

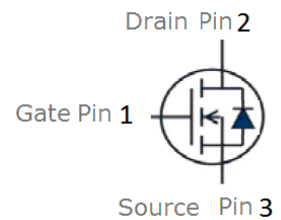
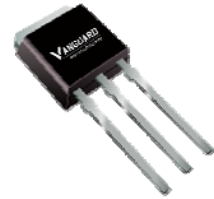
## Features

- N-Channel, 5V Logic Level Control
- Enhancement mode
- Very low on-resistance  $R_{DS(on)}$  @  $V_{GS}=4.5\text{ V}$
- VitoMOS<sup>®</sup> II Technology
- 100% Avalanche test
- Pb-free lead plating; RoHS compliant


**Halogen-Free**

Part ID	Package Type	Marking	Tape and reel information
VS1008N10MS	TO-251	008N10M	75pcs/Tube

$V_{DS}$	100	V
$R_{DS(on),TYP@ V_{GS}=10\text{ V}}$	6	m $\Omega$
$R_{DS(on),TYP@ V_{GS}=4.5\text{ V}}$	7.8	m $\Omega$
$I_D$	94	A

**TO-251**


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

Symbol	Parameter	Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage	100	V
$V_{GS}$	Gate-Source voltage	$\pm 20$	V
$I_S$	Diode continuous forward current	$T_C = 25^\circ\text{C}$	94 A
$I_D$	Continuous drain current @ $V_{GS}=10\text{V}$	$T_C = 25^\circ\text{C}$	94 A
		$T_C = 100^\circ\text{C}$	67 A
$I_{DM}$	Pulse drain current tested ①	$T_C = 25^\circ\text{C}$	376 A
$I_{DSM}$	Continuous drain current @ $V_{GS}=10\text{V}$	$T_A = 25^\circ\text{C}$	10 A
		$T_A = 70^\circ\text{C}$	8 A
EAS	Avalanche energy, single pulsed ②	41	mJ
$P_D$	Maximum power dissipation	$T_C = 25^\circ\text{C}$	107 W
$P_{DSM}$	Maximum power dissipation ③	$T_A = 25^\circ\text{C}$	1.25 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	1.4	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	100	$^\circ\text{C/W}$

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
<b>Static Electrical Characteristics @ T<sub>j</sub>=25°C (unless otherwise stated)</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	100	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =100V, V <sub>GS</sub> =0V	--	--	1	μA
	Zero Gate Voltage Drain Current(T <sub>j</sub> =125°C)	V <sub>DS</sub> =100V, V <sub>GS</sub> =0V	--	--	100	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	--	--	±100	nA
V <sub>GS(TH)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.5	1.7	2.3	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance ④	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	--	6	8.5	mΩ
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance ④	V <sub>GS</sub> =4.5V, I <sub>D</sub> =15A	--	7.8	10.5	mΩ
<b>Dynamic Electrical Characteristics @ T<sub>j</sub> = 25°C (unless otherwise stated)</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, f=1MHz	2250	2645	3050	pF
C <sub>oss</sub>	Output Capacitance		980	1155	1305	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		25	35	45	pF
R <sub>g</sub>	Gate Resistance	f=1MHz	--	3.2	--	Ω
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =50V, I <sub>D</sub> =20A, V <sub>GS</sub> =10V	--	46	--	nC
Q <sub>gs</sub>	Gate-Source Charge		--	11	--	nC
Q <sub>gd</sub>	Gate-Drain Charge		--	9	--	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =50V, I <sub>D</sub> =20A, R <sub>G</sub> =3Ω, V <sub>GS</sub> =10V	--	11.7	--	ns
t <sub>r</sub>	Turn-on Rise Time		--	7.2	--	ns
t <sub>d(off)</sub>	Turn-Off Delay Time		--	34.5	--	ns
t <sub>f</sub>	Turn-Off Fall Time		--	12.3	--	ns
<b>Source- Drain Diode Characteristics@ T<sub>j</sub> = 25°C (unless otherwise stated)</b>						
V <sub>SD</sub>	Forward on voltage	I <sub>SD</sub> =20A, V <sub>GS</sub> =0V	--	0.8	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	T <sub>j</sub> =25°C, I <sub>sd</sub> =20A, V <sub>GS</sub> =0V di/dt=500A/μs	--	21.6	--	ns
Q <sub>rr</sub>	Reverse Recovery Charge		--	44.7	--	nC

**NOTE:**

- ① Repetitive rating; pulse width limited by max junction temperature.
- ② Limited by T<sub>Jmax</sub>, starting T<sub>J</sub> = 25°C, L = 0.5mH, R<sub>G</sub> = 25Ω, I<sub>AS</sub> = 10A, V<sub>GS</sub> = 10V. Part not recommended for use above this value
- ③ The power dissipation P<sub>DSM</sub> is based on R<sub>θJA</sub> and the maximum allowed junction temperature of 150°C.
- ④ Pulse width ≤ 300μs; duty cycle ≤ 2%.

