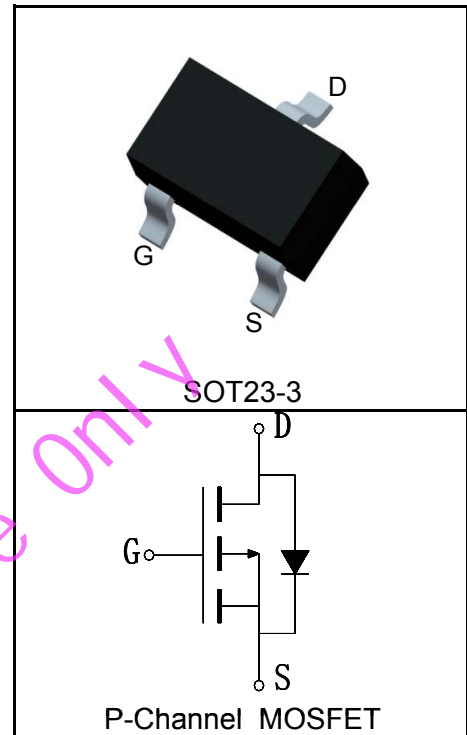


**Features**

- -20V/-5A,  
 $R_{DS(ON)} = 20m\Omega(Typ.)@V_{GS} = -4.5V$   
 $R_{DS(ON)} = 30m\Omega(Typ.)@V_{GS} = -2.5V$
- Low On-Resistance
- Super High Dense Cell Design
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

**Pin Description**



**Applications**

- Load Switch
- Power Management
- Battery Protection

**Absolute Maximum Ratings**

Symbol	Parameter	Rating	Unit
<b>Common Ratings</b> ( $T_A = 25^\circ C$ Unless Otherwise Noted)			
$V_{DSS}$	Drain-Source Voltage	-20	V
$V_{GSS}$	Gate-Source Voltage	$\pm 16$	
$T_J$	Maximum Junction Temperature	150	$^\circ C$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$I_S$	Diode Continuous Forward Current	$T_A = 25^\circ C$ -1	A
<b>Mounted on Large Heat Sink</b>			
$I_{DP}^{①}$	300 $\mu s$ Pulse Drain Current Tested	$T_A = 25^\circ C$ -20	A
$I_D^{②}$	Continuous Drain Current ( $V_{GS} = -4.5V$ )	$T_A = 25^\circ C$ -5	A
		$T_A = 70^\circ C$ -4	
$P_D$	Maximum Power Dissipation	$T_A = 25^\circ C$ 1.3	W
		$T_A = 70^\circ C$ 0.8	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	-	$^\circ C/W$
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	100	$^\circ C/W$
<b>Drain-Source Avalanche Ratings</b>			
$E_{AS}^{④}$	Avalanche Energy, Single Pulsed	-	mJ

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

Symbol	Parameter	Test Condition	RU20P7C			Unit
			Min.	Typ.	Max.	
<b>Static Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=-250\mu A$	-20			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=-20V, V_{GS}=0V$			-1	$\mu A$
		$T_J=125^\circ C$			-30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=-250\mu A$	-0.4	-0.7	-1.1	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 16V, V_{DS}=0V$			$\pm 100$	nA
$R_{DS(ON)}^{(5)}$	Drain-Source On-state Resistance	$V_{GS}=-4.5V, I_{DS}=-5A$		20	28	$m\Omega$
		$V_{GS}=-2.5V, I_{DS}=-4A$		30	38	$m\Omega$
<b>Diode Characteristics</b>						
$V_{SD}^{(5)}$	Diode Forward Voltage	$I_{SD}=-1A, V_{GS}=0V$			-1.2	V
$t_{rr}$	Reverse Recovery Time	$I_{SD}=-5A, dI_{SD}/dt=100A/\mu s$		17		ns
$Q_{rr}$	Reverse Recovery Charge			23		nC
<b>Dynamic Characteristics<sup>(6)</sup></b>						
$R_G$	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$		0.9		$\Omega$
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=-10V,$ Frequency=1.0MHz		640		pF
$C_{oss}$	Output Capacitance			135		
$C_{rss}$	Reverse Transfer Capacitance			65		
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=-10V, R_L=3.8\Omega,$ $I_{DS}=-5A, V_{GEN}=-4.5V,$ $R_G=6\Omega$		9		ns
$t_r$	Turn-on Rise Time			16		
$t_{d(OFF)}$	Turn-off Delay Time			45		
$t_f$	Turn-off Fall Time			21		
<b>Gate Charge Characteristics<sup>(6)</sup></b>						
$Q_g$	Total Gate Charge	$V_{DS}=-16V, V_{GS}=-10V,$ $I_{DS}=-5A$		10		nC
$Q_{gs}$	Gate-Source Charge			2		
$Q_{gd}$	Gate-Drain Charge			3		

