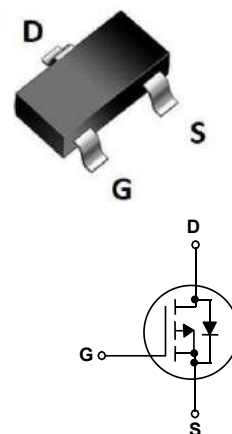


Features

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

V_{DS}	-20	V
$R_{DS(on),TYP@ V_{GS}=-4.5 V}$	128	m Ω
$R_{DS(on),TYP@ V_{GS}=-2.5 V}$	164	m Ω
I_D	-1.5	A

SOT-23


Part ID	Package Type	Marking	Packing
ZT2301	SOT-23	2301	3000pcs/Reel

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

Symbol	Parameter	Rating	Unit	
Common Ratings ($T_c=25^\circ\text{C}$ Unless Otherwise Noted)				
V_{GS}	Gate-Source Voltage	± 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 lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	$^\circ\text{C}$	
I_{DM}	Drain Current-Continuous@ Current-Pulsed (Note 1)	$T_c = 25^\circ\text{C}$ -6	A	
Mounted on Large Heat Sink				
I_D	Drain Current-Continuous	$T_c = 25^\circ\text{C}$	-1.5	A
		$T_c = 100^\circ\text{C}$	-1	A
P_D	Maximum Power Dissipation	$T_c = 25^\circ\text{C}$	1	W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient		125	$^\circ\text{C/W}$

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ T_J=25°C (unless otherwise stated)						
V(BR)DSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250μA	-20	--	--	V
IDSS	Zero Gate Voltage Drain Current	V _{DS} =-20V, V _{GS} =0V	--	--	-1	μA
IGSS	Gate-Body Leakage Current	V _{GS} =±10V, V _{DS} =0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-0.4	-0.8	-1.0	V
RDS(on)	Drain-Source On-State Resistance	V _{GS} =-4.5V, I _D =-1.5A	--	128	150	mΩ
RDS(on)	Drain-Source On-State Resistance	V _{GS} =-2.5V, I _D =-1A	--	164	220	mΩ
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated) (Note 2)						
Ciss	Input Capacitance	V _{DS} =-10V, V _{GS} =0V, f=1MHz	--	209	--	pF
Coss	Output Capacitance		--	21	--	pF
Crss	Reverse Transfer Capacitance		--	20	--	pF
Qg	Total Gate Charge	V _{DS} =-6V, I _D =-1.5A, V _{GS} =-4.5V	--	3	--	nC
Qgs	Gate-Source Charge		--	0.4	--	nC
Qgd	Gate-Drain Charge		--	0.7	--	nC
Switching Characteristics (Note 2)						
Td(on)	Turn-on Delay Time	V _{DS} =-6V, R _L =5Ω, R _G =3Ω, V _{GS} =-4.5V	--	9	--	ns
Tr	Turn-on Rise Time		--	5	--	ns
Td(off)	Turn-Off Delay Time		--	19	--	ns
Tf	Turn-Off Fall Time		--	7.5	--	ns
Source- Drain Diode Characteristics @ T_J = 25°C (unless otherwise stated)						
ISD	Source-Drain Current (Body Diode)		--	--	-1.5	A
ISM	Maximum Pulsed Drain-Source Diode Forward Current		--	--	-6	A
VSD	Forward on voltage	I _S =-3.0A, V _{GS} =0V	--	--	-1.2	V

