Description

Features

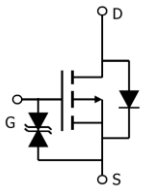
- V_{DS} = -20V, I_D = -4A
  $R_{DS(ON)}$ < 48mΩ @ V_{GS} = -4.5V
  $R_{DS(ON)}$ < 65mΩ @ V_{GS} = -2.5V
- High Power and Current Handing Capability
- Lead Free Product is Acquired
- Surface Mount Package
- ESD Rating: HBM 2.0KV

Application

- PWM Applications
- Load Switch
- Power Management

100% UIS
100% ΔVds

SOT-23-3



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	OUTLINE	Device Package	Reel Size	(PCS)Reel	Per(PCS)Carton
VSM3415KAEC-S2	VSM3415KAEC	TAPING	SOT-23-3	7inch	3000	180000

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		±8	V
I_D	Continuous Drain Current	T_C = 25℃	-4	A
		T_C = 100℃	-2.6	
I_{DM}	Pulsed Drain Current note1		-24	A
P_D	Power Dissipation	T_A = 25℃	1.67	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient		75	℃/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} = -20V, V_{GS} = 0V,	-	-	-1	μA
I_{GSS}	Gate to Body Leakage Current	V_{DS} =0V, V_{GS} = ±8V	-	-	±10	μA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D= -250μA	-0.4	-	-1.0	V
$R_{DS(on)}$	Static Drain-Source on-Resistance note2	V_{GS} =-4.5V, I_D =-4A	-	38	48	mΩ
		V_{GS} =-2.5V, I_D =-3A	-	48	65	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = -10V, V_{GS} = 0V, f = 1.0MHz	-	950	-	pF
C_{oss}	Output Capacitance		-	165	-	pF
C_{rss}	Reverse Transfer Capacitance		-	120	-	pF
Q_g	Total Gate Charge	V_{DS} = -10V, I_D = -4A, V_{GS} = -4.5V	-	12	-	nC
Q_{gs}	Gate-Source Charge		-	1.4	-	nC
Q_{gd}	Gate-Drain(“Miller”) Charge		-	3.6	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=-10V, V_{GS}=-4.5A, R_L=2.5Ω,R_{GEN}=3Ω	-	12	-	ns
t_r	Turn-on Rise Time		-	10	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	19	-	ns
t_f	Turn-off Fall Time		-	25	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-4	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 = -4A	-	-	-1.2	V

