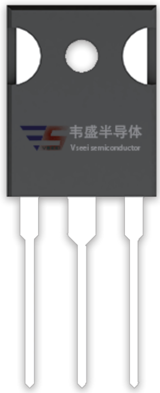
Description

The VSM150N15 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in Automotive applications and a wide variety of other applications.



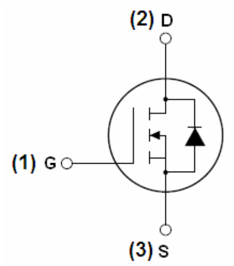
TO-247

General Features

- V_{DSS} =150V,I_D =150A
  $R_{DS(ON)}$ < 8mΩ @ V_{GS}=10V （Typ：6.6 mΩ）
- Good stability and uniformity with high E_{AS}
- Special process technology for high ESD capability
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation

Application

- Automotive applications
- Hard switched and high frequency circuits
- Uninterruptible power supply



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
VSM150N15-T7	VSM150N15	TO-247	-	-	-

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DSS}	150	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	150	A
Drain Current-Continuous(T_C=100℃)	I_D (100℃)	106	A
Pulsed Drain Current	I_{DM}	600	A
Maximum Power Dissipation	P_D	460	W
Derating factor		3.07	W/℃
Single pulse avalanche energy (Note 3)	E_{AS}	3100	mJ
Peak Diode Recovery dv/dt (Note 4)	dv/dt	18.5	V/ns

Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 175	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case (Note 1)	$R_{θJC}$	0.33	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

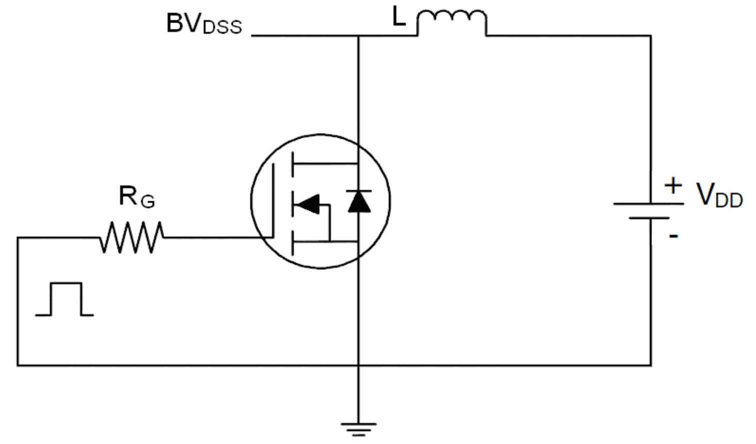
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	150	170	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=150V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±200	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	2	3	4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=40A	-	6.6	8	mΩ
Forward Transconductance	g_{FS}	V_{DS}=50V,I_D=40A	150	-	-	S
Dynamic Characteristics						
Input Capacitance	C_{lss}	V_{DS}=25V,V_{GS}=0V, F=1.0MHz	-	21000	-	PF
Output Capacitance	C_{oss}		-	1446	-	PF
Reverse Transfer Capacitance	C_{rss}		-	1120	-	PF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=30V,I_D=2A,R_L=15Ω V_{GS}=10V,R_G=2.5Ω	-	20	-	nS
Turn-on Rise Time	t_r		-	110	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	45	-	nS
Turn-Off Fall Time	t_f		-	70	-	nS
Total Gate Charge	Q_g	V_{DS}=30V,I_D=30A V_{GS}=10V	-	586	-	nC
Gate-Source Charge	Q_{gs}		-	123	-	nC
Gate-Drain Charge	Q_{gd}		-	184	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=40A	-	-	1.2	V
Reverse Recovery Time	t_{rr}	TJ = 25°C, IF = 75A di/dt = 100A/μs(Note2)	-	71	-	nS
Reverse Recovery Charge	Qrr		-	106	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

