VSD005N05LS

50V/80A N-Channel Advanced Power MOSFET

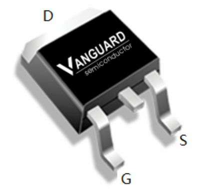
V_{DS}	50	V
$R_{DS(on),TYP}$@ V_{GS}=5V	4.5	mΩ
$R_{DS(on),TYP}$@ V_{GS}=3.3V	4.9	mΩ
I_D	80	A

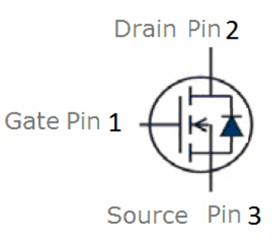
Features

- N-Channel，3.3V Logic Level Control
- Enhancement mode
- Very low on-resistance $R_{DS(on)}$ @ V_{GS}=3.3 V
- Fast Switching
- 100% Avalanche Tested
- Pb-free lead plating; RoHS compliant

Pb-Free RoHS HF Halogen-Free

TO-252





Part ID	Package Type	Marking	Tape and reel information
VSD005N05LS	TO-252	005N05L	2500pcs/Reel

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

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage		50	V
I_S	Diode continuous forward current	T_C =25°C	80	A
I_D	Continuous drain current@V_{GS}=5V	T_C =25°C	80	A
		T_A =100°C	51	A
I_{DM}	Pulse drain current tested ①	T_C =25°C	320	A
IAS	Avalanche current	L=0.3mH	55	A
EAS	Avalanche energy, single pulsed ②		135	mJ
P_D	Maximum power dissipation	T_A =25°C	83	W
V_{GS}	Gate-Source voltage		±12	V
T_{STG} T_J	Storage and operating temperature range		-55 to 175	°C

Thermal Characteristics

Symbol	Parameter	Typical	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	1.8	°C/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	48	°C/W

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ T_C = 25°C (unless otherwise stated)						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	50	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current(Tc=25℃)	V_{DS}=50V,V_{GS}=0V	--	--	1	μA
	Zero Gate Voltage Drain Current(Tc=125℃)	V_{DS}=50V,V_{GS}=0V	--	--	100	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±12V,V_{DS}=0V	--	--	±100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	0.5	1.0	1.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance③	V_{GS}=5V, I_D=30A	--	4.5	5.0	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance③	V_{GS}=4.5V, I_D=20A	--	4.7	6.0	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance③	V_{GS}=3.3V,I_D=5A	--	4.9	8.0	mΩ
Dynamic Electrical Characteristics @ T_C= 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=25V,V_{GS}=0V, f=1MHz	--	7820	--	pF
C_{oss}	Output Capacitance		--	285	--	pF
C_{rss}	Reverse Transfer Capacitance		--	175	--	pF
Q_g	Total Gate Charge	V_{DS}=25V,I_D=10A, V_{GS}=5V	--	47	--	nC
Q_{gs}	Gate-Source Charge		--	11	--	nC
Q_{gd}	Gate-Drain Charge		--	14	--	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=20V, I_D=10A, R_G=3.5Ω, V_{GS}=5V	--	10	--	nS
t_r	Turn-on Rise Time		--	21	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	45	--	nS
t_f	Turn-Off Fall Time		--	25	--	nS
Source- Drain Diode Characteristics@ T_C = 25°C (unless otherwise stated)						
V_{SD}	Forward on voltage	I_{SD}=30A,V_{GS}=0V	--	0.80	1.2	V
t_{rr}	Reverse Recovery Time	T_j=25℃,I_{sd}=20A, di/dt=500A/μs	--	36	--	nS
Q_{rr}	Reverse Recovery Charge			41		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} = 30A, V_{GS} =5V. Part not recommended for use above this value

