

**TINY PACKAGE HIGH EFFICIENCY
STEP-UP DC/DC CONVERTER**

LR9908

■ **Introduction**

The LR9908 is a CMOS step-up switching DC/DC converter that mainly consists of a reference voltage source, an oscillator, and a comparator. The LR9908 allows the duty ratio to be automatically switched according to the load (light load: 66%, high output current: 78%), enabling products with a low ripple over a wide range, high efficiency, and high output current. With the LR9908, a step-up switching DC/DC converter can be configured by using an external coil, capacitor, diode and NMOS. This feature, along with the mini package and low current consumption, makes the LR9908 ideal for applications such as the power supply unit of portable equipment.

■ **Features**

- Low voltage operation: Startup at 0.9 V min. ($I_{OUT} = 1 \text{ mA}$) guaranteed
- Duty ratio: 66/78%, built-in auto switching
- External parts: Coil, capacitor, diode, NMOS
- High efficiency: $\pm 85\%$ (typ.)
- Output voltage Adjustable
- Providing Flexibility for Using External Power Switches
- Zero Shutdown Mode Supply Current
- $6\mu\text{A}$ Quiescent (Switch-off) Supply Current
- Small SOT23-5, SOT89-5 Package

■ **Applications**

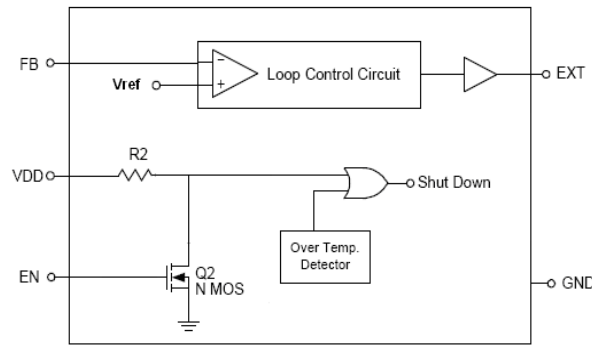
- PDA
- DSC
- LCD Panel
- RF-Tags
- MP3
- Portable Instrument
- Wireless Equipment

■ **Ordering Information**

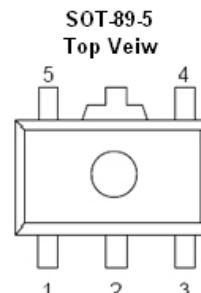
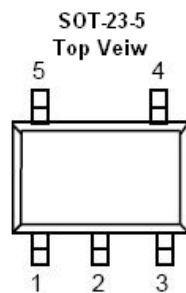
LR9908①②③④⑤

DESIGNATOR	SYMBOL	DESCRIPTION
①	A	Output voltage Adjustable, EXT
	B	Output voltage Adjustable, EXT,EN
②③④		FB voltage Exp:Vfb=1.25V Number:125
⑤	M	Package : SOT23-5
	P	Package : SOT89-5

■ Block Diagrams



■ Pin Assignment



Pin No. (SOT23-5)		Pin Name	Functions
LR9908A	LR9908B		
1	1	FB	Feedback Input Pin
2	2	V _{DD}	IC power supply pin
-	3	EN	Chip Enable (Active High)
3	-	NC	No Connection
4	4	V _{SS}	GND pin
5	5	EXT	External transistor connection pin

Pin No. (SOT89-5)		Pin Name	Functions
LR9908A	LR9908B		
-	1	EN	Chip Enable (Active High)
1	-	NC	No Connection
2	2	V _{DD}	IC power supply pin
3	3	FB	Feedback Input Pin
4	4	EXT	External transistor connection pin
5	5	V _{SS}	GND pin

■ Marking Information

8: Output Adjustable

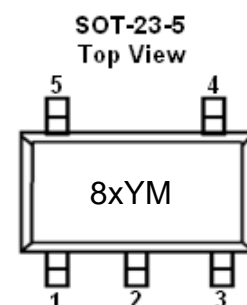
x: A-No En; B-En Available

B-En Available, FB Voltage 3.3V.

JEn Available, FB Voltage 1.25V.

Y: Year Code

M: Month Code



■ Absolute Maximum Ratings

 (Unless otherwise specified, $T_a=25^{\circ}\text{C}$)

Parameter	Symbol	Ratings	Unit
V_{OUT} pin voltage	V_{OUT}	$V_{\text{SS}}-0.3 \sim V_{\text{SS}}+8$	V
EN pin voltage	EN	$V_{\text{SS}}-0.3 \sim V_{\text{SS}}+8$	V
Power dissipation	SOT-23-5	PD	250
	SOT-89-5		500
Operating temperature	T_{opr}	$-40 \sim +85$	$^{\circ}\text{C}$
Storage temperature	T_{stg}	$-40 \sim +125$	$^{\circ}\text{C}$

■ Electrical Characteristics

 (Unless otherwise specified, $T_a=25^{\circ}\text{C}$)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Feedback Voltage	V_{FB}	—	$V_{\text{FB(s)}} \times 0.98$	V_{FB}	$V_{\text{FB(s)}} \times 1.02$	V
Input voltage	V_{IN}	—	—	—	8	V
Operation start voltage	V_{ST}	$I_{\text{OUT}}=1 \text{ mA}$	—	—	0.9	V
Current consumption 1	I_{SS1}	$V_{\text{CC}}=5\text{V}$, Continuously Switching	—	30	40	μA
Current consumption 2	I_{SS2}	$V_{\text{CC}}=5\text{V}$, $\text{FB}=2.5\text{V}$, No Switching	—	5	10	μA
Shut Down Current	I_{SSS}	$V_{\text{CC}}=5\text{V}$, $V_{\text{EN}}=0 \text{ V}$	—	—	0.5	μA
Line regulation	ΔV_{OUT1}	$V_{\text{IN}}=0.4 \times V_{\text{OUT}} \sim 0.6 \times V_{\text{OUT}}$ ($V_{\text{OUT}}=5\text{V}$)	—	20	50	mV
Load regulation	ΔV_{OUT2}	$I_{\text{OUT}}=10 \mu\text{A} \sim 50\text{mA}$ ($V_{\text{OUT}}=5\text{V}$)	—	20	50	mV
Oscillation frequency	f_{OSC}			100		kHz
Duty ratio 1	Duty1	$V_{\text{OUT}}=0.95 \times V_{\text{OUT}}$, measure waveform at LX pin	70	78	85	%
Duty ratio 2	Duty2	Measure waveform at LX pin with light load	—	66	—	%
Efficiency	EFFI			85		%
Shutdown pin input voltage	V_{SH}	$V_{\text{OUT}}=0.95 \times V_{\text{OUT}}$, judge oscillation at EXT pin	0.75	—	—	V
	V_{SL1}	$V_{\text{OUT}}=0.95 \times V_{\text{OUT}}$, judge stop at EXT pin	—	—	0.3	V
Shutdown pin input current	I_{SH}	$V_{\text{EN}}=8\text{V}$	—	—	0.1	μA
	I_{SL}	$V_{\text{EN}}=0\text{V}$	—	—	0.1	μA

 Remark: 1、 $V_{\text{IN}}=V_{\text{OUT(s)}} \times 0.6$ applied, $I_{\text{OUT}}=V_{\text{OUT(s)}} / 250 \Omega$

 2、Shutdown function built-in type: EN pin is connected to V_{OUT}

 3、 $V_{\text{OUT(s)}}$ specified above is the set output voltage value, and V_{OUT} is the typical value of the actual output voltage.

■ Standard Circuits

Component: Inductor: 22uH(Sumida)

Diode: IN5817、IN5819

Capacitor: 47uF (Tantalum type)

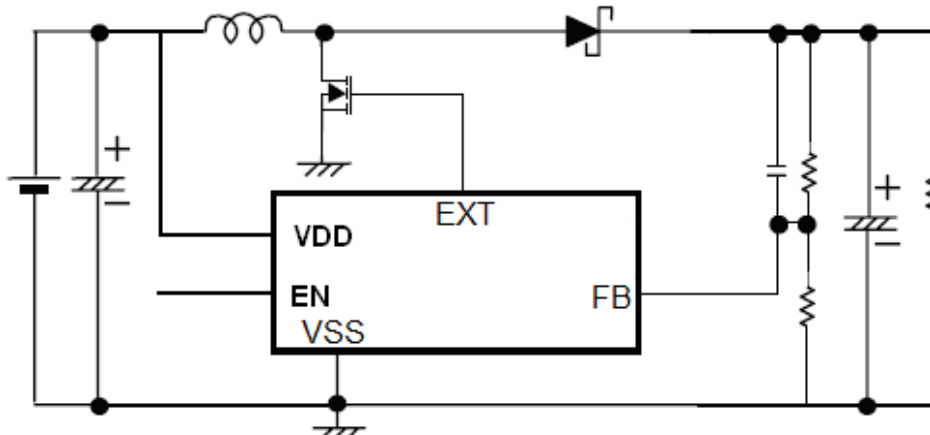
MOS: LN2312LT1G、XP151、XP161

R_{FB} : Set up so that $R_{FB1}/R_{FB2} = (V_{OUT} - V_{FB}) / V_{FB}$ (V_{OUT} =set-up output voltage) ,

