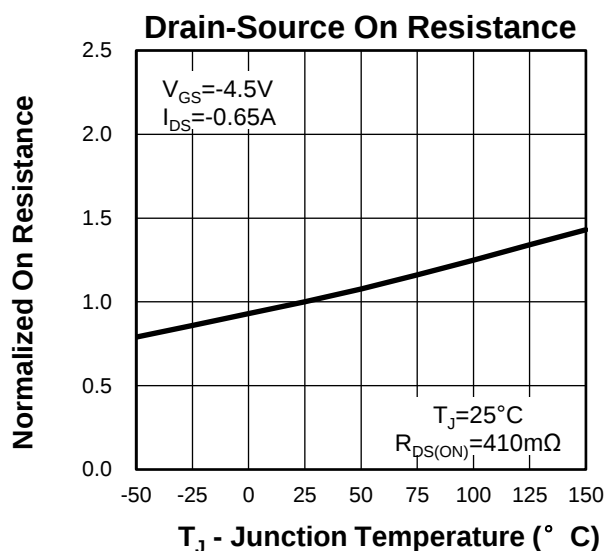
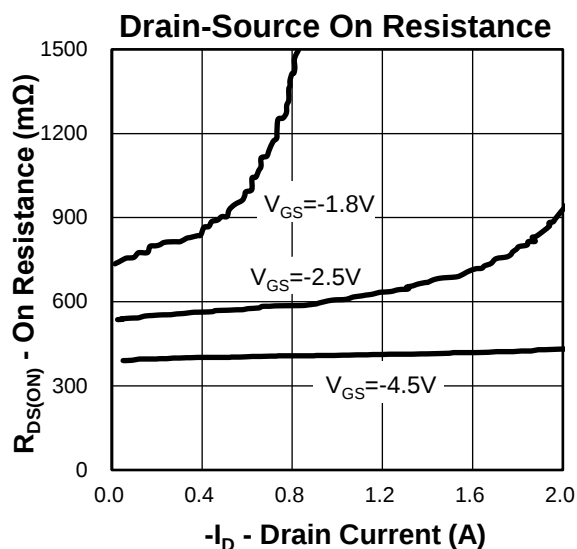
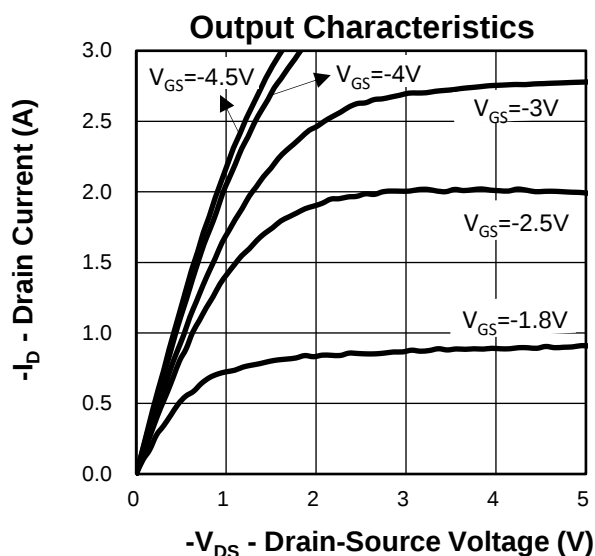
Y =Year,2017-A,2018-B,etc.

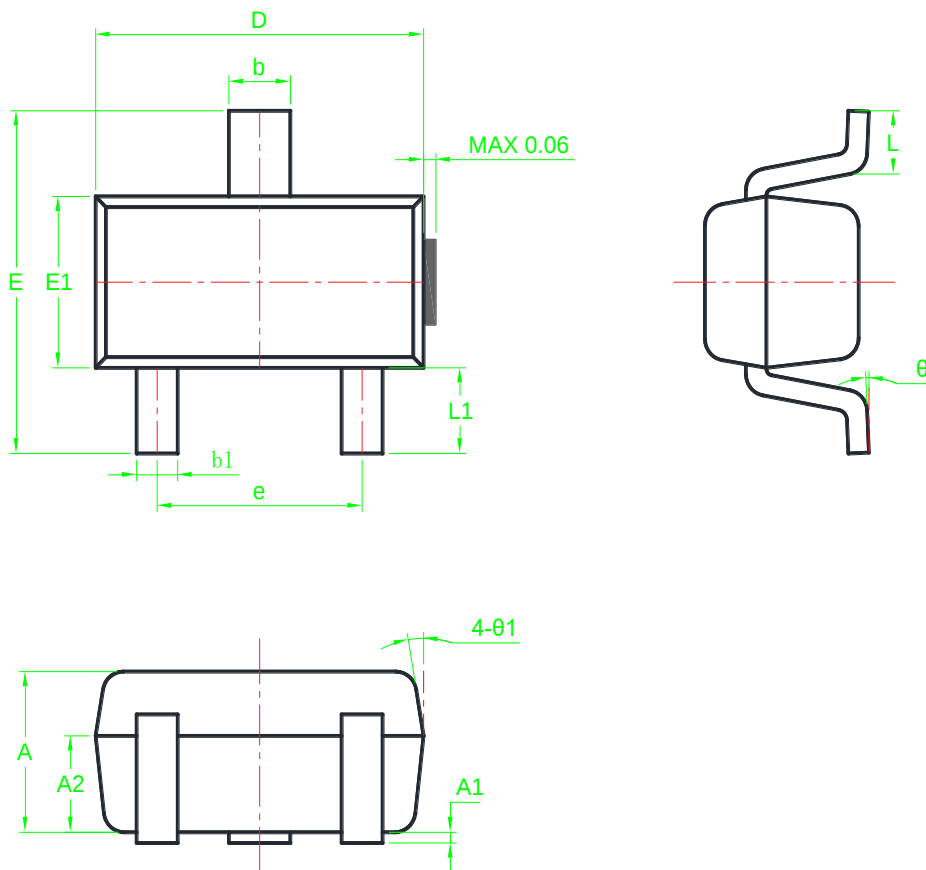
M =Month,Jan-1,Feb-2,....Sep-9,Oct-A,Nov-B,Dec-C.

