Description

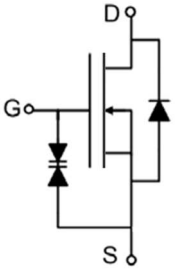
Features

- 20V, 0.75A
  $R_{DS(ON)}$< 380mΩ @ V_{GS}=4.5V
  $R_{DS(ON)}$< 450mΩ @ V_{GS}=2.5V
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired
- ESD Protected: 2KV

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)
VSM2002KT2-S2	VSM2002KT2	TAPING	SOT-23-3	-	-	-

Absolute Maximum Ratings (T_A=25℃ 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℃	0.75	A
		T_A = 100℃	0.5	A
I_{DM}	Pulsed Drain Current note1		3	A
P_D	Power Dissipation	T_A = 25℃	0.35	W
$R_{\theta JA}$	Thermal Resistance, Junction to Case		417	℃/W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +150	℃

Electrical Characteristics (T_J=25℃ 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}=16V, V_{GS}=0V,	-	-	1	μA
I_{GSS}	Gate to Body Leakage Current	V_{DS}=0V, V_{GS}= ±10V	-	-	±10	uA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	0.3	0.65	1	V
$R_{DS(on)}$	Static Drain-Source on-Resistance note2	V_{GS}=4.5V, I_D=0.5A	-	250	380	mΩ
		V_{GS}=2.5V, I_D=0.3A	-	350	450	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=10V, V_{GS}=0V, f=1.0MHz	-	79	-	pF
C_{oss}	Output Capacitance		-	13	-	pF
C_{rss}	Reverse Transfer Capacitance		-	9	-	pF
Q_g	Total Gate Charge	V_{DS}=10V, I_D=0.3A, V_{GS}=4.5V	-	5	-	nC
Q_{gs}	Gate-Source Charge		-	0.8	-	nC
Q_{gd}	Gate-Drain(“Miller”) Charge		-	1.2	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=10V, I_D=0.5A, R_{GEN}=3Ω, V_{GS}=4.5V	-	6.7	-	ns
t_r	Turn-on Rise Time		-	4.8	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	17.3	-	ns
t_f	Turn-off Fall Time		-	7.4	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	0.75	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	3	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS}=0V, I_S=0.75A	-	-	1.2	V