- 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  $T_J = 25^\circ\text{C}$ .
  - 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	Marking <sup>①</sup>	Package	Packaging	Quantity	Reel Size	Tape width
RU20P7C	TXYWW	SOT23-3	Tape&Reel	3000	7"	8mm

① The following characters could be different and means:

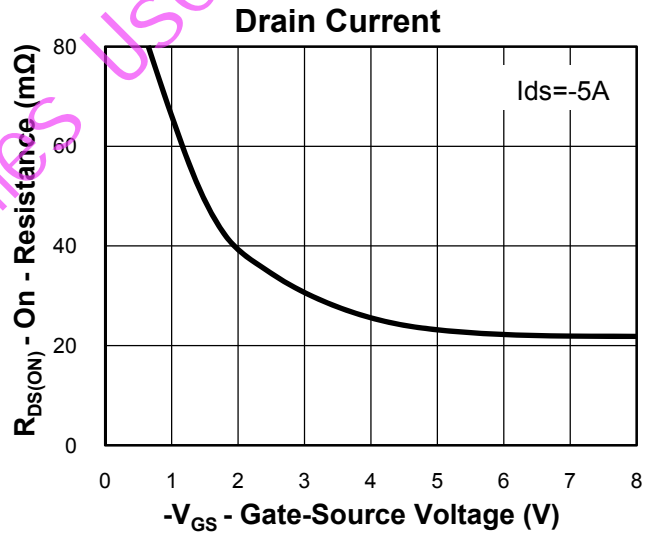
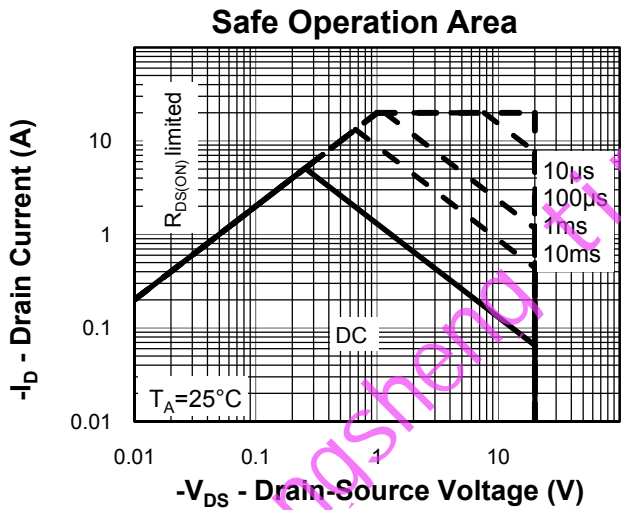
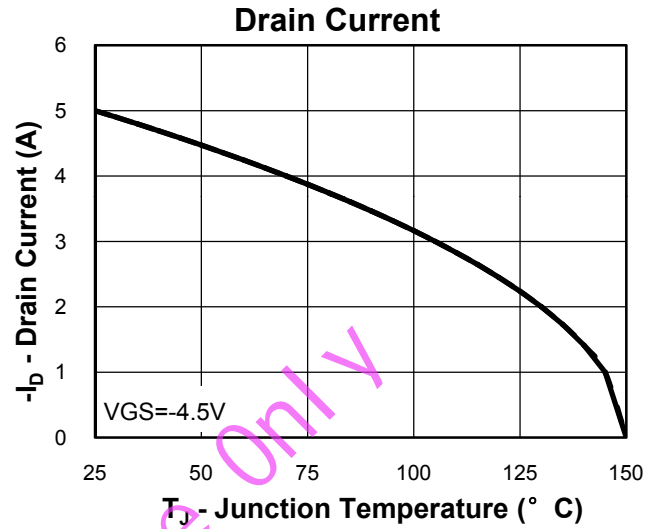
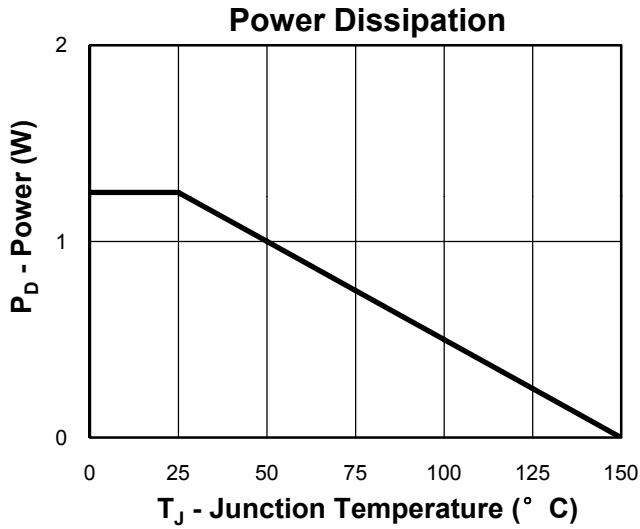
X =Assembly site code

