

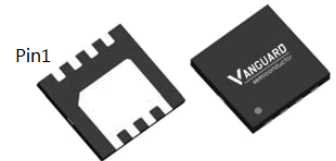
Features

- P-Channel
- Very low on-resistance $R_{DS(on)}$ @ $V_{GS}=-4.5\text{ V}$
- 100 Avalanche Tested
- Fast Switching
- Repetitive Avalanche Allowed up to T_{jmax}
- Pb-free lead plating; RoHS compliant

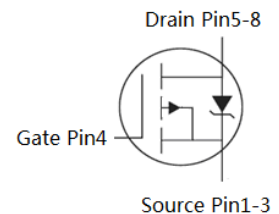
V_{DS}	-30	V
$R_{DS(on),TYP@ V_{GS}=-10\text{ V}}$	10	mΩ
$R_{DS(on),TYP@ V_{GS}=-4.5V}$	14	mΩ
I_D	-36	A



TDFN3.3x3.3



Part ID	Package Type	Marking	Tape and reel information
VSB012P03MS	TDFN3.3x3.3	012P03M	5000pcs/reel



Maximum ratings, at $T_j=25\text{ °C}$, unless otherwise specified

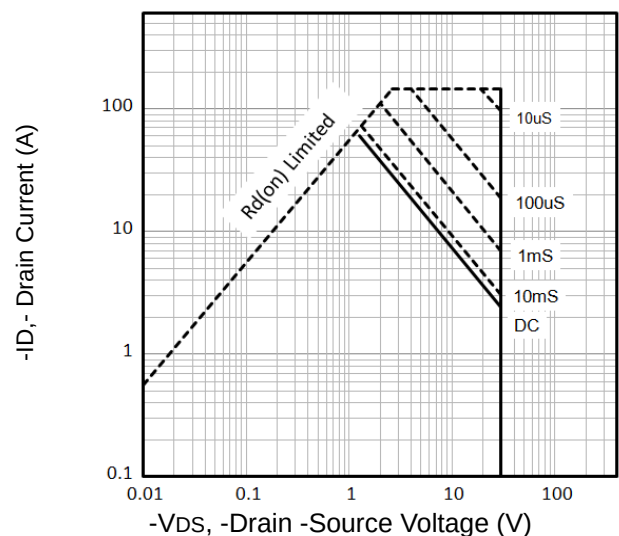
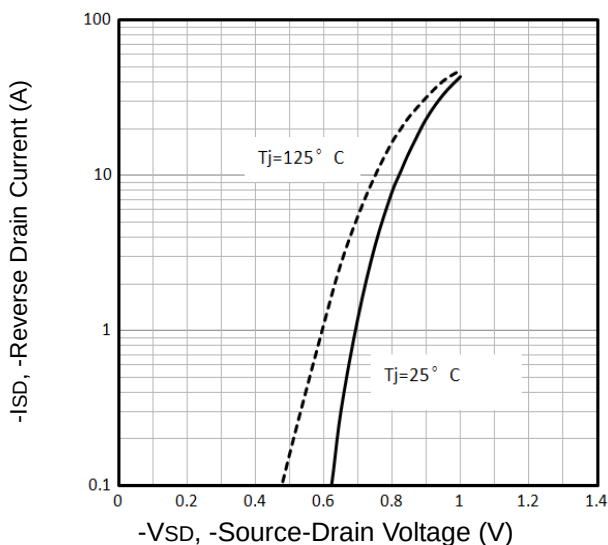
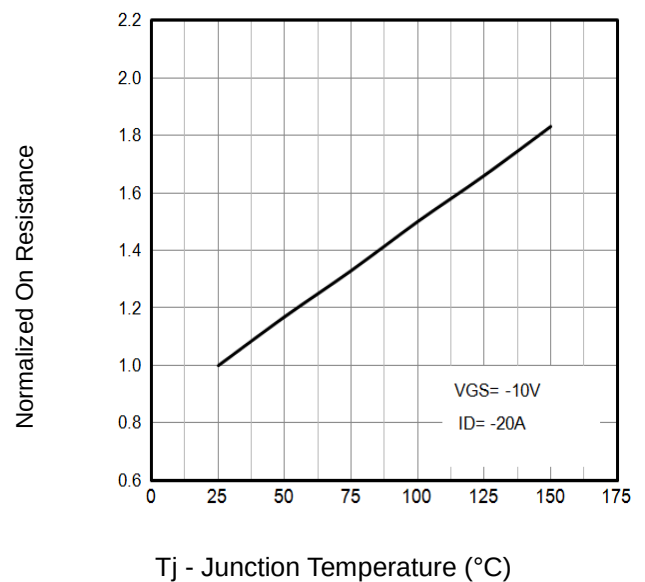
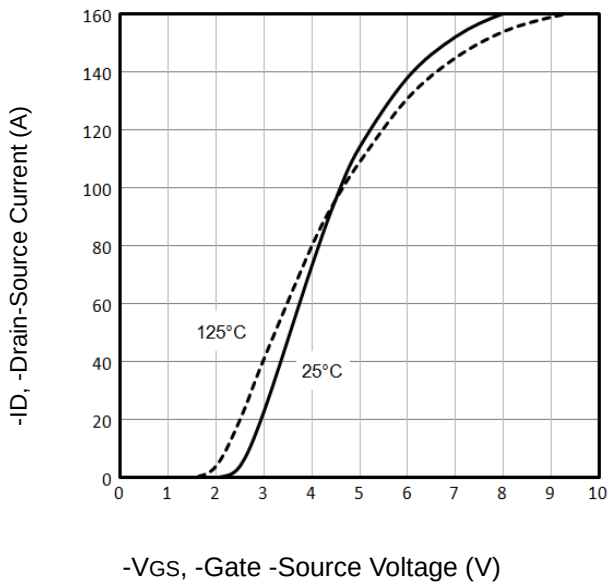
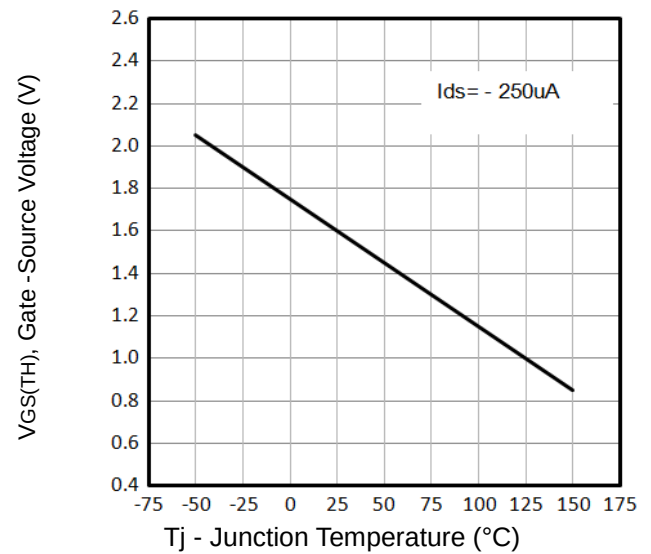
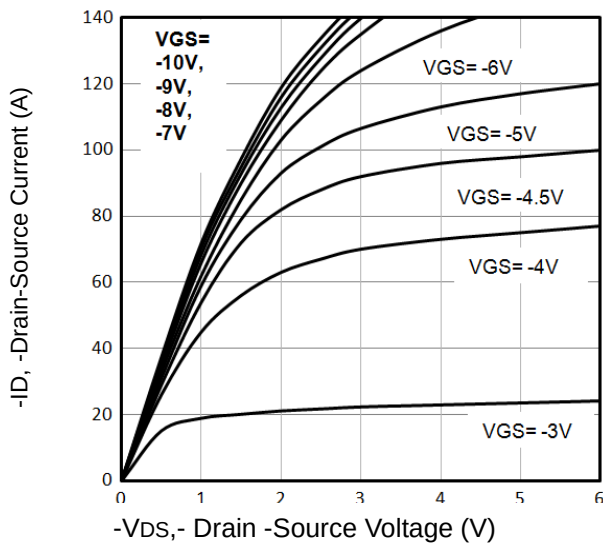
Symbol	Parameter		Rating	Unit
Common Ratings (Tc=25°C Unless Otherwise Noted)				
V _{GS}	Gate-Source Voltage		±20	V
V _{(BR)DSS}	Drain-Source Breakdown Voltage		-30	V
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-55 to 150	°C
I _S	Diode Continuous Forward Current	T _C =25°C	-36	A
Mounted on Large Heat Sink				
I _D	Continuous Drain current @V _{GS} =-10V	T _C =25°C	-36	A
		T _C =100°C	-23	A
I _{DM}	Pulse Drain Current Tested ①	T _C =25°C	-144	A
P _D	Maximum Power Dissipation	T _C =25°C	73	W
R _{θJC}	Thermal Resistance-Junction to Case		1.7	°C/W
R _{θJA}	Thermal Resistance Junction-Ambient		50	°C/W
Drain-Source Avalanche Ratings				
EAS	Avalanche Energy, Single Pulsed ②		25	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	-30	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current(Tc=25°C)	V _{DS} =-24V,V _{GS} =0V	--	--	-1	μA
	Zero Gate Voltage Drain Current(Tc=125°C)	V _{DS} =-24V,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	-1.6	-2.5	V
R _{DS(ON)}	Drain-Source On-State Resistance③	V _{GS} =-10V, I _D =-20A	--	10	12	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance③	V _{GS} =-4.5V, I _D =-20A	--	14	18	mΩ
Dynamic Electrical Characteristics @ T _J = 25°C (unless otherwise stated)						
C _{iss}	Input Capacitance	V _{DS} =-10V,V _{GS} =0V, f=1MHz	--	1980	--	pF
C _{oss}	Output Capacitance		--	350	--	pF
C _{rss}	Reverse Transfer Capacitance		--	285	--	pF
Q _g	Total Gate Charge	V _{DS} =-10V,I _D =-10A, V _{GS} =-10V	--	28	--	nC
Q _{gs}	Gate-Source Charge		--	4.8	--	nC
Q _{gd}	Gate-Drain Charge		--	9	--	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} =-15V, I _D =-1A, R _G =6.8Ω, V _{GS} =-10V	--	9.6	--	nS
t _r	Turn-on Rise Time		--	10.5	--	nS
t _{d(off)}	Turn-Off Delay Time		--	22	--	nS
t _f	Turn-Off Fall Time		--	11	--	nS
Source- Drain Diode Characteristics@ T _J = 25°C (unless otherwise stated)						
I _{SD}	Source-drain current(Body Diode)	T _c =25°C	--	--	-36	A
V _{SD}	Forward on voltage	I _{SD} =-10A,V _{GS} =0V	--	-0.82	-1.3	V
t _{rr}	Reverse Recovery Time	T _j =25°C,I _{sd} =-8A, V _{GS} =0V	--	26	--	nS
Q _{rr}	Reverse Recovery Charge	di/dt=- 100A/μs		19		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} = -10A, V_{GS} = -10V. Part not recommended for use above this value
- ③ Pulse width ≤ 300μs; duty cycles ≤ 2%.

