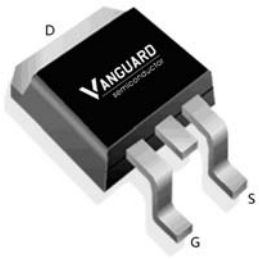
V_{DS}	60	V
$R_{DS(on),TYP}$@ V_{GS}=10V	3.7	mΩ
I_D	140	A

Features

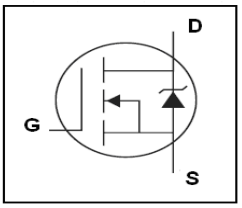
- N-Channel，10V Logic Level Control
- Enhancement mode
- Very low on-resistance
- Fast Switching
- 100% Avalanche Tested
- Pb-free lead plating; RoHS compliant

Pb-Free RoHS

TO-263



Part ID	Package Type	Marking	Tape and reel information
VSM003N06HS	TO-263	003N06H	800pcs/Reel



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	140	A
I_D	Continuous drain current@VGS=10V	T_C=25°C	140	A
		T_C=100°C	90	A
I_{DM}	Pulse drain current tested ①	T_C=25°C	560	A
IAS	Avalanche current	L=0.5mH	48	A
EAS	Avalanche energy, single pulsed ②		100	mJ
P_D	Maximum power dissipation	T_C=25°C	175	W
VGS	Gate-Source voltage		±20	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	0.85	°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	60	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current(Tc=25℃)	V_{DS}=60V,V_{GS}=0V	--	--	1	μA
	Zero Gate Voltage Drain Current(Tc=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	2.0	3.0	4.0	V
$R_{DS(ON)}$	Drain-Source On-State Resistance③	V_{GS}=10V, I_D=45A	--	3.7	4.5	mΩ
Dynamic Electrical Characteristics @ T_C= 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=25V,V_{GS}=0V, f=1MHz	--	5220	--	pF
C_{oss}	Output Capacitance		--	570	--	pF
C_{rss}	Reverse Transfer Capacitance		--	380	--	pF
R_g	Gate Resistance	f=1MHz	--	1.8	--	Ω
Q_g	Total Gate Charge	V_{DS}=30V,I_D=20A, V_{GS}=10V	--	124	--	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}=30V, I_D=10A, R_G=3.5Ω, V_{GS}=10V	--	26	--	nS
t_r	Turn-on Rise Time		--	23	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	45	--	nS
t_f	Turn-Off Fall Time		--	12	--	nS
Source- Drain Diode Characteristics@ T_C = 25°C (unless otherwise stated)						
V_{SD}	Forward on voltage	I_{SD}=35A,V_{GS}=0V	--	0.83	1.2	V
t_{rr}	Reverse Recovery Time	T_j=25℃,I_{sd}=20A, di/dt=500A/μs	--	32	--	nS
Q_{rr}	Reverse Recovery Charge			141		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} = 20A, V_{GS} =10V. Part not recommended for use above this value