Y =Year

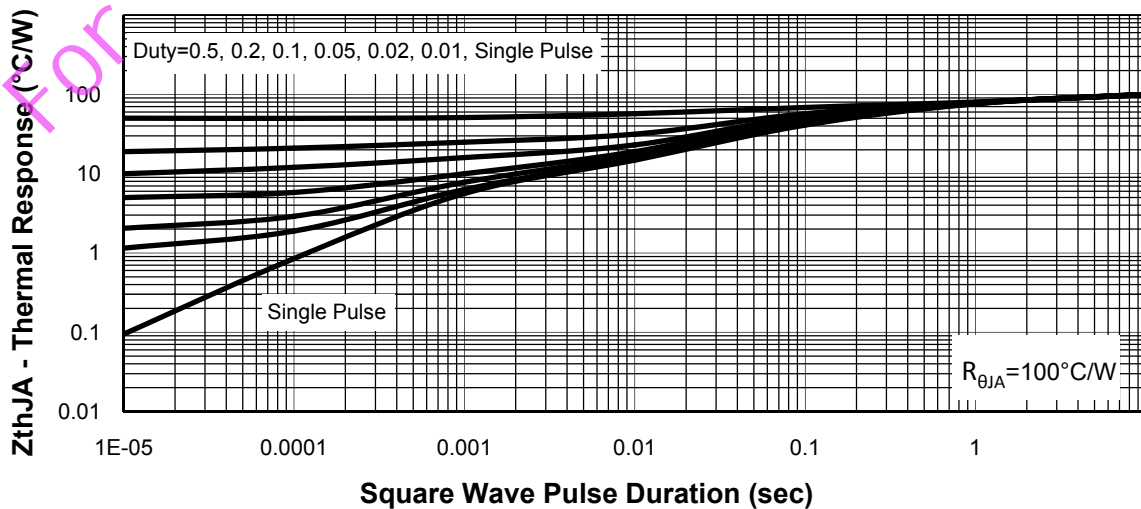
WW =Work Week

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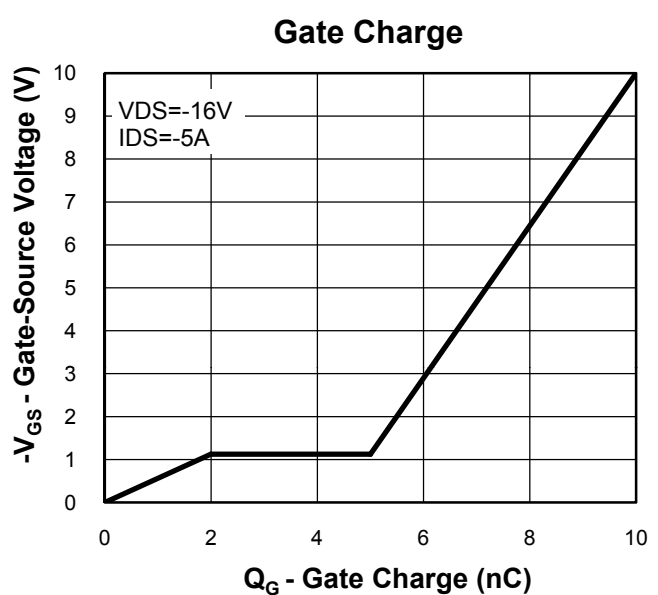
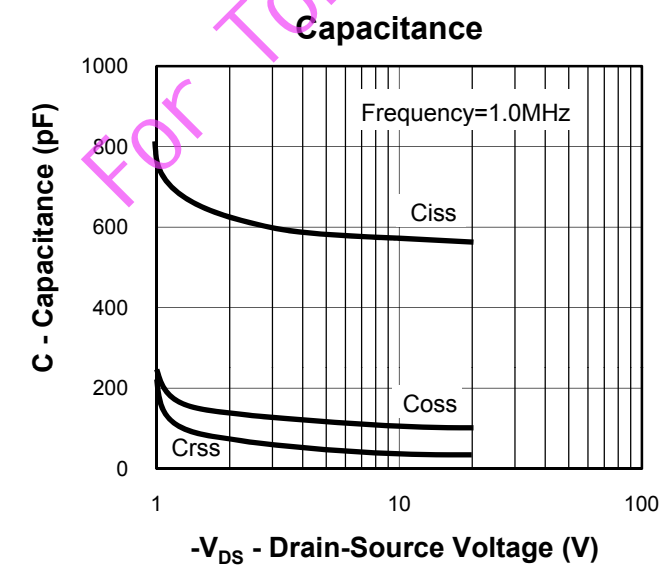
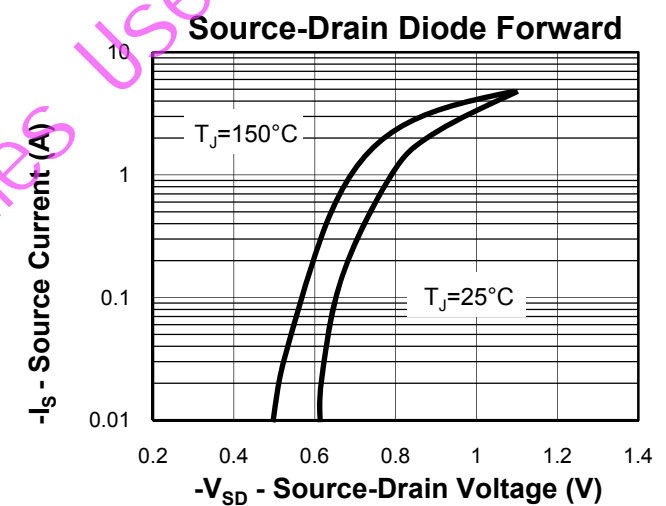
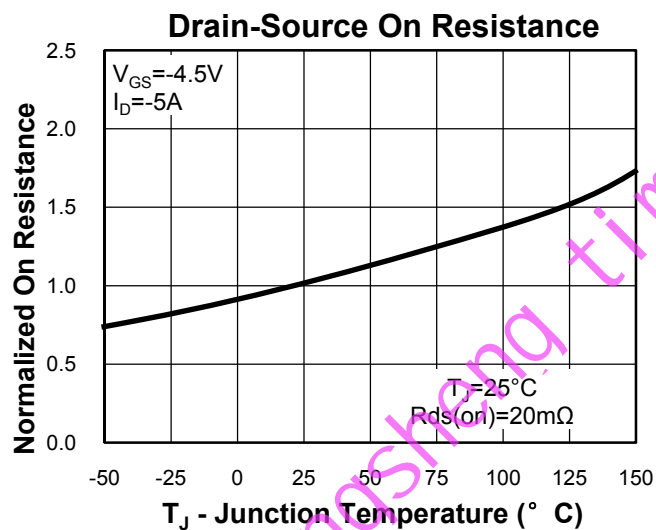
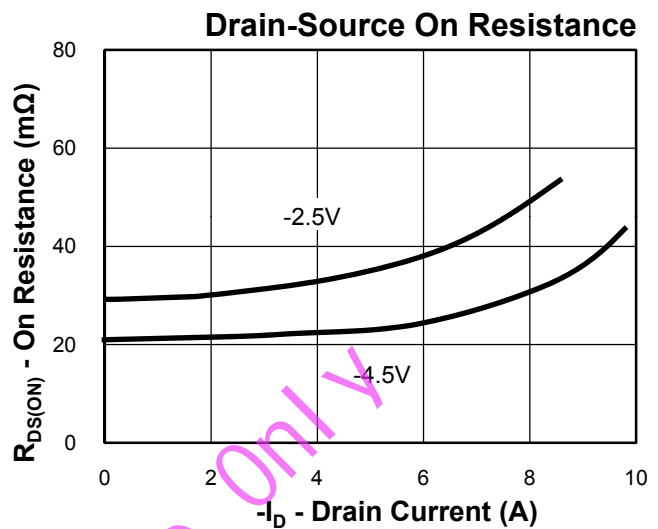
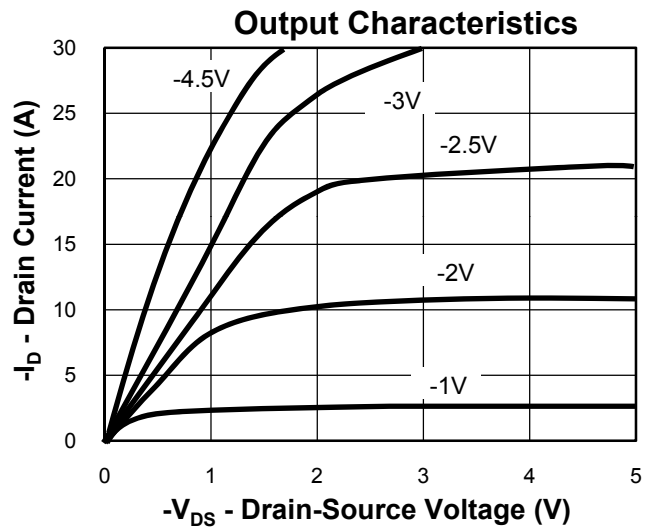
**Typical Characteristics**



