

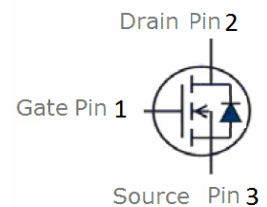
## Features

- N-Channel
- Enhancement mode
- Very low on-resistance @  $V_{GS}=4.5\text{ V}$
- Fast Switching
- Pb-free lead plating; RoHS compliant



Part ID	Package Type	Marking	Tape and reel information
VSI080N06MS	TO-251-S	080N06	80pcs/Tube

$V_{DS}$	60	V
$R_{DS(on),typ@VGS=10V}$	68	m $\Omega$
$R_{DS(on),typ@VGS=4.5V}$	85	m $\Omega$
$I_D$	15	A

**TO-251-S**


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

Symbol	Parameter	Rating	Unit	
$V_{(BR)DSS}$	Drain-Source breakdown voltage	60	V	
$V_{GS}$	Gate-Source voltage	$\pm 16$	V	
$I_D$	Continuous drain current@ $V_{GS}=10V$	$T_C=25^\circ\text{C}$	15	A
		$T_A=70^\circ\text{C}$	9.6	A
$I_{DM}$	Pulse drain current tested ①	$T_C=25^\circ\text{C}$	35	A
$P_D$	Maximum power dissipation	$T_C=25^\circ\text{C}$	30	W
$I_S$	Diode Continuous Forward Current	$T_C=25^\circ\text{C}$	15	A
EAS	Avalanche energy, single pulsed ②	$I_D=10A$	5	mJ
$T_J$	Maximum Junction Temperature	175	$^\circ\text{C}$	
$T_{STG}$	Storage and operating temperature range	-55 to 175	$^\circ\text{C}$	
<b>Thermal characteristics</b>				
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	60	$^\circ\text{C/W}$	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	5	$^\circ\text{C/W}$	

**Typical Electrical Characteristics**

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	60	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current(Tc=25°C)	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V	--	--	1	μA
	Zero Gate Voltage Drain Current(Tc=125°C)	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V	--	--	100	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±16V, 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	1.0	2.0	3.0	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance <sup>②</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =10A	--	68	80	mΩ
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance <sup>②</sup>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =5A	--	85	100	mΩ
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> = 15V, I <sub>D</sub> =1.8A	3	--	--	S
<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	--	435	--	pF
C <sub>oss</sub>	Output Capacitance		--	40	--	pF
C <sub>riss</sub>	Reverse Transfer Capacitance		--	28	--	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =30V, I <sub>D</sub> =1A, V <sub>GS</sub> =10V	--	6	--	nC
Q <sub>gs</sub>	Gate-Source Charge		--	1.7	--	nC
Q <sub>gd</sub>	Gate-Drain Charge		--	1.5	--	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =30V, I <sub>D</sub> =1A, R <sub>G</sub> =6.8Ω, V <sub>GS</sub> =4.5V	--	6	--	nS
t <sub>r</sub>	Turn-on Rise Time		--	15	--	nS
t <sub>d(off)</sub>	Turn-Off Delay Time		--	16	--	nS
t <sub>f</sub>	Turn-Off Fall Time		--	10	--	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> =10A, V <sub>GS</sub> =0V	--	0.95	1.20	V

**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 = 0.1mH, R<sub>G</sub> = 25Ω, I<sub>AS</sub> = 10A, V<sub>GS</sub> = 10V. Part not recommended for use above this value.
- ③ Pulse width ≤ 300μs; duty cycle ≤ 2%.

