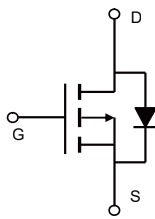


Description

Features ● $V_{DS}=-20V$, $I_D=-15A$ ● $R_{DS(ON)} < 9m\Omega$ @ $V_{GS} = -4.5V$ ● $R_{DS(ON)} < 13m\Omega$ @ $V_{GS} = -2.5V$ ● Advanced Trench Technology ● Excellent $R_{DS(ON)}$ and Low Gate Charge ● Lead free product is acquired	Application ● PWM Applications ● Load Switch <i>100% UIS TESTED!</i> <i>100% ΔV_{ds} TESTED!</i>
 SOP-8	 Schematic

Package Marking and Ordering Information

Device Marking	Device	OUTLINE	Device Package	Reel Size	Reel (PCS)	Per Carton (PCS)
VSM15P02	VSM15P02-S8	TAPING	SOP-8	13inch	4000	48000

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

Symbol	Parameter	Max.	Units
V_{DSS}	Drain-Source Voltage	-20	V
V_{GSS}	Gate-Source Voltage	± 12	V
I_D	Continuous Drain Current	$T_A = 25^{\circ}C$	A
		$T_A = 100^{\circ}C$	
I_{DM}	Pulsed Drain Current ^{note1}	-60	A
EAS	Single Pulsed Avalanche Energy ^{note2}	56	mJ
P_D	Power Dissipation $T_A = 25^{\circ}C$	3.3	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	38	$^{\circ}C/W$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^{\circ}C$

Electrical Characteristics (T_J=25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D = -250μA	-20	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -20V, V _{GS} = 0V,	-	-	-1	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} = ±12V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = -250μA	-0.35	-0.7	-1.0	V
R _{DS(on)}	Static Drain-Source on-Resistance note3	V _{GS} =-4.5V, I _D =-15A	-	7	9	mΩ
		V _{GS} =-2.5V, I _D =-12A	-	9	13	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-10V, V _{GS} =0V, f = 1.0MHz	-	4600	-	pF
C _{oss}	Output Capacitance		-	460	-	pF
C _{rss}	Reverse Transfer Capacitance		-	459	-	pF
Q _g	Total Gate Charge	V _{DS} =-10V, I _D =-15A, V _{GS} =-4.5V	-	56	-	nC
Q _{gs}	Gate-Source Charge		-	8	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	16	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} =-10V, I _D =-15A, R _{GEN} =2.7Ω, V _{GS} =-10V	-	8	-	ns
t _r	Turn-on Rise Time		-	59	-	ns
t _{d(off)}	Turn-off Delay Time		-	111	-	ns
t _f	Turn-off Fall Time		-	43	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-15	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-60	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} = 0V, I _S =-15A	-	-	-1.2	V
t _{rr}	Reverse Recovery Time	T _J =25℃,I _{SD} =-15A, V _{GS} =0V	-	23	-	ns
Q _{rr}	Reverse Recovery Charge	di/dt=-100A/μs	-	14	-	Nc

Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition: T_J=25°C, V_{DD}=-15V, V_G=-10V, R_G=25Ω, L=0.5mH, I_{AS}=-15A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

Typical Performance Characteristics

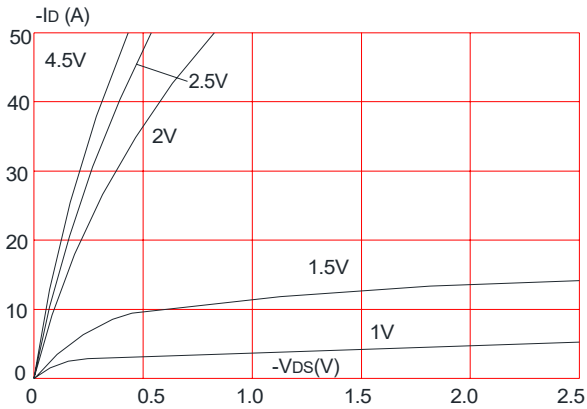
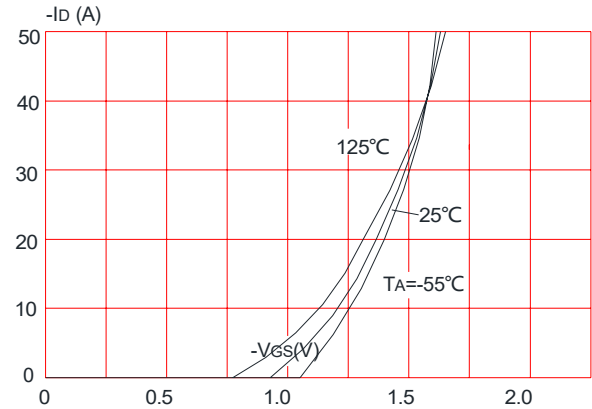
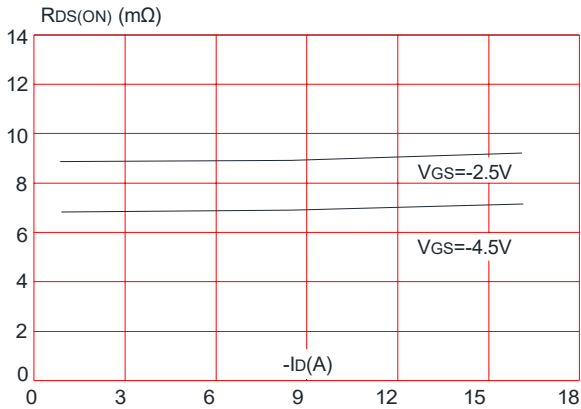
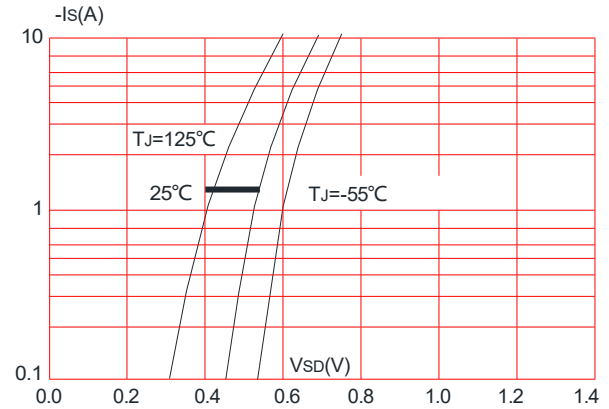
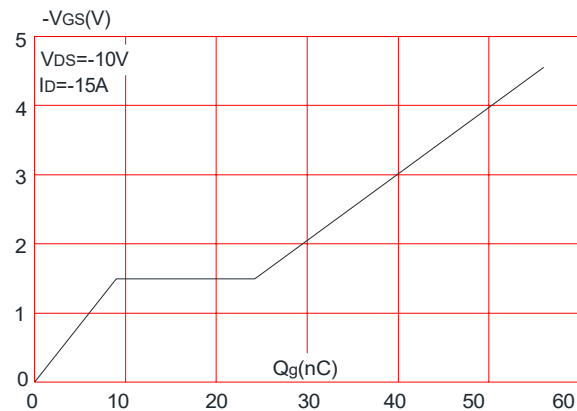
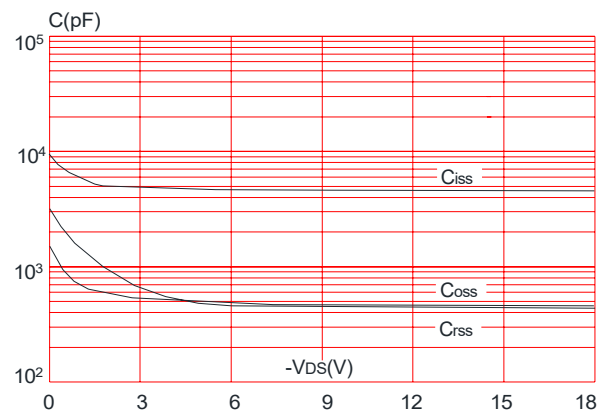
Figure1: Output Characteristics

