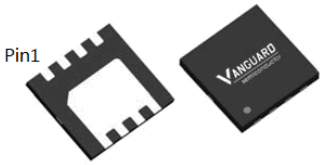
Features

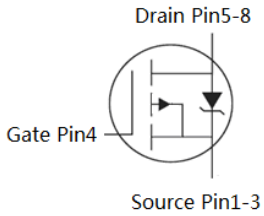
- P-Channel，-2.5V Logic Level Control
- Enhancement mode
- Very low on-resistance RDS(on) @ V_{GS}=-4.5 V
- 100 Avalanche Tested
- Fast Switching
- Pb-free lead plating; RoHS compliant

V_{DS}	-12	V
$R_{DS(on),TYP}$@ V_{GS}=-4.5 V	4.8	mΩ
$R_{DS(on),TYP}$@ V_{GS}=-2.5V	6	mΩ
I_D	-65	A

TDFN3.3x3.3



Pb-Free RoHS HF Halogen-Free



Part ID	Package Type	Marking	Tape and reel information
VSB004P02KS	TDFN3.3x3.3	004P02K	5000pcs/reel

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

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage		-12	V
I_S	Diode continuous forward current	T_A =25°C	-65	A
I_D	Continuous drain current@V_{GS}=-4.5V	T_A =25°C	-65	A
		T_A =100°C	-42	A
I_{DM}	Pulse drain current tested ①	T_A =25°C	-260	A
EAS	Avalanche energy, single pulsed ②		12	mJ
P_D	Maximum power dissipation	T_A =25°C	42	W
V_{GS}	Gate-Source voltage		±8	V
T_{STG} T_J	Storage and operating temperature range		-55 to 150	°C
Thermal Characteristics				
$R_{\theta JC}$	Thermal Resistance-Junction to Case		3.0	°C/W
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		35	°C/W

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	-12	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current(Tc=25℃)	V_{DS}=-9.6V,V_{GS}=0V	--	--	-1	μA
	Zero Gate Voltage Drain Current(Tc=125℃)	V_{DS}=-9.6V,V_{GS}=0V	--	--	-100	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±8V,V_{DS}=0V	--	--	±100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=-250μA	-0.4	--	-1	V
$R_{DS(ON)}$	Drain-Source On-State Resistance③	V_{GS}=-4.5V, I_D=-20A	--	4.8	6	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance③	V_{GS}=-2.5V, I_D=-16A	--	6	8	mΩ
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=-6V,V_{GS}=0V, f=1MHz	--	6580	--	pF
C_{oss}	Output Capacitance		--	2065	--	pF
C_{rss}	Reverse Transfer Capacitance		--	2060	--	pF
R_g	Gate Resistance	f=1MHz		42		Ω
Q_g	Total Gate Charge	V_{DS}=-6V,I_D=-20A, V_{GS}=-4.5V	--	73	--	nC
Q_{gs}	Gate-Source Charge		--	15	--	nC
Q_{gd}	Gate-Drain Charge		--	16	--	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=-6V, I_D=-20A, R_G=6Ω, V_{GS}=-4.5V	--	26	--	nS
t_r	Turn-on Rise Time		--	38	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	195	--	nS
t_f	Turn-Off Fall Time		--	89	--	nS
Source- Drain Diode Characteristics@ T_J = 25°C (unless otherwise stated)						
V_{SD}	Forward on voltage	I_{SD}=-20A,V_{GS}=0V	--	-0.8	-1.2	V
t_{rr}	Reverse Recovery Time	T_j=25℃,I_{sd}=-20A, V_{GS}=0V di/dt=-100A/μs	--	38	--	nS
Q_{rr}	Reverse Recovery Charge			20		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} =-7A, V_{GS} =-5V. Part not recommended for use above this value