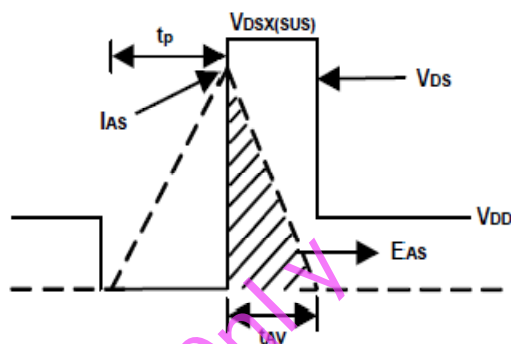
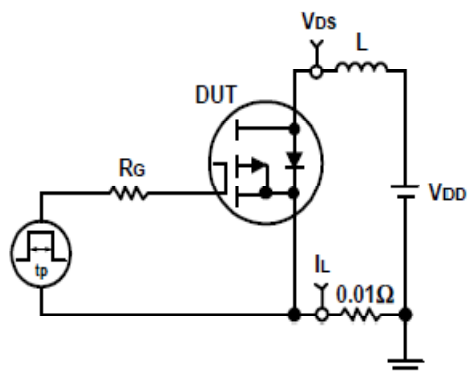
**Thermal Transient Impedance**



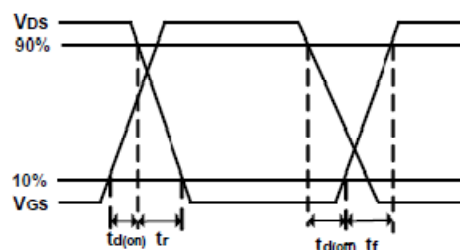
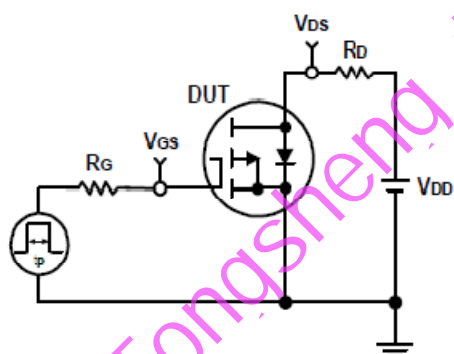
**Typical Characteristics**



