



# 100V 110mΩ N-Ch Power MOSFET

## Features

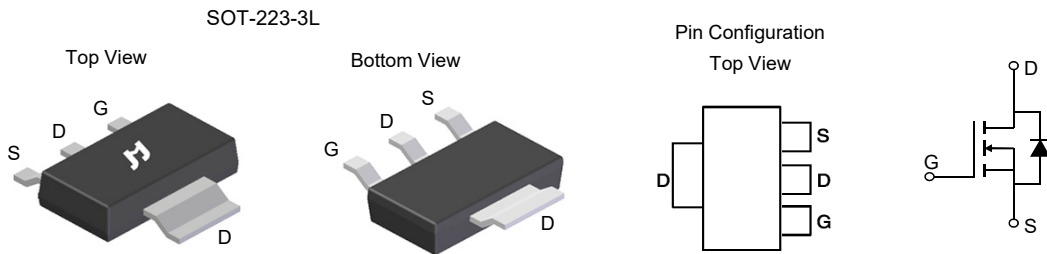
- Low Gate Charge
- Fast Switching
- 100% UIS Tested, 100% R<sub>g</sub> Tested
- Pb-free Lead Plating
- Halogen-free and RoHS-compliant

## Product Summary

Parameter	Value	Unit
V <sub>DS</sub>	100	V
V <sub>GS(th)_Typ</sub>	1.9	V
I <sub>D</sub> (@ V <sub>GS</sub> = 10V) <sup>(1)</sup>	5.9	A
R <sub>DS(ON)_Typ</sub> (@ V <sub>GS</sub> = 10V)	110	mΩ
R <sub>DS(ON)_Typ</sub> (@ V <sub>GS</sub> = 4.5V)	137	mΩ

## Applications

- Power Management in Computing, CE, IE 4.0, Communications
- Current Switching in DC/DC & AC/DC (SR) Sub-systems
- Load Switching, Quick/Wireless Charging, Motor Driving

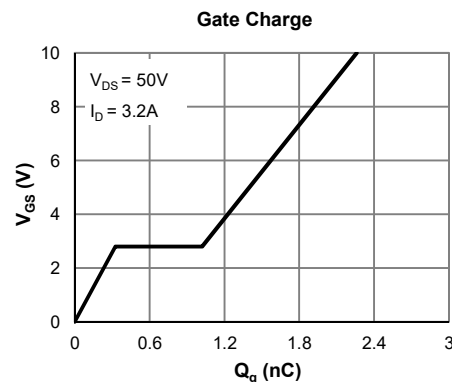
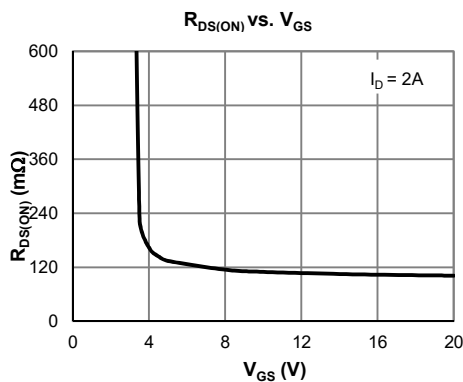


## Ordering Information

Device	Package	# of Pins	Marking	MSL	T <sub>J</sub> (°C)	Media	Quantity (pcs)
JMSL10130AY-13	SOT-223-3L	3	L10130A	3	-55 to 150	13-inch Reel	4000

## Absolute Maximum Ratings (@ T<sub>A</sub> = 25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V <sub>DS</sub>	100	V
Gate-to-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current <sup>(1)</sup>	I <sub>D</sub>	T <sub>C</sub> = 25°C	5.9
		T <sub>C</sub> = 100°C	3.7
Pulsed Drain Current <sup>(2)</sup>	I <sub>DM</sub>	24	A
Avalanche Current <sup>(3)</sup>	I <sub>AS</sub>	4.3	A
Avalanche Energy <sup>(3)</sup>	E <sub>AS</sub>	0.9	mJ
Power Dissipation <sup>(4)</sup>	P <sub>D</sub>	T <sub>C</sub> = 25°C	8.3
		T <sub>C</sub> = 100°C	3.3
Junction & Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to 150	°C



**Electrical Characteristics** (@  $T_J = 25^\circ\text{C}$  unless otherwise specified)

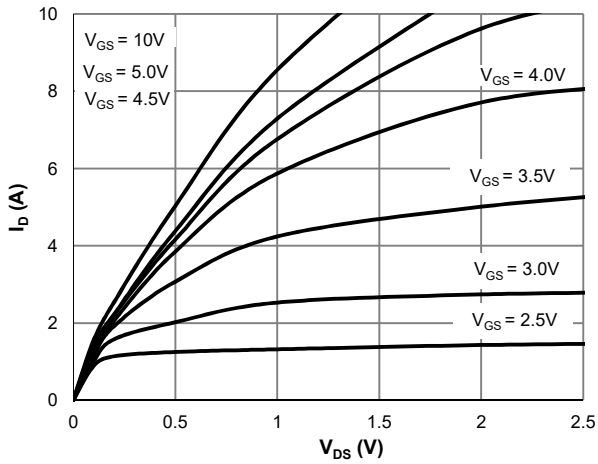
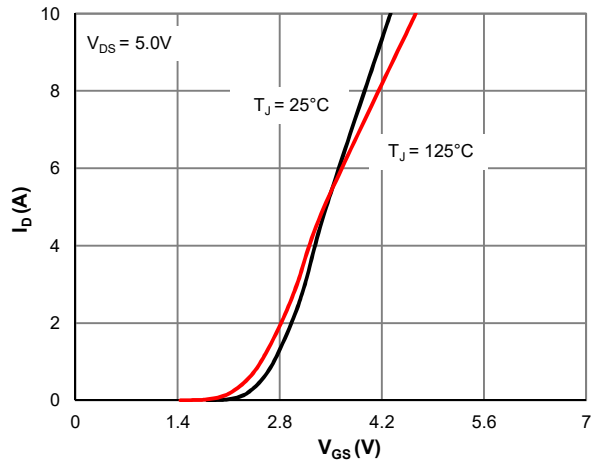
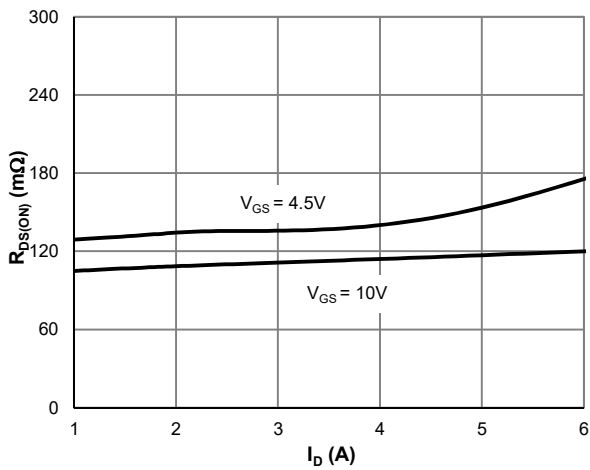
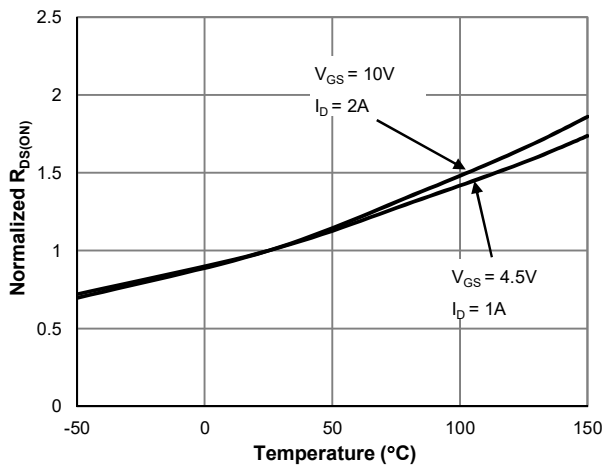
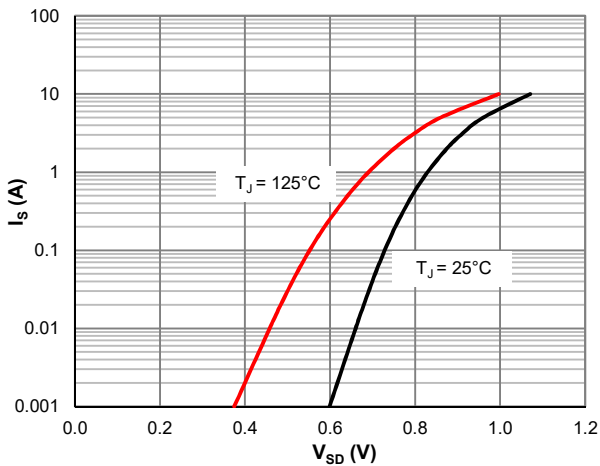
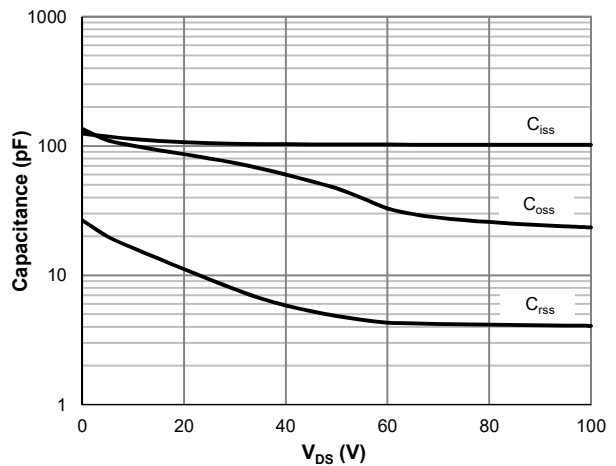
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>STATIC PARAMETERS</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$	100			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 80\text{V}, V_{GS} = 0\text{V}$ $T_J = 55^\circ\text{C}$			1.0 5.0	$\mu\text{A}$
Gate-Body Leakage Current	$I_{GSS}$	$V_{DS} = 0\text{V}, V_{GS} = \pm 20\text{V}$			$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	1.2	1.9	3.0	V
Static Drain-Source ON-Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{V}, I_D = 3.2\text{A}$		110	138	$\text{m}\Omega$
		$V_{GS} = 4.5\text{V}, I_D = 2.7\text{A}$		137	180	$\text{m}\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS} = 5\text{V}, I_D = 2\text{A}$		4.1		S
Diode Forward Voltage	$V_{SD}$	$I_S = 1\text{A}, V_{GS} = 0\text{V}$		0.70	1.0	V
Diode Continuous Current	$I_S$	$T_C = 25^\circ\text{C}$			8	A