Typical Characteristics

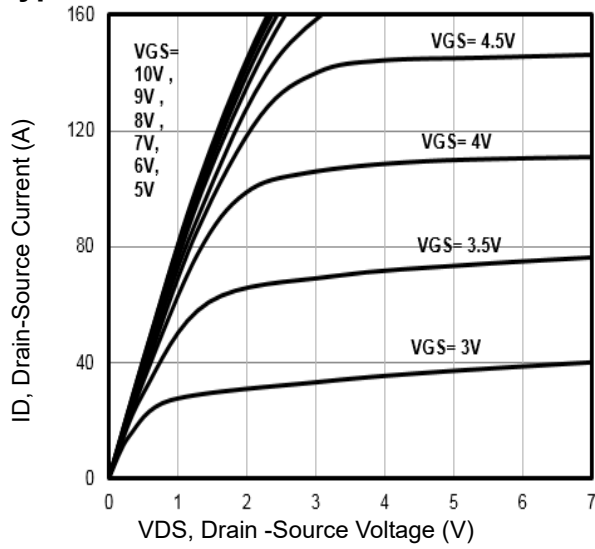


Fig1. Typical Output Characteristics

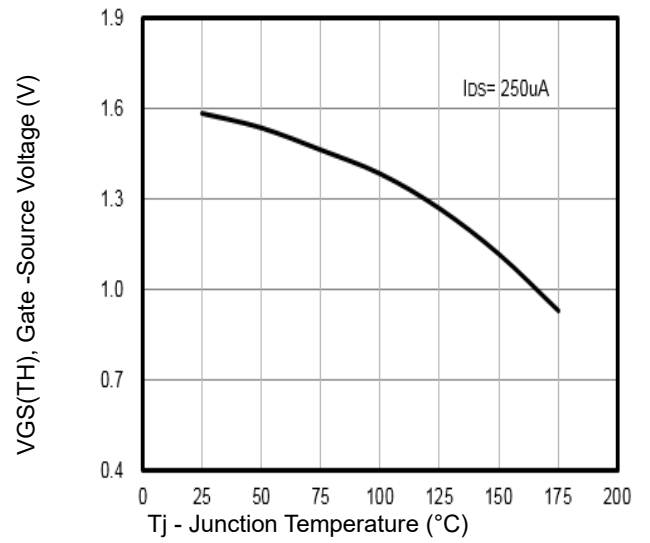


Fig2.  $V_{GS(TH)}$  Gate-Source Voltage Vs.  $T_j$

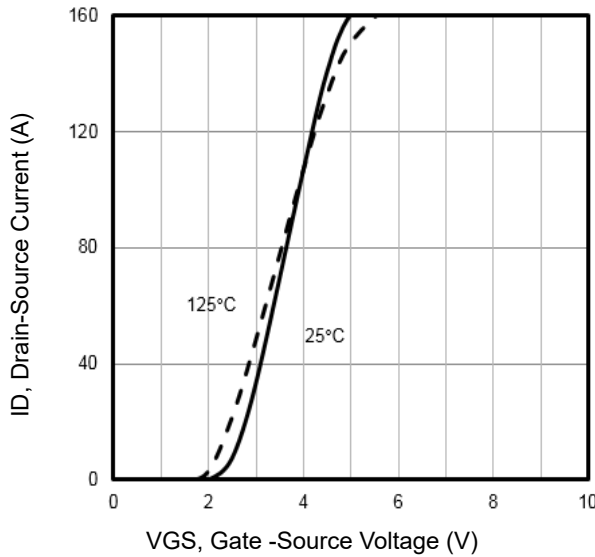


Fig3. Typical Transfer Characteristics

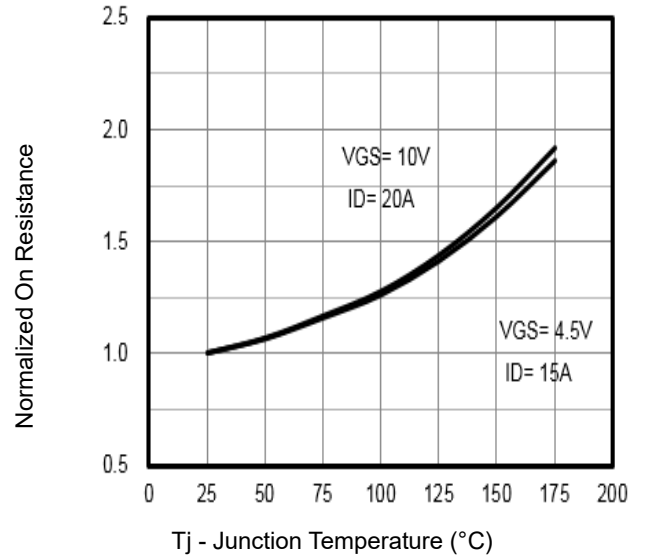


