Dual P-Ch 60V Fast Switching MOSFETs 9958

Features	Bvdss	Rdson	ID
	-60V	70mΩ	-8A

Features

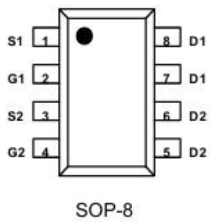
- Super Low Gate Charge
- Green Device Available
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology

Application

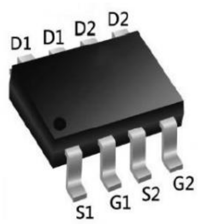
RoHS

- DC-DC Converters
- Power management function
- Synchronous-rectification applications

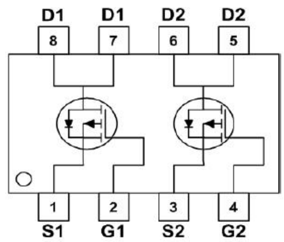
Package



1.Marking and pin assignment



2. SOP8 top view



3.Schematic diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Quantity
9958	9958	SOP8	3000

Absolute Maximum Ratings (T_C=25℃ unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	-60	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current, V_{GS} @ -10V（1）	T_C = 25℃	I_D	-8	A
	T_C = 70℃	I_D	-6.2	A
Pulsed Drain Current (2)		I_{DM}	-16.2	A
Single Pulsed Avalanche Energy (3)		E_{AS}	69.7	mJ
Avalanche Current		I_{AS}	44.4	W
Total Power Dissipation(4)	T_C = 25℃	P_D	6.1	W
Junction Temperature		T_J	-55~+150	℃
Storage Temperature		T_{STG}	-55~+150	℃

Thermal Resistance Ratings

Parameter	Symbol	Value	Unit
Junction to case	$R_{\theta JC}$	36	℃/W
Thermal Resistance Junction-Ambient (1)	$R_{\theta JA}$	85	℃/W

Ordering Information

Ordering Number	Package	Pin Assignment						Packing
Halogen Free		G1	G2	S1	S2	D1	D2	
HL9958	SOP8	2	4	1	3	7,8	5,6	Tape Reel

Electrical Characteristics (T_j=25℃unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain to Source Breakdown Voltage	V(br)dss	Id = 250μA, Vgs = 0V	-60	-	-	V
BVDSS Temperature Coefficient	△B_{VDSS}/△T_J	Reference to 25C , I_D=-1mA	-	-0.03	-	V/ C
Drain-Source Leakage Current	Idss	V_{DS}=-48V , Vgs=0V , TJ=25C	-	-	1	μA
		V_{DS}=-48V , V_{GS}=0V , TJ=55C	-	-	5	
Gate to Source Leakage Current	Igss	Vgs= ±20V , V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	Vgs(th)	Vgs=V_{DS}, I_D =-250uA	-1.2	-	-2.5	V
VGS(th) Temperature Coefficient	△VGS(th)		-	4.56	-	mV/ C
Static Drain-Source On-Resistance(2)	Rds(on)	Vgs=-10V , I_D=-3A	-	70	90	mΩ
		Vgs=-4.5V , I_D=-2A	-	90	115	
Forward Transconductance	gfs	V_{DS}=-5V , I_D=-3A	-	8.7	-	S
Gate Resistance	Rg	V_{DS}=0V , Vgs=0V , f=1MHz	-	15	-	Ω
Input Capacitance	Ciss	V_{DS}=-15V ,Vgs=0V , f=1MHz	-	1080	-	pF
Output Capacitance	Coss		-	73	-	pF
Reverse Transfer Capacitance	Crss		-	50	-	pF
Turn-ON Delay Time	td(on)	V_{DS}=-15V , Vgs=-10V , RG=3.3 , I_D=-1A	-	8.8	-	ns
Rise Time	tr		-	19.6	-	ns
Turn-OFF Delay Time	td(off)		-	47.2	-	ns
Fall Time	tf		-	9.6	-	ns
Total Gate Charge	Qg	V_{DS}=-48V , Vgs=-4.5V , I_D=-3A	-	11.8	-	nC
	Qgs		-	1.9	-	nC
	Qgd		-	6.5	-	nC
Maximum Pulsed Drain to Source Diode Forward Current(2,5)	I_{SM}	V_G=V_D=0V , Force Current	-	-	-16.2	A
Drain to Source Diode Forward Voltage(2)	Vsd	Vgs=0V , I_S=-1A , T_J=25C	-	-	-1.2	V
Continuous Diode Forward Current(1,5)	Is	V_G=V_D=0V , Force Current	-	-	-8	A