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

Typical Characteristics

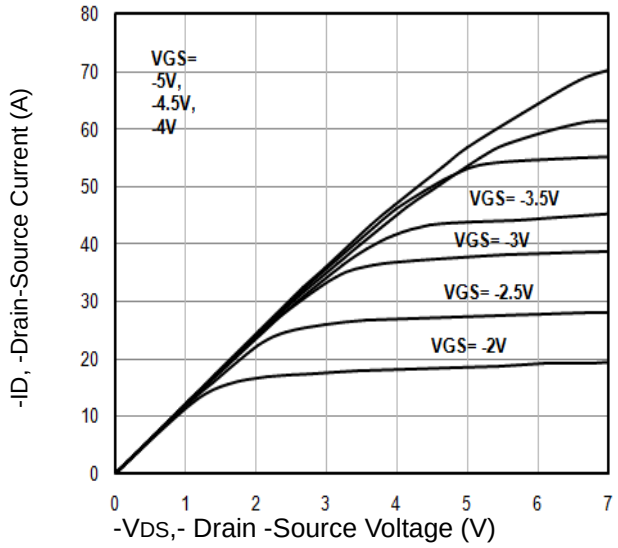


Fig1. Typical Output Characteristics

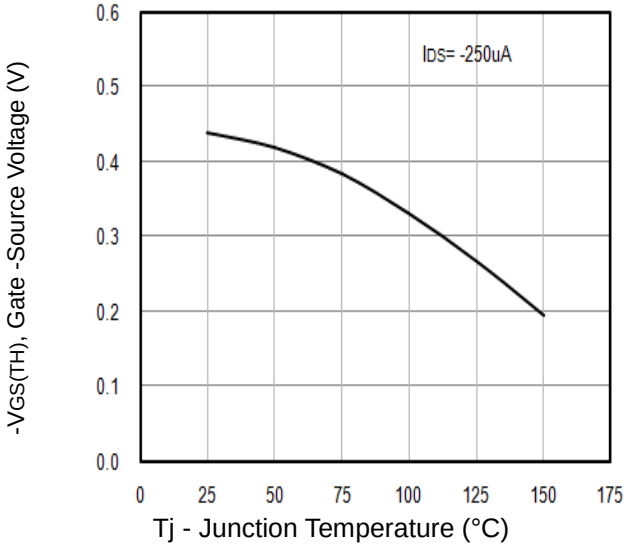


Fig2. Threshold Voltage Vs. Temperature

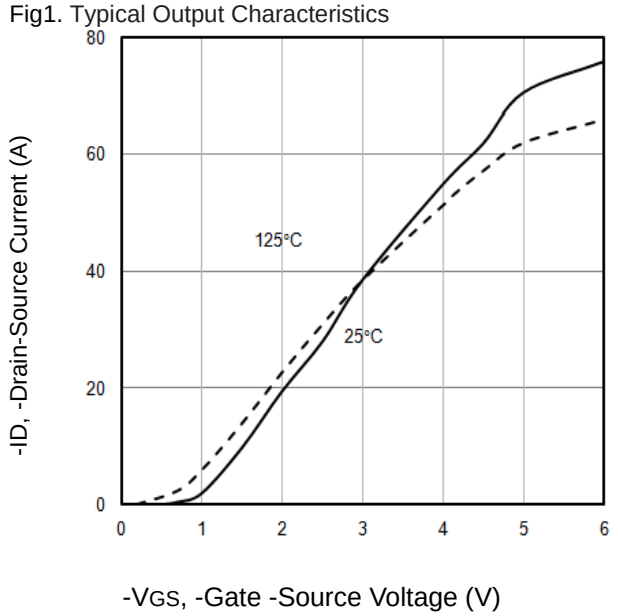


Fig3. Typical Transfer Characteristics

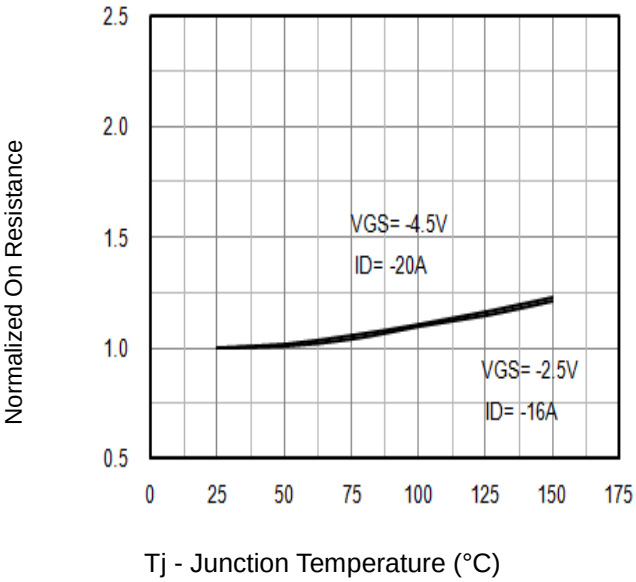


Fig4. Normalized On-Resistance Vs. Temperature

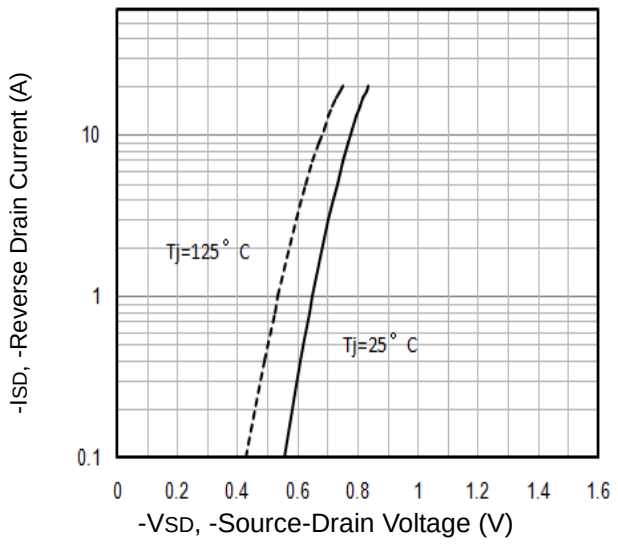


Fig5. Typical Source-Drain Diode Forward Voltage

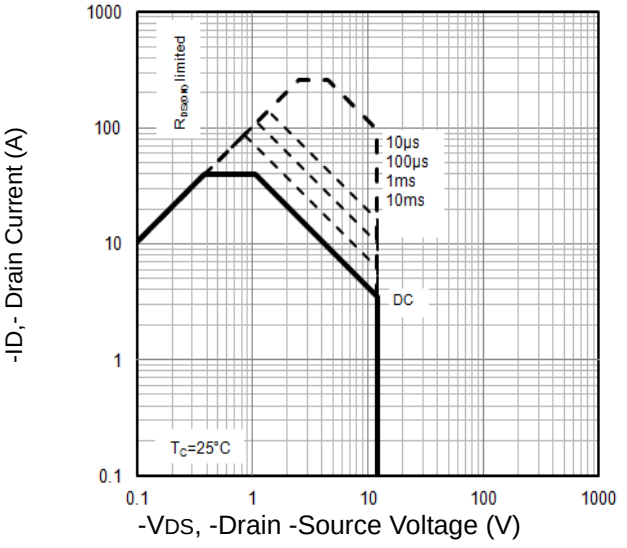


Fig6. Maximum Safe Operating Area

Typical Characteristics

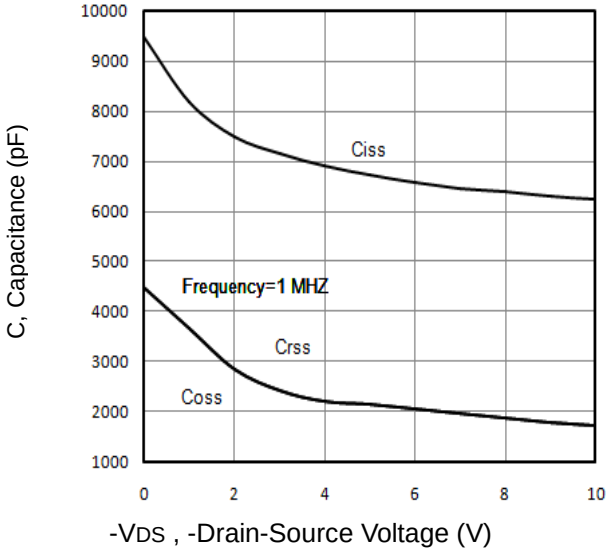


Fig7. Typical Capacitance Vs.Drain-Source Voltage

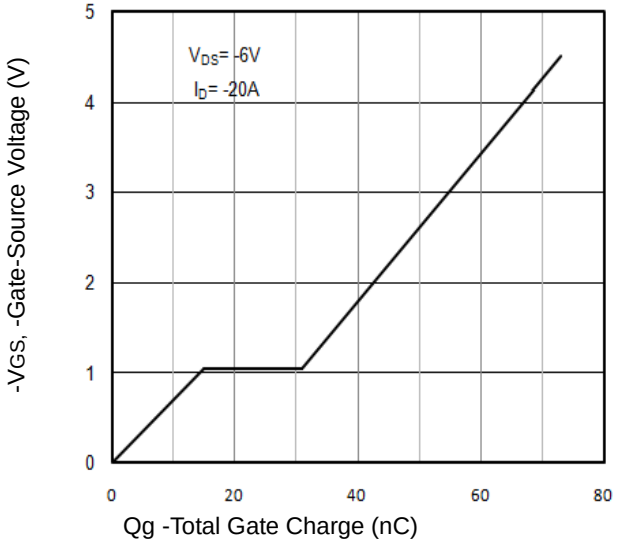


Fig8. Typical Gate Charge Vs.Gate-Source Voltage

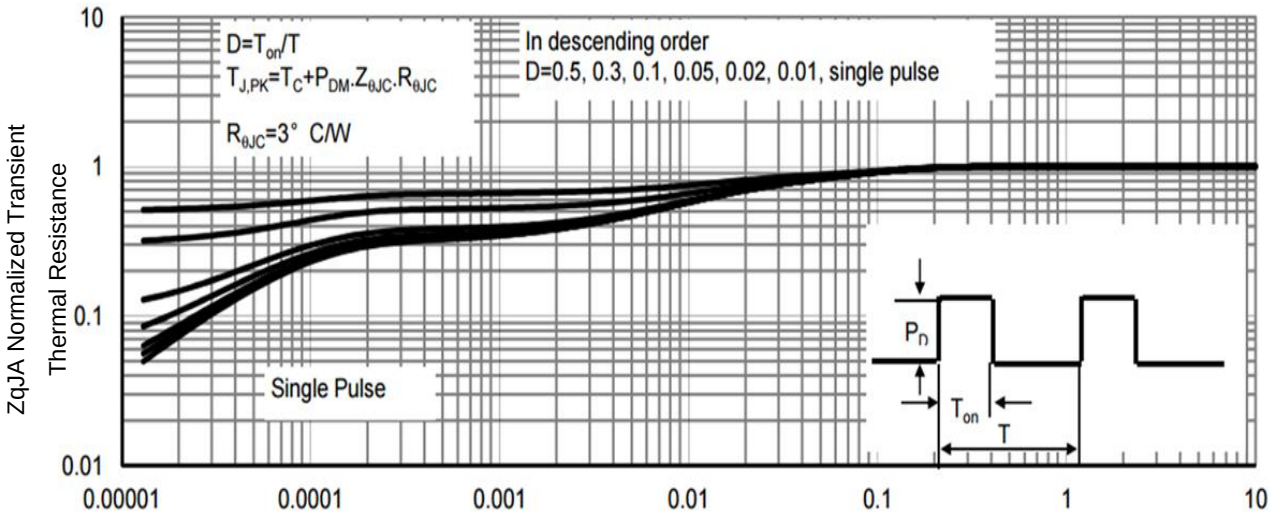


Figure 9: Normalized Maximum Transient Thermal

