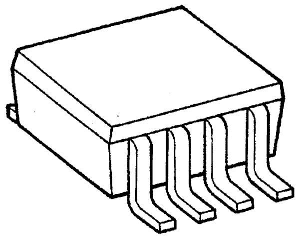
TOSHIBA CMOS Linear Integrated Circuit Silicon Monolithic

TC75W56FU,TC75W56FK

Dual Comparator

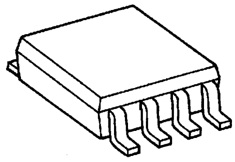
TC75W56 is a CMOS type general-purpose dual comparator capable of single power supply operation and using lower supply currents than the conventional bipolar comparators. Its push-pull output can connect directly to local IC's such as TTL and CMOS circuits.

TC75W56FU



SSOP8-P-0.65

TC75W56FK



SSOP8-P-0.50A

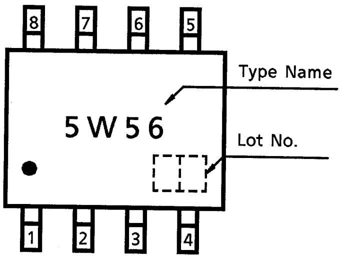
Weight
SSOP8-P-0.65 : 0.021g (typ.)
SSOP8-P-0.50A : 0.01g (typ.)

Features

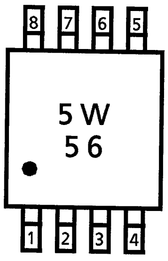
- Low supply current: $I_{DD} = 20\mu A$ (typ.)
- Single power supply operation
- Wide common mode input voltage range: V_{SS}~$V_{DD}-0.9V$
- Push-pull output circuit
- Low input bias current
- Small package

Marking (Top View)

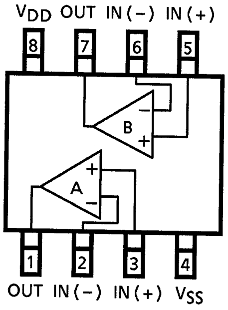
SM8



US8



Pin Connection (Top View)



Absolute Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	N
Supply voltage	V_{DD}, V_{SS}	±3.5 or 7	V
Differential input voltage	DV_{IN}	±7	V
Input voltage	V_{IN}	V_{SS}~V_{DD}	V
Output current	I_{OUT}	±3.5	mA
Power dissipation	P_D	250 (TC75W56FU)	mW
		200 (TC75W56FK)	
Operating temperature	T_{opr}	−40~85	°C
Storage temperature	T_{stg}	−55~125	°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.

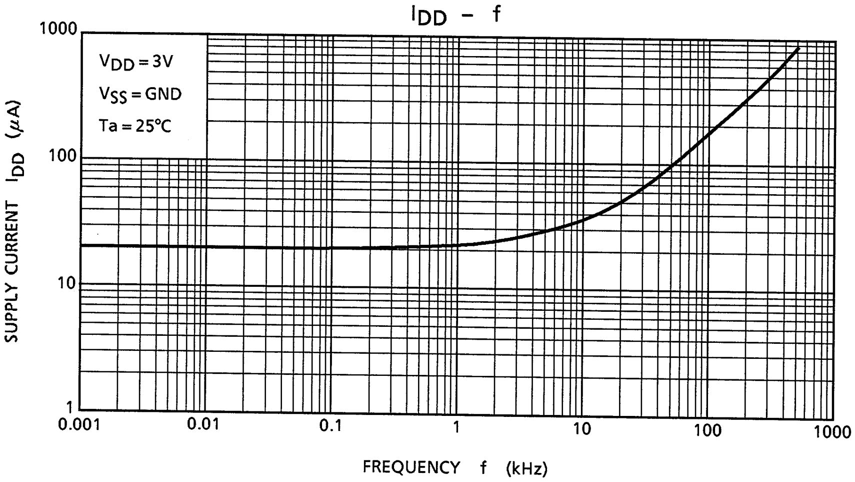
Electrical Characteristics (V_{DD} = 5V, V_{SS} = GND, Ta = 25°C)

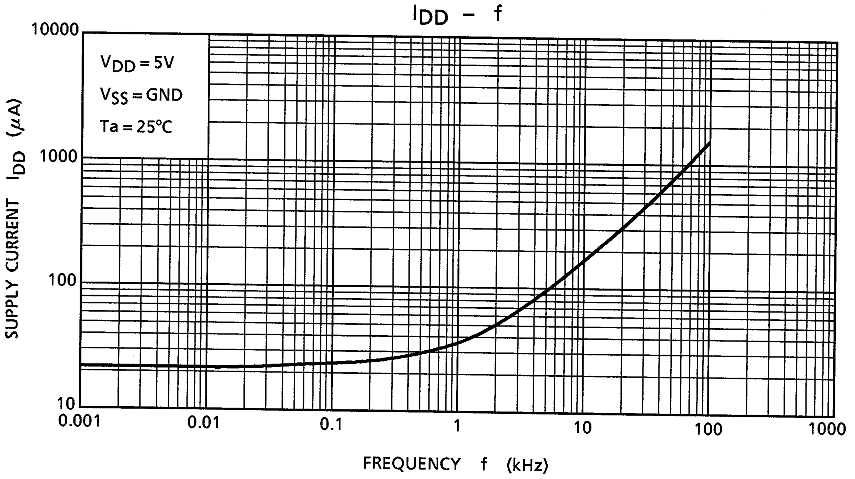
Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Input offset voltage	V_{IO}	—	—	—	±1	±7	mV
Input offset current	I_{IO}	—	—	—	1	—	pA
Input bias current	I_I	—	—	—	1	—	pA
Common mode input voltage	CMV_{IN}	—	—	0	—	4.1	V
Supply current	I_{DD} (Note)	—	—	—	22	44	μA
Voltage gain	G_V	—	—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

