

## CHIPLINK P-Channel Enhancement Mode Power MOSFET

### Description

The LX2301S combines advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltage as low as 1.8V. This device is suitable for use as a load switch or other general applications.

### Features

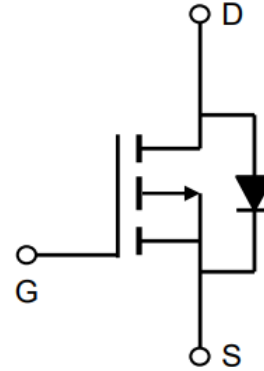
- $V_{DS} = -20V$ ,  $I_D = -1.5A$   
 $R_{DS(ON)} < 160m\Omega @ V_{DS} = -4.5V$   
 $R_{DS(ON)} < 230m\Omega @ V_{DS} = -2.5V$
- Low gate charge
- High power and current handling capability
- Termination is Lead-free and RoHS Compliant



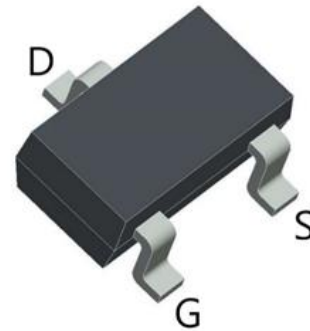
### Applications

- PWM applications
- Load switch
- Power Management

### Schematic Diagram



### SOT23 Package



## Maximum Ratings ( $T_A = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 10$	V
Continuous Drain Current	$I_D$	-1.5	A
Pulsed Drain Current <sup>B</sup>	$I_{DM}$	-6	A
Maximum Power Dissipation <sup>A</sup>	$P_D$	0.7	W
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	$^\circ C$

## Thermal Characteristic

Thermal Resistance, Junction to Ambient	$R_{QA}$	178	$^\circ C/W$
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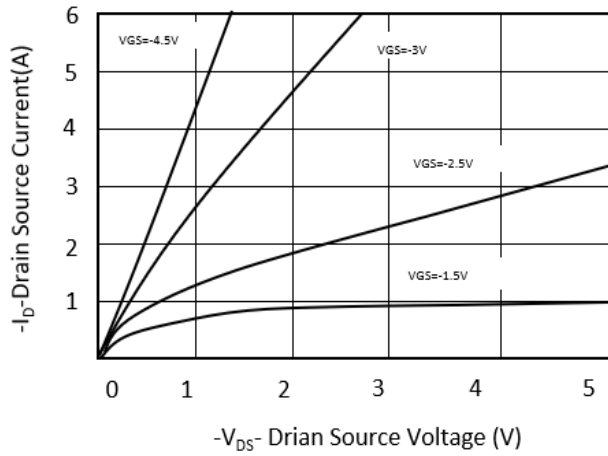
**Electrical Characteristics** ( $T_A=25^{\circ}\text{C}$  unless otherwise specified)

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	-20			V
Gate-Threshold Voltage	V <sub>th(GS)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =-250 uA	-0.4	-0.7	-1	V
Gate-body Leakage	IGSS	V <sub>DS</sub> =0V, V <sub>GS</sub> =±10V			±100	nA
Zero Gate Voltage Drain Current	IDSS	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V			-1	uA
Drain-Source On-Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-1.5A		130	160	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-1A		180	230	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =-5V, I <sub>D</sub> =-1.5A		4		s
Dynamic Characteristics						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = -10V, V <sub>GS</sub> =0V, F=1MHz		252		pF
Output Capacitance	C <sub>oss</sub>			48		
Reverse Transfer Capacitance	C <sub>rss</sub>			27		
Switching Capacitance						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = -10V, R <sub>L</sub> =5Ω V <sub>GS</sub> = -4.5V, R <sub>GEN</sub> =3Ω		3		nS
Turn-on Rise Time	t <sub>r</sub>			4		nS
Turn-off Delay Time	t <sub>d(off)</sub>			18		nS
Turn-off Fall Time	t <sub>f</sub>			3.8		nS
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = -10V, I <sub>D</sub> =-1.5A, V <sub>GS</sub> =-4.5V		2.9		nC
Gate-Source Charge	Q <sub>gs</sub>			0.45		nC
Gate-Drain Charge	Q <sub>gd</sub>			0.75		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =-1.5A			-1.2	V
Diode Forward Current	I <sub>s</sub>				-1.5	A

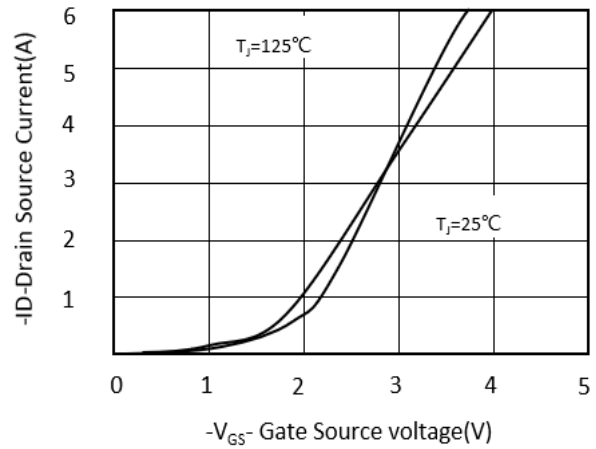
**Notes:**

- The Power dissipation  $P_D$  is based on  $T_{J(MAX)}=150^{\circ}\text{C}$ , using  $\leq 10s$  junction-to ambient thermal resistance.
- Repetitive rating, pulse width limited by junction temperature  $T_{J(MAX)}=150^{\circ}\text{C}$ . Ratings are based on low frequency and duty cycles to keep initial  $T_J=25^{\circ}\text{C}$ .
- The Static characteristics in Figures are obtained using  $<300\mu s$  pulses, duty cycle 2% max.

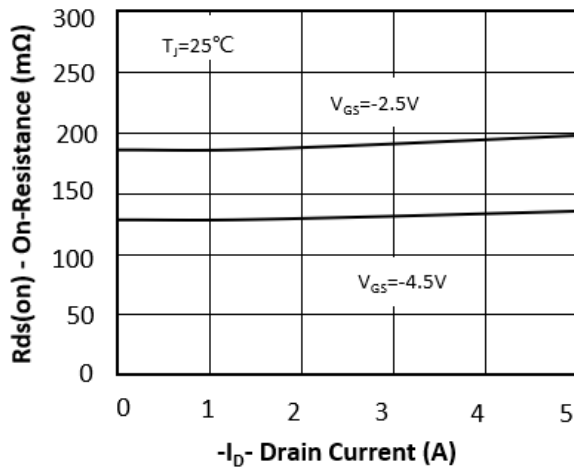
## Typical Electrical and Thermal Characteristics



