

Description

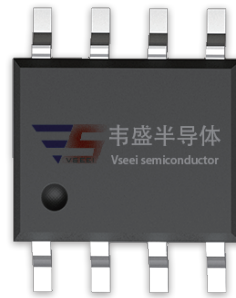
The VSM8N10 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

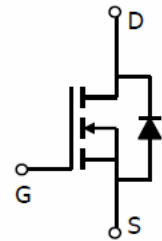
- $V_{DS} = 100V, I_D = 8A$
 $R_{DS(ON)} < 28m\Omega @ V_{GS}=10V$ (Typ:22m Ω)
- Special process technology for high ESD capability
- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current

Application

- DC/DC Primary Side Switch
- Telecom/Server
- Synchronous Rectification



SOP-8



Schematic Diagram

Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|----------------|---------|----------------|-----------|------------|------------|
| VSM8N10-S8 | VSM8N10 | SOP-8 | Ø330mm | 12mm | 2500 units |

Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|---|--------------------------|------------|------------------|
| Drain-Source Voltage | V_{DS} | 100 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Drain Current-Continuous | I_D | 8 | A |
| Drain Current-Continuous($T_C=100^\circ\text{C}$) | $I_D(100^\circ\text{C})$ | 5.6 | A |
| Pulsed Drain Current | I_{DM} | 57 | A |
| Maximum Power Dissipation | P_D | 2.6 | W |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 To 150 | $^\circ\text{C}$ |

Thermal Characteristic

| | | | |
|---|-----------------|----|--------------------|
| Thermal Resistance, Junction-to-Ambient ^(Note 2) | $R_{\theta JA}$ | 48 | $^\circ\text{C/W}$ |
|---|-----------------|----|--------------------|

Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

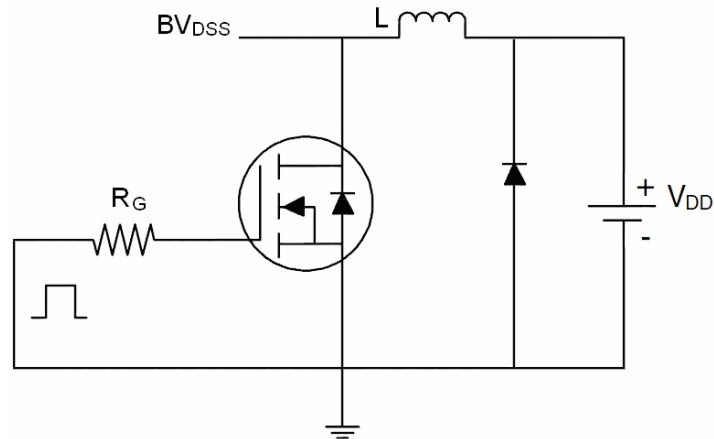
| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---------------------|--|-----|------|------|------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} =0V I _D =250μA | 100 | 110 | - | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =100V, 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 | 1.3 | 1.8 | 2.5 | V |
| Drain-Source On-State Resistance | R _{DS(ON)} | V _{GS} =10V, I _D =8A | - | 22 | 28 | mΩ |
| Forward Transconductance | g _{FS} | V _{DS} =5V, I _D =8A | 20 | - | - | S |
| Dynamic Characteristics ^(Note4) | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} =50V, V _{GS} =0V, F=1.0MHz | - | 2000 | - | PF |
| Output Capacitance | C _{oss} | | - | 300 | - | PF |
| Reverse Transfer Capacitance | C _{rss} | | - | 250 | - | PF |
| Switching Characteristics ^(Note 4) | | | | | | |
| Turn-on Delay Time | t _{d(on)} | V _{DD} =50V, I _D =10A, R _L =5Ω, R _G =1Ω, V _{GS} =10V | - | 12 | - | nS |
| Turn-on Rise Time | t _r | | - | 10 | - | nS |
| Turn-Off Delay Time | t _{d(off)} | | - | 19 | - | nS |
| Turn-Off Fall Time | t _f | | - | 8 | - | nS |
| Total Gate Charge | Q _g | I _D =10A, V _{DD} =50V, V _{GS} =10V | - | 42 | - | nC |
| Gate-Source Charge | Q _{gs} | | - | 9 | - | nC |
| Gate-Drain Charge | Q _{gd} | | - | 10 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage ^(Note 3) | V _{SD} | V _{GS} =0V, I _S =8A | - | 0.85 | 1.2 | V |
| Diode Forward Current ^(Note 2) | I _S | | - | - | 8 | A |
| Reverse Recovery Time | t _{rr} | T _J = 25°C, I _F = 8A | - | 30 | | nS |
| Reverse Recovery Charge | Q _{rr} | di/dt = 100A/μs ^(Note3) | - | 44 | | nC |

Notes:

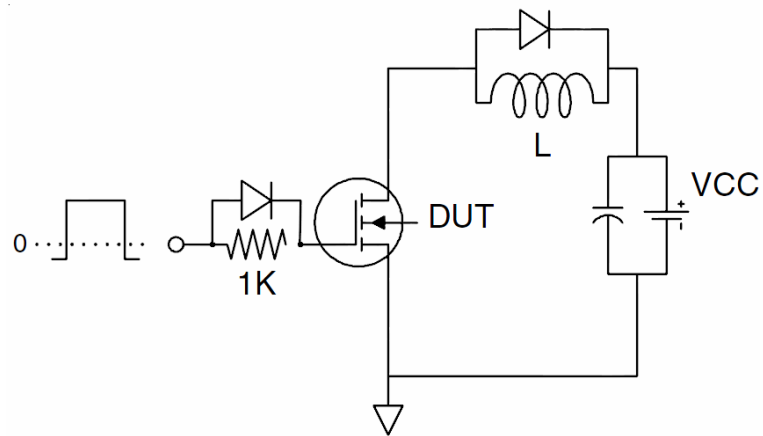
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

Test Circuit

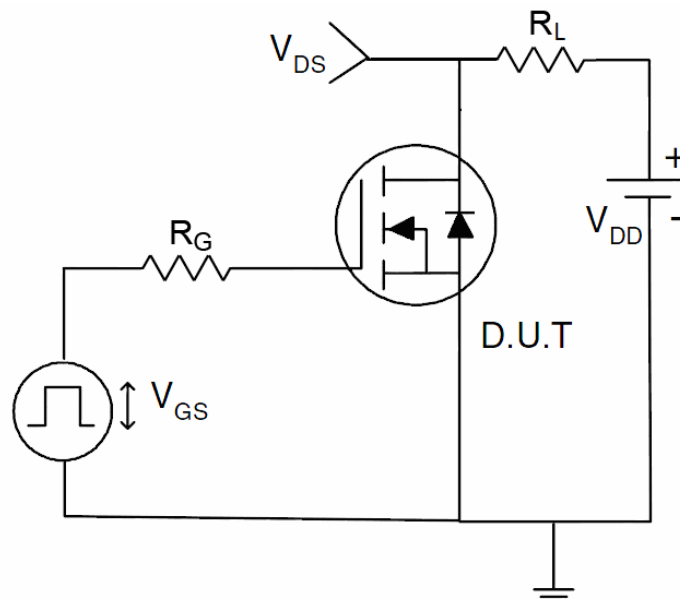
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

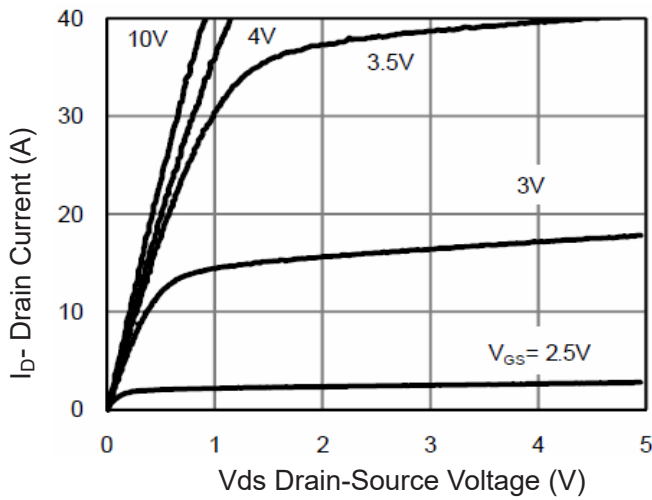


Figure 1 Output Characteristics

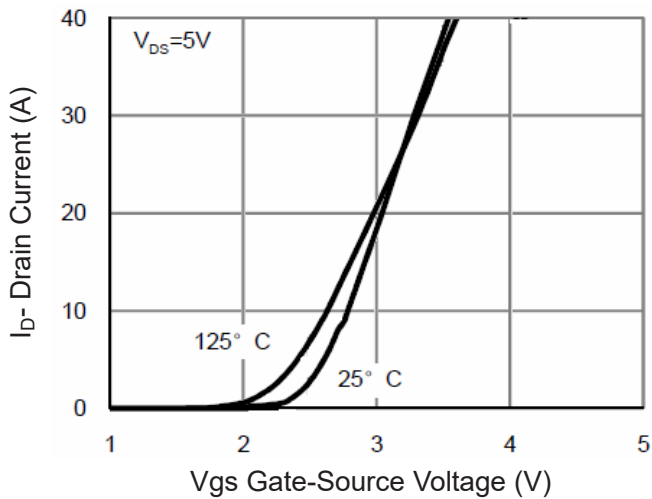


Figure 2 Transfer Characteristics

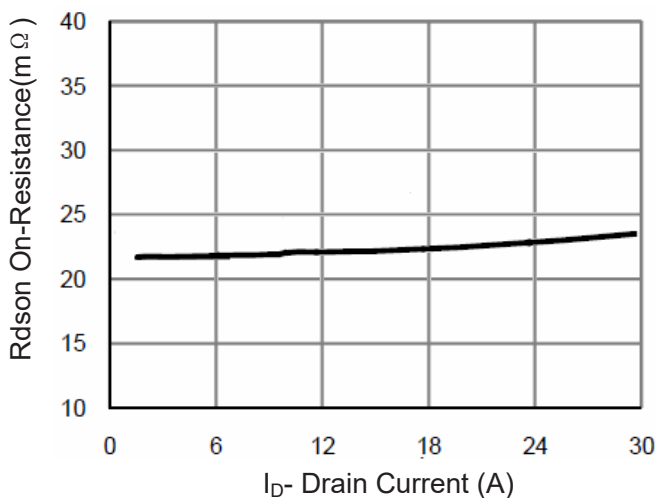


Figure 3 Rdson- Drain Current

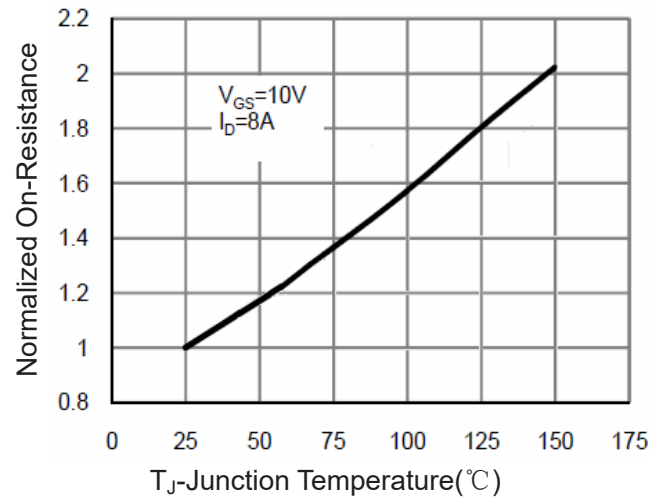


