

# Voltage Detector

**IL75XX**

## FUNCTIONS

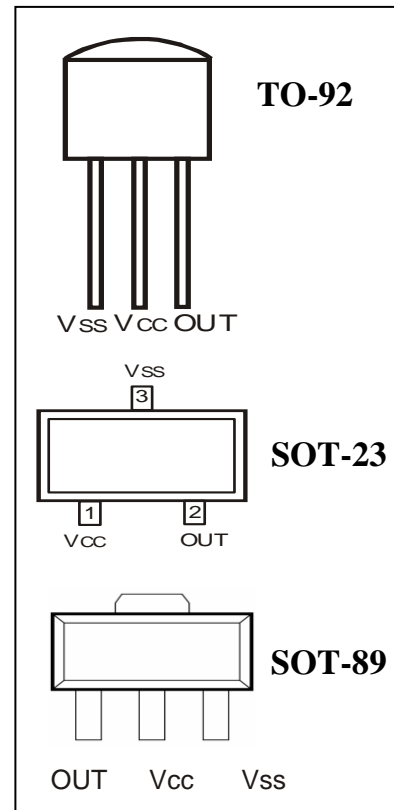
- Detecting against error operations at the power ON/OFF
- Resetting function for low voltage microprocessor
- Checking low battery
- Active Low
- CMOS or open drain output (mask option)
- Tolerance  $\pm 2\%$

## FEATURES

- Low Power Consumption
- Low Temperature Coefficient
- Built-in Voltage Reference
- Comparator Hysteresis
- TO-92, SOT-23 packages are available

## ORDERING INFORMATION

Device	Operating Temperature Range	Package	Packing
IL75xxLF	$T_A = -10^\circ \text{ to } 70^\circ \text{ C}$ for all packages	TO-92	Tape
IL75xxST		SOT-23	Tape & Reel
IL75xxPT		SOT-89	Tape & Reel



## GENERAL DESCRIPTION

The IL75XX series are the voltage detectors, consist of a high-precision voltage reference, a comparator with precise thresholds and built-in hysteresis and an output driver.

## ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ )

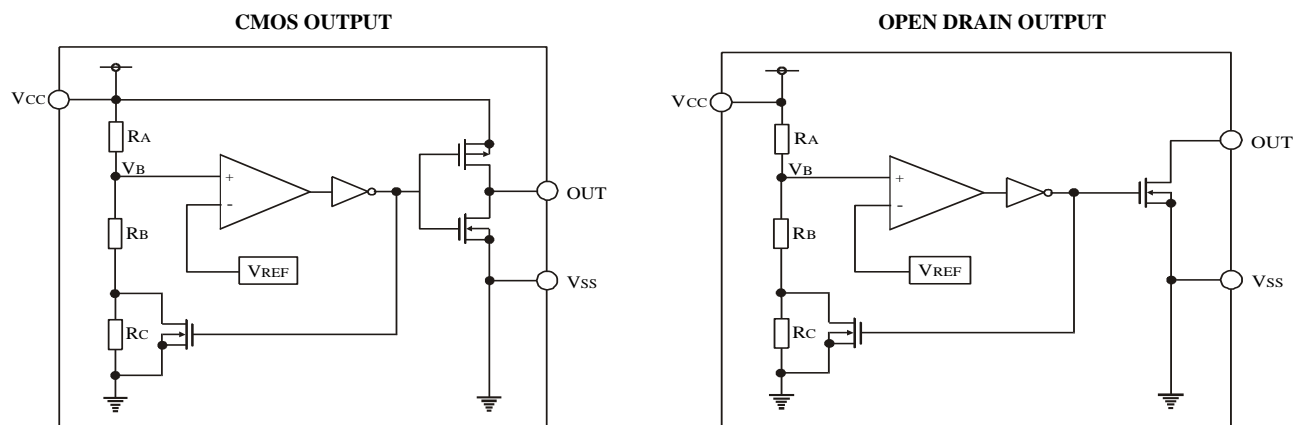
Characteristic	Symbol	Value	Unit
Supply Voltage	$V_{CC}$	-0.3 ~ +8.0	V
Operating Temperature	$T_{opr}$	-10 ~ +70	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40 ~ +125	$^\circ\text{C}$
Output Current	$I_O$	30	mA

\* Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

**ELECTRICAL CHARACTERISTICS** (T<sub>A</sub> = 25°C, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply Voltage	V <sub>CC</sub>		1.2		5.5	V
Detecting Voltage	V <sub>DET</sub>		2.16	2.20	2.24	V
			2.35	2.40	2.45	
			2.50	2.55	2.60	
			2.65	2.70	2.75	
			2.74	2.80	2.86	
			3.23	3.30	3.37	
			3.82	3.90	3.98	
			4.12	4.20	4.28	
			4.61	4.70	4.79	
4.90	5.00	5.10				
Supply Current	I <sub>CC</sub>	V <sub>CC</sub> = 5.0V, No Load		8	15	μA
Low Output Voltage	V <sub>OL</sub>	V <sub>CC</sub> = V <sub>DET</sub> -0.2V, I <sub>OL</sub> = 0.1mA		0.1	0.3	V
High Output Voltage	V <sub>OH</sub>	V <sub>CC</sub> = V <sub>DET</sub> +0.2V, I <sub>OH</sub> = 0.1mA	V <sub>CC</sub> - 0.3V			V
Hysteresis Voltage	V <sub>HYS</sub>			2.0		%
Detective Voltage Temperature Coefficient	$\frac{\Delta V_{DET}}{\Delta T \times V_{DET}}$	-10°C < T <sub>A</sub> < 70°C		± 0.02		%/°C

**BLOCK DIAGRAM**



**FUNCTIONAL DESCRIPTION**

The IL75XX series is the set of voltage detectors equipped with a high stability voltage reference which is connected to the negative input of a comparator denoted as V<sub>REF</sub> in block diagram.

When the voltage drop to the positive input of the comparator (V<sub>B</sub>) is high than V<sub>REF</sub>, V<sub>OUT</sub> goes high. If V<sub>CC</sub> is decreased so that V<sub>B</sub> falls to a value less than V<sub>REF</sub>, the comparator output inverts from high to low, V<sub>OUT</sub> goes low. The device has hysteresis to prevent the circuit from oscillation when V<sub>B</sub> ≈ V<sub>REF</sub>. If V<sub>CC</sub> falls below the minimum operating voltage, the output becomes undefined. The detectable voltage is defined as:

$$V_{DET}(-) = \frac{RA+RB+RC}{RB+RC} \times V_{REF}$$

The release voltage is defined as:

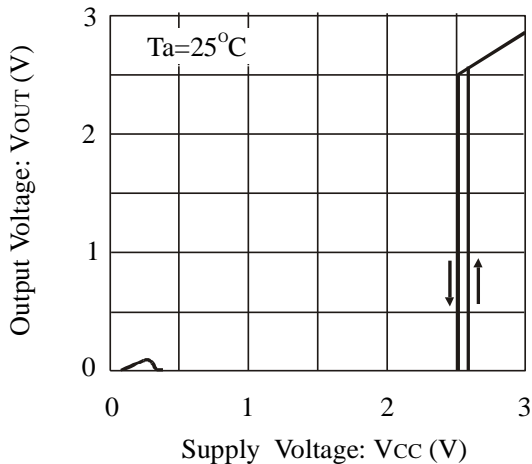
$$V_{DET}(+) = \frac{RA+RB}{RB} \times V_{REF}$$

The hysteresis width is:

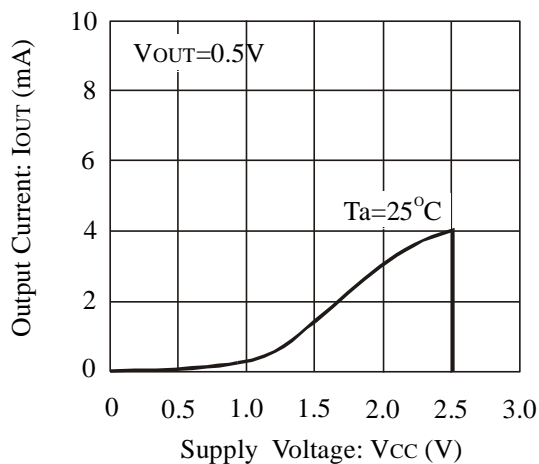
$$V_{HYS} = V_{DET}(+) - V_{DET}(-)$$

ELECTRICAL CHARACTERISTICS

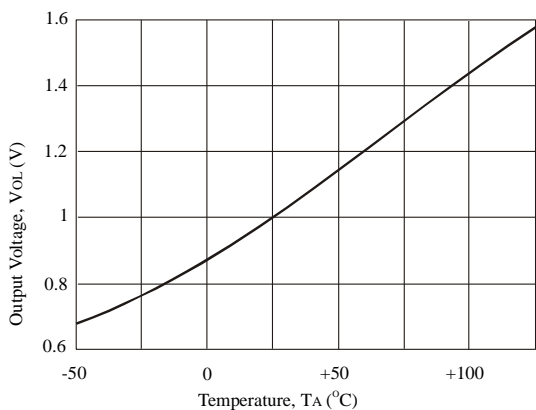
1. OUTPUT VOLTAGE vs. SUPPLY VOLTAGE  
BT75A25



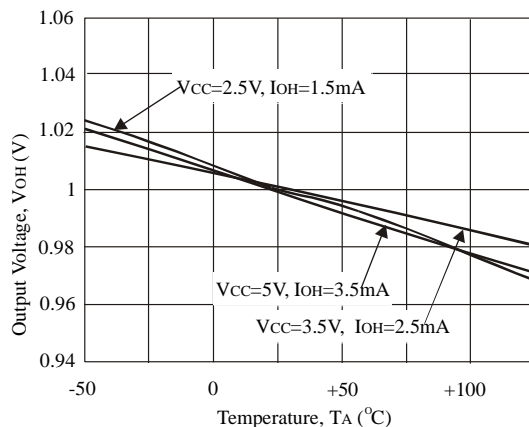
2. OUTPUT LOW CURRENT vs. SUPPLY VOLTAGE  
BT75A25



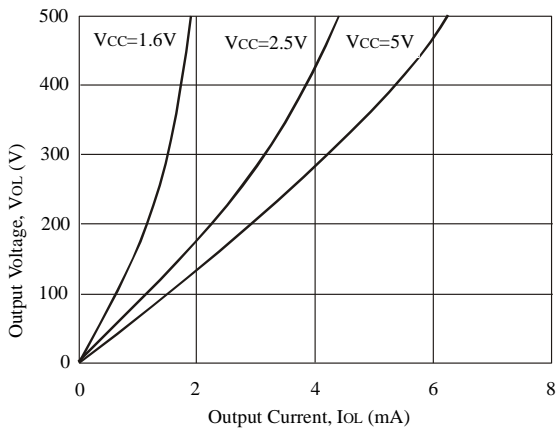
3. NORMALIZED  $V_{OL}$  vs. TEMPERATURE



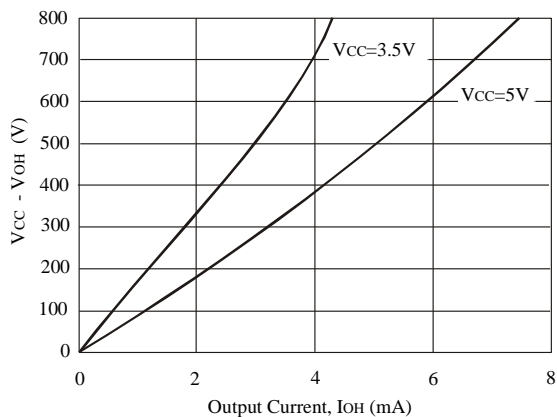
NORMALIZED  $V_{OH}$  vs. TEMPERATURE



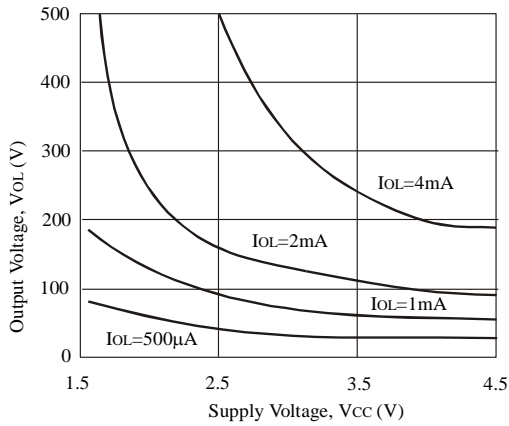
4.  $V_{OL}$  vs. OUTPUT CURRENT



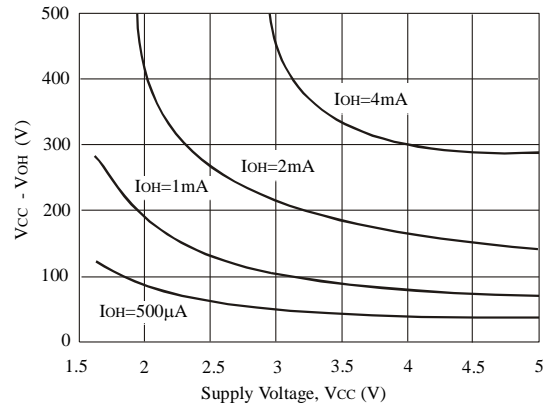
$V_{CC} - V_{OH}$  vs. OUTPUT CURRENT



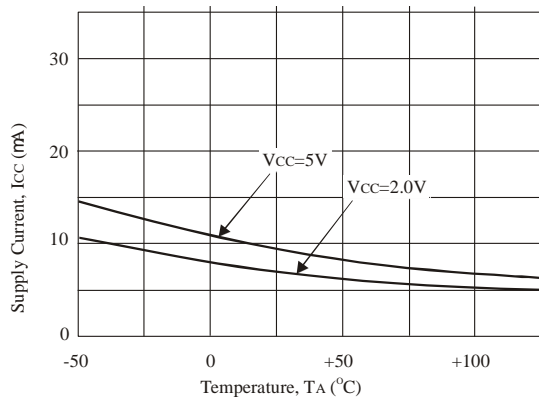
