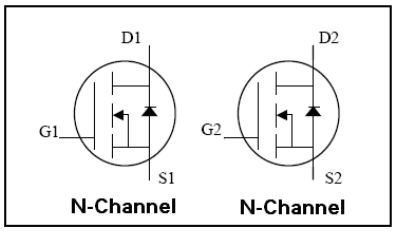
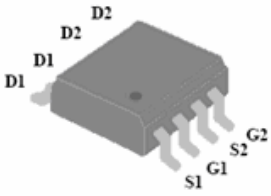
Features

- ♦30V/8A
- ♦Ron(typ.)=16mΩ @VGS=10V
- ♦Ron(typ.)=25mΩ @VGS=4.5V
- ♦Low On-Resistance
- ♦150°C Operating Temperature
- ♦Fast Switching
- ♦Lead-Free, Green Compliant

SOP8





Description

VS3009DS designed by the trench processing techniques to achieve extremely low on-resistance. And fast switching speed and improved transfer effective . These features combine to make this design an extremely efficient and reliable device for variety of DC-DC applications.

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T_C=25°C Unless Otherwise Noted)				
V_{GS}	Gate-Source Voltage		±20	V
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage		30	V
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-50 to 150	°C
I_S	Diode Continuous Forward Current	T_C=25°C	7.5①	A
Mounted on Large Heat Sink				
I_{DM}	Pulse Drain Current Tested	T_C=25°C	32②	A
I_D	Continuous Drain Current(VGS=10V)	T_C=25°C	8①	A
		T_C=100°C	6.0	
P_D	Maximum Power Dissipation	T_C=25°C	3.1	W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient		48	°C/W
$R_{\theta JC}$	Thermal Resistance-Junction to Case		1.55	°C/W

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ T_J = 25°C (unless otherwise stated)						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current (Tc=25℃)	V_{DS}=30V,V_{GS}=0V	--	--	1	μA
	Zero Gate Voltage Drain Current (Tc=125℃)	V_{DS}=30V,V_{GS}=0V	--	--	100	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V	--	--	±100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	0.9	1.5	2.0	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=8A	--	16	20	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=4.5V, I_D=4.5A	--	25	40	mΩ
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=20V,V_{GS}=0V, f=1MHz	--	450	--	pF
C_{oss}	Output Capacitance		--	69	--	pF
C_{rss}	Reverse Transfer Capacitance		--	40	--	pF
Q_g	Total Gate Charge	V_{DS}=20V,I_D=6A, V_{GS}=10V	--	13	--	nC
Q_{gs}	GateSource Charge		--	3.6	--	nC
Q_{gd}	GateDrain Charge		--	5.0	--	nC
Switching Characteristics						
$t_{d(on)}$	Turnon Delay Time	V_{DD}=20V, I_D=6A, R_G=3.3Ω, V_{GS}=10V	--	15	--	nS
t_r	Turnon Rise Time		--	19	--	nS
$t_{d(off)}$	TurnOff Delay Time		-	30	--	nS
t_f	TurnOff Fall Time		--	13	--	nS
Source Drain Diode Characteristics						
I_{SD}	Sourcedrain current(Body Diode)	T_c=25℃	7.5①	--	--	A
V_{SD}	Forward on voltage	T_j=25℃,I_{SD}=6A, V_{GS}=0V	--	0.88	1.3	V

Notes:

① Pulse test ; Pulse width≤300μs, duty cycle≤2%.

② Pulse width limited by maximum allowable junction temperature

Typical Characteristics

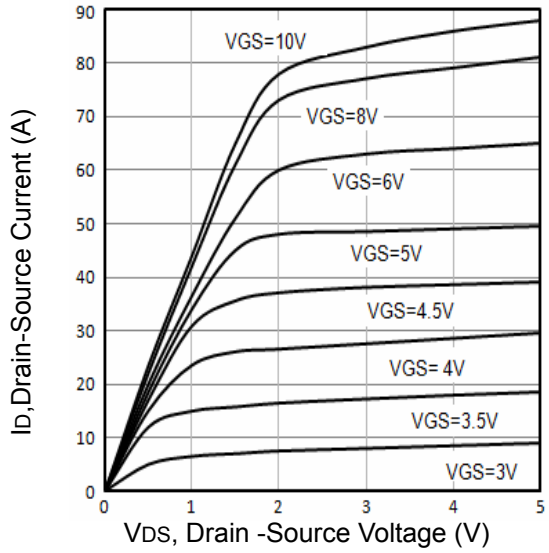


Fig1. Typical Output Characteristics

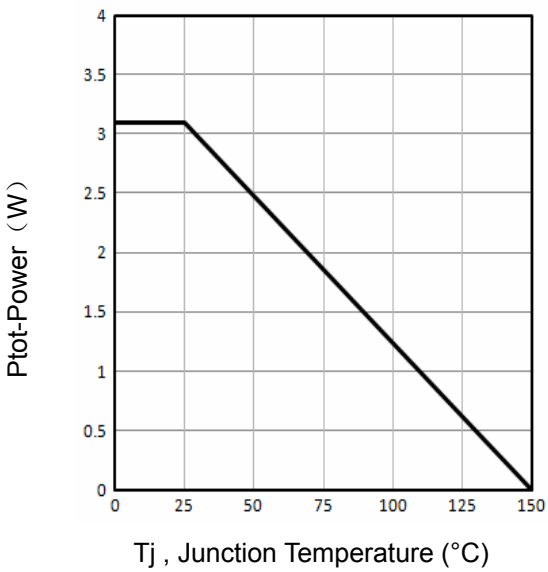


Fig2. Power Dissipation

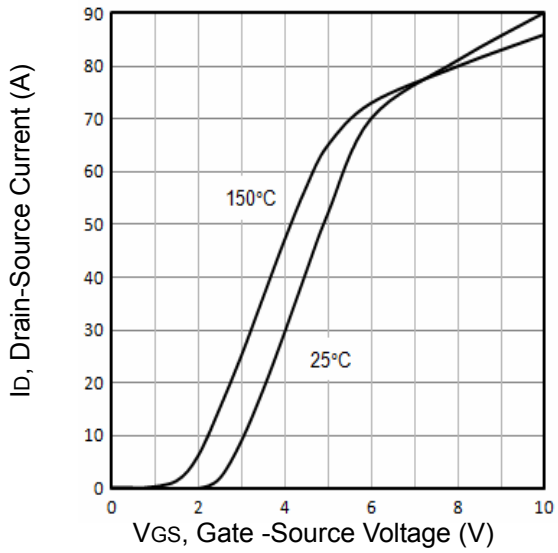


Fig3. Typical Transfer Characteristics

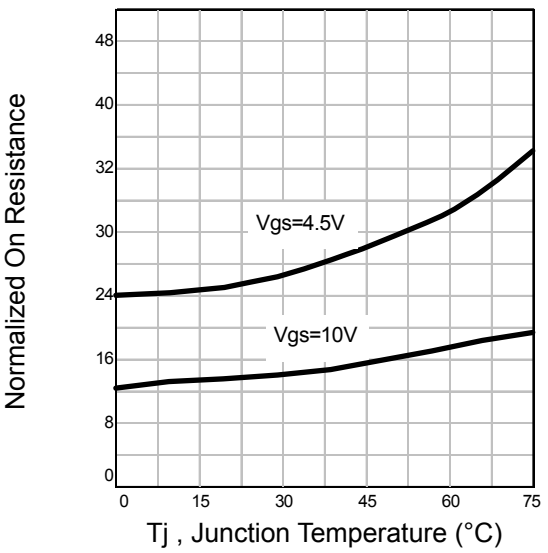


Fig4. Normalized On-Resistance Vs. Temperature

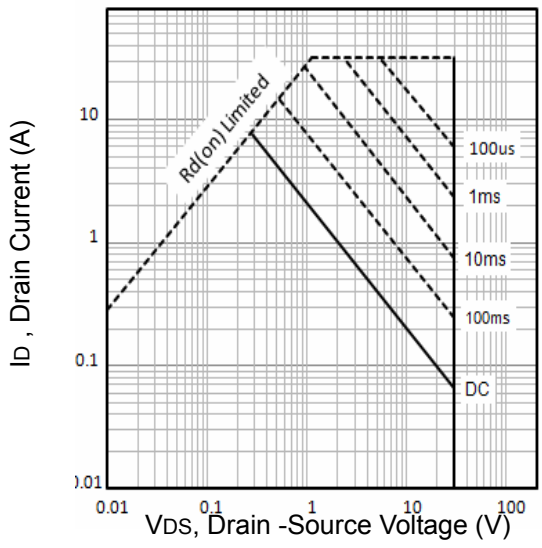


Fig5. Maximum Safe Operating Area

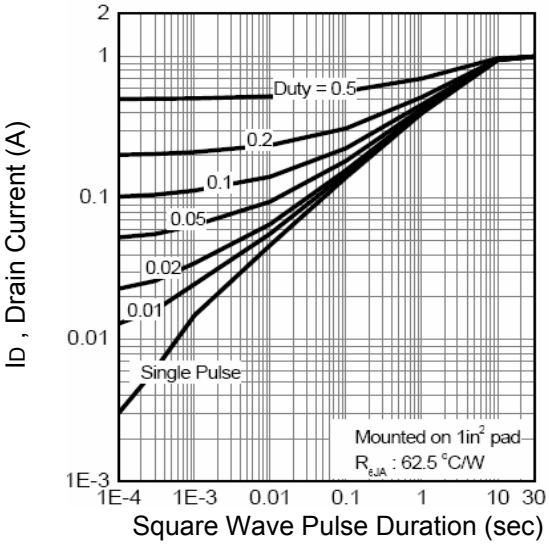


Fig6. **Thermal Transient Impedance**

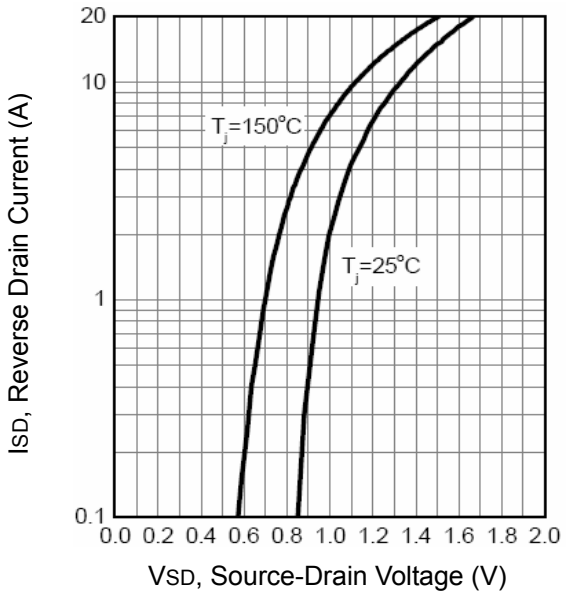


Fig7. Typical Source-Drain Diode Forward Voltage

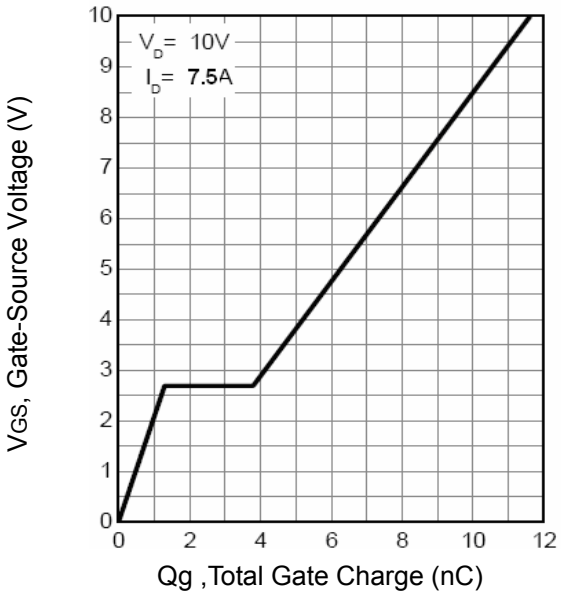


Fig8. Typical Gate Charge Vs.Gate-Source Voltage

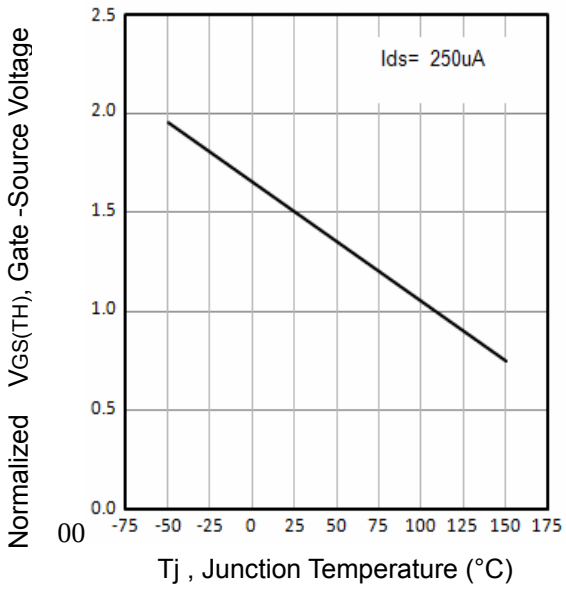


Fig9. Threshold Voltage Vs. Temperature

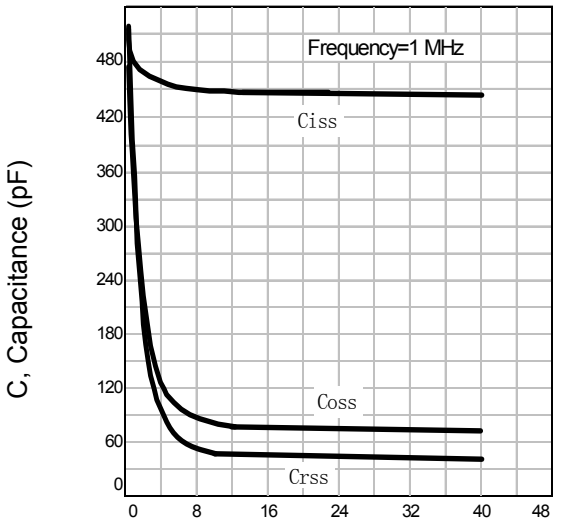


Fig10. Typical Capacitance Vs.Drain-Source Voltage

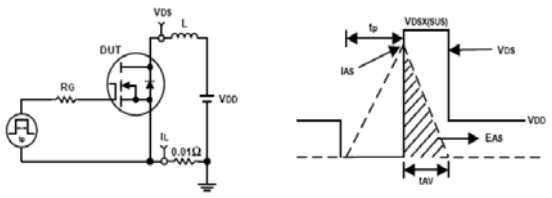


Fig11. Unclamped Inductive Test Circuit and waveforms

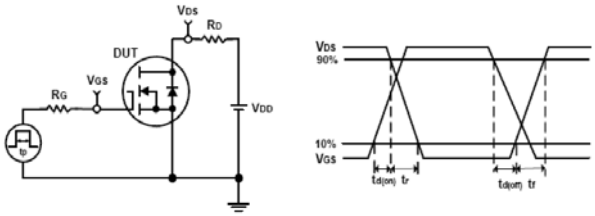
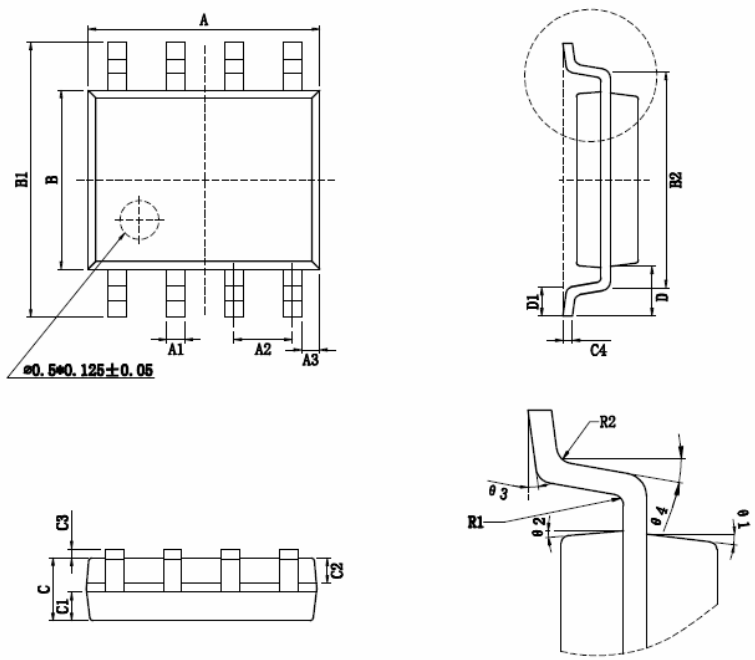


Fig12. Switching Time Test Circuit and waveforms

SOP8 Mechanical Data



Symbol	Dimensions In Millimeters		
	Min	Nom	Max
A	4.800	4.900	5.000
A1	0.356	0.406	0.456
A2	1.270Typ.		
A3	0.345Typ.		
B	3.800	3.900	4.000
B1	5.800	6.000	6.200
B2	5.00Typ.		
C	1.300	1.400	1.500
C1	0.550	0.600	0.650
C2	0.550	0.600	0.650
C3	0.050	--	0.200
C4	0.203Typ.		
D	1.050Typ.		
D1	0.400	0.500	0.600
R1	0.200Typ.		
R2	0.200Typ.		
Θ1	17°Typ.		
Θ2	13°Typ.		
Θ3	0°~ 8°Typ.		
Θ4	4°~ 12°Typ.		

Order Information

Product	Marking	Package	Packaging	Min Unit Quantity
VS3009DS	VS3009DS	SOP8	3000/Reel	6000

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