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

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

Typical Performance Characteristics

Figure1: Output Characteristics

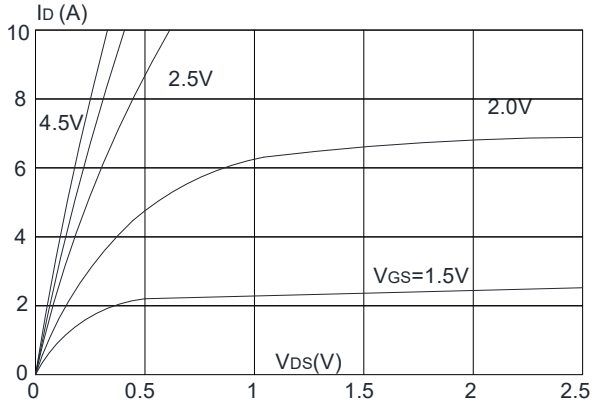


Figure 2: Typical Transfer Characteristics

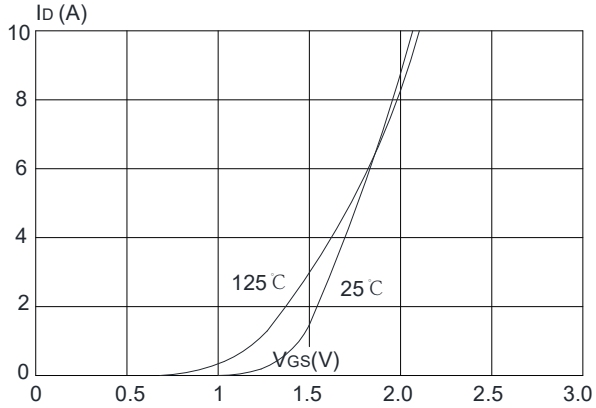


Figure 3: On-resistance vs. Drain Current

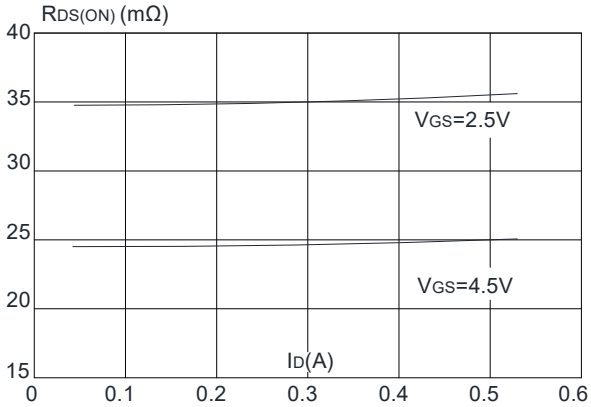


Figure 4: Body Diode Characteristics

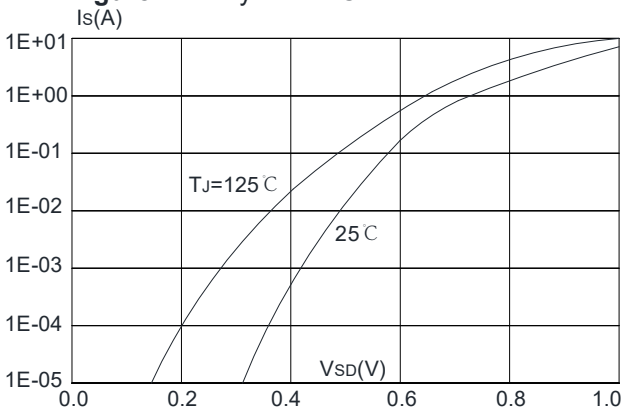


Figure 5: Gate Charge Characteristics

