P-Channel Enhancement Mode Field Effect Transistor

■ General Description

Product Summary		
V_{DSS}	I_D	$R_{DS(ON)}$(mΩ)TYP
-20V	-3.6A	95 @ VGS=-4.5V
		115@ VGS=-2.5V

■ Features

- Super high dense cell design for low $R_{DS(ON)}$
- Rugged and reliable
- Simple drive requirement
- SOT-23-3L/B package

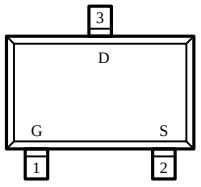
■ Package

- **SOT-23-3L/B**

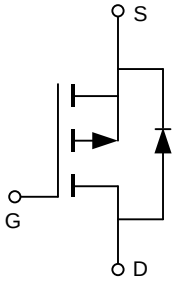
■ Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
LN2301	-55°C to +150°C	SOT-23-3L/B	3000

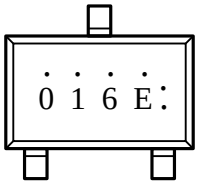
■ Pin Configuration



SOT-23-3L/B
(TOP VIEW)



■ Marking Rule



SOT-23-3L
(TOP VIEW)

Notes: "• "represents the batch number. "• "says" 1 ", dot not said "0"; For example: dot on the top of the "6", and the top right of the "E", said "010010", used to track the product batch.

■ Absolute Maximum Ratings

(TA=25℃ unless otherwise noted)

parameter	symbol	limit	unit
Drain-source voltage	V_{DS}	-20	V
Gate-source voltage	V_{GS}	±12	V
Drain current-continuous[a]@Tj=125℃	I_D	-3.6	A
-pulse *d*[b]	I_{DM}	-11	A
Drain-source Diode forward current	Is	-1.25	A
Maximum power dissipation	P_D	1.25	W
Operating junction Temperature range	Tj	-55—150	℃

■ Electrical Characteristics

(TA=25℃ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF Characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0V, I_D=-250μA	-20	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=-16V, V_{GS}=0V	-	-	-1	μA
Gate-body leakage	I_{GSS}	V_{DS}=0V, V_{GS}=±10V	-	-	±100	nA
ON Characteristics						
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-0.5	-0.8	-1.5	V
Drain-source on-state resistance	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-2.8A	-	95	110	mΩ
		V_{GS}=-2.5V, I_D=-2.0A	-	115	145	
Forward transconductance	gfs	V_{GS}=-5V, I_D=-5A	-	5	-	S
Dynamic Characteristics						
Input capacitance	C_{ISS}	V_{DS}=-10V ,V_{GS}=0V f=1.0MHz	-	586	-	pF
Output capacitance	C_{OSS}		-	101	-	
Reverse transfer capacitance	C_{RSS}		-	59	-	
Switching Characteristics						
Turn-on delay time	$t_{D(ON)}$	V_{DD}=-10V I_D=-2.8A V_{GEN}=-4.5V R_L=10ohm R_{GEN}=-60ohm	-	6.5	-	ns
Rise time	tr		-	32.1	-	
Turn-off delay time	$t_{D(OFF)}$		-	58.4	-	
Fall time	tf		-	48	-	
Total gate charge	Qg	V_{DS}=-10V,I_D=-3A V_{GS}=-4.5V	-	6	-	nC
Gate-source charge	Qgs		-	1.35	-	
Gate-drain charge	Qgd		-	1.5	-	
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode forward voltage	V_{SD}	V_{GS}=0V,Is=-1.25A	-	-0.81	-1.2	V

