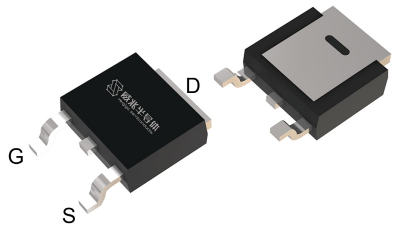
Features

- N-Channel，5V Logic Level Control
- Enhancement mode
- Very low on-resistance $R_{DS(on)}$ @ V_{GS}=4.5 V
- 100% Avalanche test
- Pb-free lead plating; RoHS compliant

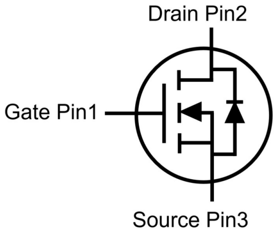
V_{DS}	30	V
$R_{DS(on),TYP}$@ V_{GS}=10 V	3	mΩ
$R_{DS(on),TYP}$@ V_{GS}=4.5 V	4.4	mΩ
I_D	105	A

TO-252



Pb-Free RoHS Halogen-Free

Part ID	Package Type	Marking	Packing
VSD005N03MS	TO-252	005N03M	2500PCS/Reel



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

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage		30	V
I_S	Diode continuous forward current	T_C =25°C	105	A
I_D	Continuous drain current @VGS=10V	T_C =25°C	105	A
		T_C =100°C	66	A
I_{DM}	Pulse drain current tested ①	T_C =25°C	420	A
EAS	Avalanche energy, single pulsed ②		81	mJ
P_D	Maximum power dissipation	T_C =25°C	54	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	2.3	°C/W
$R_{\theta JA}$	Thermal Resistance- Junction to Ambient	100	°C/W

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ Tc = 25°C (unless otherwise stated)						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	VGS=0V, ID=250μA	30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current(Tc=25℃)	VDS=30V,VGS=0V	--	--	1	μA
	Zero Gate Voltage Drain Current(Tc=125℃)	VDS=30V,VGS=0V	--	--	100	μA
I_{GSS}	Gate-Body Leakage Current	VGS=±20V,VDS=0V	--	--	±100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	VDS=VGS,ID=250μA	1	1.8	2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance③	VGS=10V, ID=20A	--	3	4	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance③	VGS=4.5V, ID=15A	--	4.4	6	mΩ
Dynamic Electrical Characteristics @ T c= 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	VDS=15V,VGS=0V, f=1MHz	--	2525	--	pF
C_{oss}	Output Capacitance		--	380	--	pF
C_{rss}	Reverse Transfer Capacitance		--	290	--	pF
R_g	Gate Resistance	f=1MHz	--	1.0	--	Ω
Q_g	Total Gate Charge	VDS=15V,ID=20A, VGS=10V	--	43	--	nC
Q_{gs}	Gate-Source Charge		--	8.6	--	nC
Q_{gd}	Gate-Drain Charge		--	7.8	--	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	VDD=15V, ID=20A, RG=3.0Ω, VGS=10V	--	9	--	ns
t_r	Turn-on Rise Time		--	6	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	42.6	--	ns
t_f	Turn-Off Fall Time		--	11.8	--	ns
Source- Drain Diode Characteristics@ Tc = 25°C (unless otherwise stated)						
V_{SD}	Forward on voltage	ISD=20A,VGS=0V	--	0.8	1.2	V
t_{rr}	Reverse Recovery Time	Tj=25℃,Isd=20A, VGS=0V di/dt=500A/μs	--	18.6	--	ns
Q_{rr}	Reverse Recovery Charge		--	32	--	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} = 18A, V_{GS} =10V. Part not recommended for use above this value

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

Typical Characteristics

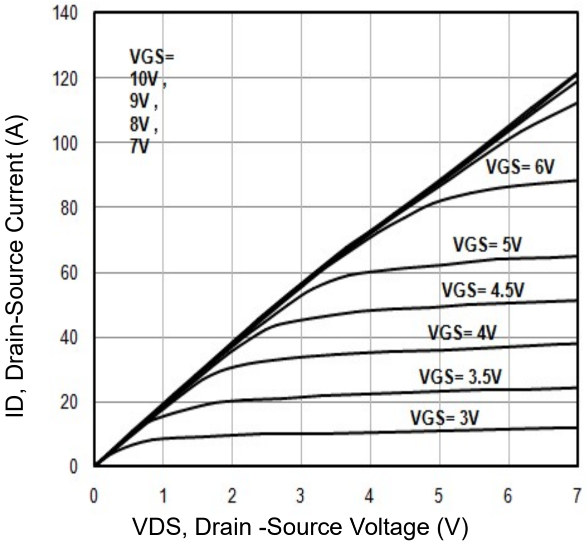


Fig1. Typical Output Characteristics

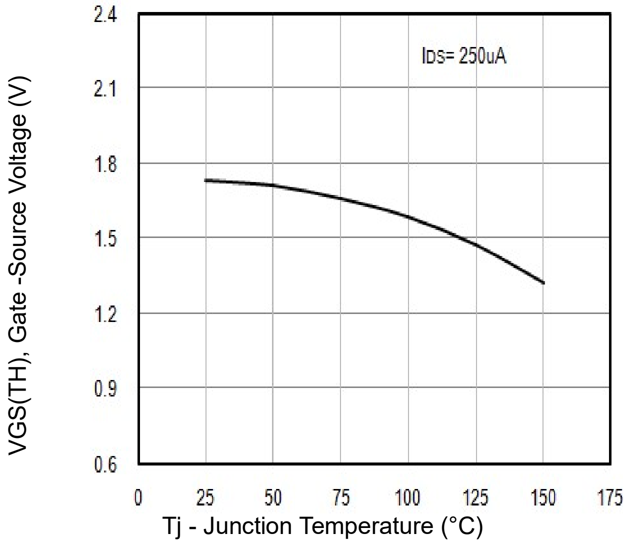


Fig2. $V_{GS(TH)}$ Gate -Source Voltage Vs.Tj

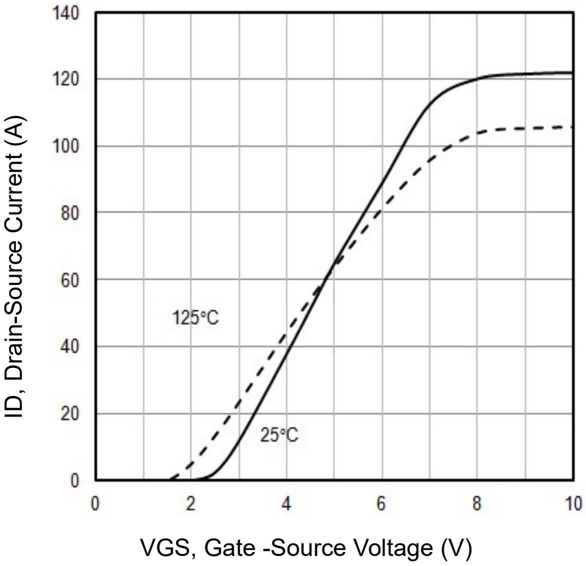


Fig3. Typical Transfer Characteristics

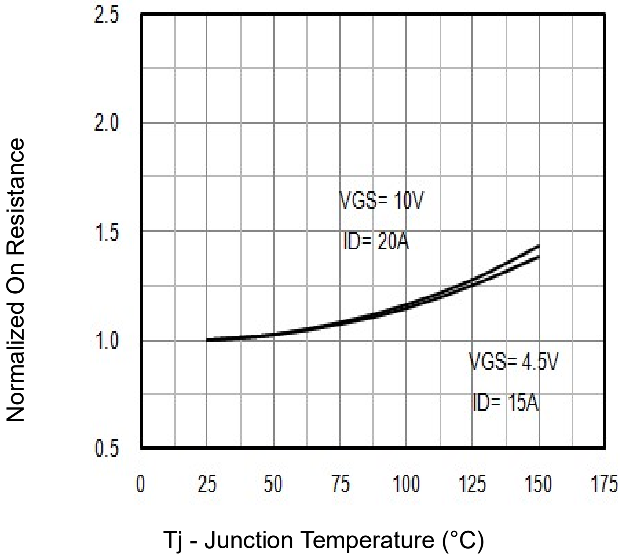


Fig4. Normalized On-Resistance Vs. Tj

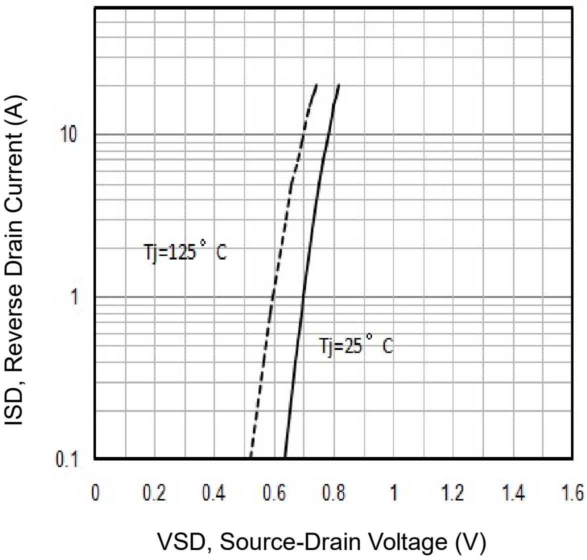


Fig5. Typical Source-Drain Diode Forward Voltage

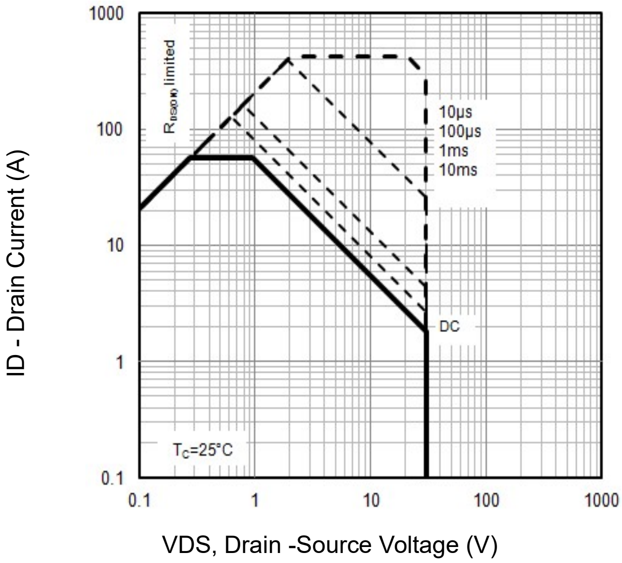


Fig6. Maximum Safe Operating Area

Typical Characteristics

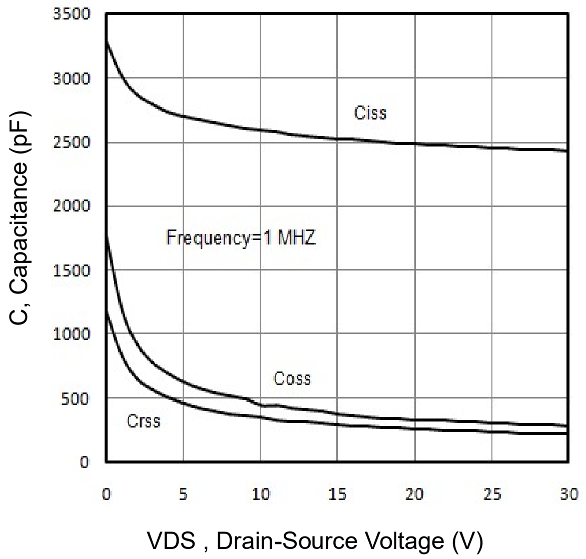


Fig7. Typical Capacitance Vs.Drain-Source Voltage

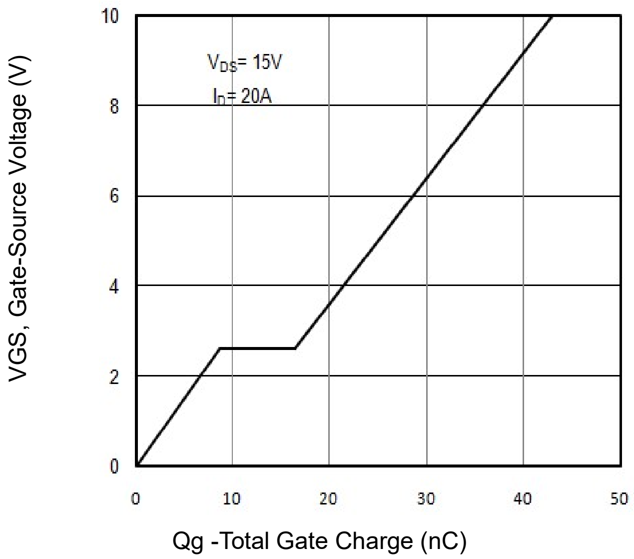


Fig8. Typical Gate Charge Vs.Gate-Source Voltage

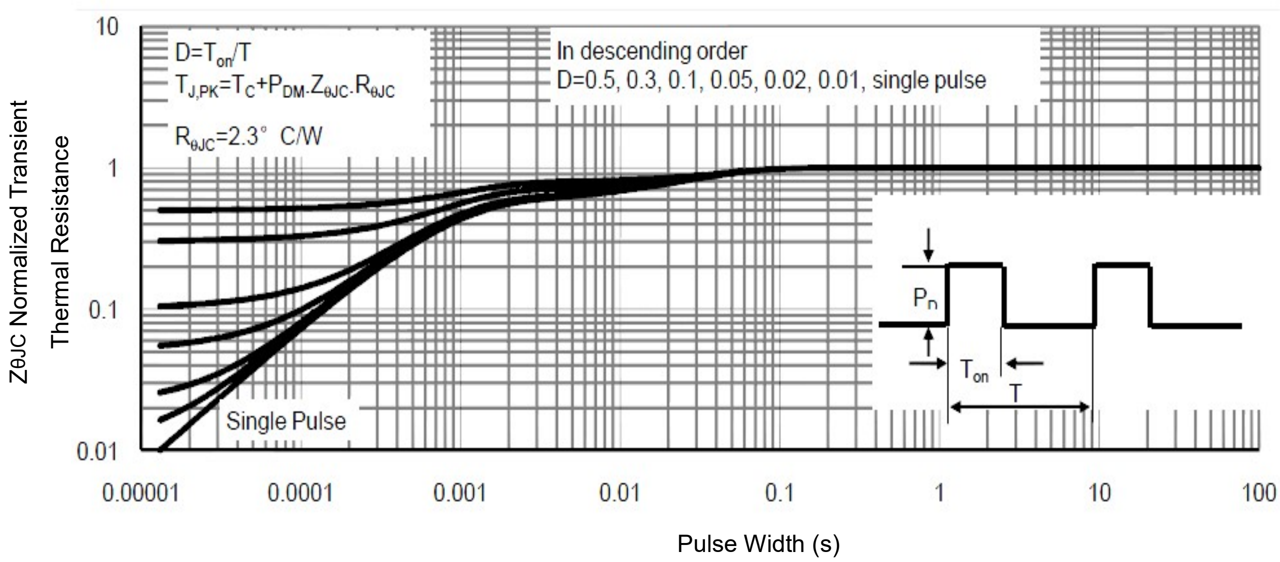


Fig9. Normalized Maximum Transient Thermal Impedance

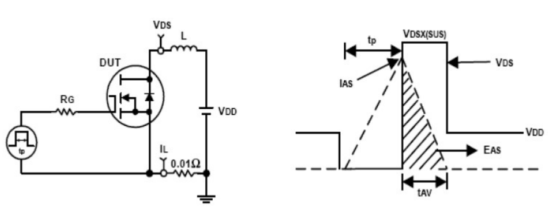


Fig10. Unclamped Inductive Test Circuit and waveforms

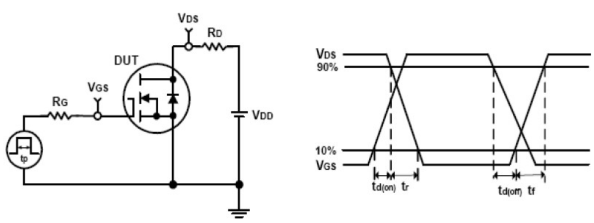
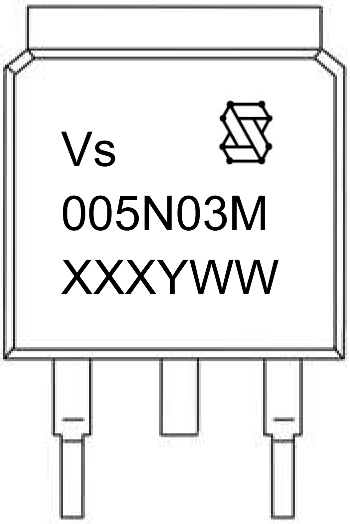


Fig11. Switching Time Test Circuit and waveforms

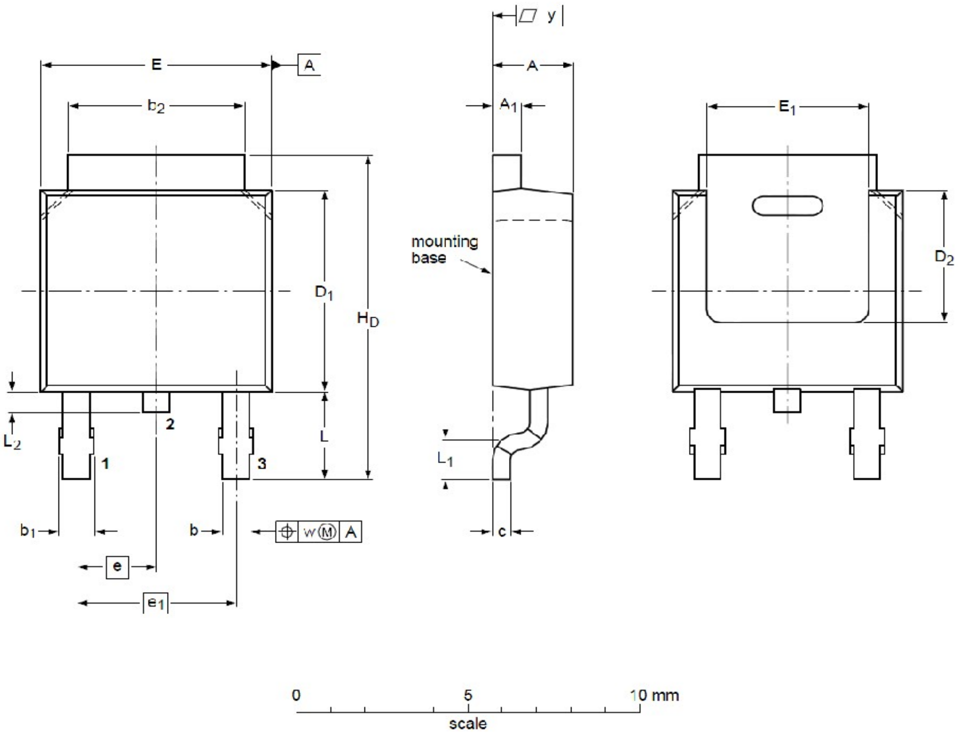
Marking Information



1st line：　Vergiga Code（Vs），　Vergiga Logo
2nd line：　Part Number（005N03M）
3rd line：　Date code　（XXXYWW）
　XXX：　Wafer Lot Number Code , code changed with Lot Number
　Y：　Year Code , refer to table below
　WW：　Week Code (01 to 53)

Code	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T
Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030

TO-252 Package Outline Data



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

Sales and Service:
sales@vgsemi.com

Vergiga Semiconductor CO., LTD
TEL: (86-755) -26902410
FAX: (86-755) -26907027
WEB: www.vgsemi.com