MLS502KW

-50V/-0.18A P-Channel MOSFET

Features

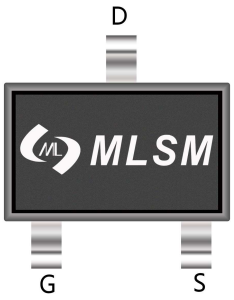
- Energy efficient
- Miniature surface mount package saves board space
- With protection diode between gate and source

Product Summary

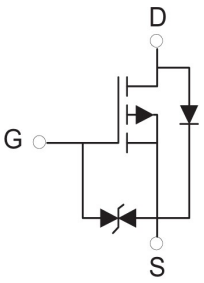
V_{DS}	$R_{DS(ON)}$ MAX	I_D MAX
-50V	8Ω@-10V	-0.18A
	10Ω@-5V	

Application

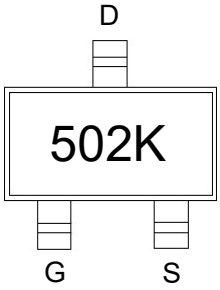
- High-speed line driver、Relay driver
- High-side load switch and Switching circuits



SOT-323 top view



Schematic diagram



502K: Device code

Marking and pin assignment

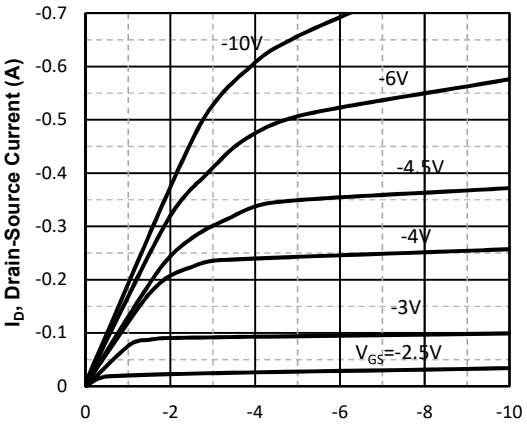
Pb-Free RoHS Halogen-Free

Absolute Maximum Ratings (TA=25℃unless otherwise noted)				
Symbol	**Parameter**		**Rating**	**Unit**
Common Ratings (TC=25°C Unless Otherwise Noted)				
V_{DS}	Drain-Source Breakdown Voltage		-50	V
V_{GS}	Gate-Source Voltage		±20	V
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	°C
I_S	Diode Continuous Forward Current	Tc=25°C	-0.18	A
Mounted on Large Heat Sink				
I_{DM}	Pulse Drain Current Tested	Tc=25°C	-0.7	A
I_D	Continuous Drain Current	Tc=25°C	-0.18	A
P_D	Maximum Power Dissipation	Tc=25°C	0.3	W
$R_{\theta JA}$	Thermal Resistance Junction-to-Ambient		417	°C/W

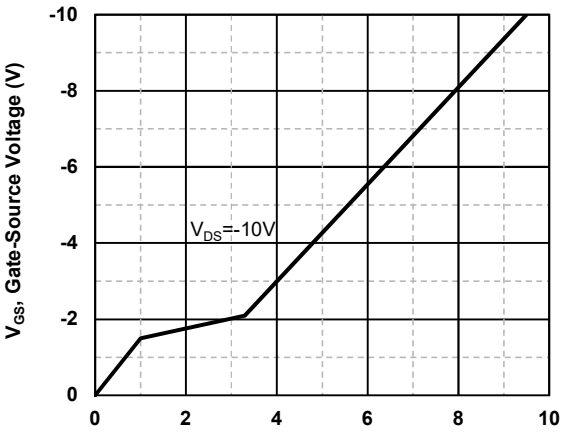
Ordering Information (Example)						
Type	**Package**	**Marking**	**Minimum Package(pcs)**	**Inner Box Quantity(pcs)**	**Outer Carton Quantity(pcs)**	**Delivery Mode**
MLS502KW	SOT-323	502K	3,000	45,000	180,000	7"reel

Electrical Characteristics (TJ=25℃ unless otherwise noted)						
Symbol	**Parameter**	**Condition**	**Min**	**Typ**	**Max**	**Unit**
Static Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
$BV_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V，I_D=-250μA	-50	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-50V，V_{GS}=0V	--	--	-1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V，V_{DS}=0V	--	--	±10	μA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}，I_D=-250μA	-0.9	--	-2	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=-10V，I_D=-0.1A	--	4.1	8	Ω
		V_{GS}=-5V，I_D=-0.1A	--	5.5	10	Ω
Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
C_{ISS}	Input Capacitance	V_{DS}=-30V，V_{GS}=0V， f=1MHz	--	43	--	pF
C_{OSS}	Output Capacitance		--	2.9	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	1.8	--	pF
Switching Characteristics						
Q_g	Total Gate Charge	V_{DS}=-10V，I_D=-4A，V_{GS}=-4.5V	--	9.5	--	nC
Q_{gs}	Gate Source Charge		--	1.1	--	nC
Q_{gd}	Gate Drain Charge		--	2	--	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=-10V，R_L=2.5Ω，V_{GS}=-4.5V，R_G=2.8Ω	--	12.8	--	nS
t_r	Turn-on Rise Time		--	8.9	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	18.8	--	nS
t_f	Turn-Off Fall Time		--	30	--	nS
Source- Drain Diode Characteristics						
V_{SD}	Forward on voltage	Tj=25℃，Is=-0.18A	--	--	-1.2	V

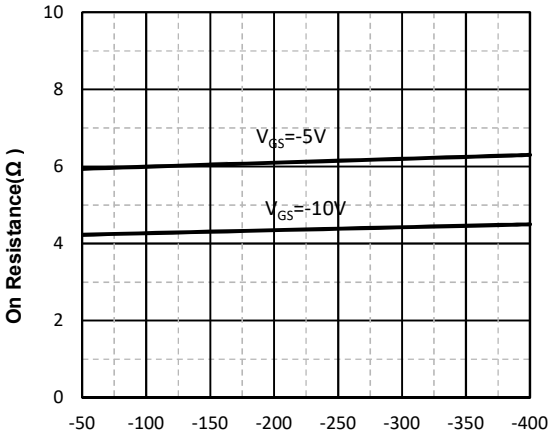
Typical Operating Characteristics



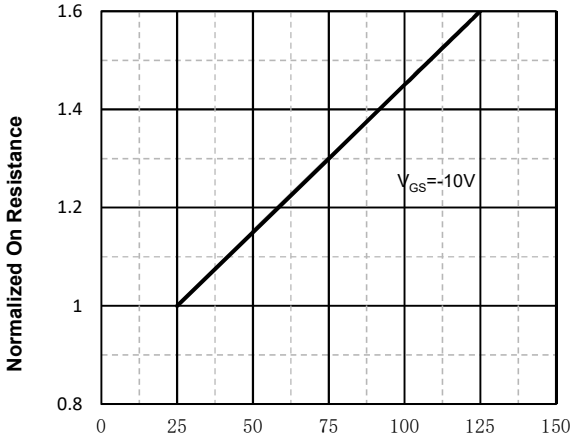
V_{DS}, Drain -Source Voltage (V)
Fig1. Typical Output Characteristics



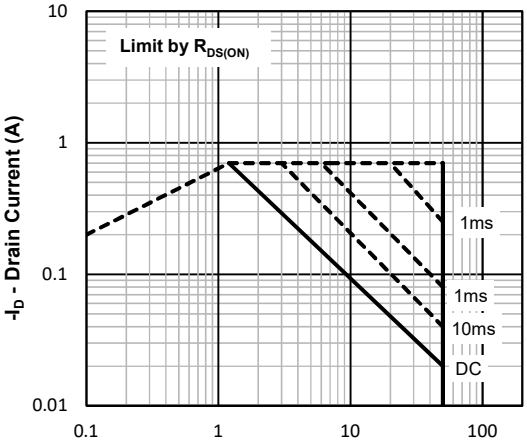
Qg -Total Gate Charge (nC)
Fig2. Typical Gate Charge Vs.Gate-Source Voltage



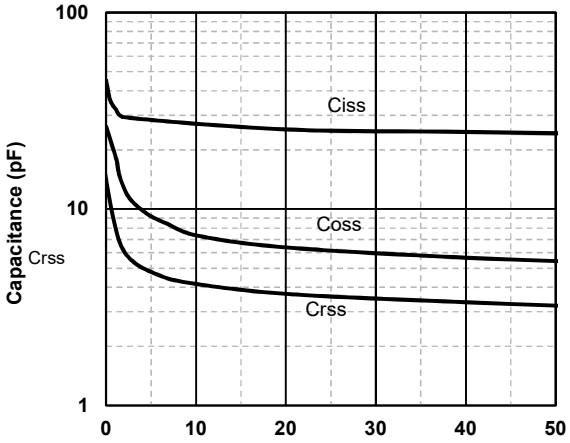
I_D, Drain-Source Current (mA)
Fig3. Drain-Source on Resistance



Tj - Junction Temperature (°C)
Fig4. Normalized On-Resistance Vs. Temperature

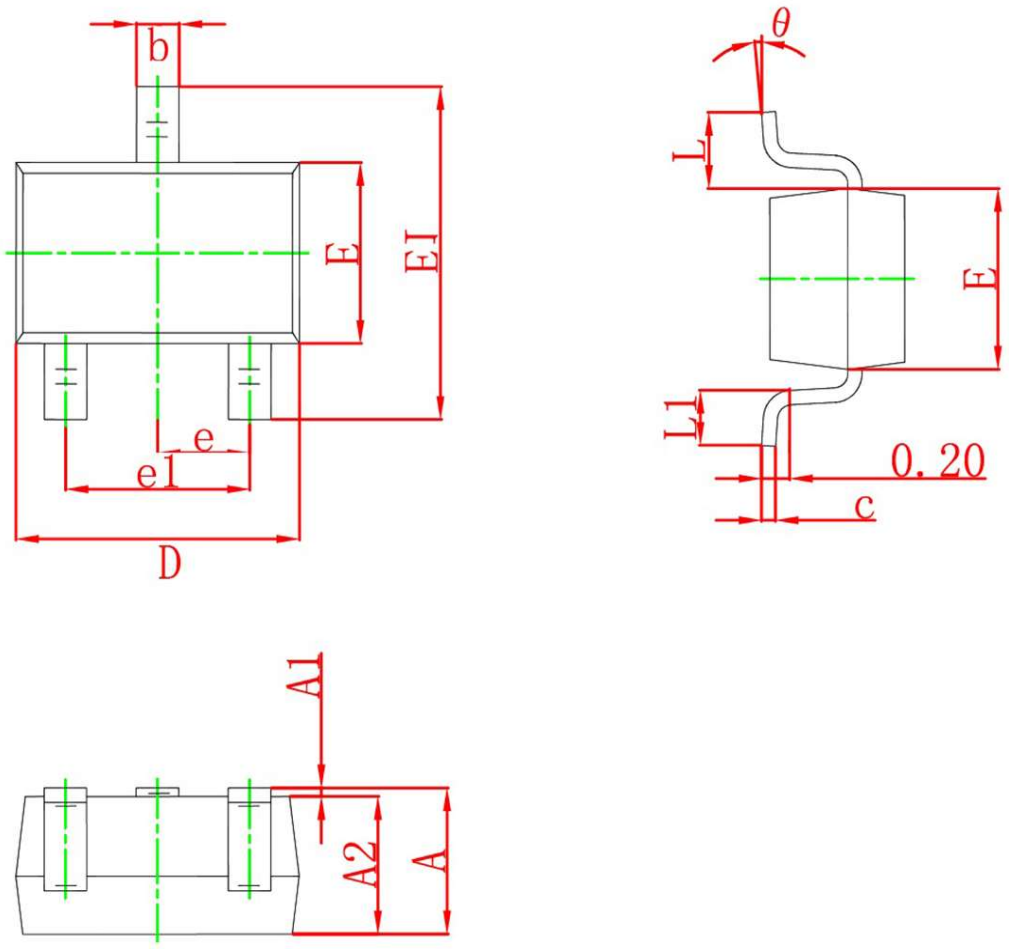


$-V_{DS}$, Drain -Source Voltage (V)
Fig5. Maximum Safe Operating Area



$-V_{DS}$, Drain-Source Voltage (V)
Fig6 Typical Capacitance Vs.Drain-Source Voltage

SOT-323 Package information



Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.200	0.400	0.008	0.016
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650TYP		0.026TYP	
e1	1.200	1.400	0.047	0.055
L	0.525REF		0.021REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°