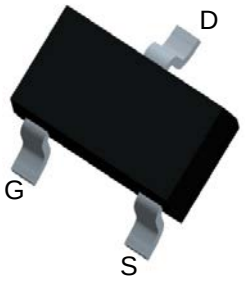
Features

- 60V/0.5A,
  $R_{DS\ (ON)}$ =4500mΩ(Typ.)@V_{GS}=10V
  $R_{DS\ (ON)}$ =5250mΩ(Typ.)@V_{GS}=4.5V
- Low On-Resistance
- Super High Dense Cell Design
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

Pin Description



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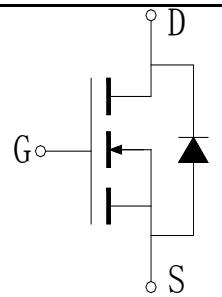


N-Channel MOSFET

Applications

- Power Management in Desktop Computer or DC/DC Converters

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T_A=25°C Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		60	V
V_{GSS}	Gate-Source Voltage		±20	
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	°C
I_S	Diode Continuous Forward Current	T_A=25°C	1.25	A
Mounted on Large Heat Sink				
I_{DP} ①	300μs Pulse Drain Current Tested	T_A=25°C	2	A
I_D ②	Continuous Drain Current(V_{GS}=10V)	T_A=25°C	0.5	A
		T_A=70°C	0.4	
P_D	Maximum Power Dissipation	T_A=25°C	1	W
		T_A=70°C	0.64	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		-	°C/W
$R_{\theta JA}$ ③	Thermal Resistance-Junction to Ambient		125	°C/W
Drain-Source Avalanche Ratings				
E_{AS} ④	Avalanche Energy, Single Pulsed		TBD	mJ

Electrical Characteristics (T_A=25°C Unless Otherwise Noted)

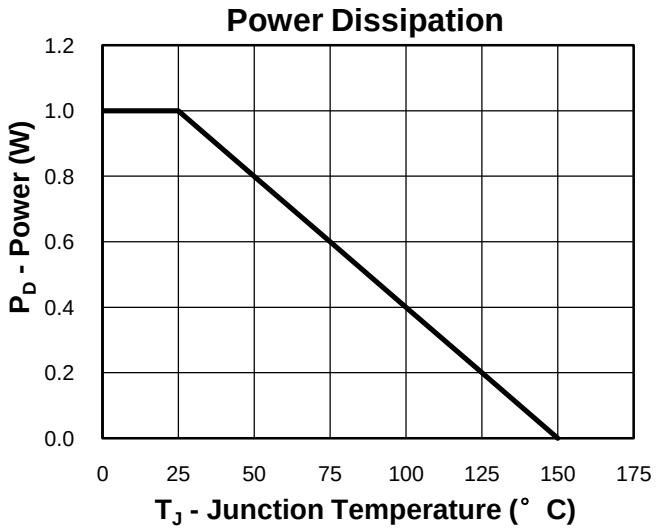
Symbol	Parameter	Test Condition	2N7002			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	60			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=60V, V_{GS}=0V			1	μA
		T_J=125°C			30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	1		2.5	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V			±100	nA
$R_{DS(ON)}$ ⑤	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=0.5A		4500	7500	mΩ
		V_{GS}=4.5V, I_{DS}=0.2A		5250	7500	mΩ
Diode Characteristics						
V_{SD} ⑤	Diode Forward Voltage	I_{SD}=0.5A, V_{GS}=0V			1.2	V
t_{rr}	Reverse Recovery Time	I_{SD}=0.5A, dI_{SD}/dt=100A/μs		19		ns
Q_{rr}	Reverse Recovery Charge			8		nC
Dynamic Characteristics ⑥						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz		0.5		Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=30V, Frequency=1.0MHz		250		pF
C_{oss}	Output Capacitance			65		
C_{rss}	Reverse Transfer Capacitance			30		
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=30V, I_{DS}=0.5A, V_{GEN}=10V,R_G=6Ω		6		ns
t_r	Turn-on Rise Time			15		
$t_{d(OFF)}$	Turn-off Delay Time			29		
t_f	Turn-off Fall Time			9		
Gate Charge Characteristics ⑥						
Q_g	Total Gate Charge	V_{DS}=48V, V_{GS}=10V, I_{DS}=0.5A		7		nC
Q_{gs}	Gate-Source Charge			1.4		
Q_{gd}	Gate-Drain Charge			2.5		