Typical Characteristics



Typical Characteristics

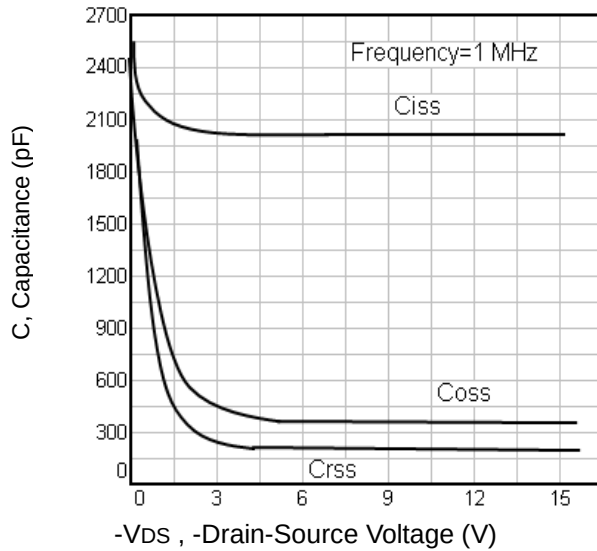


Fig7. Typical Capacitance Vs. Drain-Source Voltage

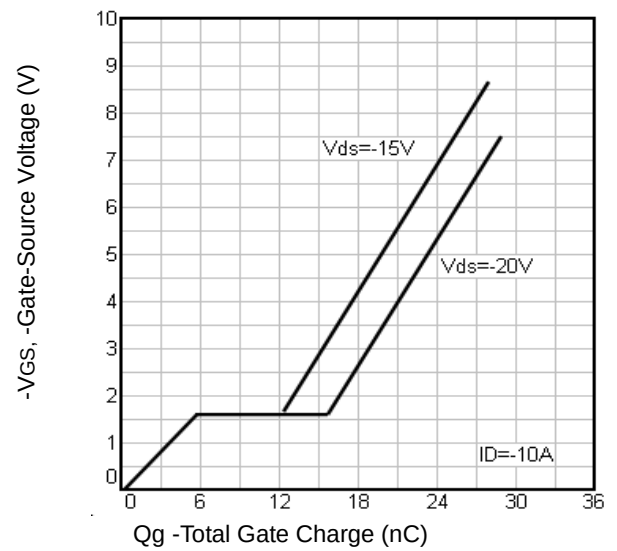


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

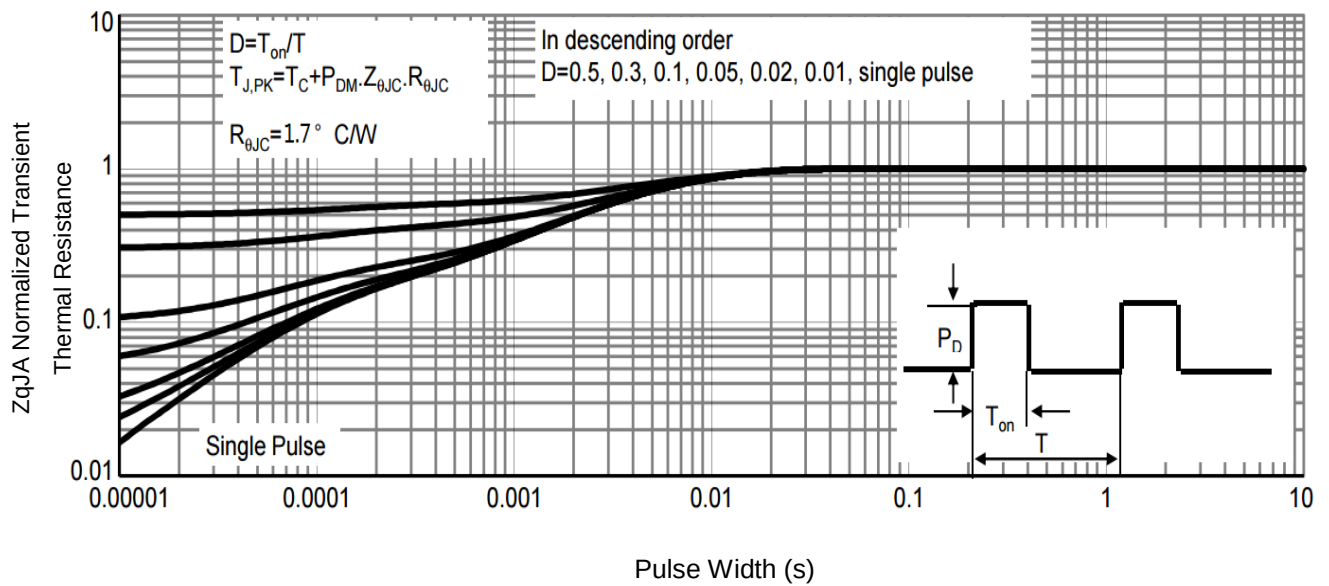


Figure 9: Normalized Maximum Transient Thermal

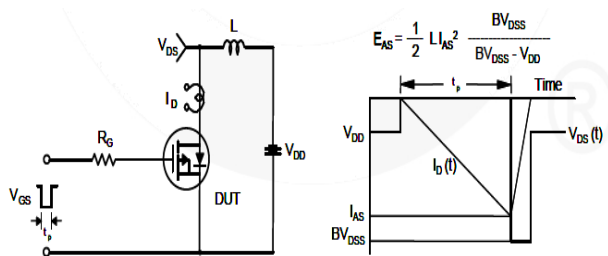


Fig10. Unclamped Inductive Test Circuit and Waveforms

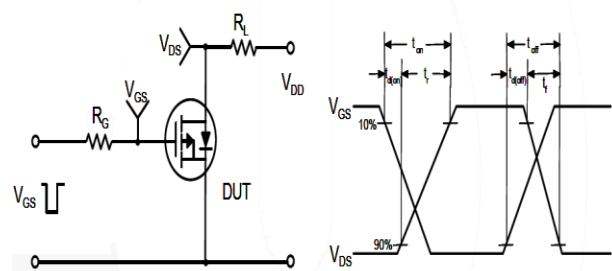
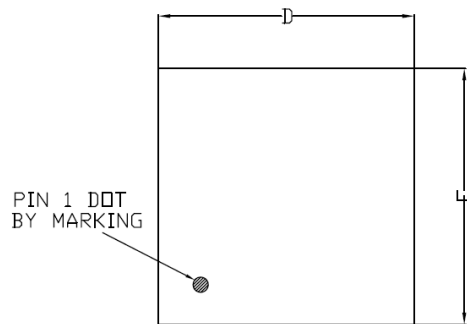