5.  $V_{OL}$  vs. SUPPLY VOLTAGE



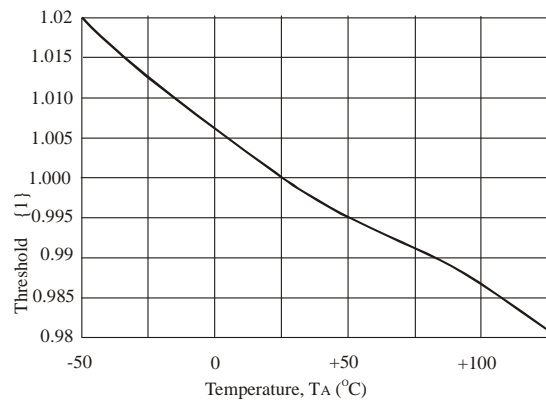
$V_{CC} - V_{OH}$  vs. SUPPLY VOLTAGE



6. SUPPLY CURRENT vs. TEMPERATURE



NORMALIZED THRESHOLD vs. TEMPERATURE



ORDERING INFORMATION

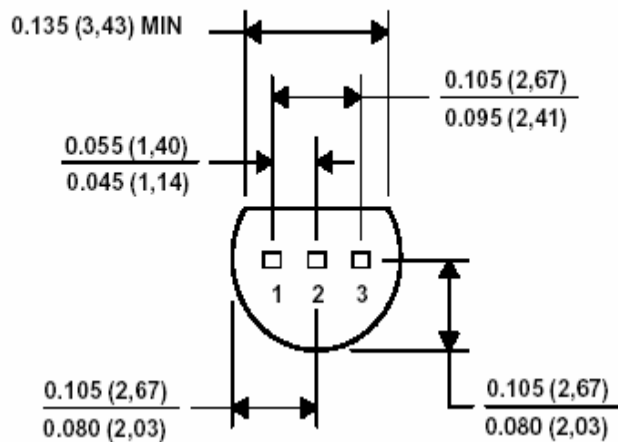
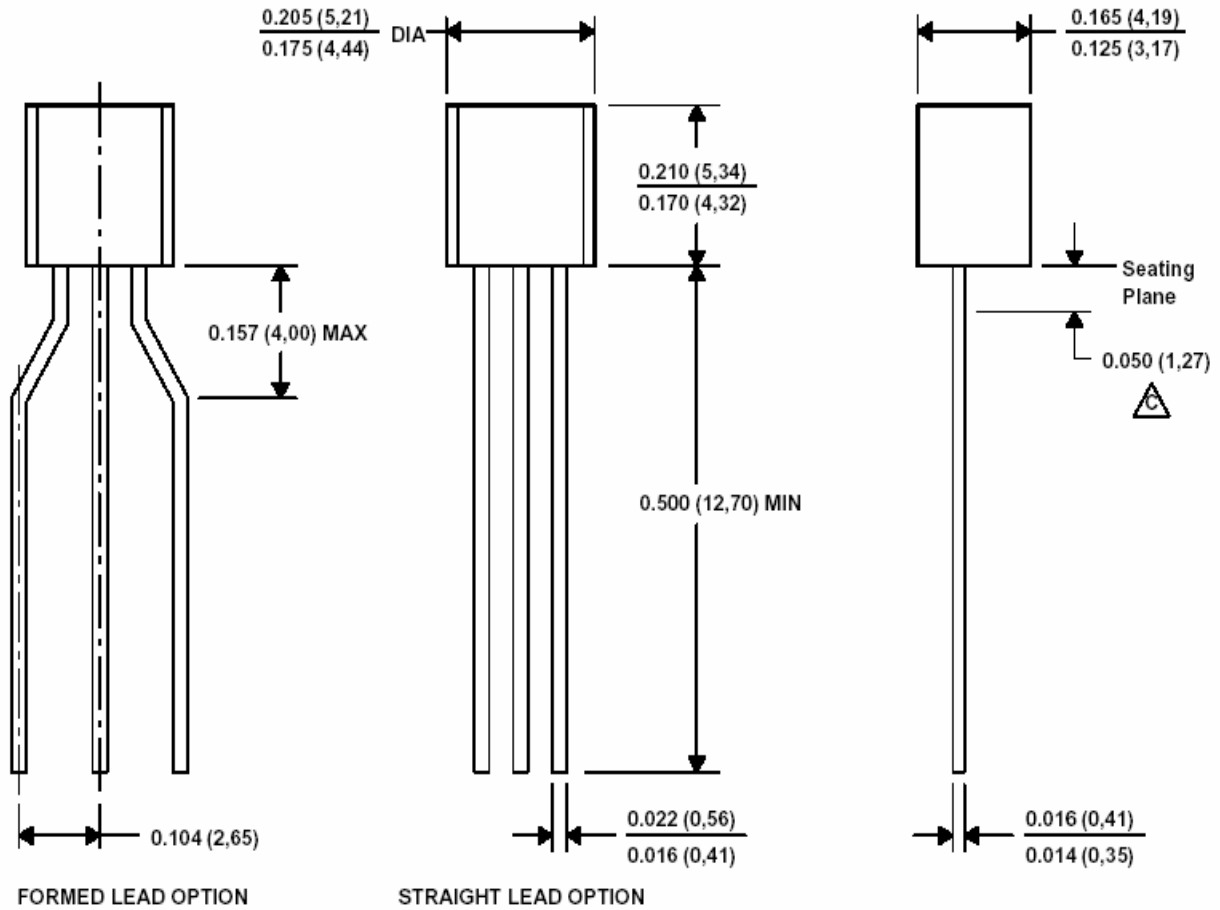
**IL75XX XX**

