

N-Channel Enhancement Mode Field Effect Transistor

General Description

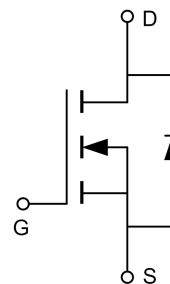
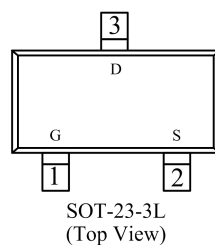
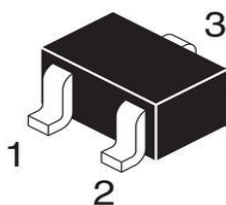
Product Summary		
V_{DS}	I_D	$R_{DS(ON)}(m\Omega)TYP$
30V	5.8A	28 @ $V_{GS}=10V$
	5A	31 @ $V_{GS}=4.5V$

Features

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

Package

- SOT-23-3L



Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
LN2310	-55°C to +150°C	SOT-23-3L	3000

Absolute Maximum Ratings

($T_A=25^\circ\text{C}$ unless otherwise noted)

parameter	symbol	limit	unit
Drain-source voltage	V_{DS}	30	V
Gate-source voltage	V_{GS}	± 20	V
Drain current-continuous ^a @ $T_j=125^\circ\text{C}$ -pulse ^b	I_D	5.8	A
	I_{DM}	30	A
Maximum power dissipation	P_D	1.25	W
Operating junction Temperature range	T_j	-55—150	$^\circ\text{C}$

■ Electrical Characteristics

(TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF Characteristics						
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	30			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =24V, V _{GS} =0V			-1	μA
Gate-body leakage	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
ON Characteristics						
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	-0.7	-1	-1.5	V
Drain-source on-state resistance	R _{DS(ON)}	V _{GS} =10V, I _D =5.8A		28	41	mΩ
		V _{GS} =4.5V, I _D =5A		31	45	
Forward transconductance	g _{fs}	V _{GS} =5V, I _D =5A		10		S
Dynamic Characteristics						
Input capacitance	C _{ISS}	V _{DS} =15V ,V _{GS} =0V f=1.0MHz		820		pF
Output capacitance	C _{OSS}			99		
Reverse transfer capacitance	C _{RSS}			77		
Switching Characteristics						
Turn-on delay time	t _{D(ON)}	V _{DD} =15V I _D =3.2A V _{GEN} =10V R _{GEN} =6ohm		3.3		ns
Rise time	tr			4.8		
Turn-off delay time	t _{D(OFF)}			26		
Fall time	tf			14		
Total gate charge	Qg	V _{DS} =15V,I _D =4A V _{GS} =4.5V		9.5		nC
Gate-source charge	Qgs			1.5		
Gate-drain charge	Qgd			3		
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode forward voltage	V _{SD}	V _{GS} =0V,I _S =1A		0.81	1.2	V

Notes:

- surface mounted on FR4 board, $t \leq 10\text{sec}$
- pulse test: pulse width $\leq 300\mu s$, duty $\leq 2\%$
- guaranteed by design, not subject to production testing

■ Thermal Characteristics

Thermal Resistance junction-to ambient	$R_{th JA}$	100	$^{\circ}C/W$
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Typical Performance Characteristics

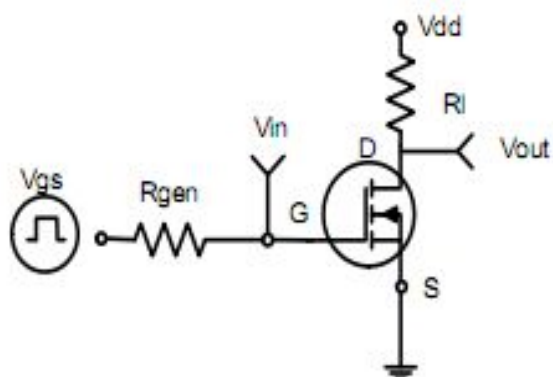


Figure 1: Switching Test Circuit

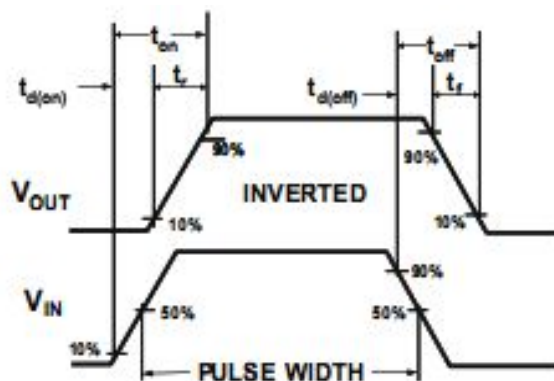


Figure 2: Switching Waveforms

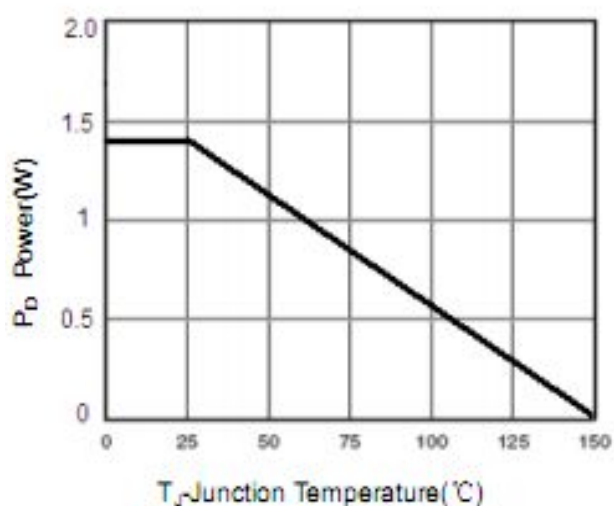


Figure 3 Power Dissipation

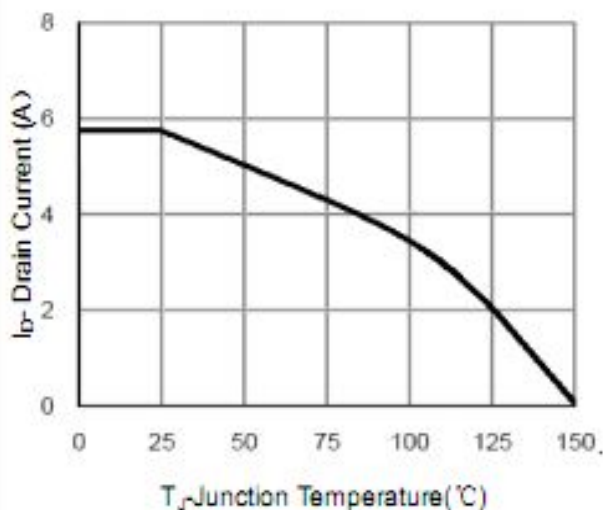


Figure 4 Drain Current

