
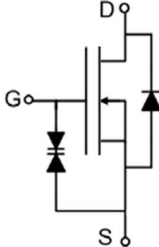


Description

Features <ul style="list-style-type: none"> ● 600V, 0.03A ● $R_{DS(ON)} < 700\Omega$ @ $V_{GS} = 0V$ ● $R_{DS(ON)} < 800\Omega$ @ $V_{GS} = 10V$ ● Self-aligned planner technology ● Pb-free lead plating ● Halogen free ● ESD improved capability 	Application <ul style="list-style-type: none"> ● Load Switch ● PWM Application ● Power management
 <p>SOT-23-3</p>	 <p>Schematic Diagram</p>

Package Marking and Ordering Information

Device Marking	Device	OUTLINE	Device Package	Reel Size	Reel (PCS)	Per Carton (PCS)
VSM501A-S2	VSM501A	TAPING	SOT-23-3	7inch	3000	180000

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

Symbol	Parameter		Max.	Units
V _{DSS}	Drain-Source Voltage		600	V
V _{GSS}	Gate-Source Voltage		±20	V
I _D	Continuous Drain Current	T _A = 25°C	0.03	A
		T _A = 100°C	0.02	A
I _{DM}	Pulsed Drain Current ^{note1}		0.12	A
dv/dt	Peak Diode Recovery dv/dt		5.0	V/ns
V _{ESD(G-S)}	Gate source ESD (HBM-C= 100pF, R=1.5kΩ)		300	V
P _D	Power Dissipation	T _A = 25°C	0.5	W
R _{θJA}	Thermal Resistance, Junction to Ambient		250	°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} = -5V, I _D =250μA	600	-	-	V
I _{D(off)}	Off-state Drain to Source Current	V _{DS} =600V, V _{GS} = -5V, T _J =25°C	-	-	0.1	μA
		V _{DS} =480V, V _{GS} =-5V, T _J =125°C	-	-	10	μA
I _{GSS}	Gate to Source Leakage Current	V _{DS} =0V, V _{GS} = ±20V	-	-	±100	nA
On Characteristics						
I _{DSS}	On-state drain current	V _{GS} =0V, V _{DS} =25V	12	-	-	mA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =3V, I _D =8μA	-2.7	-1.8	-1.0	V
R _{DS(on)}	Static Drain-Source on-Resistance <small>note2</small>	V _{GS} =0V, I _D =3mA	-	350	700	Ω
		V _{GS} =10V, I _D =16mA	-	400	800	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =-5V, f = 1.0MHz	-	50	-	pF
C _{oss}	Output Capacitance		-	4.53	-	pF
C _{rss}	Reverse Transfer Capacitance		-	1.08	-	pF
Q _g	Total Gate Charge	V _{DS} =400V, I _D =0.01A, V _{GS} =-5V to 5V	-	1.14	-	nC
Q _{gs}	Gate-Source Charge		-	0.5	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	0.37	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DS} =300V, I _D =0.01A, R _{GEN} =6Ω, V _{GS} =-5V to 7V	-	9.9	-	ns
t _r	Turn-on Rise Time		-	55.8	-	ns
t _{d(off)}	Turn-off Delay Time		-	56.4	-	ns
t _f	Turn-off Fall Time		-	136	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	0.03	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	0.12	A
V _{SD}	Diode Forward Voltage	I _F =16mA, V _{GS} =-5V	-	-	1.2	V
t _{rr}	Reverse Recovery Time	V _{GS} =-5V, I _F =0.01A,	-	243	-	ns
Q _{rr}	Reverse Recovery Charge	di/dt=100A/μs	-	636	-	nC

