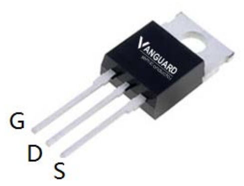
V_{DS}	60	V
$R_{DS(on),TYP}$@ V_{GS}=10 V	4.4	mΩ
$R_{DS(on),TYP}$@ V_{GS}=4.5V	5.2	mΩ
I_D	125	A

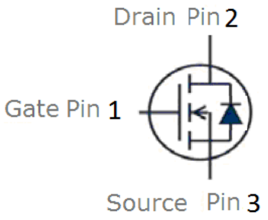
Features

- N-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

Pb-Free RoHS

TO-220AB





Part ID	Package Type	Marking	Tape and reel information
VST003N06MS	TO-220AB	003N06M	50pcs/Tube

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

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage		60	V
I_S	Diode continuous forward current	T_C =25°C	125	A
I_D	Continuous drain current@V_{GS}=10V	T_C =25°C	125	A
		T_C =100°C	80	A
I_{DM}	Pulse drain current tested ①	T_C =25°C	500	A
EAS	Avalanche energy, single pulsed ②		169	mJ
P_D	Maximum power dissipation	T_C =25°C	139	W
V_{GS}	Gate-Source voltage		±20	V
T_{STG} T_J	Storage and operating temperature range		-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typical	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	0.9	°C/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	62.5	°C/W

Typical 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	60	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=60V,V_{GS}=0V	--	--	1	μA
	Zero Gate Voltage Drain Current(T_j=125℃)	V_{DS}=60V,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 Resistance③	V_{GS}=10V, I_D=40A	--	4.4	5	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance③	V_{GS}=4.5V, I_D=20A	--	5.2	6	mΩ
Dynamic Electrical Characteristics @ T_j= 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=30V,V_{GS}=0V, f=1MHz	--	4940	--	pF
C_{oss}	Output Capacitance		--	500	--	pF
C_{rss}	Reverse Transfer Capacitance		--	495	--	pF
R_g	Gate Resistance	f=1MHz		1.35		Ω
Q_g	Total Gate Charge	V_{DS}=30V,I_D=40A, V_{GS}=10V	--	85	--	nC
Q_{gs}	Gate-Source Charge		--	17	--	nC
Q_{gd}	Gate-Drain Charge		--	19	--	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=30V, I_D=40A, R_G=3Ω, V_{GS}=10V	--	14.8	--	nS
t_r	Turn-on Rise Time		--	5.6	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	56	--	nS
t_f	Turn-Off Fall Time		--	12	--	nS
Source- Drain Diode Characteristics@ T_j = 25°C (unless otherwise stated)						
V_{SD}	Forward on voltage	I_{SD}=40A,V_{GS}=0V	--	0.85	1.2	V
t_{rr}	Reverse Recovery Time	T_j=25℃,I_{sd}=40A, V_{GS}=0V di/dt=500A/μs	--	18	--	nS
Q_{rr}	Reverse Recovery Charge			40		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} = 26A, V_{GS} =10V. Part not recommended for use above this value

