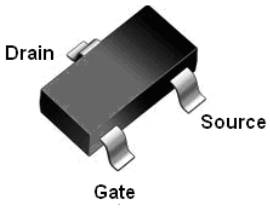
Features

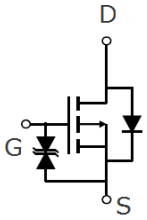
- P-Channel
- Enhancement mode
- Very low on-resistance @ V_{GS}=-2.5 V
- Fast Switching
- ESD Protection HBM 2KV
- Pb-free lead plating; RoHS compliant

Pb-Free RoHS HF Halogen-Free

V_{DS}	-20	V
$R_{DS(on),TYP}$ @V_{GS}=-4.5 V	30	mΩ
$R_{DS(on),TYP}$ @V_{GS}=-2.5 V	40	mΩ
I_D	-5	A

SOT23-3L





Part ID	Package Type	Marking	Tape and reel information
VS3415AL	SOT23-3L	V25	3000pcs/reel

Maximum ratings, at T_j=25 °C, unless otherwise specified

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage		-20	V
I_S	Diode continuous forward current	T_C=25°C	-5	A
I_D	Continuous drain current@V_{GS}=10V	T_C=25°C	-5	A
		T_C=70°C	-4	A
I_{DM}	Pulse drain current tested ①	T_C=25°C	-20	A
P_D	Maximum power dissipation	T_C=25°C	1.5	W
V_{GS}	Gate-Source voltage		±8	V
ESD	HBM		2	KV
T_{STG} T_J	Storage and operating temperature range		-55 to 150	°C
Thermal Characteristics				
$R_{\theta JC}$	Thermal Resistance-Junction to Case		14.5	°C/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient		85	°C/W

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ T_C = 25°C (unless otherwise stated)						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=-250μA	-20	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current(Tc=25℃)	V_{DS}=-20V,V_{GS}=0V	--	--	1	μA
	Zero Gate Voltage Drain Current(Tc=125℃)	V_{DS}=-20V,V_{GS}=0V	--	--	100	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±8V,V_{DS}=0V	--	--	±10	μA
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=-250μA	-0.45	-0.65	-0.95	V
$R_{DS(ON)}$	Drain-Source On-State Resistance②	V_{GS}=-4.5V, I_D=--5A	--	30	40	mΩ
		V_{GS}=-2.5V, I_D=-3A	--	40	50	mΩ
		V_{GS}=-1.8V, I_D=-1A	--	60	90	mΩ
Dynamic Electrical Characteristics @ T_C= 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=-12V,V_{GS}=0V, f=1MHz	--	780	--	pF
C_{oss}	Output Capacitance		--	88	--	pF
C_{rss}	Reverse Transfer Capacitance		--	18	--	pF
Q_g	Total Gate Charge	V_{DS}=-10V,I_D=-2.5A, V_{GS}=-4.5V	--	10	--	nC
Q_{gs}	Gate-Source Charge		--	1.1	--	nC
Q_{gd}	Gate-Drain Charge		--	2.1	--	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=-10V, I_D=-2.5A, R_G=3Ω, V_{GS}=-4.5V	--	23	--	nS
t_r	Turn-on Rise Time		--	110	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	50	--	nS
t_f	Turn-Off Fall Time		--	100	--	nS
Source- Drain Diode Characteristics@ T_C = 25°C (unless otherwise stated)						
V_{SD}	Forward on voltage	I_{SD}=-3A,V_{GS}=0V	--	-0.84	-1.2	V
t_{rr}	Reverse Recovery Time	T_j=25℃,I_{sd}=-3A, V_{GS}=0V di/dt=-100A/μs	--	23	--	nS
Q_{rr}	Reverse Recovery Charge			52		nC

NOTE:

① Repetitive rating; pulse width limited by max. junction temperature.

② Pulse width ≤ 300μs; duty cycle≤ 2%.

Typical Characteristics

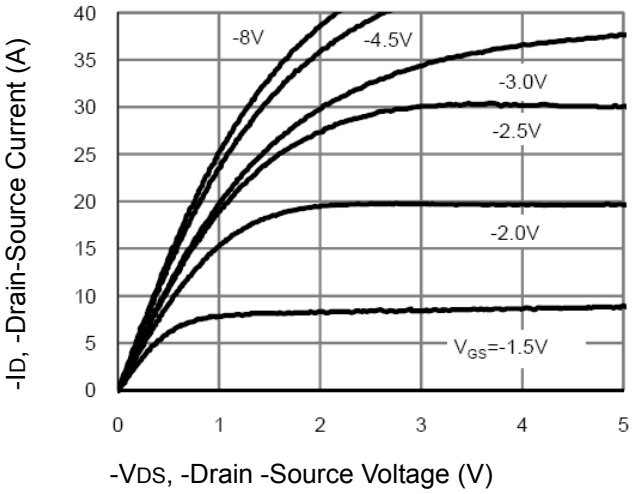


Fig1. Typical Output Characteristics

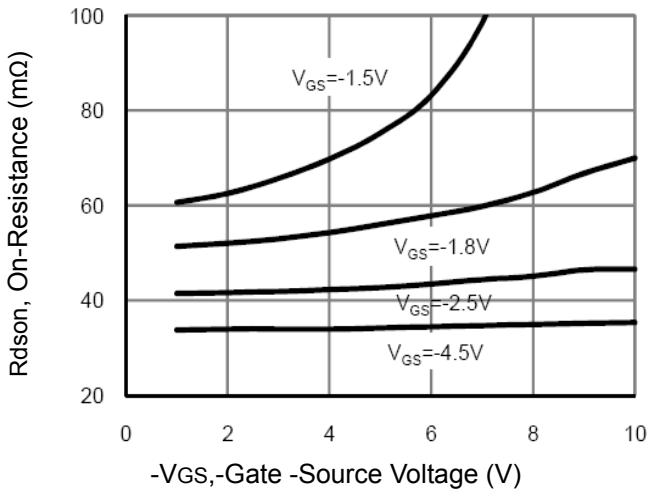


Fig2. On-Resistance vs Drain Current and Gate Voltage

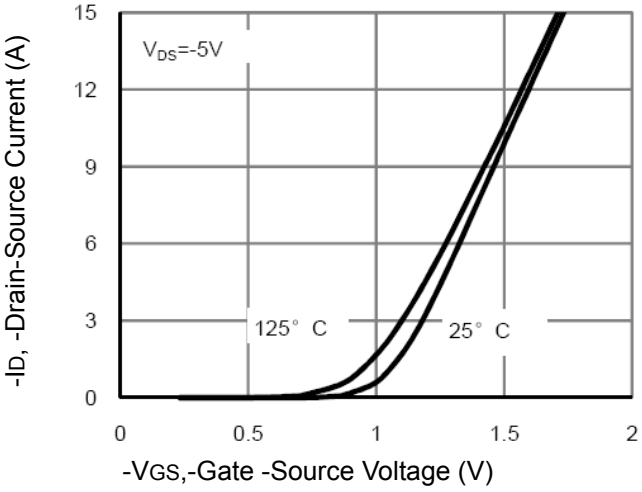


Fig3. Typical Transfer Characteristics

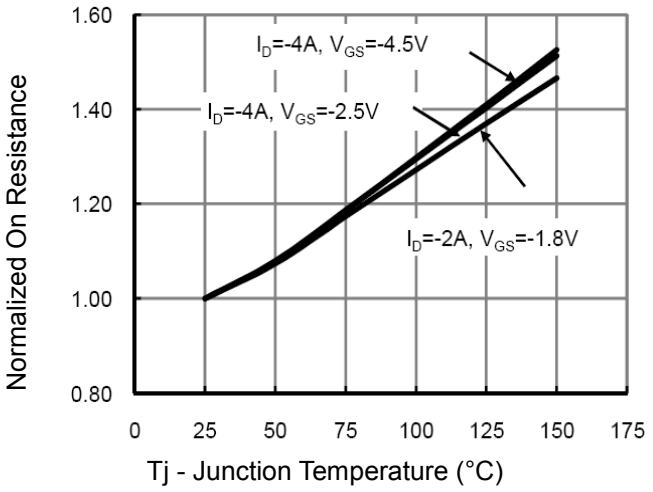


Fig4. Normalized On-Resistance Vs. Temperature

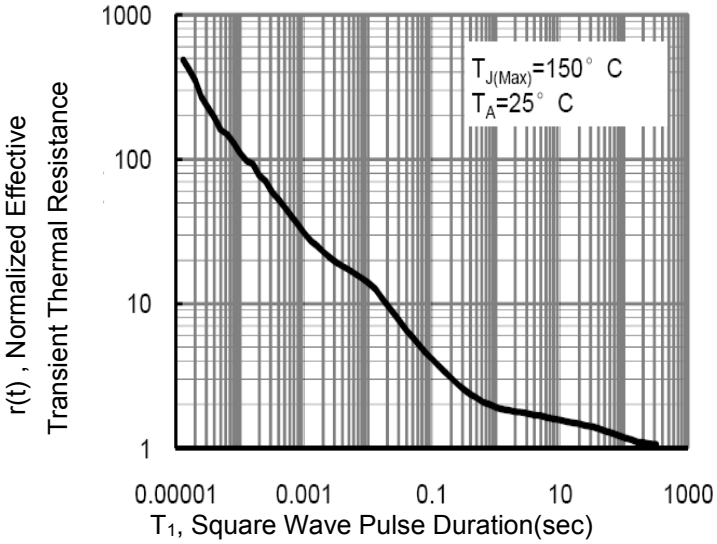


Fig5. T1 ,Transient Thermal Response Curve

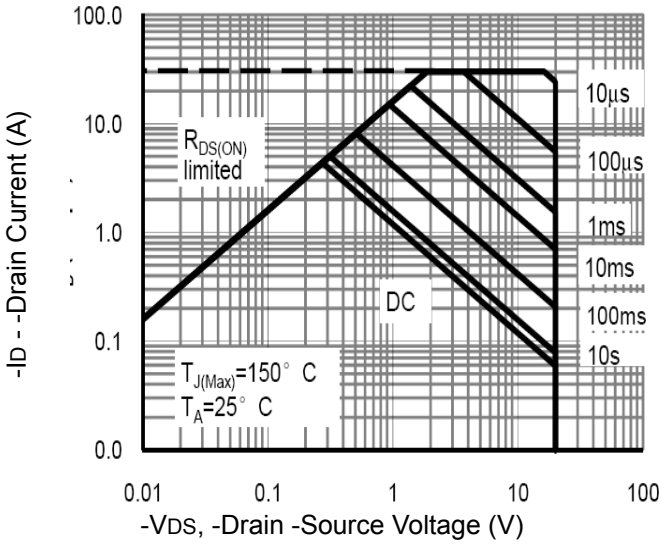


Fig6. Maximum Safe Operating Area

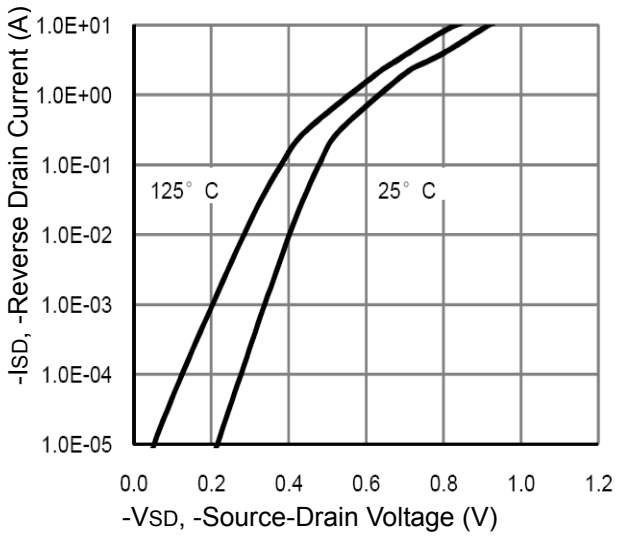


Fig7. Typical Source-Drain Diode Forward Voltage

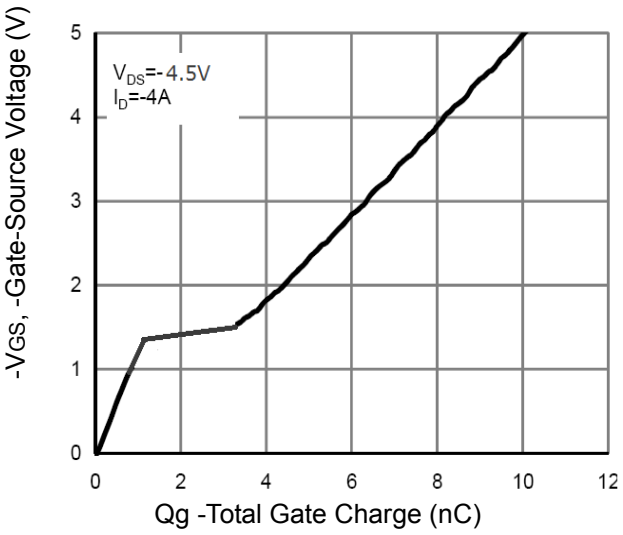


Fig8. Typical Gate Charge Vs.Gate-Source Voltage

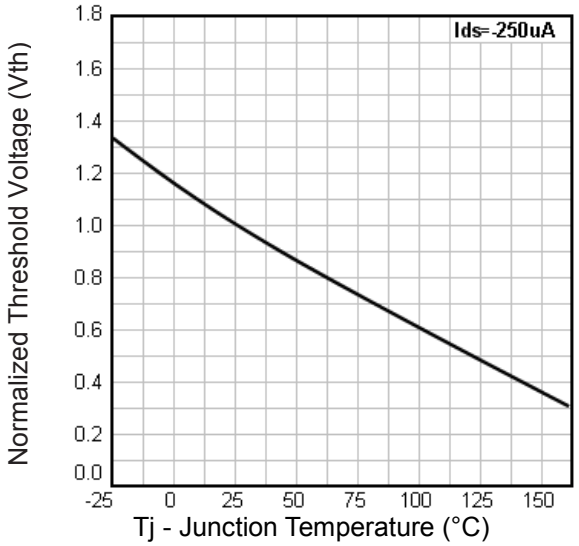


Fig9. Normalized Threshold Voltage Vs. Temperature

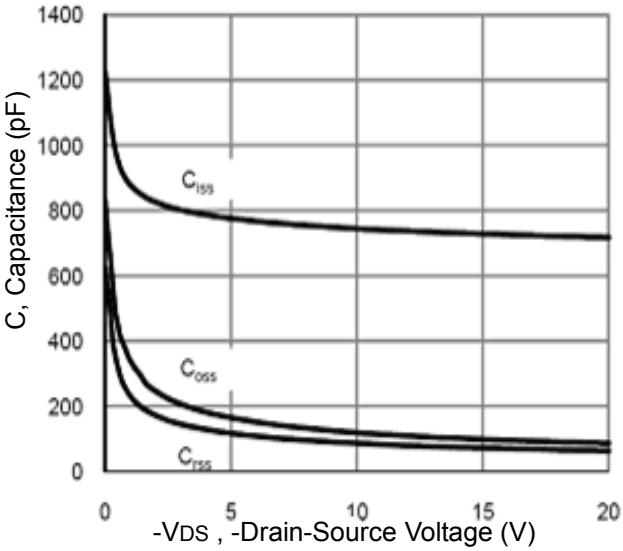


Fig10. Typical Capacitance Vs.Drain-Source Voltage

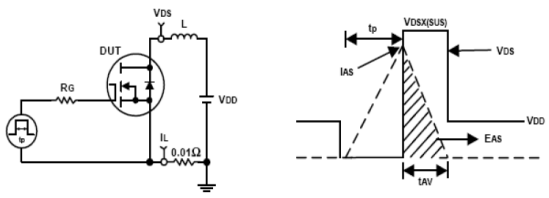


Fig11. Unclamped Inductive Test Circuit and waveforms

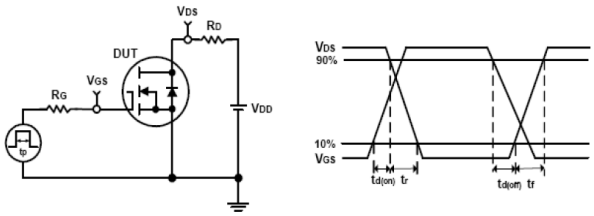
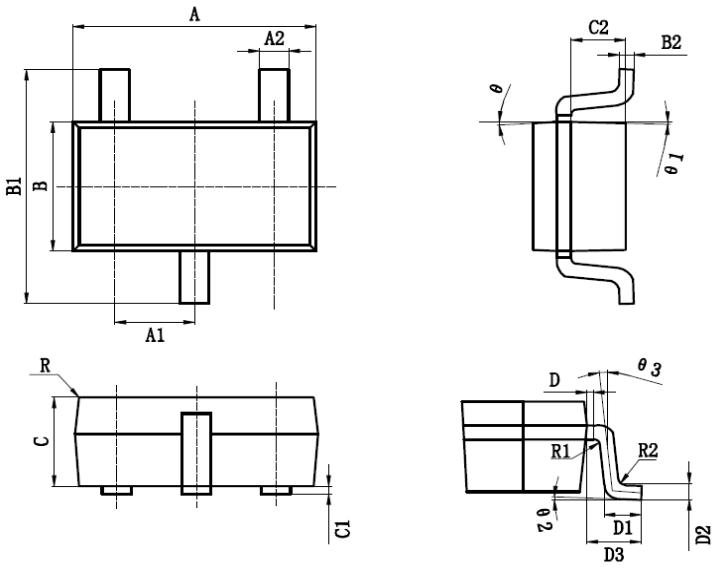


Fig12. Switching Time Test Circuit and waveforms

SOT23-3L Mechanical Data



Size / Symbol	Min.(mm)	Max.(mm)	Size / Symbol	Min.(mm)	Max.(mm)
A	2.82	3.02	D1	0.40	0.50
A1	0.90	1.00	**D2**	0.254TYP	
A2	0.35	0.45	**D3**	**0.60**	**0.70**
B	1.52	1.72	**θ**	9° TYP4	
B1	2.80	3.00	**θ1**	10° TYP4	
B2	0.119	0.135	**θ2**	0° ～ 8°	
C	1.05	1.15	**θ3**	6° TYP	
C1	0.03	0.13	R	＜0.2TYP4	
C2	0.60	0.70	R1	0.08TYP	
D	0.03	0.13	R2	0.08TYP	

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