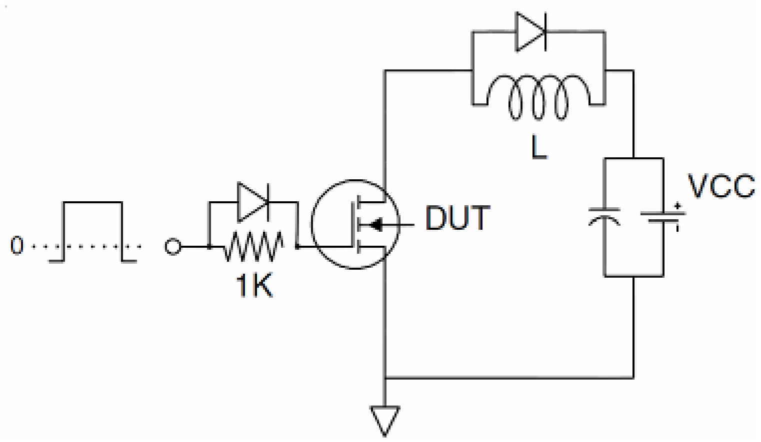
1. Surface Mounted on FR4 Board, t ≤ 10 sec.
2. Pulse Test: Pulse Width ≤ 400μs, Duty Cycle ≤ 2%.
3. EAS condition：Tj=25℃,V_{DD}=75V,V_G=10V,L=0.5mH,Rg=25Ω
4. I_{SD}⩽125A, di/dt⩽260A/μs, V_{DD}⩽$V_{(BR)DSS}$，T_J ⩽175°C

Test circuit

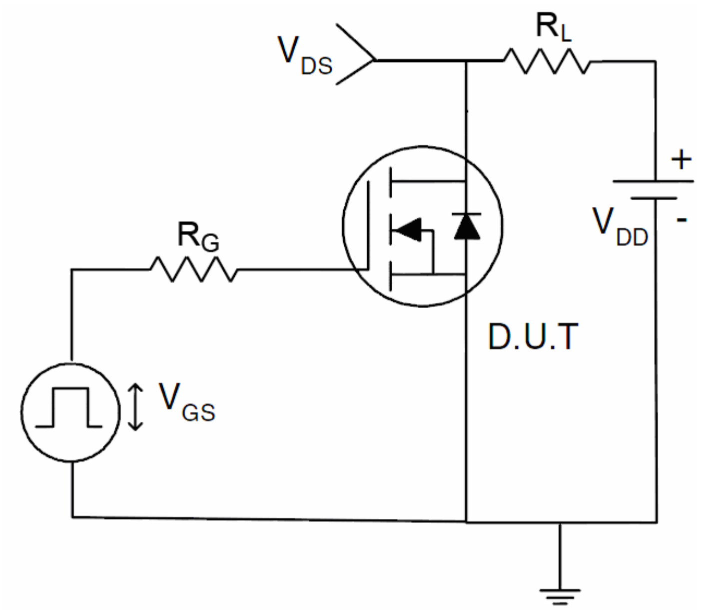
1） E_{AS} test Circuits



2） Gate charge test Circuit:



3） Switch Time Test Circuit:



