

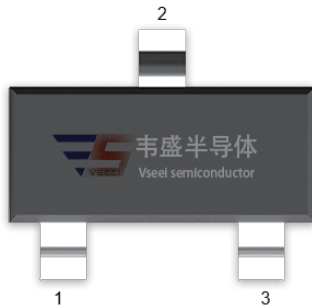
Description

Features

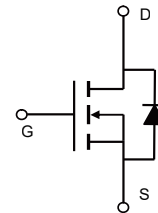
- 20V, 5A
 $R_{DS(ON)} < 22m\Omega$ @ $V_{GS} = 4.5V$
 $R_{DS(ON)} < 36m\Omega$ @ $V_{GS} = 2.5V$
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired
- ESD Rating: HBM 2KV

Application

- Load Switch
- PWM Application
- Power management



SOT-23



Schematic

Package Marking and Ordering Information

Device Marking	Device	OUTLINE	Device Package	Reel Size	Reel (PCS)	Per Carton (PCS)
VSM3416KS	VSM3416KS-S2	TAPING	SOT-23	7inch	3000	120000

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	5	A
		T _A = 100°C	3.3	A
I _{DM}	Pulsed Drain Current ^{note1}		20	A
P _D	Power Dissipation	T _A = 25°C	0.9	W
R _{θJA}	Thermal Resistance, Junction to Ambient		139	°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	20	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =20V, 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	0.4	0.7	1	V
R _{DS(on)}	Static Drain-Source on-Resistance note2	V _{GS} =4.5V, I _D =5A	-	17	22	mΩ
		V _{GS} =2.5V, I _D =3A	-	26	36	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, f=1.0MHz	-	545	-	pF
C _{oss}	Output Capacitance		-	103	-	pF
C _{rss}	Reverse Transfer Capacitance		-	90	-	pF
Q _g	Total Gate Charge	V _{DS} =10V, I _D =5A, V _{GS} =4.5V	-	8	-	nC
Q _{gs}	Gate-Source Charge		-	2.5	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	3	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DS} =10V,R _L =1.5Ω, R _{GEN} =3Ω, V _{GS} =5V	-	0.5	-	ns
t _r	Turn-on Rise Time		-	1	-	ns
t _{d(off)}	Turn-off Delay Time		-	12	-	ns
t _f	Turn-off Fall Time		-	4	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	5	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	20	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S =5A	-	-	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

