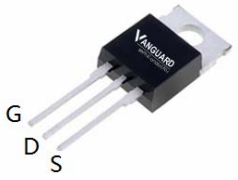
Features

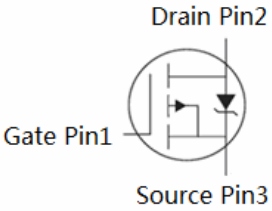
- P-Channel，Logic level -5V
- Enhancement mode
- Very low on-resistance $R_{DS(on)}$ @ V_{GS}=-4.5 V
- Fast Switching
- 100% Avalanche Tested
- Pb-free lead plating; RoHS compliant

V_{DS}	-100	V
$R_{DS(on),TYP}$@ V_{GS}=-10 V	44	mΩ
$R_{DS(on),TYP}$@ V_{GS}=-4.5 V	46	mΩ
I_D	-25	A

TO-220AB



Pb-Free RoHS



Part ID	Package Type	Marking	Tape and reel information
VST050P10MS	TO-220AB	050P10M	50pcs/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
		T_C=100°C	56	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		60	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(Tc=25℃)	V_{DS}=-100V,V_{GS}=0V	--	--	-1	μA
	Zero Gate Voltage Drain Current(Tc=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	--	44	50	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance③	V_{GS}=-5V, I_D=-10A	--	46	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 = 0.3mH,R_G = 25Ω, I_{AS} =-20A, V_{GS} =-10V. Part not recommended for use above this value

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

Typical Characteristics

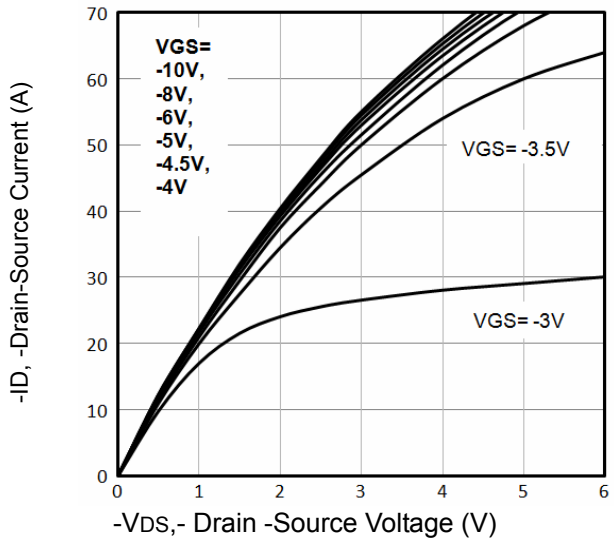


Fig1. Typical Output Characteristics

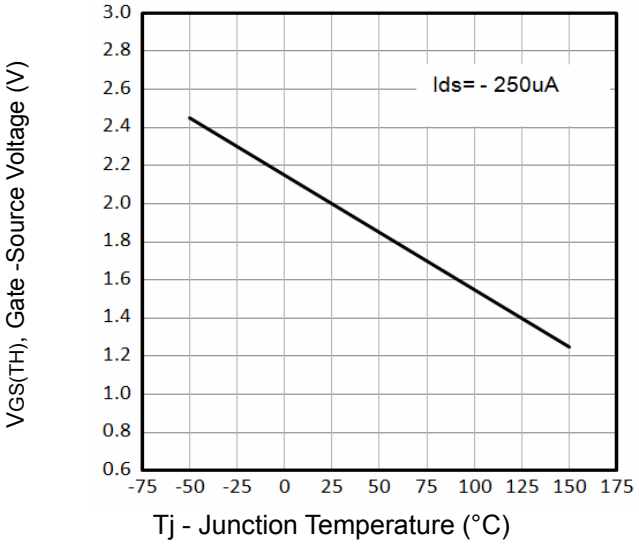


Fig2. Threshold Voltage Vs. Temperature

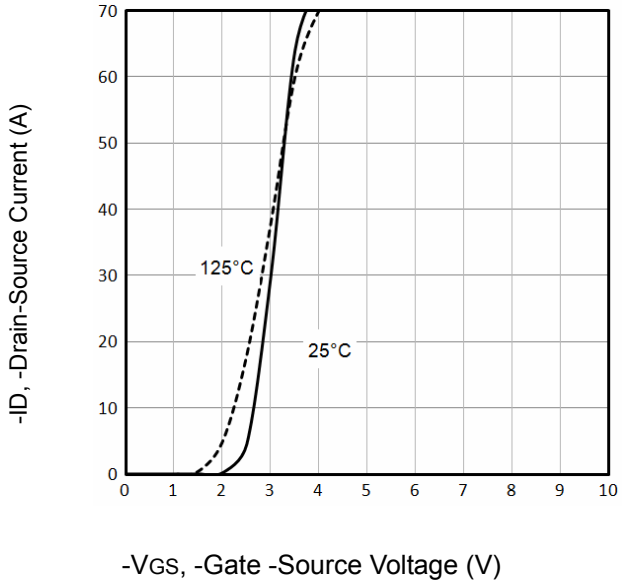


Fig3. Typical Transfer Characteristics

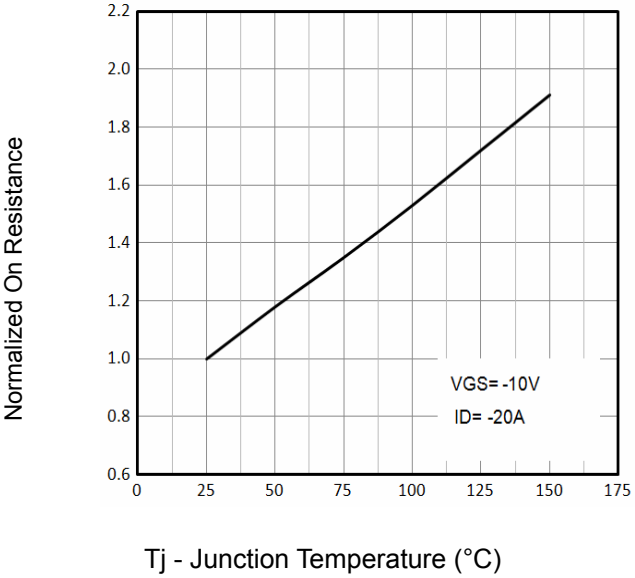


Fig4. Normalized On-Resistance Vs. Temperature

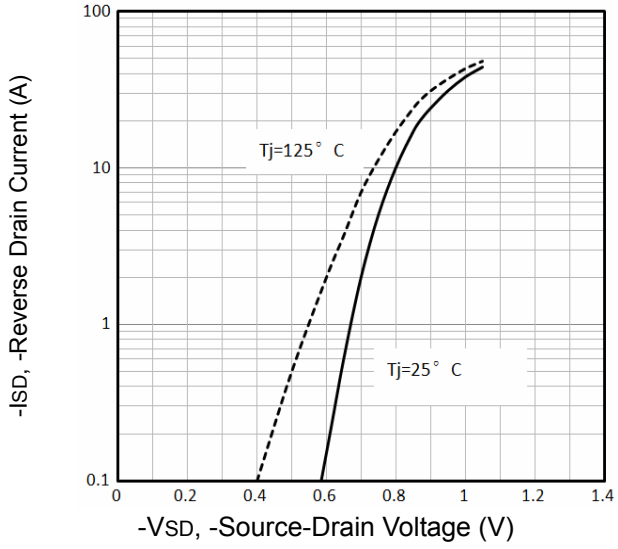


Fig5. Typical Source-Drain Diode Forward Voltage

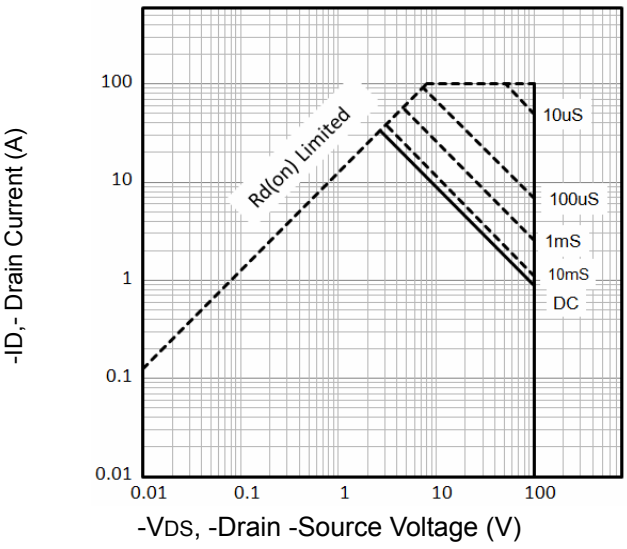


Fig6. Maximum Safe Operating Area

Typical Characteristics

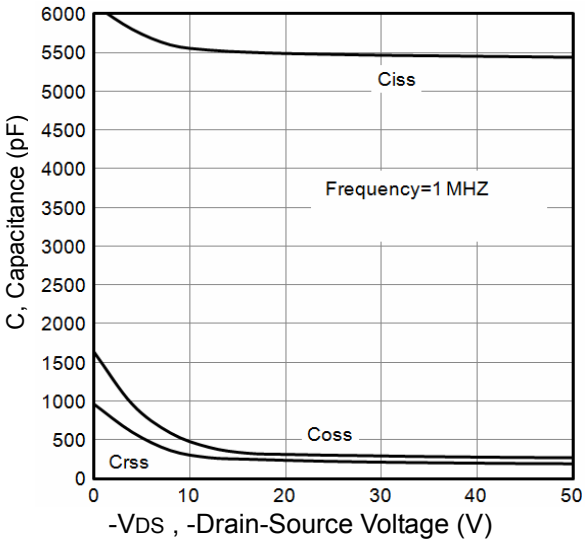