**Typical Characteristics**

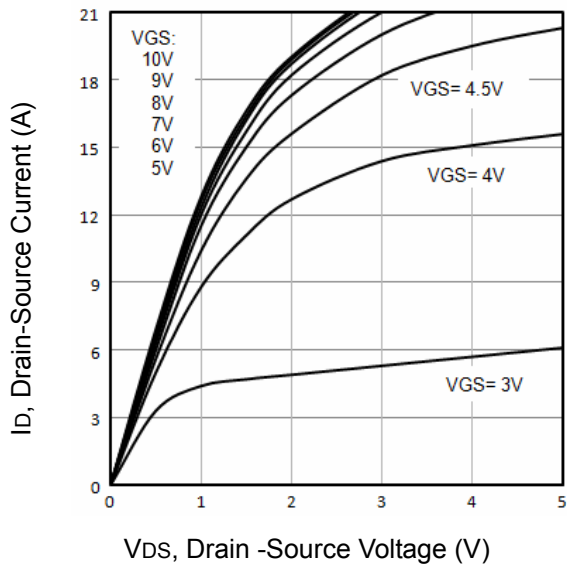


Fig1. Typical Output Characteristics

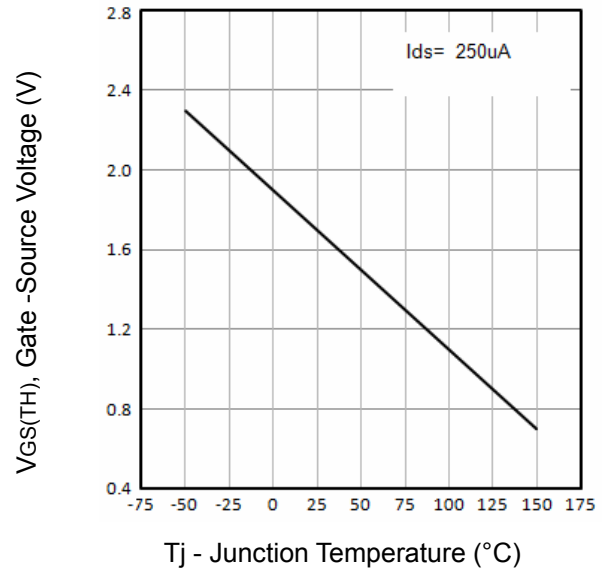


Fig2. Threshold Voltage Vs. Temperature

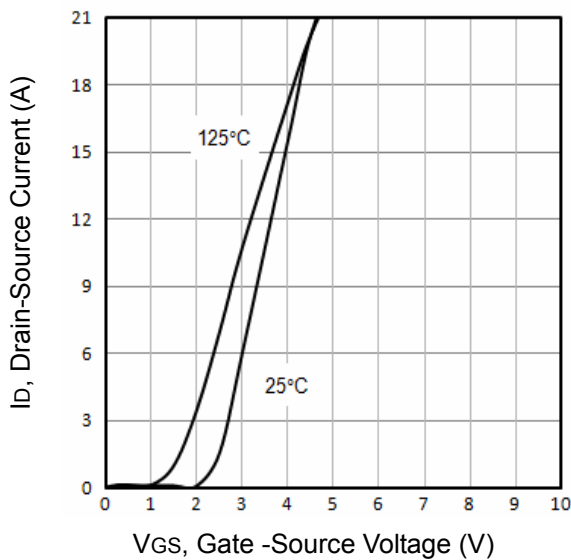


Fig3. Typical Transfer Characteristics

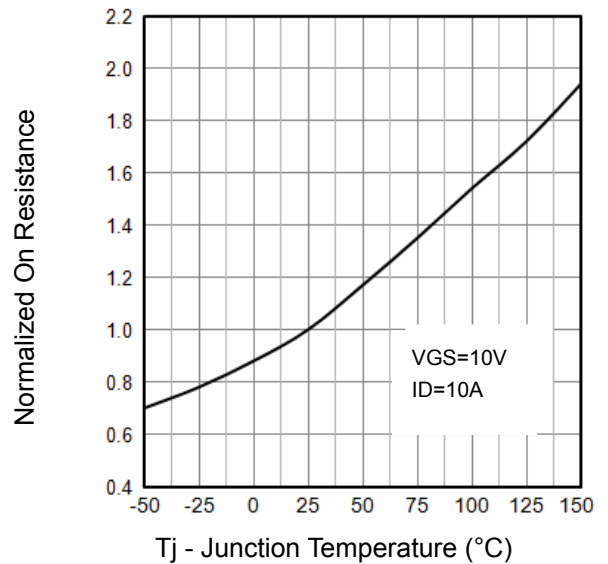


Fig4. Normalized On-Resistance Vs. Temperature

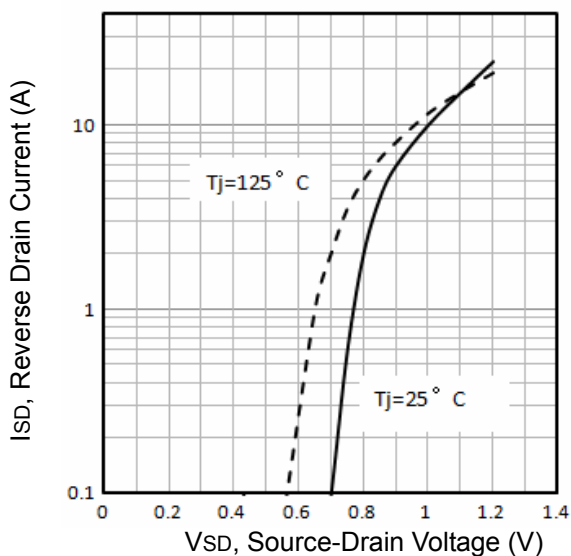


Fig5. Typical Source-Drain Diode Forward Voltage

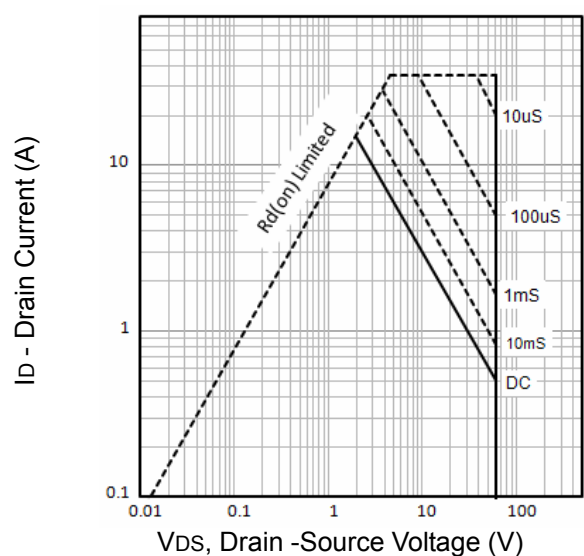


