

TOSHIBA CMOS Linear Integrated Circuit Silicon Monolithic

TC75S59AFE, TC75S59AFC

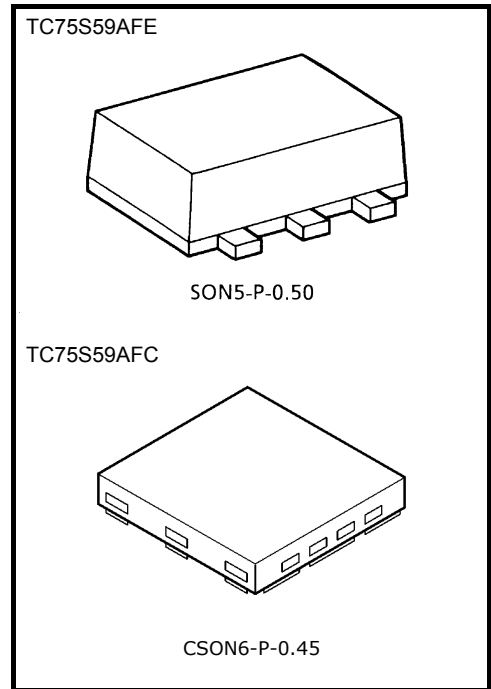
Single Comparator (Open-Drain Output)

The TC75S59AFE and TC75S59AFC are CMOS general-purpose single comparators. The devices can operate from a single supply voltage and are designed for a lower supply-current than conventional general-purpose bipolar comparators. The output is designed for Open-Drain Output and can supply a higher voltage than the power supply. Therefore, it is possible to pull-up the voltage to a level higher than that of the power supply. The Open-Drain Output can be wired-OR with another Open-Drain Output circuit.

* Output voltage should not exceed the maximum rating.

Features

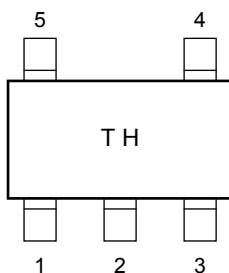
- Low Supply Current: $I_{DD} = 100 \mu A$ (typ.)
- Single Power Supply Operation
- Wide Common Mode Input Voltage Range: $V_{SS} \sim V_{DD} - 0.9 V$
- Open-Drain Output Circuit
- Low Input Bias Current
- Small Package



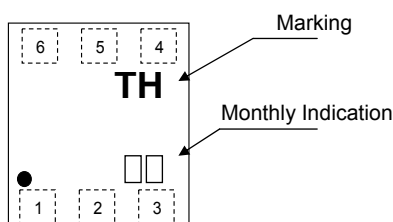
Weight
 SON5-P-0.50 : 0.003 g (typ.)
 CSON6-P-0.45 : 0.002 g (typ.)

Marking (top view)

TC75S59AFE

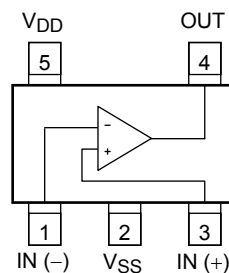


TC75S59AFC

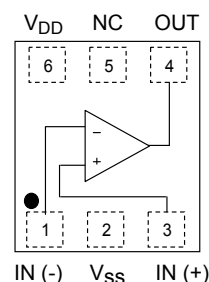


Pin Assignment (top view)

TC75S59AFE



TC75S59AFC



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} ~V _{DD}	V	
Output Current	I _O	±35	mA	
Output Voltage	V _O	V _{SS} ~ V _{SS} + 7	V	
Power Dissipation	P _D	TC75S59AFE	100	mW
		TC75S59AFC	100 (Note 1)	
Operating Temperature	T _{opr}	-40~85	°C	
Storage Temperature	T _{stg}	-55~125	°C	

Note: Due to the CMOS structure, this device may be susceptible 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.

(Note 1) : FR4 in board implementation
(25.4mm × 25.4mm × 1.6t, Cu Pad: 0.4mm²)

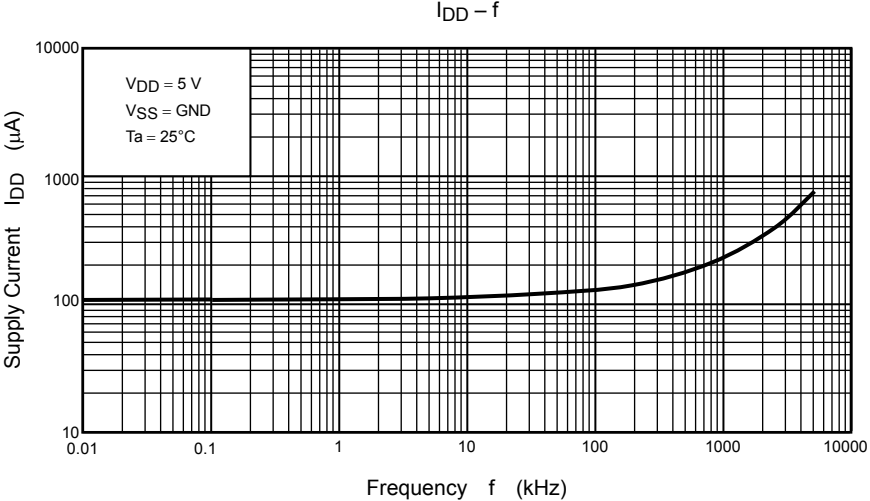
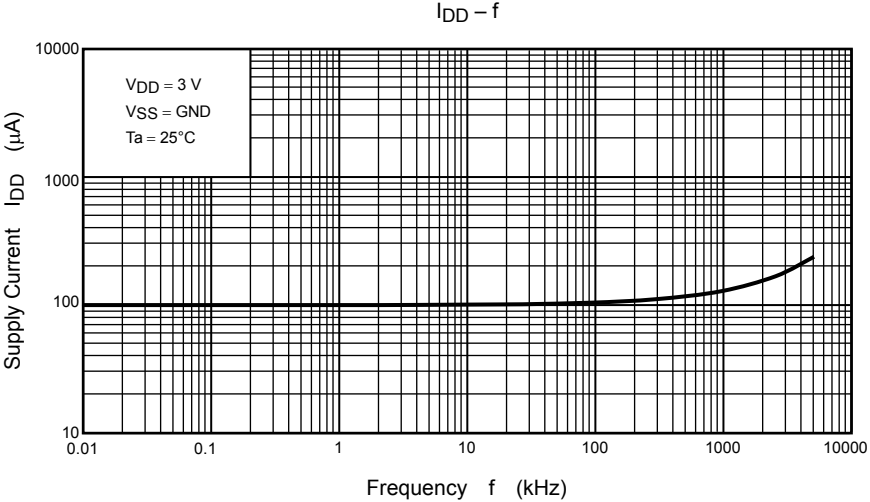
Electrical Characteristics ($V_{DD} = 5\text{ V}$, $V_{SS} = \text{GND}$, $T_a = 25^\circ\text{C}$)

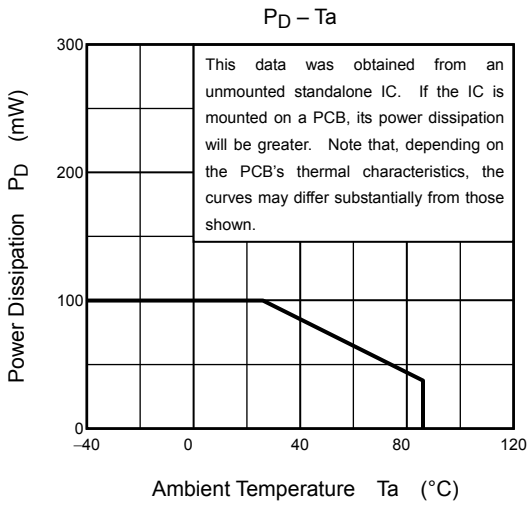
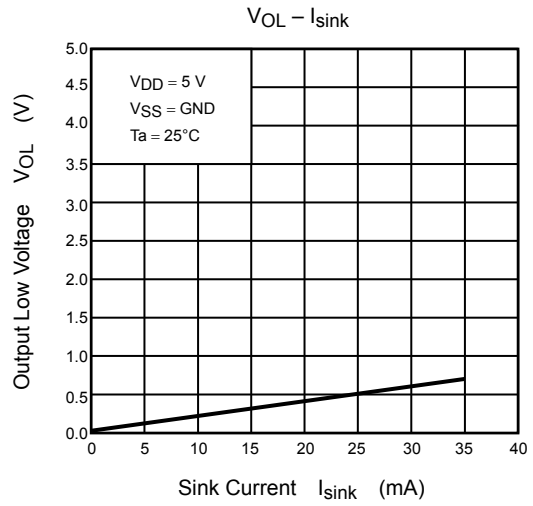
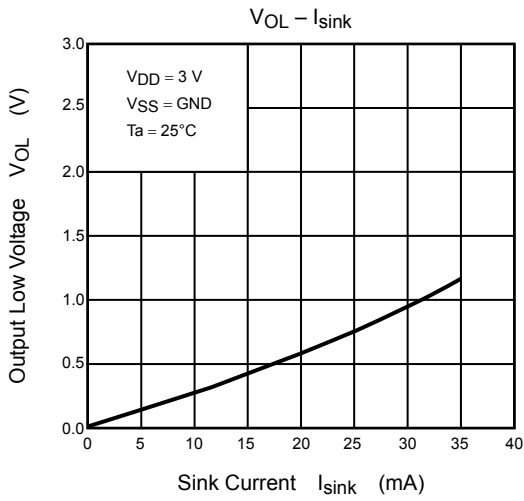
Characteristics	Symbol	Test Circuit	Test Condition	Min.	Typ.	Max.	Unit
Input Offset Voltage	V_{IO}	—	—	—	± 1	± 7	mV
Input Offset Current	I_{IO}	—	—	—	1	—	pA
Input Bias Current	I_I	—	—	—	1	—	pA
Common Mode Input Voltage	CMV_{IN}	—	—	0	—	4.1	V
Supply Current	$I_{DD}(\text{Note1})$	—	—	—	110	220	μA
Voltage Gain	G_V	—	—	—	94	—	dB
Sink Current	I_{sink}	—	$V_{OL} = 0.5\text{ V}$	13	25	—	mA
Output Leakage Current	I_{LEAK}	—	$V_{DD} = 5\text{ V}$, $V_O = 5\text{ V}$	—	5	—	nA
Off-state Leakage Current	I_{OFF}	—	$V_{DD} = 0\text{ V}$, $V_O = 5\text{ V}$	—	5	—	nA
Output Low Voltage	V_{OL}	—	$I_{\text{sink}} = 5.0\text{ mA}$	—	0.1	0.3	V
Operating Supply Voltage Range	V_{DD}	—	—	1.8	—	7.0	V
Propagation Delay (Turn on)	$t_{PLH}(1)$	—	Over Drive = 100 mV	—	200	—	ns
	$t_{PLH}(2)$	—	TTLStep Input	—	140	—	
Propagation Delay (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 ($V_{DD} = 3\text{ V}$, $V_{SS} = \text{GND}$, $T_a = 25^\circ\text{C}$)

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	$I_{DD}(\text{Note1})$	—	—	—	100	200	μA
Sink Current	I_{sink}	—	$V_{OL} = 0.5\text{ V}$	6	18	—	mA
Output Leakage Current	I_{LEAK}	—	$V_{DD} = 3\text{ V}$, $V_O = 3\text{ V}$	—	5	—	nA
Off-State Leakage Current	I_{OFF}	—	$V_{DD} = 0\text{ V}$, $V_O = 3\text{ V}$	—	5	—	nA
Output Low Voltage	V_{OL}	—	$I_{\text{sink}} = 5.0\text{ mA}$	—	0.15	0.35	V
Propagation Delay (Turn On)	t_{PLH}	—	Over Drive = 100 mV	—	160	—	ns
Propagation Delay (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: The current consumption of this device increases as its operating frequency increases. Note that the power dissipation should not exceed the allowable power.

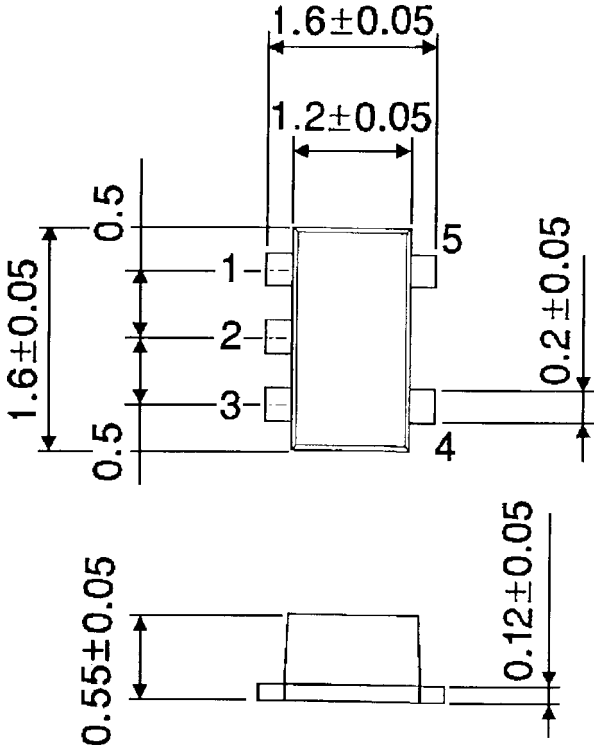




Package Dimensions

SON5-P-0.50

Unit : mm

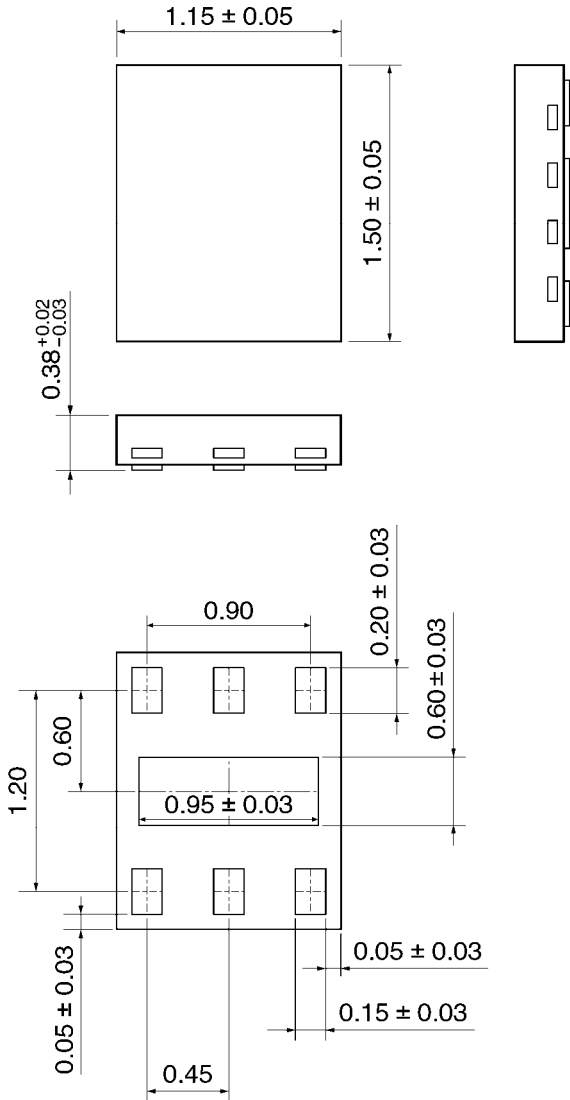


Weight: 0.003 g (Typ.)

Package Dimensions

CSON6-P-0.45

Unit: mm



Weight: 0.002 g (Typ.)

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