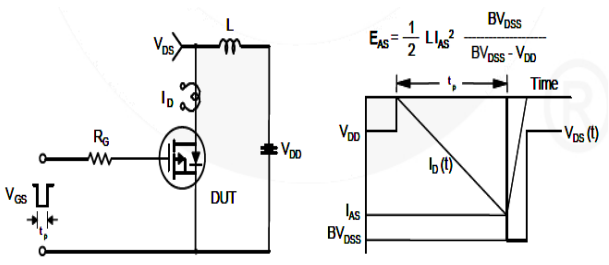


Fig10. Unclamped Inductive Test Circuit and Waveforms

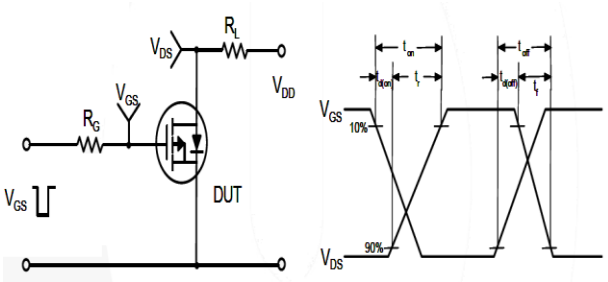
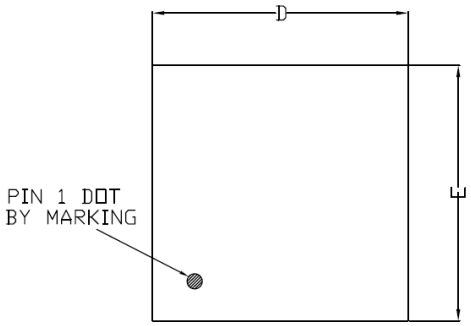
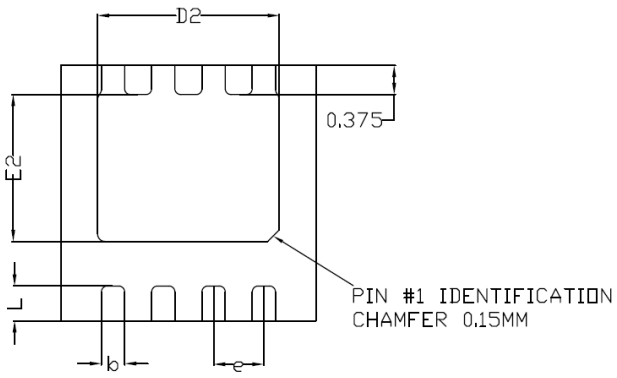


Fig11. Switching Time Test Circuit and waveforms

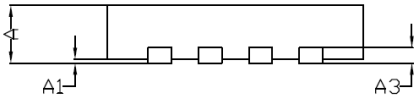
TDFN3.3x3.3 Package Outline Data



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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