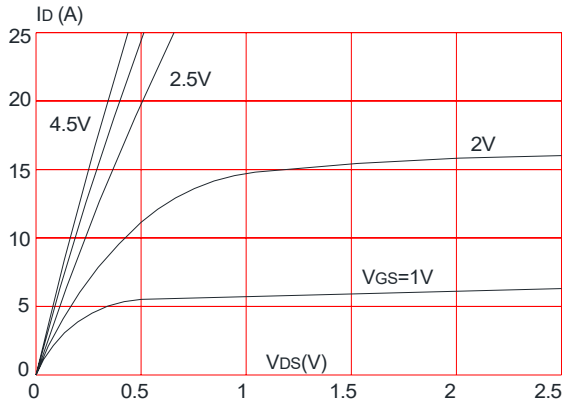
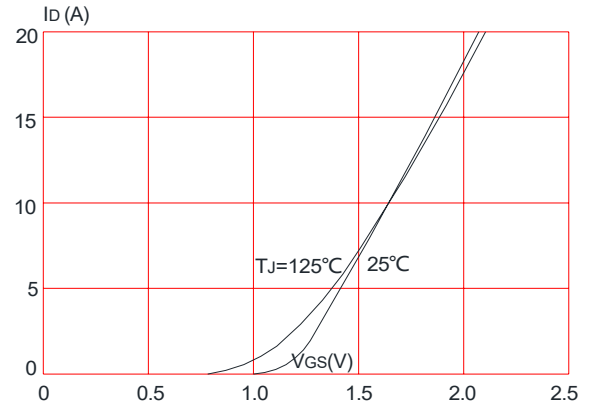
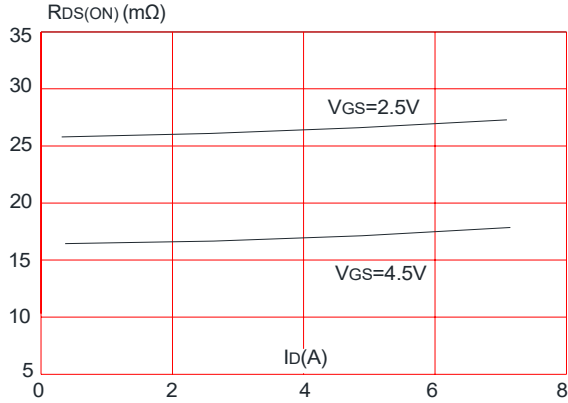
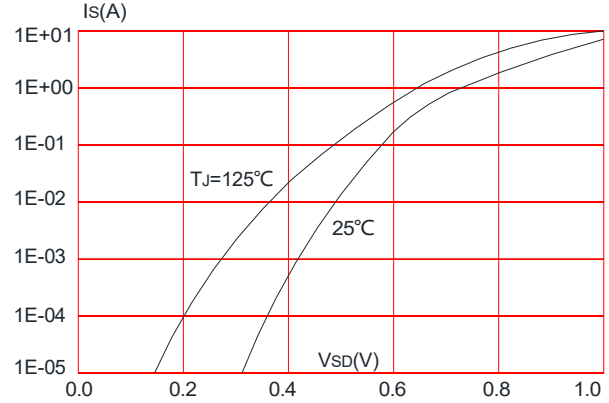
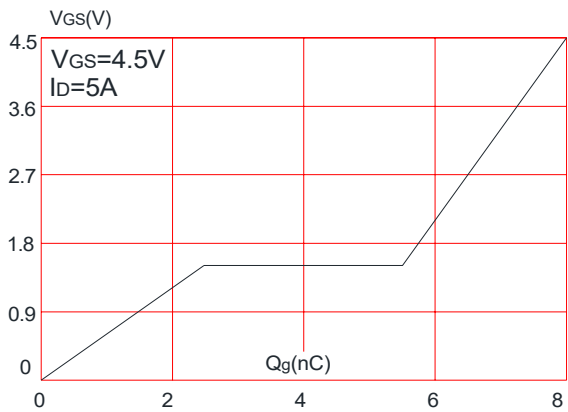
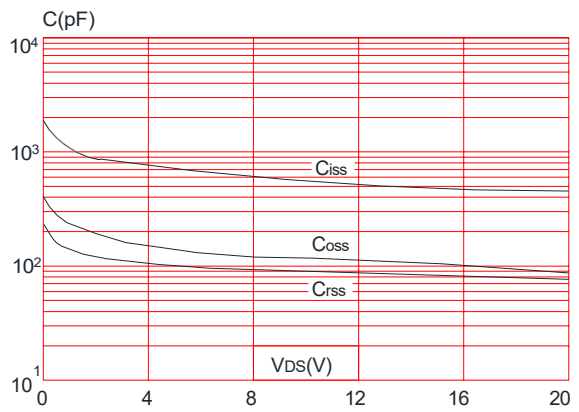
Figure 1: Output Characteristics

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

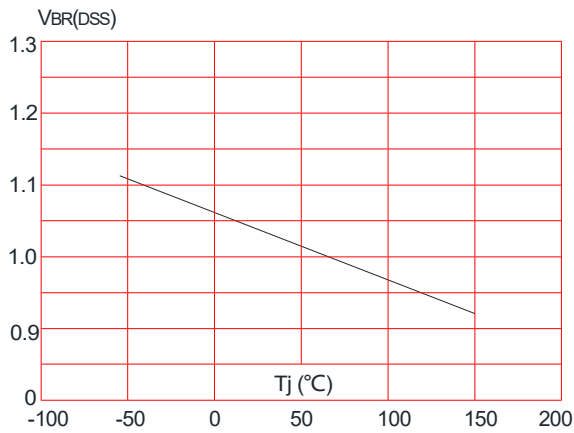


Figure 8: Normalized on Resistance vs. Junction Temperature

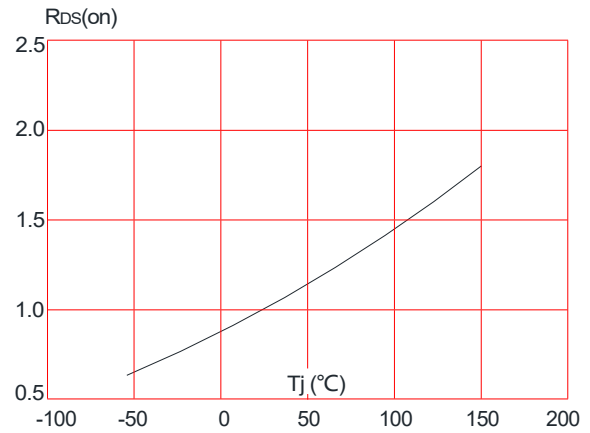


Figure 9: Maximum Safe Operating Area

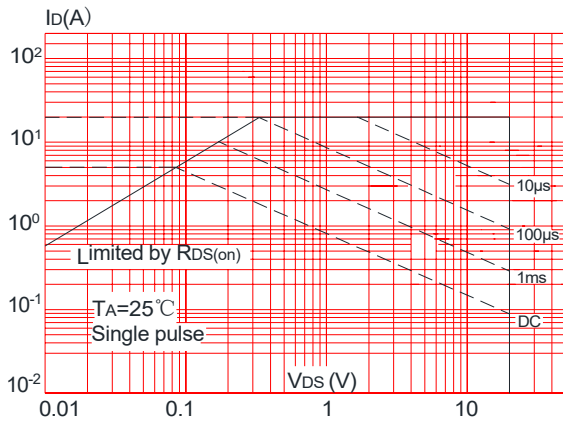


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

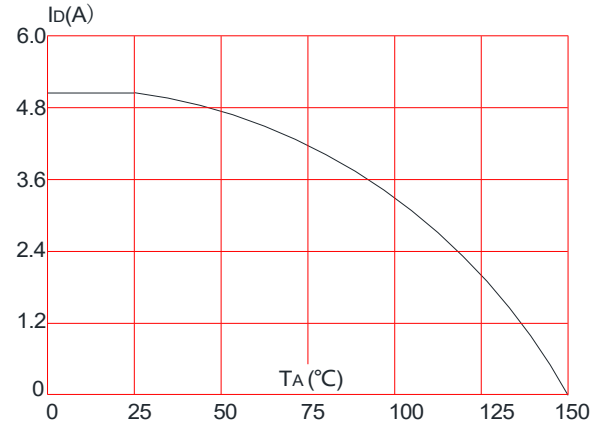
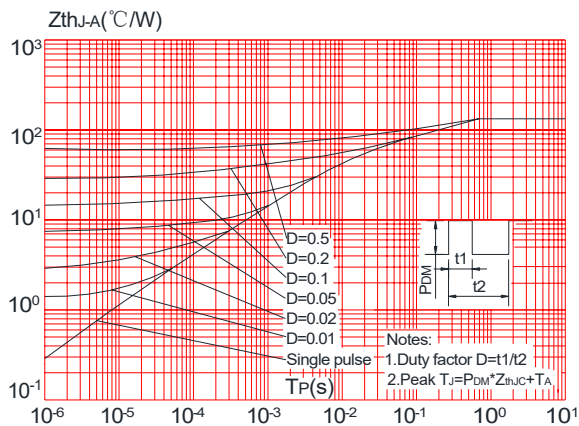