Figure 4 Rdson-Junction Temperature

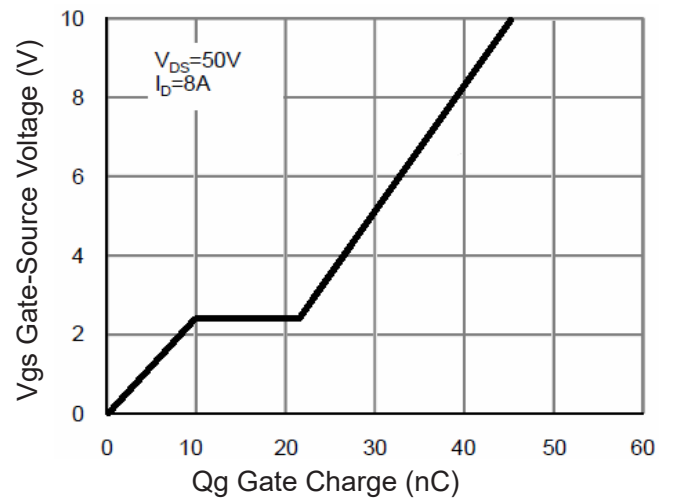


Figure 5 Gate Charge

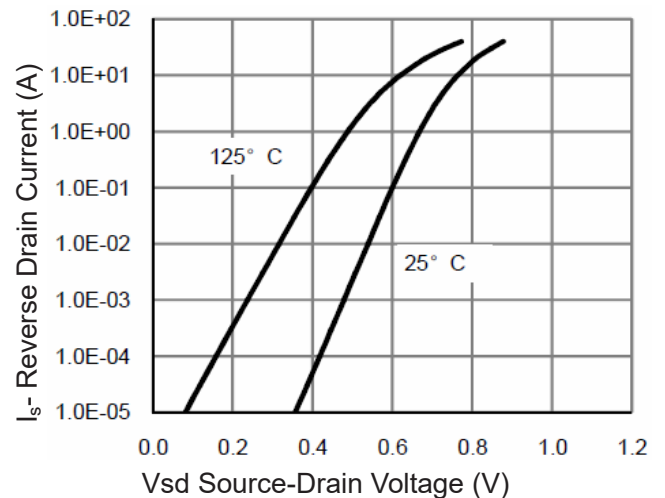
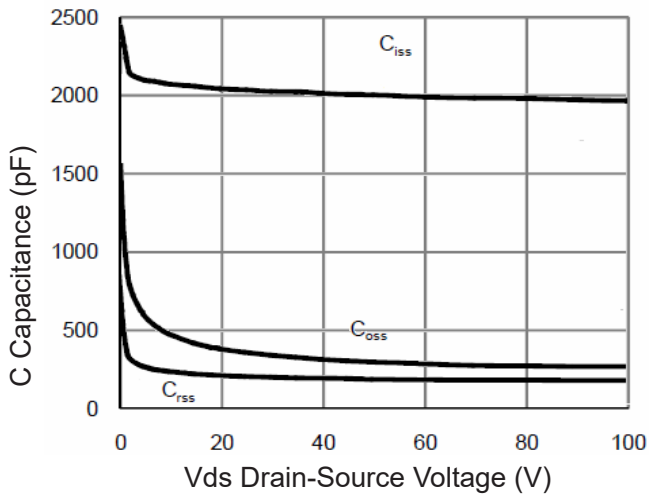
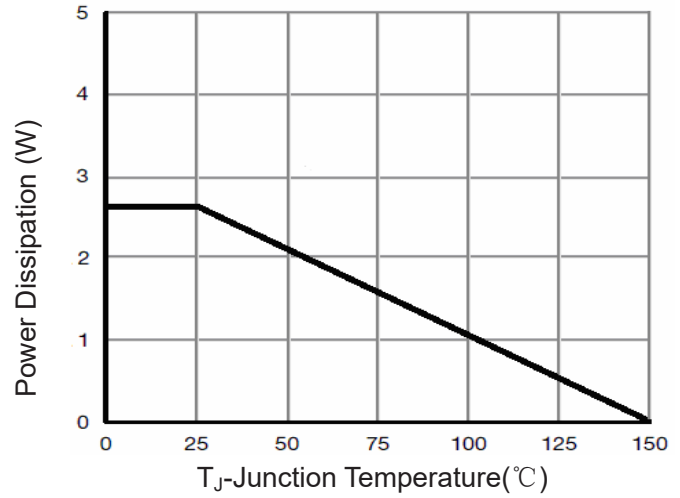
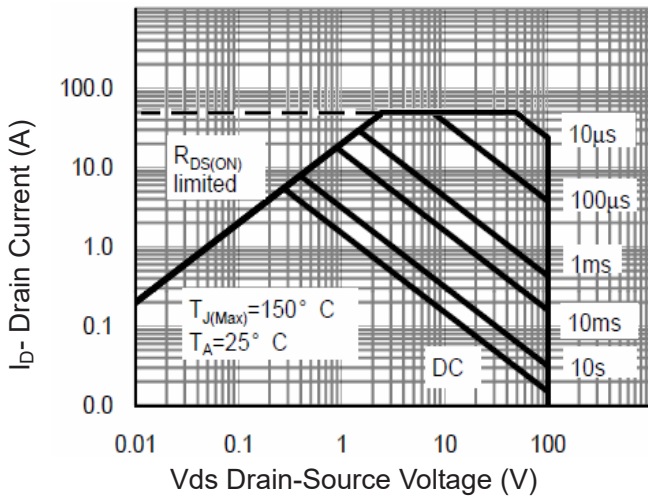