Fig4. Normalized On-Resistance Vs.  $T_j$

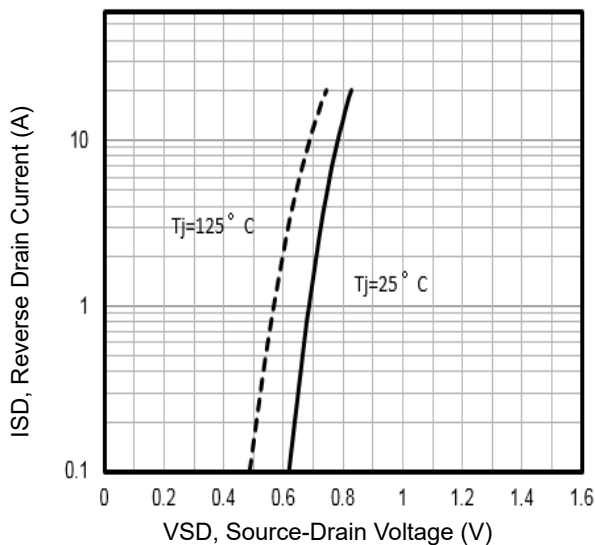


Fig5. Typical Source-Drain Diode Forward Voltage

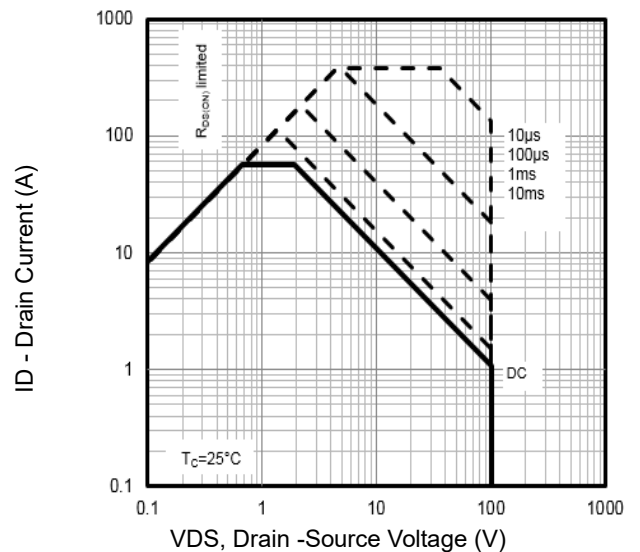


Fig6. Maximum Safe Operating Area

Typical Characteristics

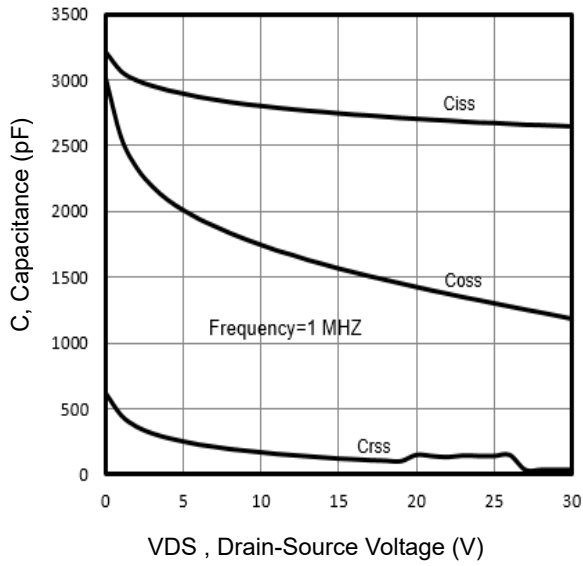


Fig7. Typical Capacitance Vs.Drain-Source Voltage

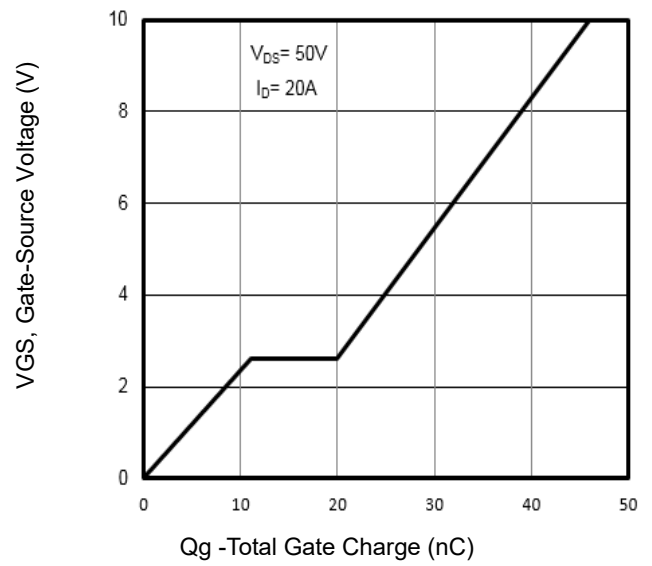


Fig8. Typical Gate Charge Vs.Gate-Source Voltage

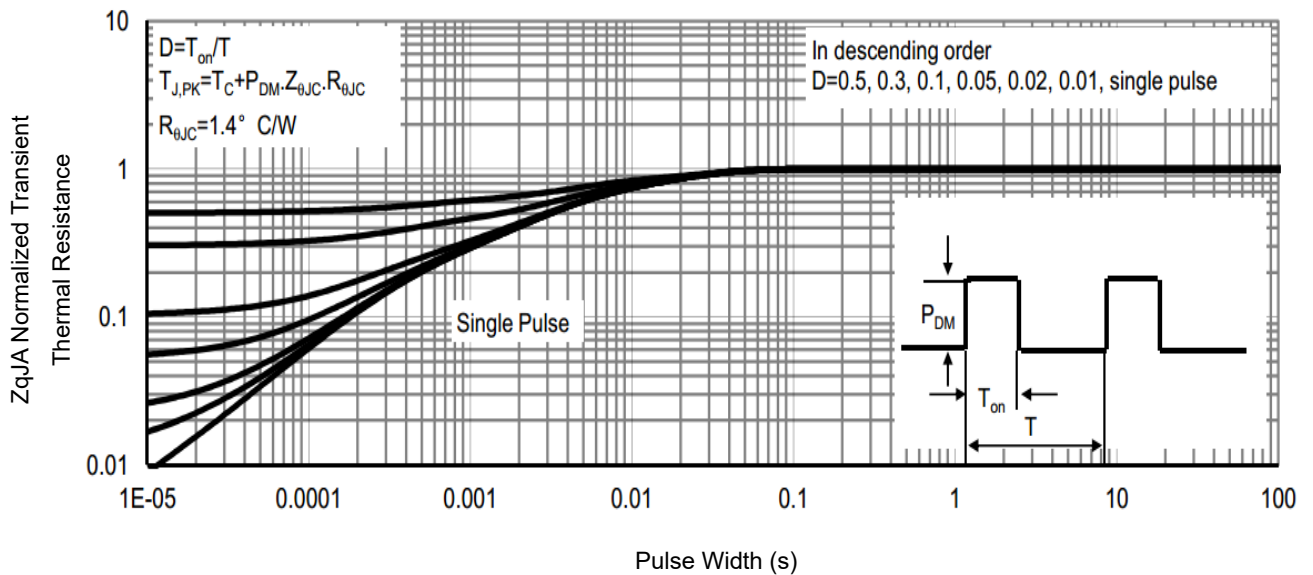


Fig9. Normalized Maximum Transient Thermal Impedance

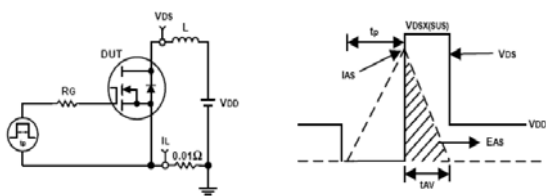


Fig10. Unclamped Inductive Test Circuit and waveforms

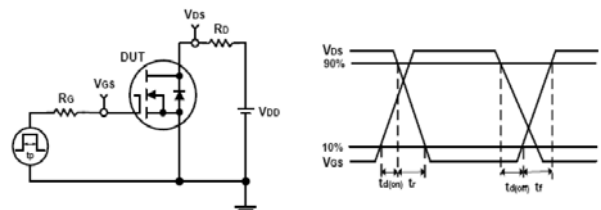
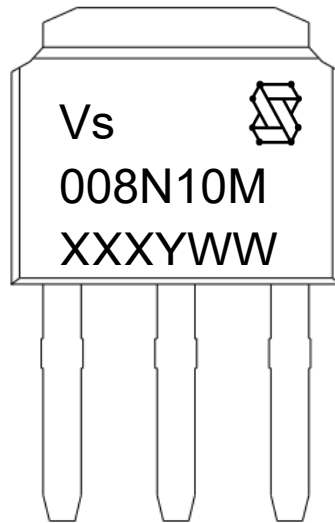


Fig11. Switching Time Test Circuit and waveforms

## Marking Information



1st line: Vanguard Code (Vs), Vanguard Logo

2nd line: Part Number (008N10M)

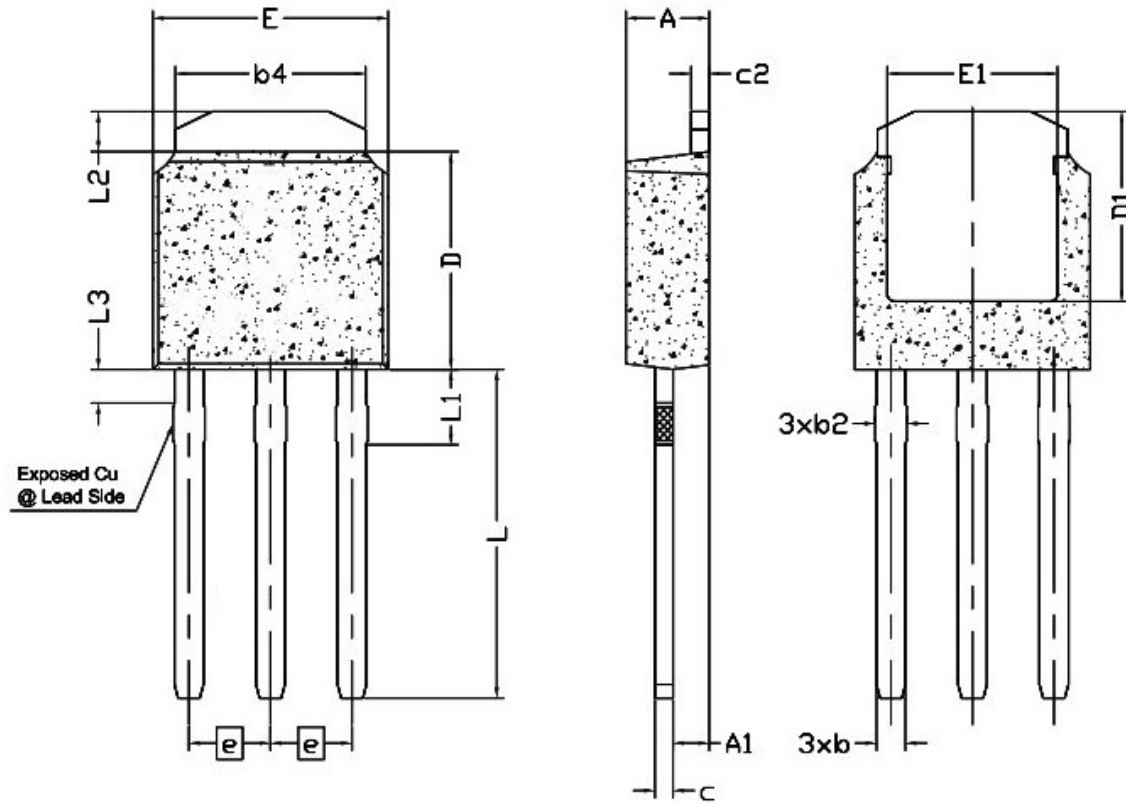
3rd line: Date code (XXXYWW)

XXX: Wafer Lot Number

Y: Year Code, e.g. E means 2017

WW: Week Code

**TO-251 Package Outline Data**



Symbol	Dimensions (unit: mm)		
	Min	Typ	Max
A	2.20	2.30	2.39
A1	0.89	1.04	1.15
b	0.64	0.76	0.89
b2	0.77	0.84	1.14
b3	5.21	5.34	5.46
c	0.46	0.50	0.60
c2	0.46	0.50	0.60
D	5.98	6.10	6.223
D1	5.10	--	--
E	6.40	6.60	6.731
E1	4.40	--	--
e	2.286 BSC		
H	11.05	11.25	11.45
L	3.98	4.13	4.35
L3	0.89	--	1.27
L4	0.698 REF		
L5	0.972	1.099	1.226
α	79° REF		

**Notes:**

1. Dimension "D" and "E" do NOT include mold flash, protrusion or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 0.1mm per side.

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