Fig7. Typical Capacitance Vs.Drain-Source Voltage

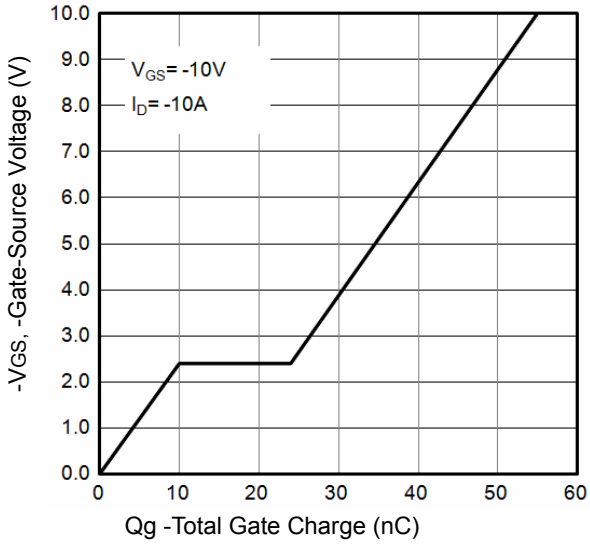


Fig8. Typical Gate Charge Vs.Gate-Source Voltage

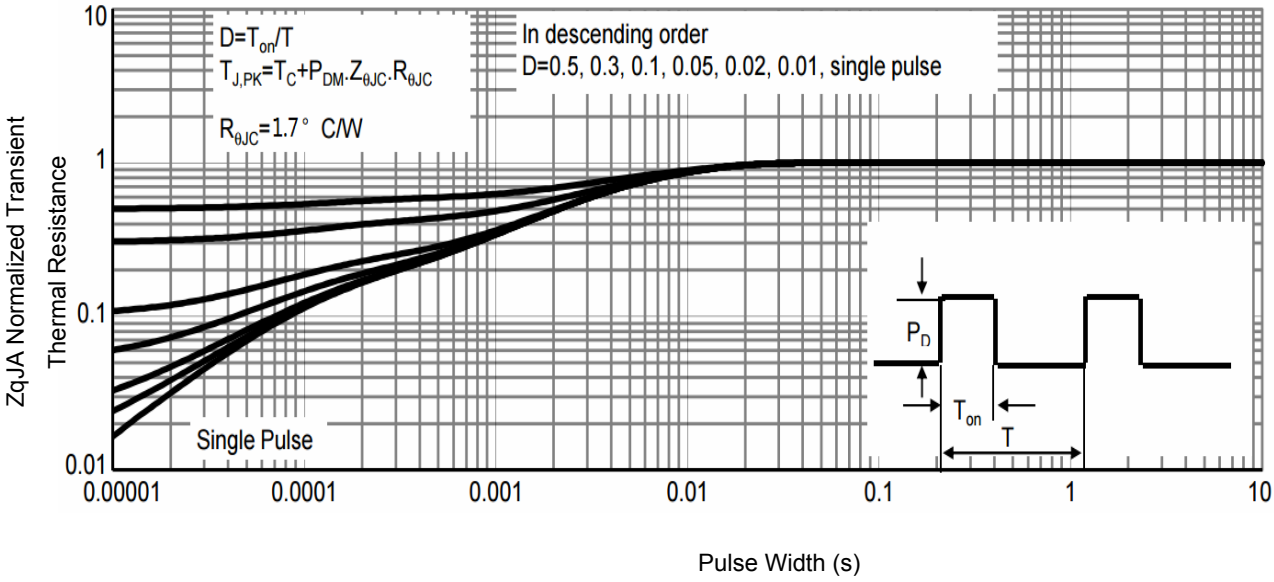


Fig9. Normalized Maximum Transient Thermal Impedance

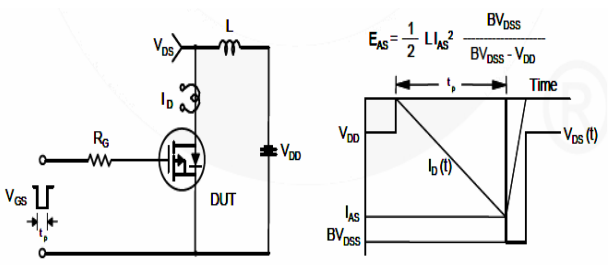


Fig10. Unclamped Inductive Test Circuit and Waveforms

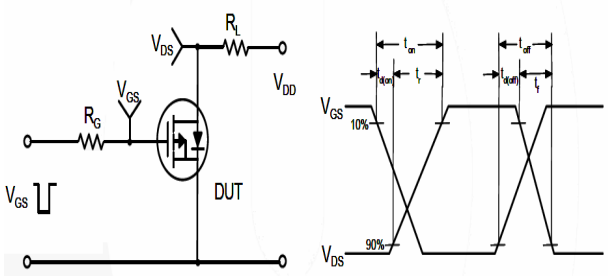
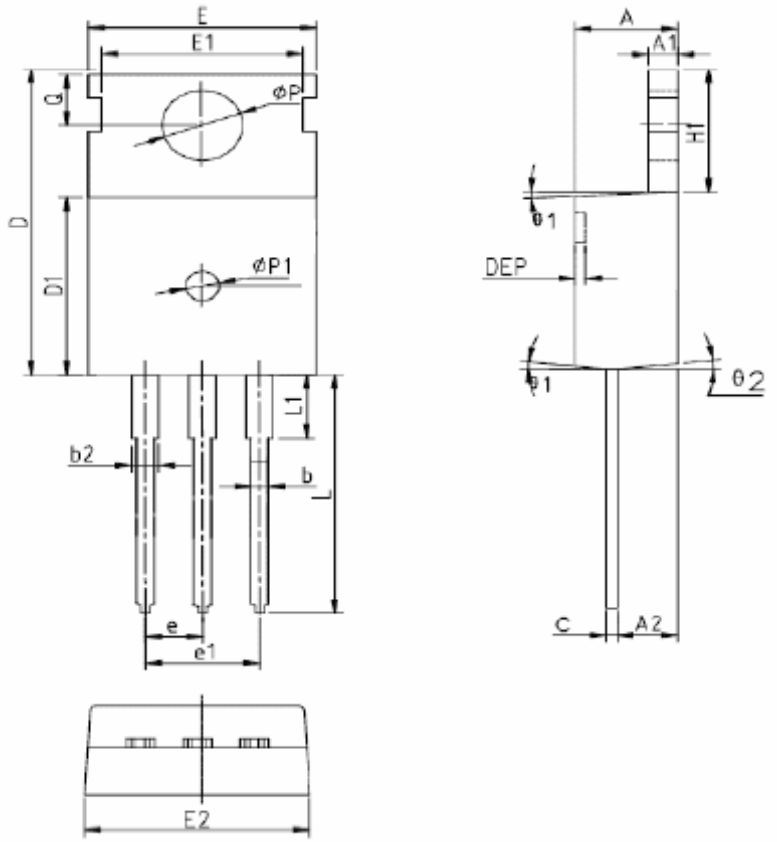


Fig11. Switching Time Test Circuit and waveforms

TO-220AB Package Outline



SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.57	4.70	0.173	0.180	0.185	θp1	1.40	1.50	1.60	0.055	0.059	0.063
A1	1.27	1.30	1.33	0.050	0.051	0.052	e	2.54BSC			0.1BSC		
A2	2.35	2.40	2.50	0.093	0.094	0.098	e1	5.08BSC			0.2BSC		
b	0.77	-	0.90	0.030	-	0.035	H1	6.40	6.50	6.60	0.252	0.256	0.260
b2	1.23	-	1.36	0.048	-	0.054	L	12.75	-	13.17	0.502	-	0.519
C	0.48	0.50	0.52	0.019	0.020	0.021	L1	-	-	3.95	-	-	0.156
D	15.40	15.60	15.80	0.606	0.614	0.622	L2	2.50REF.			0.098REF.		
D1	9.00	9.10	9.20	0.354	0.358	0.362	Øp	3.57	3.60	3.63	0.141	0.142	0.143
DEP	0.05	0.10	0.20	0.002	0.004	0.008	Q	2.73	2.80	2.87	0.107	0.110	0.113
E	9.70	9.90	10.10	0.382	0.389	0.398	θ1	5°	7°	9°	5°	7°	9°
E1	-	8.70	-	-	0.343	-	θ2	1°	3°	5°	1°	3°	5°
E2	9.80	10.00	10.20	0.386	0.394	0.401							

Customer Service

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