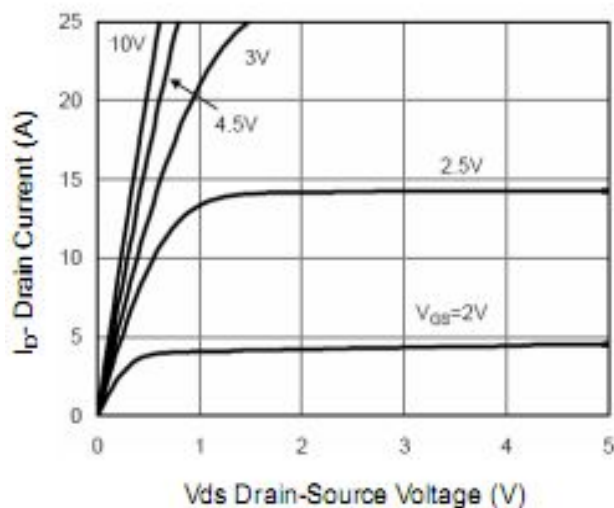


Figure 5 Output Characteristics

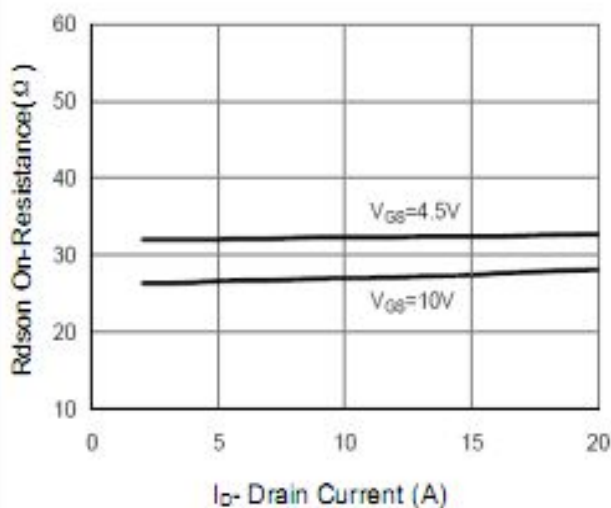


Figure 6 Drain-Source On-Resistance

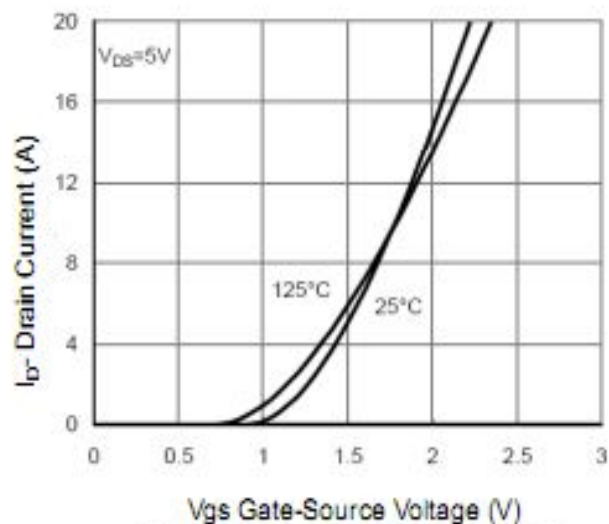


Figure 7 Transfer Characteristics

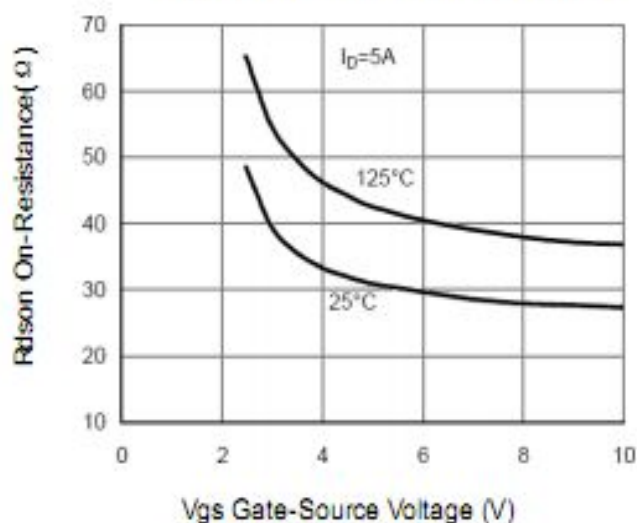


Figure 9 $R_{DS(on)}$ vs V_{GS}

