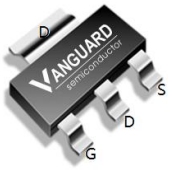
Features

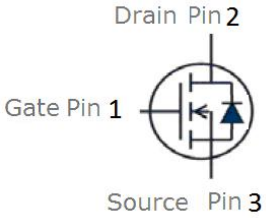
- Enhancement mode
- Fast Switching and High efficiency
- Pb-free lead plating; RoHS compliant

V_{DS}	100	V
$R_{DS(on),TYP}$@ V_{GS}=10 V	135	mΩ
$R_{DS(on),TYP}$@ V_{GS}=4.5 V	150	mΩ
I_D	3	A

SOT223



Pb-Free RoHS HF Halogen-Free



Part ID	Package Type	Marking	Tape and reel information
VSZ160N10MS	SOT223	160N10M	2500PCS/Reel

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

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage		100	V
V_{GS}	Gate-Source voltage		±20	V
I_S	Diode continuous forward current	T_A=25°C	2	A
I_D	Continuous drain current @VGS=10V	T_A=25°C	3	A
		T_A=100°C	2	A
I_{DM}	Pulse drain current tested ①	T_A=25°C	12	A
P_D	Maximum power dissipation	T_A=25°C	2.5	W
T_{STG}, T_J	Storage and junction temperature range		-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typical	Unit
$R_{\theta JL}$	Thermal Resistance, Junction-to-Lead	15	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	50	°C/W

Electrical Characteristics

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	100	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=100V,V_{GS}=0V	--	--	1	uA
	Zero Gate Voltage Drain Current(T_j=125℃)	V_{DS}=100V,V_{GS}=0V	--	--	100	uA
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	1.3	1.8	2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance ②	V_{GS}=10V, I_D=2A	--	135	175	mΩ
		T_j=100℃	--	195	--	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance ②	V_{GS}=4.5V, I_D=1.5A	--	150	195	mΩ
Dynamic Electrical Characteristics @ T_j = 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=30V,V_{GS}=0V, f=1MHz	255	300	345	pF
C_{oss}	Output Capacitance		--	25	50	pF
C_{rss}	Reverse Transfer Capacitance		--	20	40	pF
R_g	Gate Resistance	f=1MHz	--	2.7	--	Ω
Q_g (10V)	Total Gate Charge	V_{DS}=50V,I_D=3A, V_{GS}=10V	--	9	--	nC
Q_g (4.5V)	Total Gate Charge		--	4.7	--	nC
Q_{gs}	Gate-Source Charge		--	1.2	--	nC
Q_{gd}	Gate-Drain Charge		--	2.4	--	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=50V, I_D=3A, R_G=3.0Ω, V_{GS}=10V	--	4.4	--	ns
t_r	Turn-on Rise Time		--	2.6	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	12	--	ns
t_f	Turn-Off Fall Time		--	4.4	--	ns
Source- Drain Diode Characteristics@ T_j = 25°C (unless otherwise stated)						
V_{SD}	Forward on voltage	I_{SD}=2A,V_{GS}=0V	--	0.8	1.2	V
t_{rr}	Reverse Recovery Time	T_j=25℃,I_{sd}=3A, V_{GS}=0V di/dt=100A/μs	--	15	--	ns
Q_{rr}	Reverse Recovery Charge		--	11	--	nC

NOTE:

① Repetitive rating; pulse width limited by max junction temperature.

② Pulse width ≤ 380μs; duty cycle≤ 2%.

