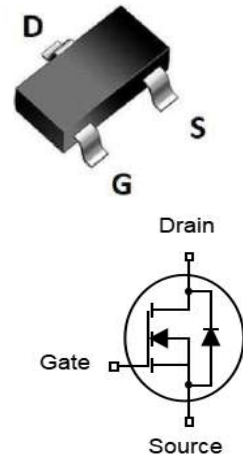


## Features

- N-Channel
- Fast switching
- Very Low On-resistance  $R_{DS(ON)}$
- Low Crss
- Improved dv/dt capability

$V_{DS}$	20	V
$R_{DS(on),TYP@ V_{GS}=4.5V}$	21.5	m $\Omega$
$R_{DS(on),TYP@ V_{GS}=2.5V}$	28.5	m $\Omega$
$I_D$	4	A

**SOT-23**


Part ID	Package Type	Marking	Packing
ZT2302A	SOT-23	2302	3000pcs/Reel

## Absolute Maximum Ratings $T_A = 25^\circ\text{C}$ , unless otherwise specified

Symbol	Parameter	Rating	Unit	
<b>Common Ratings (<math>T_c=25^\circ\text{C}</math> Unless Otherwise Noted)</b>				
$V_{GS}$	Gate-Source Voltage	$\pm 10$	V	
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	20	V	
$T_J$	Maximum Junction Temperature	150	$^\circ\text{C}$	
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$	
$T_L$	Maximum Temperature for Soldering	300	$^\circ\text{C}$	
$I_{DM}$	Drain Current-Continuous@ Current-Pulsed (Note 1)	$T_c = 25^\circ\text{C}$ 12	A	
<b>Mounted on Large Heat Sink</b>				
$I_D$	Drain Current-Continuous	$T_c = 25^\circ\text{C}$	4.0	A
		$T_c = 70^\circ\text{C}$	3.0	A
$P_D$	Maximum Power Dissipation	1.2	W	
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	101	$^\circ\text{C/W}$	

**Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b>Static Electrical Characteristics @ T<sub>J</sub>=25°C (unless otherwise stated)</b>						
V(BR)DSS	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	20	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V	--	--	1	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±10V, V <sub>DS</sub> =0V	--	--	±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.45	--	1.1	V
R <sub>DS(on)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =4.5V, I <sub>D</sub> =4A	--	21.5	30	mΩ
R <sub>DS(on)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =2.5V, I <sub>D</sub> =3A	--	28.5	40	mΩ
<b>Dynamic Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHz	--	306	--	pF
C <sub>oss</sub>	Output Capacitance		--	60	--	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		--	56	--	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =10V, I <sub>D</sub> =4A, V <sub>GS</sub> =5V	--	4.1	--	nC
Q <sub>gs</sub>	Gate-Source Charge		--	0.6	--	nC
Q <sub>gd</sub>	Gate-Drain Charge		--	1.8	--	nC
<b>Switching Characteristics</b>						
T <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =10V, I <sub>D</sub> =4A, R <sub>G</sub> =6Ω, V <sub>GS</sub> =5V	--	5	--	ns
T <sub>r</sub>	Turn-on Rise Time		--	35	--	ns
T <sub>d(off)</sub>	Turn-Off Delay Time		--	14.5	--	ns
T <sub>f</sub>	Turn-Off Fall Time		--	5.6	--	ns
<b>Source- Drain Diode Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
I <sub>SD</sub>	Source-Drain Current (Body Diode)		--	--	4	A
V <sub>SD</sub>	Forward on voltage	I <sub>S</sub> =4A, V <sub>GS</sub> =0V	--	--	1.2	V

**Notes:**

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. Device mounted on FR-4 PCB, 1inch x 0.85inch x 0.062 inch
3. Pulse Test: Pulse Width≤300μs, Duty Cycles≤0.5%