Note :

1.The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper. 2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

3.The EAS data shows Max. rating . The test condition is V_{DD}=-25V,V_{GS}=-10V,L=0. 1mH,IAS=-24.4A

4.The power dissipation is limited by 150C junction temperature

5.The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

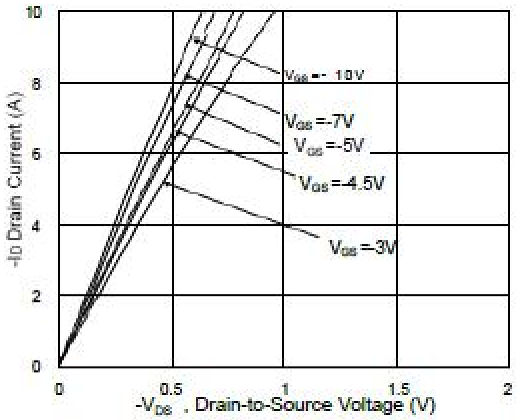


Fig.1 Typical Output Characteristics

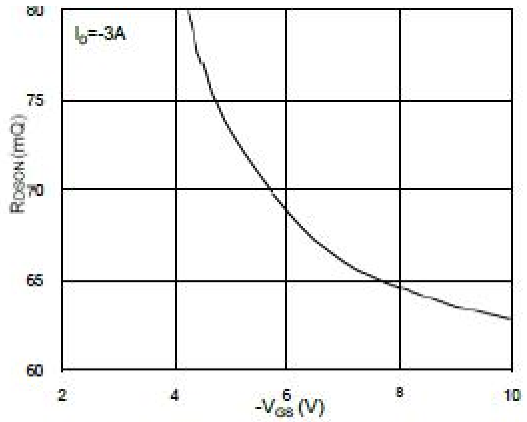


Fig.2 On-Resistance v.s Gate-Source

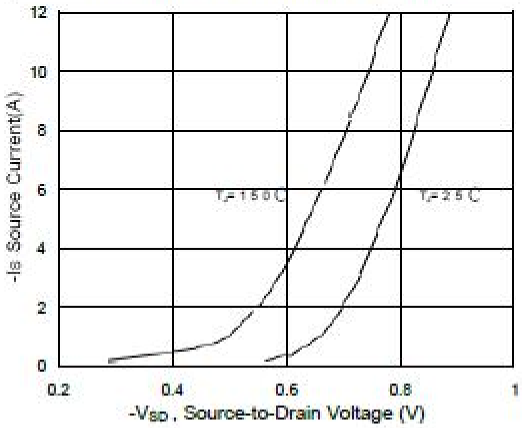


Fig.3 Forward Characteristics of Reverse

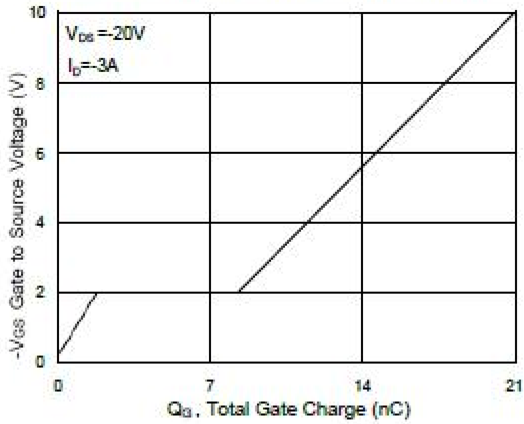


Fig.4 Gate-Charge Characteristics

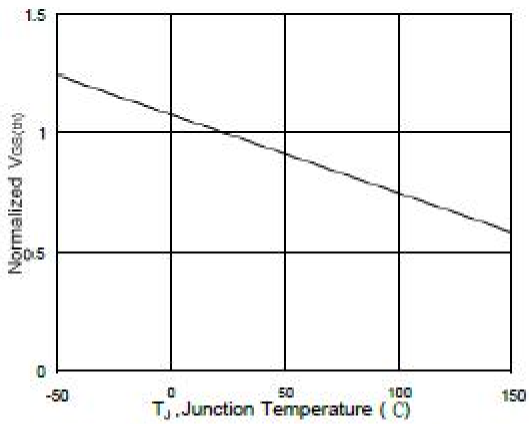


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

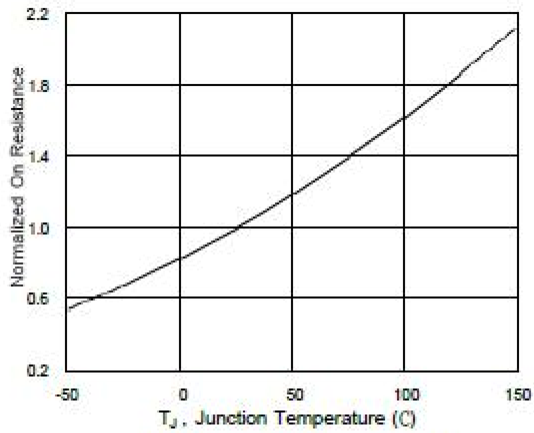


Fig.6 Normalized R_{DSON} vs. T_J

Typical Characteristics

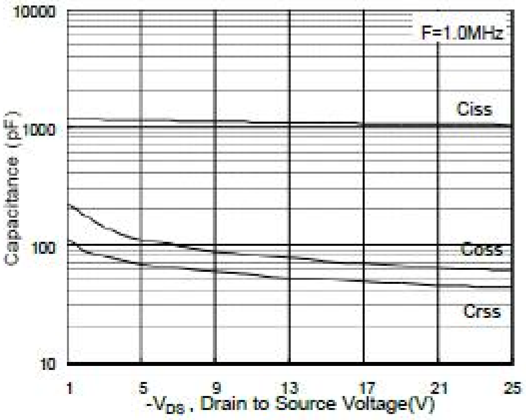


Fig.7 Capacitance

