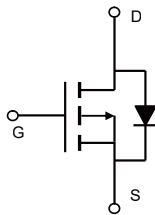


Description

Features ● $V_{DS}=-12V$, $I_D=-4.1A$ ● $R_{DS(ON)} < 36m\Omega$ @ $V_{GS} = -4.5V$ ● $R_{DS(ON)} < 53m\Omega$ @ $V_{GS} = -2.5V$ ● Advanced Trench Technology ● Excellent $R_{DS(ON)}$ and Low Gate Charge ● Lead free product is acquired	Application ● PWM Applications ● Load Switch ● Power Management
 SOT-23	 Schematic

Package Marking and Ordering Information

Device Marking	Device	OUTLINE	Device Package	Reel Size	Reel (PCS)	Per Carton (PCS)
VSM2305B	VSM2305B-S2	TAPING	SOT-23	7inch	3000	120000

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

Symbol	Parameter		Max.	Units
V_{DSS}	Drain-Source Voltage		-12	V
V_{GSS}	Gate-Source Voltage		± 8	V
I_D	Continuous Drain Current	$T_C = 25^{\circ}C$	-4.1	A
		$T_C = 100^{\circ}C$	-2.6	
I_{DM}	Pulsed Drain Current ^{note1}		-34	A
P_D	Power Dissipation	$T_C = 25^{\circ}C$	1.7	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient		74	$^{\circ}C/W$
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	-12	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-12V, V _{GS} = 0V,	-	-	-1	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} = ± 8V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = -250μA	-0.4	-0.65	-1.0	V
R _{DS(on)}	Static Drain-Source on-Resistance note2	V _{GS} =-4.5V, I _D =-4.1A	-	26	36	mΩ
		V _{GS} =-2.5V, I _D =-3A	-	35	53	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = -4V, V _{GS} = 0V, f = 1.0MHz	-	905	-	pF
C _{oss}	Output Capacitance		-	210	-	pF
C _{rss}	Reverse Transfer Capacitance		-	195	-	pF
Q _g	Total Gate Charge	V _{DS} = -4V, I _D = -4.1A, V _{GS} = -4.5V	-	7.8	15	nC
Q _{gs}	Gate-Source Charge		-	1.2	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	1.6	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} = -4V, I _D = -3.3A, R _G =1.0Ω, V _{GEN} =-4.5V, R _L =1.2Ω	-	13	20	ns
t _r	Turn-on Rise Time		-	35	53	ns
t _{d(off)}	Turn-off Delay Time		-	32	48	ns
t _f	Turn-off Fall Time		-	10	20	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-4.1	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-16	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} = 0V, I _S = -4.1A	-	-	-1.2	V
t _{rr}	Reverse Recovery Time	V _{GS} =0V, I _S =-4.1A,	-	20	-	ns
Q _{rr}	Reverse Recovery Charge	di/dt=100A/μs	-	9	-	nC