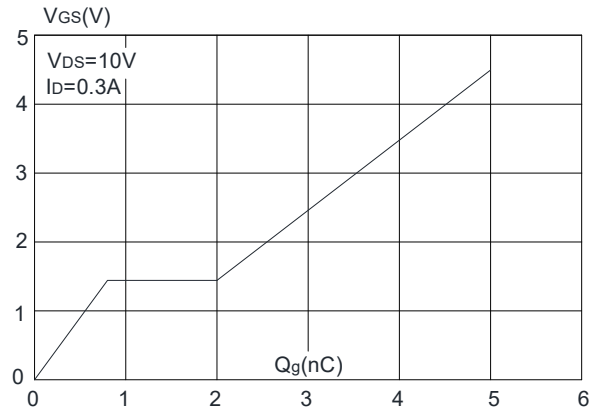


Figure 6: Capacitance Characteristics

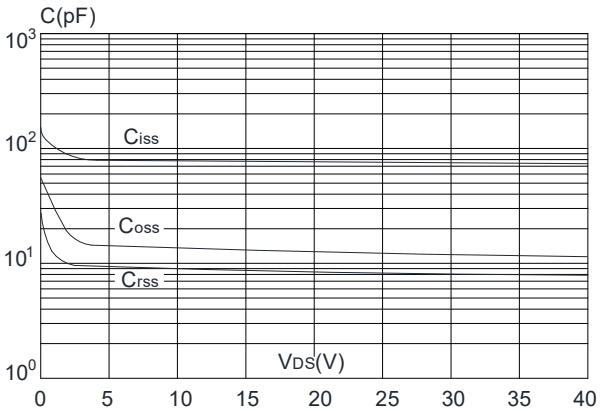


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

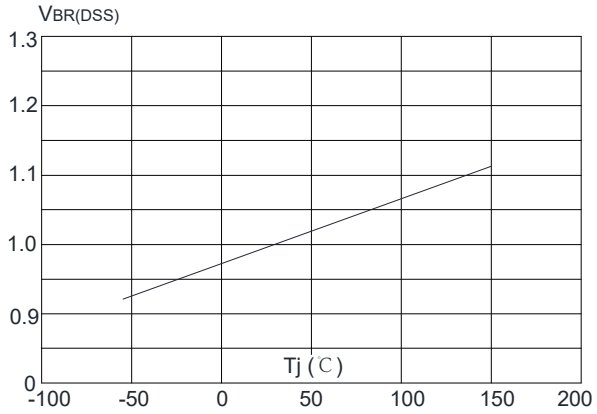


Figure 8: Normalized on Resistance vs. Junction Temperature

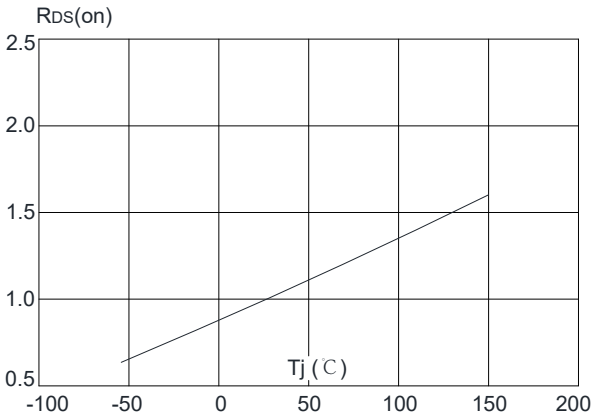


Figure 9: Maximum Safe Operating Area

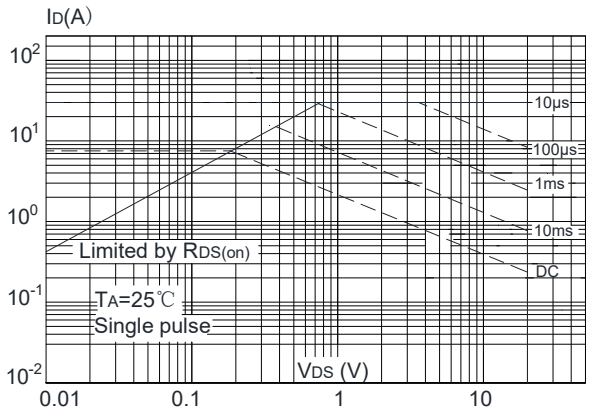


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

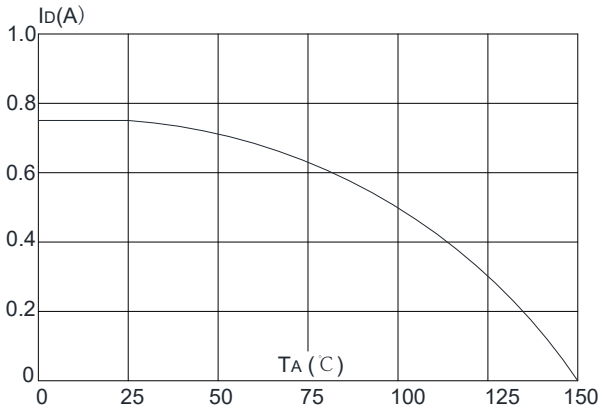
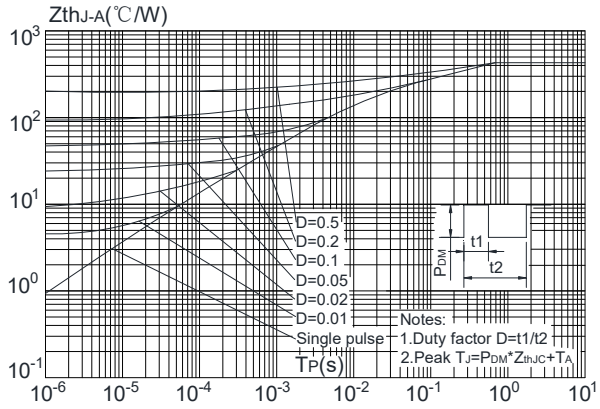