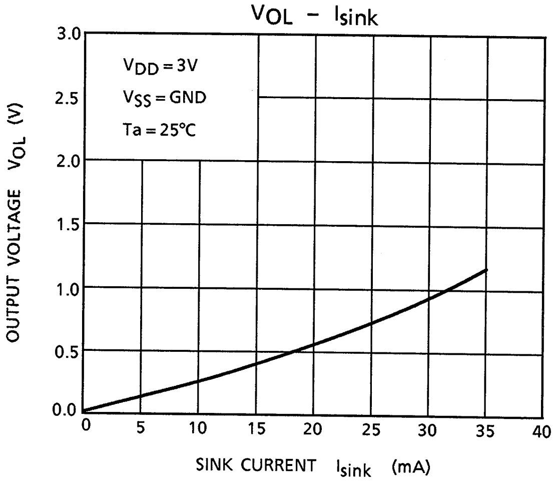
Electrical Characteristics (V_{DD} = 3V, V_{SS} = GND, Ta = 25°C)

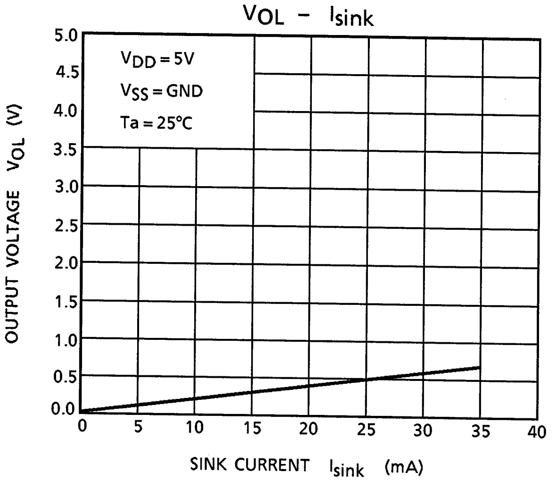
Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Input offset voltage	V_{IO}	—	—	—	±1	±7	mV
Input offset current	I_{IO}	—	—	—	1	—	pA
Input bias current	I_I	—	—	—	1	—	pA
Common mode input voltage	CMV_{IN}	—	—	0	—	2.1	V
Supply current	I_{DD} (Note)	—	—	—	20	40	μA
Sink current	I_{sink}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

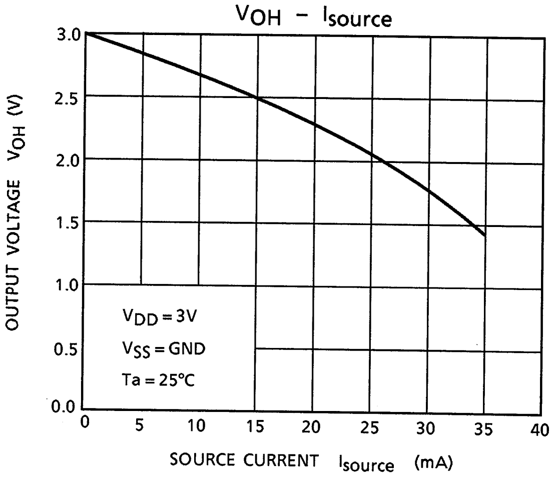
Note: Since this product causes an increase in current consumption with a rise in operational frequency, make sure that power consumption does not exceed the allowable dissipation.

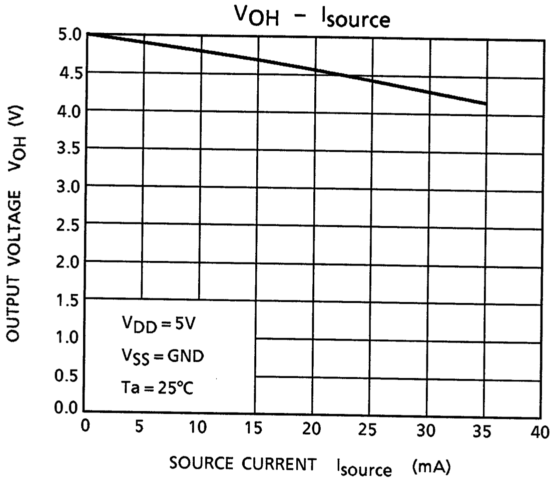

I_{DD} – f
V_{DD} = 3V
V_{SS} = GND
Ta = 25°C
SUPPLY CURRENT I_{DD} (μA)
1000
100
10
1
0.001
0.01
0.1
1
10
100
1000
FREQUENCY f (kHz)


