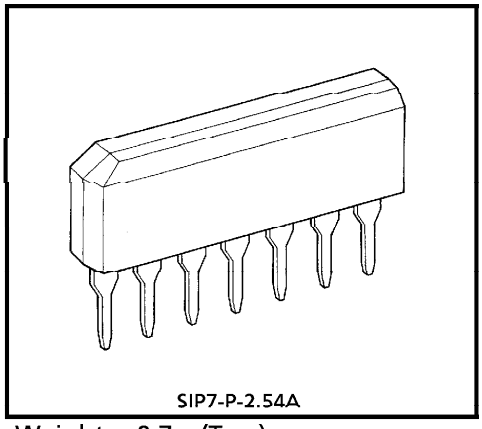
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA7523AS

SINGLE COMPARATOR

TA7523AS is comparator with wide range single or two supply voltage. Output is open collector and wired-OR possible.



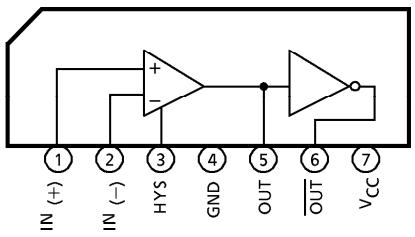
SIP7-P-2.54A

Weight : 0.7g (Typ.)

FEATURES

- Wide Common Mode Input Voltage : $0V \sim V_{CC} - 1.5V$
- Output is Compatible with TTL and CMOS.
- With Two Output Terminal (OUT, $\overline{OUT}$)
- Hysteresis Voltage Width is Variable by External Resistor.
- Wide Supply Voltage Range : 2V~36V or ±1V~±18V
- Output Sink Current : 100mA (Typ.)

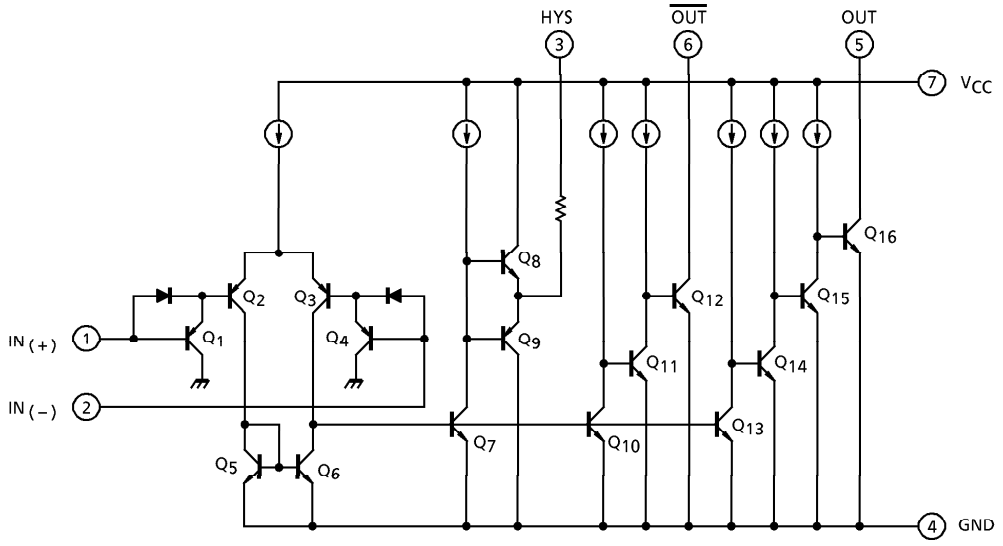
PIN CONNECTION



961001EBA1

- TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.
- The products described in this document are subject to foreign exchange and foreign trade control laws.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.

EQUIVALENT CIRCUIT



MAXIMUM RATINGS (Ta = 25°C)

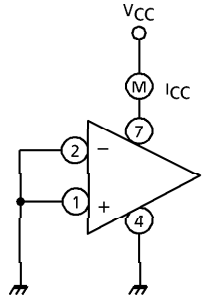
CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	± 18 or 36	V
Differential Input Voltage	DV_{IN}	± 36	V
Common Mode Input Voltage	CMV_{IN}	− 0.3~V_{CC}	V
Power Dissipation	P_D	500	mW
Operating Temperature	T_{opr}	− 40~85	°C
Storage Temperature	T_{stg}	− 55~125	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 5V、 Ta = 25°C)

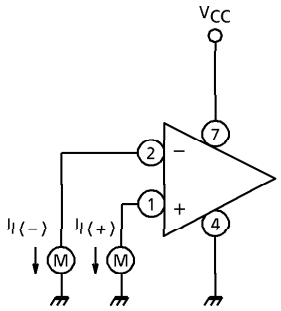
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V_{IO}	4	—	—	3	10	mV
Input Bias Current	I_I	2	—	—	25	250	nA
Input Offset Current	I_{IO}	2	—	—	5	50	nA
Common Mode Input Voltage	CMV_{IN}	4	—	0	—	V_{CC} − 1.5	V
Voltage Gain	G_V	—	R_L = 15kΩ	—	200	—	V / mV
Supply Current	I_{CC}	1	No Load	—	6	10	mA
Sink Current	I_{sink}	5	V_{IN} (+) = 0V, V_{IN} (−) = 1V, V_{OL} = 1.5V	80	100	—	mA
Output Voltage	V_{OL}	5	V_{IN} (+) = 0V, V_{IN} (−) = 1V, I_{sink} = 60mA	—	0.2	0.4	V
Output Leak Current	I_{LEAK}	3	V_{IN} (+) = 1V, V_{IN} (−) = 0V, V_O = 5V	—	0.1	—	nA
Response Time	t_{rsp}	6	R_L = 82Ω, C_L = 15pF	—	0.9	—	μs

TEST CIRCUIT

(1) I_{CC}

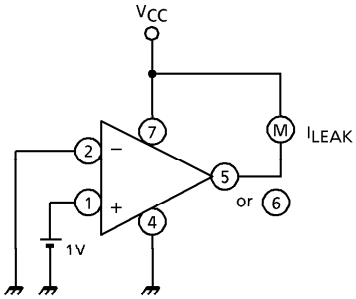


(2) I_I, I_{IO}

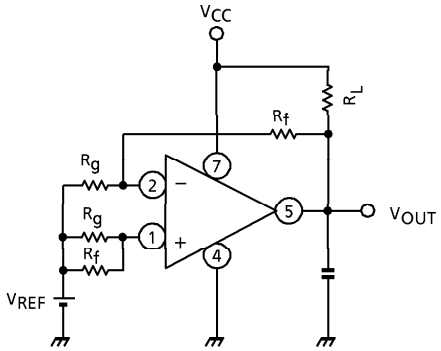


$I_{IO} = I_I(+) - I_I(-)$

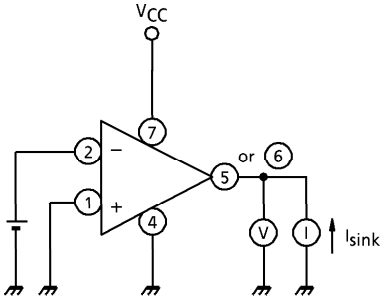
(3) I_{LEAK}



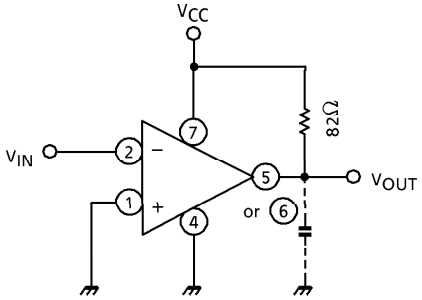
(4) V_{IO}, CMV_{IN}



(5) I_{sink}, V_{OL}

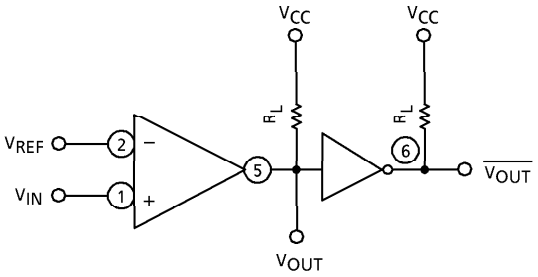


(6) t_{rsp}

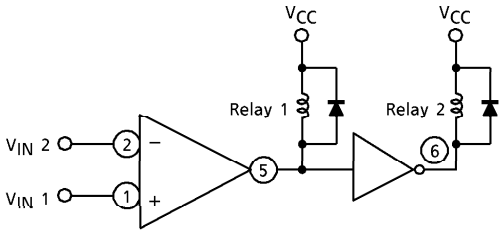


APPLICATION CIRCUIT

1. GENERAL COMPARATOR

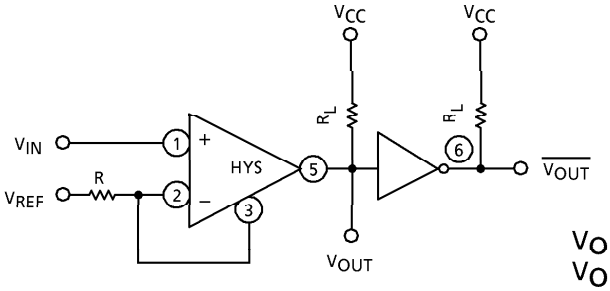


2. COMPARE WITH INPUT VOLTAGE

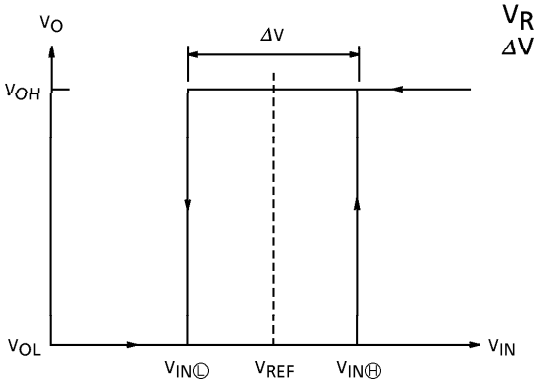


LED 2 IS LIGHTED AT V_{IN} 1>V_{IN} 2
LED 2 IS LIGHTED AT V_{IN} 1<V_{IN} 2

3. COMPARATOR WIDTH HYSTERESIS



V_{OH} : OUTPUT VOLTAGE ("H" LEVEL)
V_{OL} : OUTPUT VOLTAGE ("L" LEVEL)
V_{IN}Ⓗ : TURNOVER INPUT VOLTAGE ("H" LEVEL)
V_{IN}Ⓛ : TURNOVER INPUT VOLTAGE ("L" LEVEL)
V_{REF} : REFERENCE VOLTAGE
ΔV : HYSTERESIS WIDTH

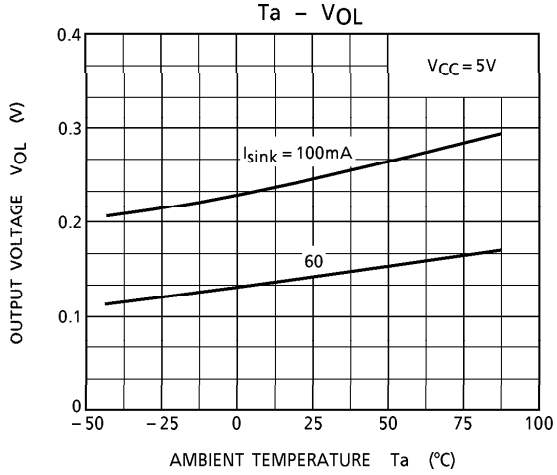


Calculate the Hysteresis width using the following equation

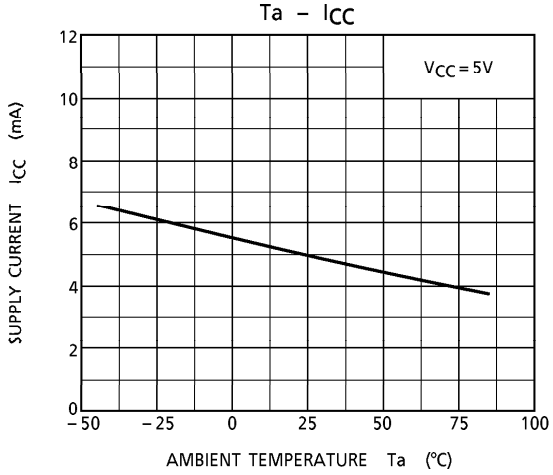
$$\Delta V \fallingdotseq (V_{CC} - 1.5)\frac{R}{R + 10} \qquad V_{CC}\,(V) \quad R\,(k\Omega)$$

CHARACTERISTICS

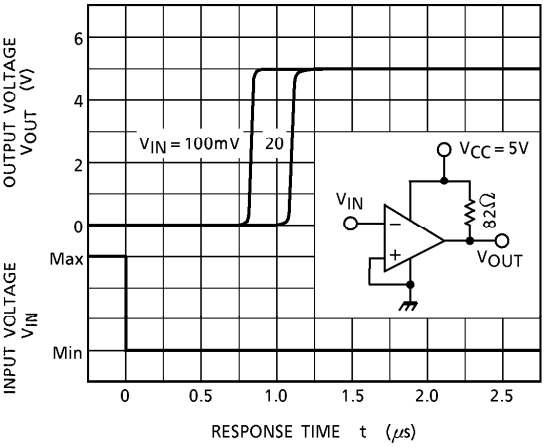
Ta – V_{OL}



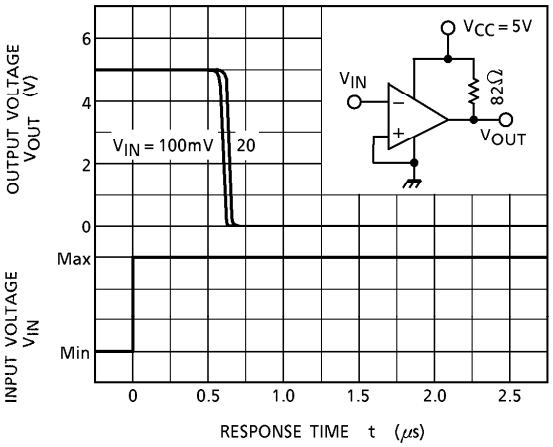
Ta – I_{CC}



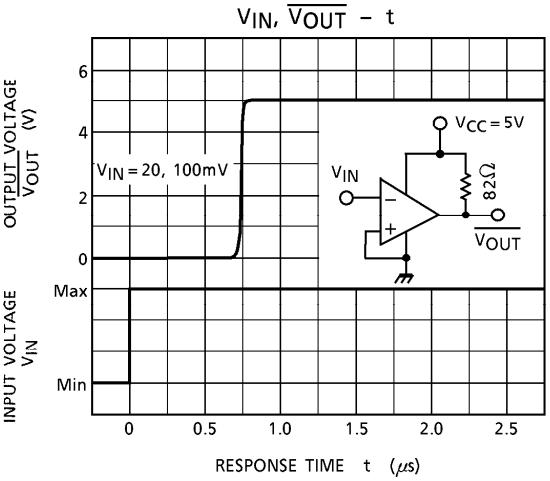
V_{IN}, V_{OUT} – t



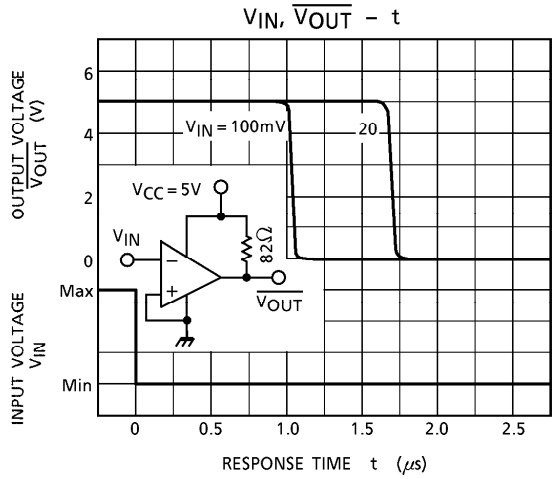
V_{IN}, V_{OUT} – t

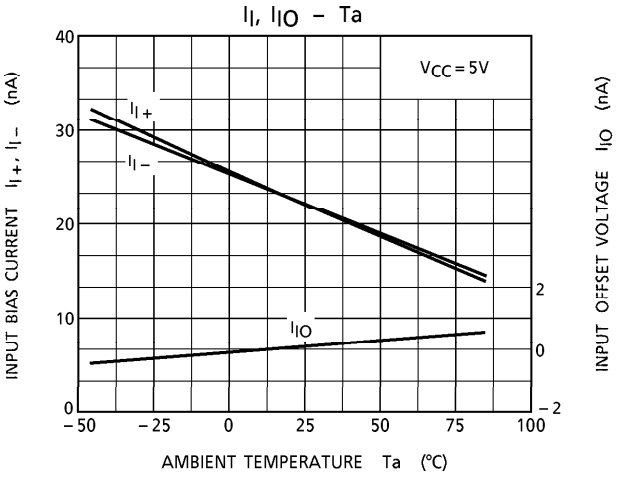


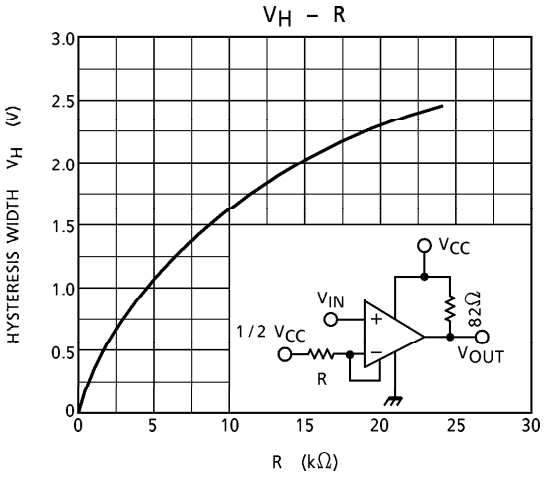
V_{IN}, $\overline{V_{OUT}}$ – t



V_{IN}, $\overline{V_{OUT}}$ – t



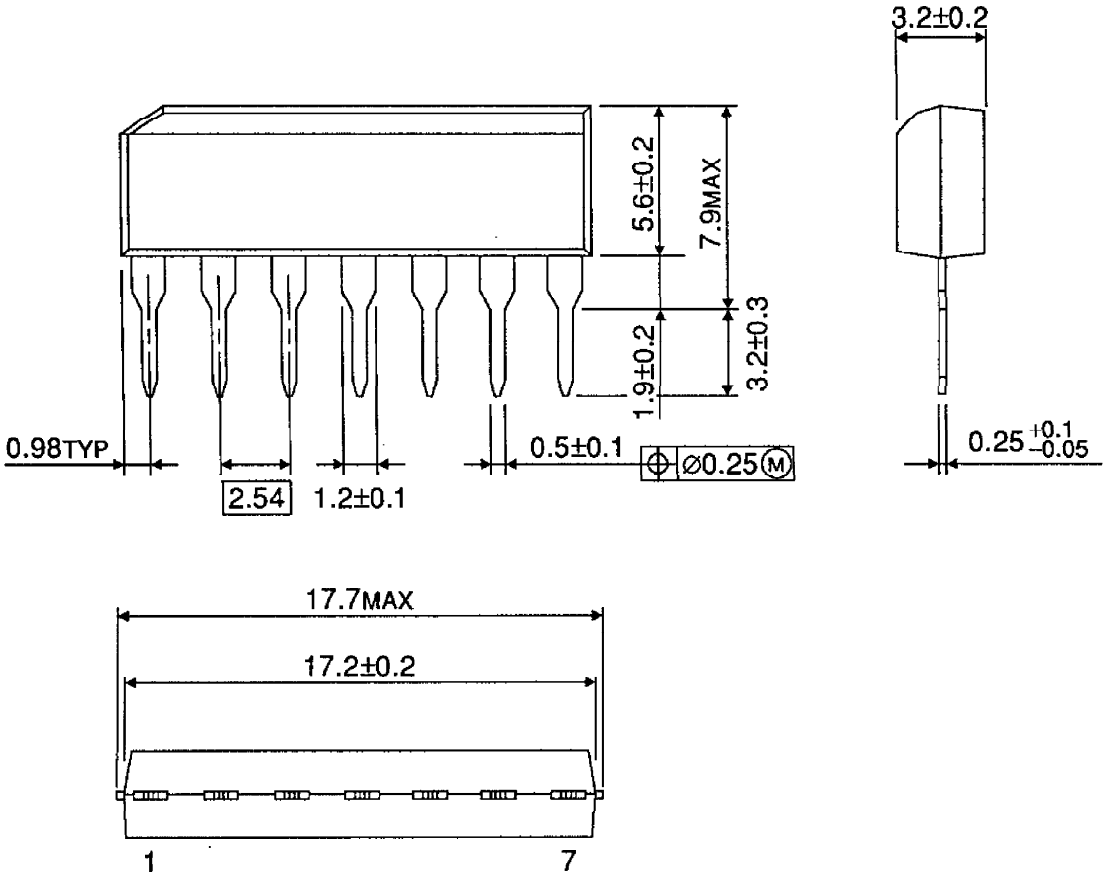

I_I, I_{IO} – Ta
V_{CC} = 5V
I_{I+}
I_{I-}
I_{IO}
INPUT BIAS CURRENT I_{I+}, I_{I-} (nA)
INPUT OFFSET VOLTAGE I_{IO} (nA)
AMBIENT TEMPERATURE Ta (°C)
40
30
20
10
0
2
0
– 2
– 50
– 25
0
25
50
75
100


V_H – R
HYSTERESIS WIDTH V_H (V)
R (kΩ)
3.0
2.5
2.0
1.5
1.0
0.5
0
0
5
10
15
20
25
30
V_{CC}
V_{IN}
1/2 V_{CC}
R
82Ω
V_{OUT}

OUTLINE DRAWING

SIP7-P-2.54A

Unit : mm



Weight : 0.7g (Typ.)