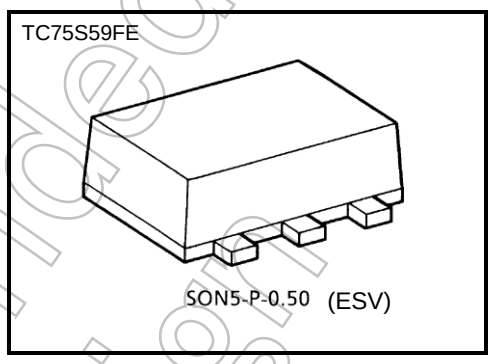
TOSHIBA CMOS Linear Integrated Circuit Silicon Monolithic

TC75S59FE

Single Comparator

The TC75S59FE is a CMOS general-purpose single comparator. The device can operate off a single power supply and draws a lower supply current than a conventional bipolar general-purpose comparator. This device's open-drain output stage can be wire-ORed with those of other open-drain output circuits.

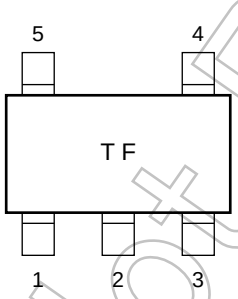


Weight
SON5-P-0.50 : 0.003 g (typ.)

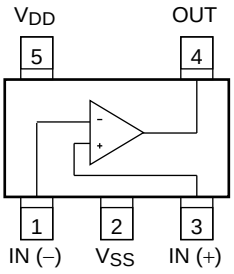
Features

- Low-current power supply : I_{DD} = 100 μA (typ.)
- Single power supply operation: VDD = ±0.9 to ±3.5 V or 1.8 to 7 V
- Wide common mode input voltage range: V_{SS} to V_{DD} − 0.9 V
- Open drain output circuit
- Low input bias current
- Small package

Marking (top view)



Pin Connection (top view)



Start of commercial production
1997-02

Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Supply voltage	V_{DD}, V_{SS}	±3.5 or 7	V
Differential input voltage	DV_{IN}	±7	V
Input voltage	V_{IN}	V_{SS} to V_{DD}	V
Output current	I_O	±35	mA
Power dissipation	P_D	100	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: This device’s CMOS structure makes it prone to latch-up. To prevent latch-up, please take the following precautions:

- Ensure that no I/O pin’s voltage level ever exceeds V_{DD} or drops below V_{SS}.
  In addition, check the power-on timing.
- Do not subject the device to excessive noise.

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

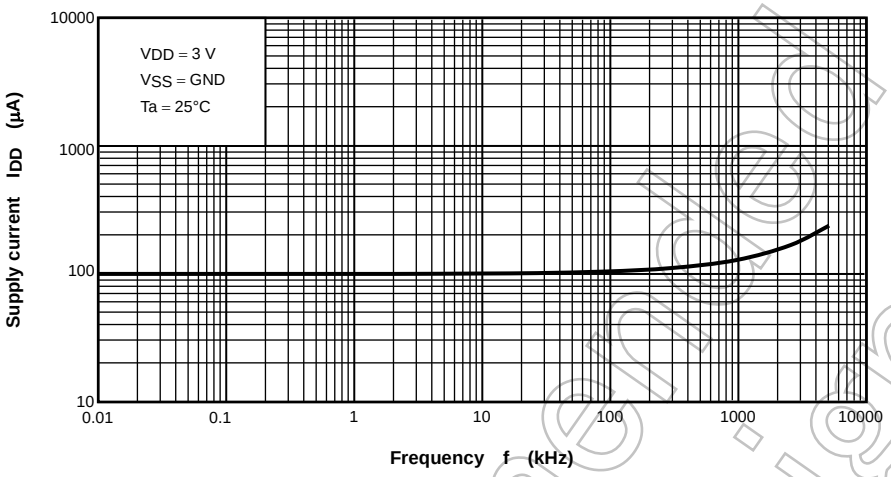
Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Input offset voltage	V_{IO}	—	—	—	±1	±7	mV
Input offset current	I_{IO}	—	—	—	1	—	pA
Input bias current	I_I	—	—	—	1	—	pA
Common mode input voltage	CMV_{IN}	—	—	0	—	4.1	V
Supply current	I_{DD} (Note)	—	—	—	110	220	μA
Voltage gain	G_V	—	—	—	94	—	dB
Sink current	I_{sink}	—	V_{OL} = 0.5 V	13	25	—	mA
Output leak current	I_{LEAK}	—	V_O = 5 V	—	5	—	nA
Output voltage	V_{OL}	—	I_{sink} = 5.0 mA	—	0.1	0.3	V
Operating supply voltage	V_{DD}	—	—	1.8	—	7.0	V
Propagation delay time (turn on)	t_{PLH} (1)	—	Over drive = 100 mV	—	200	—	ns
	t_{PLH} (2)	—	TTL step input	—	140	—	
Propagation delay time (turn off)	t_{PHL} (1)	—	Over drive = 100 mV	—	80	—	ns
	t_{PHL} (2)	—	TTL step input	—	60	—	
Response time	t_{TLH}	—	Over drive = 100 mV	—	160	—	ns
	t_{THL}	—	Over drive = 100 mV	—	3	—	

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

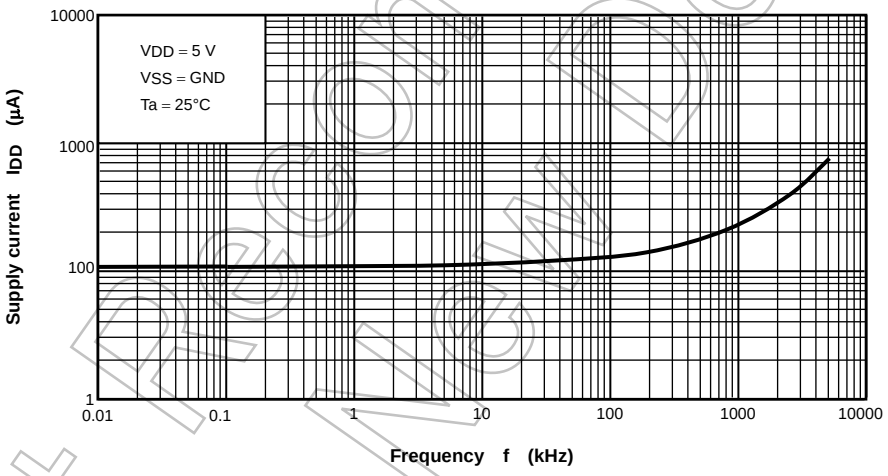
Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Input offset voltage	V_{IO}	—	—	—	±1	±7	mV
Input offset current	I_{IO}	—	—	—	1	—	pA
Input bias current	I_I	—	—	—	1	—	pA
Common mode input voltage	CMV_{IN}	—	—	0	—	2.1	V
Supply current	I_{DD} (Note)	—	—	—	100	200	μA
Sink current	I_{sink}	—	V_{OL} = 0.5 V	6	18	—	mA
Output leak current	I_{LEAK}	—	V_O = 3 V	—	5	—	nA
Output voltage	V_{OL}	—	I_{sink} = 5.0 mA	—	0.15	0.35	V
Propagation delay time (turn on)	t_{PLH}	—	Over drive = 100 mV	—	160	—	ns
Propagation delay time (turn off)	t_{PHL}	—	Over drive = 100 mV	—	70	—	ns
Response time	t_{TLH}	—	Over drive = 100 mV	—	170	—	ns
	t_{THL}	—	Over drive = 100 mV	—	3	—	

Note: This device's current consumption increases as its operating frequency increases. Note that the power dissipation should not exceed the allowable power dissipation.

I_{DD} – f

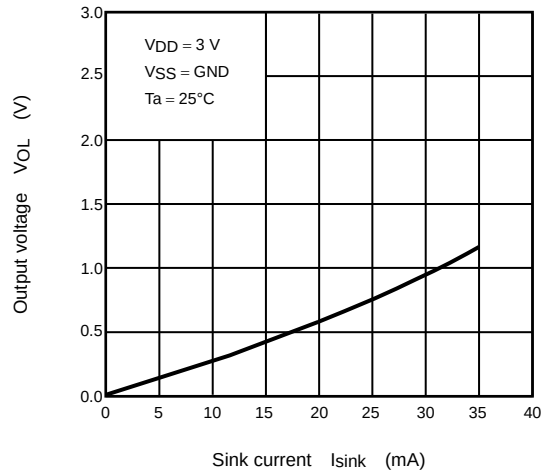


I_{DD} – f

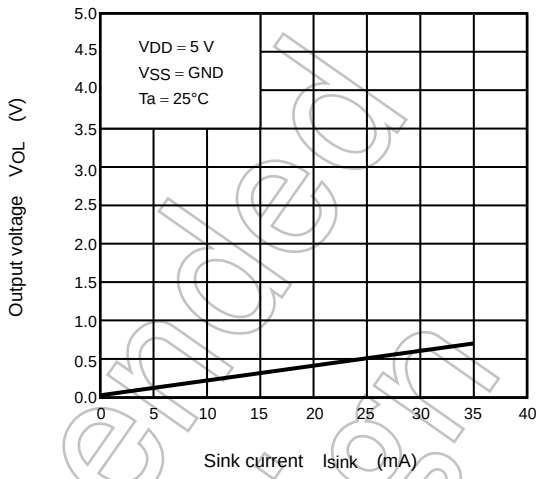


The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

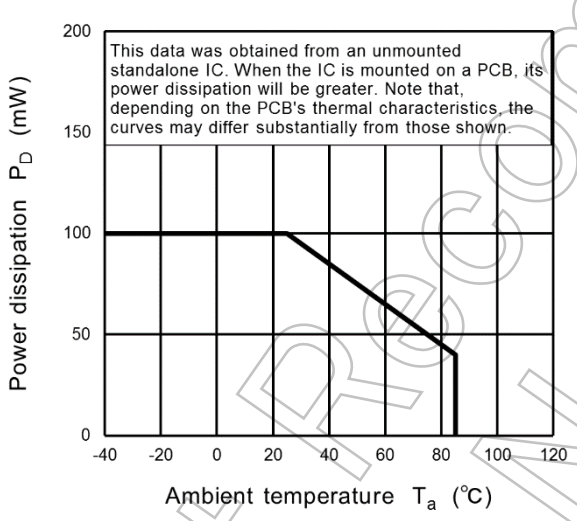
V_{OL} – I_{sink}



V_{OL} – I_{sink}



P_D – Ta



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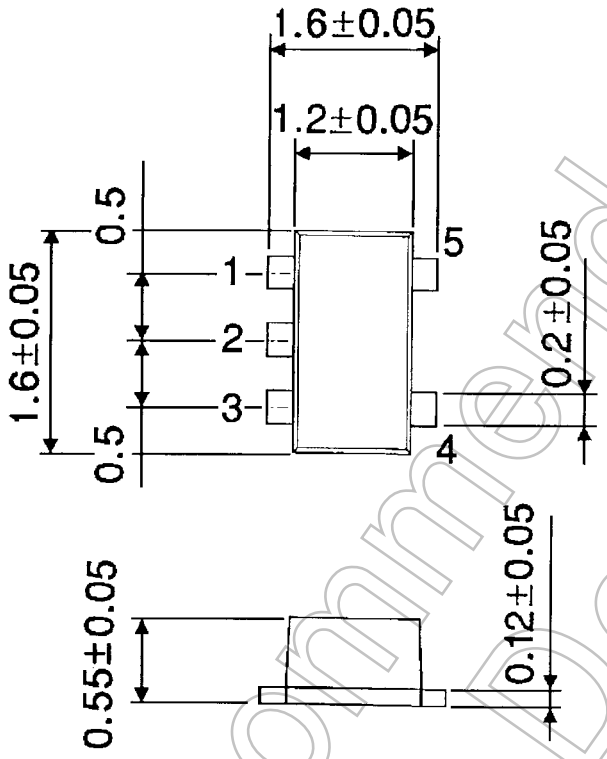
Package Dimensions

SON5-P-0.50 Unit : mm



Weight: 0.003 g (typ.)

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