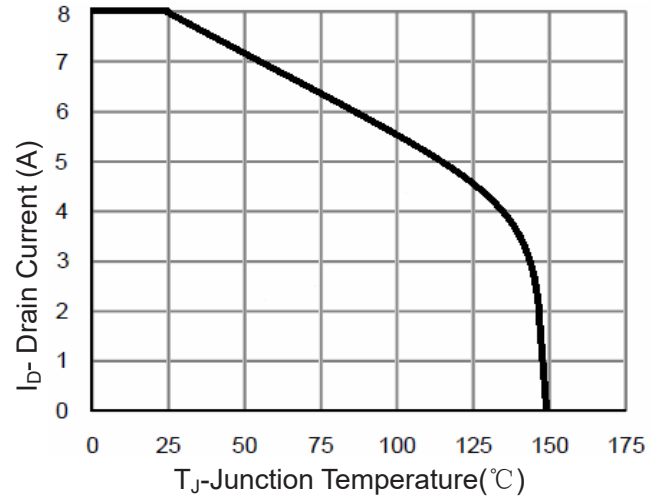
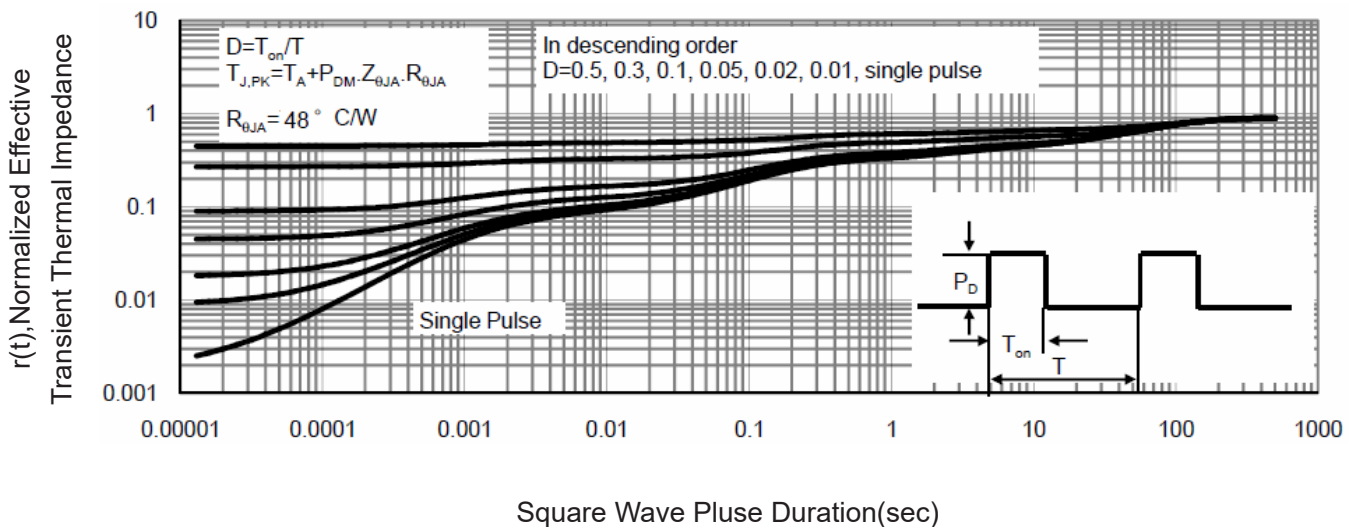


Figure 6 Source- Drain Diode Forward


Figure 7 Capacitance vs Vds

Figure 9 Power De-rating

Figure 8 Safe Operation Area

Figure 10 Current De-rating

Figure 11 Normalized Maximum Transient Thermal Impedance