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

Typical Characteristics

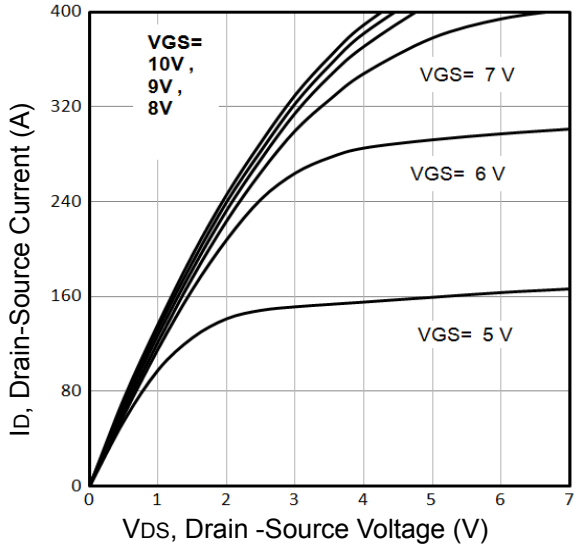


Fig1. Typical Output Characteristics

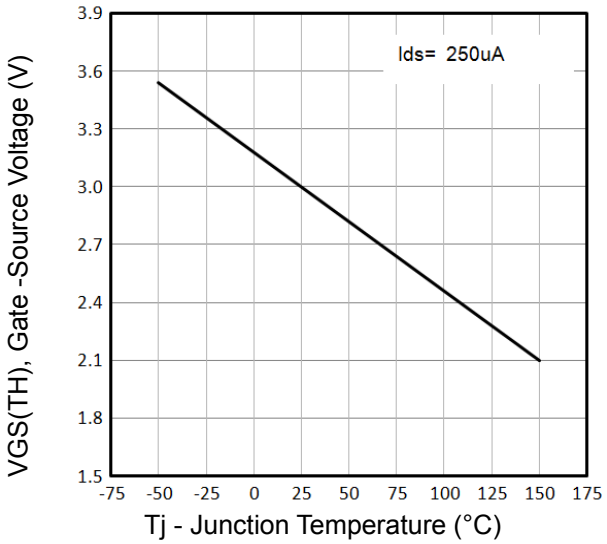


Fig2. $V_{GS(TH)}$ Gate -Source Voltage Vs.Tj

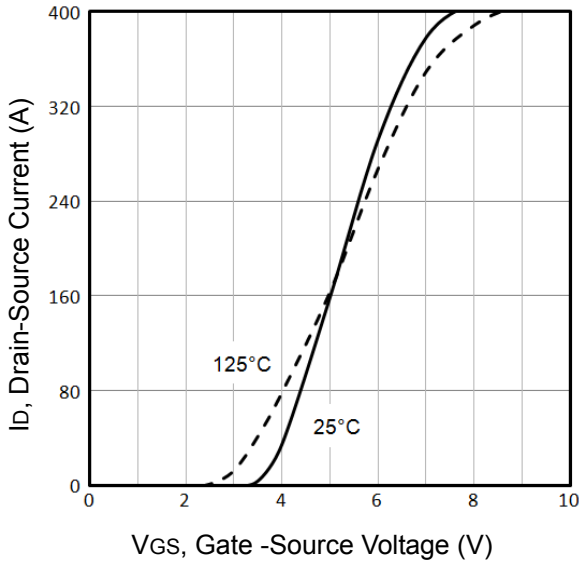


Fig3. Typical Transfer Characteristics

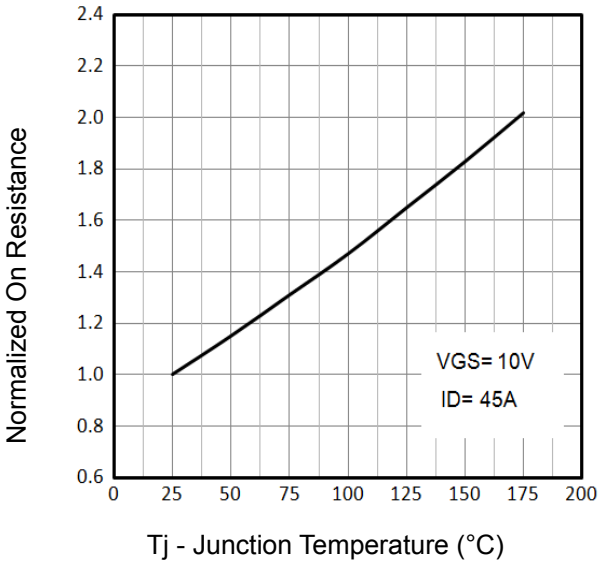


Fig4. Normalized On-Resistance Vs. Tj

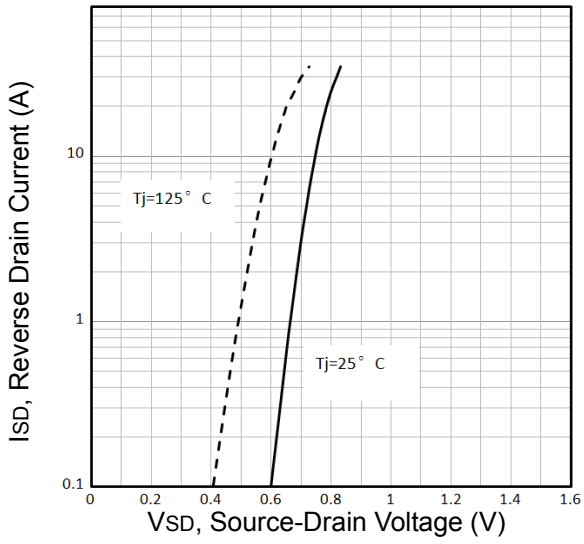


Fig5. Typical Source-Drain Diode Forward Voltage

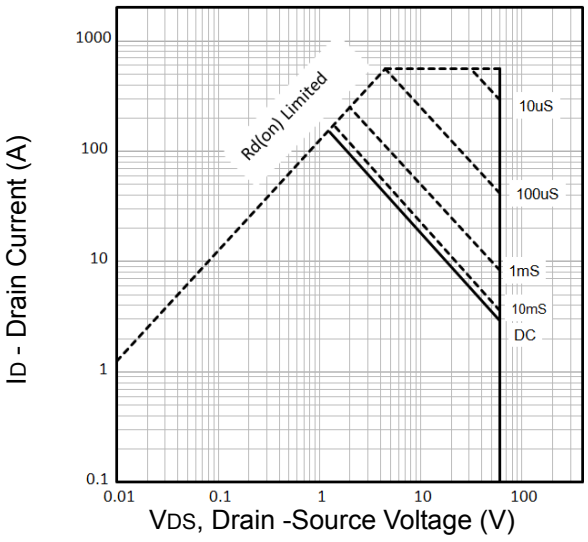


Fig6. Maximum Safe Operating Area

Typical Characteristics

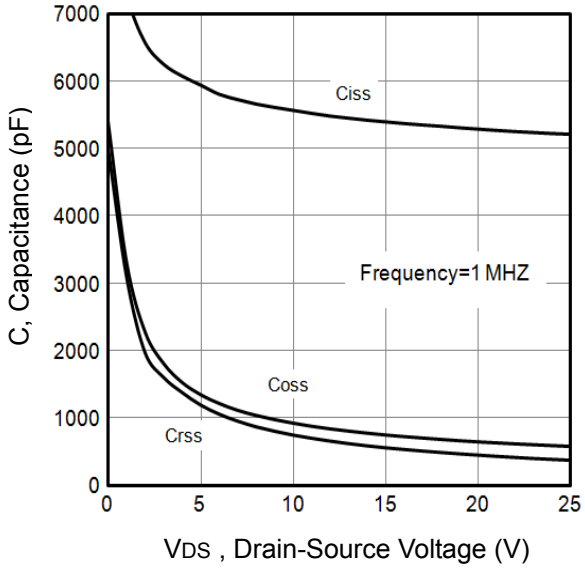


Fig7. Typical Capacitance Vs.Drain-Source Voltage

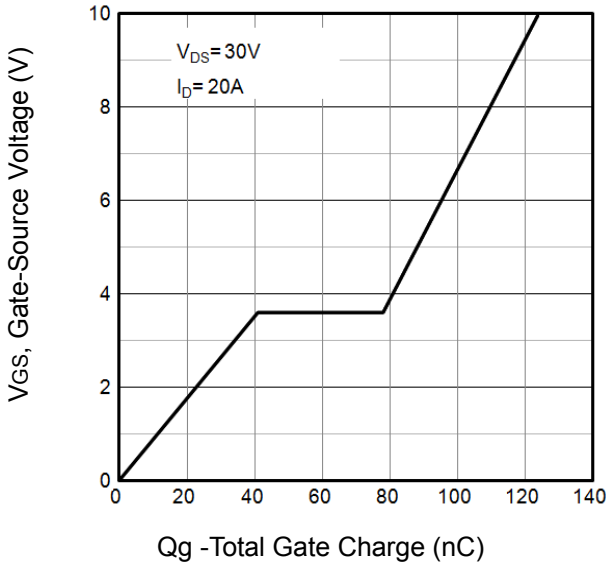


Fig8. Typical Gate Charge Vs.Gate-Source

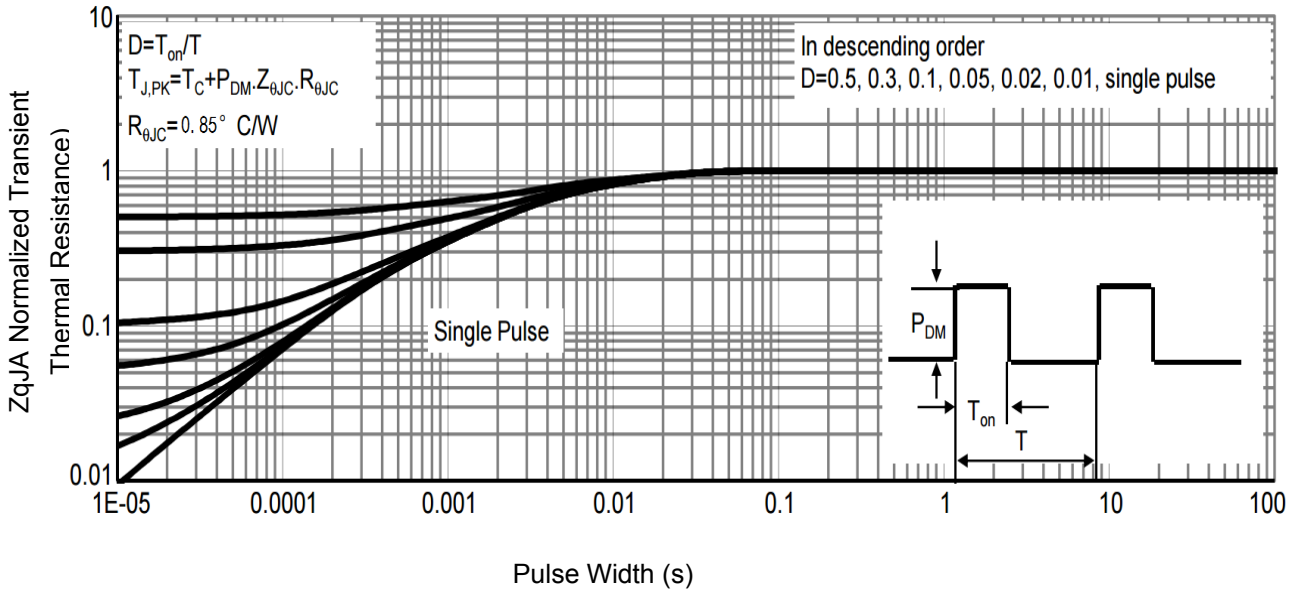


Fig9 . Normalized Maximum Transient Thermal Impedance

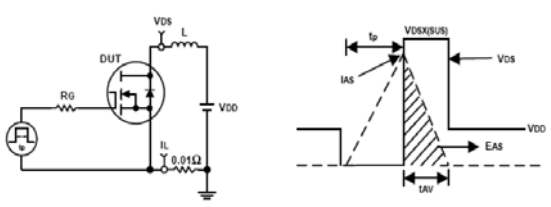


Fig10. Unclamped Inductive Test Circuit and waveforms

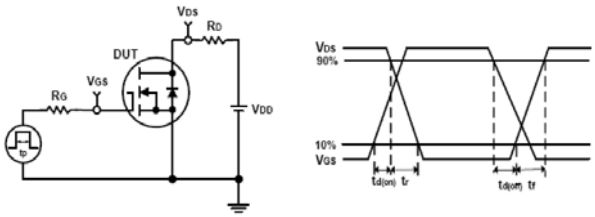
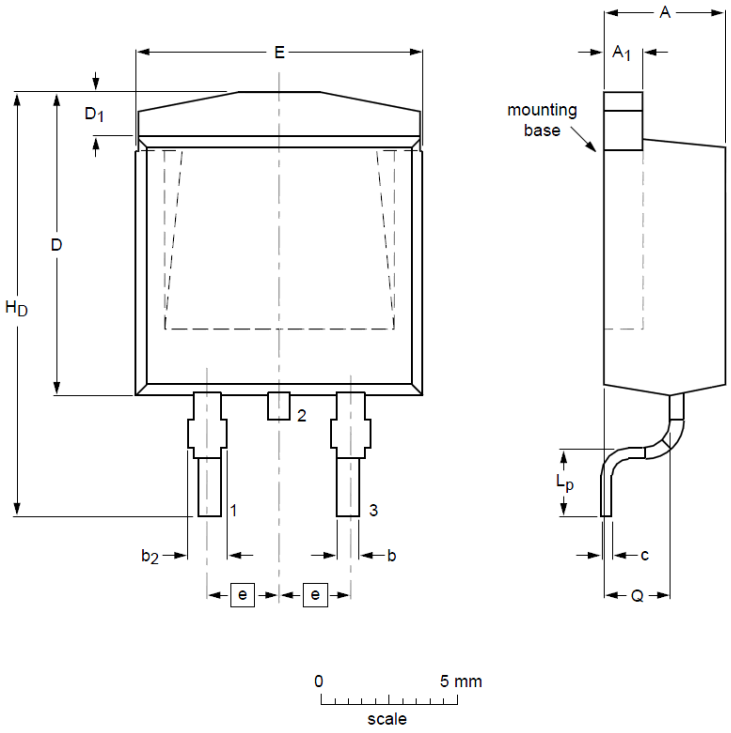


Fig11. Switching Time Test Circuit and waveforms

TO-263 Package Outline Data



DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	4.40	4.55	4.70	**A_1**	1.25	1.30	1.40
b	0.60	0.76	0.85	**b_2**	1.05	1.30	1.45
c	0.35	0.45	0.60	**D**	9.80	10.20	10.50
D_1	1.20	1.51	1.60	**E**	9.70	10.10	10.30
e	--	2.54	--	**H_D**	14.80	15.45	15.80
L_P	2.10	2.40	2.90	**Q**	2.20	2.50	2.60

Customer Service

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