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

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

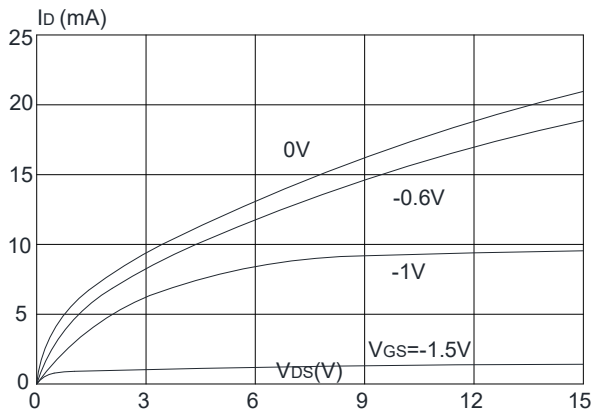
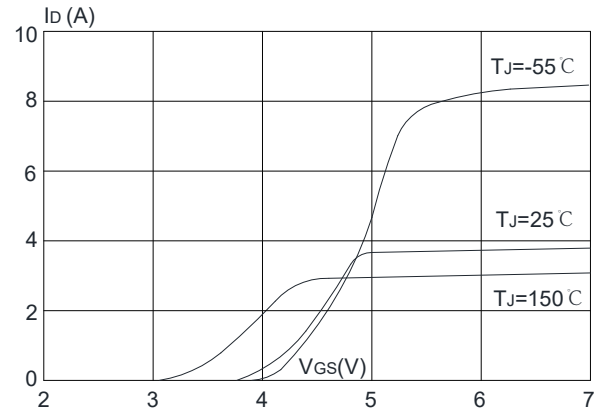
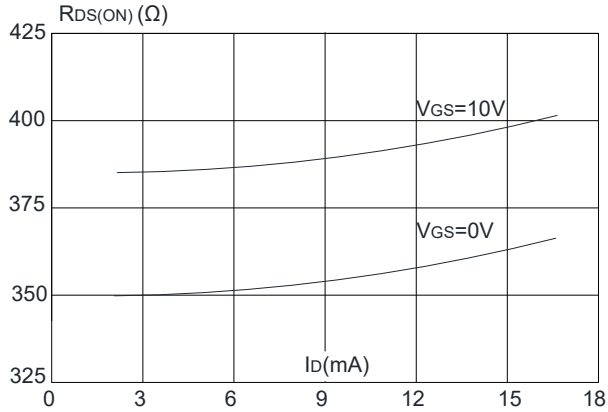
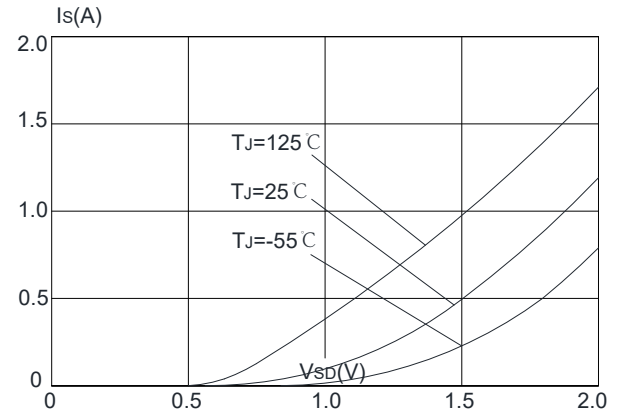
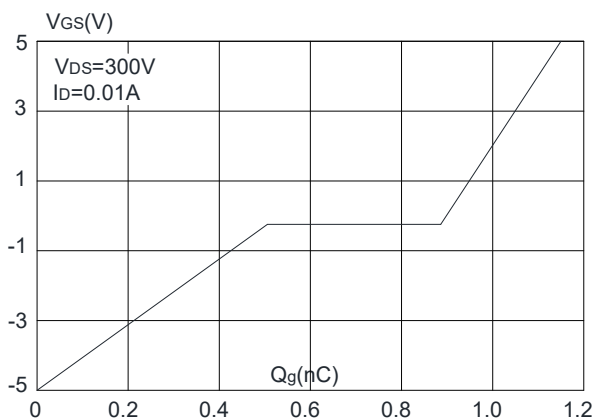
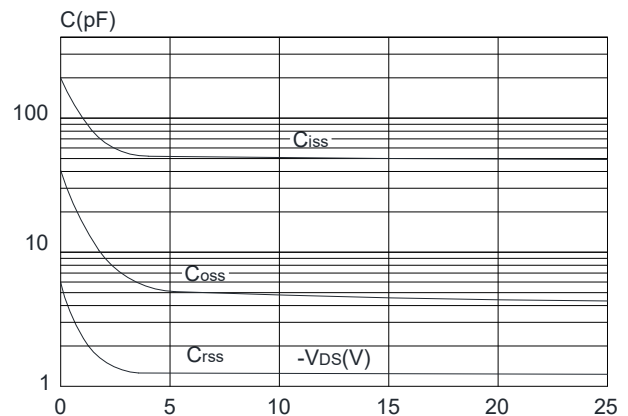
Figure1: Output Characteristics

