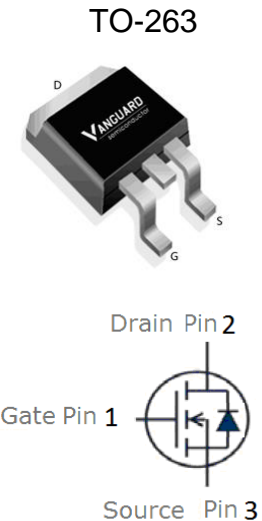


Features

- N-Channel, 10V Logic Level Control
- Enhancement mode
- VitoMOS[®] II Technology
- Fast Switching and High efficiency
- 100% Avalanche Tested
- Pb-free lead plating; RoHS compliant



Part ID	Package Type	Marking	Tape and reel information
VSM003N06HS-G	TO-263	003N06H	1000pcs/Reel



Maximum ratings, at $T_A=25\text{ }^\circ\text{C}$, unless otherwise specified

Symbol	Parameter	Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage	65	V
V_{GS}	Gate-Source voltage	± 20	V
I_S	Diode continuous forward current	$T_C=25^\circ\text{C}$	150 A
I_D	Continuous drain current @ $V_{GS}=10\text{V}$	$T_C=25^\circ\text{C}$	150 A
		$T_C=100^\circ\text{C}$	106 A
I_{DM}	Pulse drain current tested ①	$T_C=25^\circ\text{C}$	600 A
I_{DSM}	Continuous drain current @ $V_{GS}=10\text{V}$	$T_A=25^\circ\text{C}$	19 A
		$T_A=70^\circ\text{C}$	15 A
EAS	Avalanche energy, single pulsed ②	100	mJ
P_D	Maximum power dissipation	$T_C=25^\circ\text{C}$	125 W
		$T_C=100^\circ\text{C}$	63 W
P_{DSM}	Maximum power dissipation ③	$T_A=25^\circ\text{C}$	2 W
		$T_A=70^\circ\text{C}$	1.3 W
T_{STG}, T_J	Storage and Junction Temperature Range	-55 to 175	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typical	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.2	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	$^\circ\text{C/W}$

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	65	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =60V, V _{GS} =0V	--	--	1	μA
	Zero Gate Voltage Drain Current(T _J =125°C)	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	2.4	3.0	4.0	V
R _{DS(ON)}	Drain-Source On-State Resistance ④	V _{GS} =10V, I _D =40A	--	3.0	4.3	mΩ
		T _J =100°C	--	4.2	--	mΩ
Dynamic Electrical Characteristics @ T_j = 25°C (unless otherwise stated)						
C _{iss}	Input Capacitance	V _{DS} =30V, V _{GS} =0V, f=1MHz	2620	3080	3545	pF
C _{oss}	Output Capacitance		1665	1960	2255	pF
C _{rss}	Reverse Transfer Capacitance		25	35	45	pF
R _g	Gate Resistance	f=1MHz	--	1.5	--	Ω
Q _g (10V)	Total Gate Charge	V _{DS} =30V, I _D =40A, V _{GS} =10V	--	43	--	nC
Q _{gs}	Gate-Source Charge		--	15	--	nC
Q _{gd}	Gate-Drain Charge		--	9	--	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} =30V, I _D =40A, R _G =3Ω, V _{GS} =10V	--	15	--	ns
t _r	Turn-on Rise Time		--	59	--	ns
t _{d(off)}	Turn-Off Delay Time		--	26	--	ns
t _f	Turn-Off Fall Time		--	40	--	ns
Source- Drain Diode Characteristics @ T_j = 25°C (unless otherwise stated)						
V _{SD}	Forward on voltage	I _{SD} =40A, V _{GS} =0V	--	0.9	1.2	V
t _{rr}	Reverse Recovery Time	T _J =25°C, I _{SD} =40A, V _{GS} =0V	--	50	--	ns
Q _{rr}	Reverse Recovery Charge	di/dt=100A/μs	--	43	--	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 The power dissipation P_{DSM} is based on R_{θJA} and the maximum allowed junction temperature of 150°C.

④ Pulse width ≤ 380μs; duty cycle ≤ 2%.