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



Test Circuit

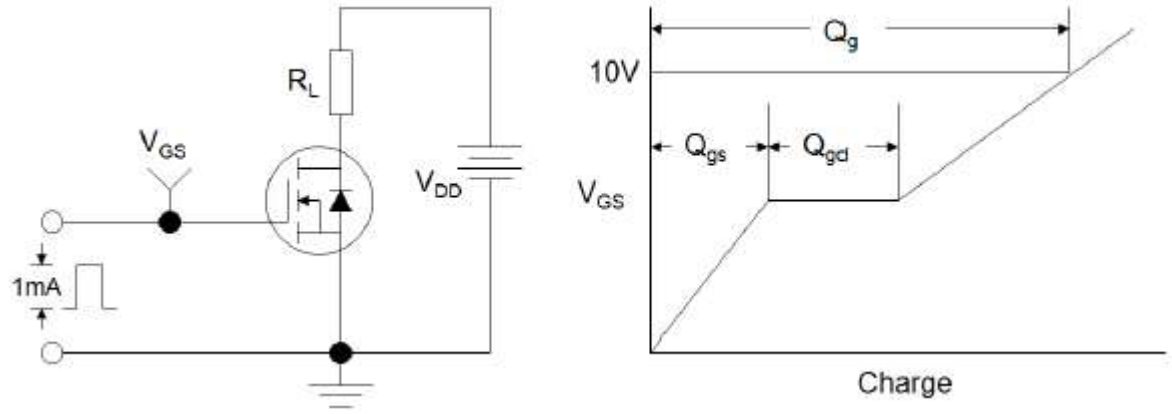


Figure1:Gate Charge Test Circuit & Waveform

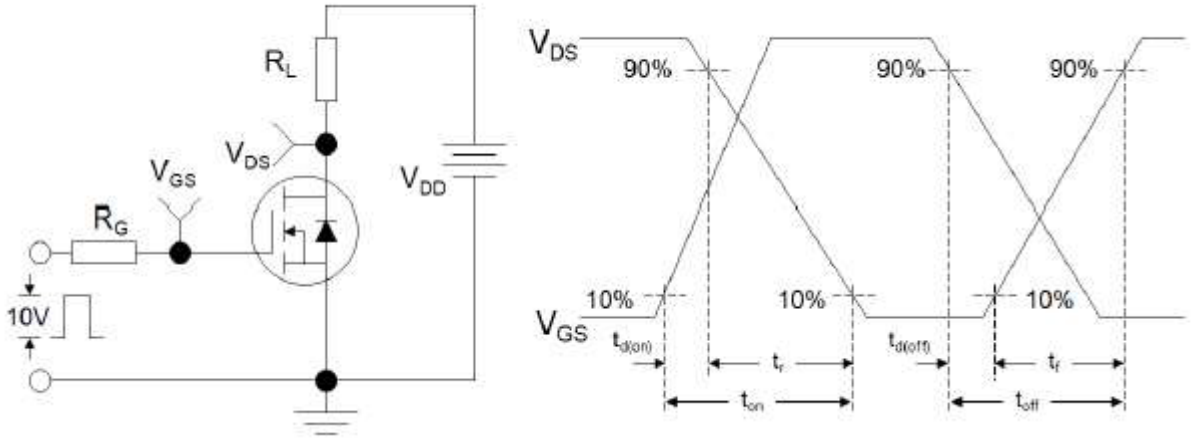


Figure 2: Resistive Switching Test Circuit & Waveforms

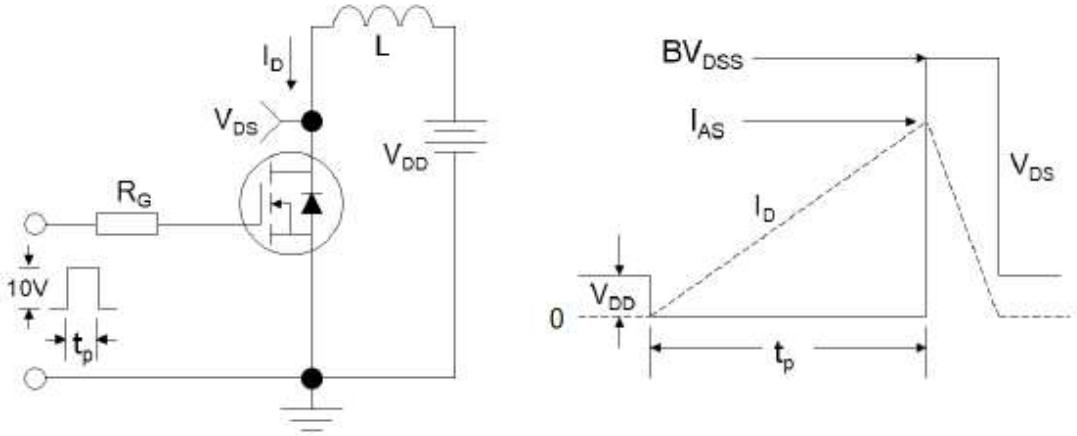


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms