N-Channel Enhancement Mode Field Effect Transistor

■ General Description

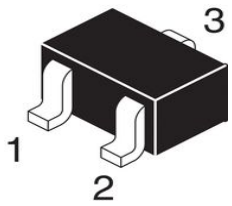
Product Summary		
V_{DSS}	I_D	$R_{DS(ON)}$(mΩ)TYP
20V	3.6A	33 @ VGS= 4.5V
		52 @ VGS= 2.5V

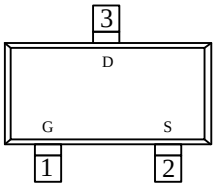
■ Features

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

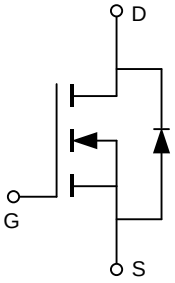
■ Package

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





SOT-23-3L/B
(Top View)



■ Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
LN2300	-55°C to +150°C	SOT-23-3L/B	3000

■ Absolute Maximum Ratings

(TA=25℃ unless otherwise noted)

parameter	symbol	limit	unit
Drain-source voltage	V_{DS}	20	V
Gate-source voltage	V_{GS}	±8	V
Drain current-continuous[a]@Tj=125℃-pulse [b]	I_D	3.6	A
	I_{DM}	12	A
Drain-source Diode forward current	Is	1.25	A
Maximum power dissipation	P_D	1.25	W
Operating junction Temperature range	T_j	-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}=±8V			±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		33	45	mΩ
		V_{GS}=2.5V, I_D=2.0A		52	60	
Forward transconductance	g_{fs}	V_{GS}=7V, I_D=5A		5		S
Dynamic Characteristics						
Input capacitance	C_{ISS}	V_{DS}=10V ,V_{GS}=0V f=1.0MHz		608		pF
Output capacitance	C_{OSS}			115		
Reverse transfer capacitance	C_{RSS}			86		
Switching Characteristics						
Turn-on delay time	$t_{D(ON)}$	V_{DD}=10V I_D=3.6A, V_{GEN}=4.5V R_L=10ohm R_{GEN}=10ohm		10		ns
Rise time	tr			14		
Turn-off delay time	$t_{D(OFF)}$			39		
Fall time	tf			26		
Total gate charge	Qg	V_{DS}=10V,I_D=3A V_{GS}=4.5V		9.2		nC
Gate-source charge	Qgs			1.6		
Gate-drain charge	Qgd			2.6		
Drain-Source Diode Characteristics						
Diode forward voltage	V_{SD}	V_{GS}=0V,Is=1.25A		0.84	1.3	V

Notes:

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

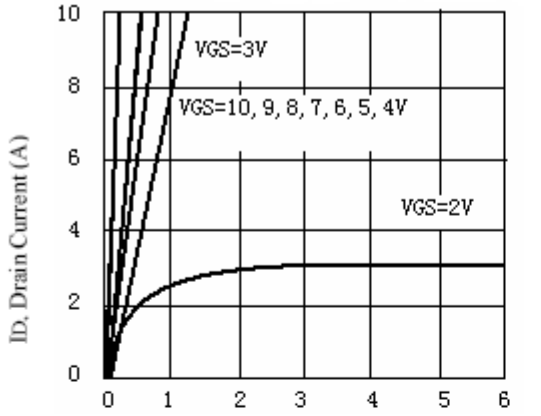
b. pulse test:pulse width≤300μs,duty≤2%

c. guaranteed by design, not subject to production testing

■ Thermal Characteristics

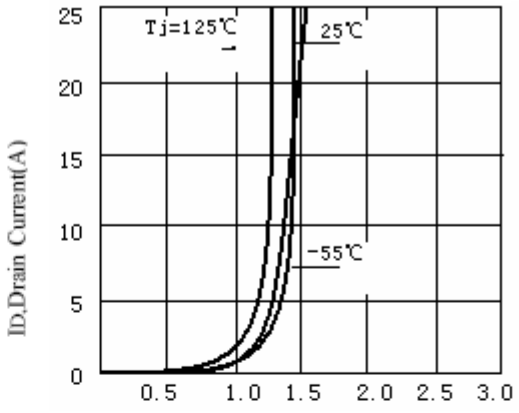
Thermal Resistance junction-to ambient	Rth JA	100	℃/W

