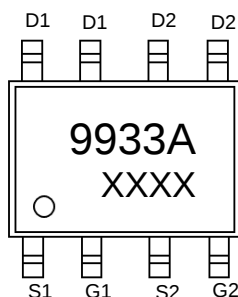


Features

- Trench Power LV MOSFET technology
- Low $R_{DS(on)}$ & FOM
- Extremely low switching loss
- Excellent stability and uniformity

Application

- Power management
- Portable equipment

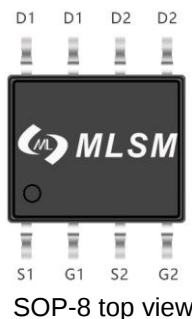


Marking and pin assignment

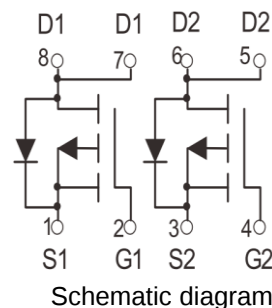
9933A : Device code
 XXXX : Code

Product Summary

V_{DS}	$R_{DS(on)}$ TYP	I_D
-20V	48mΩ@-4.5V	-4A
	75mΩ@-2.5V	



SOP-8 top view



Schematic diagram



Pb-Free



Halogen-Free

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Symbol	Parameter	Rating	Unit
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Common Ratings (TC=25°C Unless Otherwise Noted)

V_{DS}	Drain-Source Breakdown Voltage	-20	V
V_{GS}	Gate-Source Voltage	±12	V
T_J	Maximum Junction Temperature	150	°C
T_{STG}	Storage Temperature Range	-55 to 150	°C
I_S	Diode Continuous Forward Current	$T_c=25^\circ\text{C}$	-4

Mounted on Large Heat Sink

I_{DM}	Pulse Drain Current Tested	$T_c=25^\circ\text{C}$	-16	A
I_D	Continuous Drain Current	$T_c=25^\circ\text{C}$	-4	A
P_D	Maximum Power Dissipation	$T_c=25^\circ\text{C}$	1.3	W
$R_{\theta JA}$	Thermal Resistance Junction-to-Ambient		96	°C/W

Ordering Information (Example)

Type	Package	Marking	Minimum Package(pcs)	Inner Box Quantity(pcs)	Outer Carton Quantity(pcs)	Delivery Mode
MQ9933A	SOP-8	9933A	3,000	6,000	42,000	13"reel

Electrical Characteristics (TJ=25℃ unless otherwise noted)						
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ TJ = 25℃ (unless otherwise stated)						
BV _{(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-Body Leakage Current	V _{GS} =±12V, V _{DS} =0V	--	--	±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-0.4	-0.62	-1.4	V
R _{DS(on)}	Drain-Source On-State Resistance	V _{GS} =-4.5V, I _D =-4.0A	--	48	58	mΩ
		V _{GS} =-2.5V, I _D =-3.0A	--	75	94	mΩ
Dynamic Electrical Characteristics @ TJ = 25℃ (unless otherwise stated)						
C _{ISS}	Input Capacitance	V _{DS} =-10V, V _{GS} =0V, f=1MHz	--	438	--	pF
C _{OSS}	Output Capacitance		--	76	--	pF
C _{RSS}	Reverse Transfer Capacitance		--	62	--	pF
Switching Characteristics						
Q _g	Total Gate Charge	V _{DS} =-10V, I _D =-4A, V _{GS} =-4.5V	--	5.41	--	nC
Q _{gs}	Gate Source Charge		--	1.17	--	nC
Q _{gd}	Gate Drain Charge		--	1.24	--	nC
t _{d(on)}	Turn-on Delay Time	V _{DD} =-10V, I _D =-4A, V _{GS} =-4.5V, R _G =3Ω	--	6.4	--	nS
t _r	Turn-on Rise Time		--	21.8	--	nS
t _{d(off)}	Turn-Off Delay Time		--	37.4	--	nS
t _f	Turn-Off Fall Time		--	34	--	nS
Source- Drain Diode Characteristics						
V _{SD}	Forward on voltage	Tj=25℃, Is=-4A	--	--	-1.2	V

Typical Operating Characteristics

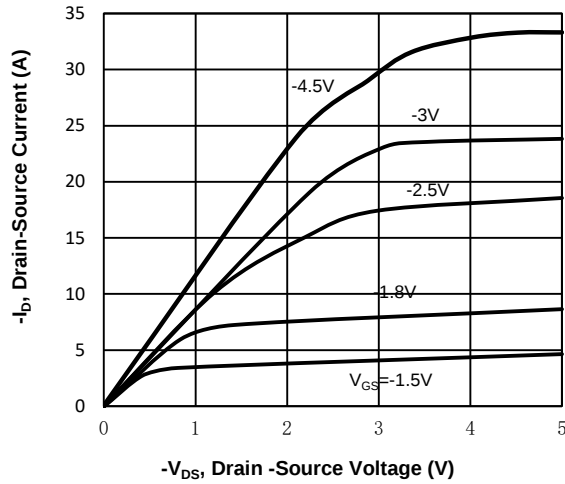


Fig1. Typical Output Characteristics

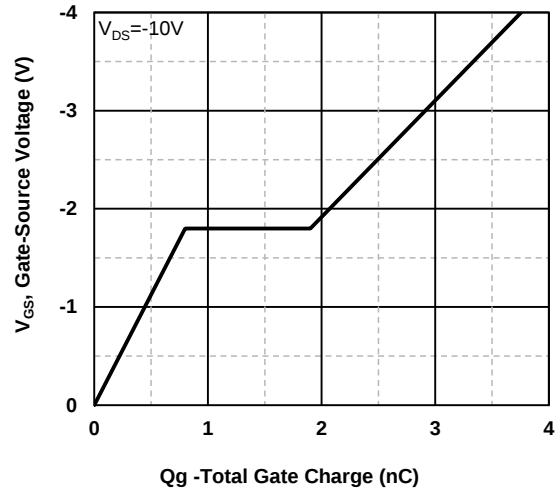


Fig2. Typical Gate Charge Vs. Gate-Source Voltage

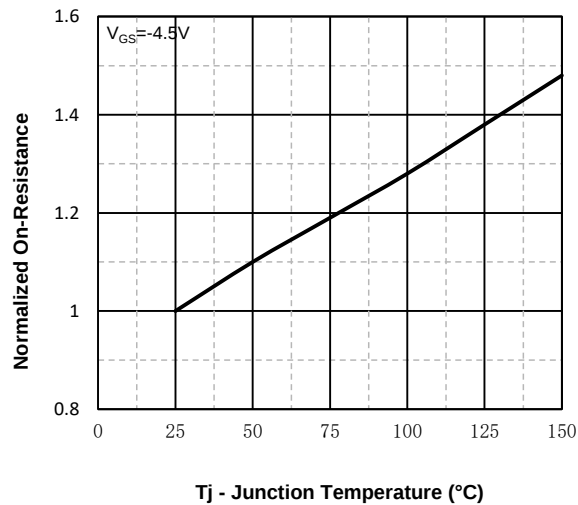


Fig3. Normalized On-Resistance Vs. Temperature

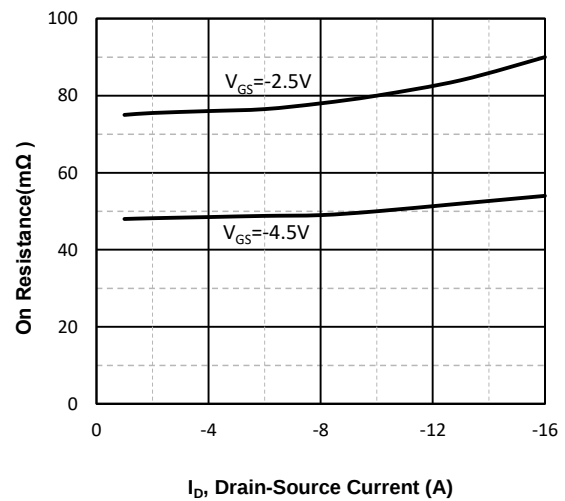


Fig4. Drain-Source on Resistance Vs. Drain-Source Current

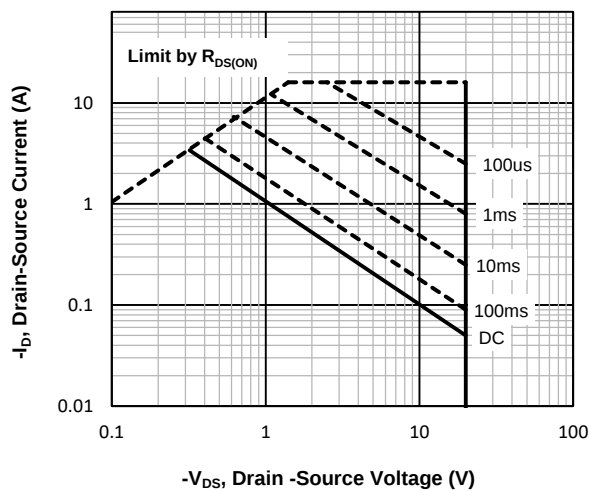


Fig5. Maximum Safe Operating Area

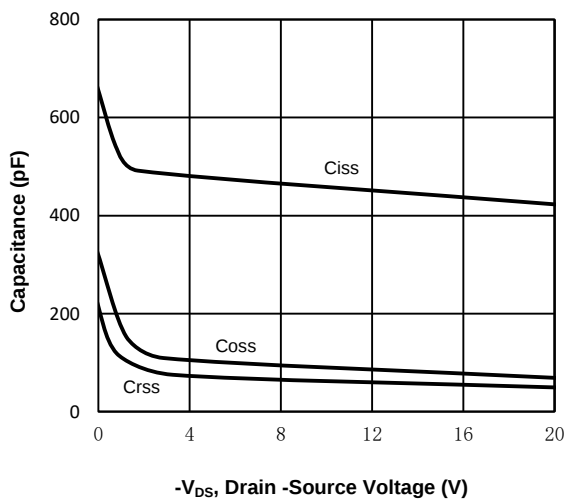


Fig6 Typical Capacitance Vs. Drain-Source Voltage

SOP-8 Package information



Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	1.450	1.750	0.057	0.068
A1	0.100	0.250	0.003	0.009
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.012	0.020
c	0.170	0.250	0.006	0.009
D	4.700	5.100	0.185	0.200
e	1.270(BSC)		0.050(BSC)	
E	3.800	4.000	0.149	0.157
E1	5.800	6.200	0.228	0.244
L	0.400	1.270	0.015	0.050
θ	0°	8°	0°	8°