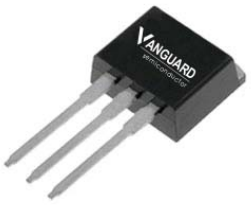
Features

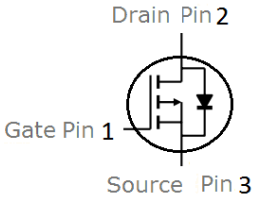
- P-Channel，5V Logic Level Control
- Enhancement mode
- Very low on-resistance $R_{DS(on)}$ @ V_{GS}=-4.5 V
- Fast Switching
- 100% Avalanche Tested
- Pb-free lead plating； RoHS compliant; Hg-Free

V_{DS}	-100	V
$R_{DS(on),TYP}$@ V_{GS}=-10 V	45	mΩ
$R_{DS(on),TYP}$@ V_{GS}=-4.5 V	48	mΩ
I_D	-25	A

TO-251



Pb-Free RoHS HF Halogen-Free



Part ID	Package Type	Marking	Tape and reel information
VSI050P10MS	TO-251	050P10M	75cs/Tube

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T_C =25°C Unless Otherwise Noted)				
V_{GS}	Gate-Source Voltage		±20	V
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage		-100	V
T_J	Maximum Junction Temperature		175	°C
T_{STG}	Storage Temperature Range		-55 to 175	°C
I_S	Diode Continuous Forward Current	T_C =25°C	-25	A
Mounted on Large Heat Sink				
I_{DM}	Pulse Drain Current Tested ①	T_C =25°C	-100	A
I_D	Continuous Drain current@V_{GS}=10V	T_C =25°C	-25	A
P_D	Maximum Power Dissipation	T_C =25°C	88	W
$R_{\theta JC}$	Thermal Resistance-Junction to Case		1.7	°C/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient(ts<10s)		50	°C/W
Drain-Source Avalanche Ratings				
EAS	Avalanche Energy, Single Pulsed ②		81	mJ

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(Tj=25℃)	V_{DS}=-100V,V_{GS}=0V	--	--	-1	μA
	Zero Gate Voltage Drain Current(Tj=125℃)	V_{DS}=-100V,V_{GS}=0V	--	--	-10	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	-2.0	-3.0	V
$R_{DS(ON)}$	Drain-Source On-State Resistance③	V_{GS}=-10V, I_D=-20A	--	45	50	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance③	V_{GS}=-5V, I_D=-10A	--	48	55	mΩ
Dynamic Electrical Characteristics @ T_j = 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=-50V,V_{GS}=0V, f=1MHz	--	5430	--	pF
C_{oss}	Output Capacitance		--	245	--	pF
C_{rss}	Reverse Transfer Capacitance		--	175	--	pF
Q_g	Total Gate Charge	V_{DS}=-50V,I_D=-10A, V_{GS}=-10V	--	55	--	nC
Q_{gs}	Gate-Source Charge		--	10	--	nC
Q_{gd}	Gate-Drain Charge		--	14	--	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=-50V, I_D=-1A, R_G=6.8Ω, V_{GS}=-10V	--	18	--	nS
t_r	Turn-on Rise Time		--	22	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	52	--	nS
t_f	Turn-Off Fall Time		--	60	--	nS
Source- Drain Diode Characteristics@ T_j = 25°C (unless otherwise stated)						
I_{SD}	Source-drain current(Body Diode)	T_C=25℃	--	--	-25	A
V_{SD}	Forward on voltage	I_{SD}=-20A,V_{GS}=0V	--	0.86	-1.3	V
t_{rr}	Reverse Recovery Time	T_j=25℃,I_{sd}=-15A, V_{GS}=0V di/dt=-100A/μs	--	45	--	nS
Q_{rr}	Reverse Recovery Charge			115		nC

NOTE:

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

② Limited by T_{Jmax}, starting T_J = 25°C, L = 0.5mH,R_G = 25Ω, I_{AS} =-18A, V_{GS} =-10V. Part not recommended for use above this value

③ Pulse width ≤ 300μs; duty cycle≤ 2%.

Typical Characteristics

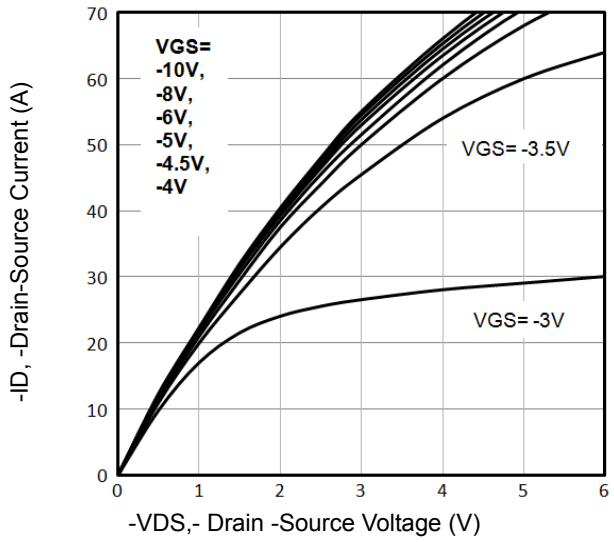


Fig1. Typical Output Characteristics

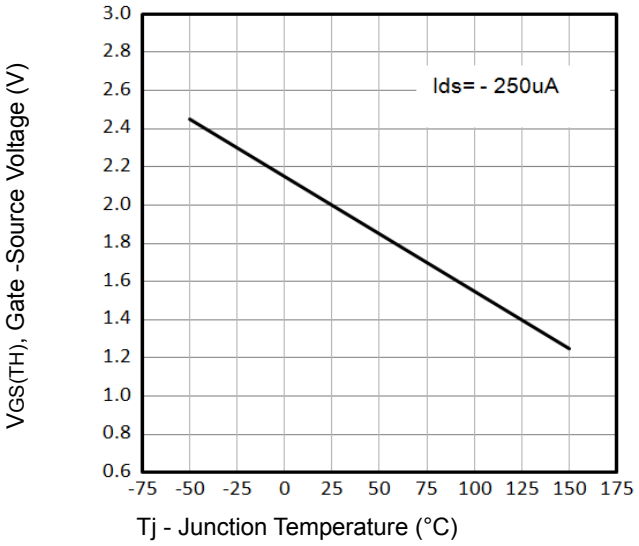


Fig2. $V_{GS(TH)}$ Gate -Source Voltage Vs.Tj

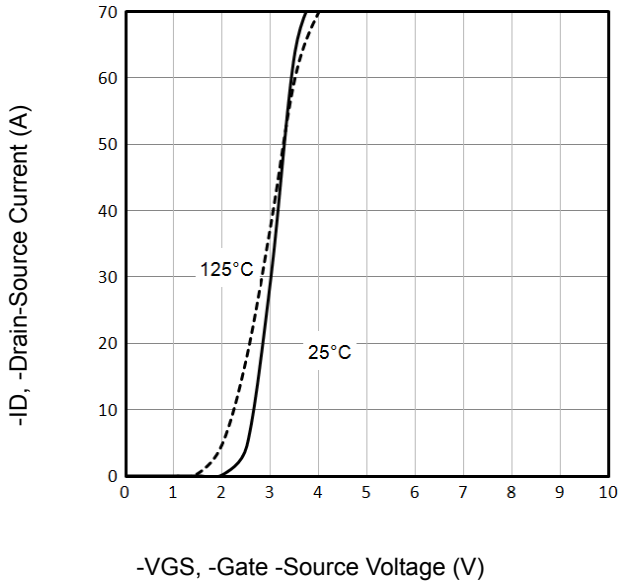


Fig3. Typical Transfer Characteristics

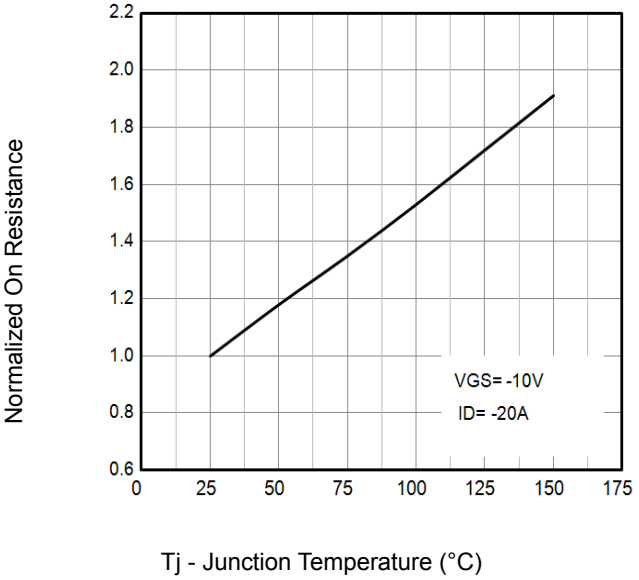


Fig4. Normalized On-Resistance Vs. Tj

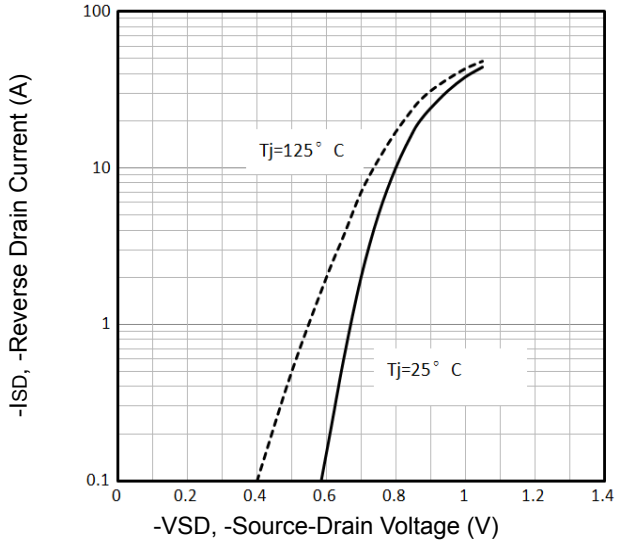


Fig5. Typical Source-Drain Diode Forward Voltage

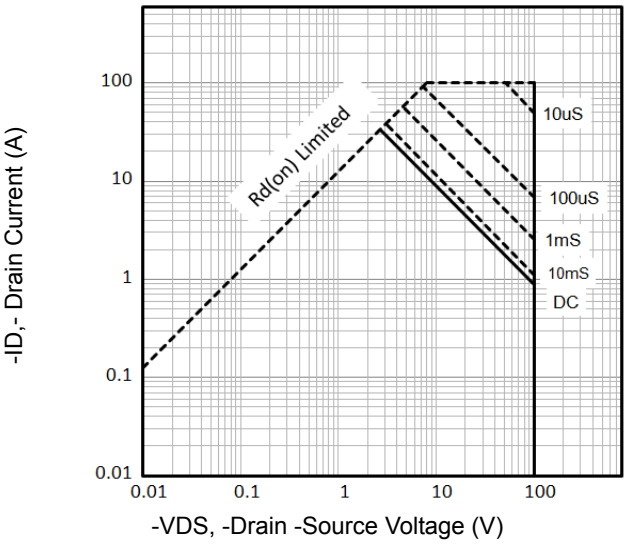


Fig6. Maximum Safe Operating Area

Typical Characteristics

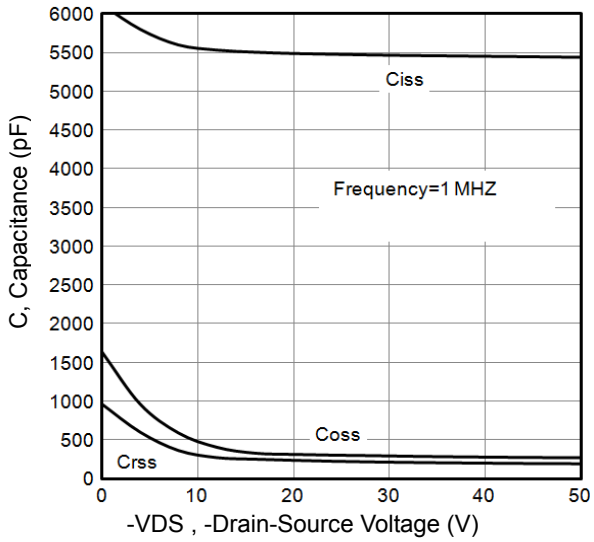


Fig7. Typical Capacitance Vs.Drain-Source Voltage

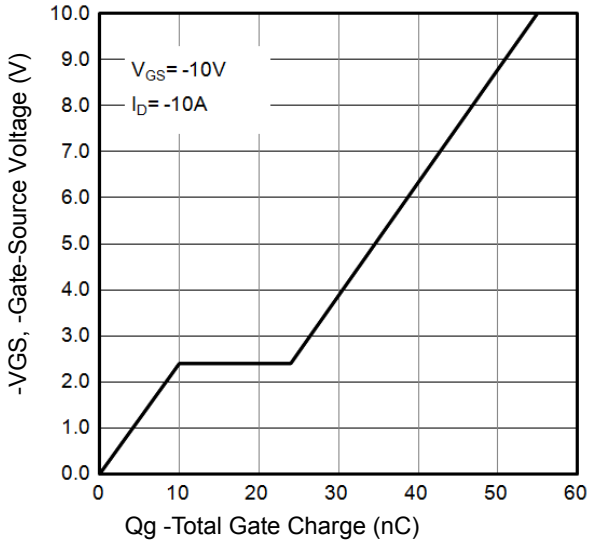


Fig8. Typical Gate Charge Vs.Gate-Source Voltage

