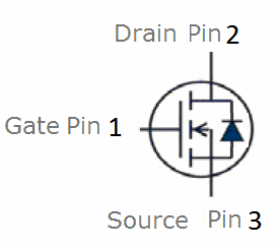
Features

- N-Channel,5V Logic Level Control
- Enhancement mode
- Low on-resistance @ V_{GS}=4.5 V
- Fast Switching
- Pb-free lead plating; RoHS compliant

V_{DS}	100	V
$R_{DS(on),typ@VGS=10V}$	70	mΩ
$R_{DS(on),typ@VGS=4.5V}$	75	mΩ
I_D	5	A

SOT223

Pb-Free RoHS HF Halogen-Free



Part ID	Package Type	Marking	Tape and reel information
VSZ090N10MS	SOT223	090N10M	3000pcs/reel

Maximum ratings, at T_j=25 °C, unless otherwise specified

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage		100	V
V_{GS}	Gate-Source voltage		±20	V
I_D	Continuous drain current@V_{GS}=10V	T_C=25°C	5	A
		T_A=70°C	3.2	A
I_{DM}	Pulse drain current tested ①	T_C=25°C	20	A
P_D	Maximum power dissipation	T_C=25°C	4.1	W
I_S	Diode Continuous Forward Current	T_C=25°C	5	A
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage and operating temperature range		-55 to 175	°C
Thermal characteristics				
$R_{\theta JA}$	Thermal Resistance Junction-Ambient		30	°C/W
$R_{\theta JC}$	Thermal Resistance-Junction to Case		15	°C/W

Typical Electrical Characteristics

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	100	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current(Tc=25℃)	V_{DS}=100V,V_{GS}=0V	--	--	1	μA
	Zero Gate Voltage Drain Current(Tc=125℃)	V_{DS}=100V,V_{GS}=0V	--	--	100	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V	--	--	±100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	1.0	1.8	2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance②	V_{GS}=10V, I_D=5A	--	70	90	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance②	V_{GS}=4.5V, I_D=2A	--	75	100	mΩ
Dynamic Electrical Characteristics @ T_J= 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=30V,V_{GS}=0V, f=1MHz	--	435	--	pF
C_{oss}	Output Capacitance		--	45	--	pF
C_{rss}	Reverse Transfer Capacitance		--	30	--	pF
Q_g	Total Gate Charge	V_{DS}=50V,I_D=1A, V_{GS}=10V	--	9	--	nC
Q_{gs}	Gate-Source Charge		--	1.7	--	nC
Q_{gd}	Gate-Drain Charge		--	1.6	--	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=30V, I_D=1A, R_G=6.8Ω, V_{GS}=4.5V	--	6	--	nS
t_r	Turn-on Rise Time		--	15	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	16	--	nS
t_f	Turn-Off Fall Time		--	10	--	nS
Source- Drain Diode Characteristics@ T_J= 25°C (unless otherwise stated)						
V_{SD}	Forward on voltage	I_{SD}=5A,V_{GS}=0V	--	0.83	1.20	V
t_{rr}	Reverse Recovery Time	T_j=25℃,I_{sd}=5A, V_{GS}=0V di/dt=500A/μs	--	43	--	nS
Q_{rr}	Reverse Recovery Charge			185		nC

NOTE:

① Repetitive rating; pulse width limited by max. junction temperature

② Pulse width ≤ 300μs; duty cycle≤ 2%.

Typical Characteristics

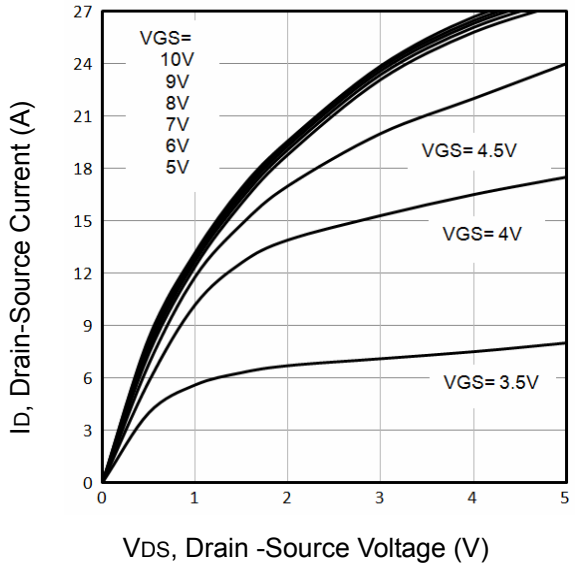


Fig1. Typical Output Characteristics

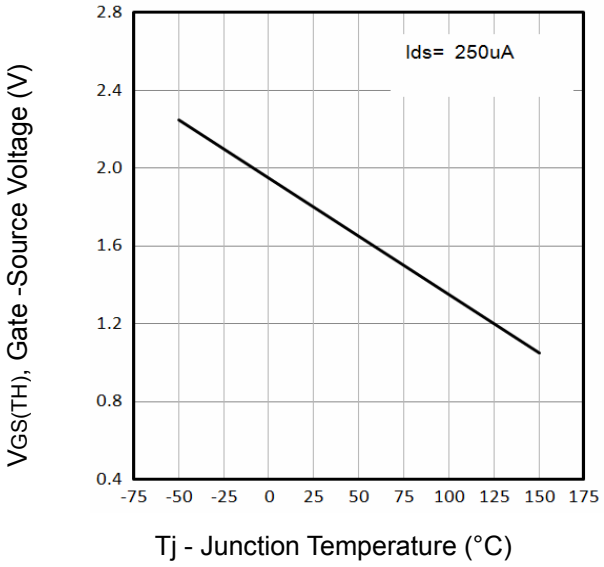


Fig2. Threshold Voltage Vs. Temperature

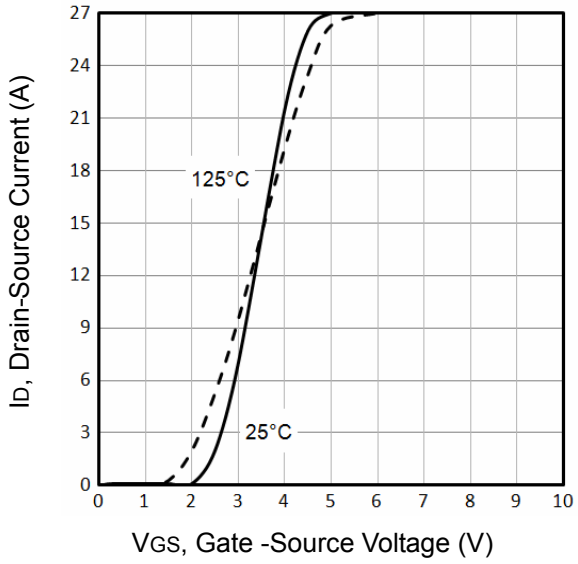


Fig3. Typical Transfer Characteristics

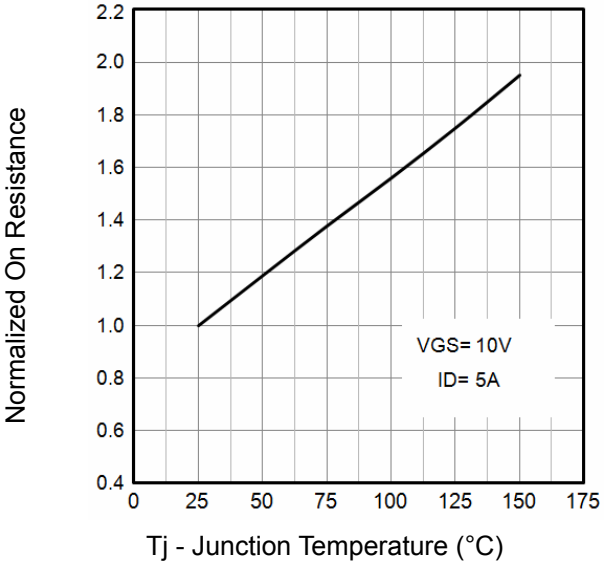


Fig4. Normalized On-Resistance Vs. Temperature

