

Features

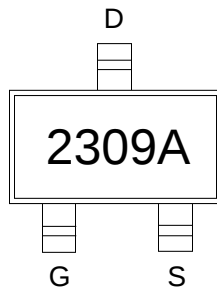
- Leading trench technology for low $R_{DS(on)}$
- Low Gate Charge
- Excellent package for good heat dissipation

Product Summary

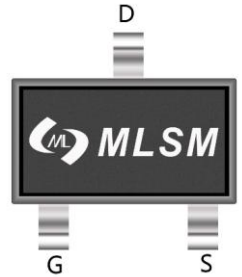
V_{DS}	$R_{DS(on)}$ TYP	I_D
-60V	125mΩ@-10V	-3A
	180mΩ@-4.5V	

Application

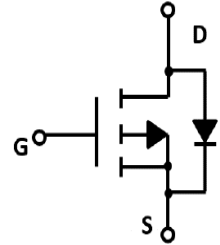
- Video monitor
- Power management



2309A: Device code



SOT-23-3L top view



Schematic diagram



Pb-Free



Halogen-Free

Marking and pin assignment

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Rating	Unit
Common Ratings ($T_C=25^{\circ}\text{C}$ Unless Otherwise Noted)			
V_{DS}	Drain-Source Breakdown Voltage	-60	V
V_{GS}	Gate-Source Voltage	± 20	V
T_J	Maximum Junction Temperature	150	$^{\circ}\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}\text{C}$
I_S	Diode Continuous Forward Current	$T_C=25^{\circ}\text{C}$ -3	A

Mounted on Large Heat Sink

I_{DM}	Pulse Drain Current Tested	$T_C=25^{\circ}\text{C}$ -9	A
I_D	Continuous Drain Current	$T_C=25^{\circ}\text{C}$ -3	A
P_D	Maximum Power Dissipation	$T_C=25^{\circ}\text{C}$ 0.35	W
$R_{\theta JA}$	Thermal Resistance Junction-to-Ambient	357	$^{\circ}\text{C/W}$

Ordering Information (Example)

Type	Package	Marking	Minimum Package(pcs)	Inner Box Quantity(pcs)	Outer Carton Quantity(pcs)	Delivery Mode
MLSK2309A	SOT-23-3L	2309A	3,000	45,000	180,000	7"reel

Electrical Characteristics (T _J =25℃ unless otherwise noted)						
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ T _J = 25℃ (unless otherwise stated)						
B _{V(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250μA	-55	-62	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-50V, V _{GS} =0V	--	--	-1.0	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	1.0	-1.7	-2.5	V
R _{DS(on)}	Drain-Source On-State Resistance	V _{GS} =-10V, I _D =-3.0A	--	125	180	mΩ
		V _{GS} =-4.5V, I _D =-1.5A	--	180	240	mΩ
Dynamic Electrical Characteristics @ T _J = 25℃ (unless otherwise stated)						
C _{ISS}	Input Capacitance	V _{DS} =-25V, V _{GS} =0V, f=1MHz	--	555	--	pF
C _{OSS}	Output Capacitance		--	35	--	pF
C _{RSS}	Reverse Transfer Capacitance		--	30	--	pF
Switching Characteristics						
Q _g	Total Gate Charge	V _{DS} =-25V, I _D =-10A, V _{GS} =-10V	--	20	--	nC
Q _{gs}	Gate Source Charge		--	3	--	nC
Q _{gd}	Gate Drain Charge		--	6.5	--	nC
t _{d(on)}	Turn-on Delay Time	V _{DD} =-25V, I _D =-10A, V _{GS} =-10V, R _G =3Ω	--	10	--	nS
t _r	Turn-on Rise Time		--	46	--	nS
t _{d(off)}	Turn-Off Delay Time		--	18	--	nS
t _f	Turn-Off Fall Time		--	30	--	nS
Source- Drain Diode Characteristics						
V _{SD}	Forward on voltage	T _J =25℃, I _S =-3A	--	--	-1.2	V