Typical Characteristics

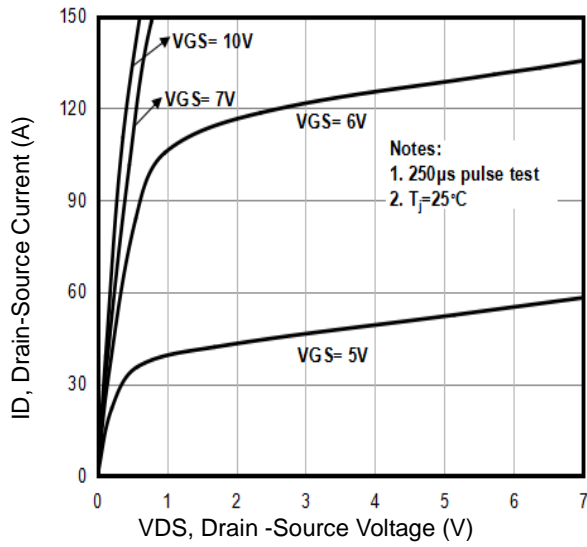


Fig1. Typical Output Characteristics

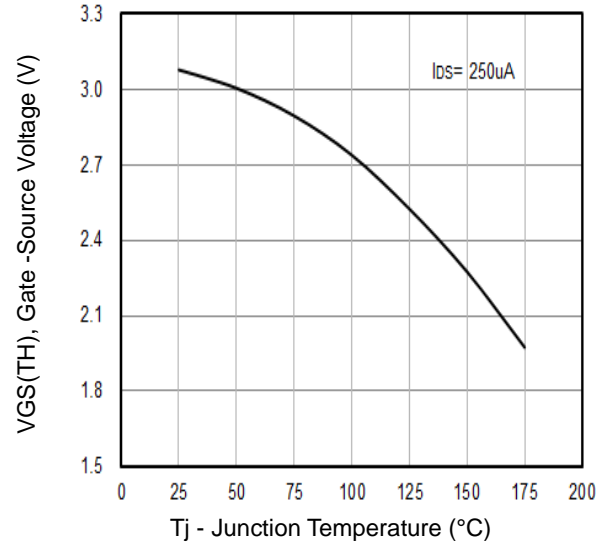


Fig2. VGS(TH) Gate-Source Voltage Vs. Tj

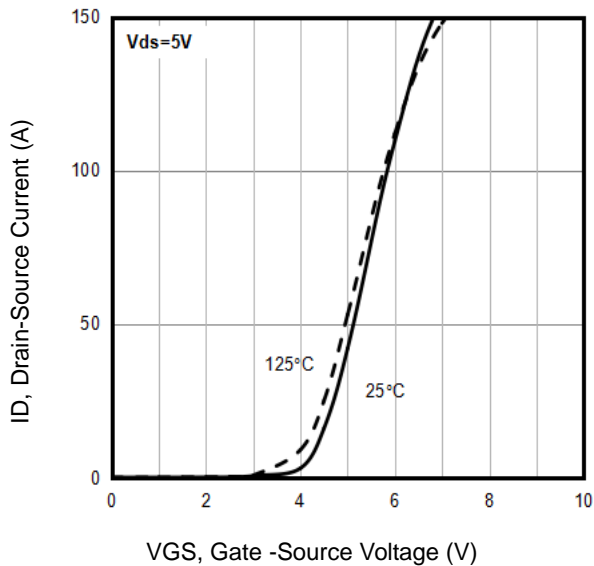


Fig3. Typical Transfer Characteristics

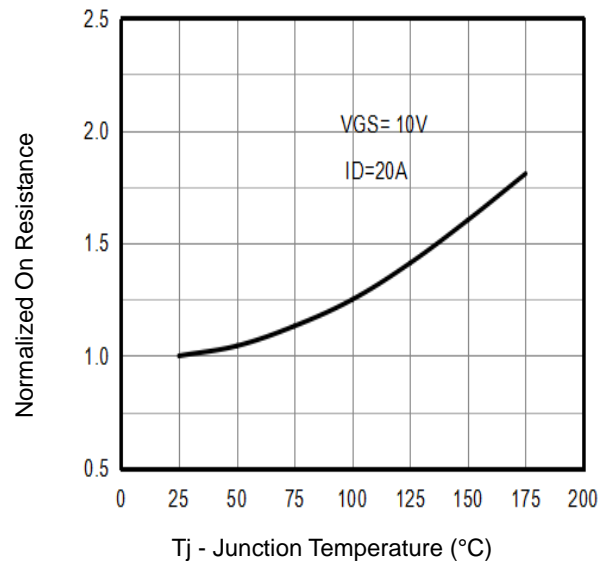


Fig4. Normalized On-Resistance Vs. Temperature