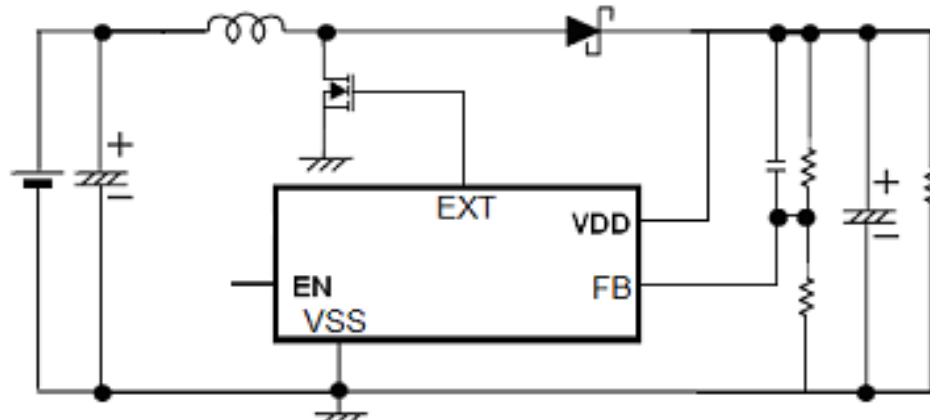
Please use with $R_{FB1} + R_{FB2} \leq 2M \Omega$

C_{FB} : Set up that $F_{zfb} = 1/(2 \times \pi \times C_{FB} \times R_{FB1})$ is within the Adjustments necessary in respect of L, C_L.

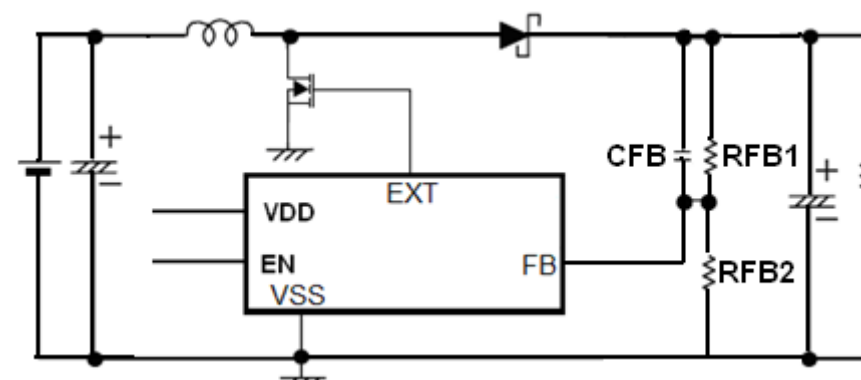
1、LR9908 Circuits 1:($3V \leq V_{IN} \leq 8V$)



2、LR9908 Circuits 2:($V_{IN} \leq 3V$)



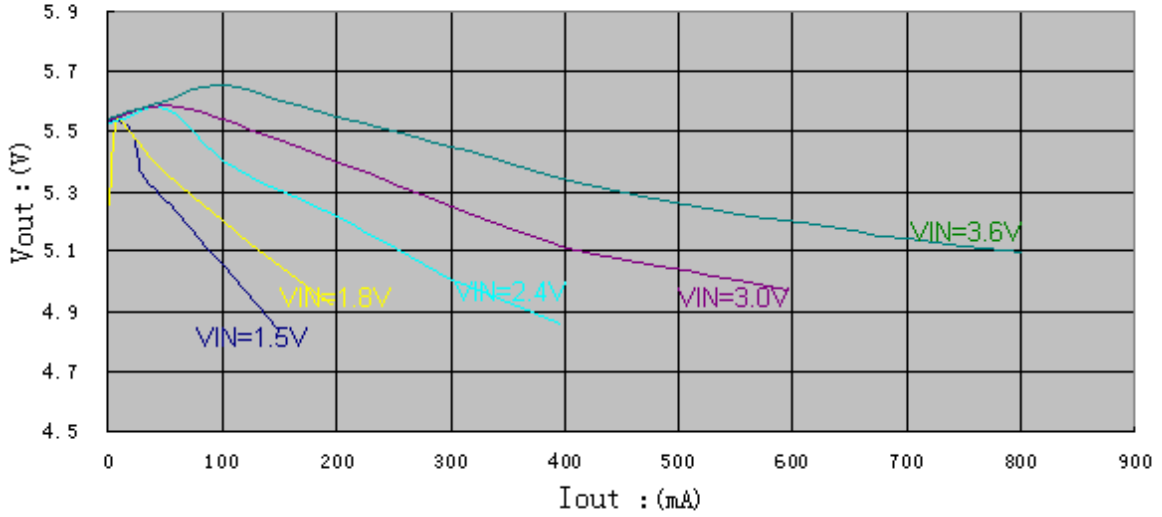
3、LR9908 Circuits 3:($V_{IN} \geq 8V$)



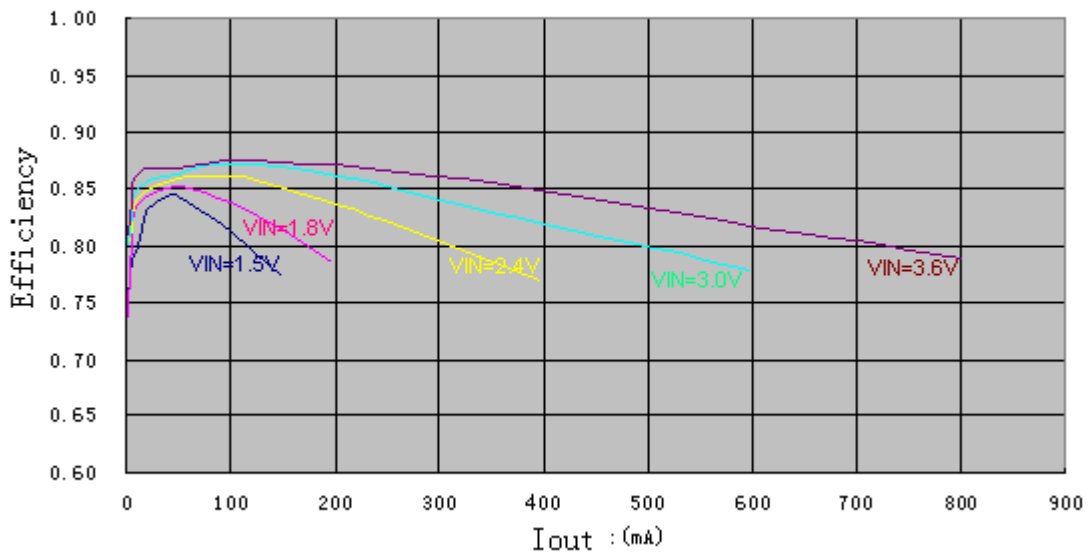
NOTE: Pin VDD can be connected to some other power supply (3V~8V)