Typical Operating Characteristics

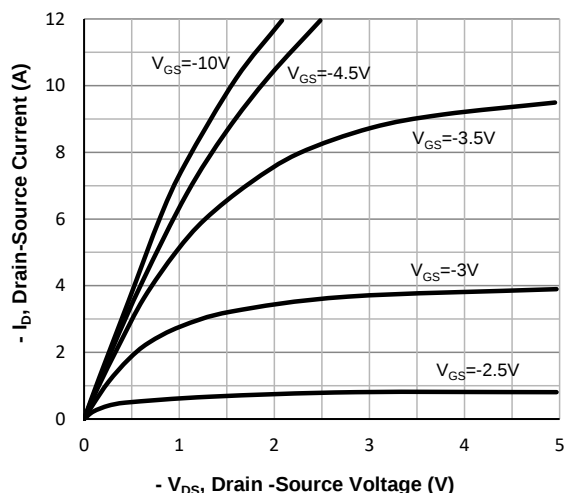


Fig1. Typical Output Characteristics

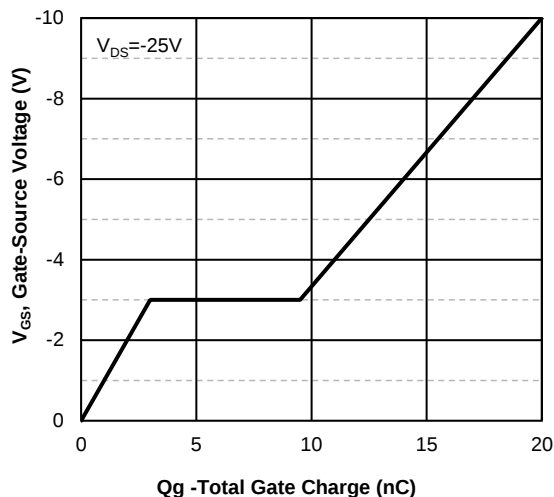


Fig2. Typical Gate Charge Vs. Gate-Source Voltage

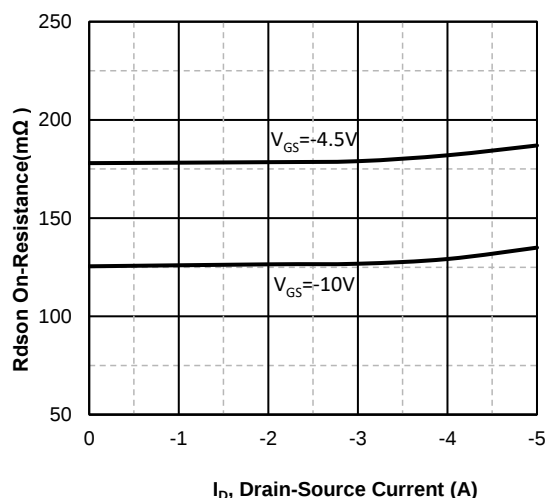


Fig3. Drain-Source on Resistance

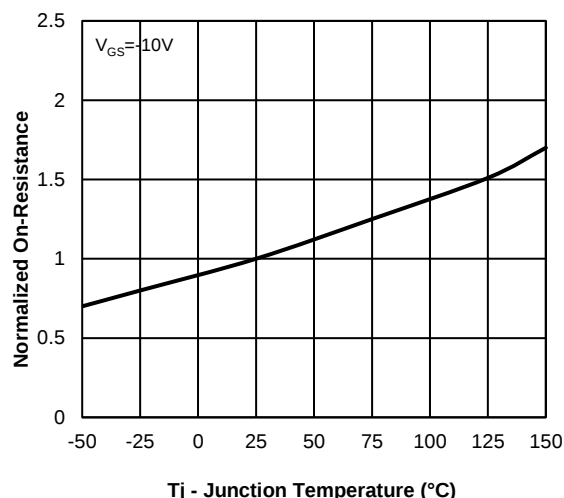


Fig4. Normalized On-Resistance Vs. Temperature

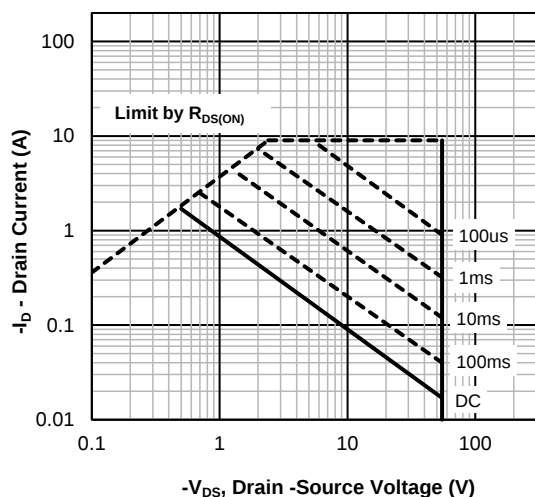


Fig5. Maximum Safe Operating Area

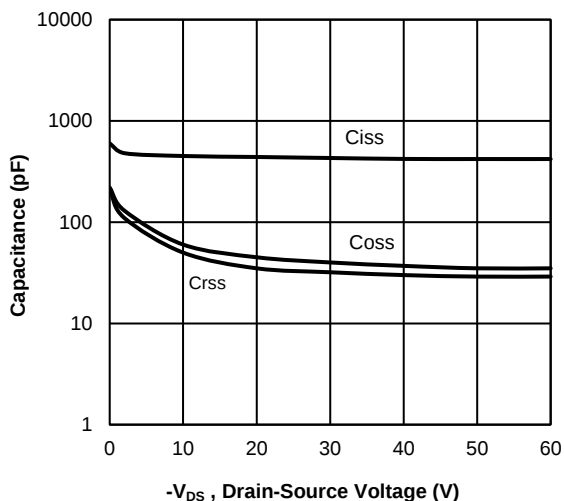