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

P- Channel Typical Characteristics

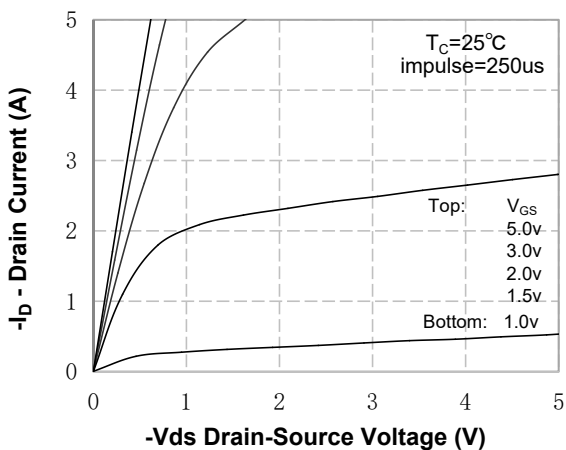


Figure 1. On-Region Characteristics

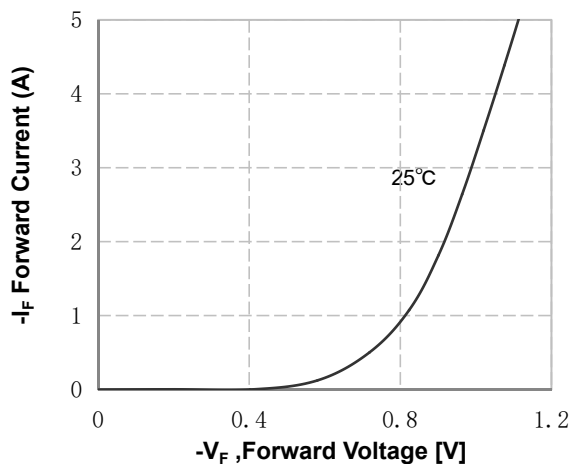


Figure 4. Body Diode Forward Voltage Variation with Source Current

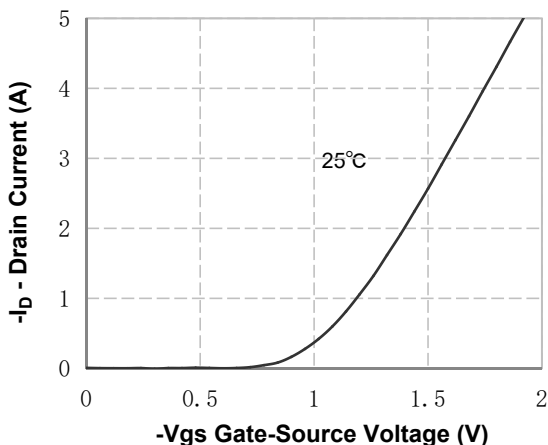


Figure 2. Transfer Characteristics

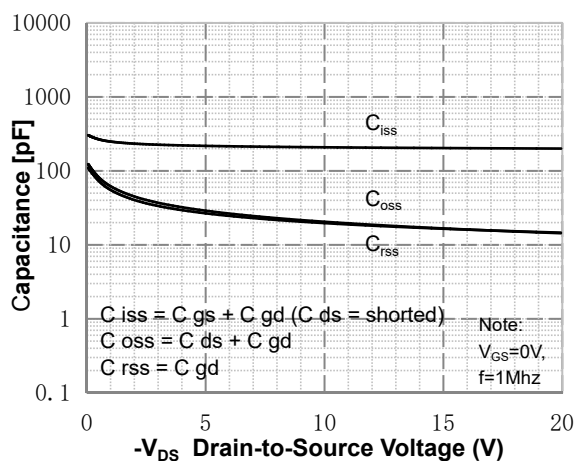


Figure 5. Capacitance Characteristics

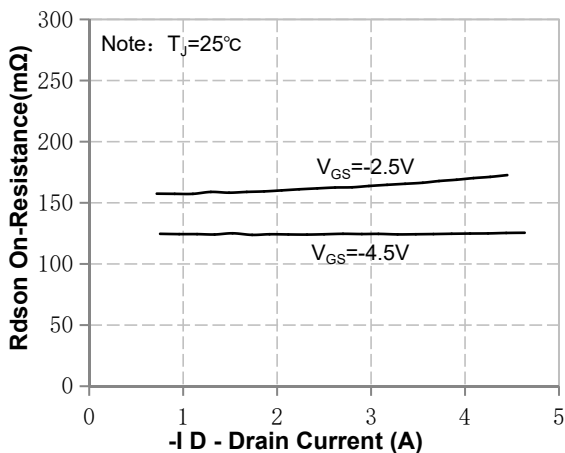


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

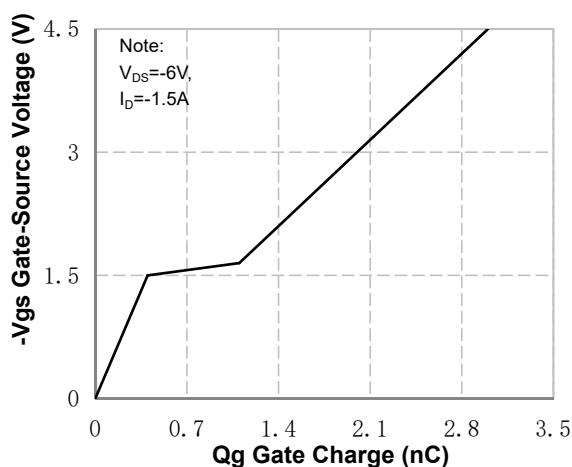


Figure 6. Gate Charge Characteristics

P- Channel Typical Characteristics (Continued)

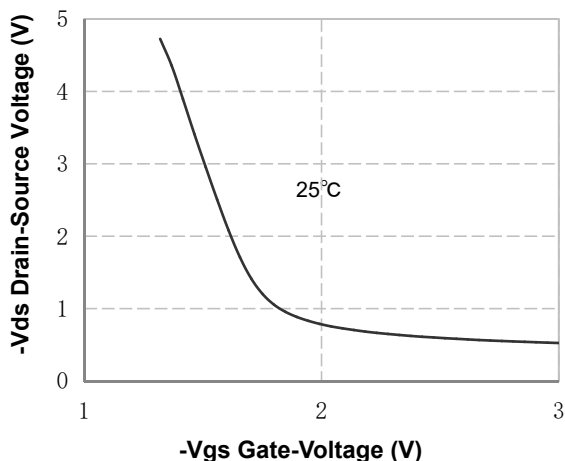


Figure 7. Vds Drain-Source Voltage vs Gate Voltage

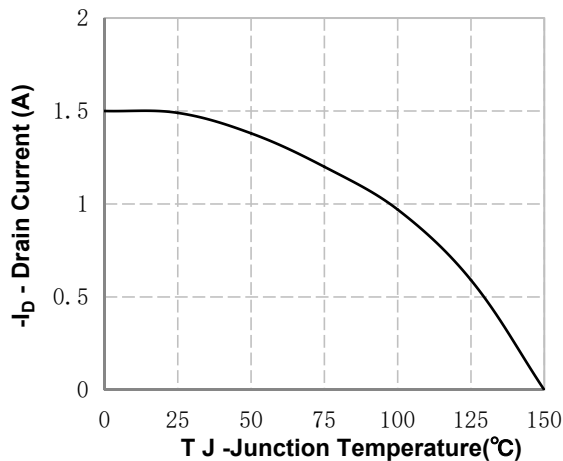


Figure 9 . Maximum Continuous Drain Current vs Temperature

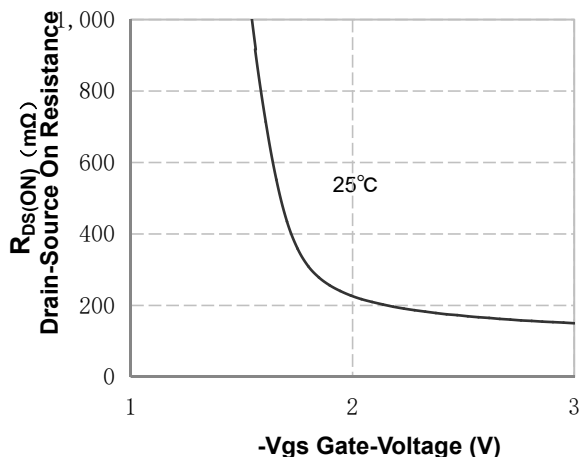


Figure 8. On-Resistance vs Gate Voltage

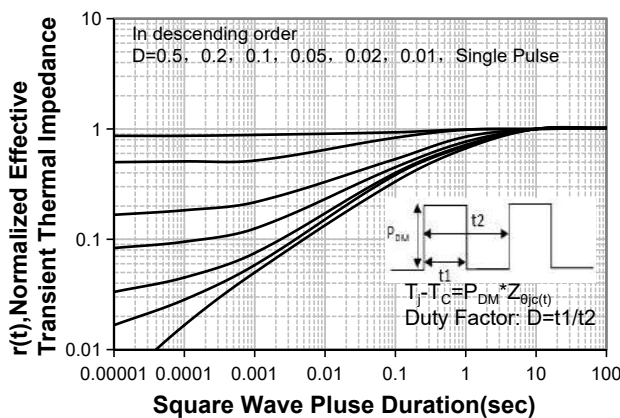


Figure 10. Transient Thermal Response Curve

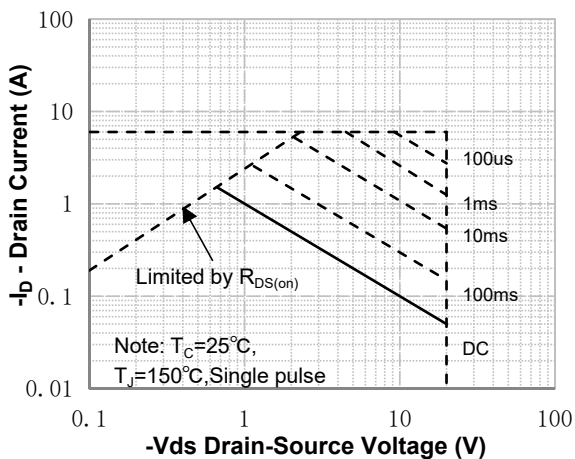
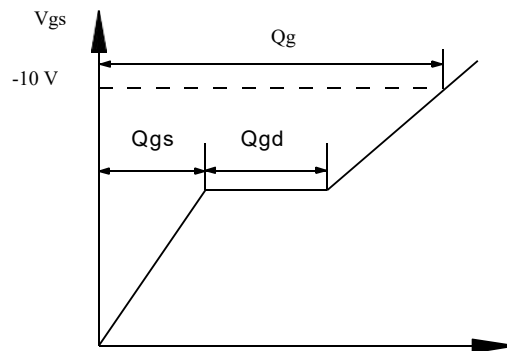
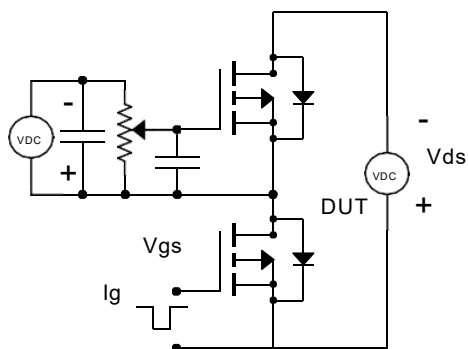
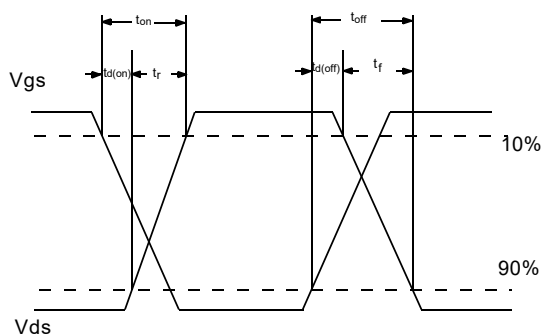
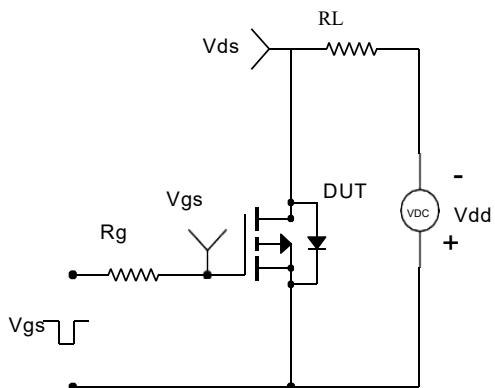


Figure 11. Maximum Safe Operating Area

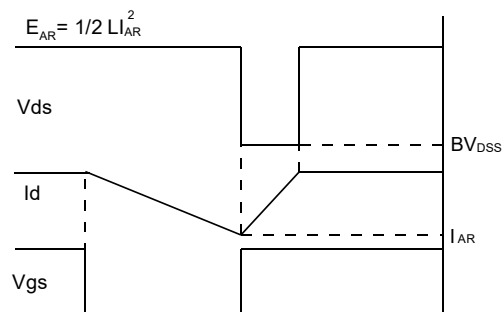
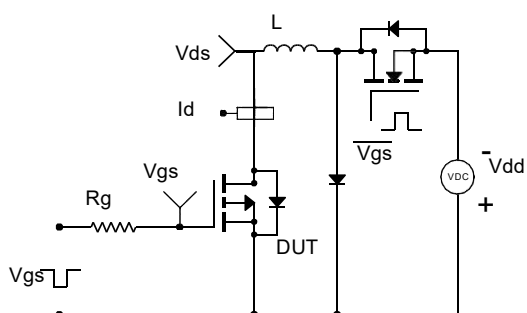
Gate Charge Test Circuit & Waveform



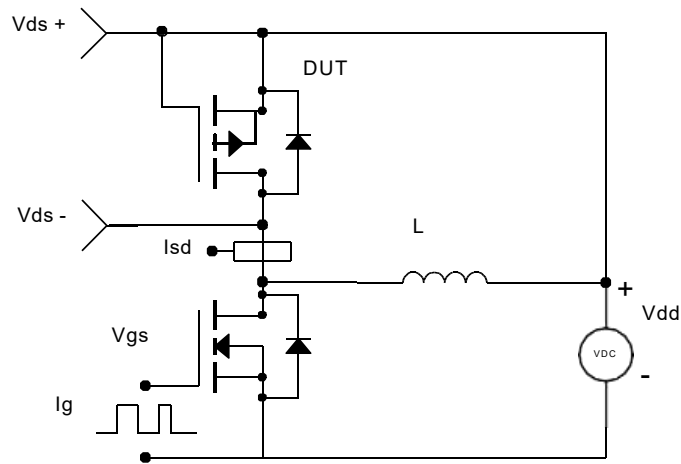
Resistive Switching Test Circuit & Waveforms



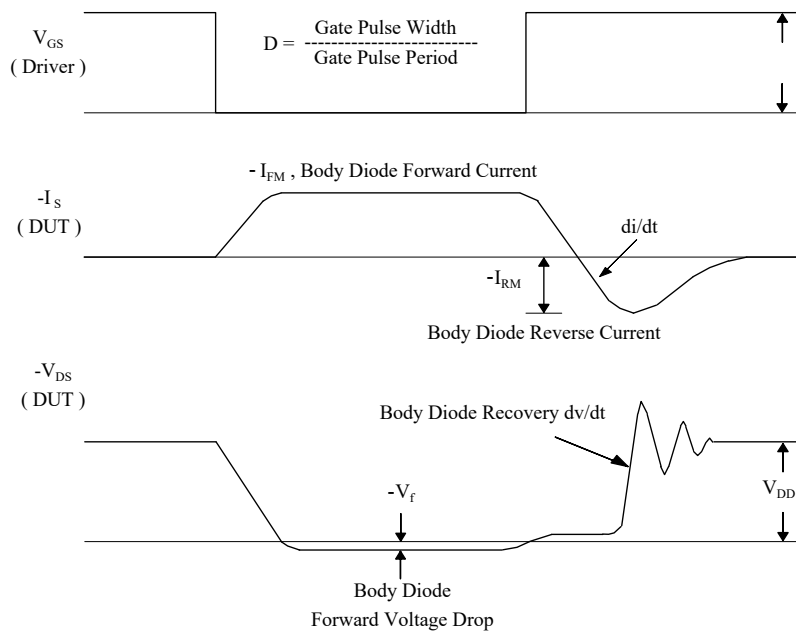
Unclamped Inductive Switching Test Circuit & Waveforms



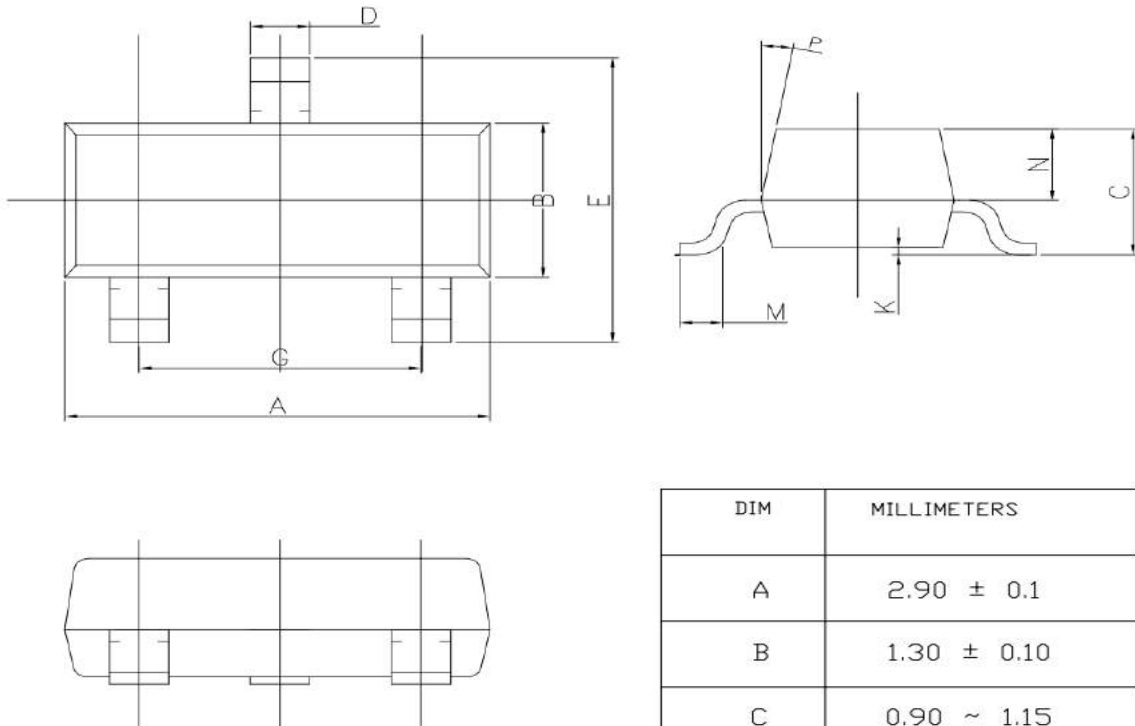
Peak Diode Recovery dv/dt Test Circuit & Waveforms



- dv/dt controlled by R_G
- I_{SD} controlled by pulse period



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:

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