<b>DYNAMIC PARAMETERS</b> <sup>(5)</sup>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{V}, V_{DS} = 50\text{V}, f = 1\text{MHz}$		103		pF
Output Capacitance	$C_{oss}$			47		pF
Reverse Transfer Capacitance	$C_{rss}$			4.9		pF
Gate Resistance	$R_g$	$V_{GS} = 0\text{V}, V_{DS} = 0\text{V}, f = 1\text{MHz}$		2.6		$\Omega$
<b>SWITCHING PARAMETERS</b> <sup>(5)</sup>						
Total Gate Charge (@ $V_{GS} = 10\text{V}$ )	$Q_g$	$V_{GS} = 0 \text{ to } 10\text{V}$ $V_{DS} = 50\text{V}, I_D = 3.2\text{A}$		2.3		nC
Total Gate Charge (@ $V_{GS} = 4.5\text{V}$ )	$Q_g$			1.3		nC
Gate Source Charge	$Q_{gs}$			0.3		nC
Gate Drain Charge	$Q_{gd}$			0.7		nC
Turn-On Delay Time	$t_{D(on)}$	$V_{GS} = 10\text{V}, V_{DS} = 50\text{V}$ $R_L = 15.6\Omega, R_{GEN} = 6\Omega$		2.1		ns
Turn-On Rise Time	$t_r$			3.3		ns
Turn-Off Delay Time	$t_{D(off)}$			7.5		ns
Turn-Off Fall Time	$t_f$			3.2		ns
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = 3.2\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$		21		ns
Body Diode Reverse Recovery Charge	$Q_{rr}$	$I_F = 3.2\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$		8.0		nC

**Thermal Performance**

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	55	66	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	11.5	15.0	$^\circ\text{C}/\text{W}$

**Notes:**

1. Computed continuous current assumes the condition of  $T_{J\_Max}$  while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under  $T_{J\_Max} = 150^\circ\text{C}$ .
3. This single-pulse measurement was taken under the following condition [ $L = 100\mu\text{H}, V_{GS} = 10\text{V}, V_{DS} = 50\text{V}$ ] while its value is limited by  $T_{J\_Max} = 150^\circ\text{C}$ .
4. The power dissipation  $P_D$  is based on  $T_{J\_Max} = 150^\circ\text{C}$ .
5. This value is guaranteed by design hence it is not included in the production test.

**Typical Electrical & Thermal Characteristics**

**Figure 1: Saturation Characteristics**

**Figure 2: Transfer Characteristics**

**Figure 3:  $R_{DS(ON)}$  vs. Drain Current**

**Figure 4:  $R_{DS(ON)}$  vs. Junction Temperature**

**Figure 5: Body-Diode Characteristics**

**Figure 6: Capacitance Characteristics**

Typical Electrical & Thermal Characteristics

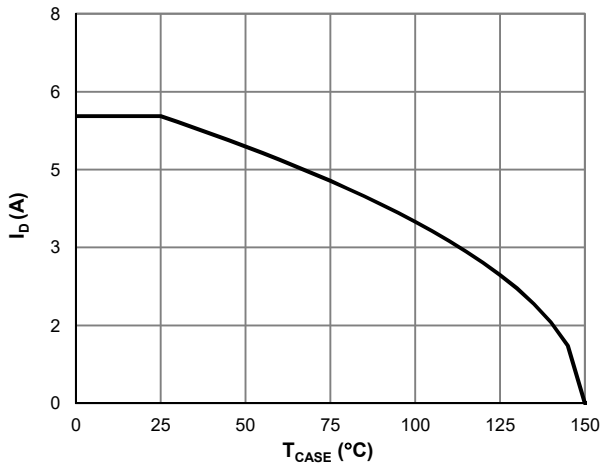


Figure 7: Current De-rating

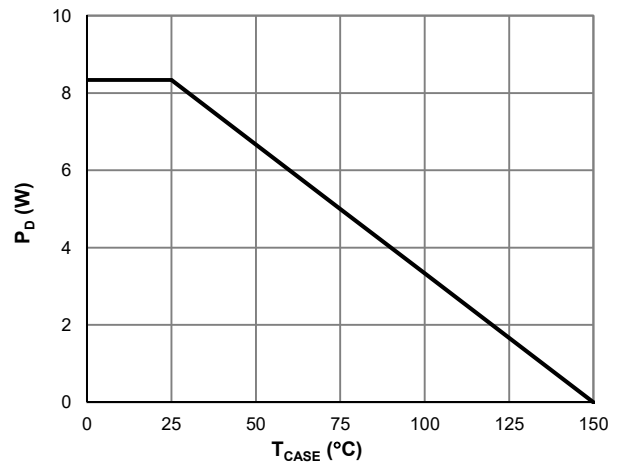


Figure 8: Power De-rating

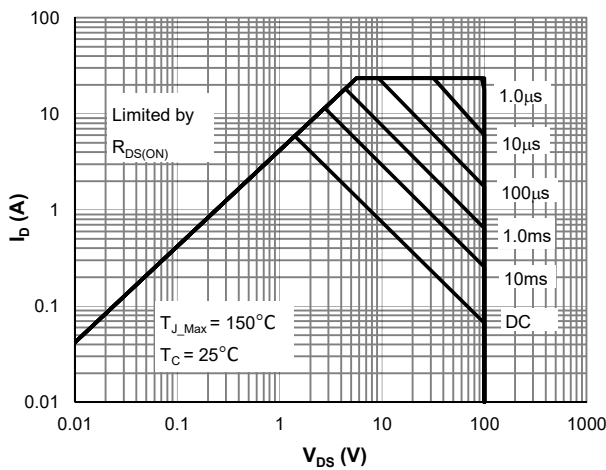


Figure 9: Maximum Safe Operating Area

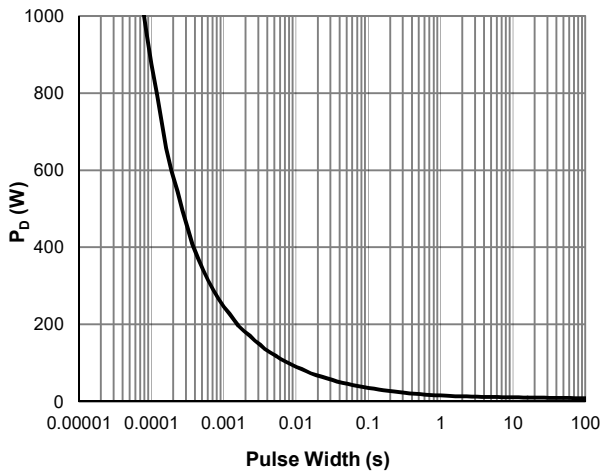


Figure 10: Single Pulse Power Rating, Junction-to-Case

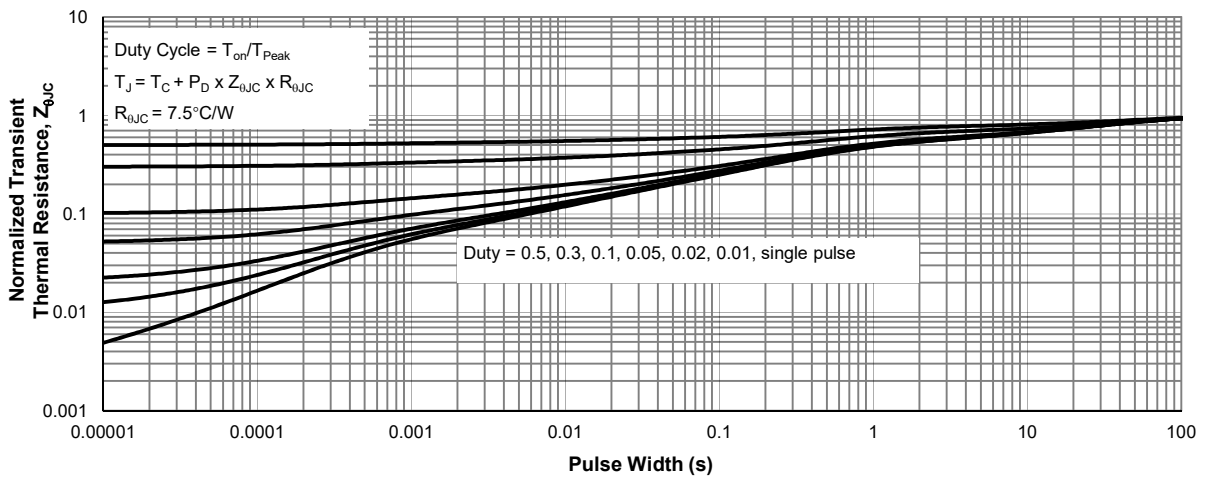
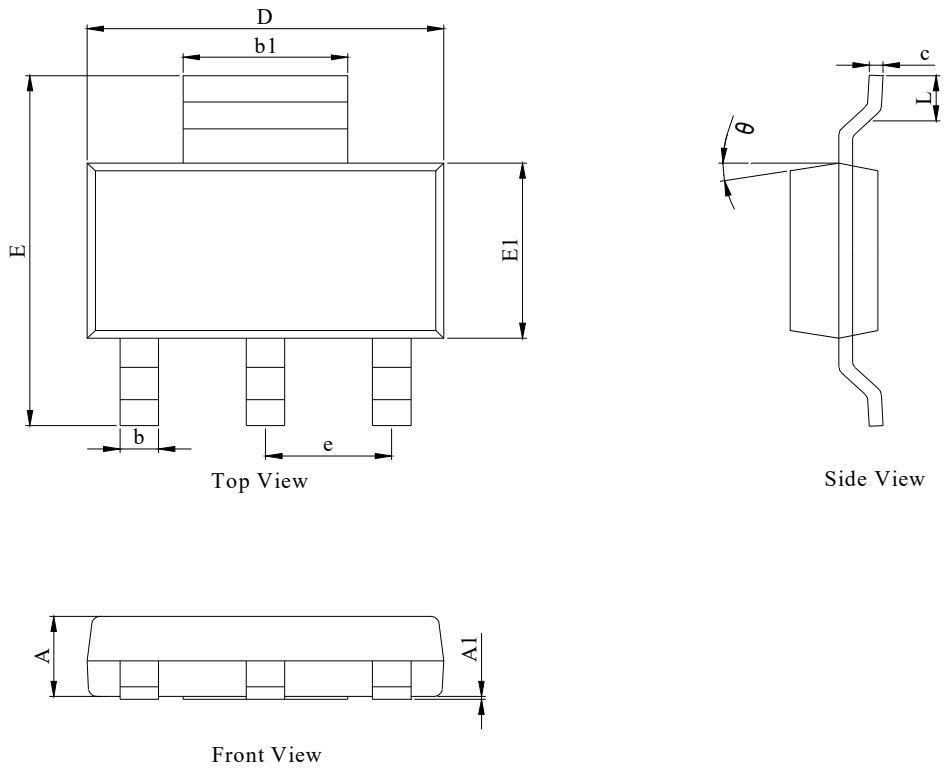


Figure 11: Normalized Maximum Transient Thermal Impedance

**SOT-223-3L Package Information**
**Package Outline**


DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	1.50	1.60	1.80
A1	0.01	0.06	0.10
b	0.60	0.70	0.80
b1	2.90	3.00	3.10
D	6.30	6.50	6.70
E	6.70	7.00	7.30
E1	3.30	3.50	3.70
c	0.22	0.26	0.32
L	0.70	0.90	1.10
e	2.30 BSC		
$\theta$	-	-	10°

**Recommended Soldering Footprint**
