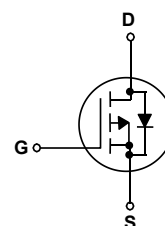
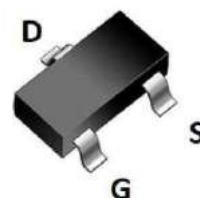


## Features

- P-Channel
- Low Gate Charge
- High Power and current handing capability
- Lead free product is acquired

$V_{DS}$	-12	V
$R_{DS(on),TYP@ V_{GS}=-4.5 V}$	13	m $\Omega$
$R_{DS(on),TYP@ V_{GS}=-2.5 V}$	19	m $\Omega$
$I_D$	-8	A

**SOT-23-3L**


Part ID	Package Type	Marking	Packing
ZT1209	SOT-23-3L	1209	3000pcs/Reel

Symbol	Parameter	Rating	Unit	
<b>Common Ratings (T<sub>c</sub>=25°C Unless Otherwise Noted)</b>				
$V_{GS}$	Gate-Source Voltage	±12	V	
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	-12	V	
$T_J$	Maximum Junction Temperature	150	°C	
$T_{STG}$	Storage Temperature Range	-55 to 150	°C	
$I_{DM}$	Drain Current-Continuous@ Current-Pulsed (Note 1)	$T_C=25^\circ C$ -32	A	
<b>Mounted on Large Heat Sink</b>				
$I_D$	Drain Current-Continuous	$T_C=25^\circ C$	-8	A
		$T_C=100^\circ C$	-5	A
$P_D$	Maximum Power Dissipation	$T_C=25^\circ C$	3	W
		$T_C=100^\circ C$	1.25	W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	40	°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	-12	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =-12V, 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	-0.5	-0.7	-1.0	V
R <sub>DS(on)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-5A	--	13	17	mΩ
R <sub>DS(on)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-4A	--	19	26	mΩ
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =-5V, I <sub>D</sub> =-5A	--	14	--	S
<b>Dynamic Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated) (Note 2)</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-10V, V <sub>GS</sub> =0V, f=1MHz	--	1448	--	pF
C <sub>oss</sub>	Output Capacitance		--	322	--	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		--	282	--	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =-10V, I <sub>D</sub> =-5A, V <sub>GS</sub> =-4.5V	--	16	--	nC
Q <sub>gs</sub>	Gate-Source Charge		--	3.4	--	nC
Q <sub>gd</sub>	Gate-Drain Charge		--	4.1	--	nC
<b>Switching Characteristics</b>						
T <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =-10V, R <sub>L</sub> =2Ω, R <sub>G</sub> =3Ω, V <sub>GS</sub> =-4.5V	--	16	--	ns
T <sub>r</sub>	Turn-on Rise Time		--	64	--	ns
T <sub>d(off)</sub>	Turn-Off Delay Time		--	71	--	ns
T <sub>f</sub>	Turn-Off Fall Time		--	62	--	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)		--	--	-8	A
V <sub>SD</sub>	Forward on voltage (Note 1)	I <sub>S</sub> =-5.0A, V <sub>GS</sub> =0V	--	--	-1.2	V

**Notes:**

1.Repetitive Rating: Pulse width limited by maximum junction temperature.

### Typical Electrical And Thermal Characteristics (Curves)

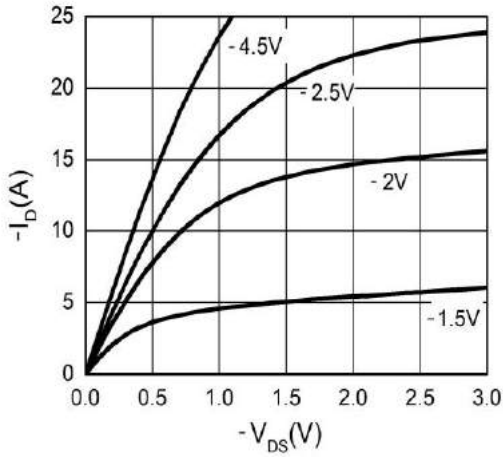


Figure 1. Output Characteristics

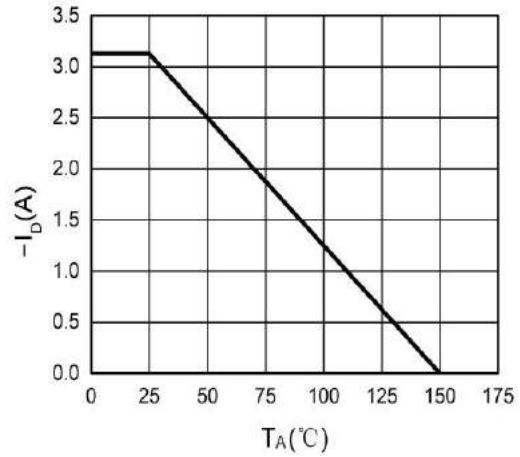


Figure 4. Power Dissipation

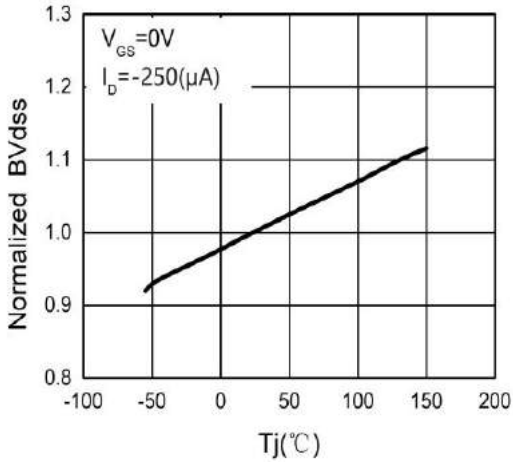


Figure 2.  $BV_{DS}$  vs Junction Temperature

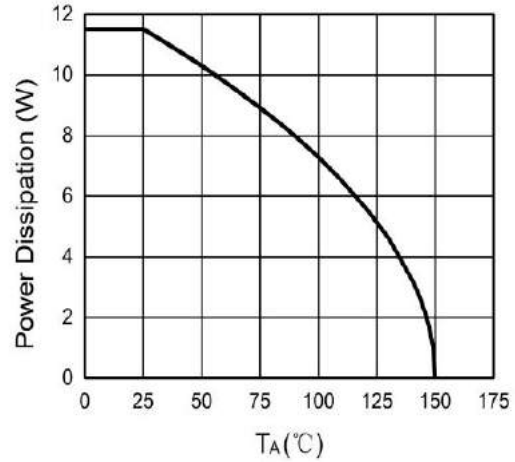


Figure 5. Drain Current

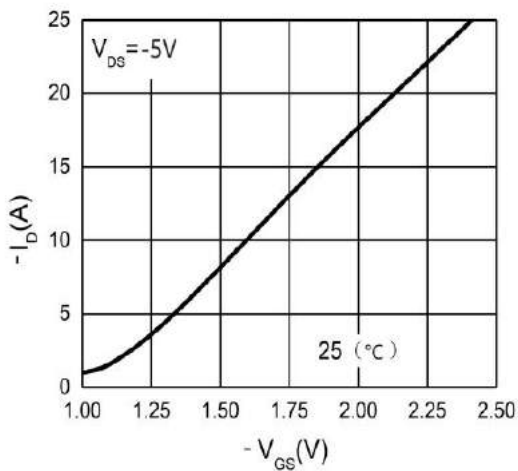


Figure 3. Transfer Characteristics

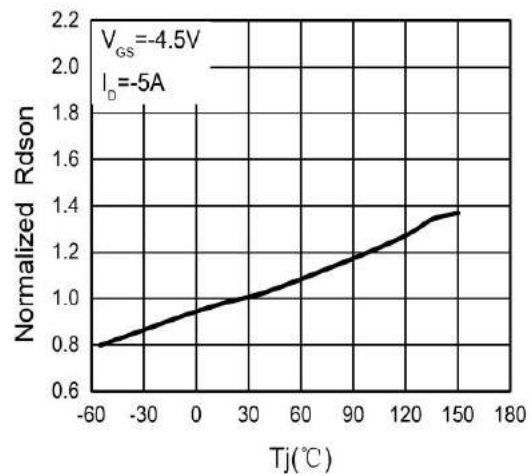


Figure 6.  $R_{DS(on)}$  vs Junction Temperature

### Typical Electrical And Thermal Characteristics (Curves)

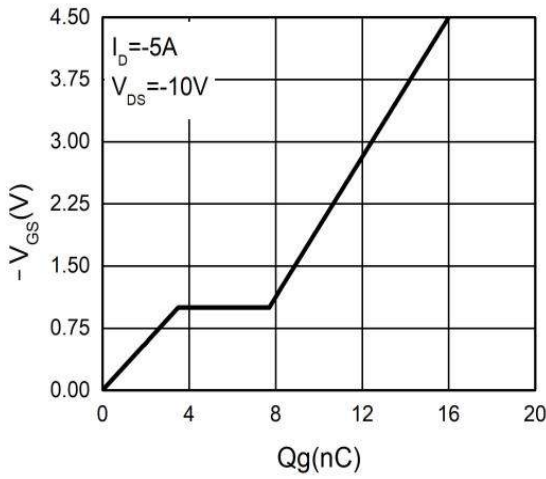


Figure 7. Gate Charge Waveforms

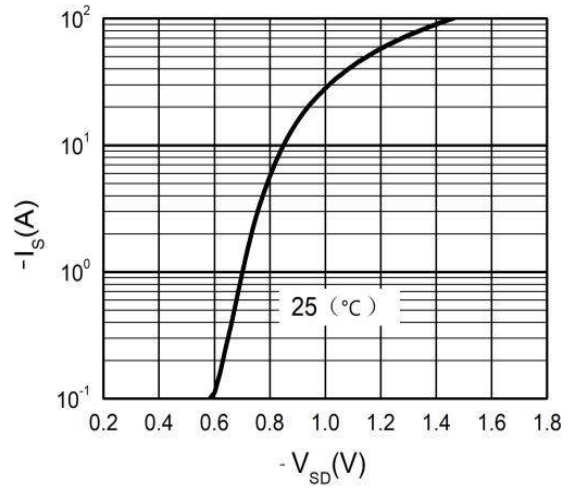


Figure 9. Body-Diode Characteristics

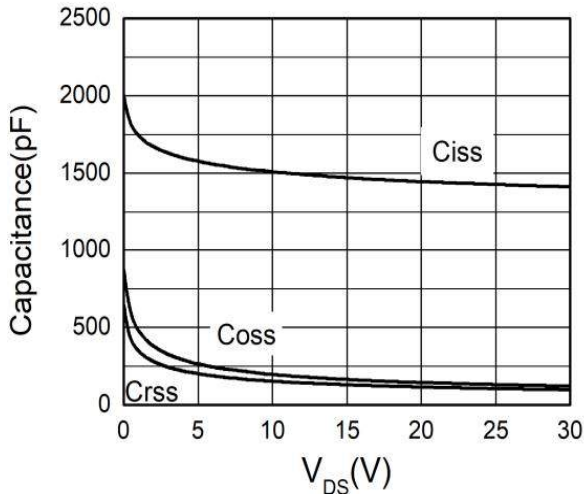


Figure 8. Capacitance

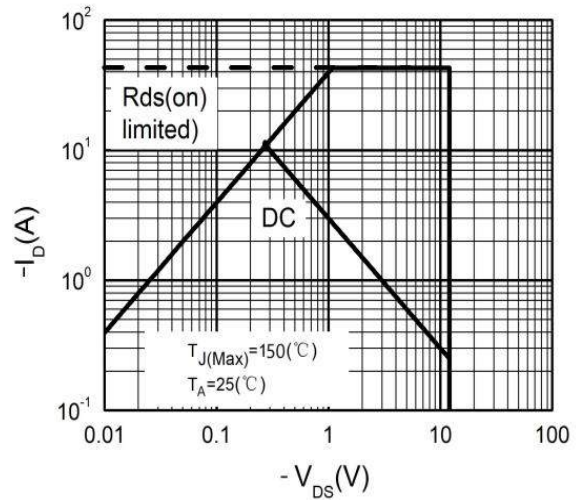
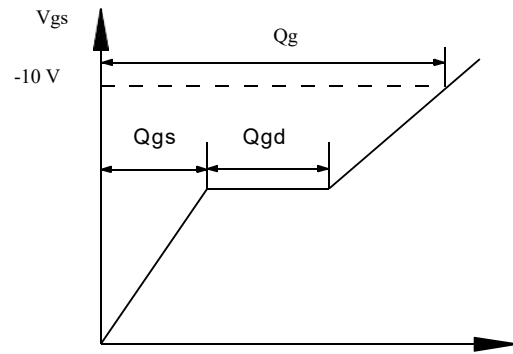
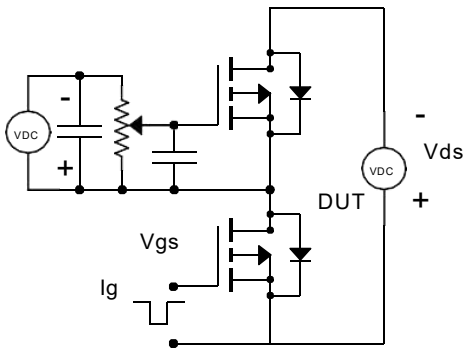
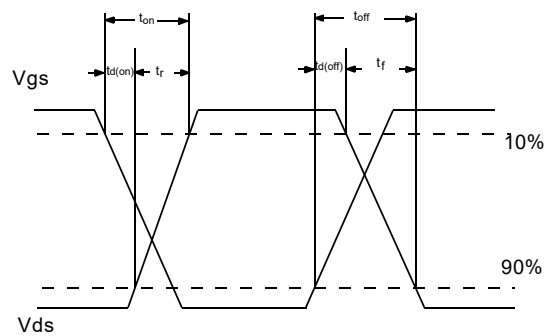
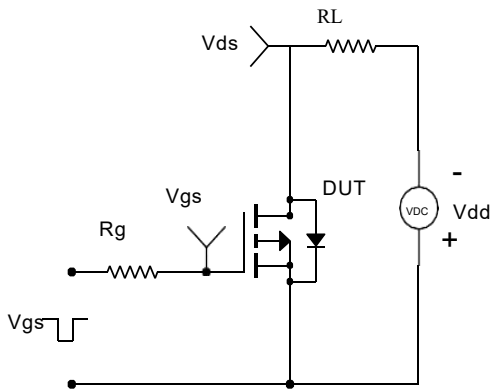


Figure 10. Maximum Safe Operating Area

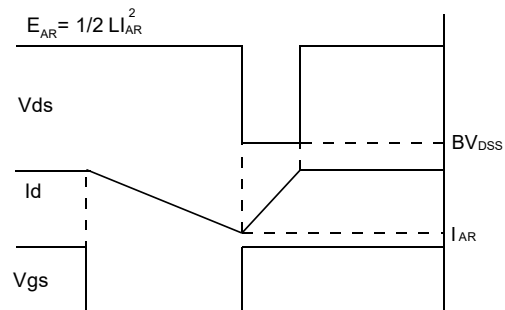
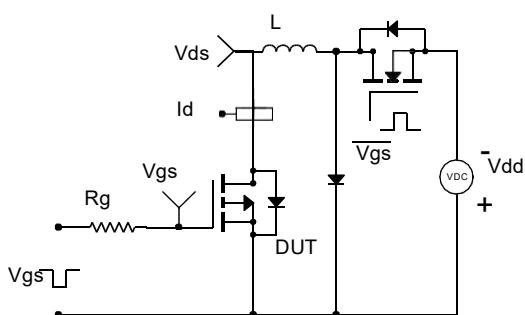
### Gate Charge Test Circuit & Waveform



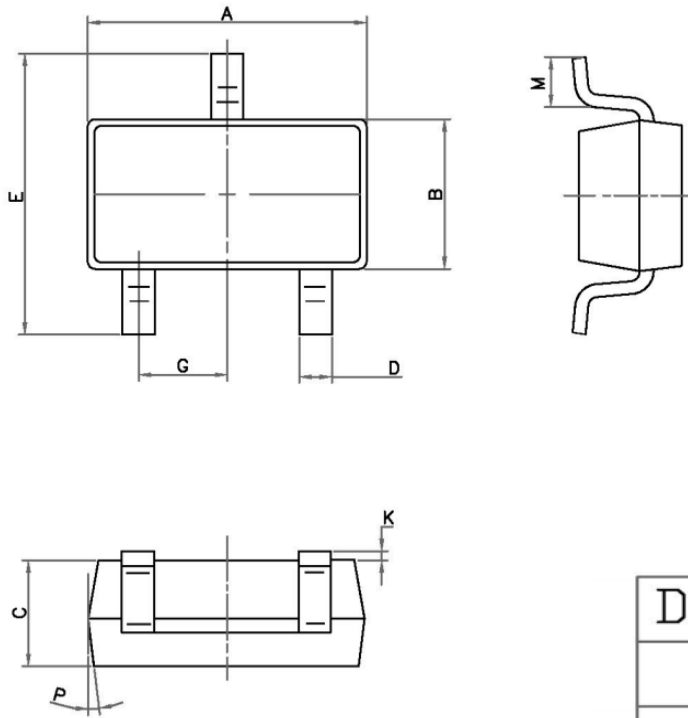
### Resistive Switching Test Circuit & Waveforms



### Unclamped Inductive Switching Test Circuit & Waveforms



## SOT-23-3L Package Information



DIM	MILLIMETERS
A	2.82~3.02
B	1.60 ± 0.10
C	1.10 ± 0.05
D	0.40 ± 0.10
E	2.65~2.95
G	0.95typ
K	0.00~0.10
M	0.20MIN
P	9 ± 2°

## Customer Service

**Sales and Service:**

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