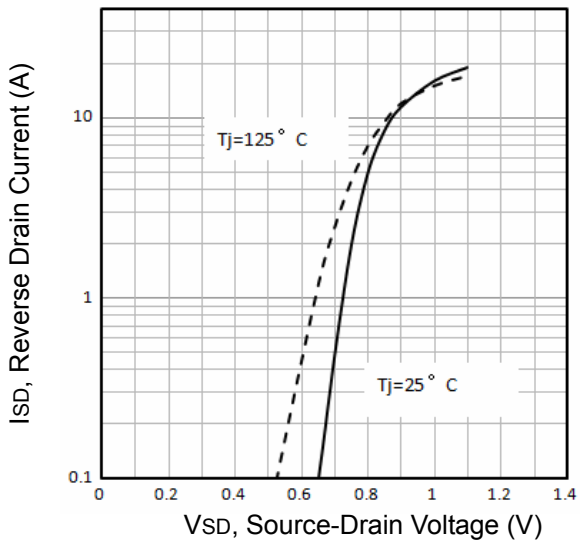


Fig5. Typical Source-Drain Diode Forward Voltage

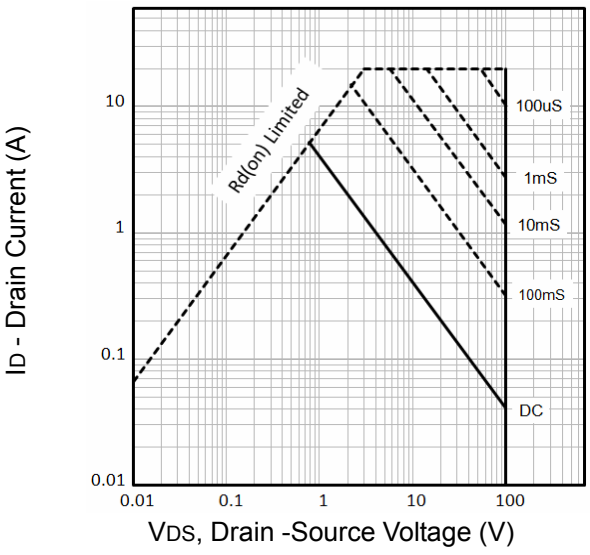


Fig6. Maximum Safe Operating Area

Typical Characteristics

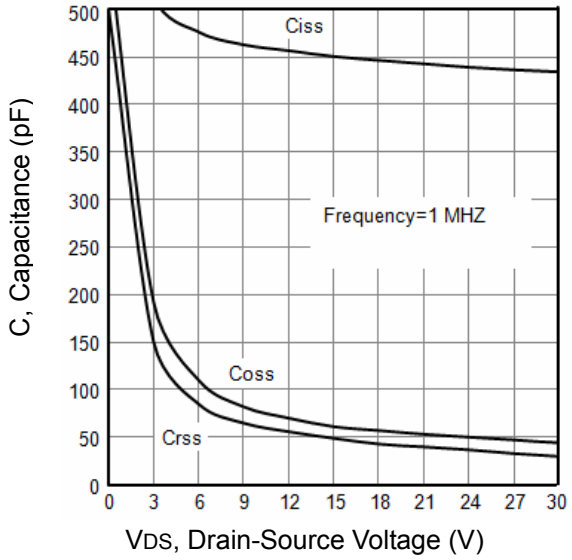


Fig7. Typical Capacitance Vs. Drain-Source

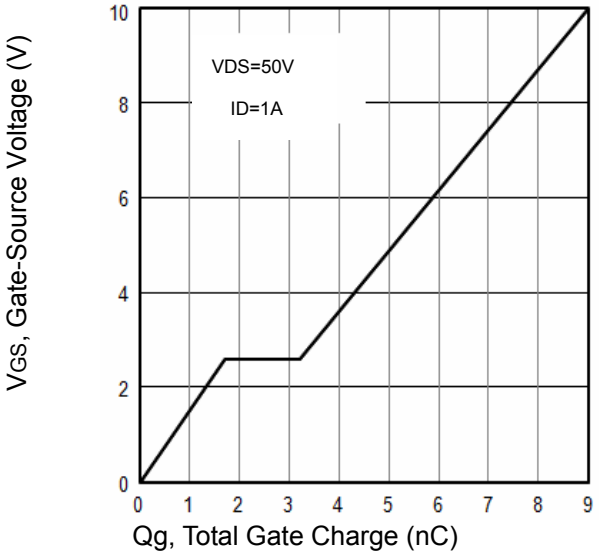


Fig8. Typical Gate Charge Vs. Gate-Source

