

Description

Features

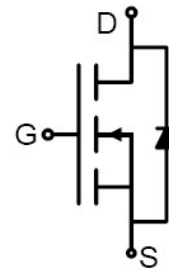
- 20V, 6.8A
 $R_{DS(ON)} < 21m\Omega @ V_{GS} = 4.5V$
 $R_{DS(ON)} < 30m\Omega @ V_{GS} = 2.5V$
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired

Application

- Load Switch
- PWM Application
- Power management



SOT-23-3



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	OUTLINE	Device Package	Reel Size	Reel (PCS)	Per Carton (PCS)
VSM2312A-S2	VSM2312A	TAPING	SOT-23-3	7inch	3000	180000

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

Symbol	Parameter		Max.	Units
V _{DSS}	Drain-Source Voltage		20	V
V _{GSS}	Gate-Source Voltage		±10	V
I _D	Continuous Drain Current	T _A = 25°C	6.8	A
		T _A = 100°C	4.4	A
I _{DM}	Pulsed Drain Current ^{note1}		27.2	A
P _D	Power Dissipation	T _A = 25°C	1.6	W
R _{θJA}	Thermal Resistance, Junction to Case		78	°C/W
T _J , T _{STG}	Operating and Storage Temperature Range		-55 to +150	°C

Electrical Characteristics ($T_J=25^{\circ}\text{C}$ 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,	-	-	1.0	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	0.5	0.7	1.0	V
R _{DS(on)}	Static Drain-Source on-Resistance <small>note2</small>	V _{GS} =4.5V, I _D =4A	-	16	21	mΩ
		V _{GS} =2.5V, I _D =3A	-	20	30	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, f = 1.0MHz	-	780	-	pF
C _{oss}	Output Capacitance		-	140	-	pF
C _{rss}	Reverse Transfer Capacitance		-	80	-	pF
Q _g	Total Gate Charge	V _{DS} =10V, I _D =3.5A, V _{GS} =4.5V	-	11	-	nC
Q _{gs}	Gate-Source Charge		-	2.3	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	2.9	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DS} =10V, I _D =3.5A, R _{GEN} =3Ω, V _{GS} =4.5V	-	9	-	ns
t _r	Turn-on Rise Time		-	30	-	ns
t _{d(off)}	Turn-off Delay Time		-	35	-	ns
t _f	Turn-off Fall Time		-	10	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	6.8	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	27.2	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} = 0V, I _S =6.8A	-	-	1.2	V

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

2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

Typical Performance Characteristics

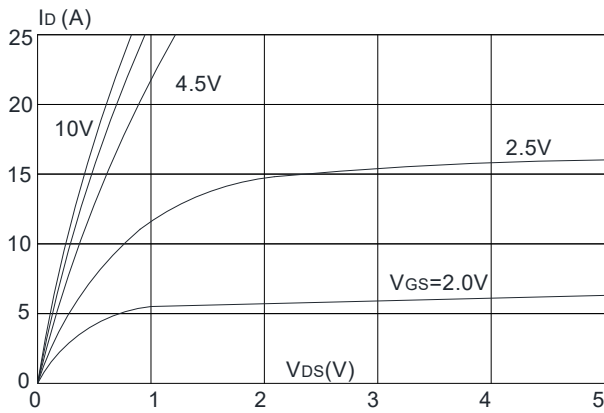
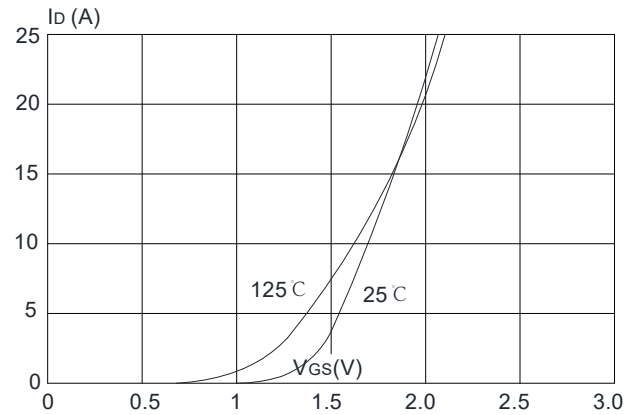
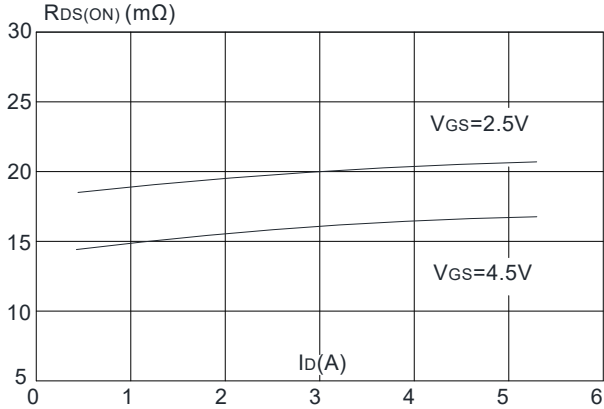
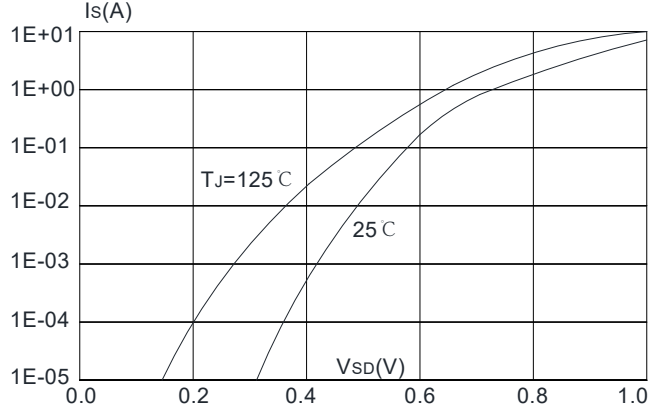
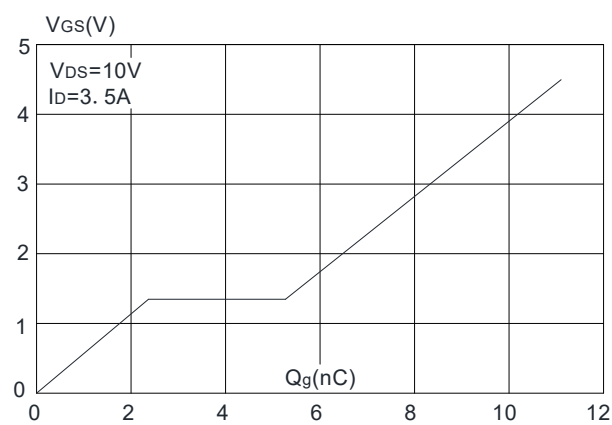
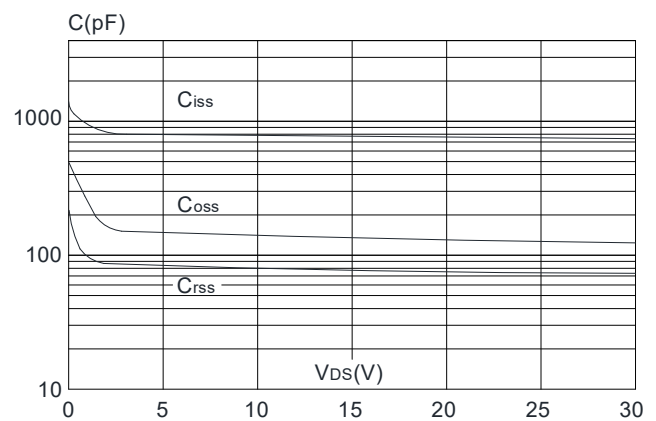
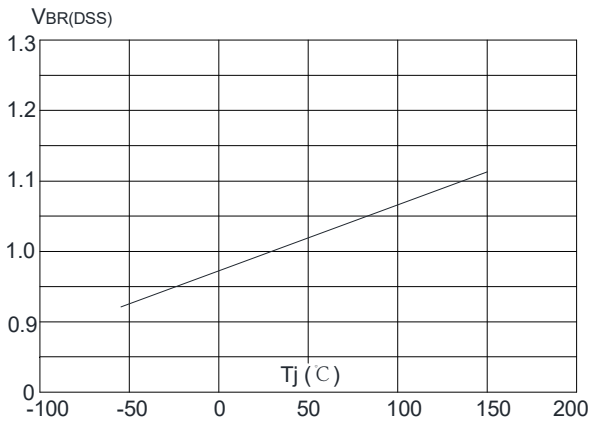
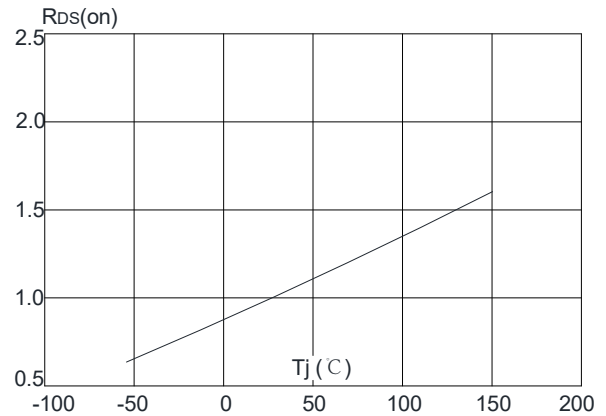
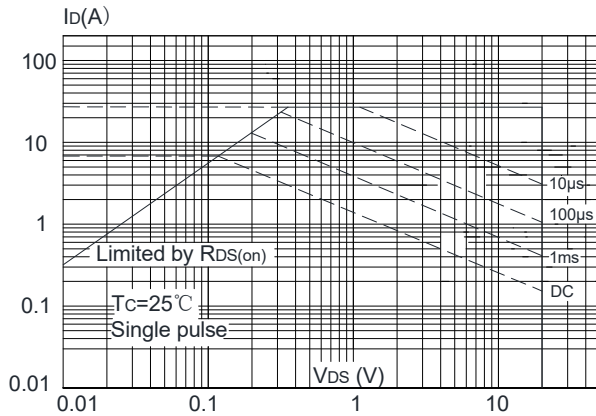
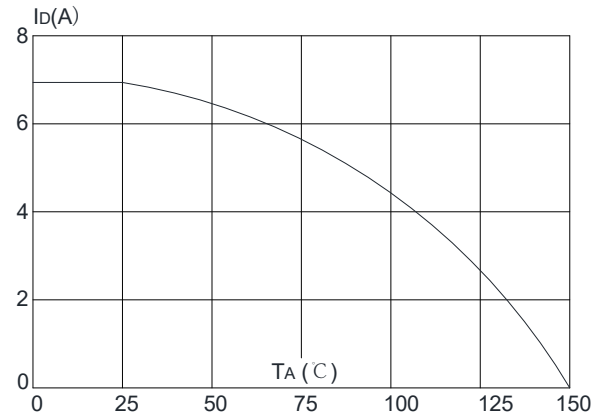
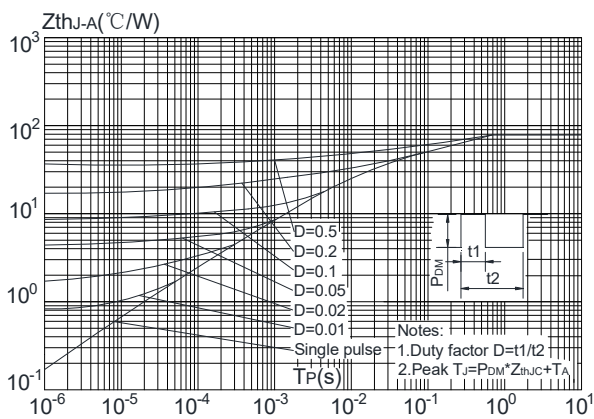
Figure1: Output Characteristics

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

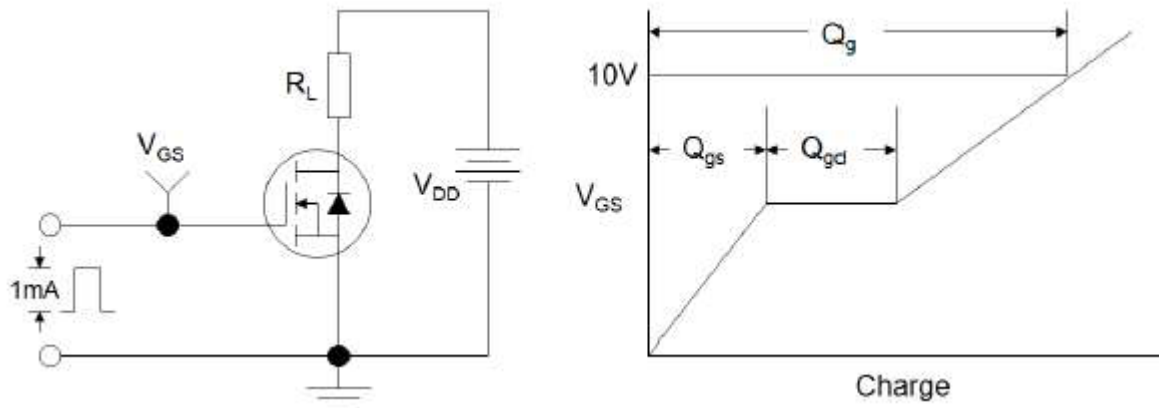


Figure1:Gate Charge Test Circuit & Waveform

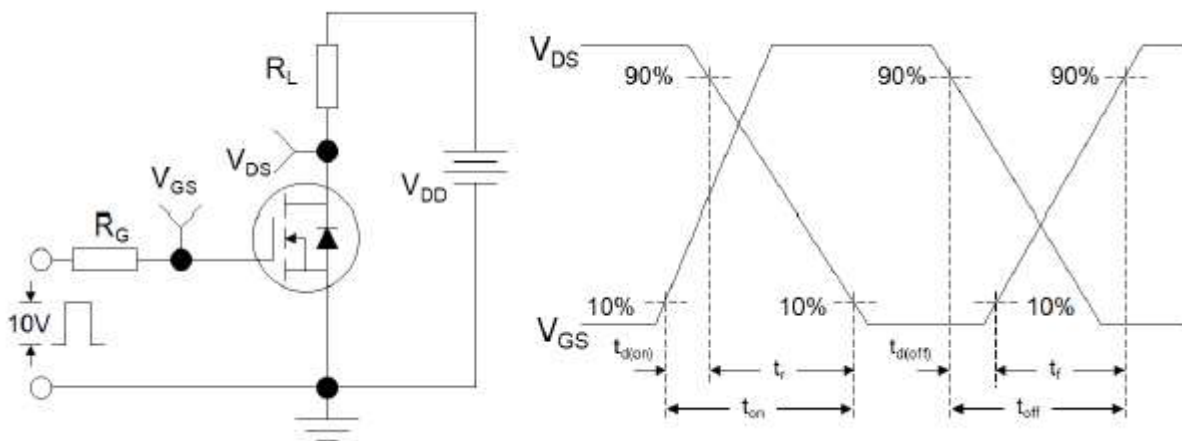


Figure 2: Resistive Switching Test Circuit & Waveforms

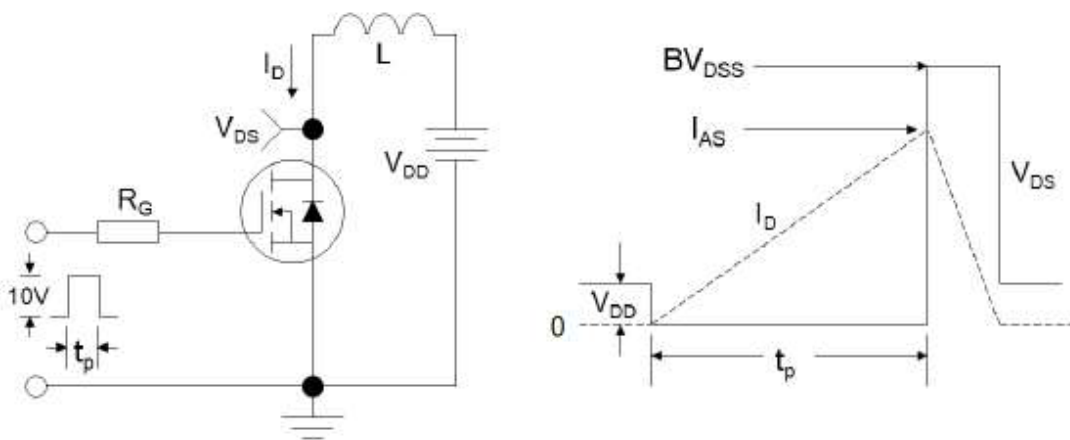


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms