Description

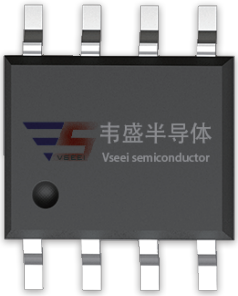
The VSM7N03 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

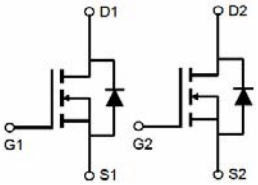
- V_{DS} =30V,I_D =7A
  $R_{DS(ON)}$ < 23mΩ @ V_{GS}=10V
  $R_{DS(ON)}$ < 40mΩ @ V_{GS}=4.5V
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current

Application

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply



SOP-8



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
VSM7N03-S8	VSM7N03	SOP-8	Ø330mm	12mm	2500 units

Absolute Maximum Ratings (T_A=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	7	A
Drain Current-Continuous(T_C=100℃)	I_D (100℃)	4.95	A
Pulsed Drain Current	I_{DM}	40	A
Maximum Power Dissipation	P_D	2	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	62.5	85	℃/W

Electrical Characteristics (T_A=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1.1	-	2.1	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=7A	-	18	23	mΩ
		V_{GS}=4.5V, I_D=6A	-	25	40	
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=7A	-	15	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=15V,V_{GS}=0V, F=1.0MHz	-	380	-	PF
Output Capacitance	C_{oss}		-	67	-	PF
Reverse Transfer Capacitance	C_{rss}		-	41	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=15V, R_L=2Ω V_{GS}=10V,R_G=3Ω	-	5	-	nS
Turn-on Rise Time	t_r		-	3	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	15	-	nS
Turn-Off Fall Time	t_f		-	3	-	nS
Total Gate Charge	Q_g	V_{DS}=15V,I_D=7A, V_{GS}=4.5V	-	7.2	-	nC
Gate-Source Charge	Q_{gs}		-	1.3	-	nC
Gate-Drain Charge	Q_{gd}		-	1.7	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=7A	-	-	1.2	V
Diode Forward Current (Note 2)	I_S		-	-	7	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.

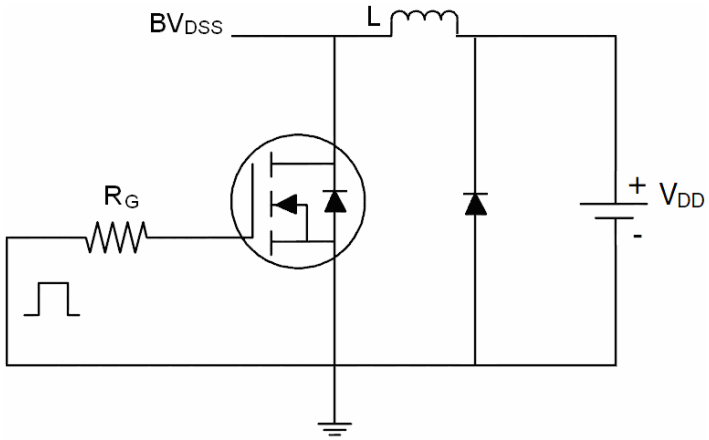
2. The value of $R_{\theta JA}$ is measured with the device mounted on 1in ^{2} FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design.Surface Mounted on FR4 Board, t ≤ 10 sec. The current rating is based on the t ≤ 10s thermal resistance rating.

3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

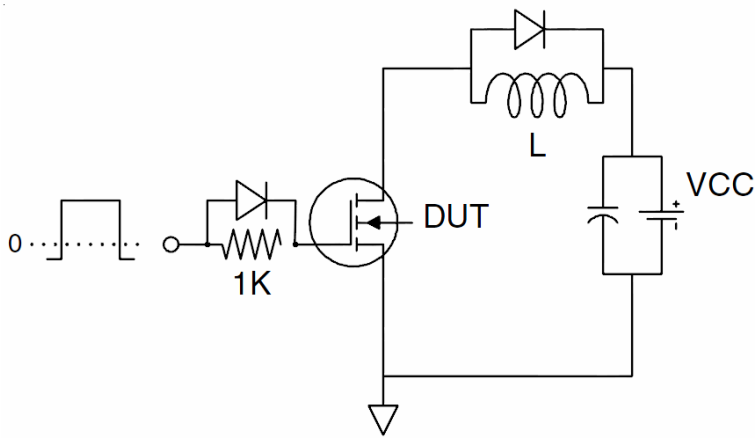
4. Guaranteed by design, not subject to production.