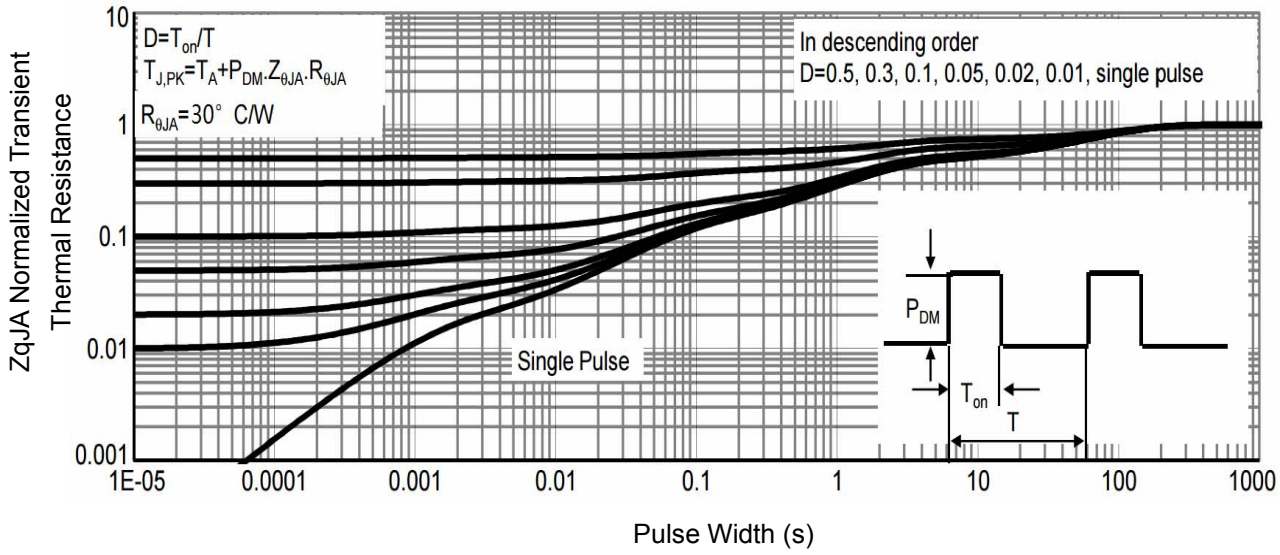


Fig9. Normalized Maximum Transient Thermal

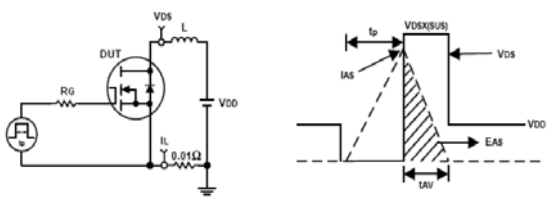


Fig10. Unclamped Inductive Test Circuit and waveforms

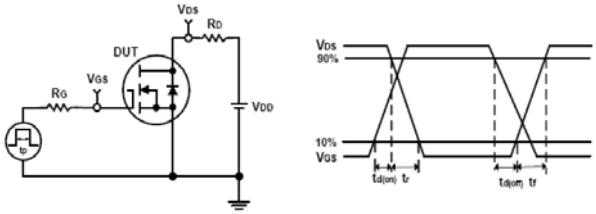
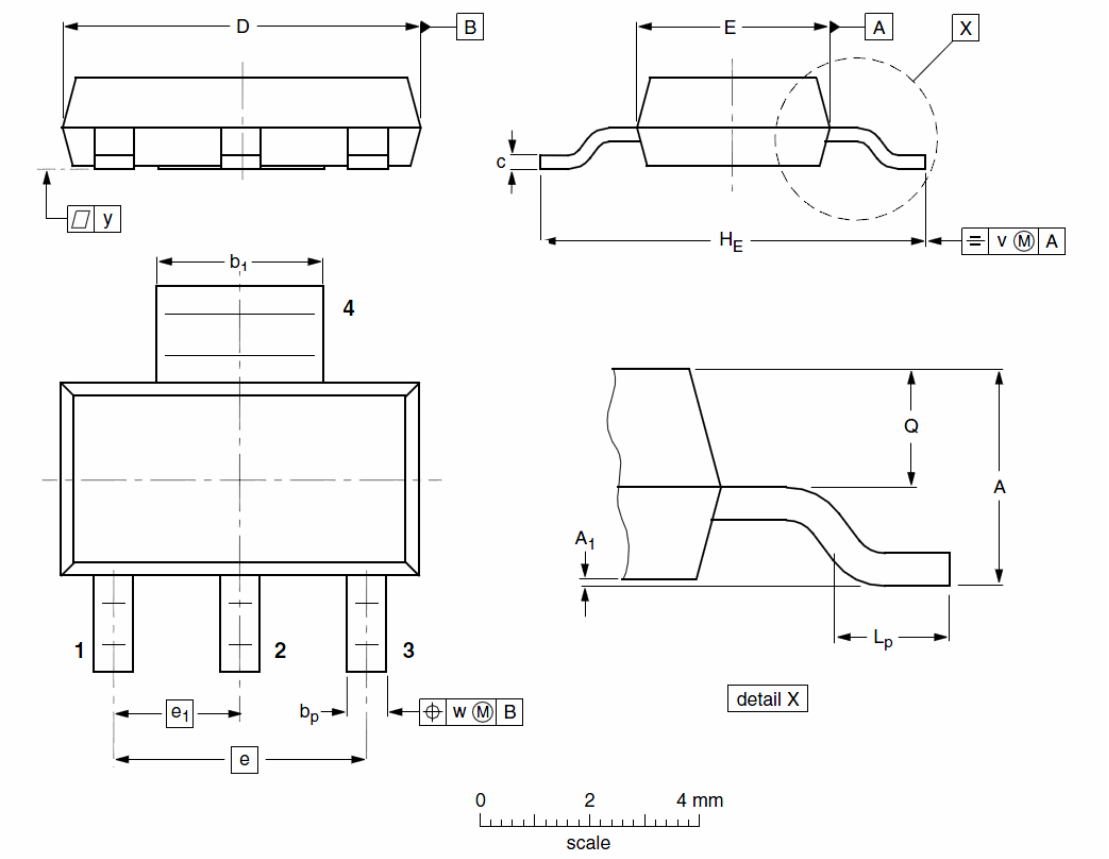


Fig11. Switching Time Test Circuit and waveforms

SOT223 Package Outline Data



DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	1.50	1.68	1.80	**A_1**	0.01	0.05	0.10
b_p	0.60	0.72	0.80	**b_1**	2.90	3.02	3.10
c	0.22	0.27	0.32	**D**	6.30	6.50	6.70
E	3.30	3.51	3.70	**e**	--	4.60	--
e_1	--	2.30	--	**H_E**	6.70	7.02	7.30
L_p	0.70	0.90	1.10	**Q**	0.85	0.92	0.95
v	--	0.20	--	**w**	--	0.10	--
y	--	0.10	--				

Customer Service

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