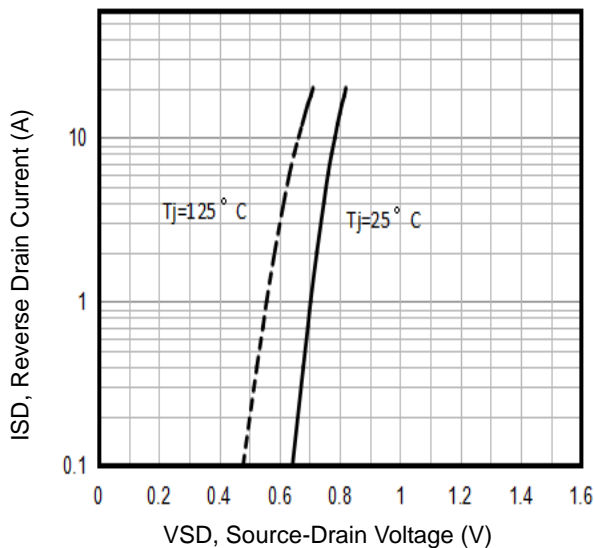


Fig5. Typical Source-Drain Diode Forward Voltage

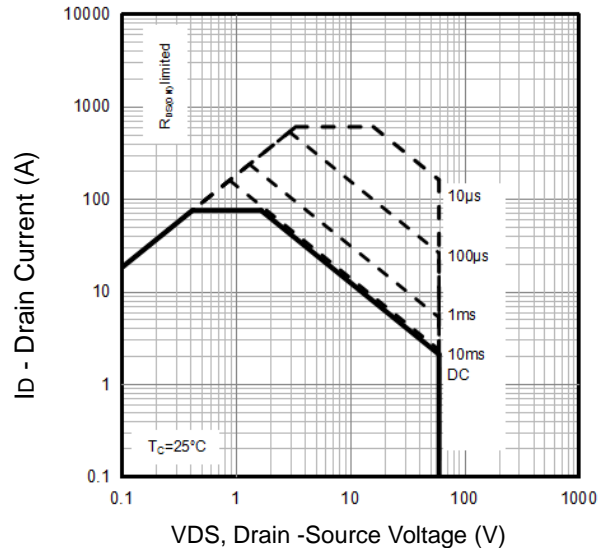


Fig6. Maximum Safe Operating Area

Typical Characteristics

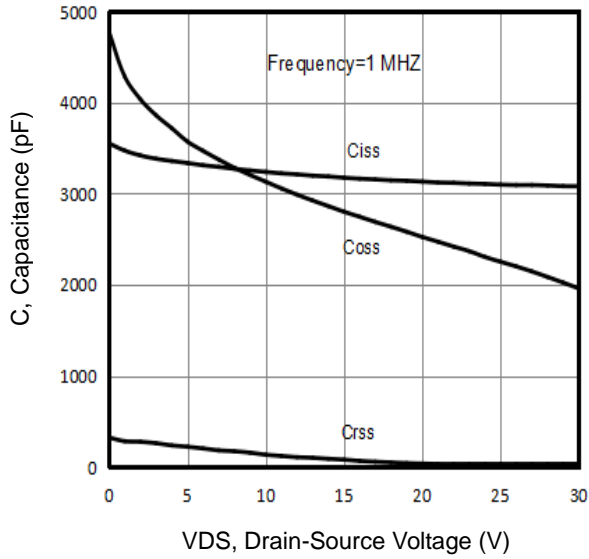


Fig7. Typical Capacitance Vs. Drain-Source Voltage

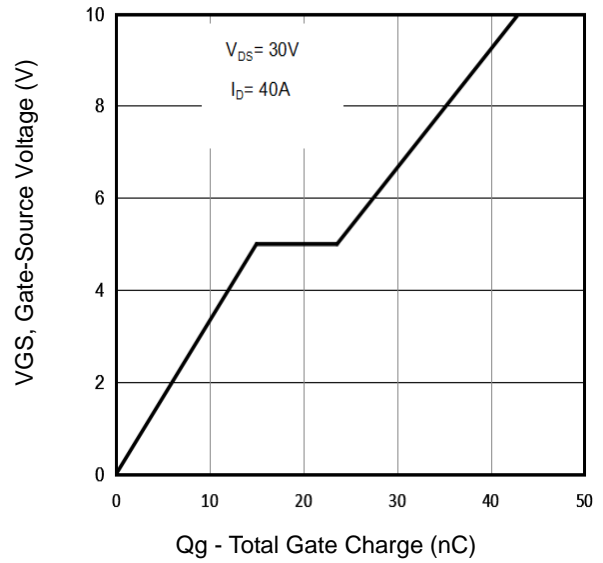


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

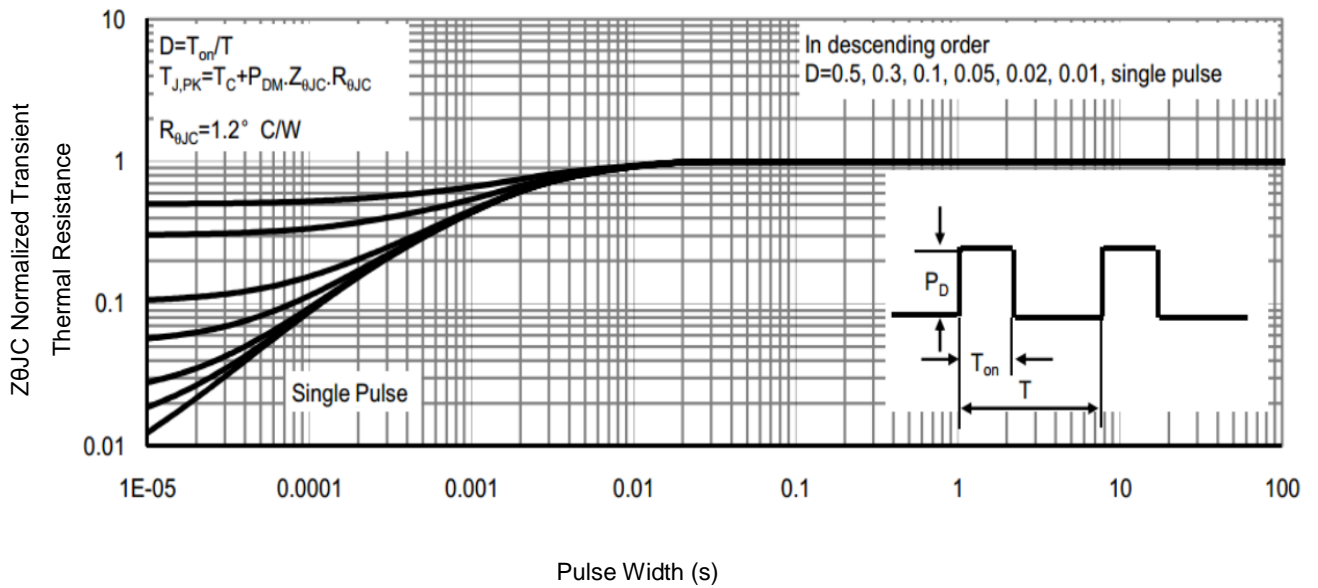


Fig9. Normalized Maximum Transient Thermal Impedance

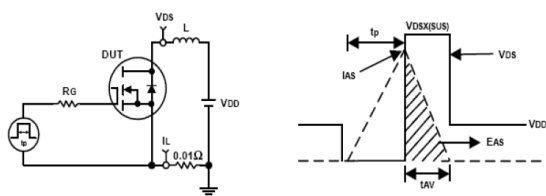


Fig10. Unclamped Inductive Test Circuit and waveforms

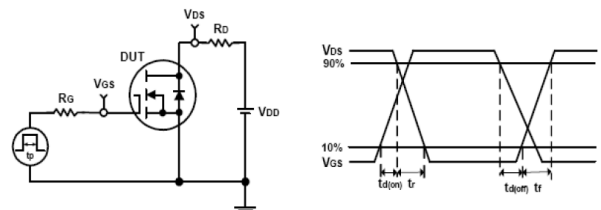
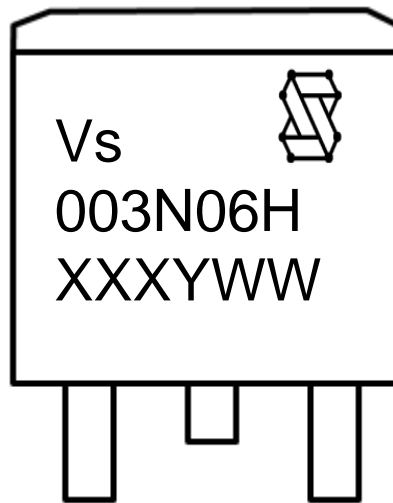