Test Circuit

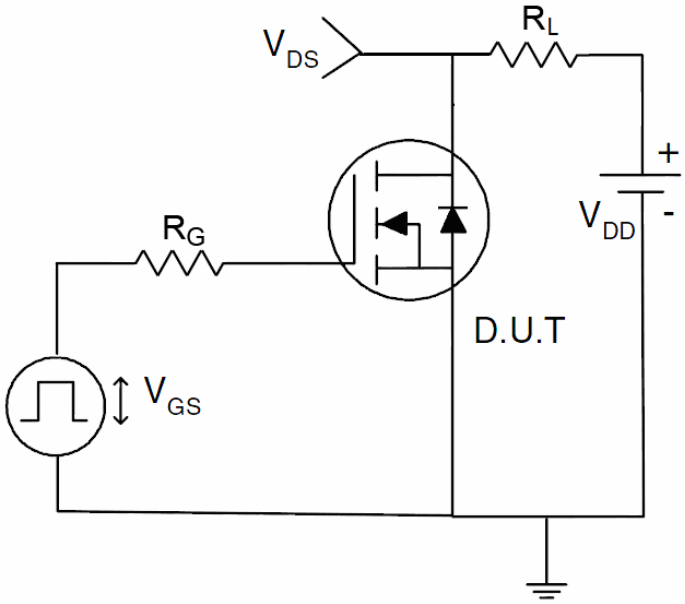
1) E_{AS} Test Circuits



2) Gate Charge Test Circuit:



3) Switch Time Test Circuit:



Typical Electrical and Thermal Characteristics (Curves)