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



Test Circuit

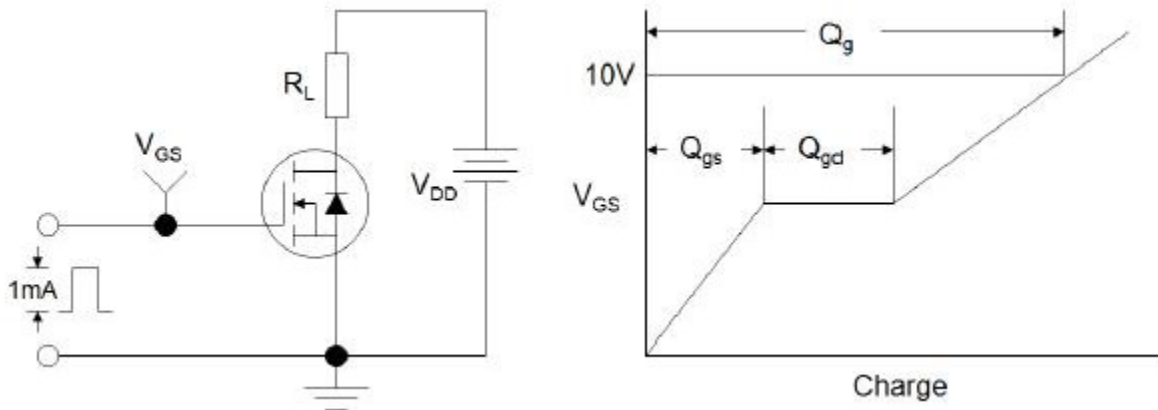


Figure1:Gate Charge Test Circuit & Waveform

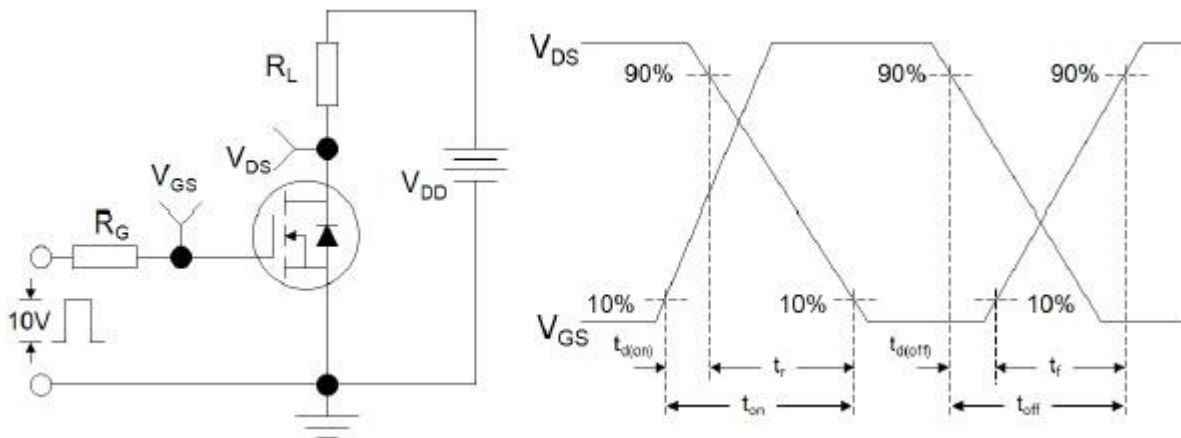


Figure 2: Resistive Switching Test Circuit & Waveforms

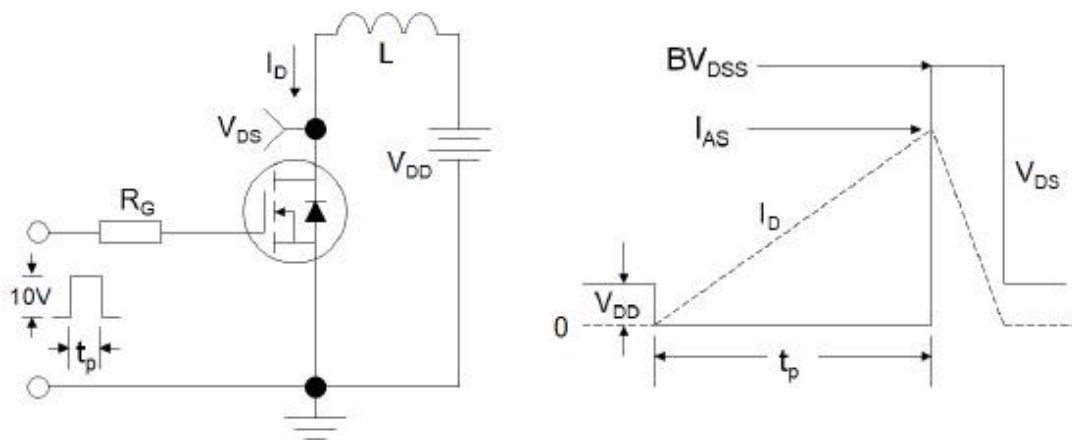


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms