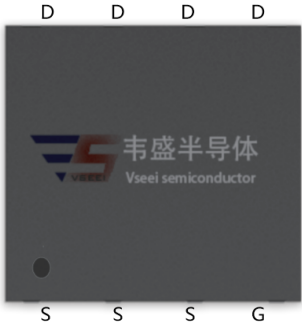
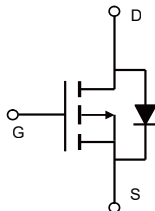


Description

Features ● $V_{DS} = -30V$, $I_D = -15A$ $R_{DS(ON)} < 14m\Omega$ @ $V_{GS} = -10V$ $R_{DS(ON)} < 24m\Omega$ @ $V_{GS} = -4.5V$ ● Advanced Trench Technology ● Excellent $R_{DS(ON)}$ and Low Gate Charge ● Lead free product is acquired	Application ● PWM Applications ● Load Switch ● Power Management <i>100% UIS TESTED!</i> <i>100% ΔV_{ds} TESTED!</i>
 DFN3x3	 Schematic

Package Marking and Ordering Information

Device Marking	Device	OUTLINE	Device Package	Reel Size	Reel (PCS)	Per Carton (PCS)
VSM15P03	VSM15P03-D33	TAPING	DFN3x3	13inch	5000	50000

Absolute Maximum Ratings (T_C=25°C unless otherwise specified)

Symbol	Parameter	Max.	Units
V_{DSS}	Drain-Source Voltage	-30	V
V_{GSS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Current	$T_C = 25^\circ C$	A
		$T_C = 100^\circ C$	A
I_{DM}	Pulsed Drain Current ^{note1}	-60	A
E_{AS}	Single Pulsed Avalanche Energy ^{note2}	40	mJ
P_D	Power Dissipation $T_C = 25^\circ C$	5.4	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	23	°C/W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	°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	-30	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -30V, V _{GS} =0V,	-	-	-1	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} = ±20V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D = -250μA	-1.0	-1.6	-2.5	V
R _{DS(on)}	Static Drain-Source on-Resistance Note3	V _{GS} = -10V, I _D = -10A	-	11	14	mΩ
		V _{GS} = -4.5V, I _D = -5A	-	17	24	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = -15V, V _{GS} =0V, f=1.0MHz	-	2070	-	pF
C _{OSS}	Output Capacitance		-	273	-	pF
C _{rSS}	Reverse Transfer Capacitance		-	246	-	pF
Q _g	Total Gate Charge	V _{DS} = -15V, I _D = -5A, V _{GS} = -10V	-	22	-	nC
Q _{gs}	Gate-Source Charge		-	4	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	5.8	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} = -15V, I _D = -10A, V _{GS} =-10V, R _{GEN} =2.5Ω	-	9	-	ns
t _r	Turn-on Rise Time		-	13	-	ns
t _{d(off)}	Turn-off Delay Time		-	48	-	ns
t _f	Turn-off Fall Time		-	20	-	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	-	-0.8	-1.2	V
trr	Reverse Recovery Time	T _J =25℃,	-	64	-	ns
Qrr	Reverse Recovery Charge	V _{DD} = -24V,I _F =-2.8A, dI/dt=-100A/μs	-	25	-	nC