### Avalanche Test Circuit and Waveforms

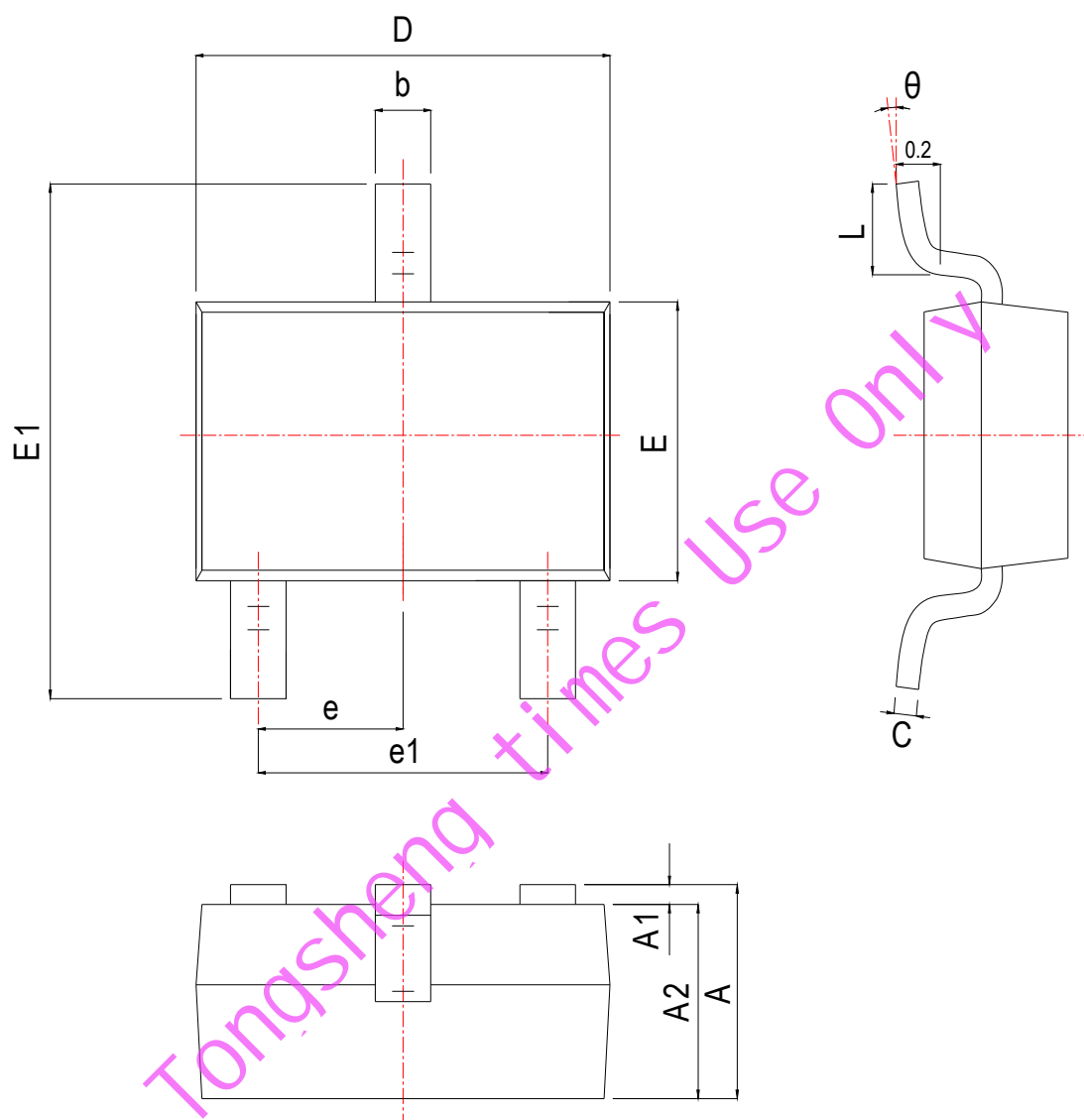


### Switching Time Test Circuit and Waveforms



**Package Information**

**SOT23-3**



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.050	1.150	1.250	0.041	0.045	0.049
A1	0.000	0.050	0.100	0.000	0.002	0.004
A2	1.050	1.100	1.150	0.041	0.043	0.045
b	0.300	0.400	0.500	0.012	0.016	0.020
c	0.100	0.150	0.200	0.004	0.006	0.008
D	2.820	2.920	3.020	0.111	0.115	0.119
E	1.500	1.600	1.700	0.059	0.063	0.067
E1	2.650	2.800	2.950	0.104	0.110	0.116
e	0.950 BSC			0.037 BSC		
e1	1.800	1.900	2.000	0.071	0.075	0.079
L	0.300	0.450	0.600	0.012	0.018	0.024
$\theta$	0°	4°	8°	0°	4°	8°

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