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

Typical Characteristics

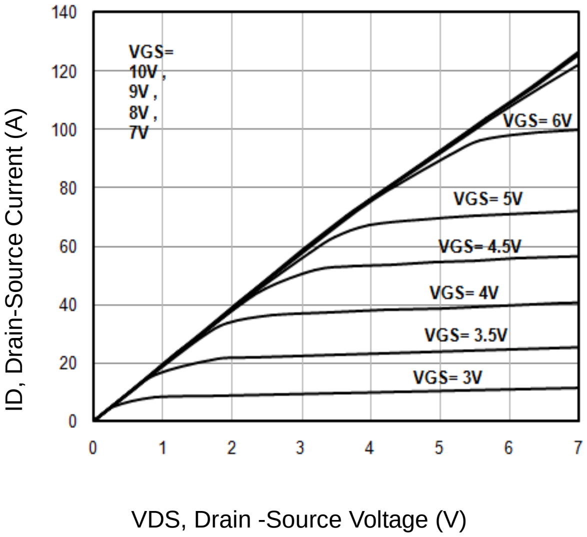


Fig1. Typical Output Characteristics

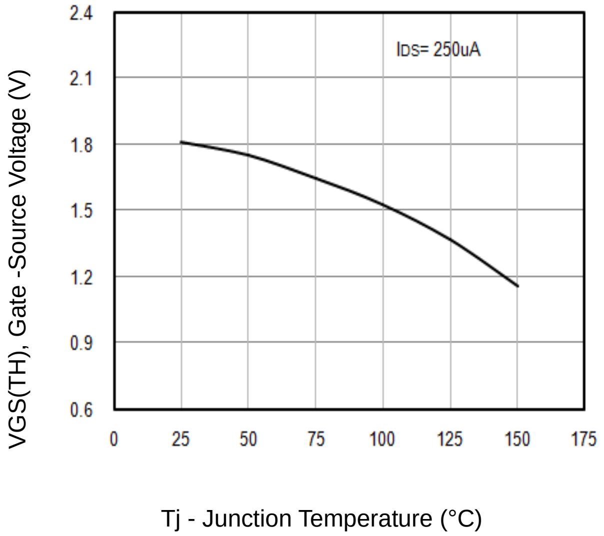


Fig2. $V_{GS(TH)}$ Gate -Source Voltage Vs. Tj

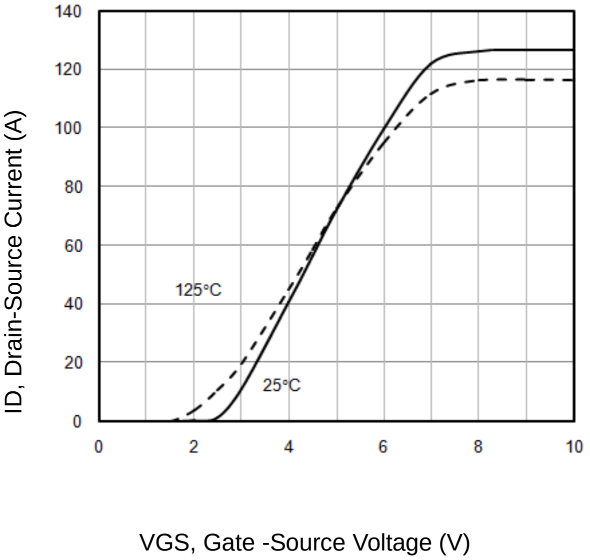


Fig3. Typical Transfer Characteristics

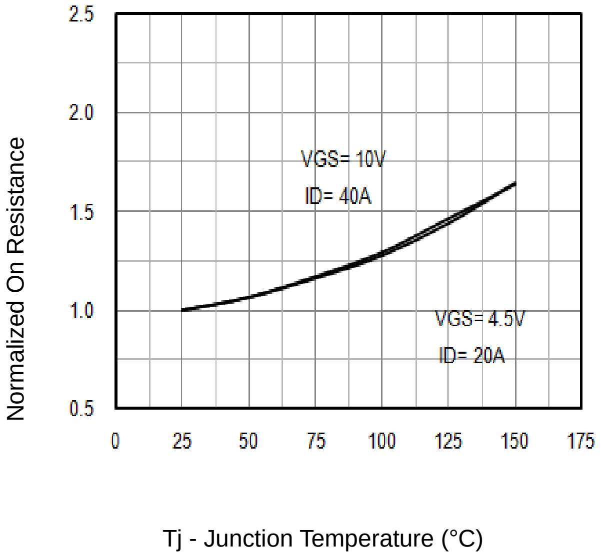


Fig4. Normalized On-Resistance Vs. Temperature

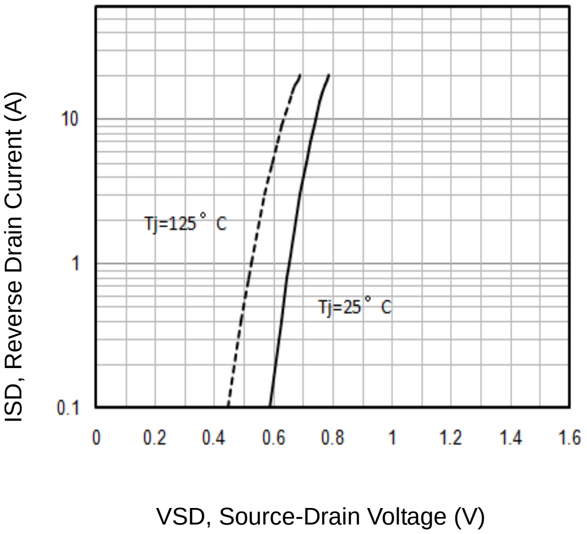