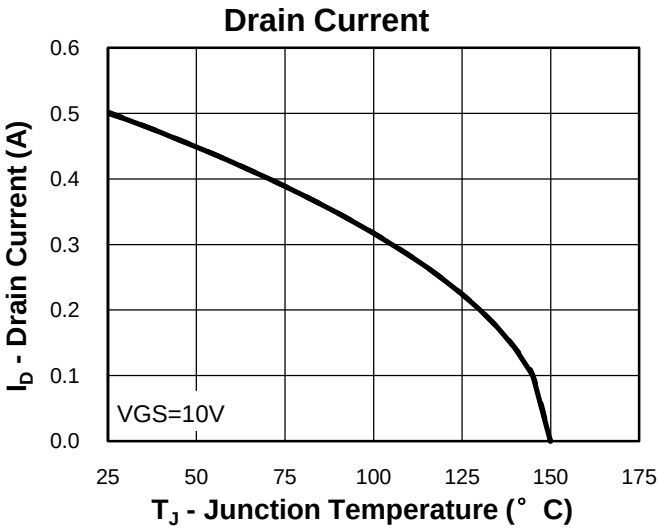
Notes:
①Pulse width limited by safe operating area.
②Calculated continuous current based on maximum allowable junction temperature.
③When mounted on 1 inch square copper board, t≤10sec. The value in any given application depends on the user's specific board design.
④Limited by $T_{Jmax.}$ Starting T_J = 25°C.
⑤Pulse test;Pulse width≤300μs, duty cycle≤2%.
⑥Guaranteed by design, not subject to production testing.

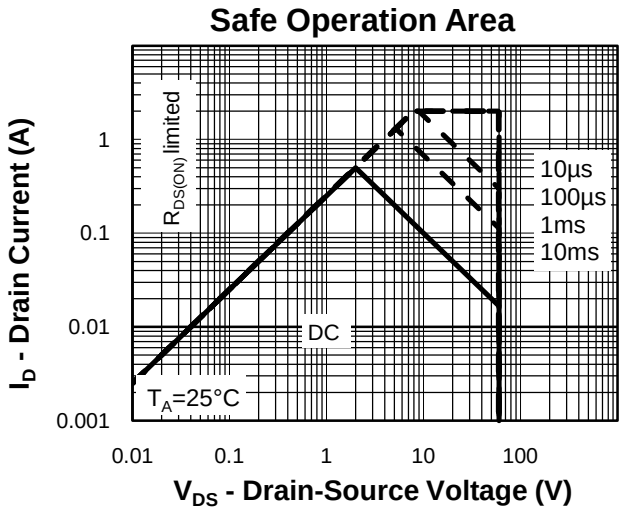
Ordering and Marking Information

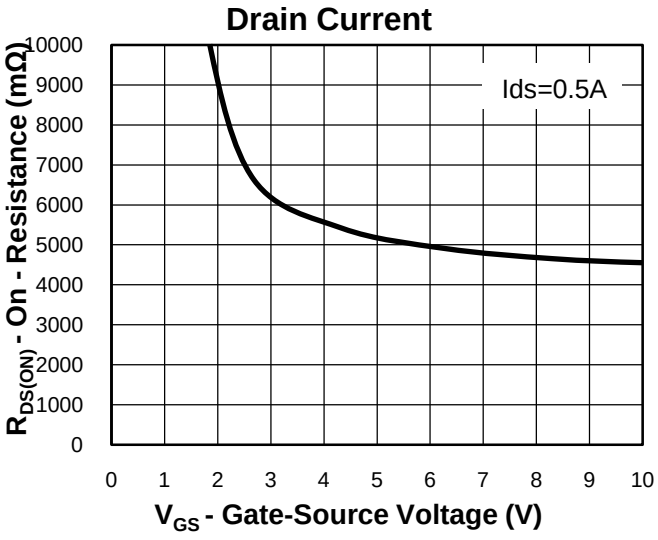
Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
2N7002	7002	SOT23	Tape&Reel	3000	7''	8mm

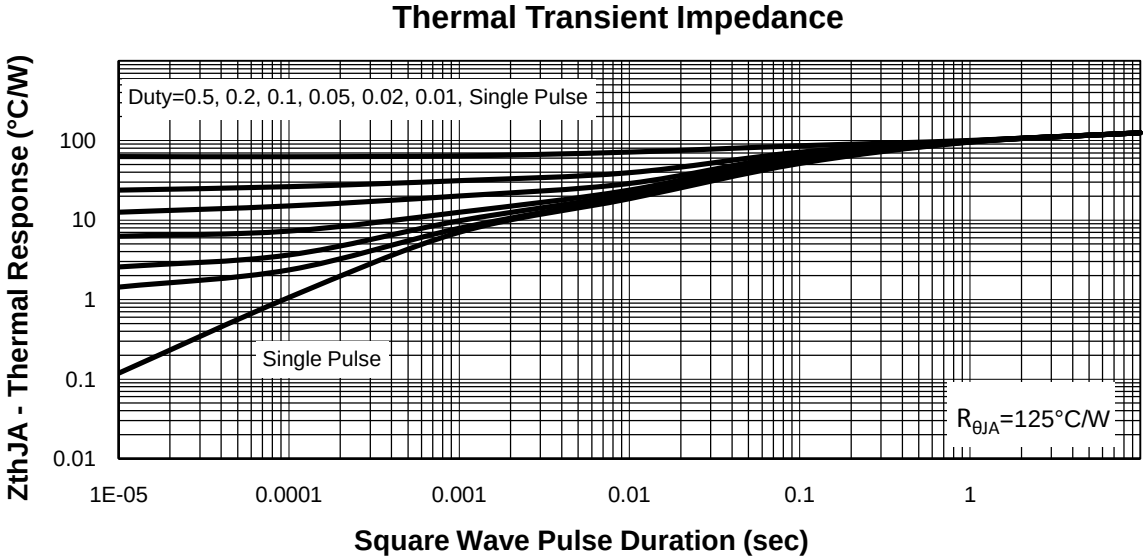
Typical Characteristics



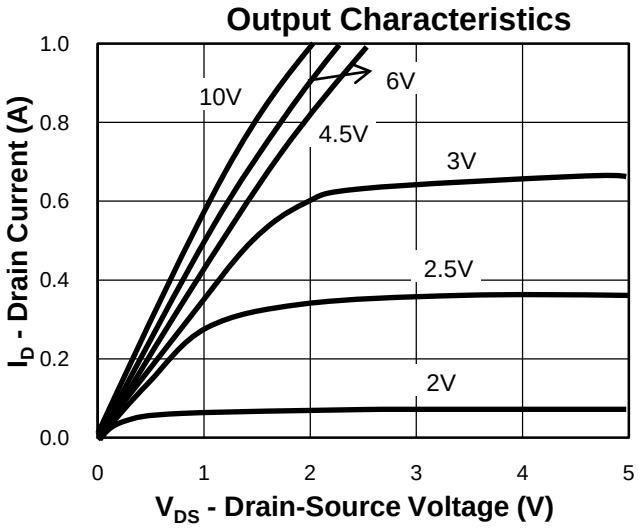


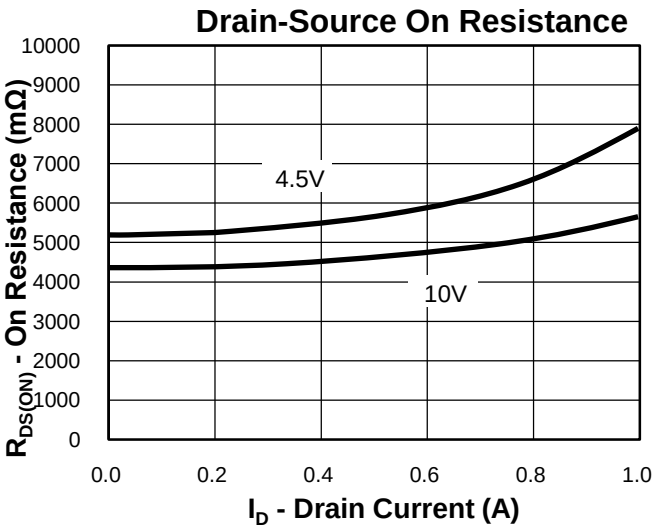


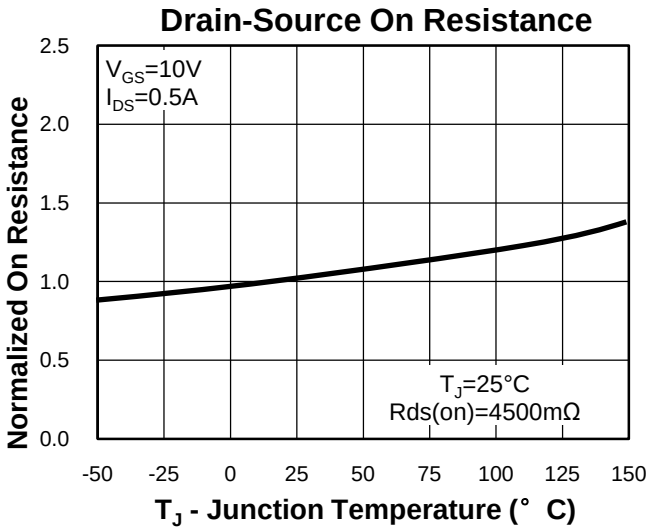


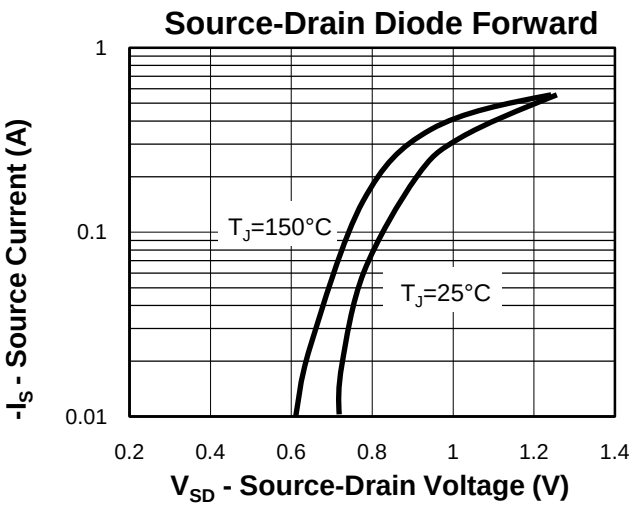


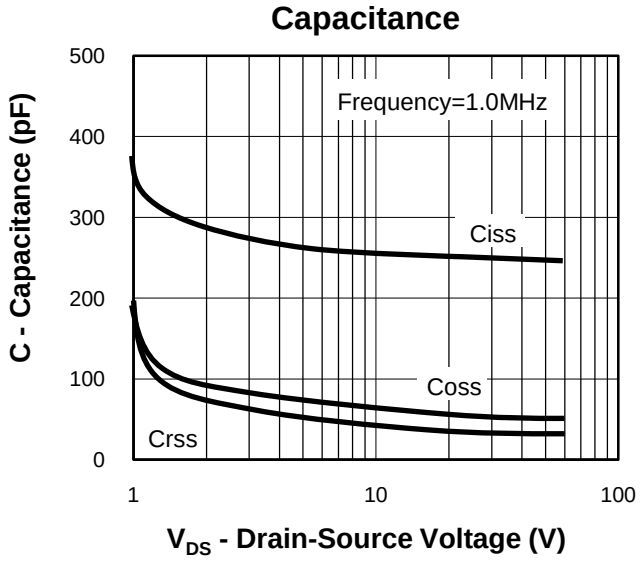
Typical Characteristics

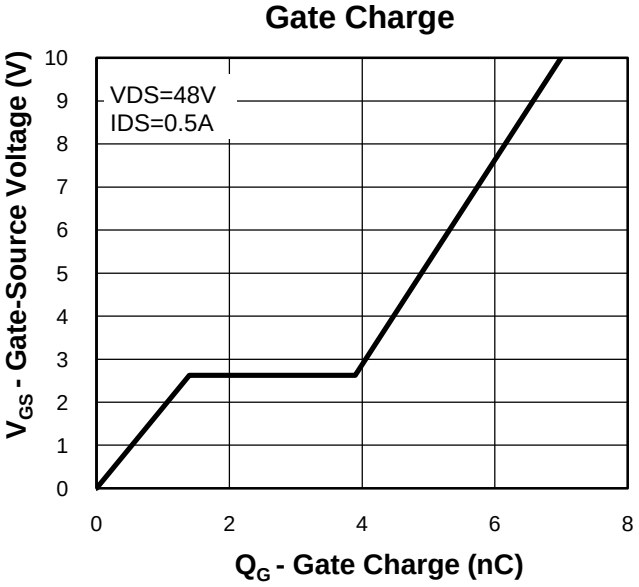




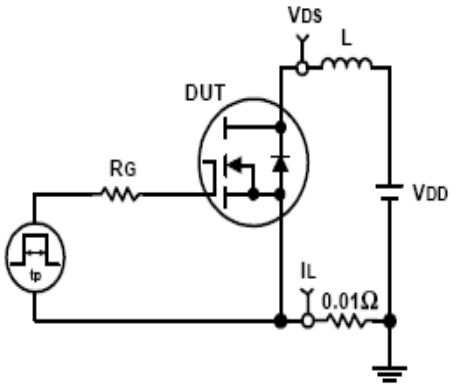


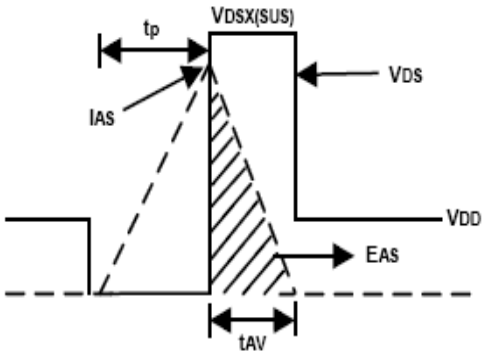




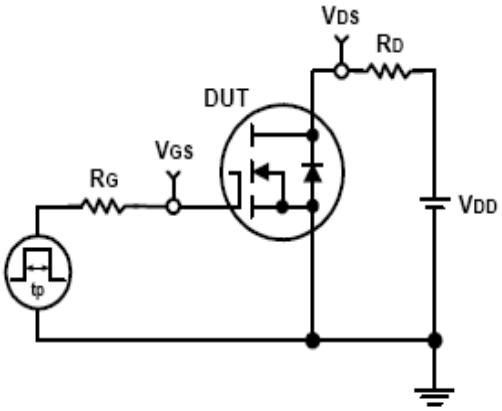


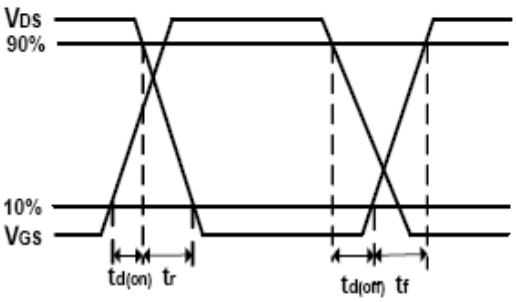
Avalanche Test Circuit and Waveforms





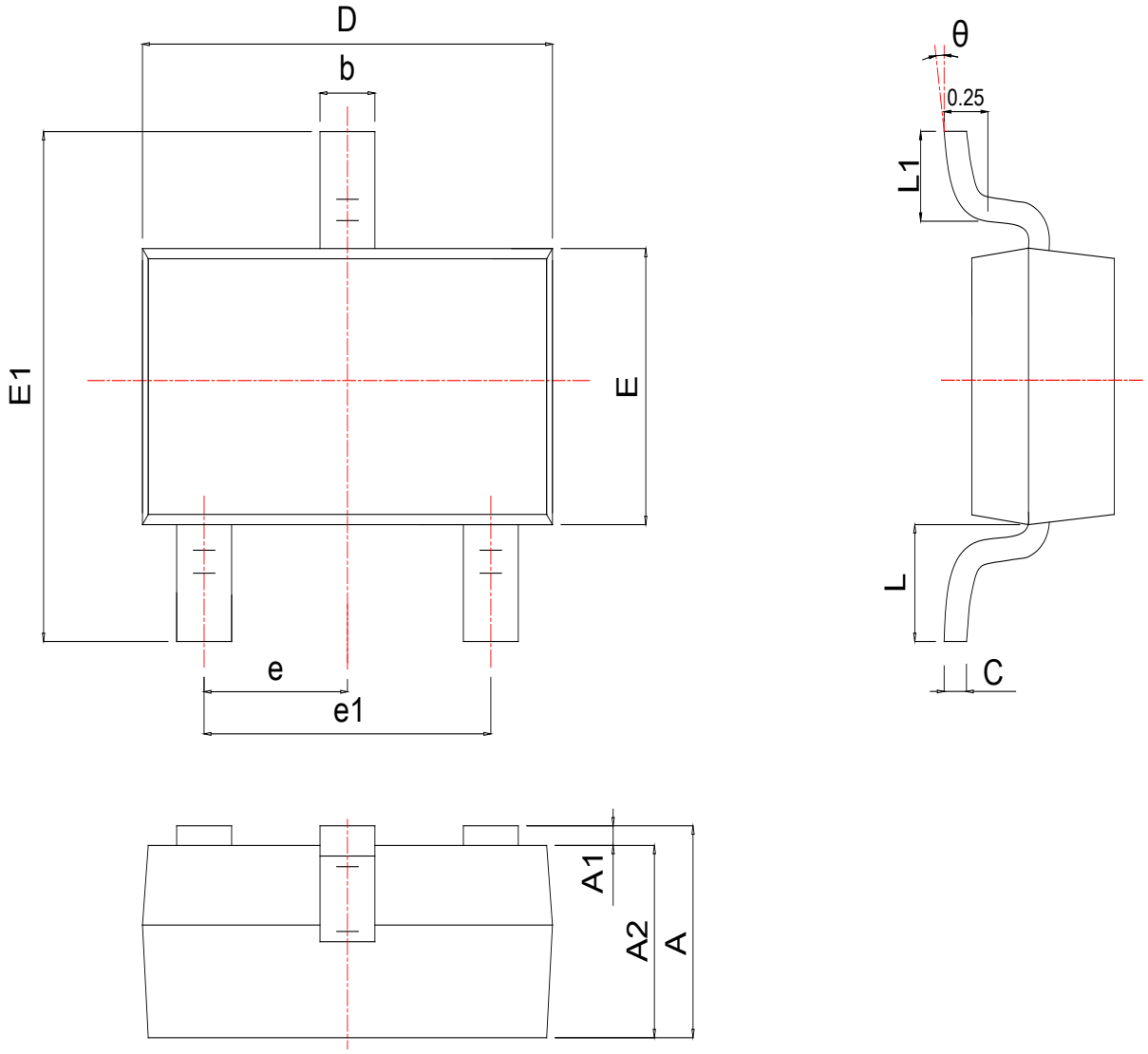
Switching Time Test Circuit and Waveforms





Package Information

SOT23



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.900	1.025	1.150	0.035	0.040	0.045
A1	0.050	0.075	0.100	0.002	0.003	0.004
A2	0.900	0.975	1.020	0.035	0.038	0.040
b	0.300	0.400	0.500	0.012	0.016	0.020
c	0.080	0.115	0.150	0.003	0.005	0.006
D	2.800	2.900	3.000	0.110	0.114	0.118
E	1.200	1.300	1.400	0.047	0.051	0.055
E1	2.250	2.400	2.550	0.089	0.094	0.100
e	0.950 TYP			0.037 TYP		
e1	1.800	1.900	2.000	0.071	0.075	0.079
L	0.540 REF			0.021 REF		
L1	0.400	0.500	0.600	0.016	0.018	0.020
θ	0°	*	8°	0°	*	8°

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