Typical Electrical and Thermal Characteristics

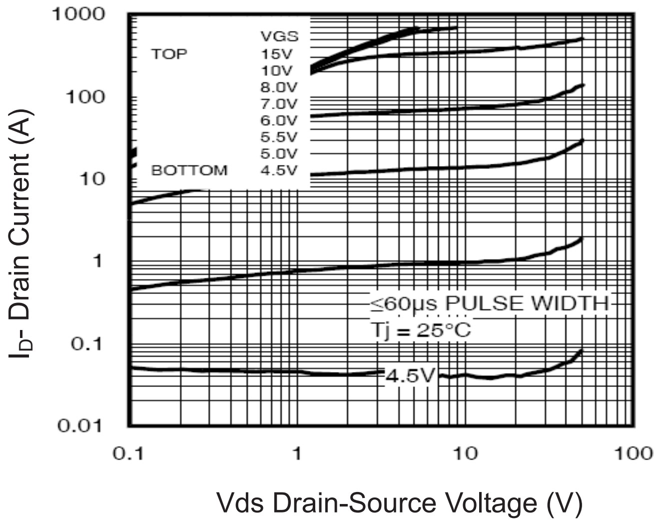


Figure 1 Output Characteristics

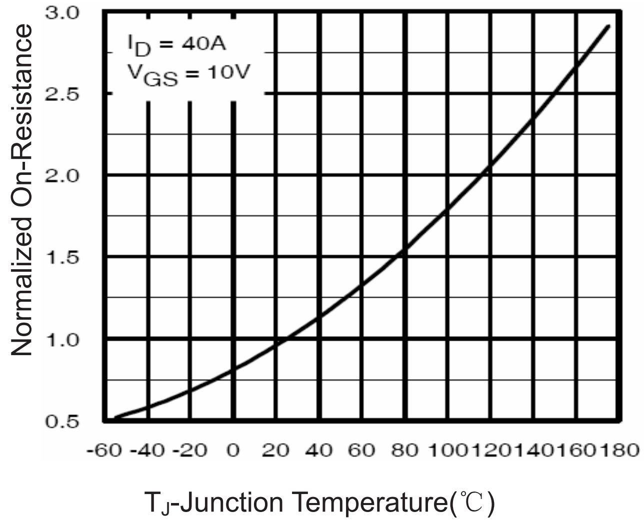


Figure 4 Rdson-JunctionTemperature

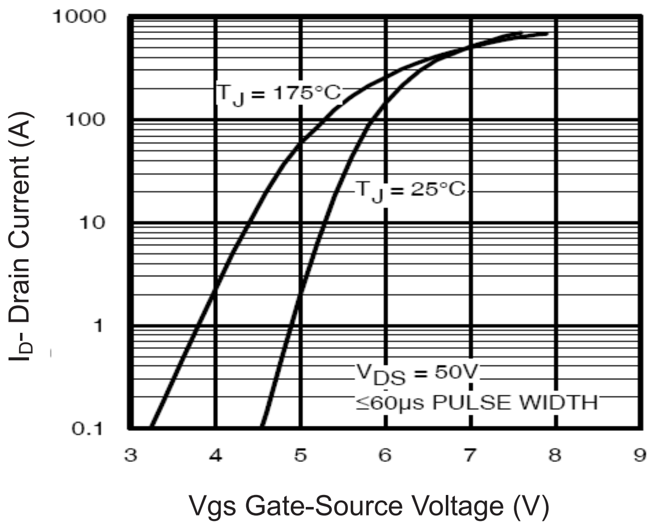


Figure 2 Transfer Characteristics

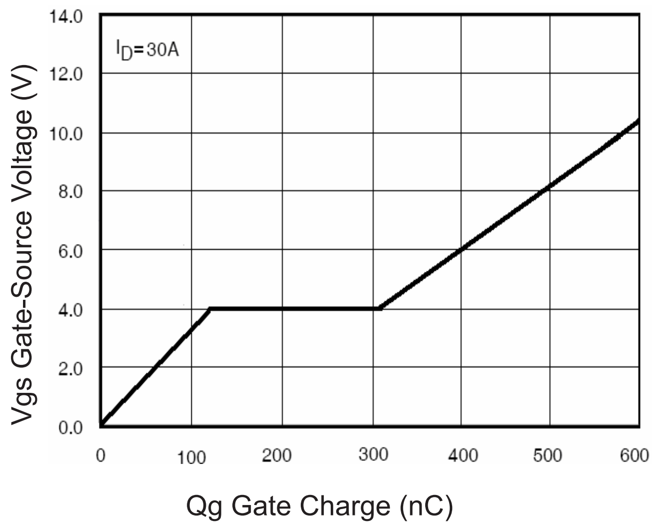