I_{DD} – f
V_{DD} = 5V
V_{SS} = GND
Ta = 25°C
SUPPLY CURRENT I_{DD} (μA)
10000
1000
100
10
0.001
0.01
0.1
1
10
100
1000
FREQUENCY f (kHz)


V_{OL} – I_{sink}
V_{DD} = 3V
V_{SS} = GND
Ta = 25°C
OUTPUT VOLTAGE V_{OL} (V)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
5
10
15
20
25
30
35
40
SINK CURRENT I_{sink} (mA)

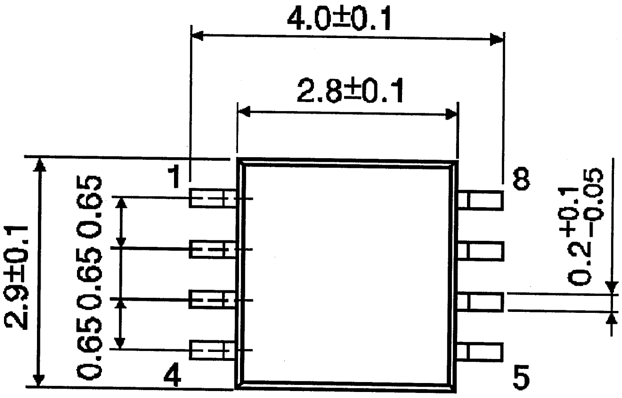

V_{OL} – I_{sink}
V_{DD} = 5V
V_{SS} = GND
Ta = 25°C
OUTPUT VOLTAGE V_{OL} (V)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
5
10
15
20
25
30
35
40
SINK CURRENT I_{sink} (mA)

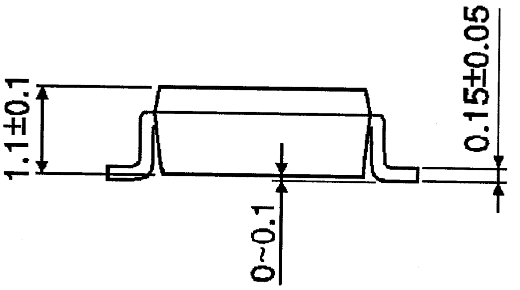

V_{OH} – I_{source}
V_{DD} = 3V
V_{SS} = GND
Ta = 25°C
OUTPUT VOLTAGE V_{OH} (V)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
5
10
15
20
25
30
35
40
SOURCE CURRENT I_{source} (mA)


V_{OH} – I_{source}
V_{DD} = 5V
V_{SS} = GND
Ta = 25°C
OUTPUT VOLTAGE V_{OH} (V)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
5
10
15
20
25
30
35
40
SOURCE CURRENT I_{source} (mA)

Package Dimensions

SSOP8-P-0.65 Unit: mm

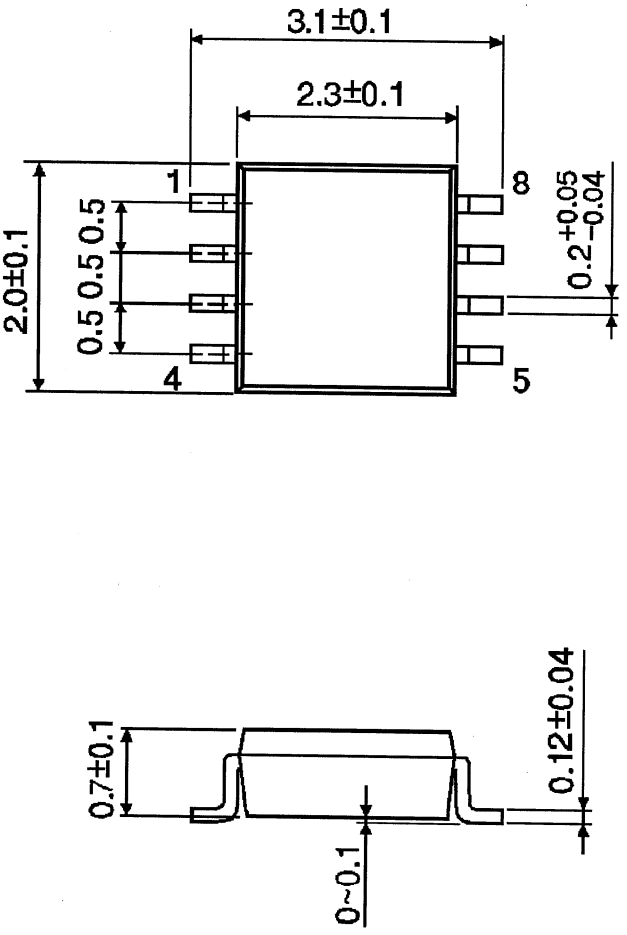




Weight: 0.021g(typ.)

Package Dimensions

SSOP8-P-0.50A Unit: mm



Weight: 0.01g(typ.)

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20070701-EN GENERAL

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