Fig5. Typical Source-Drain Diode Forward Voltage

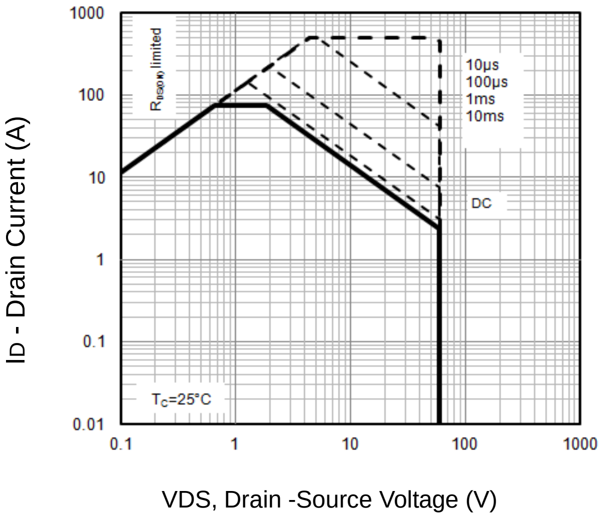


Fig6. Maximum Safe Operating Area

Typical Characteristics

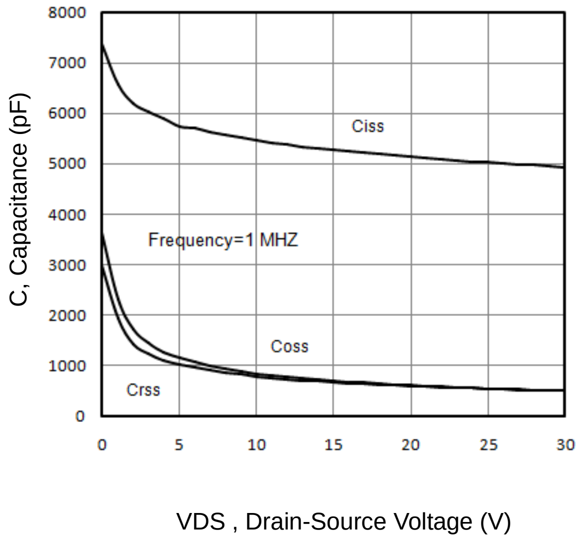


Fig7. Typical Capacitance Vs.Drain-Source Voltage

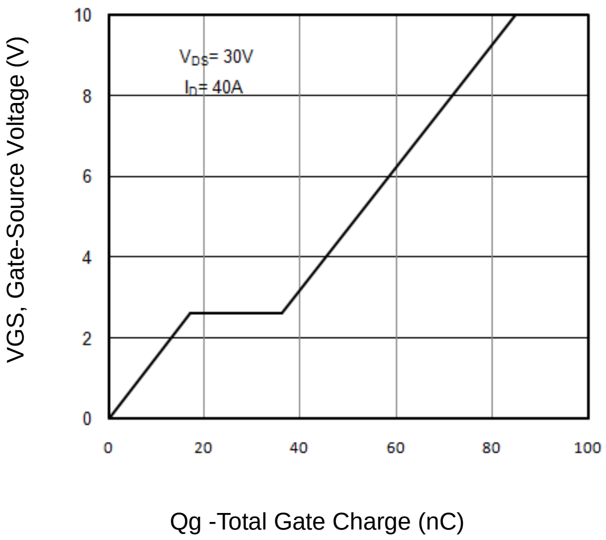


Fig8. Typical Gate Charge Vs.Gate-Source Voltage

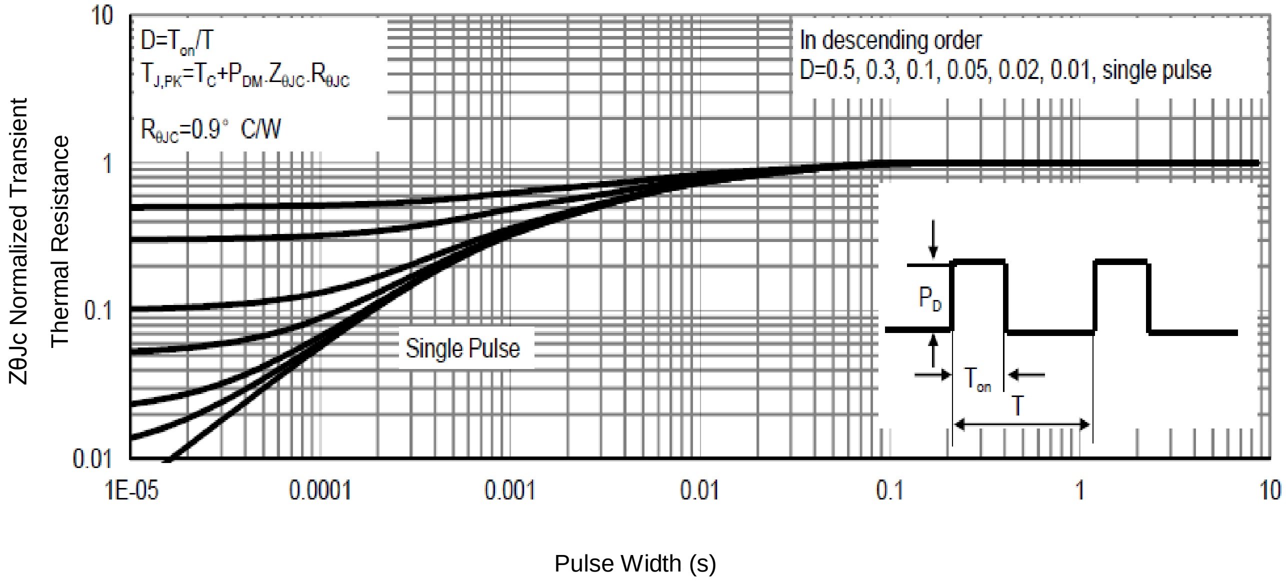


Fig9 . Normalized Maximum Transient Thermal Impedance

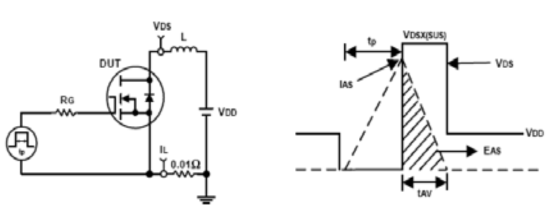