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

Typical Characteristics

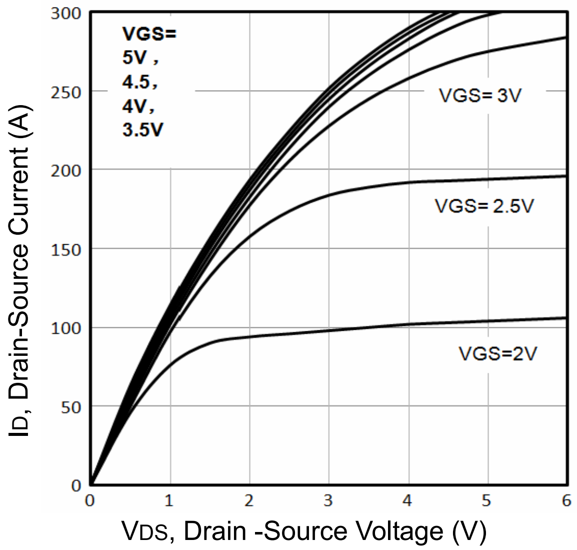


Fig1. Typical Output Characteristics

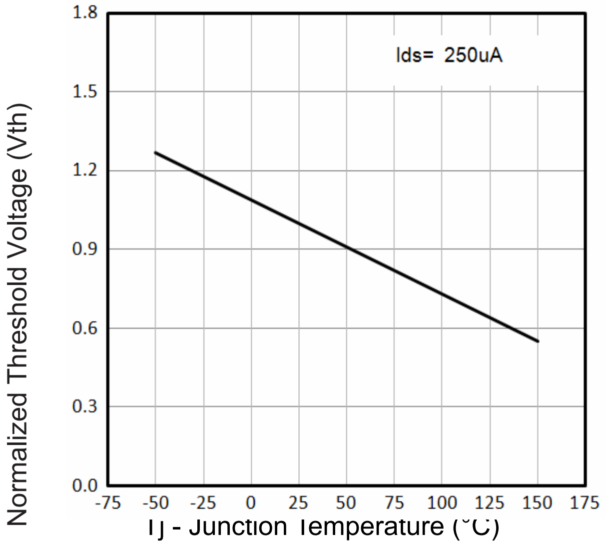


Fig2. Normalized Threshold Voltage Vs. Temperature

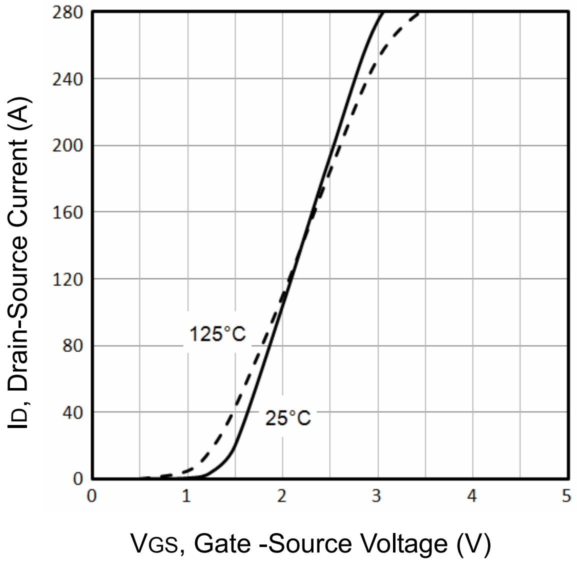


Fig3. Typical Transfer Characteristics

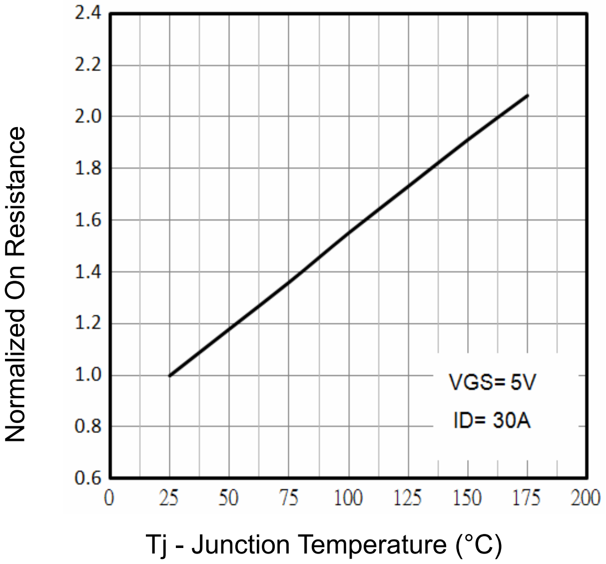


Fig4. Normalized On-Resistance Vs. Temperature

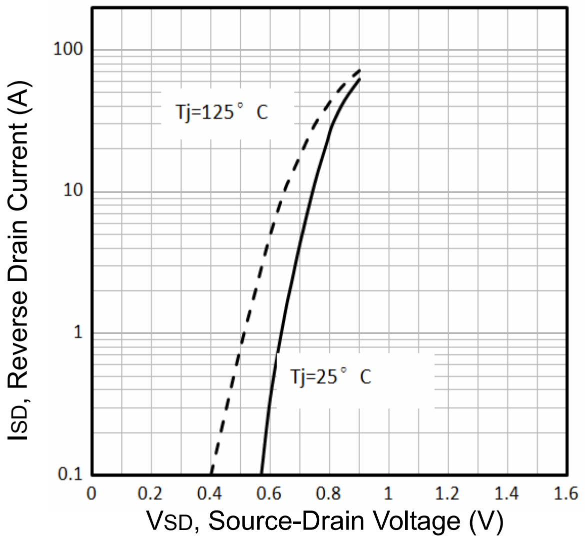


Fig5. Typical Source-Drain Diode Forward Voltage

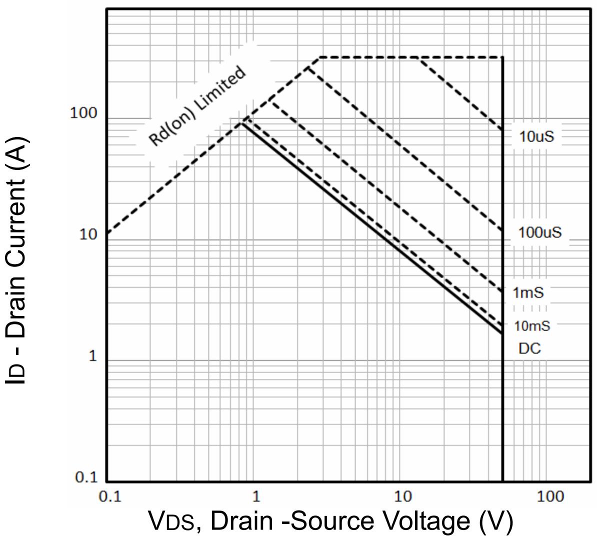


Fig6. Maximum Safe Operating Area

Typical Characteristics

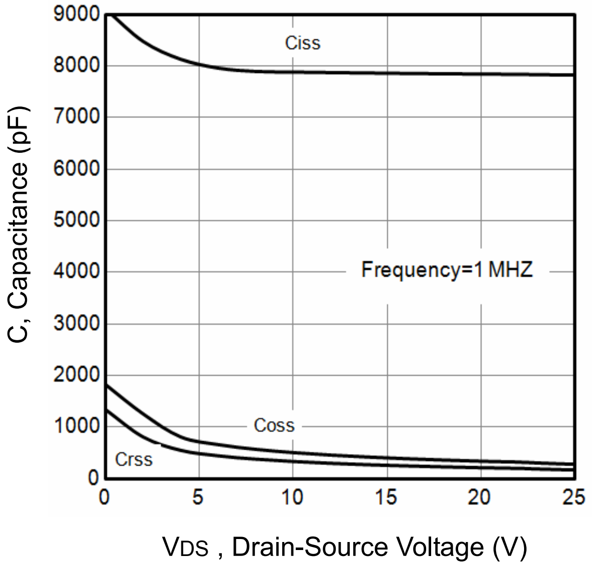


Fig7. Typical Capacitance Vs.Drain-Source Voltage

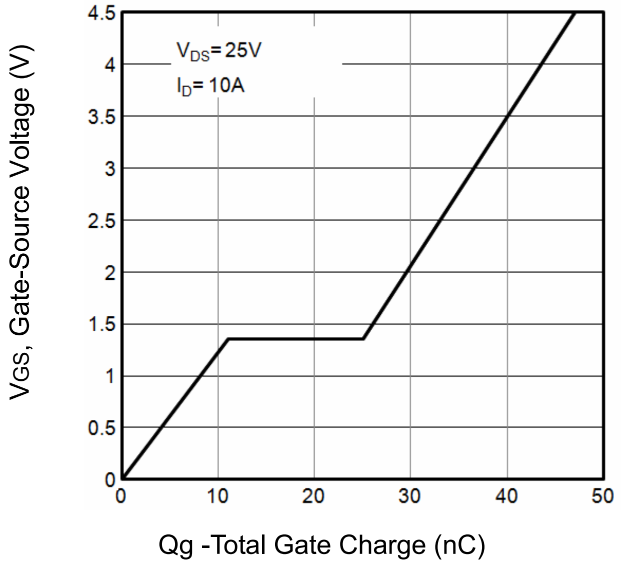


Fig8. Typical Gate Charge Vs.Gate-Source

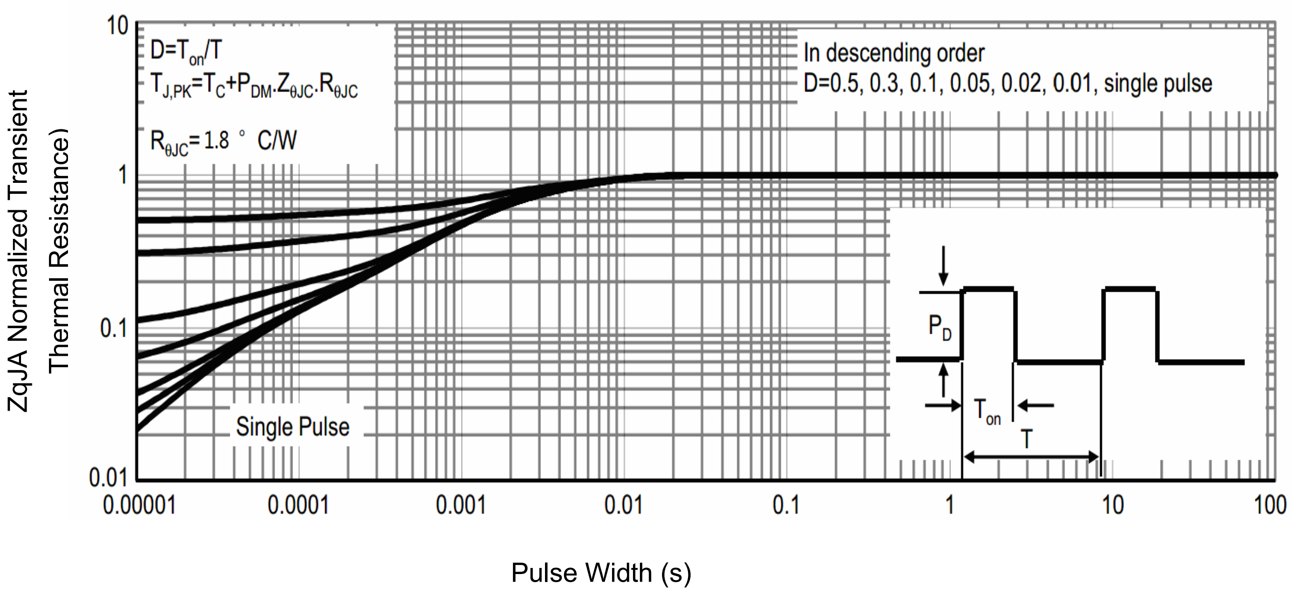


Fig9 . Normalized Maximum Transient Thermal Impedance

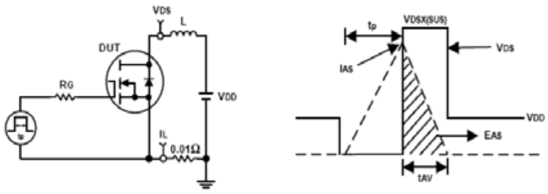


Fig10. Unclamped Inductive Test Circuit and waveforms

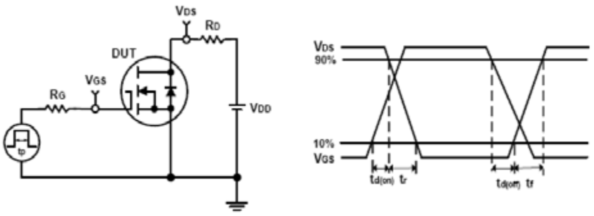
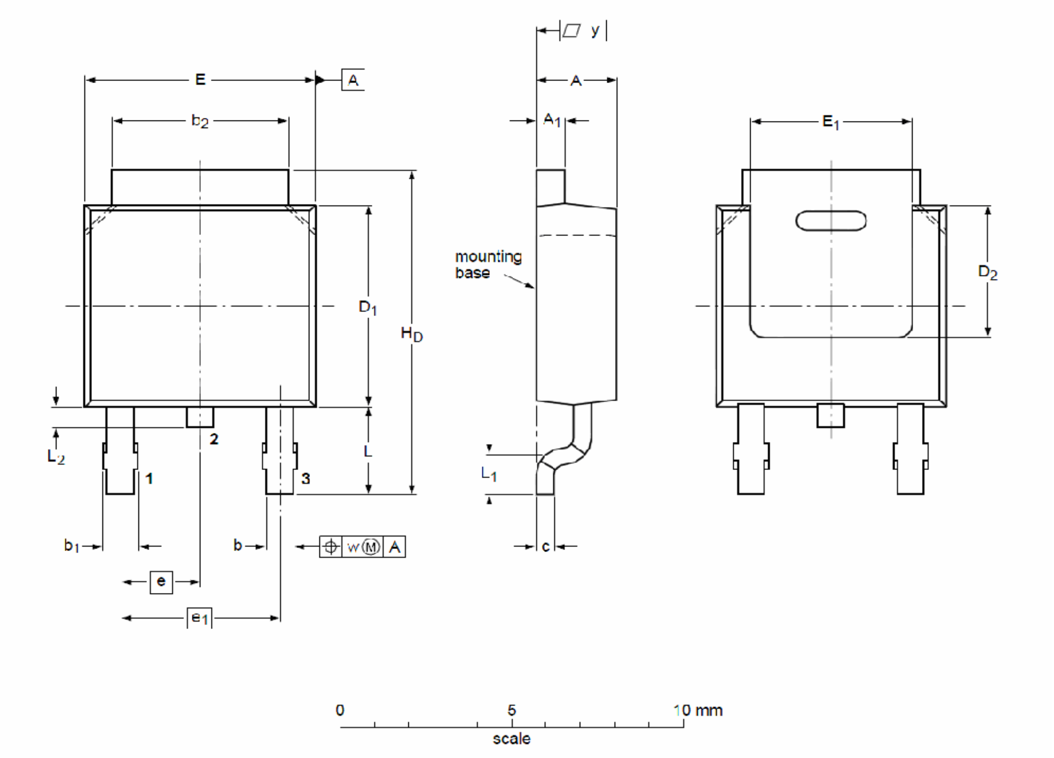


Fig11. Switching Time Test Circuit and waveforms

TO-252 Package Outline



DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	2.22	2.30	2.38	**A_1**	0.46	0.58	0.93
b	0.71	0.79	0.89	**b_1**	0.90	0.98	1.10
b_2	5.00	5.30	5.46	**c**	0.20	0.40	0.56
D_1	5.98	6.05	6.22	**D_2**	--	4.00	--
E	6.47	6.60	6.73	**E_1**	5.10	5.28	5.45
e	--	2.28	--	**e_1**	--	4.57	--
H_D	9.60	10.08	10.40	**L**	2.75	2.95	3.05
L_1	--	0.50	--	**L_2**	0.80	0.90	1.10
w	--	0.20	--	**y**	0.20	--	--

Customer Service

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