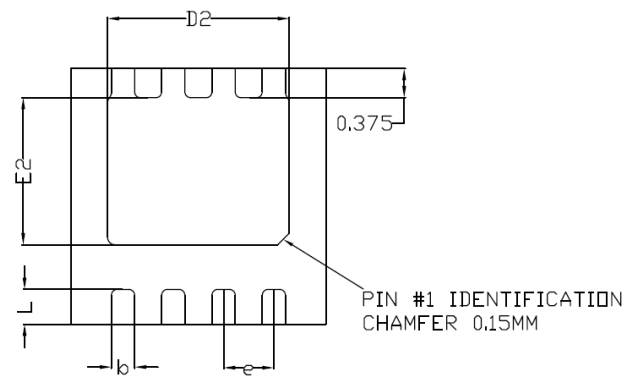


Fig11. Switching Time Test Circuit and waveforms

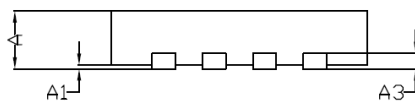
TDFN3.3x3.3 Package Outline Data



TOP VIEW



BOTTOM VIEW



SIDE VIEW

Lead finish : NiPdAu

DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	0.70	0.75	0.80	A1	0.00	--	0.05
A3	0.20 REF			D	3.25	3.30	3.35
E	3.25	3.30	3.35	D2	2.30	2.35	2.40
E2	1.85	1.90	1.95	b	0.25	0.30	0.35
L	0.35	0.45	0.55	e	0.65 BSC		

Customer Service

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