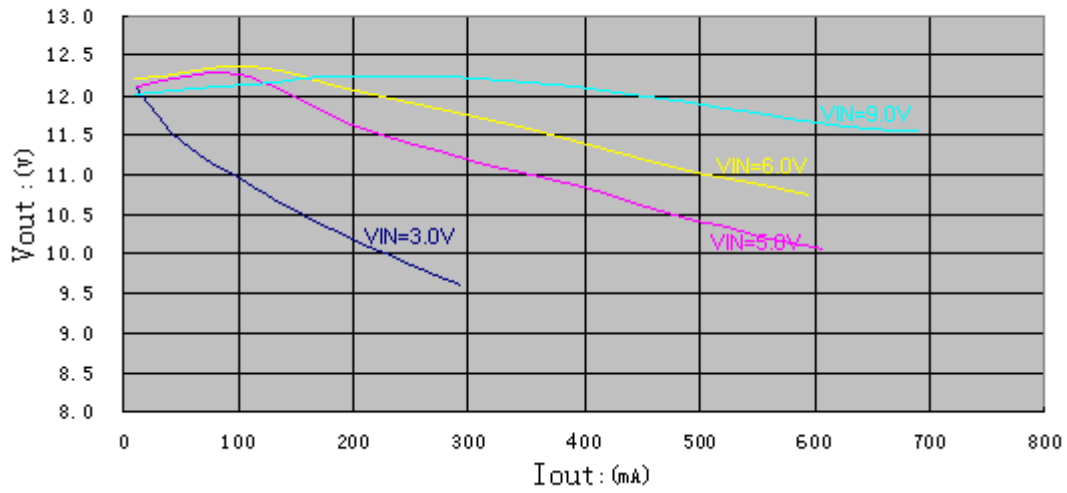
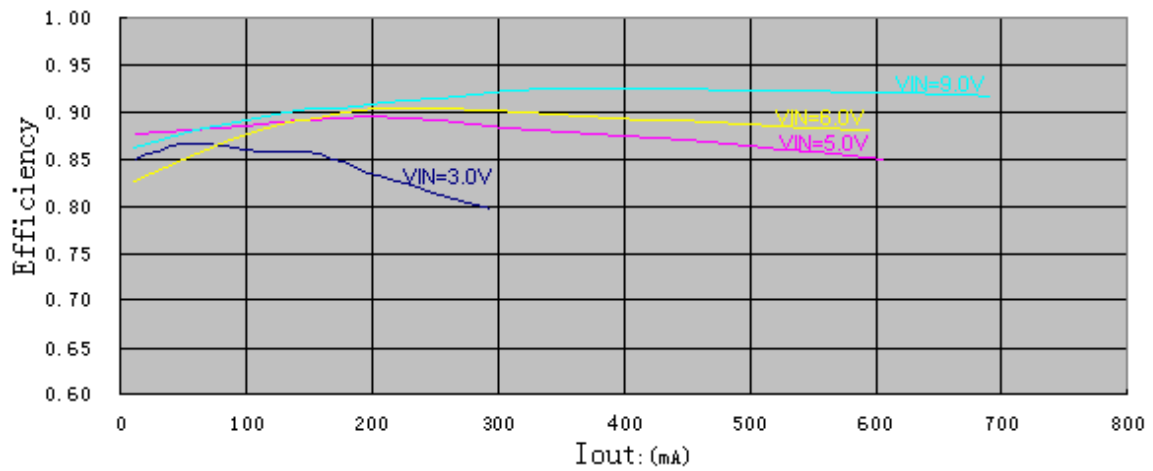
■ Characteristics

A. V_{OUT} VS I_{OUT} : ($V_{OUT}=5.5V$)

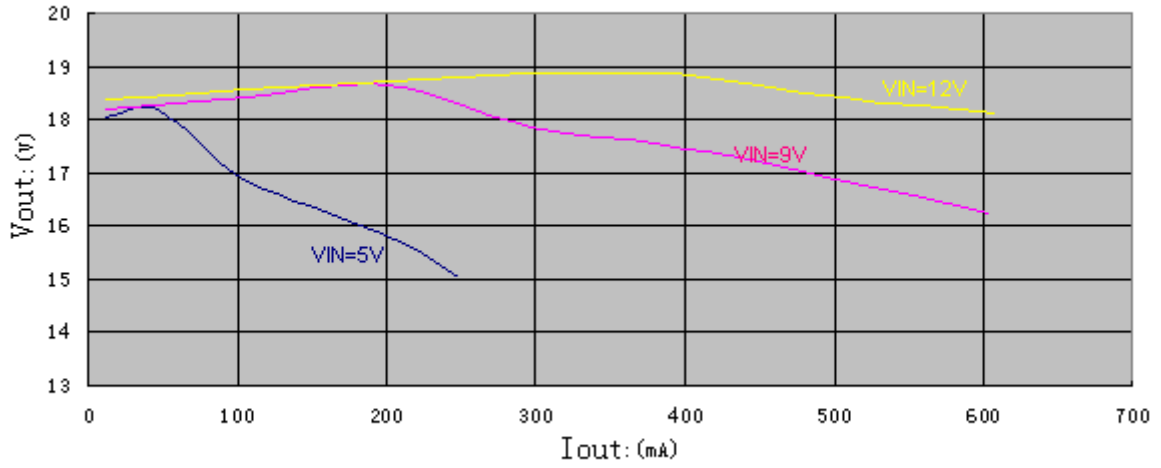


B. Efficiency VS I_{OUT} : ($V_{OUT}=5.5V$)

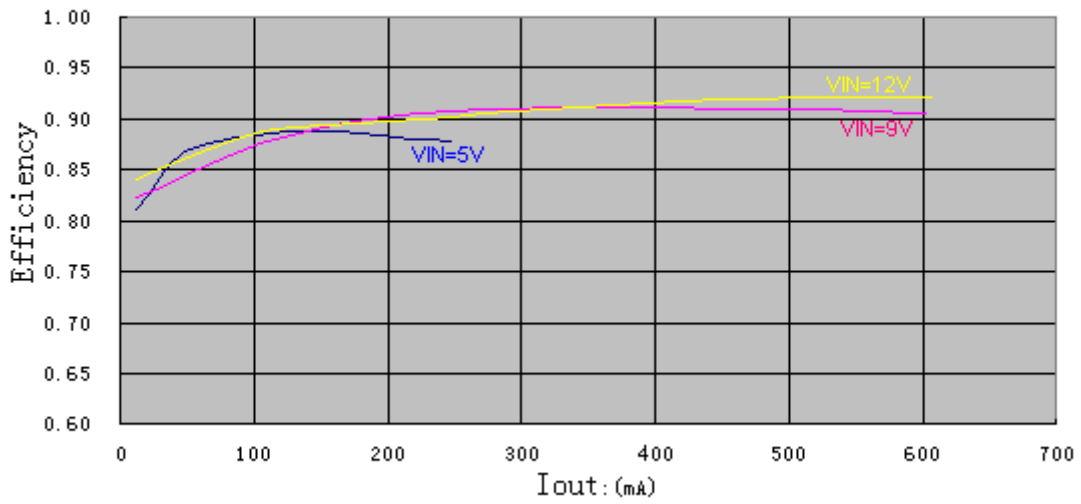


C. V_{OUT} VS I_{OUT} : ($V_{OUT}=12V$)

D. Efficiency VS I_{OUT} : ($V_{OUT}=12V$)


E. V_{OUT} VS I_{OUT} : ($V_{OUT}=18V$)

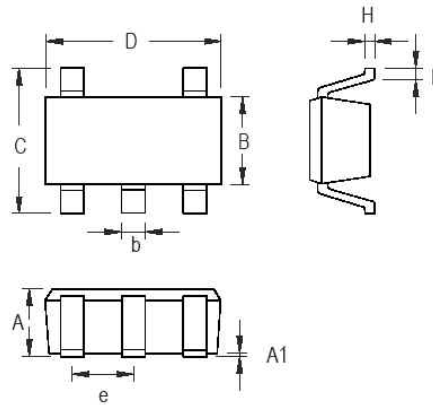


F. Efficiency VS I_{OUT} : ($V_{OUT}=18V$)



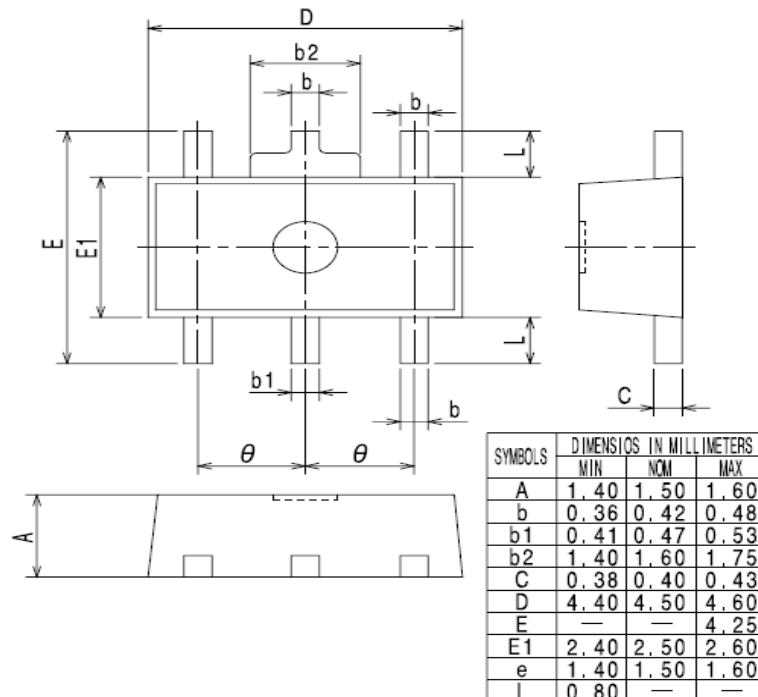
■ Package information

● SOT- 23- 5



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.889	1.295	0.035	0.051
A1	0.000	0.152	0.000	0.006
B	1.397	1.803	0.055	0.071
b	0.356	0.559	0.014	0.022
C	2.591	2.997	0.102	0.118
D	2.692	3.099	0.106	0.122
e	0.838	1.041	0.033	0.041
H	0.080	0.254	0.003	0.010
L	0.300	0.610	0.012	0.024

● SOT- 89- 5



单击下面可查看定价，库存，交付和生命周期等信息

[>>LRC\(乐山无线电\)](#)