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

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

Typical Performance Characteristics

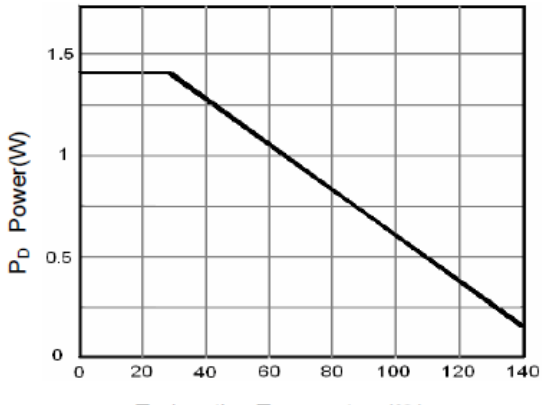


Figure 3 Power Dissipation

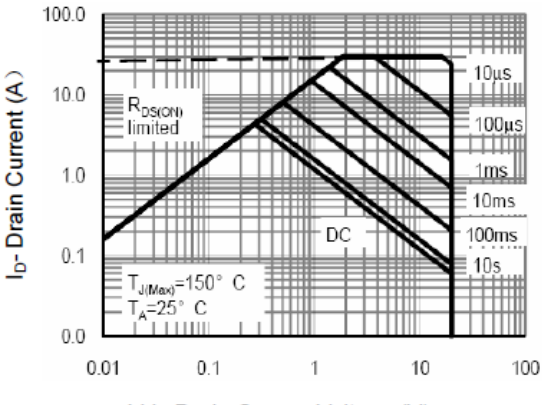


Figure 4 Safe Operation Area

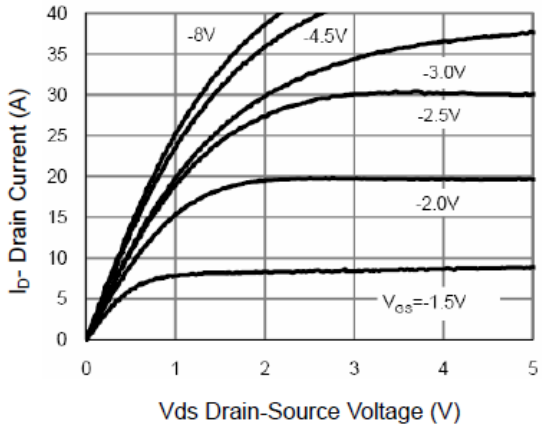


Figure 5 Output Characteristics

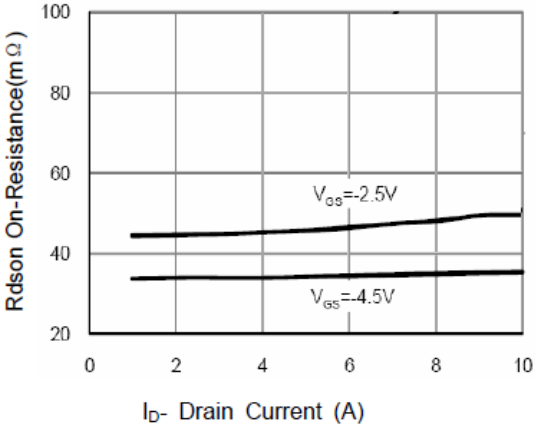


Figure 6 Drain-Source On-Resistance

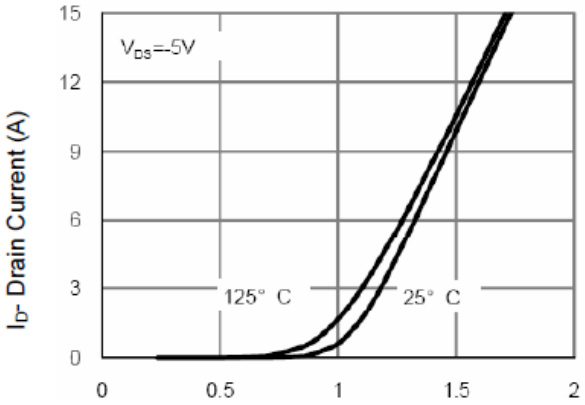


Figure 7 Transfer Characteristics

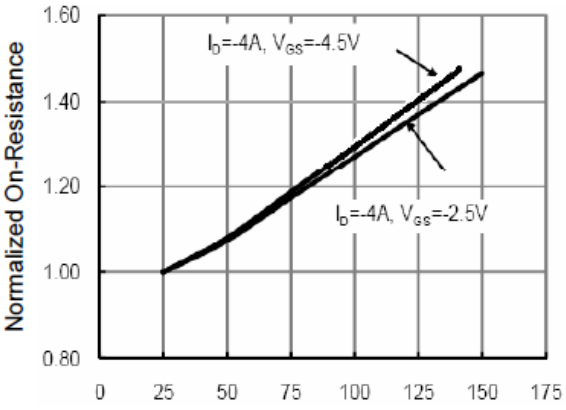


Figure 8 Drain-Source On-Resistance

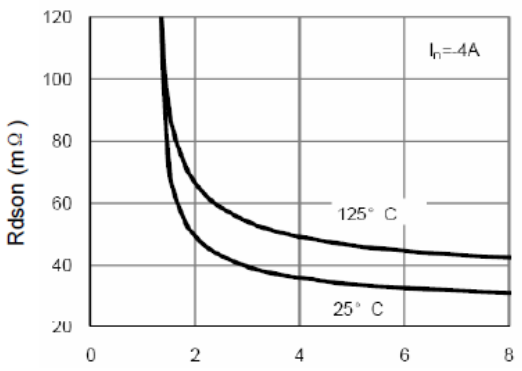


Figure 9 Rdson vs Vgs

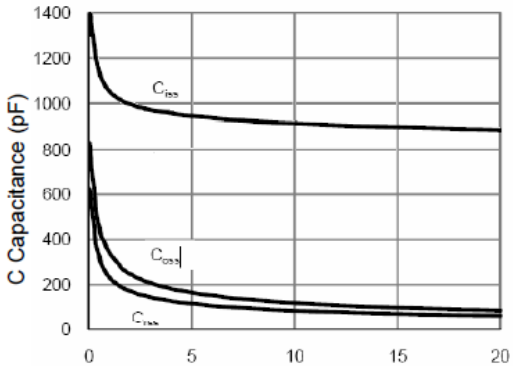


Figure 10 Capacitance vs Vds

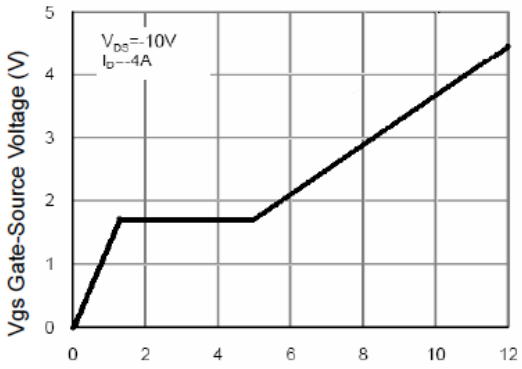


Figure 11 Gate Charge

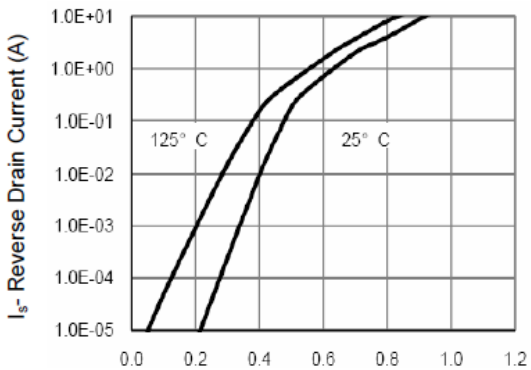


Figure 12 Source- Drain Diode Forward

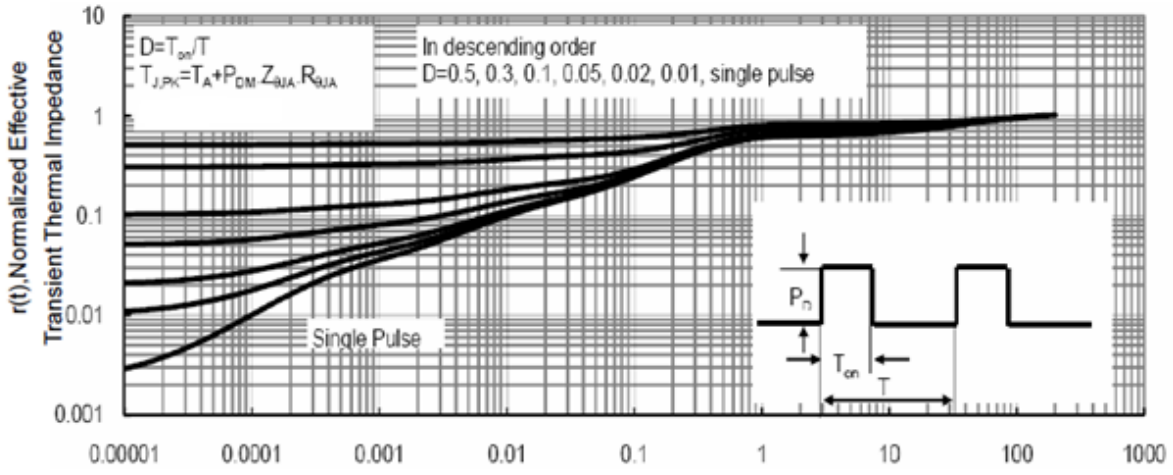
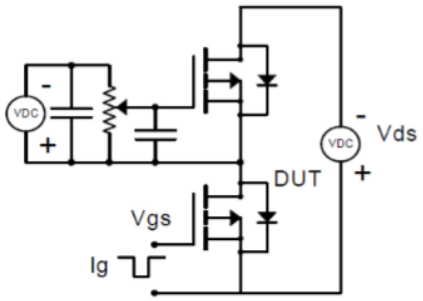
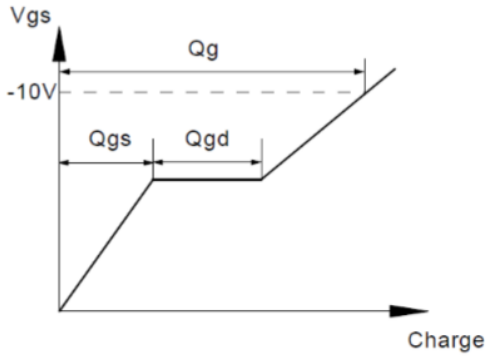


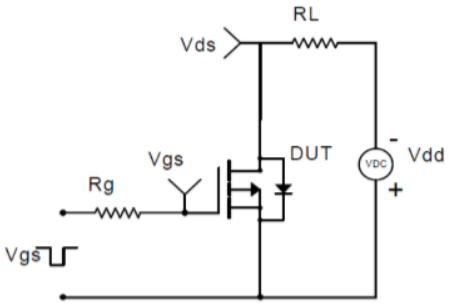
Figure 13 Normalized Maximum Transient Thermal Impedance

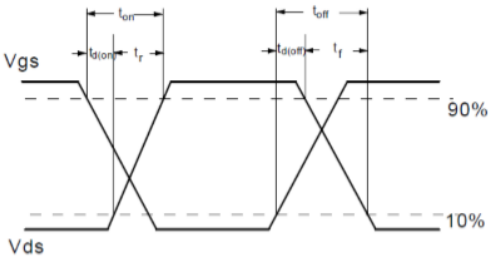
Gate Charge Test Circuit & Waveform



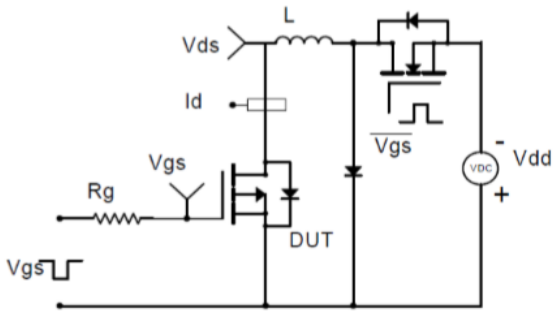


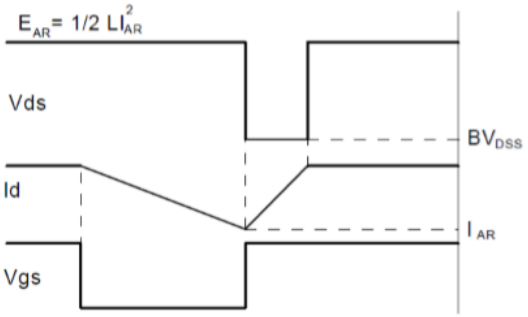
Resistive Switching Test Circuit & Waveforms





Unclamped Inductive Switching (UIS) Test Circuit & Waveforms





Diode Recovery Test Circuit & Waveforms