- 22 -> 2.20V
- 24 -> 2.40V
- 25 -> 2.55V
- .
- .
- 42 -> 4.20V
- 47 -> 4.70V
- 50 -> 5.00V

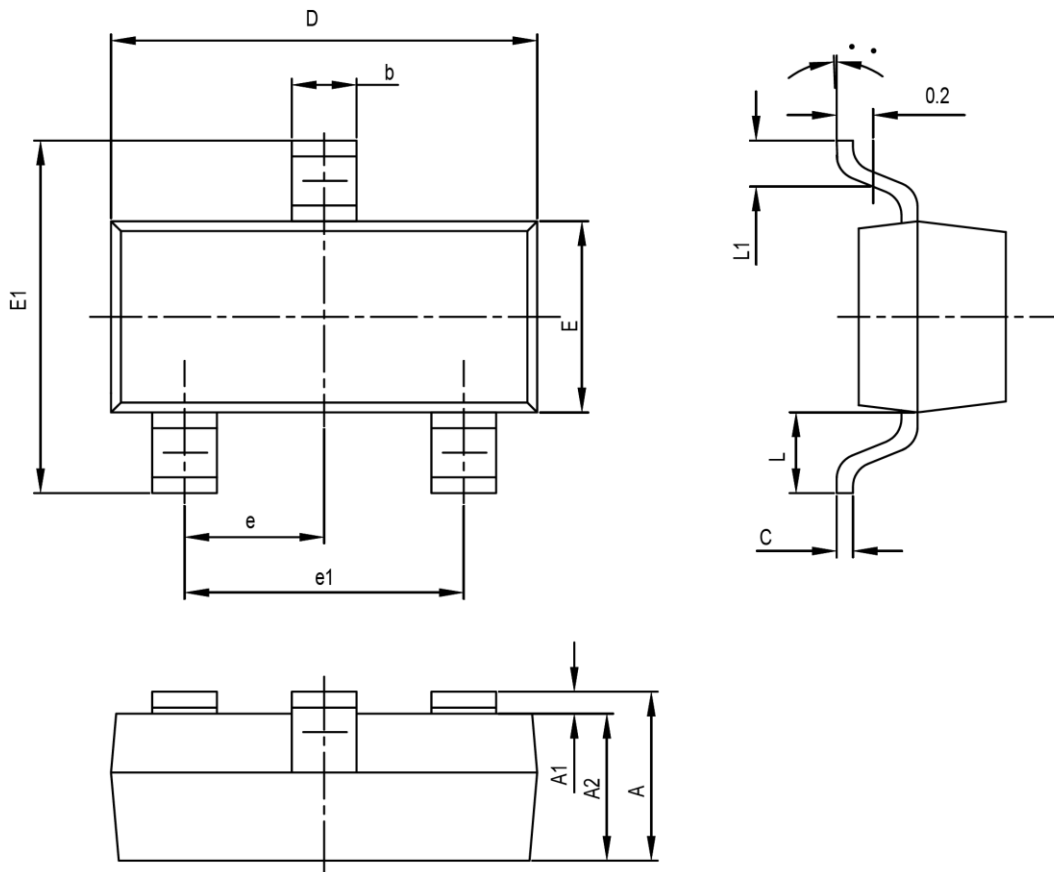
- LS = TO-92 Straight (Bulk)
- LF = TO-92 Form (Taping)
- ST = SOT-23 (Taping)
- PT = SOT-89 (Taping)

PACKAGE DIMENSIONS

TO-92

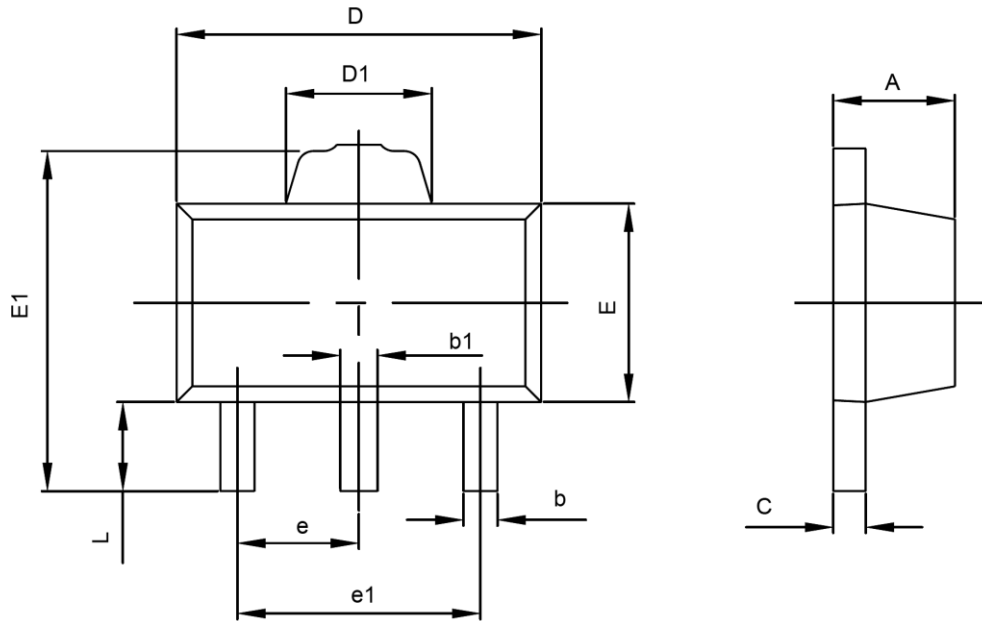


SOT-23 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
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	0.950TPY		0.037TPY	
e1	1.800	2.000	0.071	0.079
L	0.550REF		0.022REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

SOT-89-3L PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.360	0.560	0.014	0.022
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.400	1.800	0.055	0.071
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500TYP		0.060TYP	
e1	2.900	3.100	0.114	0.122
L	0.900	1.100	0.035	0.043