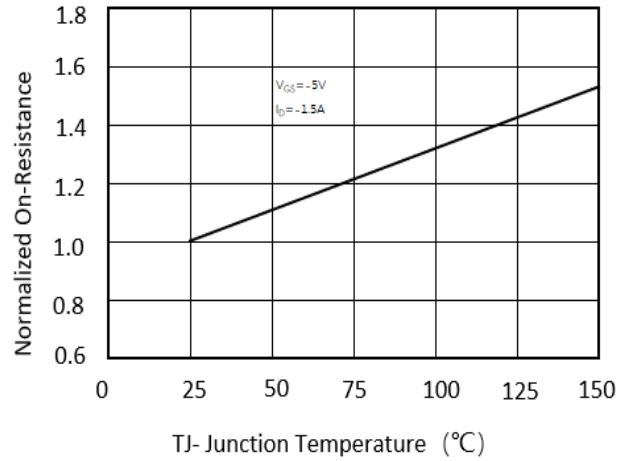
**Figure 1: On-region Characteristics**



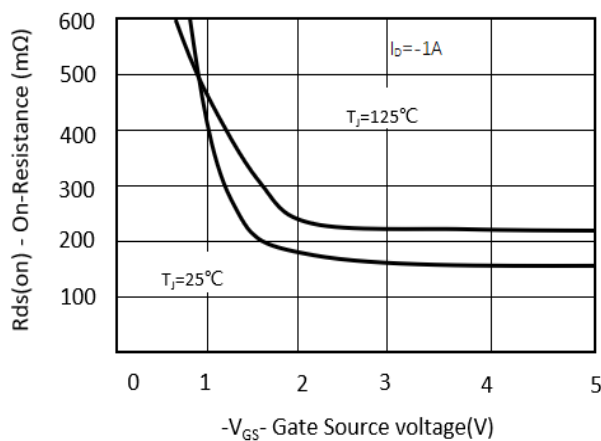
**Figure 2: Transfer Characteristics**



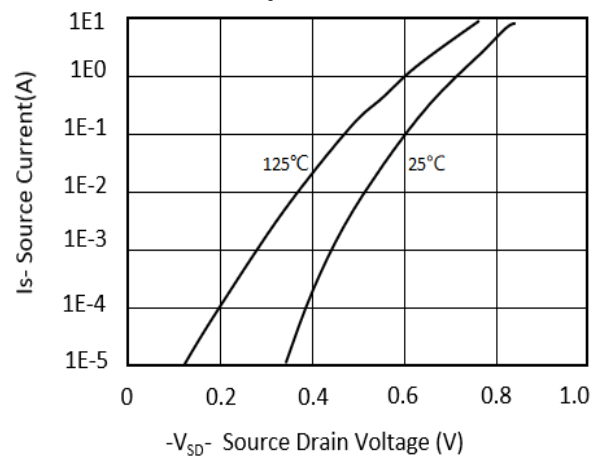
**Figure 3: Drain-Source On-Resistance**



**Figure 4: On-Resistance vs. Junction Temperature**



**Figure 5: On-Resistance vs. Gate-Source Voltage**



**Figure 6: Body-Diode Characteristics**

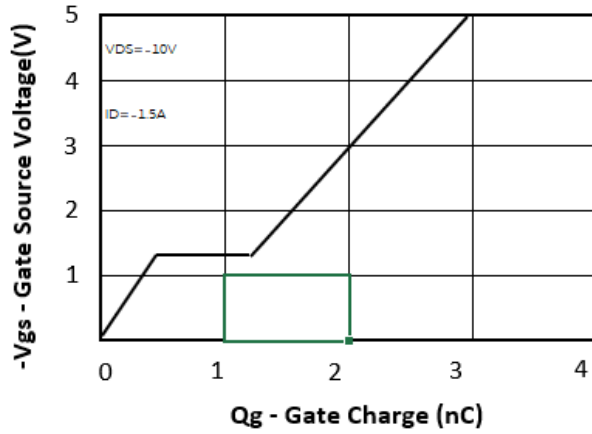


Figure 7: Gate-Charge Characteristics

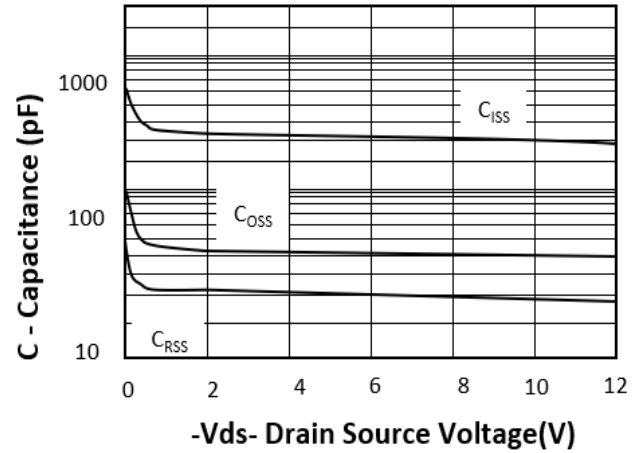


Figure 8: Capacitance Characteristics

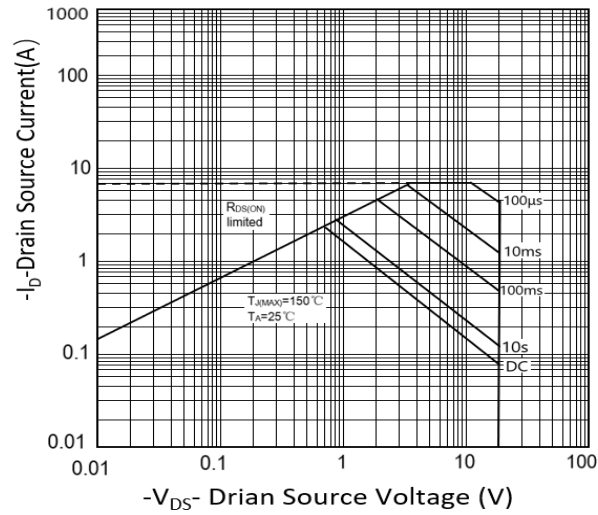


Figure 9: Safe Operation Area

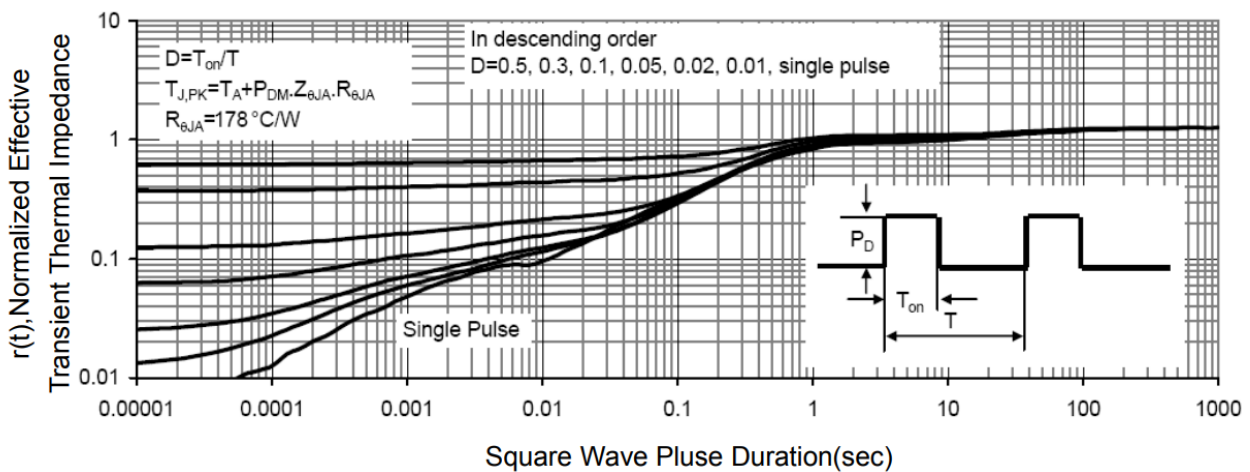
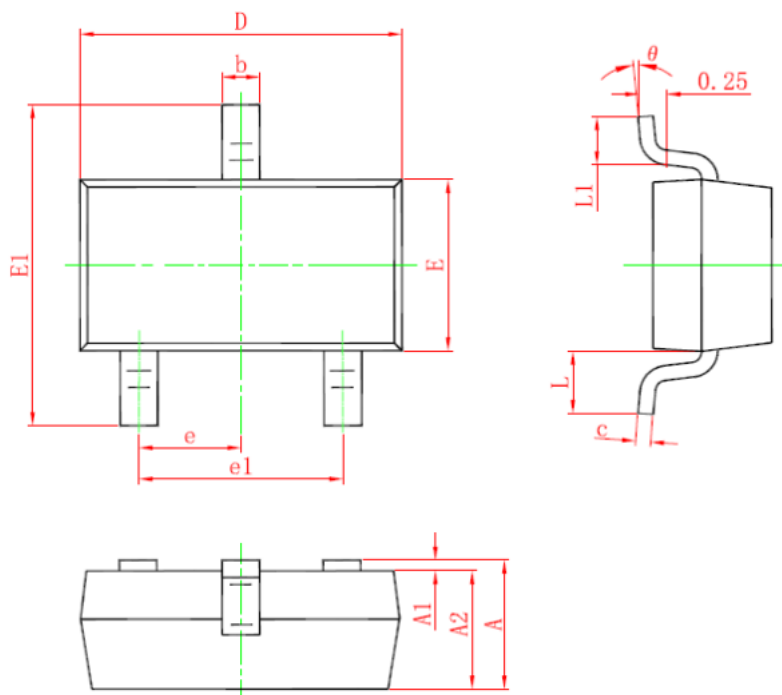


Figure 10: Normalized Maximum transient Thermal Impedance

## SOT-23 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
$\theta$	0°	8°	0°	8°

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