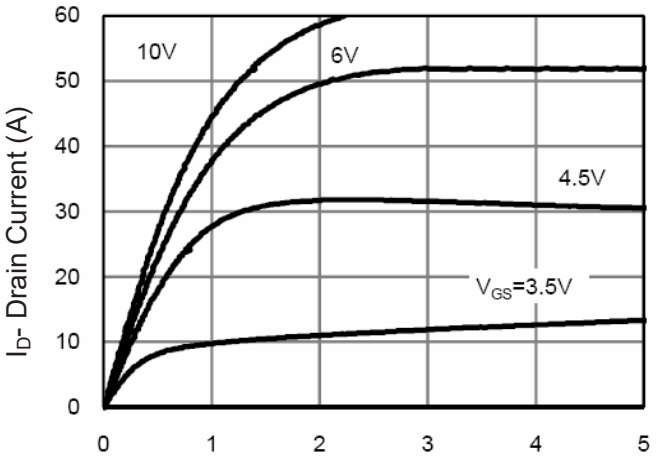


Figure 1 Output Characteristics

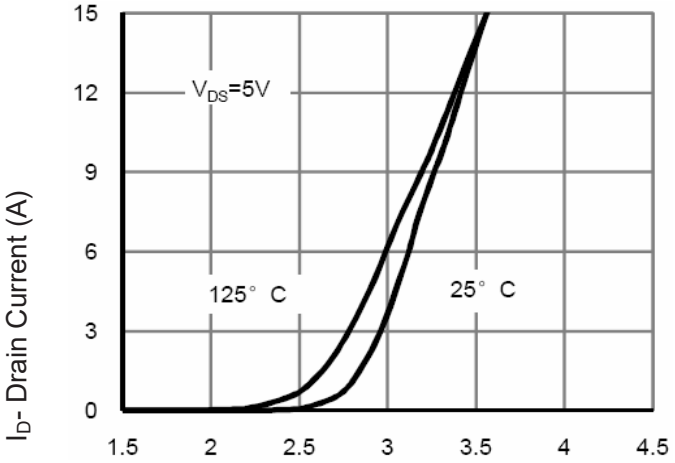


Figure 2 Transfer Characteristics

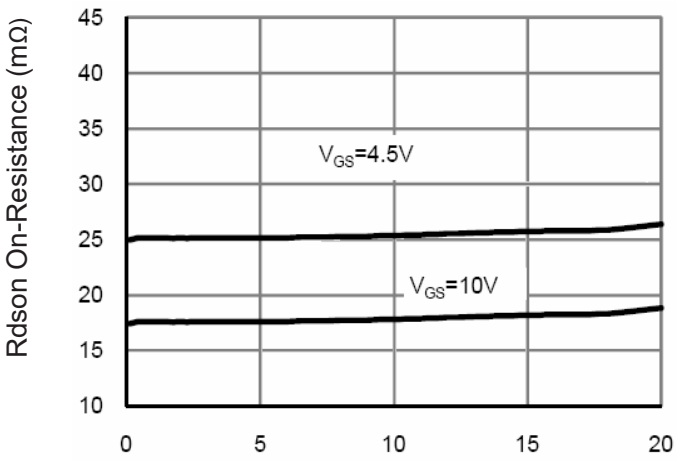


Figure 3 Rdson- Drain Current

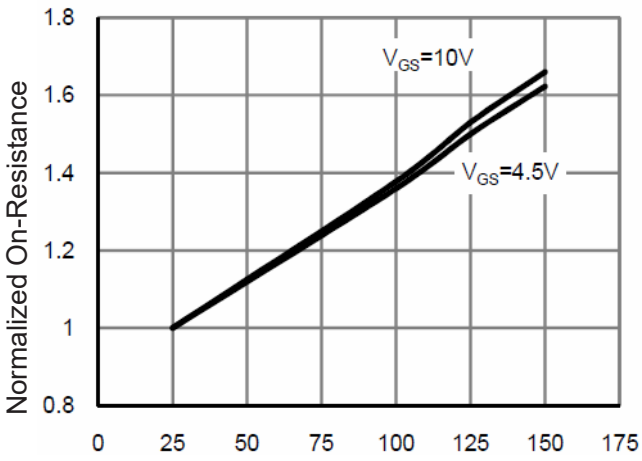


Figure 4 Rdson-JunctionTemperature

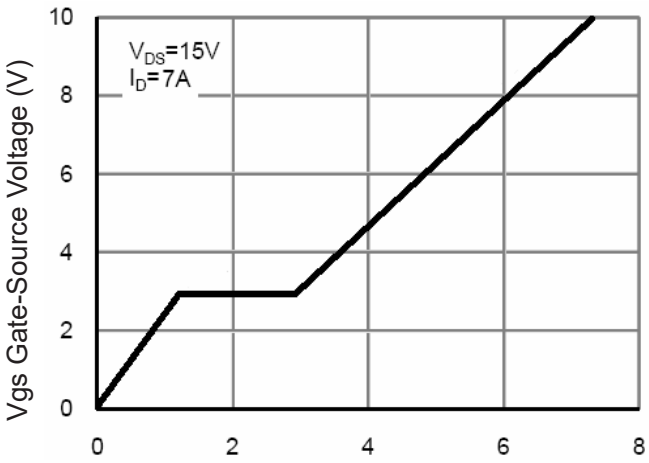


Figure 5 Gate Charge

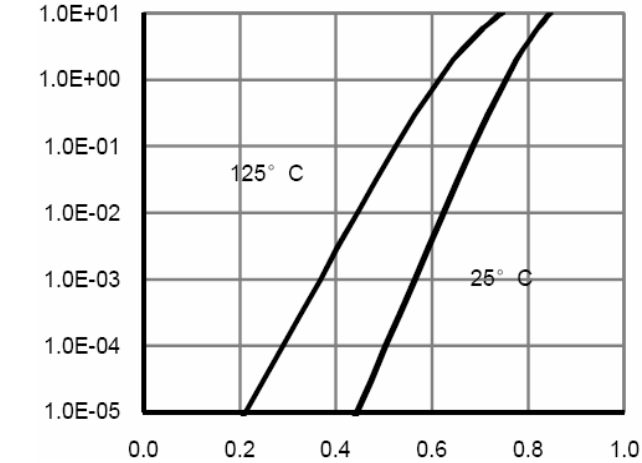


Figure 6 Source- Drain Diode Forward

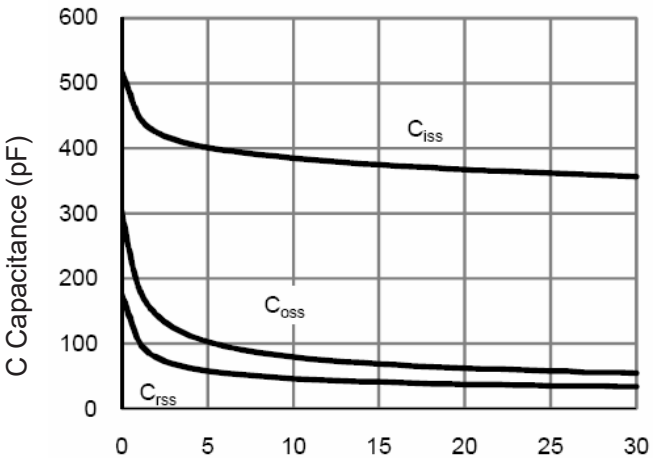


Figure 7 Capacitance vs Vds

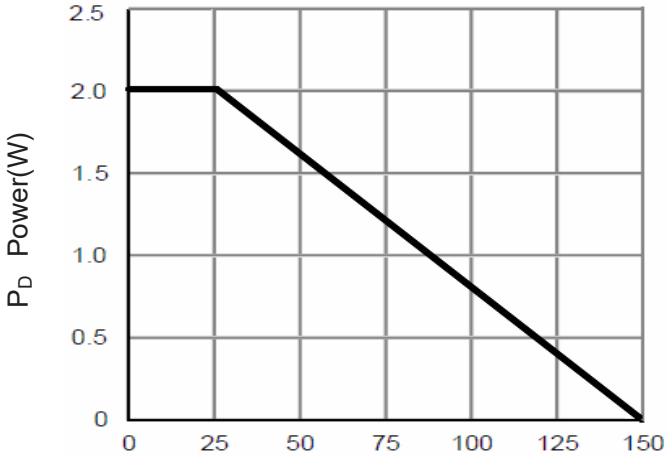


Figure 9 Power Dissipation

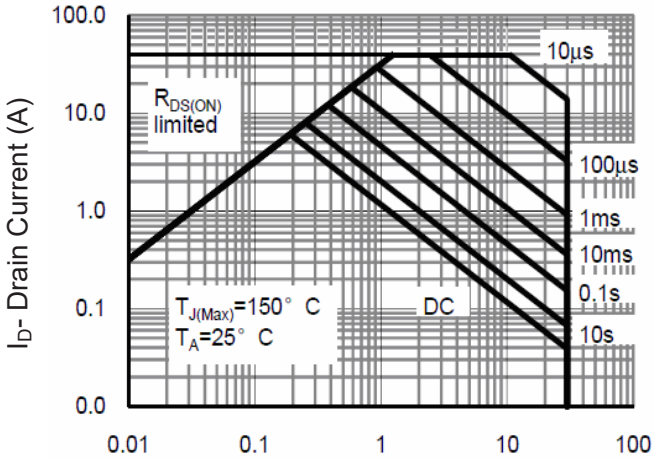


Figure 8 Safe Operation Area

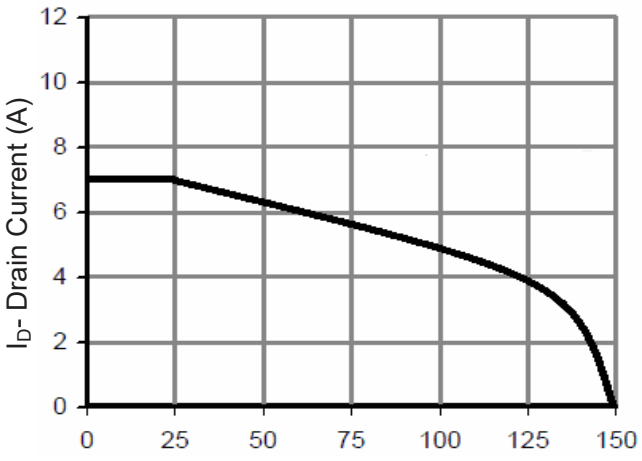


Figure 10 Current De-rating

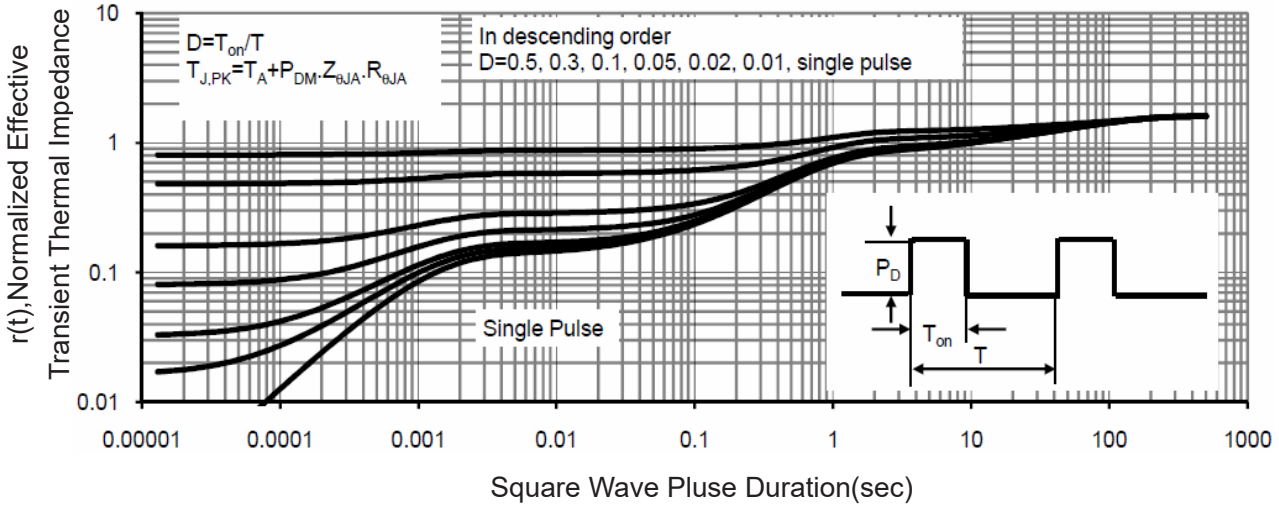


Figure 11 Normalized Maximum Transient Thermal Impedance