Fig10. Unclamped Inductive Test Circuit and waveforms

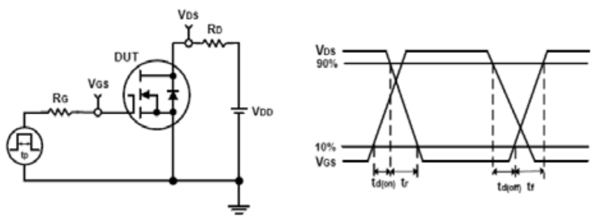
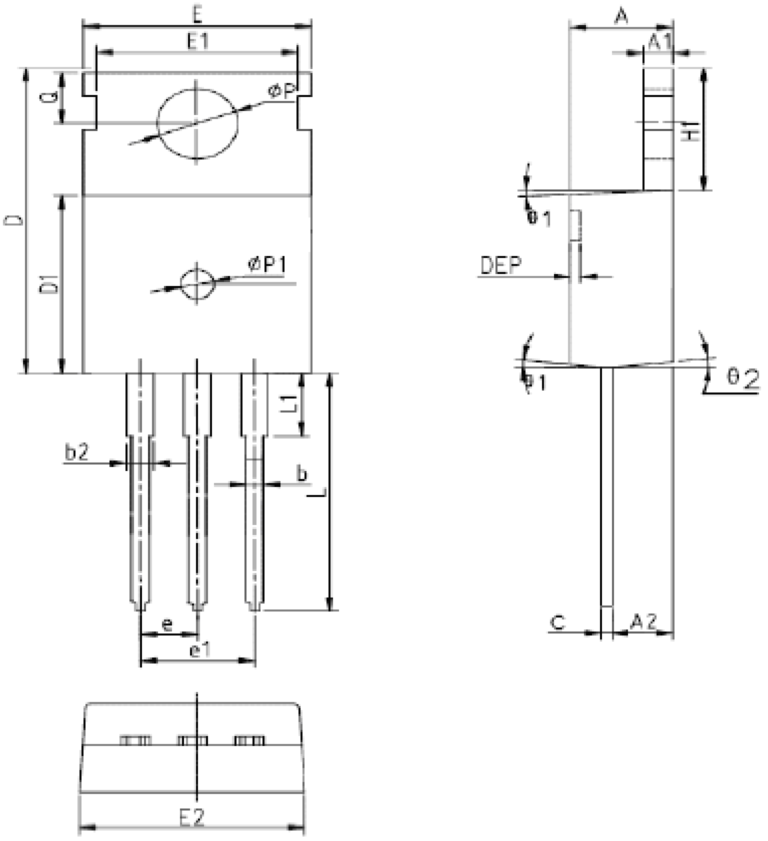


Fig11. Switching Time Test Circuit and waveforms

TO-220AB Package Outline Data



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	Øp1	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	θ 1	5°	7°	9°	5°	7°	9°
E1	-	8.70	-	-	0.343	-	θ 2	1°	3°	5°	1°	3°	5°
E2	9.80	10.00	10.20	0.386	0.394	0.401							

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