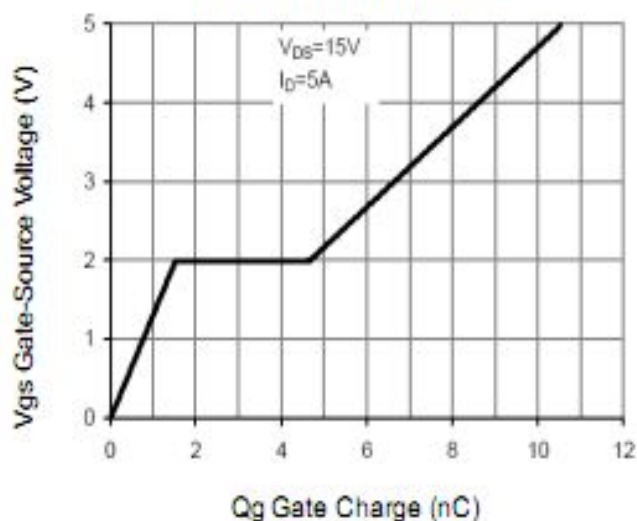


Figure 11 Gate Charge

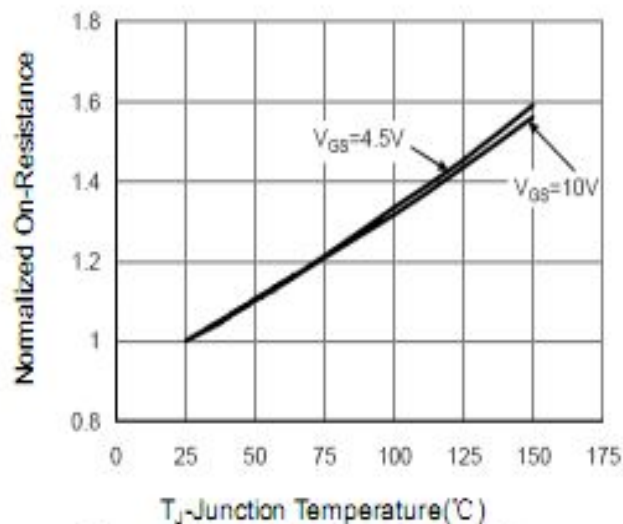


Figure 8 Drain-Source On-Resistance

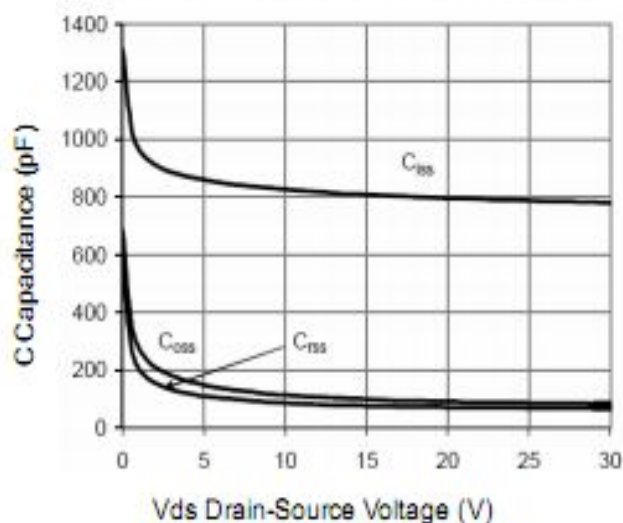


Figure 10 Capacitance vs V_{DS}

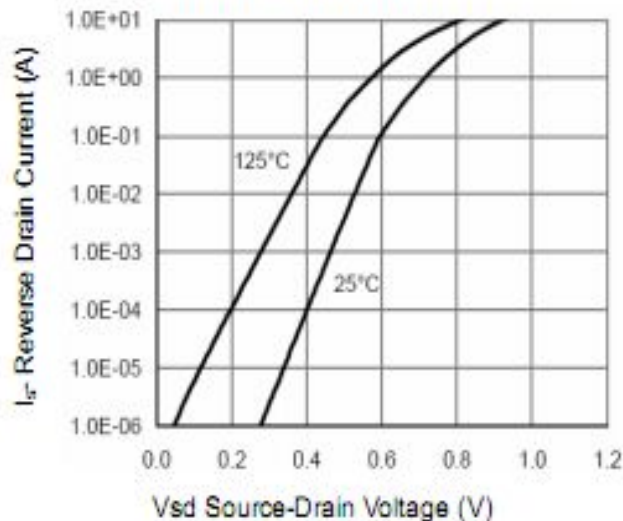


Figure 12 Source-Drain Diode Forward

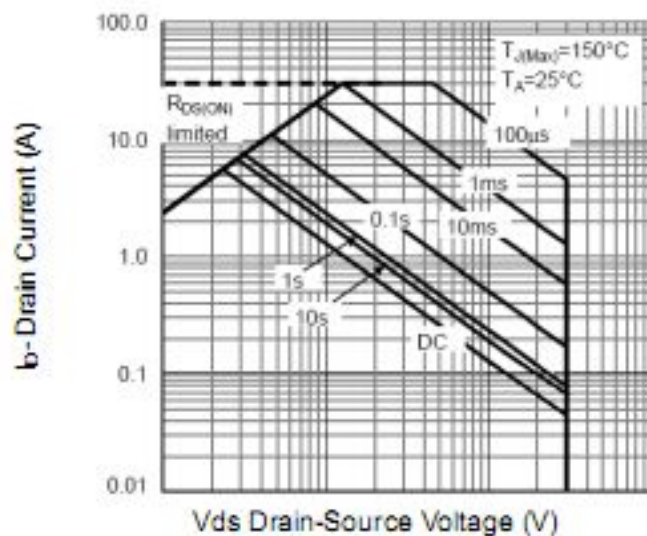


Figure 13 Safe Operation Area

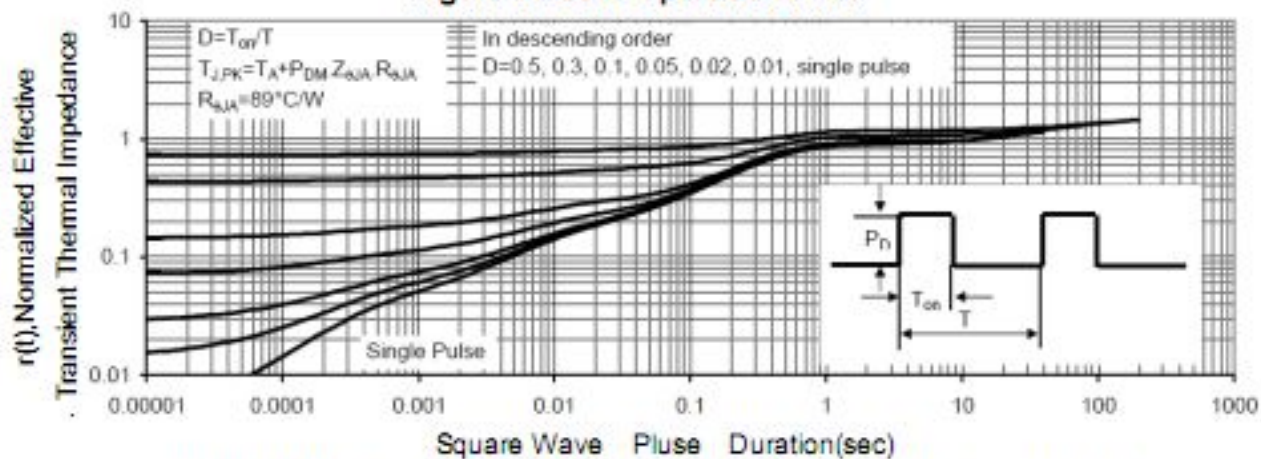
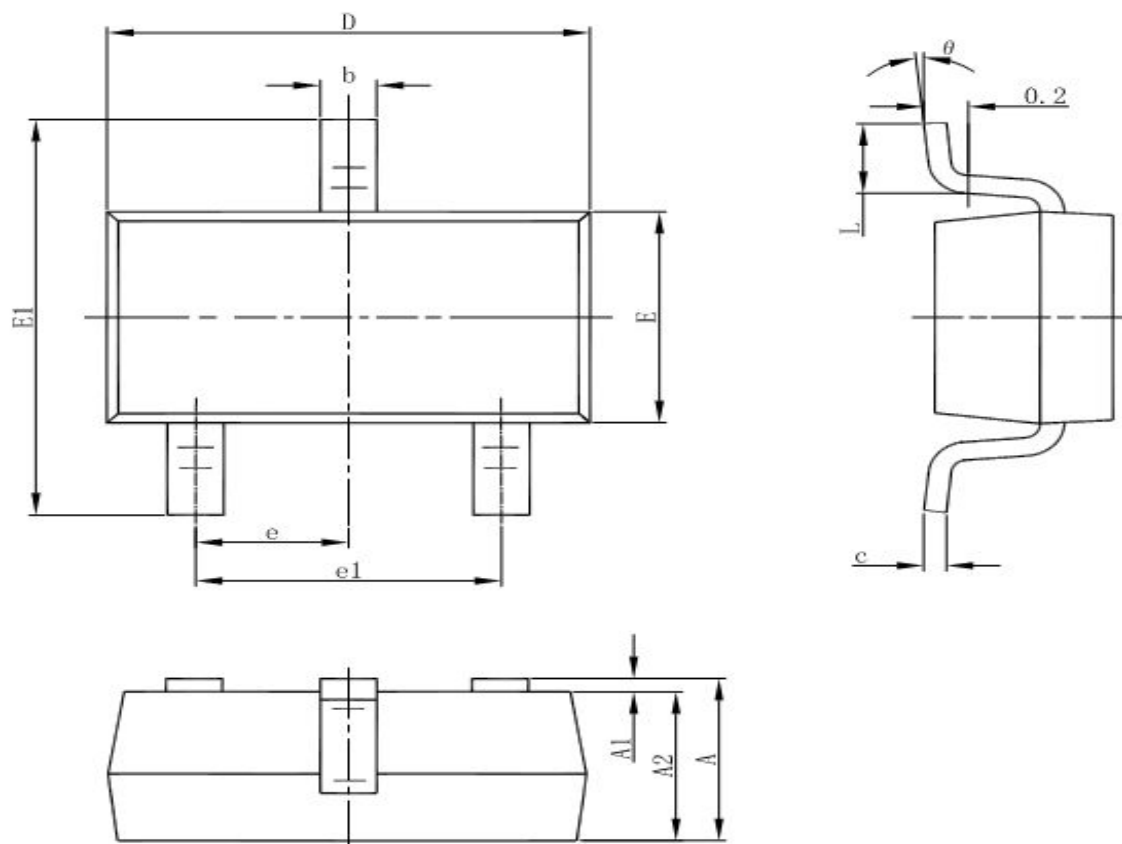


Figure 14 Normalized Maximum Transient Thermal Impedance

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°