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

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

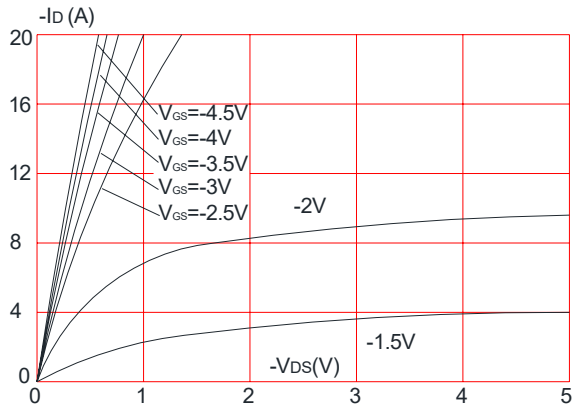
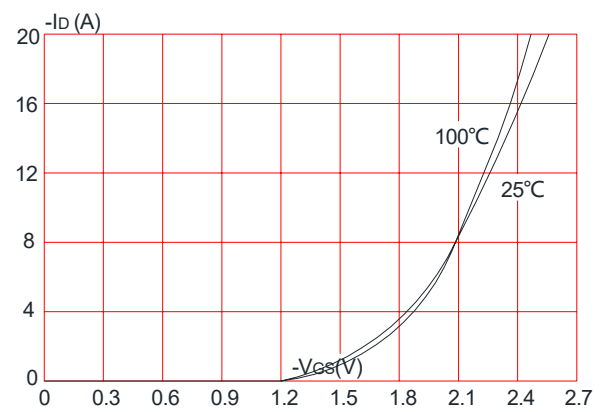
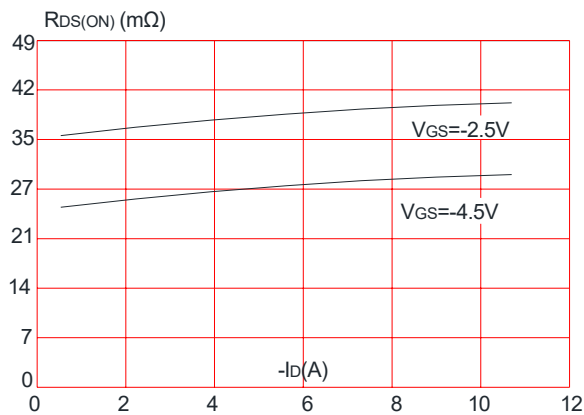
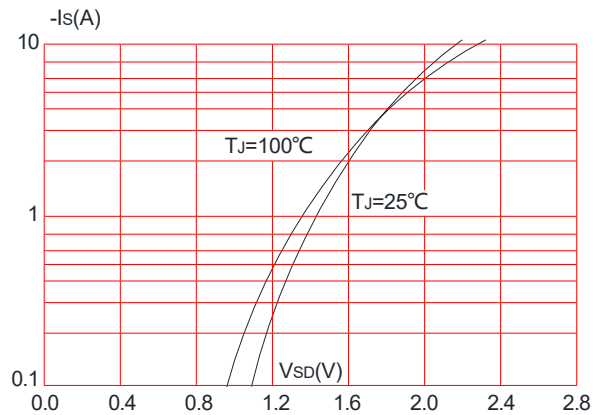
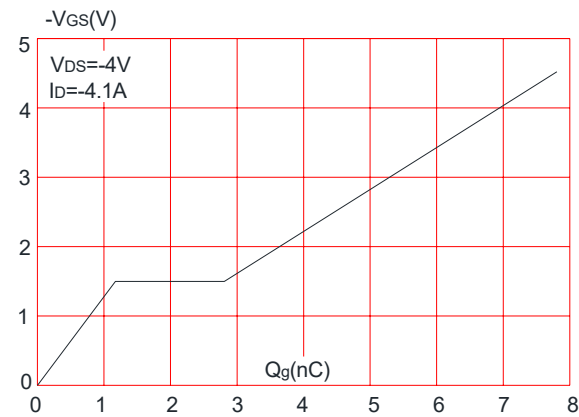
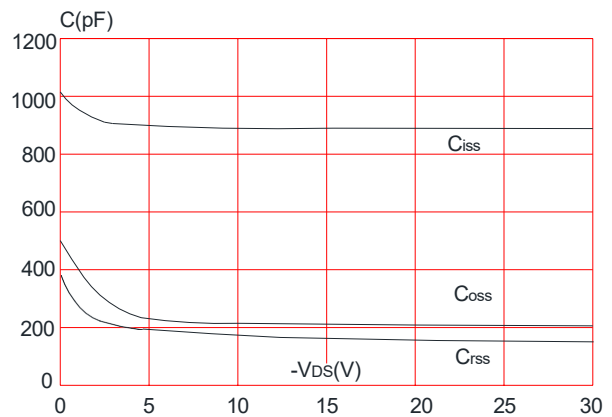
Figure1: Output Characteristics

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

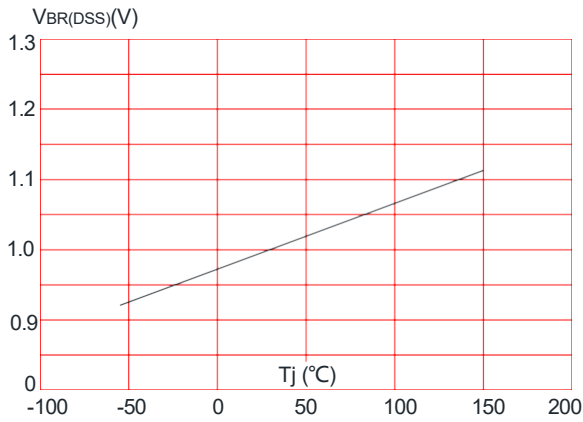


Figure 8: Normalized on Resistance vs. Junction Temperature

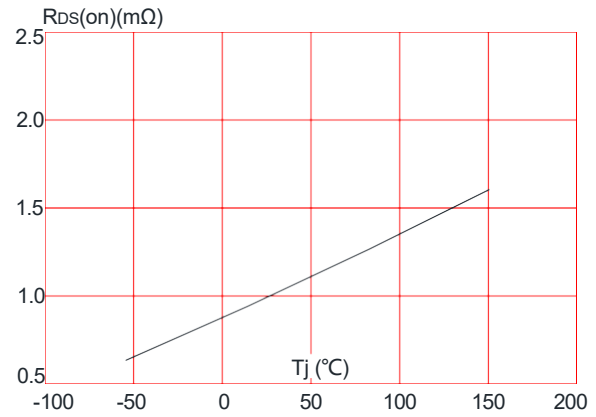


Figure 9: Maximum Safe Operating Area

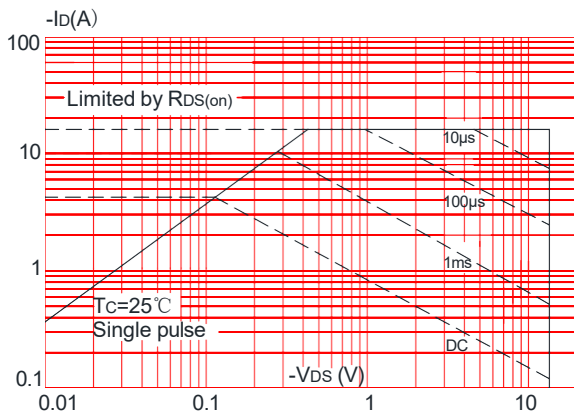


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

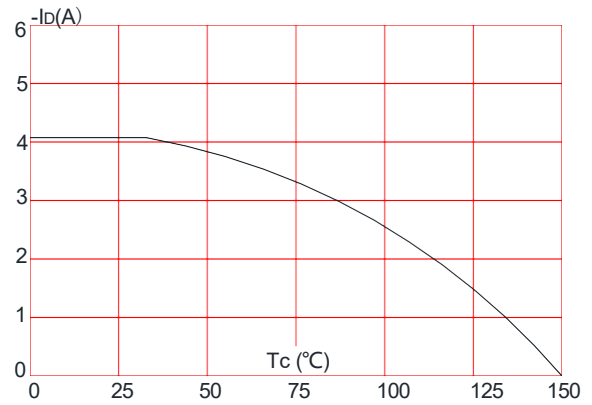
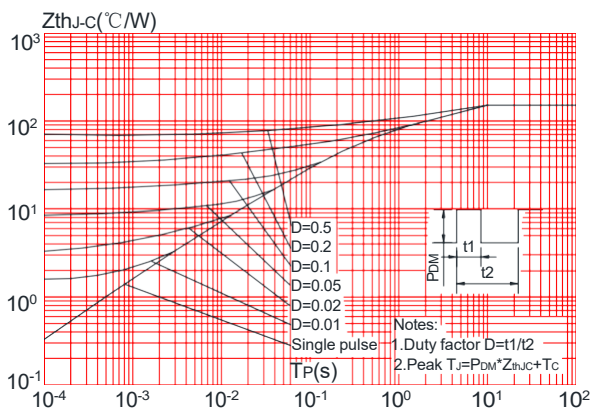
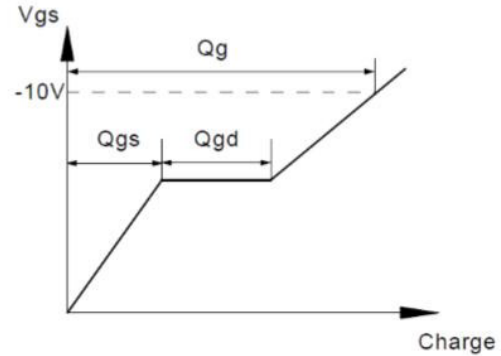
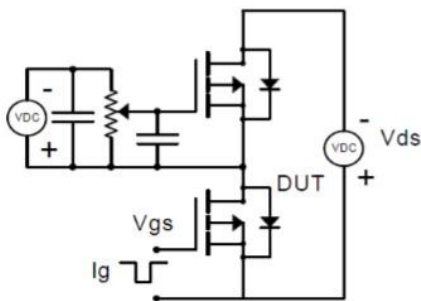


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

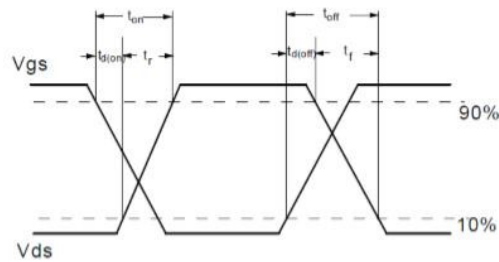
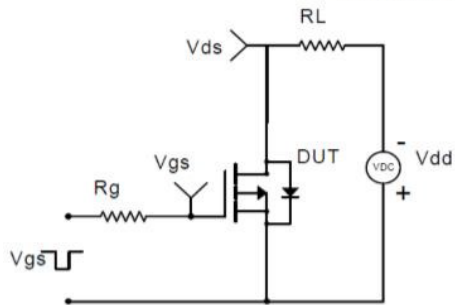


Test Circuit

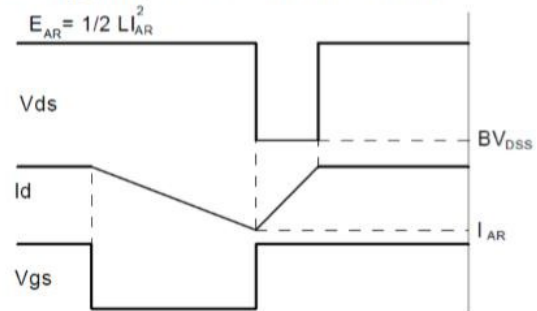
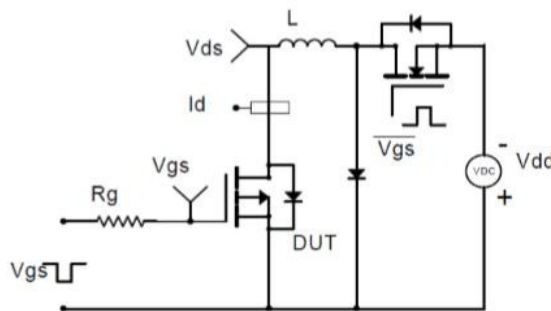
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