Notes:

a. surface mounted on FR4 board,t≤10sec

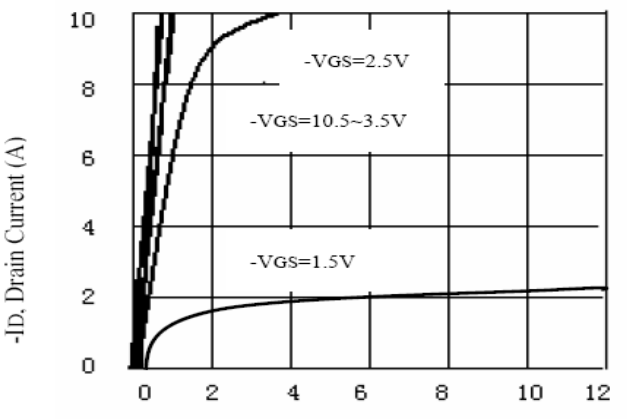
b. pulse test: pulse width≤300μs,duty≤2%

c. guaranteed by design, not subject to production testing

■ Thermal Characteristics

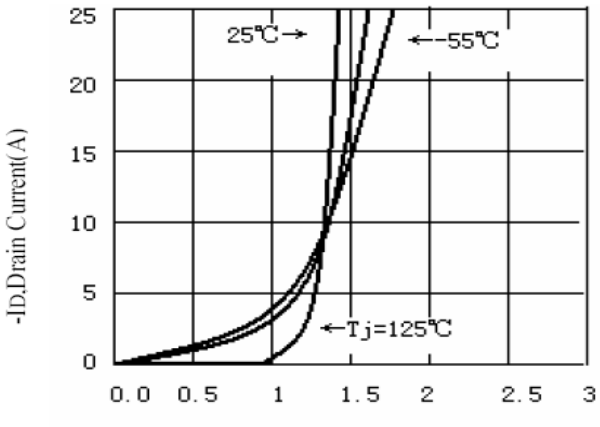
Thermal Resistance junction-to ambient	Rth JA	100	℃/W

■ Typical Performance Characteristics



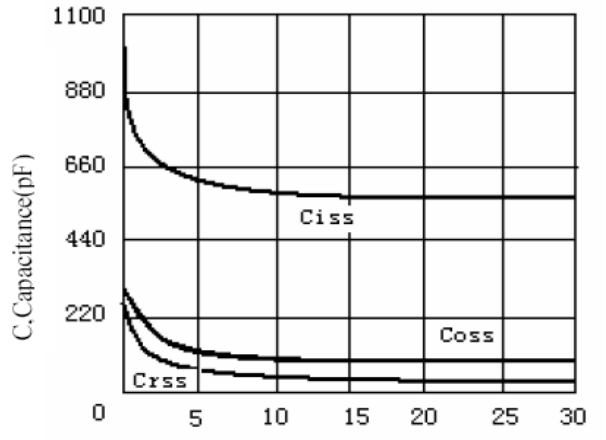
- VDS, Drain-to-Source Voltage (V)

Figure 1. Output Characteristics



-VGS, Gate-to-source Voltage (V)

Figure 2. Transfer Characteristics



- VGS, Drain-to Source Voltage

Figure3. Capacitance

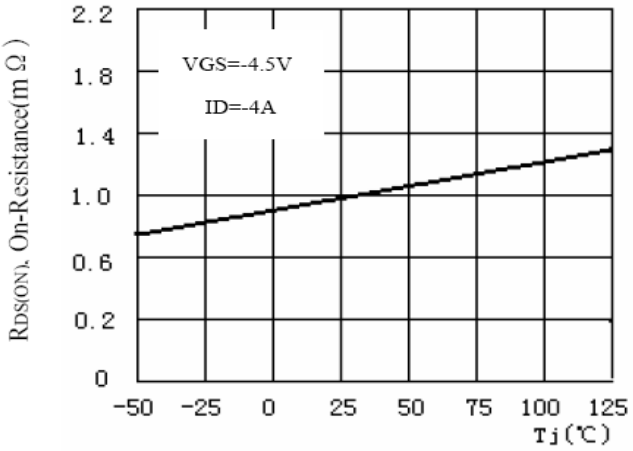
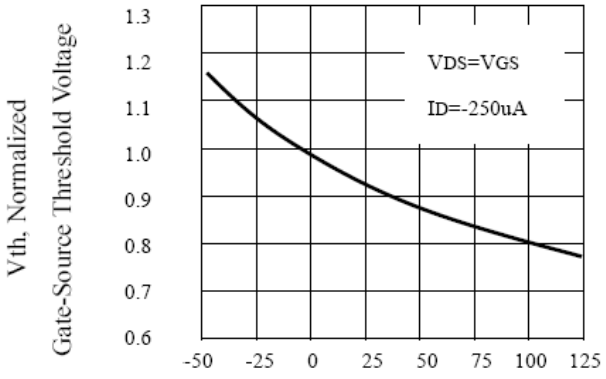
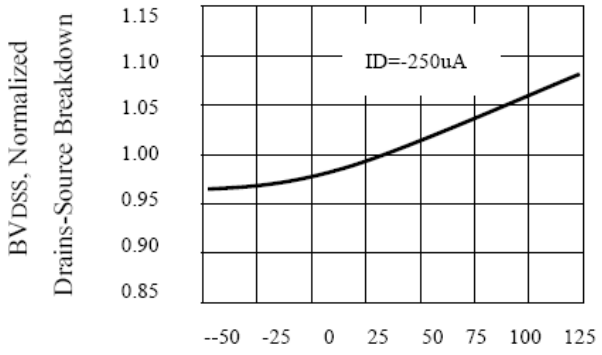


Figure4. On-Resistance Variation with Temperature



Tj,. Junction Temperature(℃)

Figure5.Gate Threshold Variation With Temperature



Tj, .Junction Temperature (℃)

Figure6.Breakdown Voltage Variation With Temperature

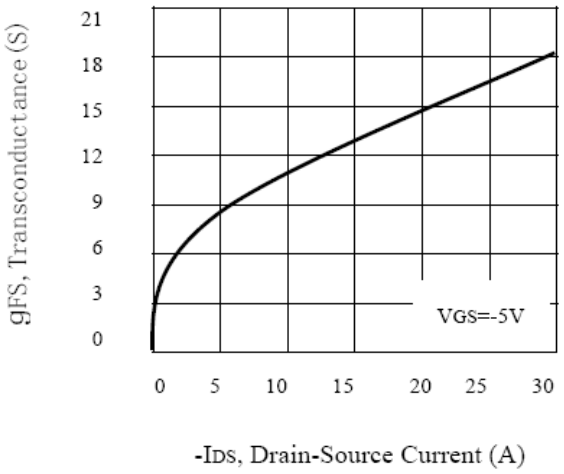


Figure7.Transconductance Variation With Drain Current

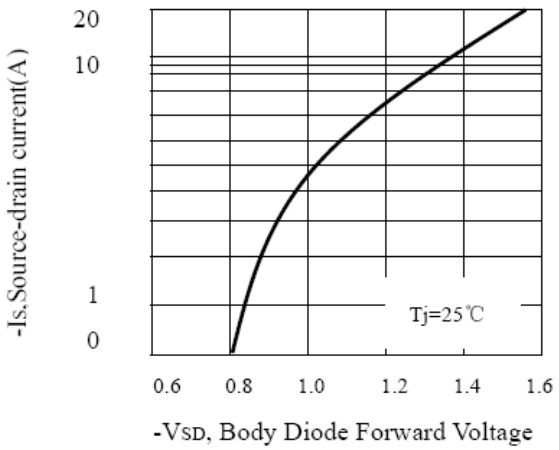


Figure8.Body Diode Forward Voltage Variation with Source Current

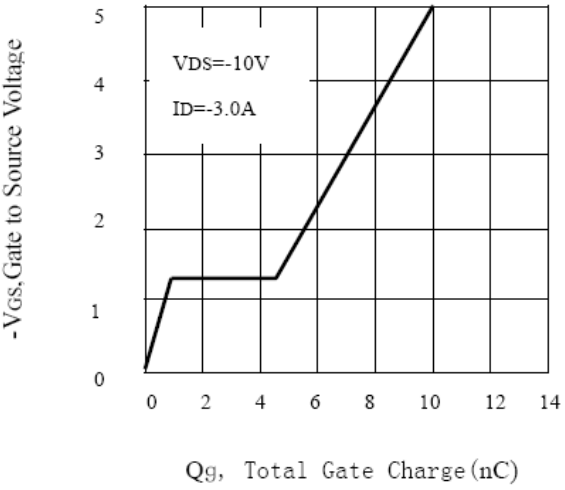


Figure9. Gate Charge

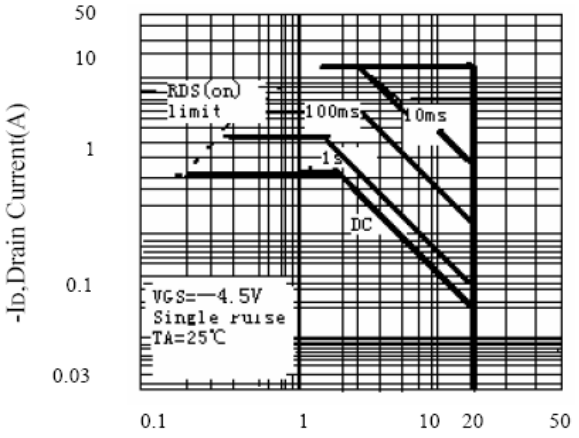
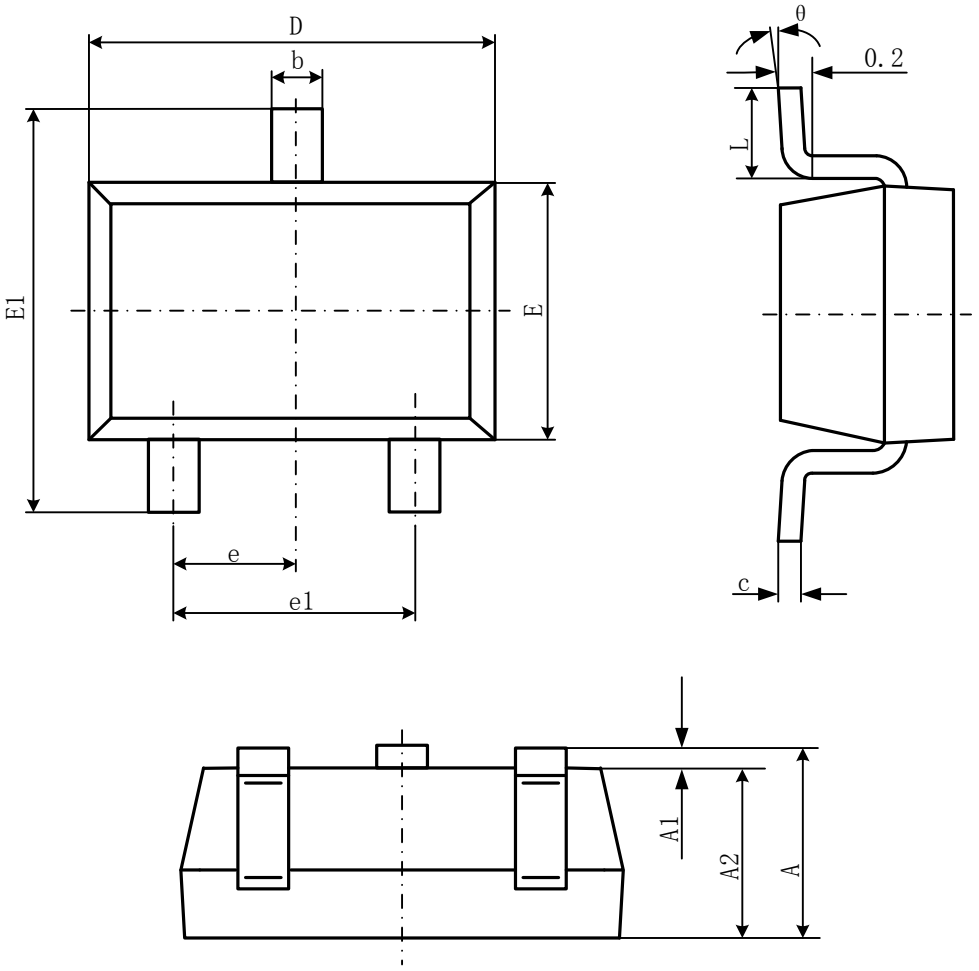


Figure10.Maximum Safe Operating Area

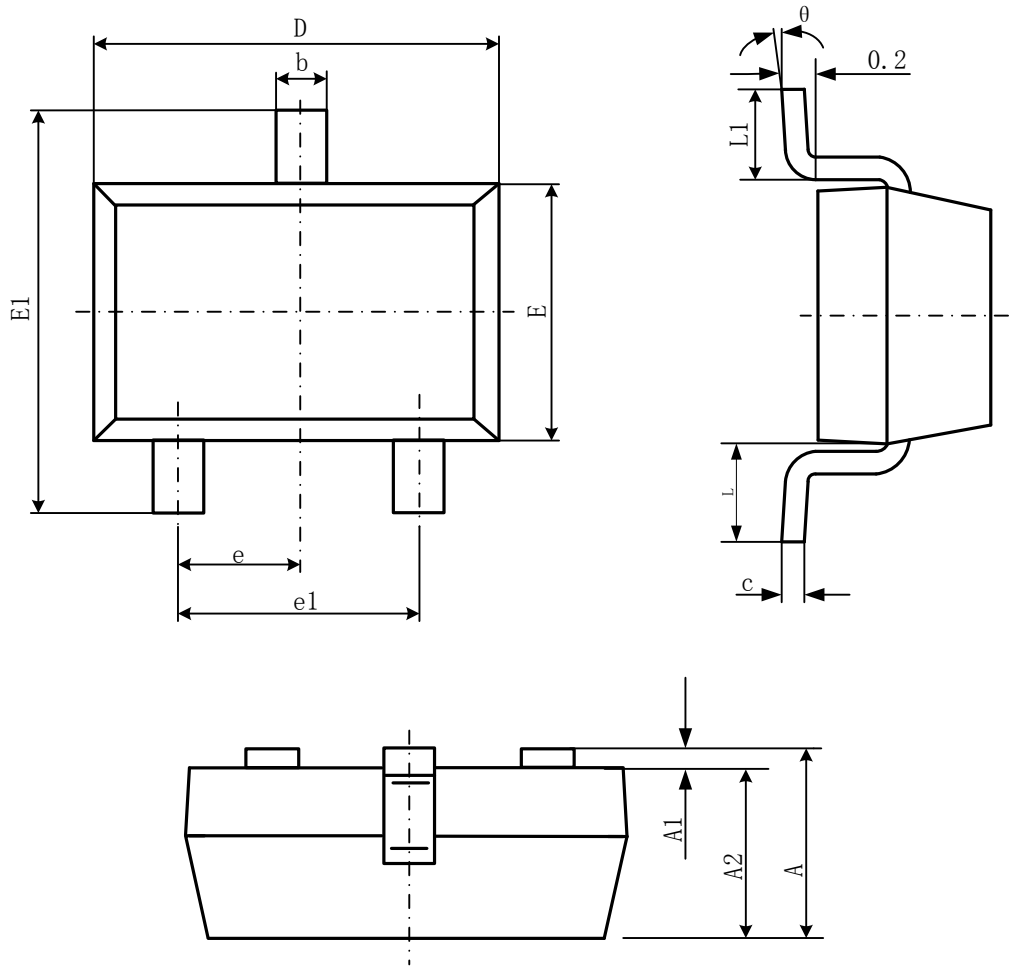
■ 封装形式

- **SOT-23-3L**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

- **SOT-23-3B**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.041	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.041	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	1.500	1.700	0.059	0.067
E1	2.250	2.550	0.089	0.100
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°