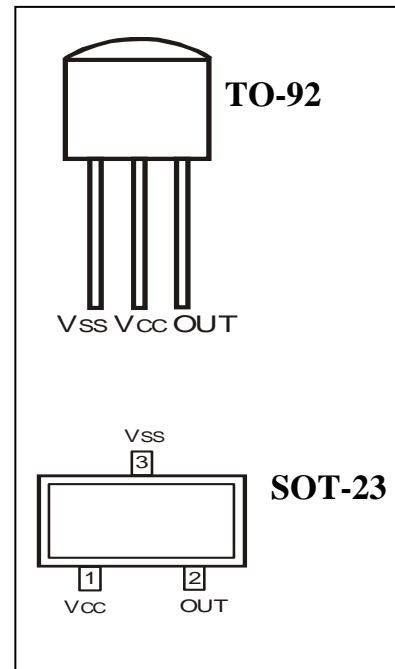# Voltage Detector

BT75Axx

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%

TO-92

Vss Vcc OUT

FEATURES

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

Vss

3

SOT-23

1   2

Vcc   OUT

GENERAL DESCRIPTION

The BT75AXX 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°C)

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

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ELECTRICAL CHARACTERISTICS   ($T_A = 25^oC$, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply Voltage	V_{CC}		1.2		5.5	V
Detecting Voltage	V_{DET}		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_{CC}	$V_{CC} = 5.0V$, No Load		8	15	μA
Low Output Voltage	V_{OL}	$V_{CC} = V_{DET}-0.2V$, $I_{OL} = 0.1mA$		0.1	0.3	V
High Output Voltage	V_{OH}	$V_{CC} = V_{DET}+0.2V$, $I_{OH} = 0.1mA$	$V_{CC} - 0.3V$			V
Hysteresis Voltage	V_{HYS}			2.0		%
Detective Voltage Temperature Coefficient	$\dfrac{\Delta V_{DET}}{\Delta T \times \Delta V_{DET}}$	$-10^oC < T_A < 70^oC$		± 0.02		%/^oC

BLOCK DIAGRAM

CMOS OUTPUT   **OPEN DRAIN OUTPUT**
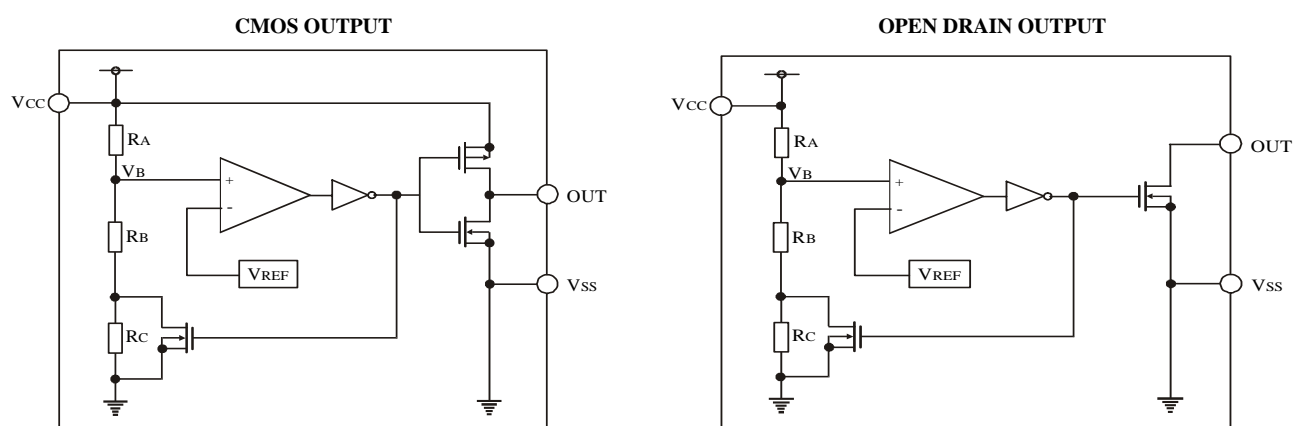
FUNCTIONAL DESCRIPTION

The BT75AXX 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_{REF} in block diagram.

When the voltage drop to the positive input of the comparator (V_B) is high than V_{REF}, V_{OUT} goes high.

If V_{CC} is decreased so that V_B falls to a value less than V_{REF}, the comparator output inverts from high to low, V_{OUT} goes low.

The device has hysteresis to prevent the circuit from oscillation when $V_B \approx V_{REF}$.

If V_{CC} 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:

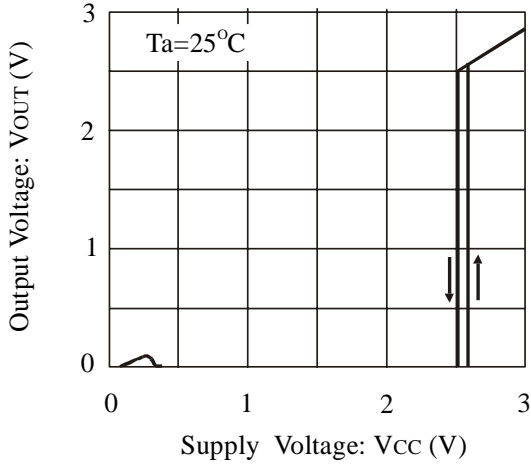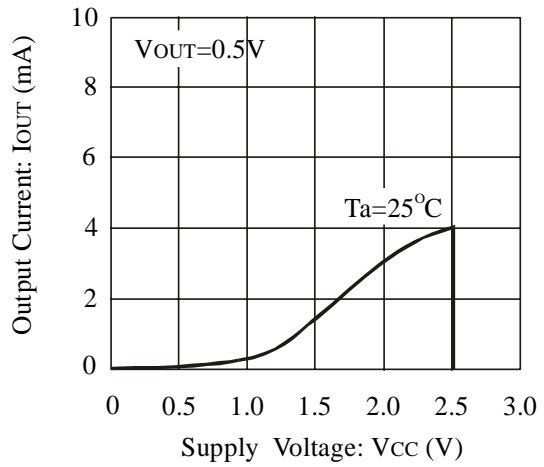$$V_{DET}(+) = \frac{RA+RB}{RB} \times V_{REF}$$

The hysteresis width is:
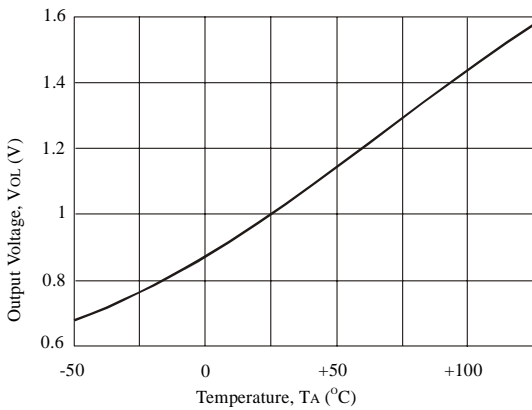
$$V_{HYS} = V_{DET}(+) - V_{DET}(-)$$

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ELECTRICAL CHARACTERISTICS

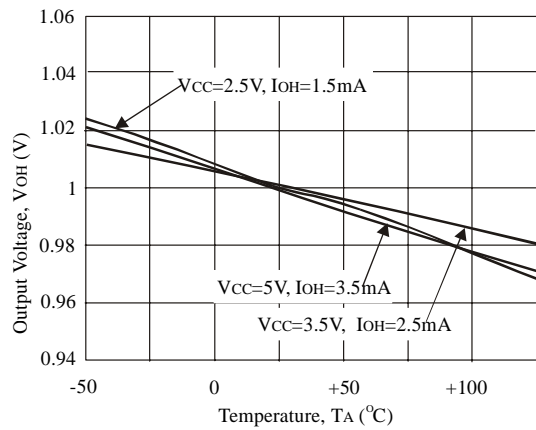**1. OUTPUT VOLTAGE vs. SUPPLY VOLTAGE**
   BT75A25

2. OUTPUT LOW CURRENT vs. SUPPLY VOLTAGE
   BT75A25

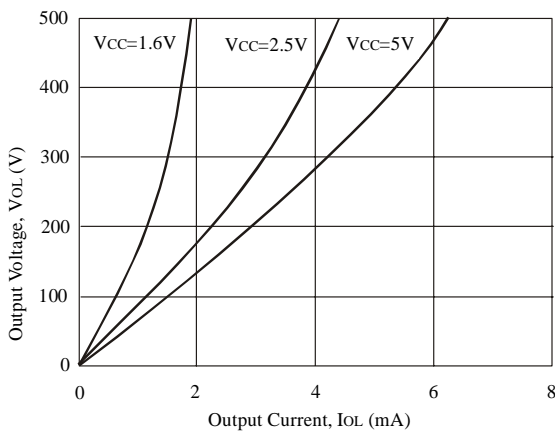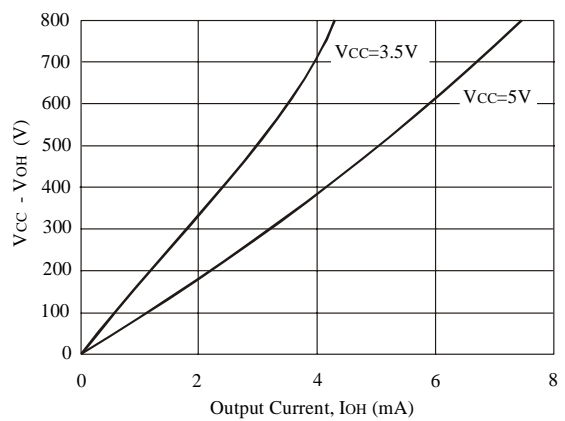**3. NORMALIZED V_{OL} vs. TEMPERATURE**

NORMALIZED V_{OH} vs. TEMPERATURE

4. V_{OL} vs. OUTPUT CURRENT

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

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3

5. V$_{OL}$ vs. SUPPLY VOLTAGE

Output Voltage, V$_{OL}$ (V)

I$_{OL}$=4mA

I$_{OL}$=2mA

I$_{OL}$=1mA

I$_{OL}$=500µA

Supply Voltage, V$_{CC}$ (V)
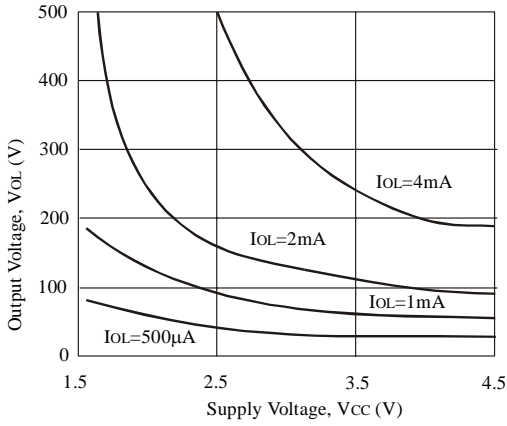
V$_{CC}$ - V$_{OH}$ vs. SUPPLY VOLTAGE

V$_{CC}$ - V$_{OH}$ (V)

I$_{OH}$=4mA

I$_{OH}$=2mA

I$_{OH}$=1mA

I$_{OH}$=500µA

Supply Voltage, V$_{CC}$ (V)
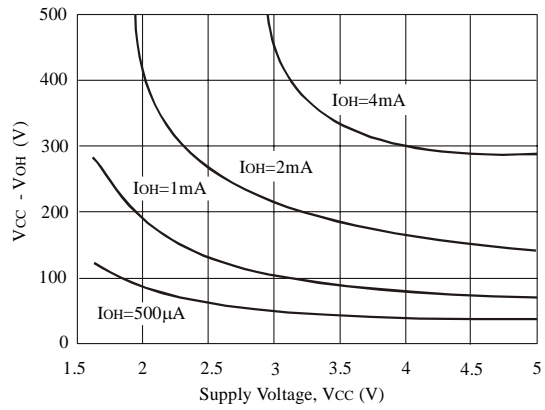
6. SUPPLY CURRENT vs. TEMPERATURE

Supply Current, I$_{CC}$ (mA)

V$_{CC}$=5V

V$_{CC}$=2.0V
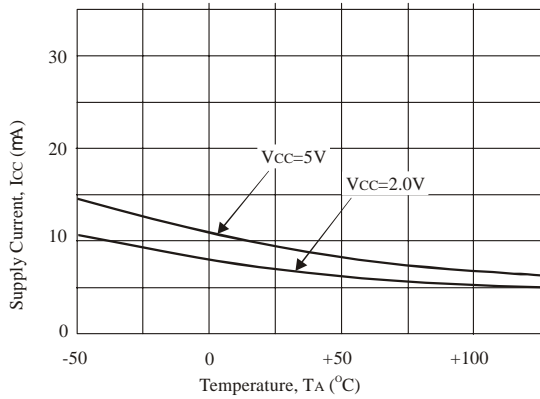
Temperature, T$_A$ (^{o}C)

NORMALIZED THRESHOLD vs. TEMPERATURE

Threshold [1]

Temperature, T$_A$ (^{o}C)
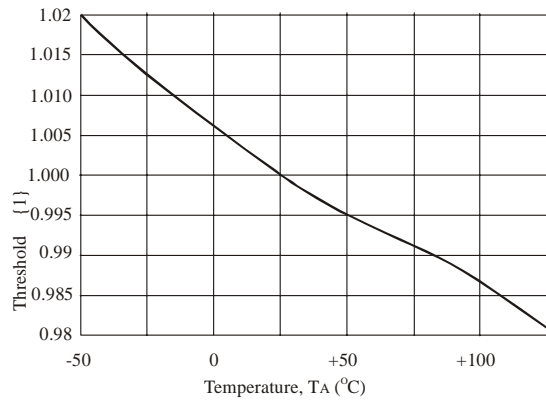
ORDERING INFORMATION

BT75A XX XX - XX

PF = Pb Free

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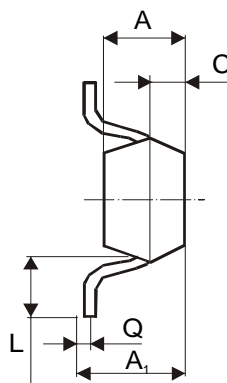.
.
42 -> 4.20V
47 -> 4.70V
50 -> 5.00V

S = SOT-23
LS = TO-92 Straight (Bulk)
LF = TO-92 Form (Taping)

PACKAGE DIMENSIONS

SOT-23
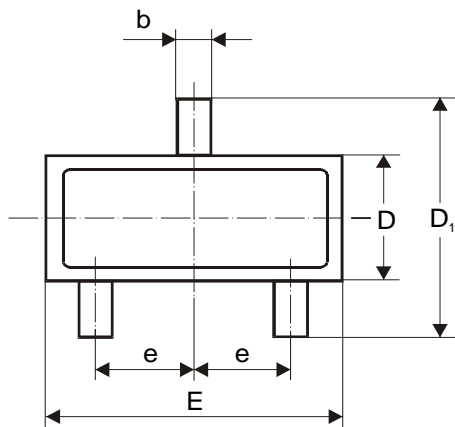
Dimension	mm	
	min	max
A	0.75	0.95
A_1	0.25	1.10
b	0.38	0.46
C	0.50	0.65
D	1.20	1.40
D_1	2.10	2.50
E	2.80	3.00
e	0.85	1.05
L	0.40	0.60
Q	0.09	0.15

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TO-92

0.205 (5,21) / 0.175 (4,44) DIA

0.165 (4,19) / 0.125 (3,17)

0.210 (5,34) / 0.170 (4,32)

0.157 (4,00) MAX

Seating Plane

0.050 (1,27)

0.500 (12,70) MIN

0.104 (2,65)

0.022 (0,56) / 0.016 (0,41)

0.016 (0,41) / 0.014 (0,35)

FORMED LEAD OPTION

STRAIGHT LEAD OPTION

0.135 (3,43) MIN

0.105 (2,67) / 0.095 (2,41)

0.055 (1,40) / 0.045 (1,14)

1 2 3

0.105 (2,67) / 0.080 (2,03)

0.105 (2,67) / 0.080 (2,03)

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