Fig6. Maximum Safe Operating Area

**Typical Characteristics**

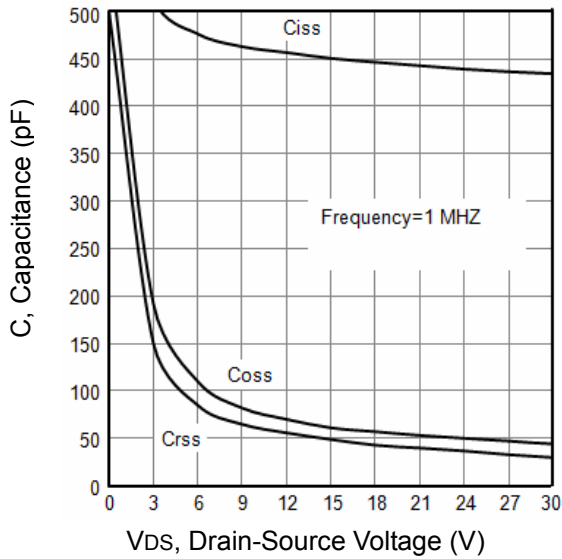


Fig7. Typical Capacitance Vs. Drain-Source Voltage

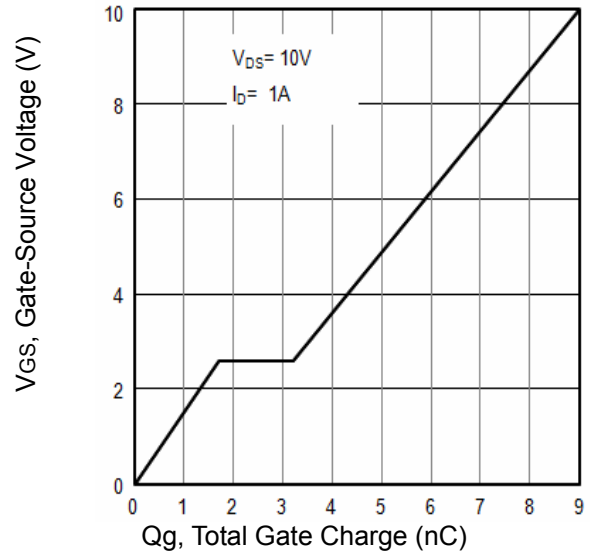


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

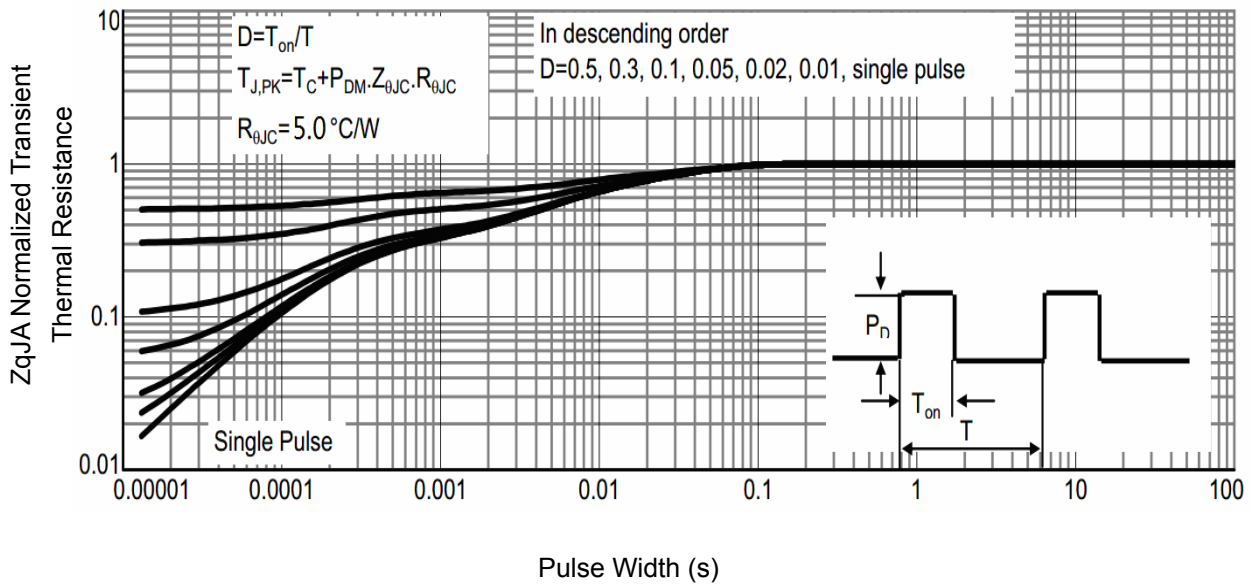


Figure 9: Normalized Maximum Transient Thermal

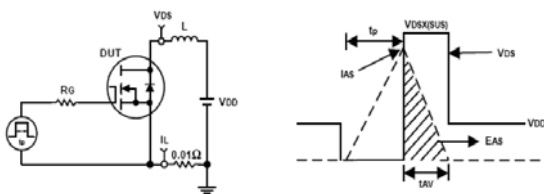


Fig10. Unclamped Inductive Test Circuit and waveforms

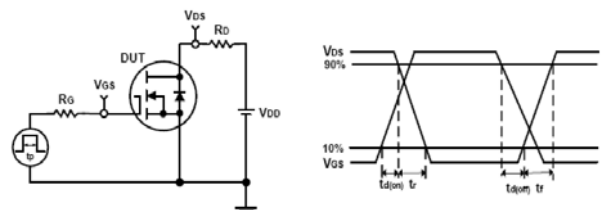
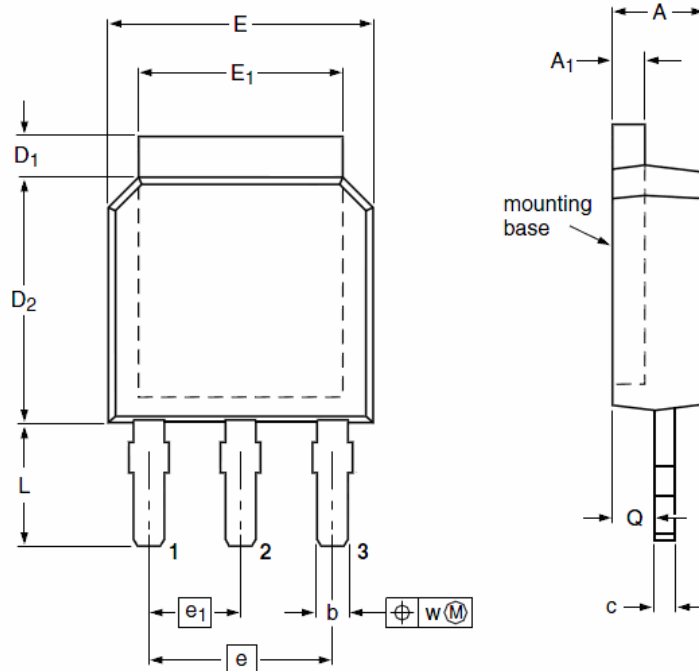


Fig11. Switching Time Test Circuit and waveforms

**TO-251-S Package Outline Data**



**DIMENSIONS** ( unit : mm )

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	2.10	2.30	2.50	A <sub>1</sub>	0.40	0.48	0.60
b	0.65	0.75	0.85	c	0.40	0.50	0.60
D <sub>1</sub>	0.65	0.90	1.20	D <sub>2</sub>	5.90	6.08	6.25
E	6.35	6.58	6.80	E <sub>1</sub>	5.10	5.28	5.50
e	--	2.28	--	e <sub>1</sub>	--	4.57	--
L	4.75	5.15	5.85	Q	0.80	0.90	1.08
w	--	0.20	--				

**Customer Service**

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