Figure 5 Gate Charge

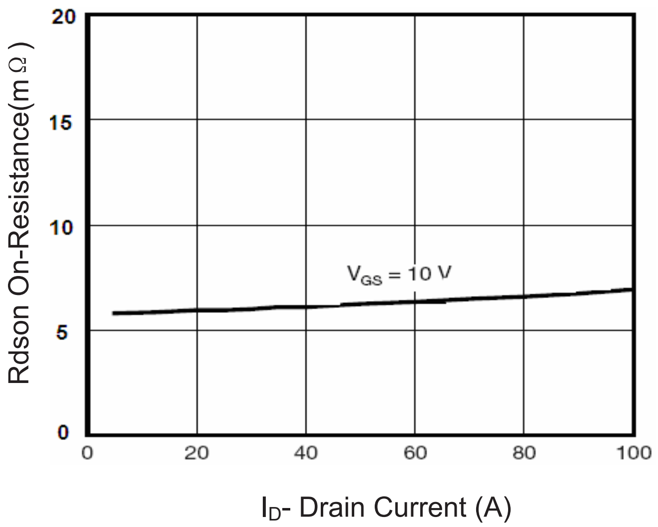


Figure 3 Rdson- Drain Current

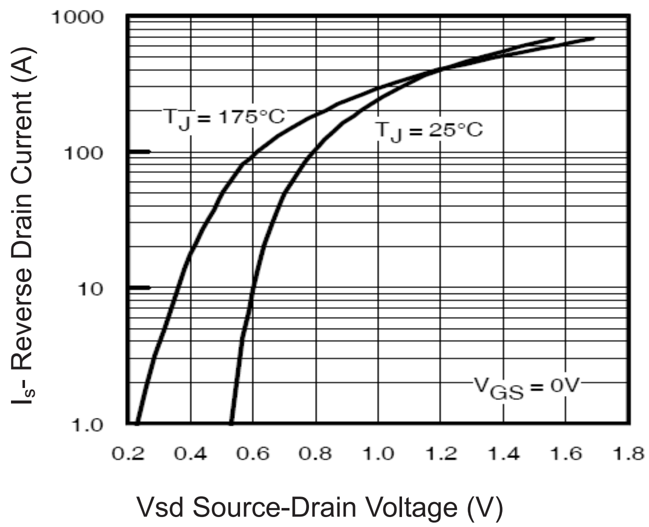


Figure 6 Source- Drain Diode Forward

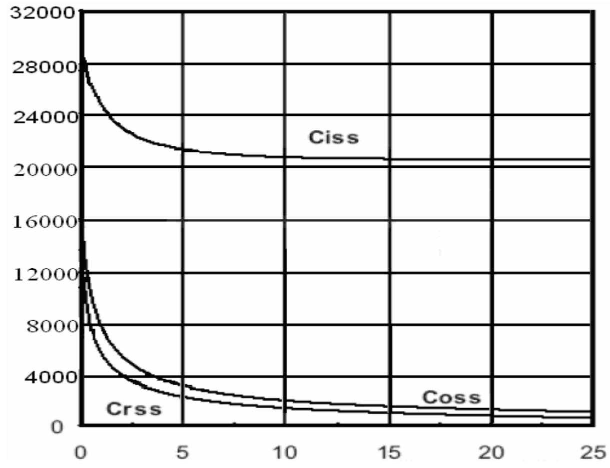


Figure 7 Capacitance vs Vds

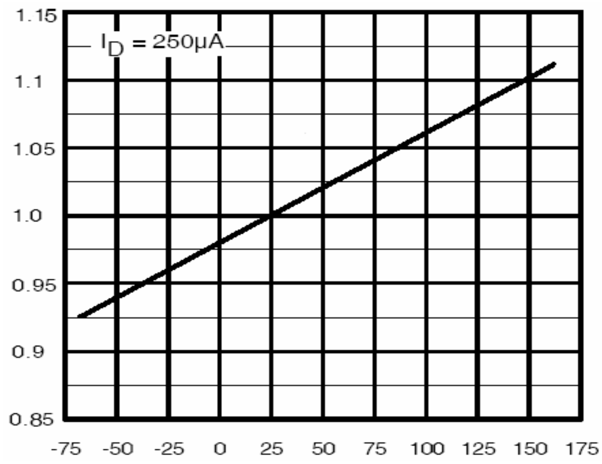