Figure 2: Typical Transfer Characteristics

Figure 3: On-resistance vs. Drain Current

Figure 4: Body Diode Characteristics

Figure 5: Gate Charge Characteristics

Figure 6: Capacitance Characteristics


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

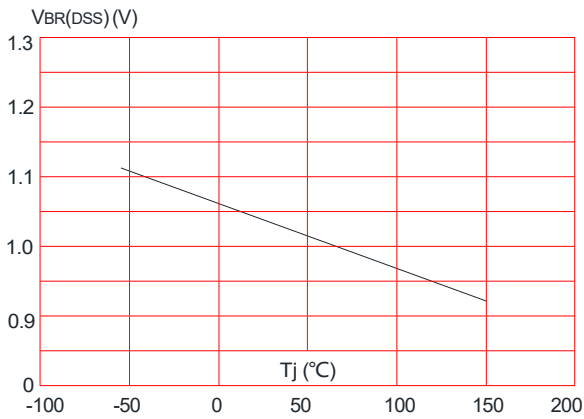


Figure 8: Normalized on Resistance vs. Junction Temperature

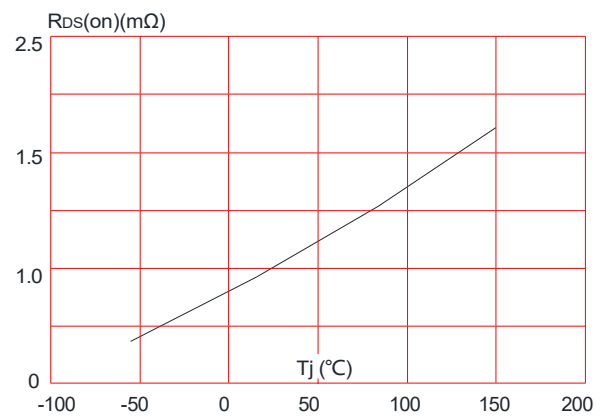


Figure 9: Maximum Safe Operating Area