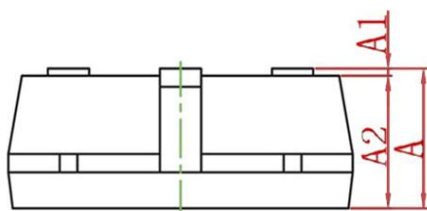
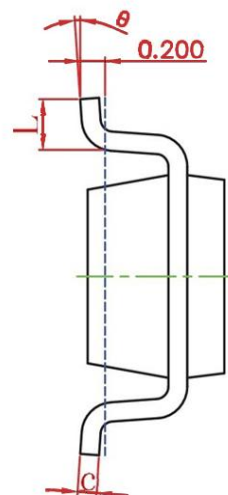
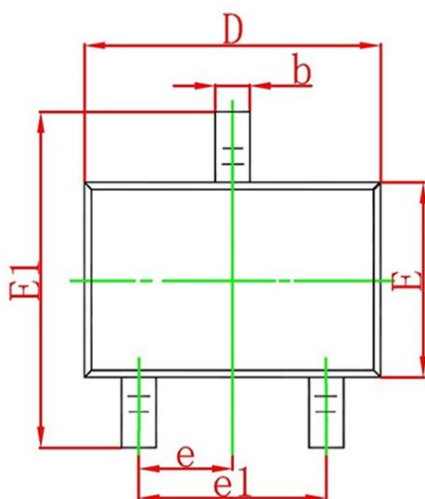


Fig6 Typical Capacitance Vs. Drain-Source Voltage

SOT-23-3L Package information



Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.042	0.050
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.042	0.046
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.112	0.120
E	1.500	1.700	0.060	0.068
E1	2.650	2.950	0.106	0.118
e	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°