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

2. EAS condition: T_J=25°C, V_{GS}=10V, R_G=25Ω, L=0.5mH, I_{AS}=-12.7A

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

Typical Performance Characteristics

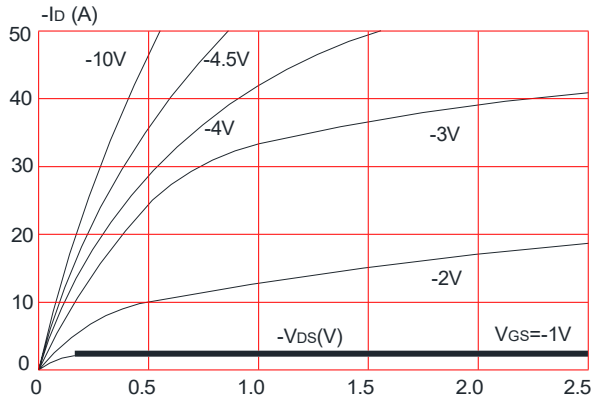
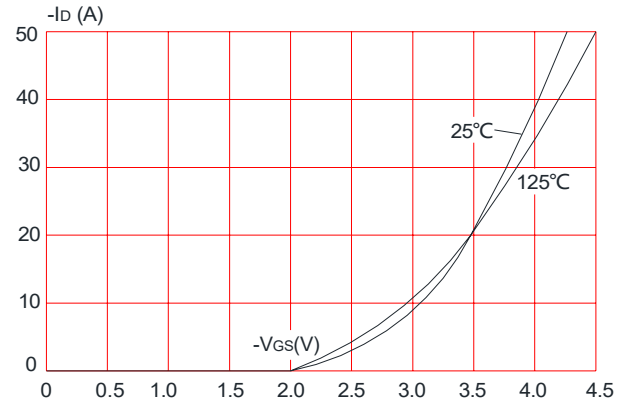
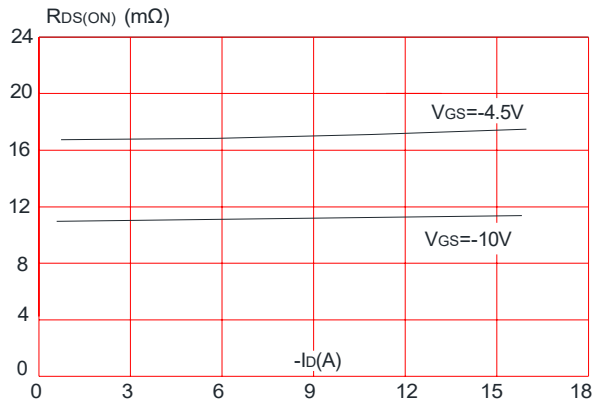
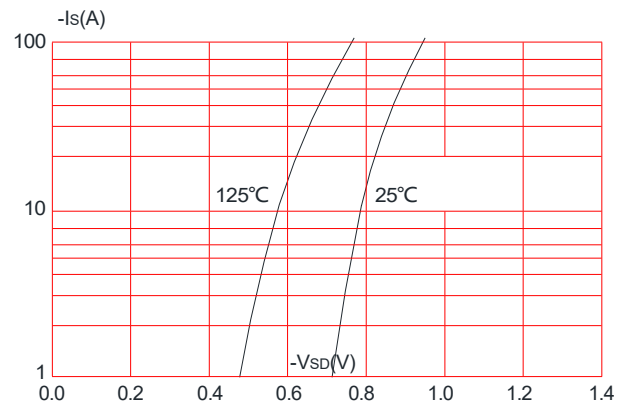
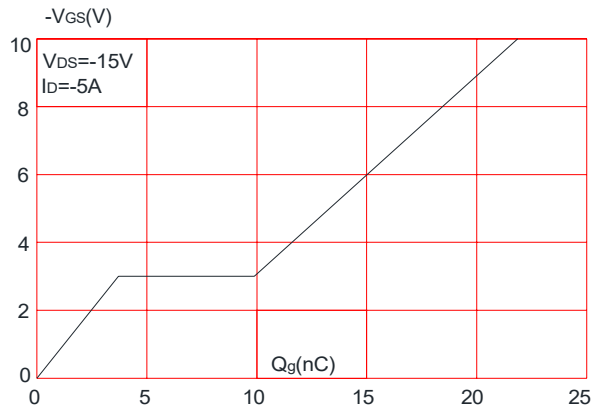
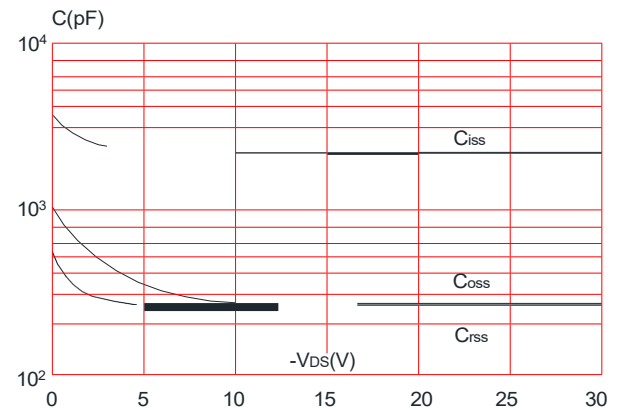
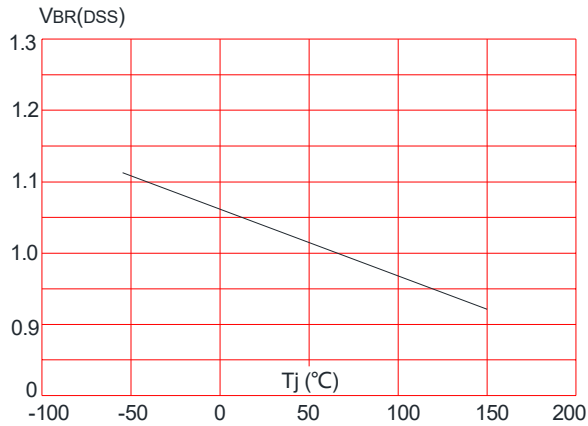
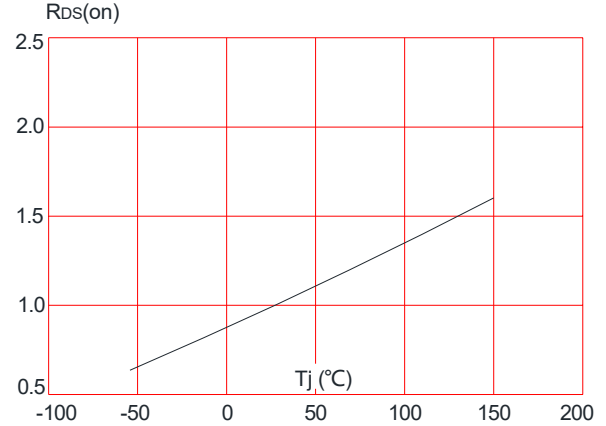
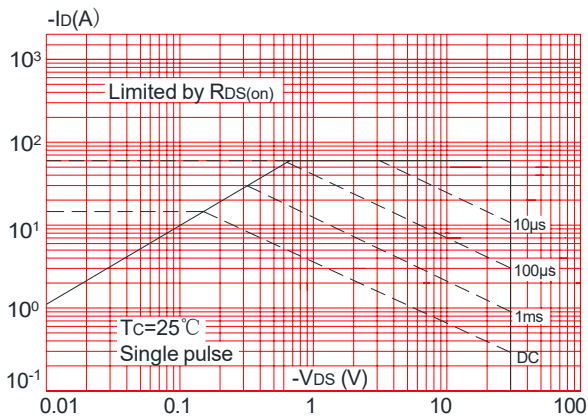
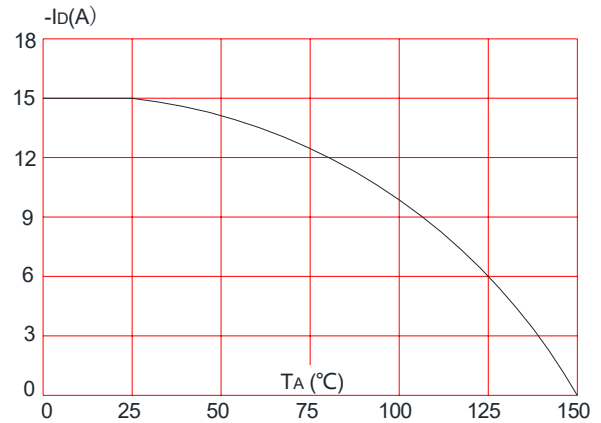
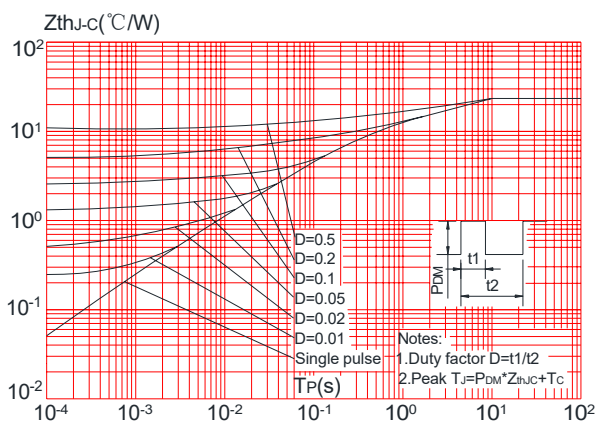
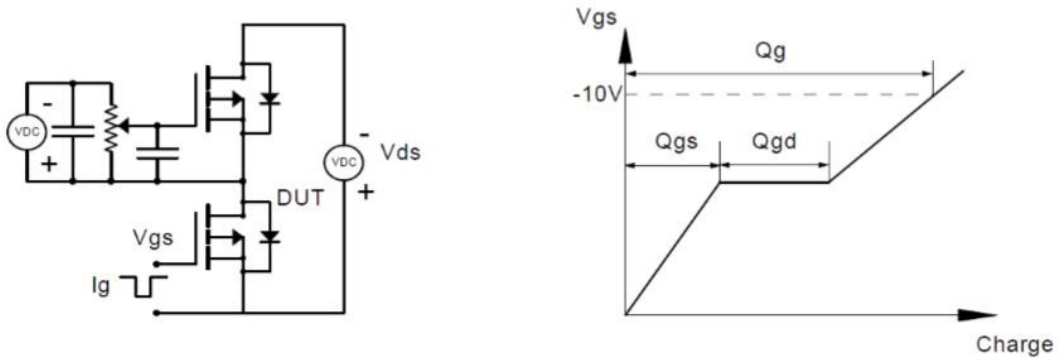
Figure1: Output Characteristics

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


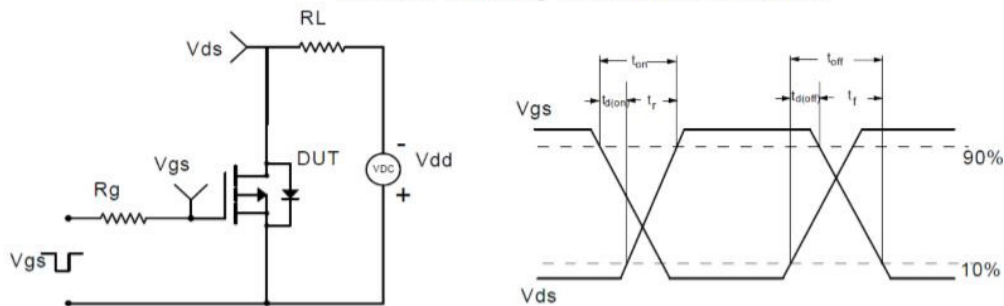
Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

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-Case


Test Circuit

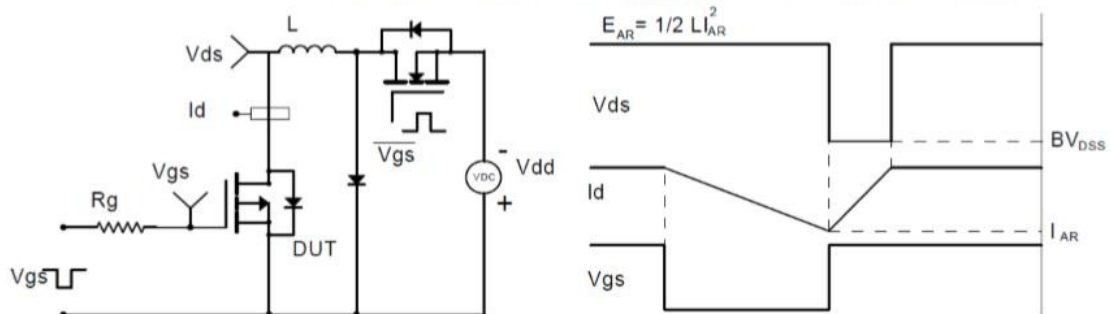
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