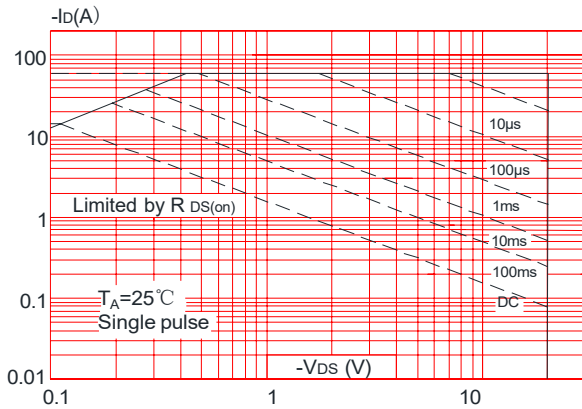


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

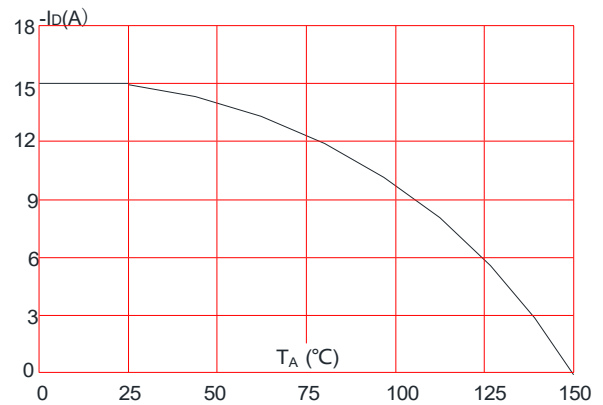
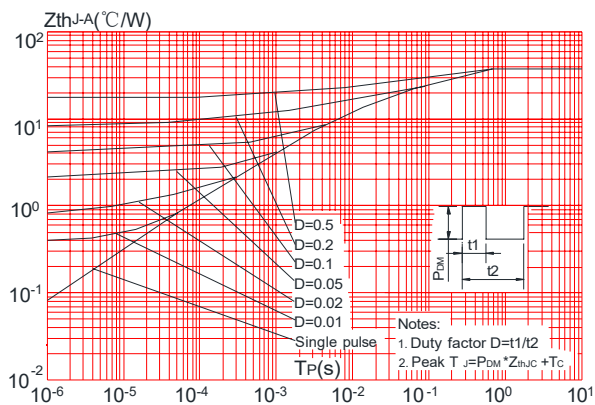
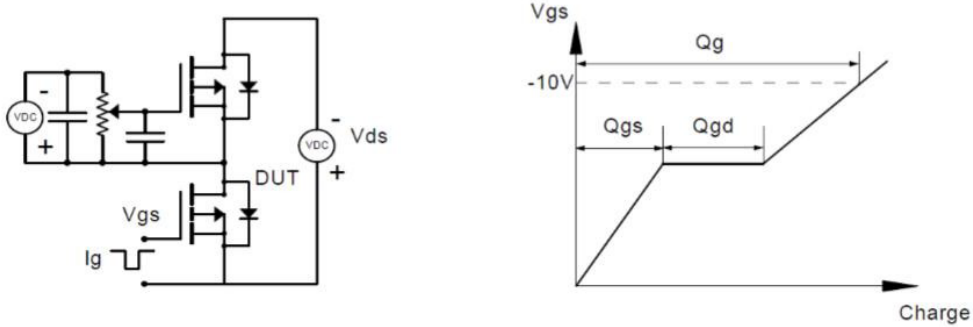


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

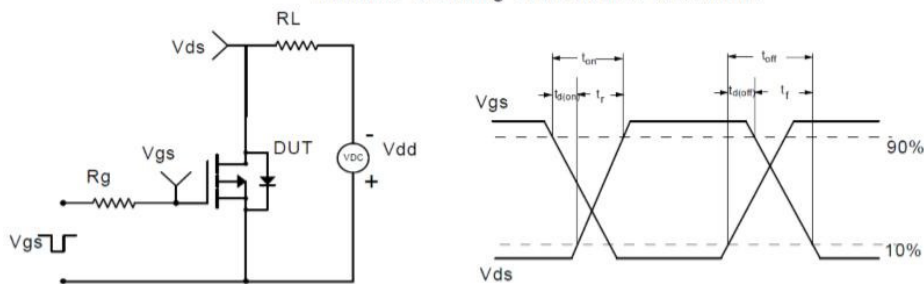


Test Circuit

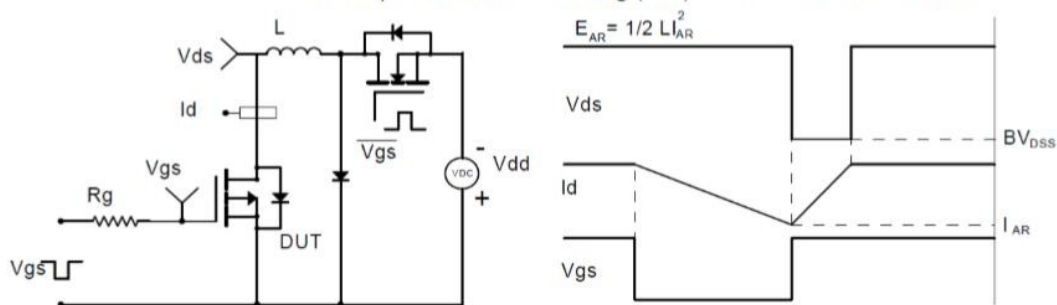
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