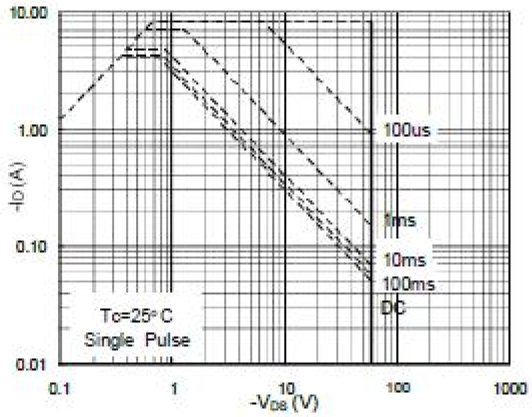


Fig.8 Safe Operating Area

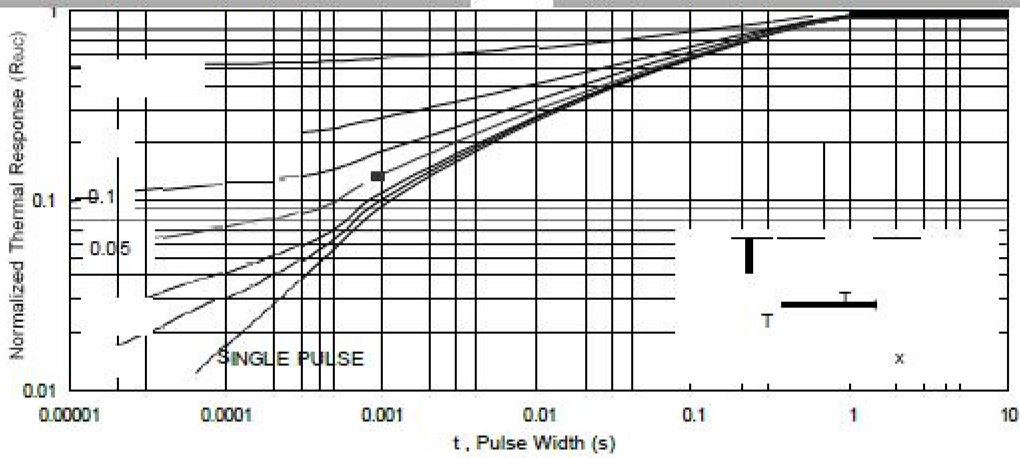


Fig.9 Normalized Maximum Transient Thermal Impedance

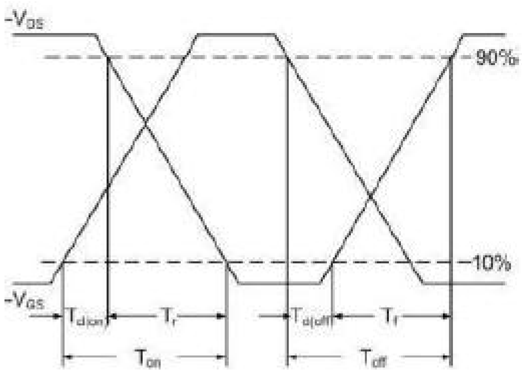


Fig.10 Switching Time Waveform

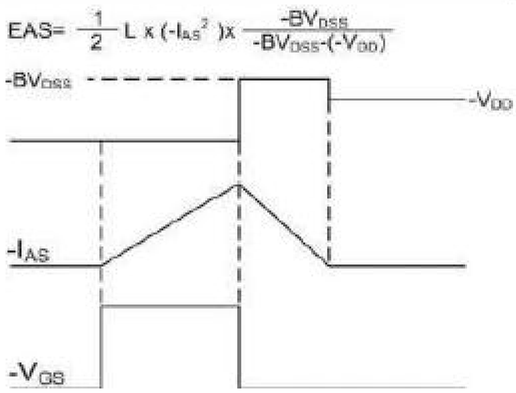
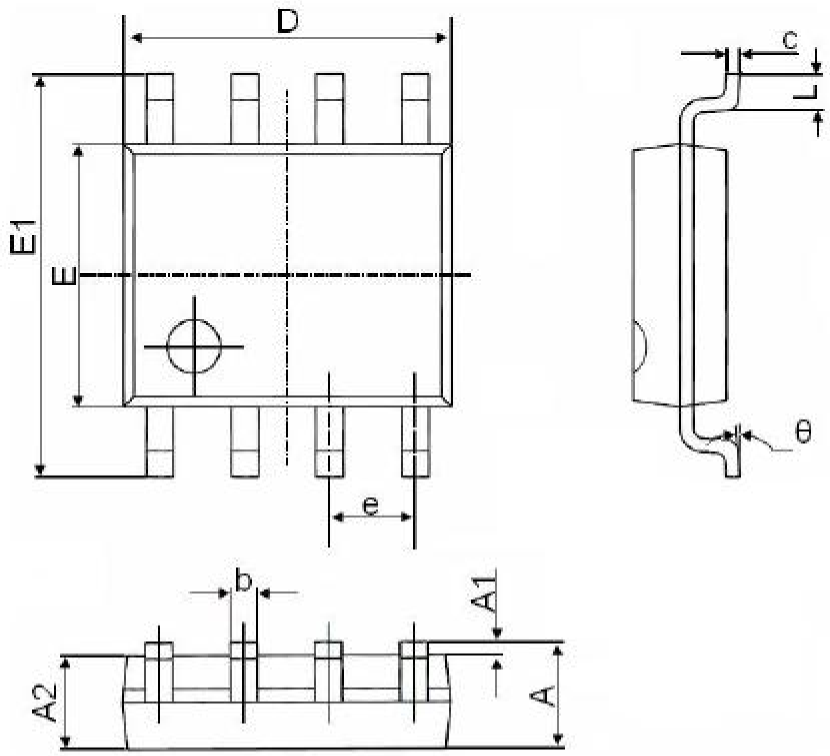


Fig.11 Unclamped Inductive Waveform

Package Dimensions SOP8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

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