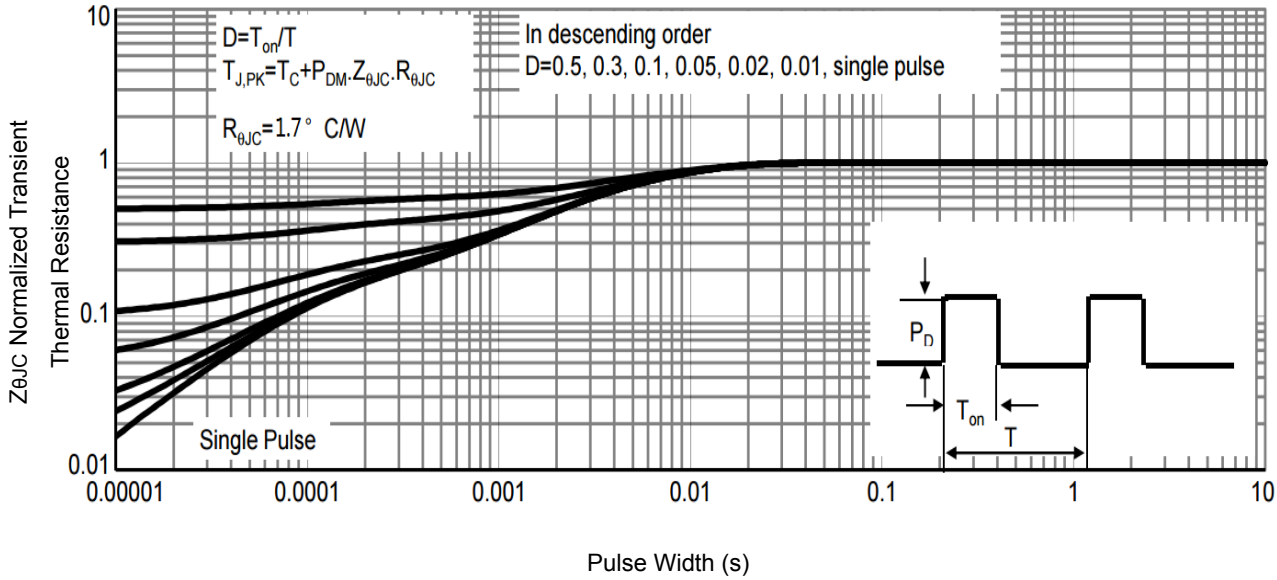


Fig9. Normalized Maximum Transient Thermal Impedance

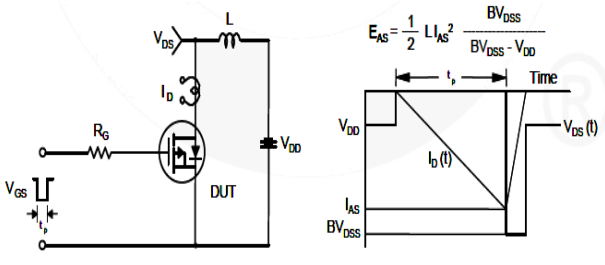


Fig10. Unclamped Inductive Test Circuit and Waveforms

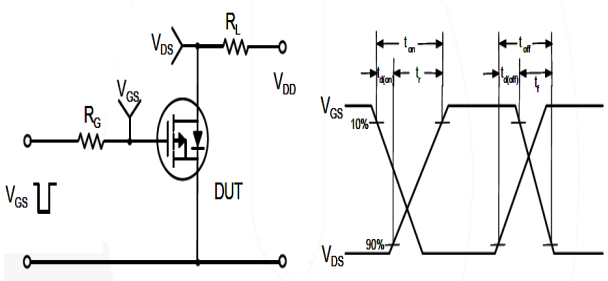
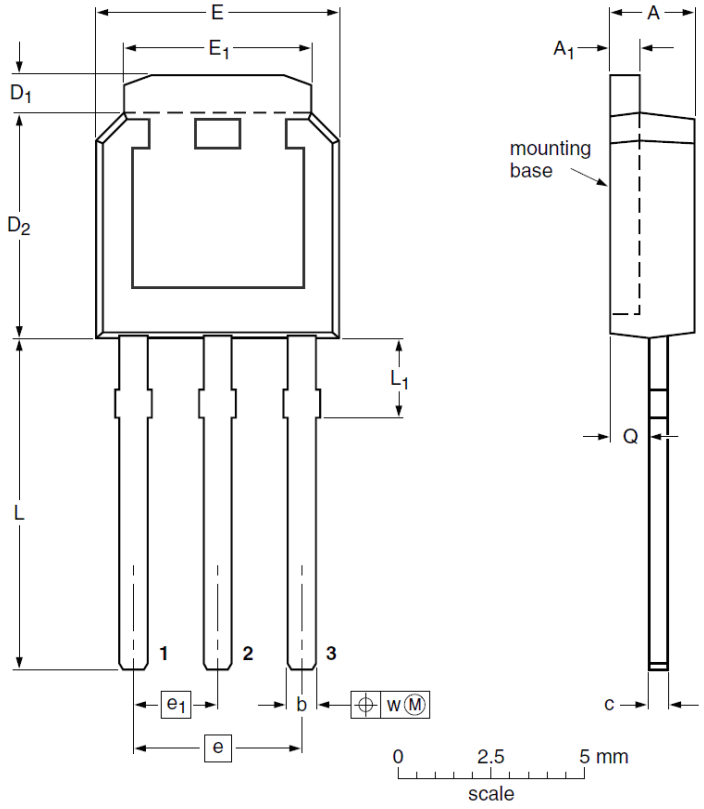


Fig11. Switching Time Test Circuit and waveforms

TO-251 Package Outline Data



DIMENSIONS (unit : mm)

Label	Min	Typ	Max	Label	Min	Typ	Max
A	2.22	2.30	2.38	**A_1**	0.46	0.55	0.93
b	0.71	0.78	0.89	**c**	0.46	0.51	0.56
D_1	0.96	1.02	1.10	**D_2**	5.98	6.05	6.22
E	6.47	6.60	6.73	**E_1**	5.20	5.33	5.55
e	--	4.57	--	**e_1**	--	2.28	--
L	9.20	9.38	9.60	**L_1**	--	2.70	--
Q	1.00	1.05	1.10	**w**	--	0.30	--

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