Typical Characteristics



Typical Characteristics

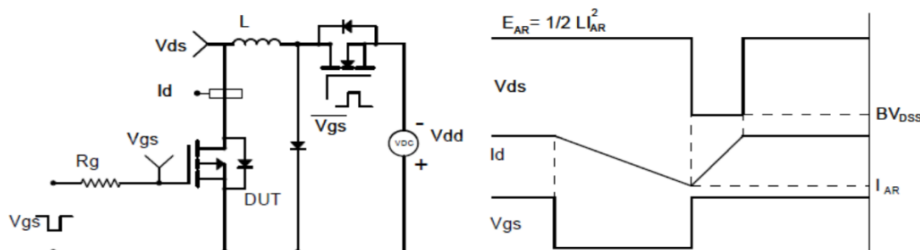


Package Information
SOT-523


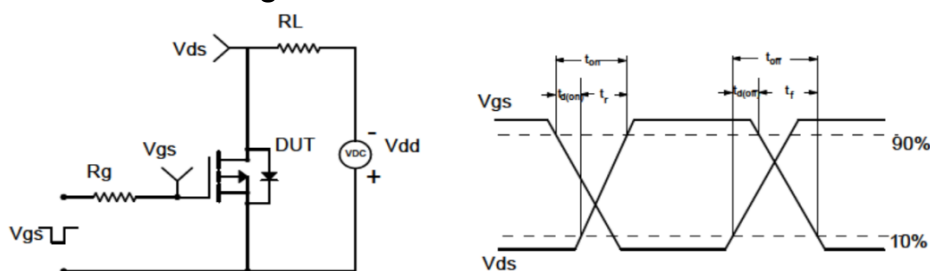
SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.75	0.80	0.028	0.030	0.031	E	1.50	1.60	1.75	0.059	0.063	0.069
A1	0.00	0.05	0.10	0.000	0.002	0.004	E1	0.70	0.80	0.90	0.028	0.031	0.035
A2	0.45REF			0.018REF			L	0.20	0.30	0.40	0.008	0.012	0.016
b	0.25	0.30	0.35	0.010	0.012	0.014	L1	0.40REF			0.016REF		
b1	0.15	0.20	0.25	0.006	0.008	0.010	θ	0°	*	5°	0°	*	5°
D	1.55	1.60	1.65	0.061	0.063	0.065	$\theta 1$	5°	*	12°	5°	*	12°
e	1.00REF			0.039REF									

Note: Dimensions do not inclusive burrs and mold flash.

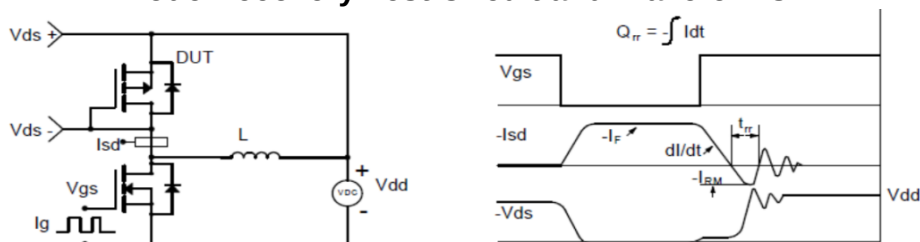
Avalanche Test Circuit and Waveforms



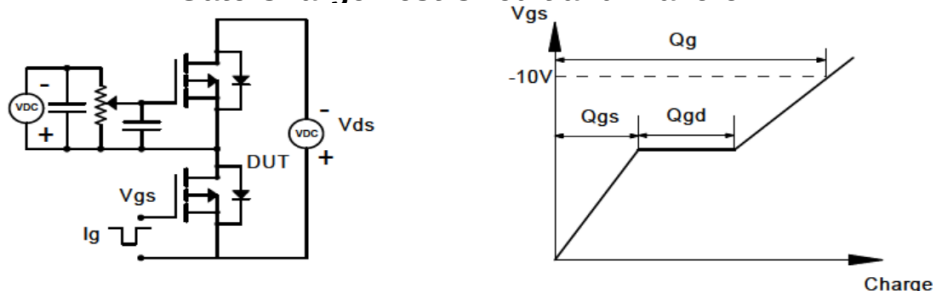
Switching Time Test Circuit and Waveforms



Diode Recovery Test Circuit and Waveforms



Gate Charge Test Circuit and Waveform



Customer Service

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