Fig11. Switching Time Test Circuit and waveforms



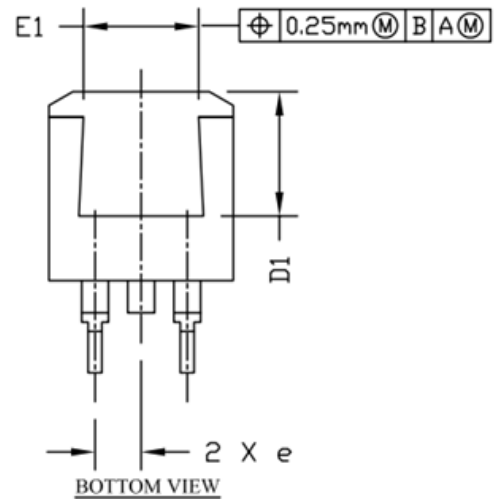
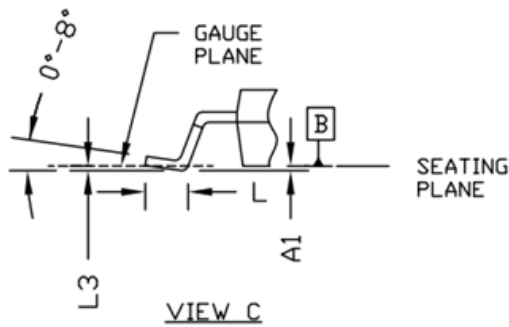
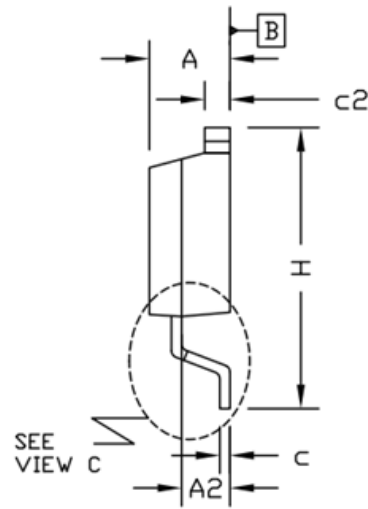
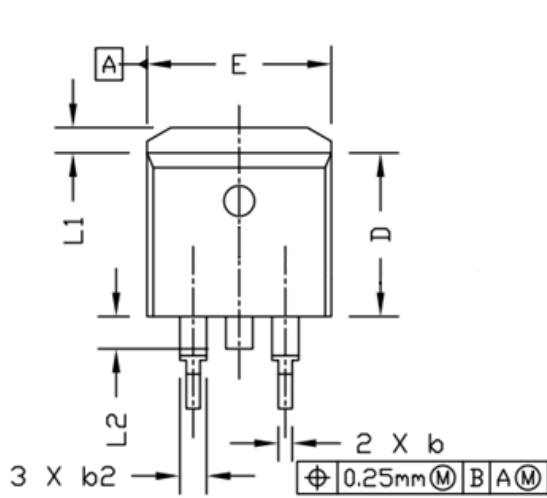
Marking Information



- 1st line: Vanguard Code (Vs), Vanguard Logo
2nd line: Part Number (003N06H)
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)



TO-263 Package Outline Data



Symbol	Dimensions (unit: mm)		
	Min	Typ	Max
A	4.400	4.570	4.700
A1	0.000	0.100	0.200
A2	2.300	2.400	2.500
b	0.700	0.800	0.900
b2	1.200	1.270	1.360
c	0.381	0.500	0.737
c2	1.220	1.300	1.350
D	8.600	9.200	9.300
D1	6.860		
e	2.540 BSC		
E	9.780	9.880	10.260
E1	6.225		
H	14.700	15.100	15.500
L	2.000	2.550	2.750
L1	1.000	1.200	1.400
L2	1.300	1.600	1.700
L3	0.255 BSC		

Notes:

1. Refer to JEDEC TO-263 variation AB
2. Dimension "D" & "E" do NOT include mold flash, mold flash shall not exceed 0.127mm per side.

Customer Service

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