Typical Characteristics

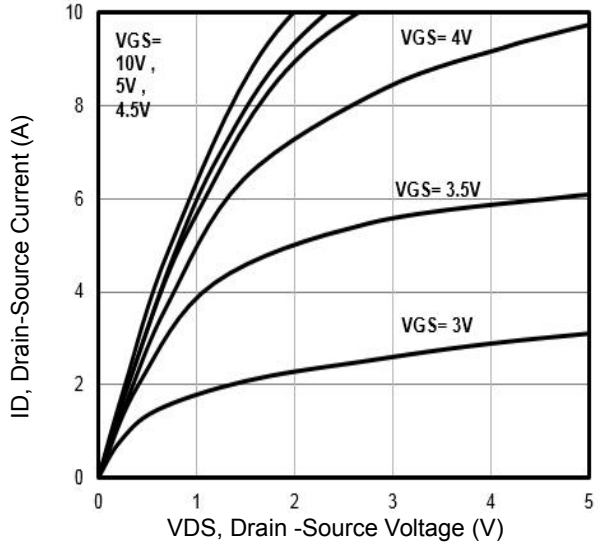


Fig1. Typical Output Characteristics

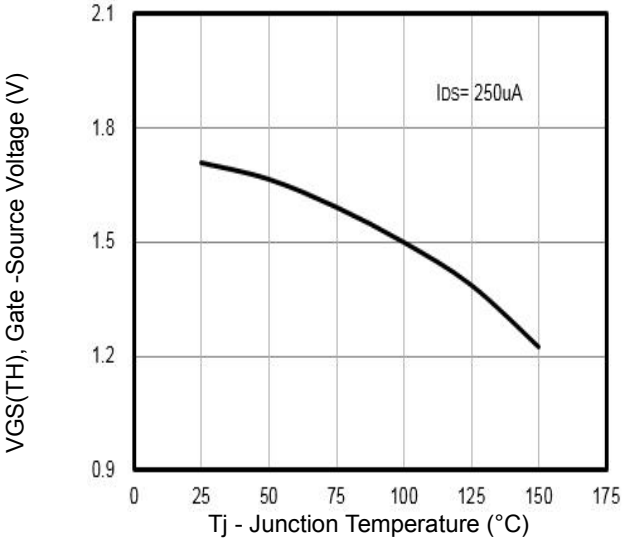


Fig2. $V_{GS(TH)}$ Gate -Source Voltage Vs. Tj

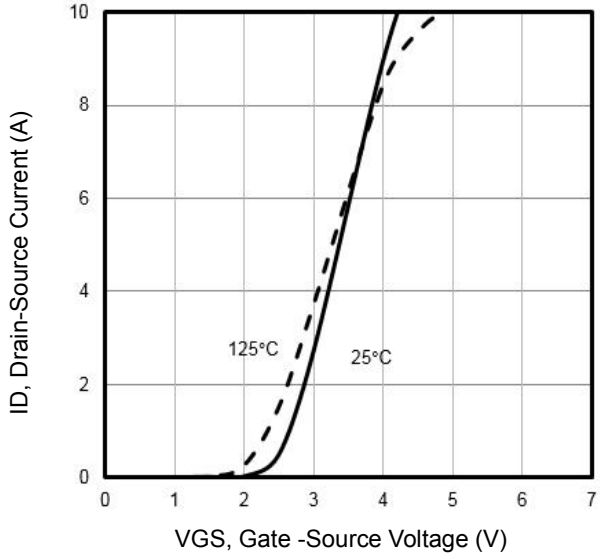


Fig3. Typical Transfer Characteristics

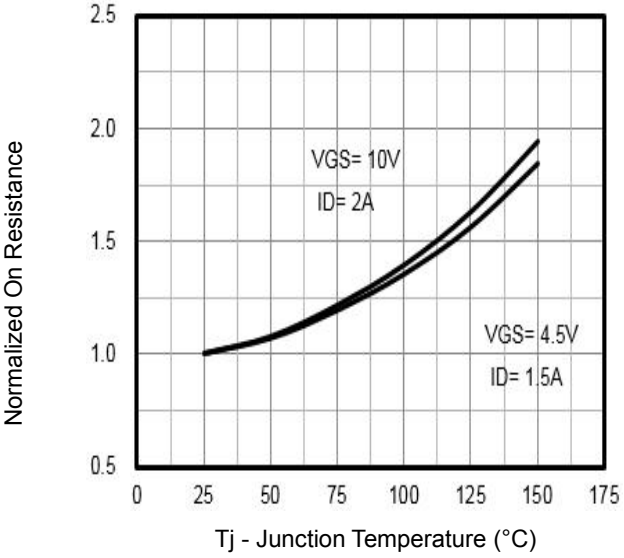


Fig4. Normalized On-Resistance Vs. Tj

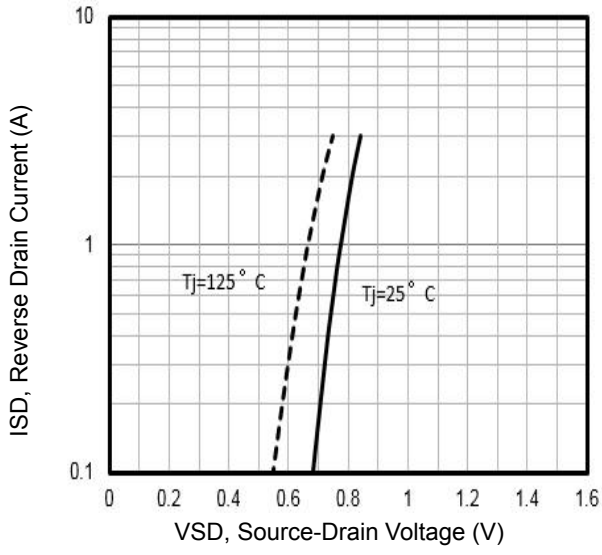


Fig5. Typical Source-Drain Diode Forward Voltage

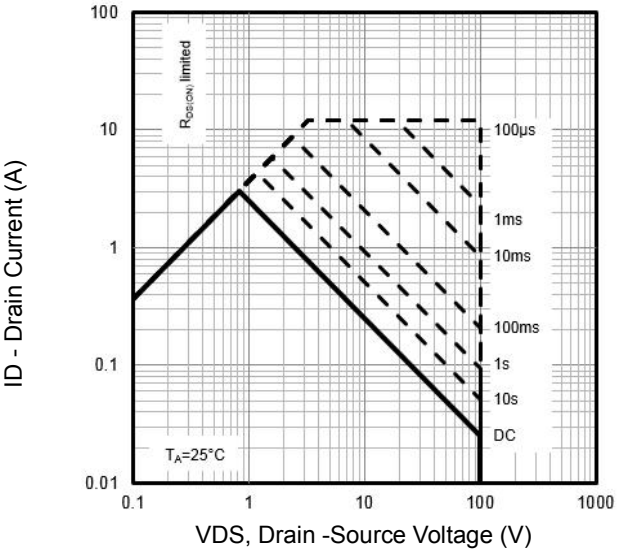


Fig6. Maximum Safe Operating Area

Typical Characteristics

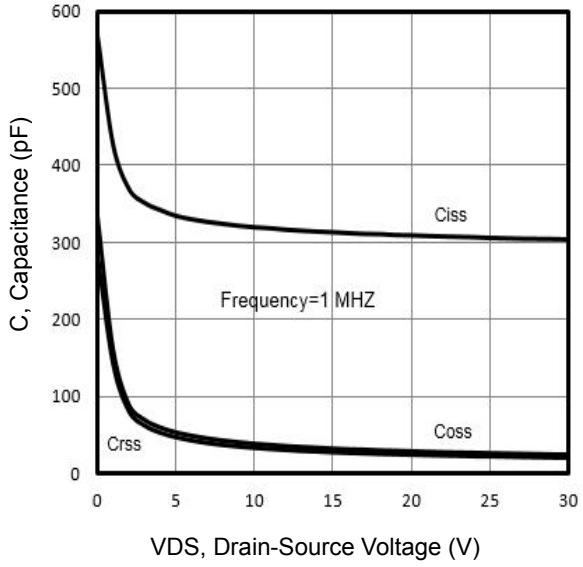


Fig7. Typical Capacitance Vs. Drain-Source Voltage

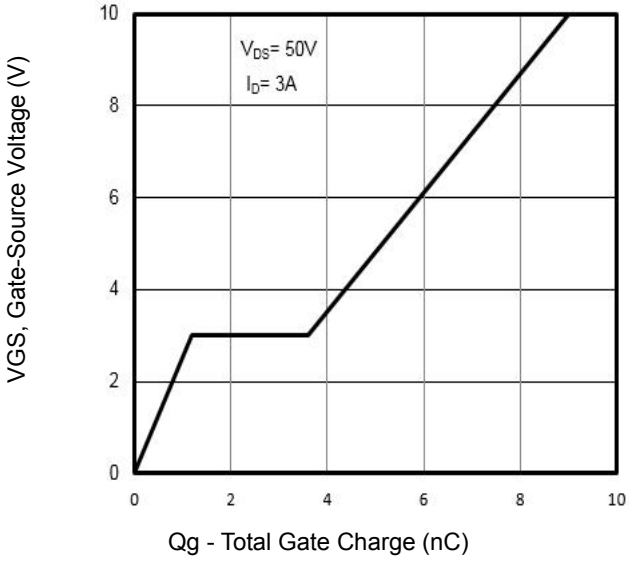


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

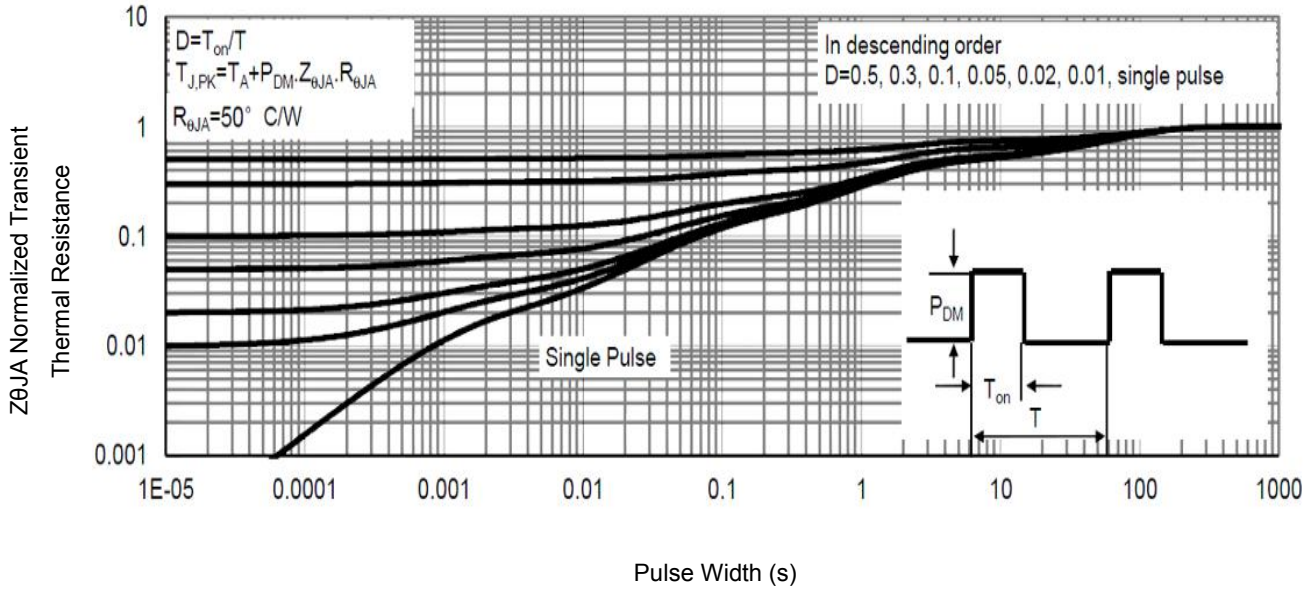


Fig9. Normalized Maximum Transient Thermal Impedance

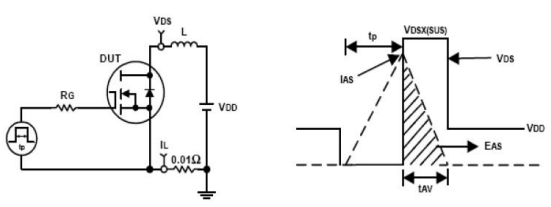


Fig10. Unclamped Inductive Test Circuit and waveforms

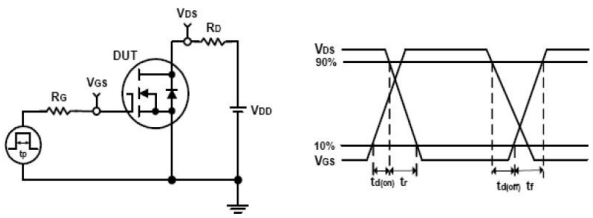
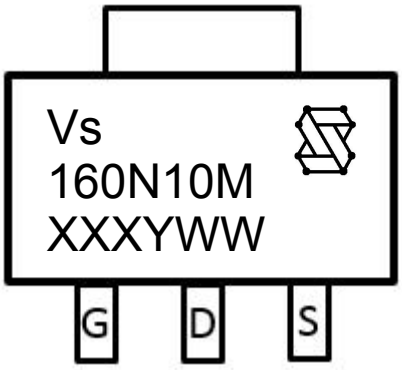


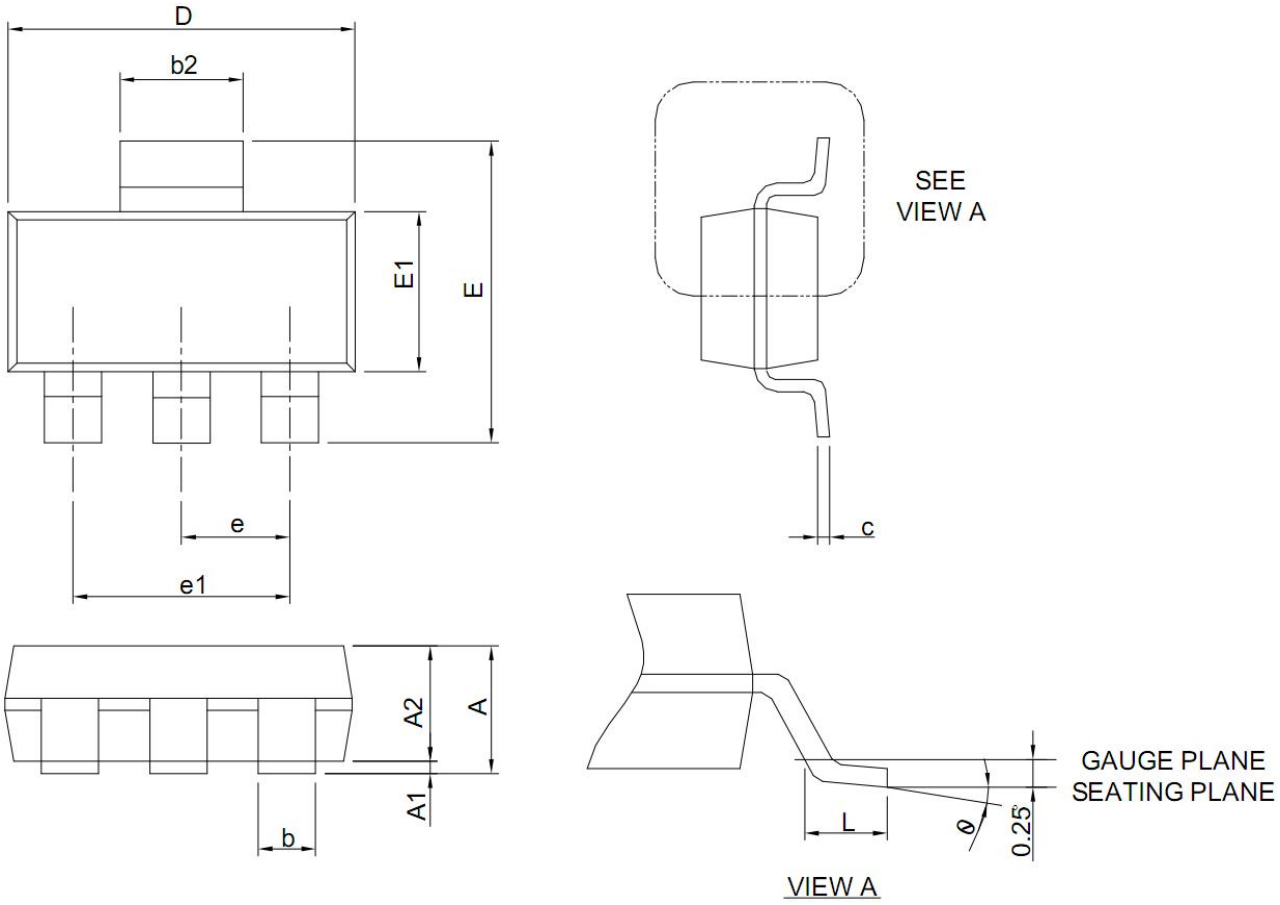
Fig11. Switching Time Test Circuit and waveforms

Marking Information



1st line： Vanguard Code（Vs）， Vanguard Logo
2nd line： Part Number（160N10M）
3rd line： Date code （XXXYWW）
XXX： Wafer Lot Number Code , code changed with Lot Number
Y： Year Code，(e.g. E=2017, F=2018, G=2019, H=2020, etc)
WW： Week Code (01 to 53)

SOT223 Package Outline Data



Symbol	Dimensions (unit: mm)		
	Min	Typ	Max
A	1.50	1.65	1.80
A1	0.02	0.06	0.10
A2	1.50	1.60	1.70
b	0.66	0.72	0.80
b2	2.90	3.00	3.10
c	0.23	0.30	0.35
D	6.30	6.50	6.70
E	6.70	7.00	7.30
E1	3.30	3.50	3.70
e	2.30 REF		
e1	4.60 REF		
L	0.75	--	1.15
θ	0 °	--	10 °

Notes:

1. Refer to JEDEC TO-261 variation AA
2. Dimensions "D" and "E1" do NOT include mold flash, tie bar burrs, gate burrs and interlead flash.

Customer Service

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