■ Typical Performance Characteristics



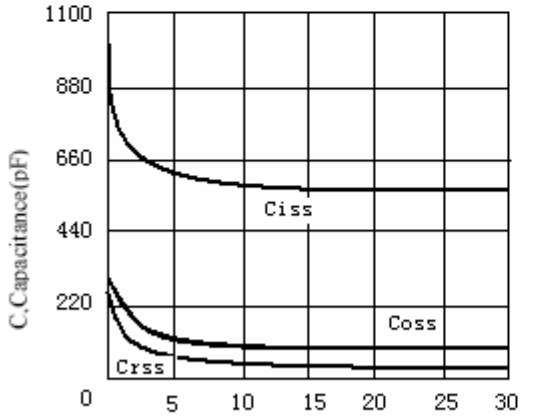
VDS, Drain-to-Source Voltage (V)

Figure 1. Output Characteristics



VGS, Gate-to-source Voltage (V)

Figure 2. Transfer Characteristics



VGS, Drain-to Source Voltage

Figure3. Capacitance

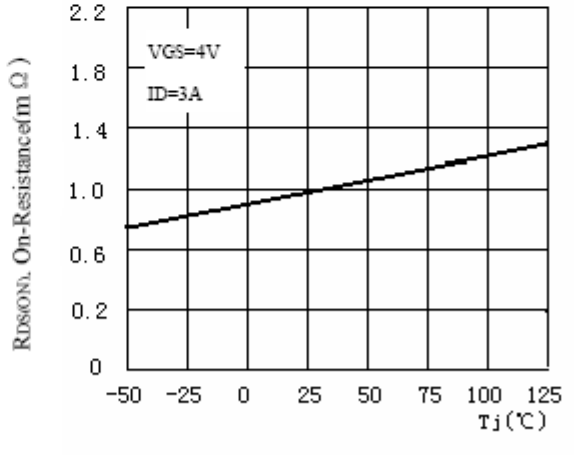
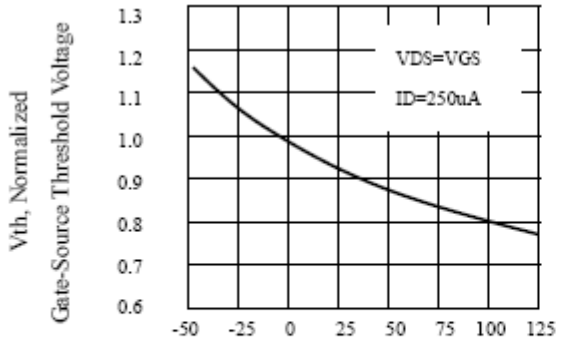
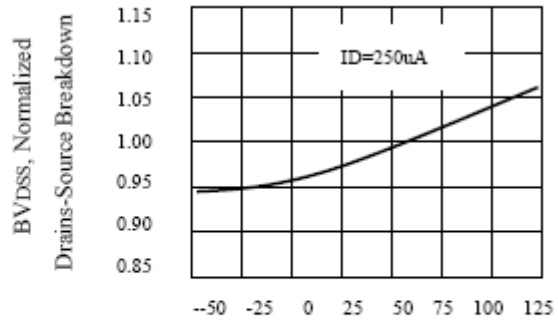


Figure4. On-Resistance Variation with Temperature



Tj,. Junction Temperature(℃)

Figure5.Gate Threshold Variation With Temperature



Tj, Junction Temperature (℃)

Figure6.Breakdown Voltage Variation With Temperature

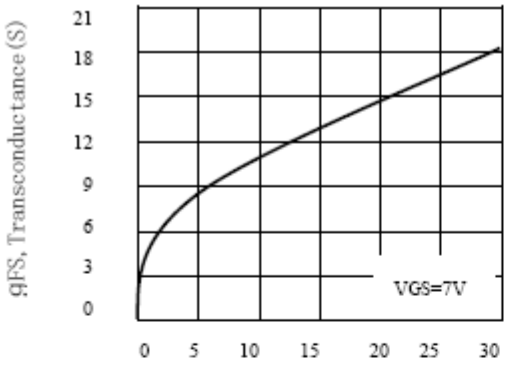


Figure7.Transconductance Variation With Drain Current

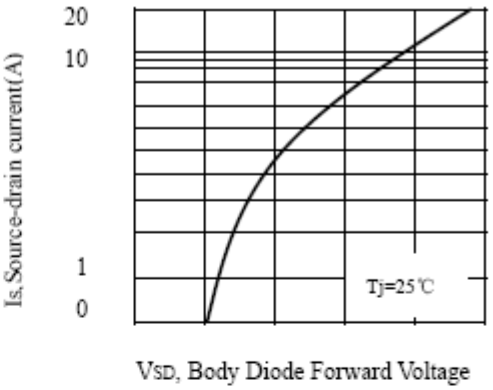


Figure8.Body Diode Forward Voltage Variation with Source Current

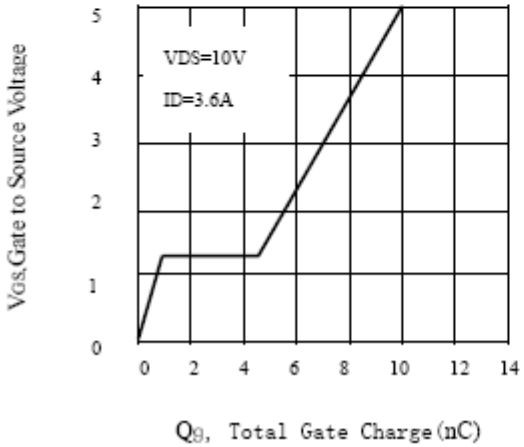


Figure9. Gate Charge

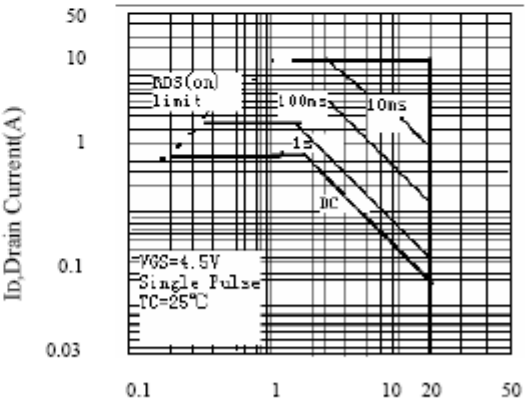
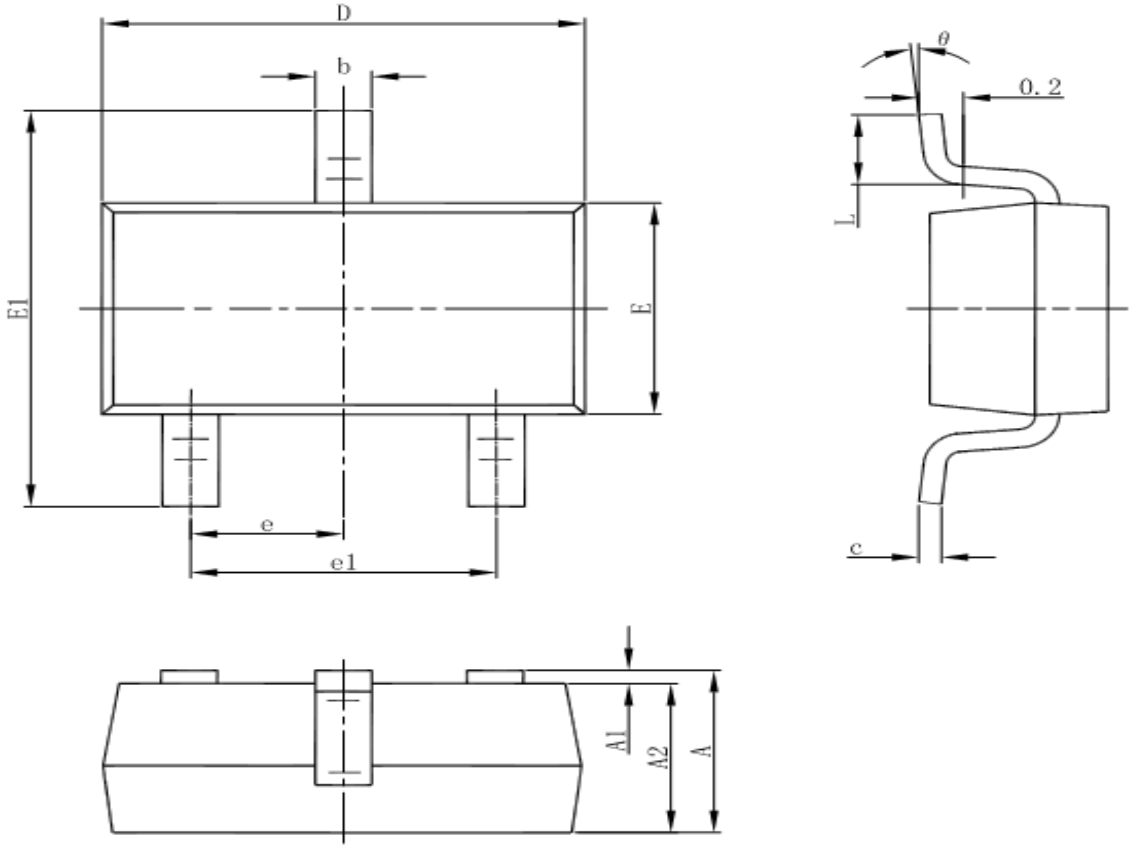