Figure 9 BV_{DSS} vs Junction Temperature

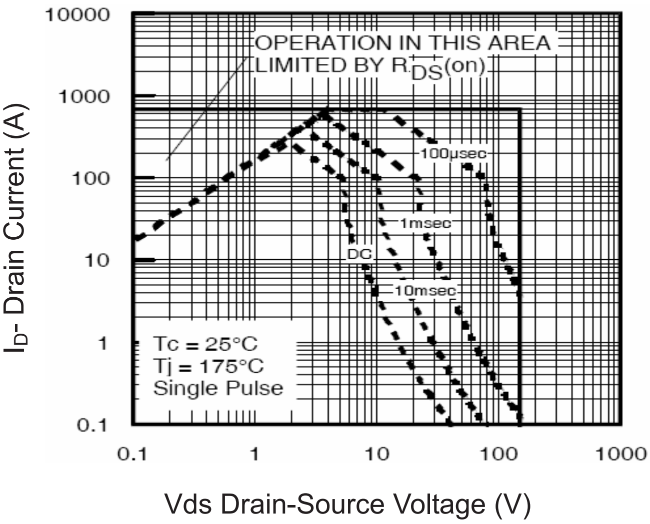


Figure 8 Safe Operation Area

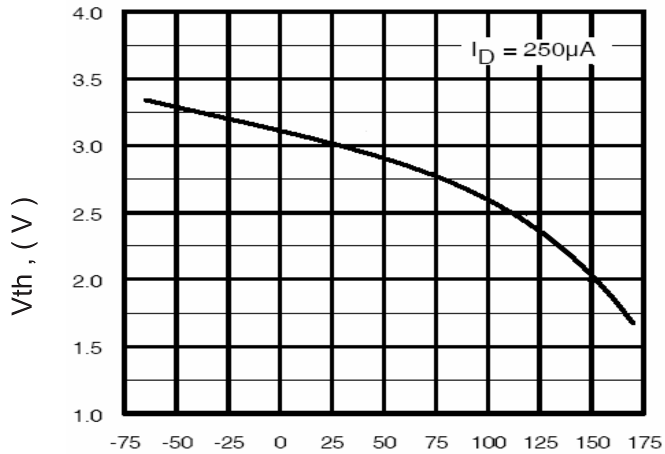


Figure 10 $V_{GS(th)}$ vs Junction Temperatur

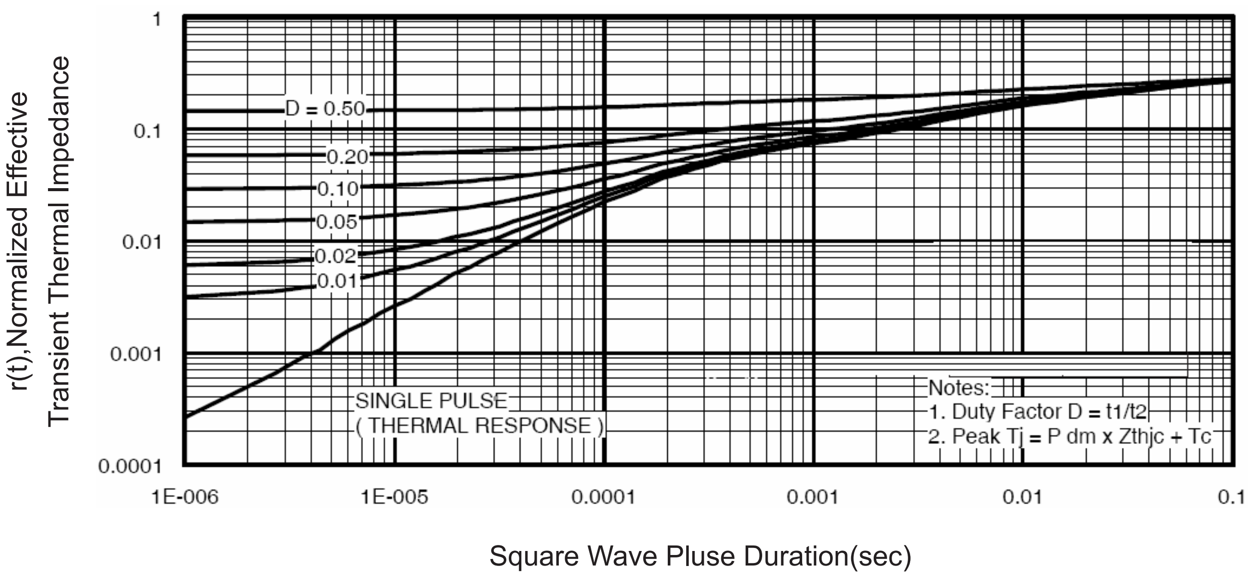


Figure 11 Normalized Maximum Transient Thermal Impedance