### N- Channel Typical Characteristics

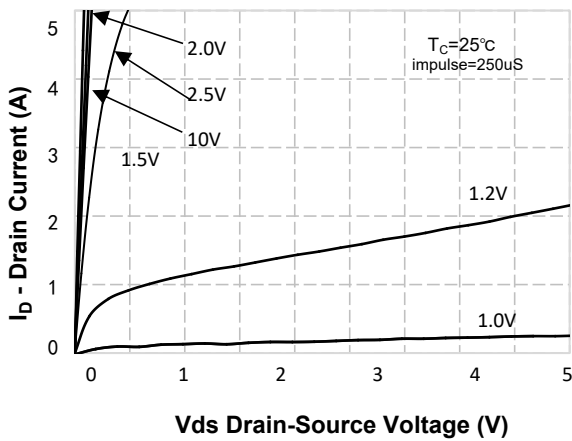


Figure 1. On-Region Characteristics

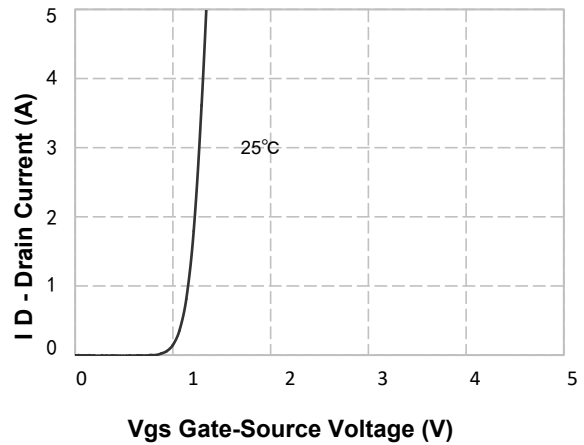


Figure 2. Transfer Characteristics

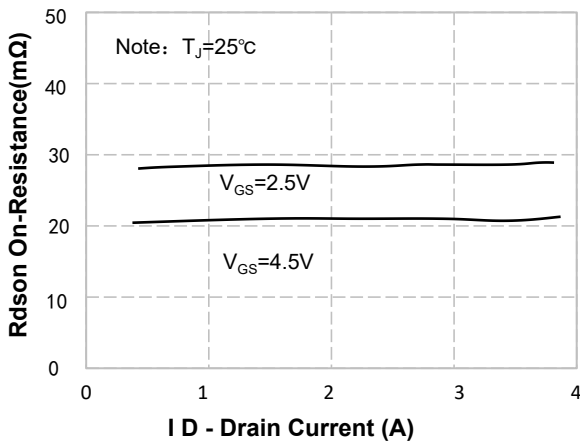


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

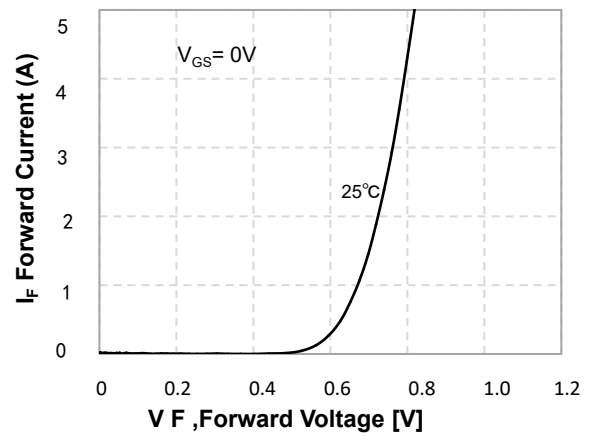


Figure 4. Body Diode Forward Voltage Variation with Source Current

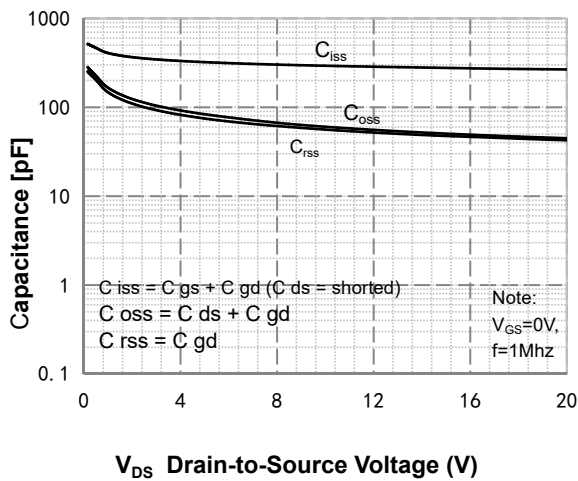


Figure 5. Capacitance Characteristics

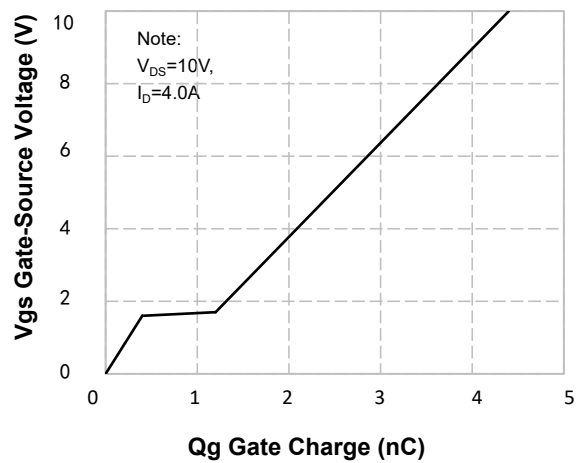


Figure 6. Gate Charge Characteristics

N- Channel Typical Characteristics (Continued)