Figure10.Maximum Safe Operating Area

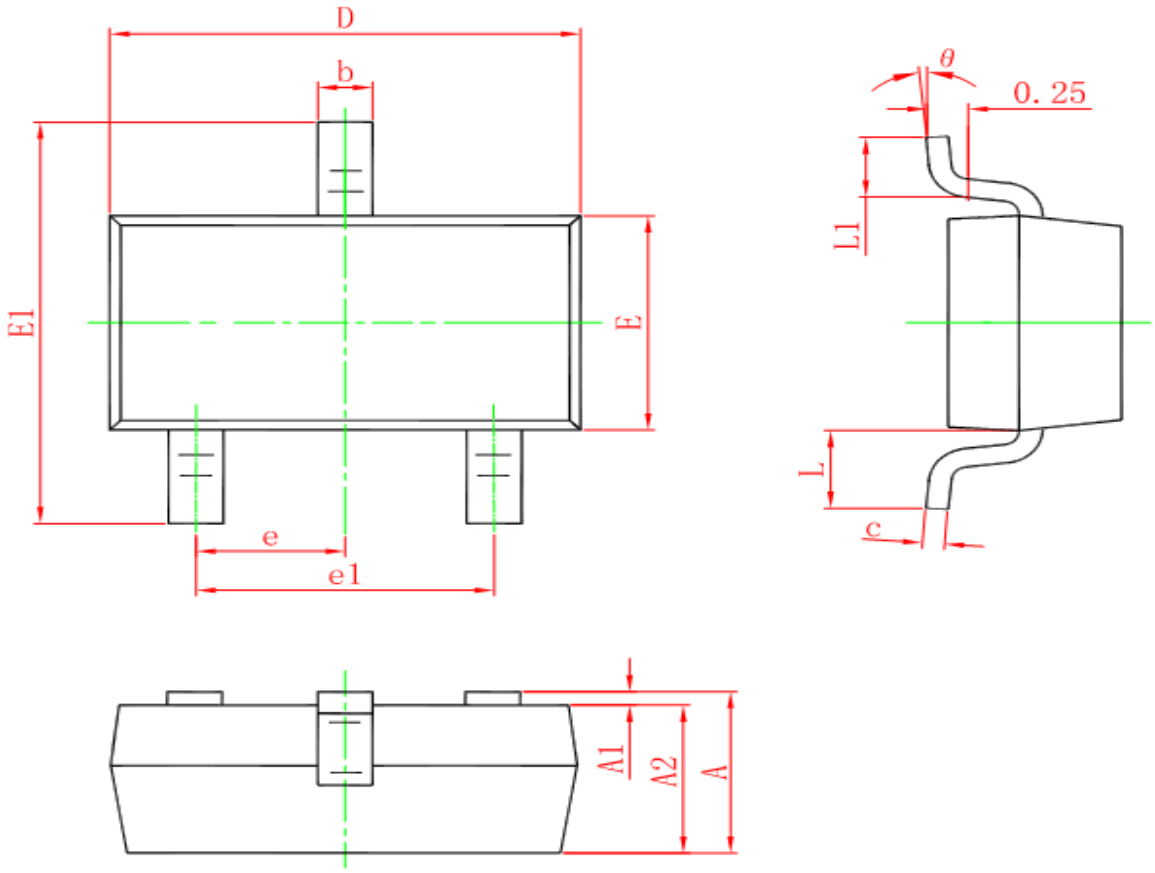
■ Package Information

- 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	0.035	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
θ	0°	8°	0°	8°