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

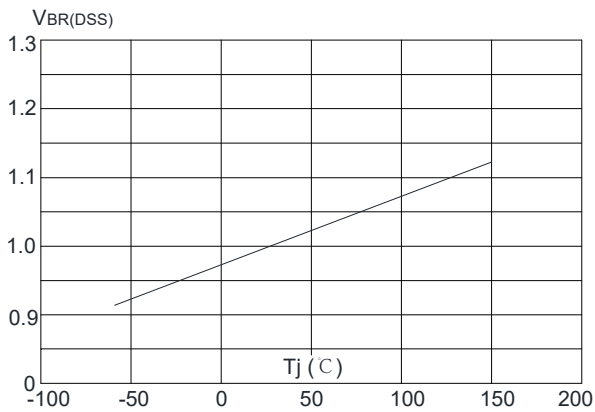


Figure 8: Normalized on Resistance vs. Junction Temperature

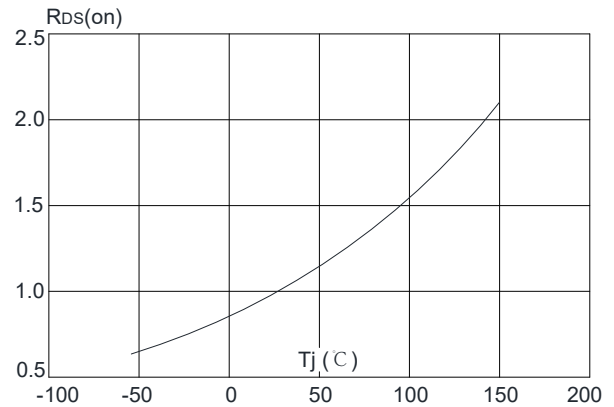


Figure 9: Maximum Safe Operating Area

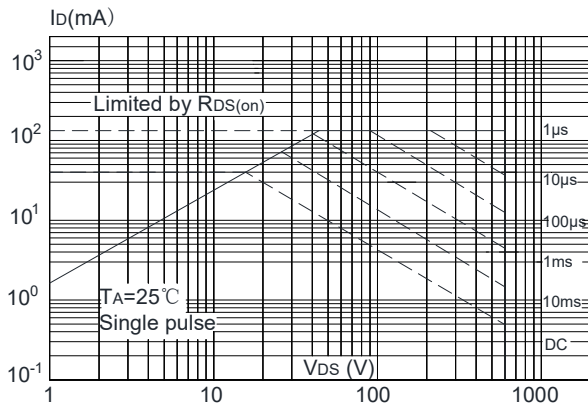


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

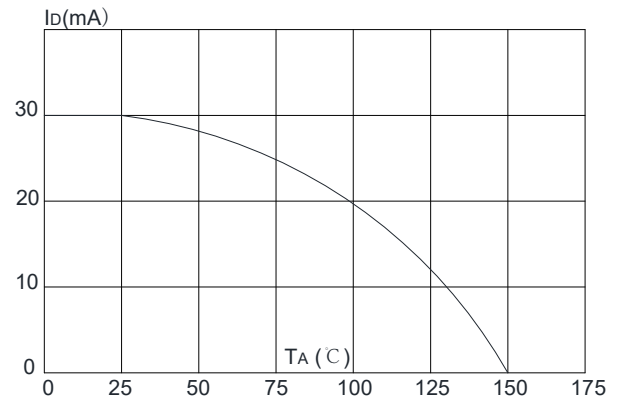
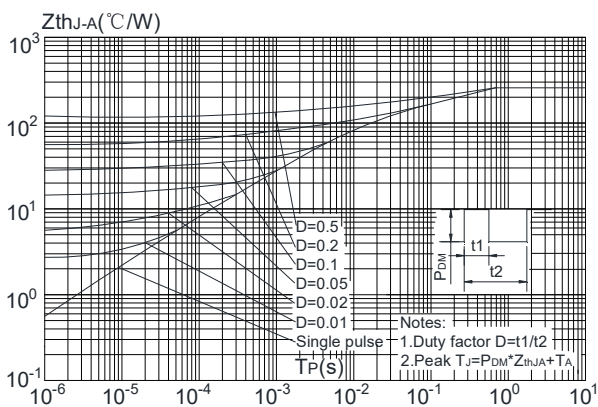


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



Test Circuit

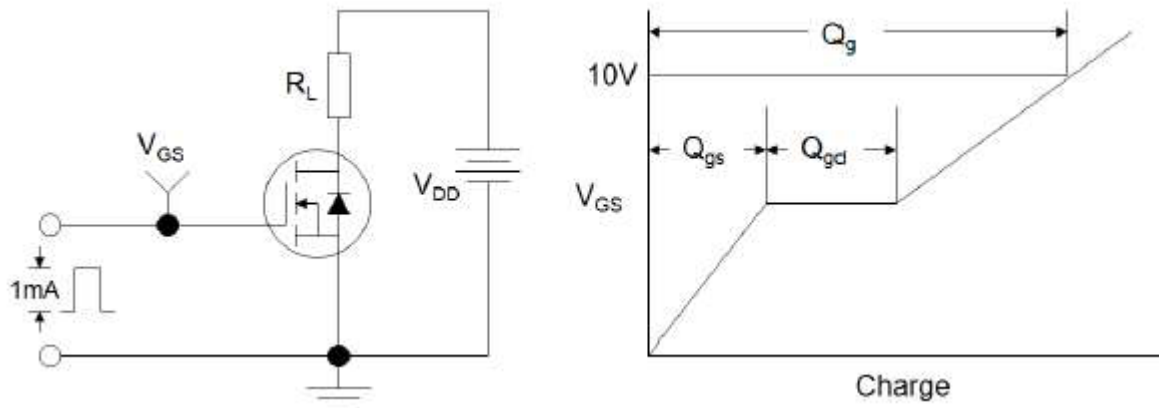


Figure1:Gate Charge Test Circuit & Waveform

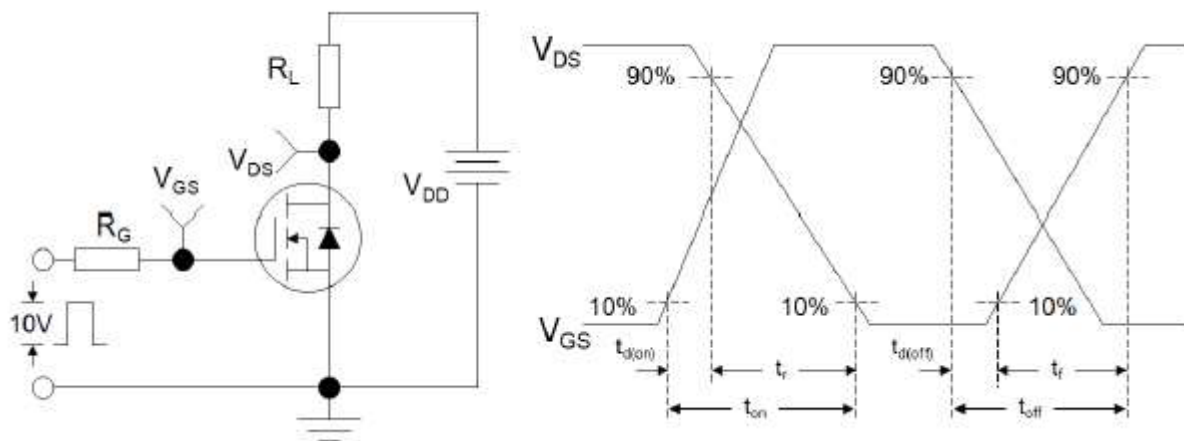


Figure 2: Resistive Switching Test Circuit & Waveforms

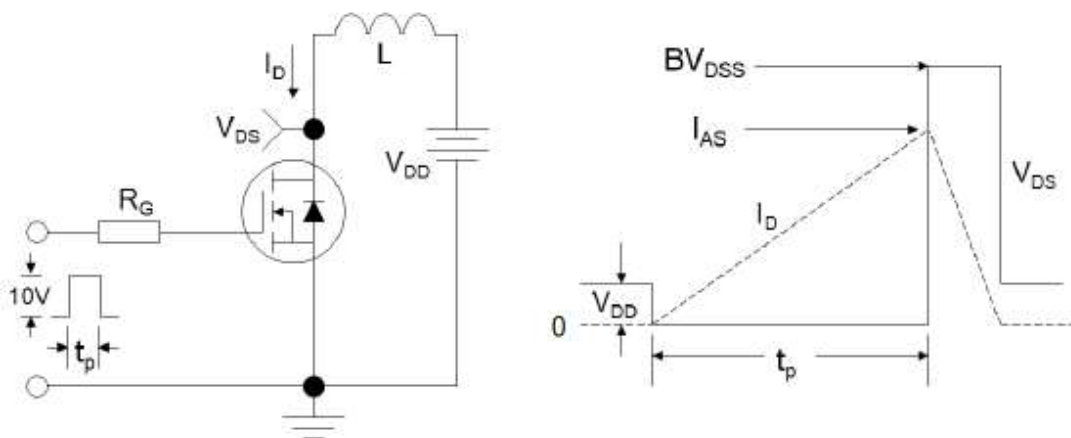


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms