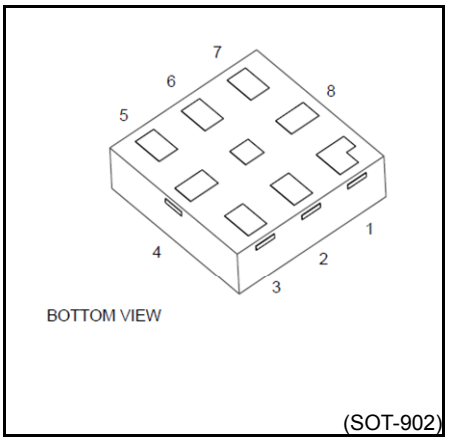
TOSHIBA CMOS Linear Integrated Circuit Silicon Monolithic

TC75W56L8X

Dual Comparator

TC75W56L8X is a CMOS type general-purpose dual comparator capable of single power supply operation and using lower supply currents than the conventional bipolar comparators. Its push-pull output can connect directly to logic IC's such as TTL and CMOS circuits.

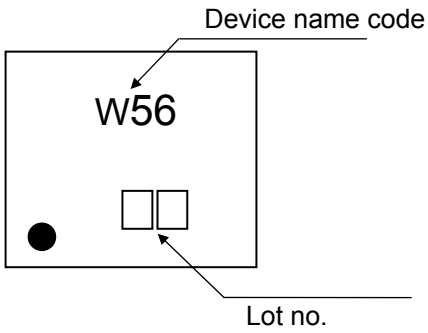


Weight: 3.1 mg (typ.)

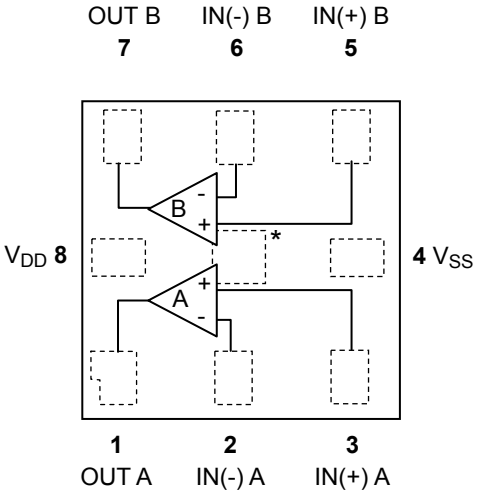
Features

- Low supply current: I_{DD} = 20μA (typ.)
- Single power supply operation
- Common mode input voltage range: V_{SS} to V_{DD}−0.9V
- Push-pull output circuit
- Low input bias current
- Small package

Marking (Top View)



Pin Assignment (Top view)



*Central pad is not a connected pin.

Absolute Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	N
Supply voltage	V_{DD}, V_{SS}	±3.5 or 7	V
Differential input voltage	ΔV_{IN}	±7	V
Input voltage	V_{IN}	$V_{SS\ to}$ V_{DD}	V
Output current	I_{OUT}	±35	mA
Power Dissipation	P_D	300 (Note1)	mW
Operating temperature	T_{opr}	−40 to 85	°C
Storage temperature	T_{stg}	−55 to 125	°C

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook (“Handling Precautions”/“Derating Concept and Methods”) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note: Since this product sometimes brings about latchcap, which is peculiar to CMOS devices, note the following points:

- Don’t raise the voltage level of I/O pins beyond V_{DD}, nor lower it below V_{SS}.
  Consider the timing for power supply, too.
- Don’t let any abnormal noise enter the device.

Note1: Mounted on an FR4 board.

Electrical Characteristics (V_{DD} = 5V, V_{SS} = GND, Ta = 25°C)

Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Input offset voltage	V_{IO}	—	—	—	±1	±7	mV
Input offset current	I_{IO}	—	—	—	1	—	pA
Input bias current	I_I	—	—	—	1	—	pA
Common-mode input voltage range	V_{ICM}	—	—	0	—	4.1	V
Supply current	I_{DD} (Note)	—	—	—	22	44	μA
Voltage gain	G_V	—	—	—	94	—	dB
Sink current	I_{SINK}	—	V_{OL} = 0.5V	13	25	—	mA
Source current	I_{SOURCE}	—	V_{OH} = 4.5V	9	21	—	mA
High-level Output voltage	V_{OL}	—	I_{SINK} = 5.0 mA	—	0.1	0.3	V
Low-level Output voltage	V_{OH}	—	I_{SOURCE} = 5.0 mA	4.7	4.9	—	
Operating supply voltage	V_{DD}	—	—	1.8	—	7.0	V
Propagation delay time (L/H)	t_{PLH} (1)	—	Over drive = 100mV	—	680	—	ns
	t_{PLH} (2)	—	TTL step input	—	500	—	
Propagation delay time (H/L)	t_{PHL} (1)	—	Over drive = 100mV	—	250	—	ns
	t_{PHL} (2)	—	TTL step input	—	380	—	
Response time	t_{TLH}	—	Over drive = 100mV	—	60	—	ns
	t_{THL}	—	Over drive = 100mV	—	8	—	

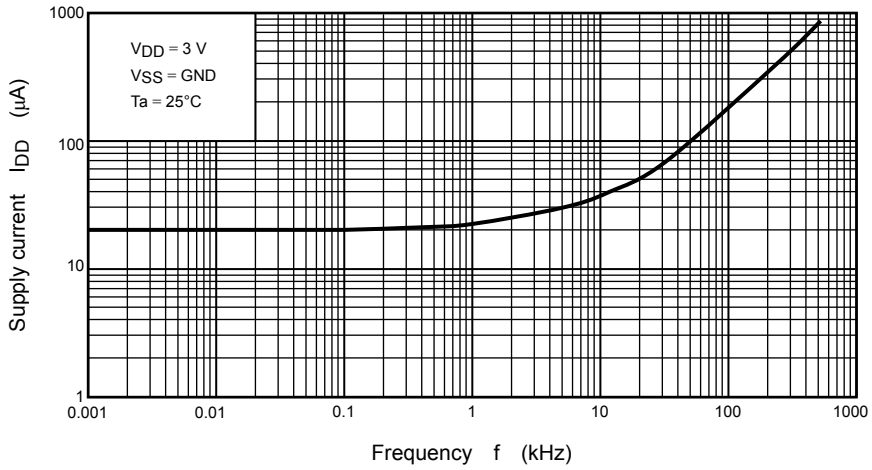
Note: Since this product causes an increase in current consumption with a rise in operational frequency, make sure that power consumption does not exceed the allowable dissipation.

Electrical Characteristics (V_{DD} = 3V, V_{SS} = GND, Ta = 25°C)

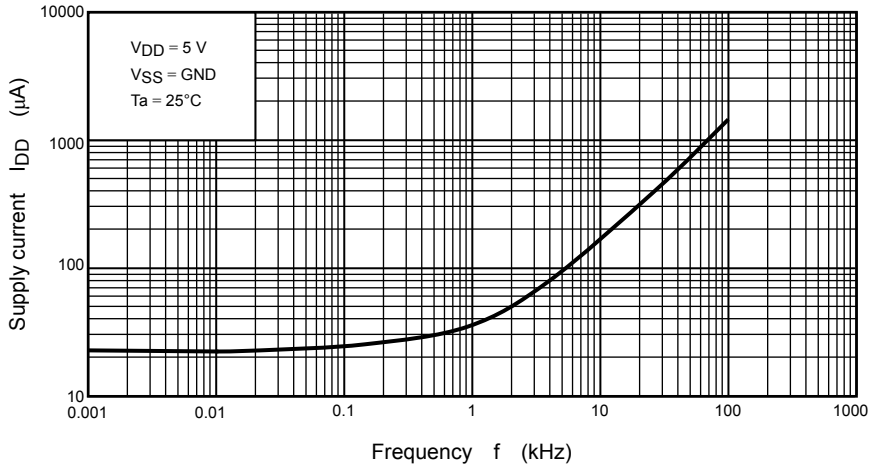
Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Input offset voltage	V_{IO}	—	—	—	±1	±7	mV
Input offset current	I_{IO}	—	—	—	1	—	pA
Input bias current	I_I	—	—	—	1	—	pA
Common-mode input voltage range	V_{ICM}	—	—	0	—	2.1	V
Supply current	I_{DD} (Note)	—	—	—	20	40	μA
Sink current	I_{SINK}	—	V_{OL} = 0.5V	6	18	—	mA
Source current	I_{SOURCE}	—	V_{OH} = 2.5V	3	15	—	mA
High-level Output voltage	V_{OL}	—	I_{SINK} = 5.0mA	—	0.15	0.35	V
Low-level Output voltage	V_{OH}	—	I_{SOURCE} = 5.0mA	2.65	2.85	—	
Propagation delay time (L/H)	t_{PLH}	—	Over drive = 100mV	—	550	—	ns
Propagation delay time (H/L)	t_{PHL}	—	Over drive = 100mV	—	250	—	ns
Response time	t_{TLH}	—	Over drive = 100mV	—	30	—	ns
	t_{THL}	—	Over drive = 100mV	—	8	—	

Note: Since this product causes an increase in current consumption with a rise in operational frequency, make sure that power consumption does not exceed the allowable dissipation.

I_{DD} – f


1000
100
10
1
0.001
0.01
0.1
1
10
100
1000
VDD = 3 V
VSS = GND
Ta = 25°C
Supply current IDD (μA)
Frequency f (kHz)

I_{DD} – f


10000
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10
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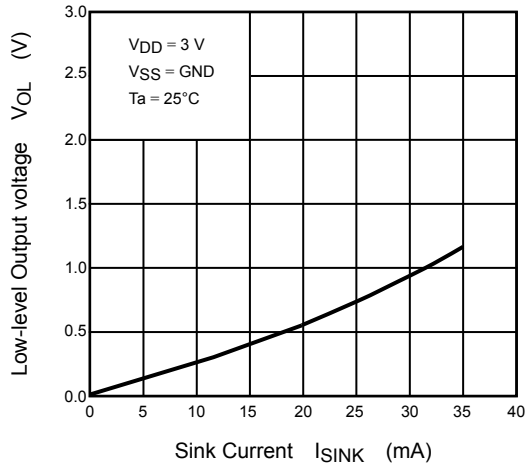
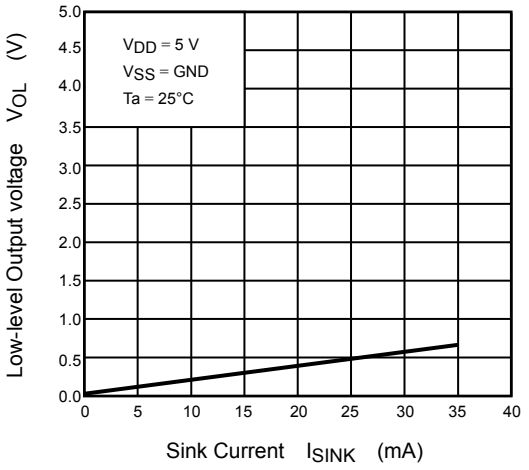
1000
VDD = 5 V
VSS = GND
Ta = 25°C
Supply current IDD (μA)
Frequency f (kHz)

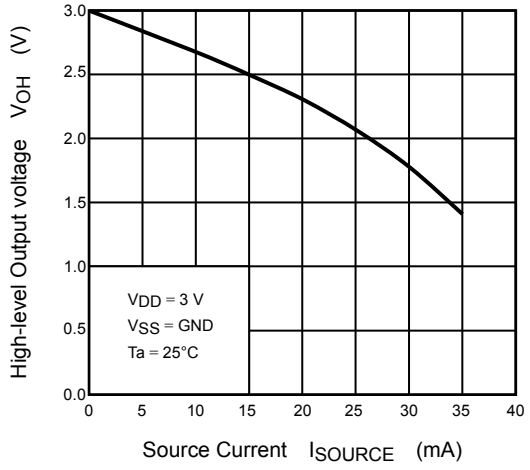
V_{OL} – I_{SINK}



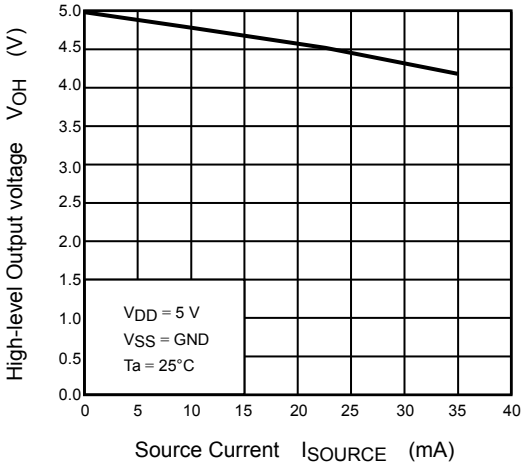
V_{OL} – I_{SINK}



V_{OH} – I_{SOURCE}

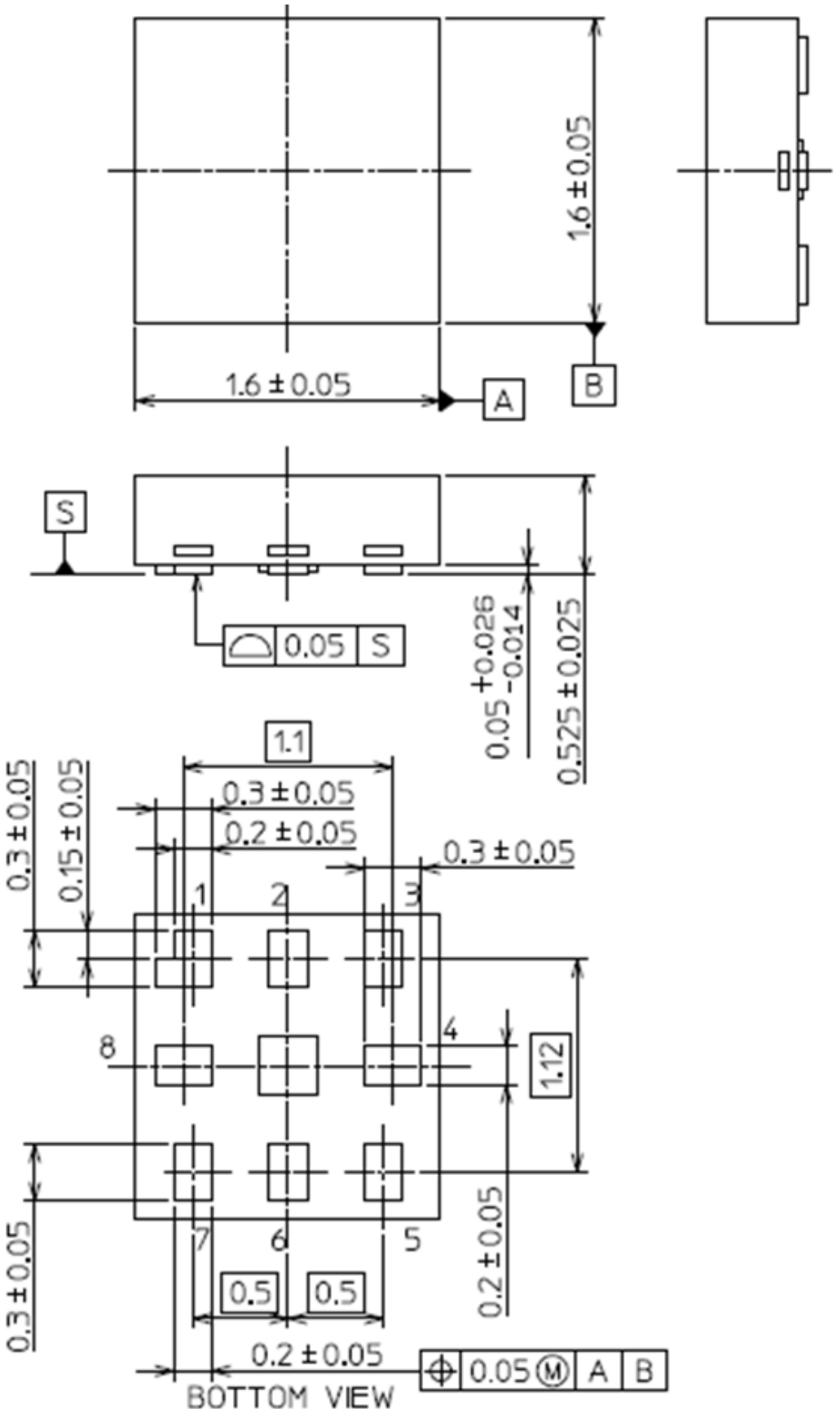


V_{OH} – I_{SOURCE}



Package Dimensions

Unit : mm



Weight : 3.1 mg (Typ.)

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