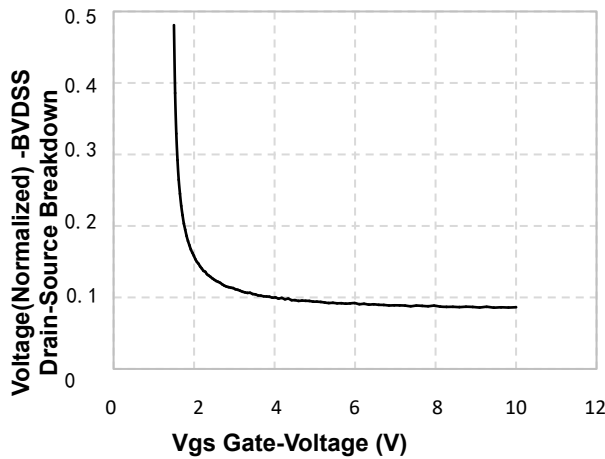


Figure 7. Breakdown Voltage Variation vs Gate-Voltage

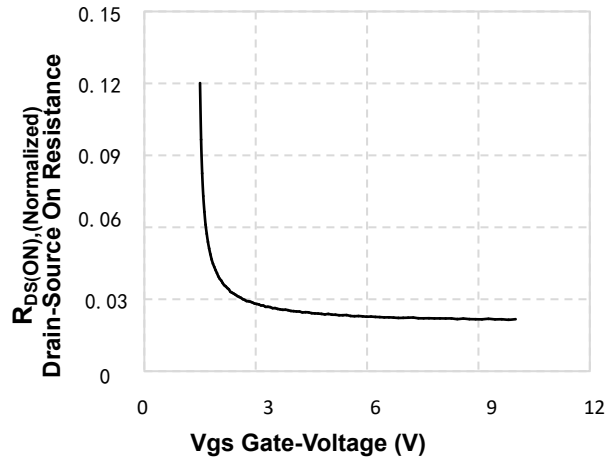


Figure 8. On-Resistance Variation vs Gate Voltage

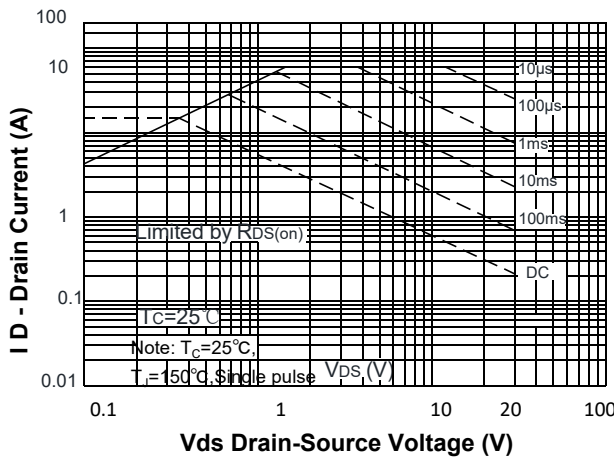


Figure 9. Maximum Safe Operating Area

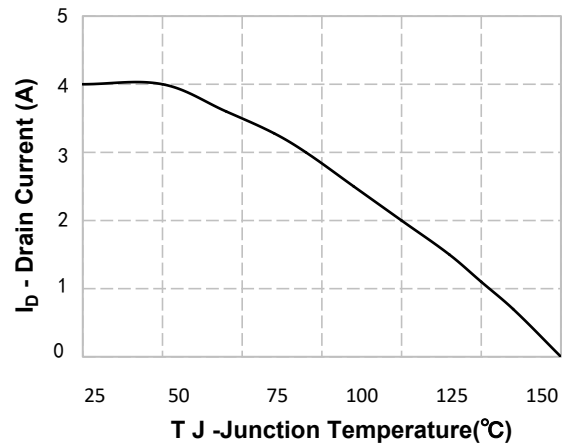


Figure 10. Maximum Continuous Drain Current vs Temperature

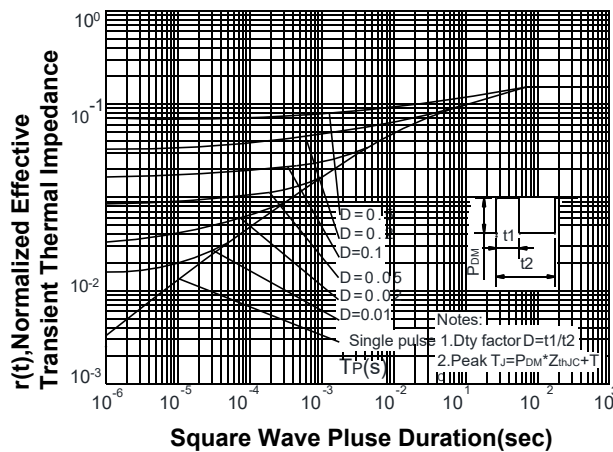
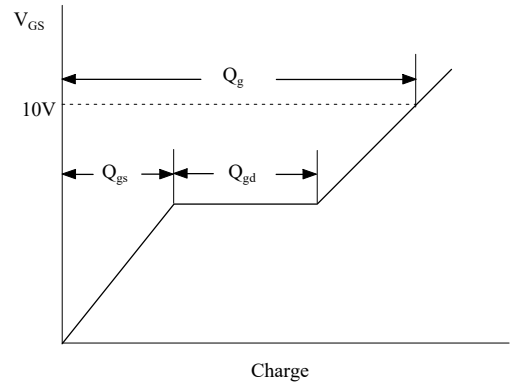
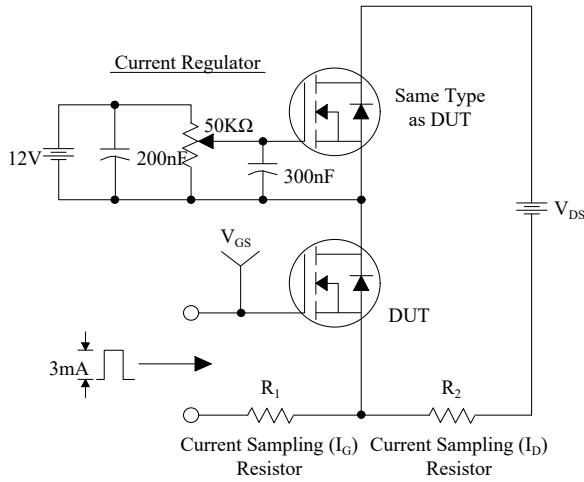
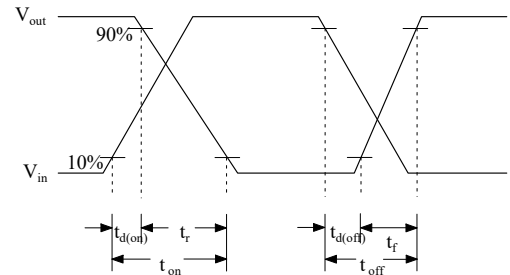
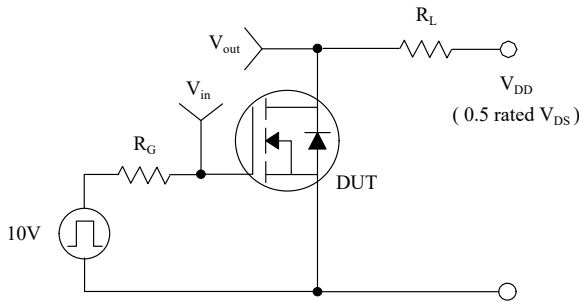


Figure 11. Transient Thermal Response Curve

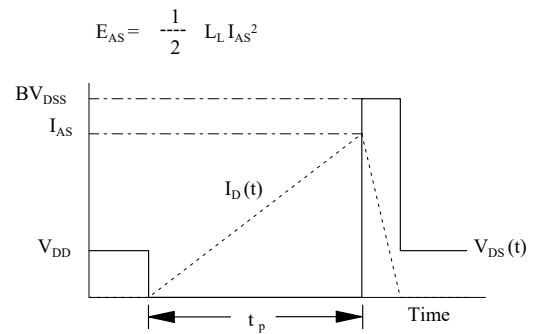
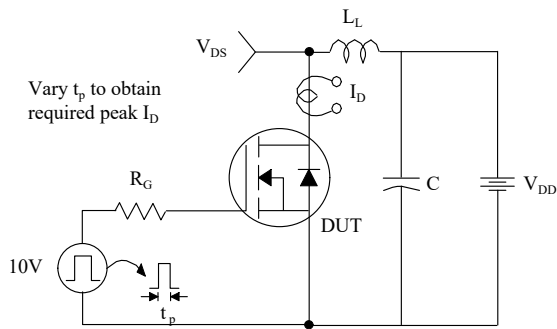
### Gate Charge Test Circuit & Waveform



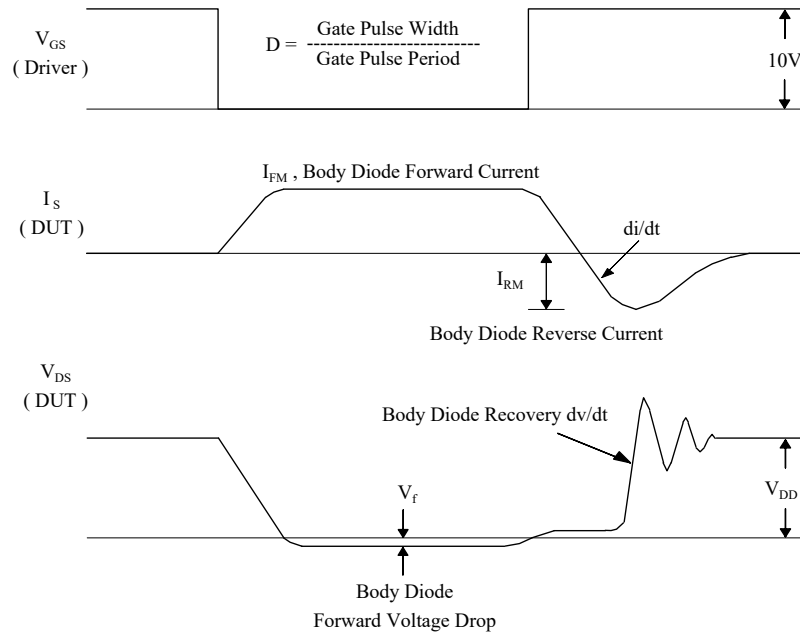
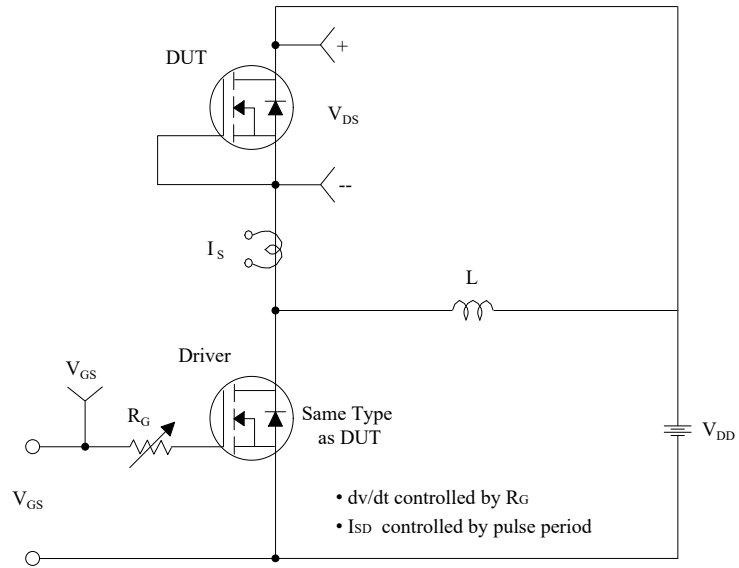
### Resistive Switching Test Circuit & Waveforms



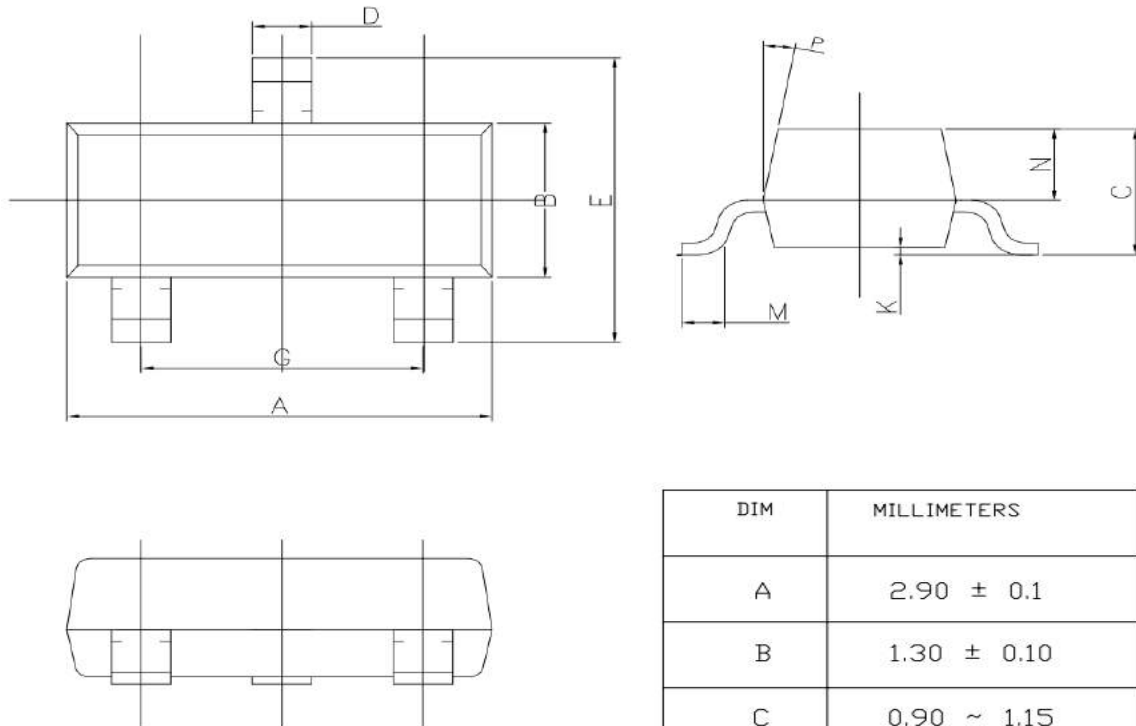
### Unclamped Inductive Switching Test Circuit & Waveforms



### Peak Diode Recovery dv/dt Test Circuit & Waveforms



## SOT-23 Package Information



DIM	MILLIMETERS
A	2.90 ± 0.1
B	1.30 ± 0.10
C	0.90 ~ 1.15
D	0.40 ± 0.1
E	2.40 ± 0.15
G	1.90 ± 0.10
K	0.00~0.10
M	0.30MIN
N	0.60 ± 0.10
P	10°TYP

## Customer Service

### Sales and Service:

[zj@ztasemi.com](mailto:zj@ztasemi.com)