

TOSHIBA CMOS Linear Integrated Circuit Silicon Monolithic

TC75S58AFE, TC75S58AFC

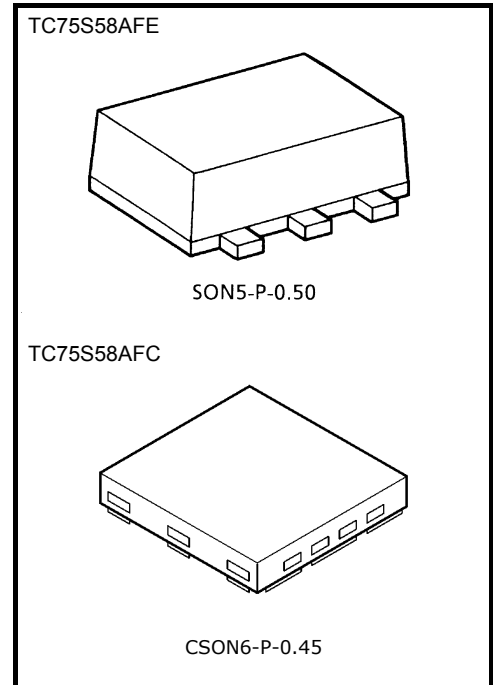
Single Comparator (Open-Drain Output)

The TC75S58AFE and TC75S58AFC 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.

Feature

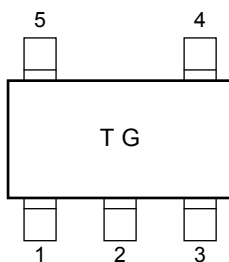
- Low Supply Current: $I_{DD} = 10 \mu A$ (typ.)
- Single Power Supply Operation
- Wide Common Mode Input: V_{SS} to $V_{DD} - 0.9 V$
- Open-Drain Output Circuit
- Low Input Bias Current
- Small Package



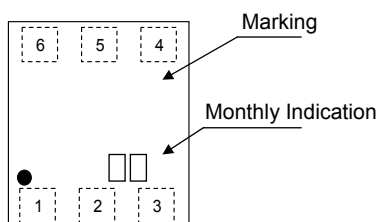
Weight
SON5-P-0.50 : 0.003 g (typ.)
CSON6-P-0.45 : 0.002 g (typ.)

Marking (top view)

TC75S58AFE

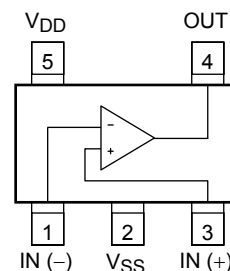


TC75S58AFC

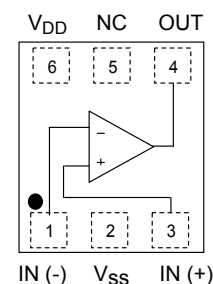


Pin Assignment (top view)

TC75S58AFE



TC75S58AFC



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	
Output Voltage	V _O	V _{SS} to V _{SS} + 7	V	
Power Dissipation	P _D	TC75S58AFE	100	mW
		TC75S58AFC	100 (Note1)	
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: 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 Input pin 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)

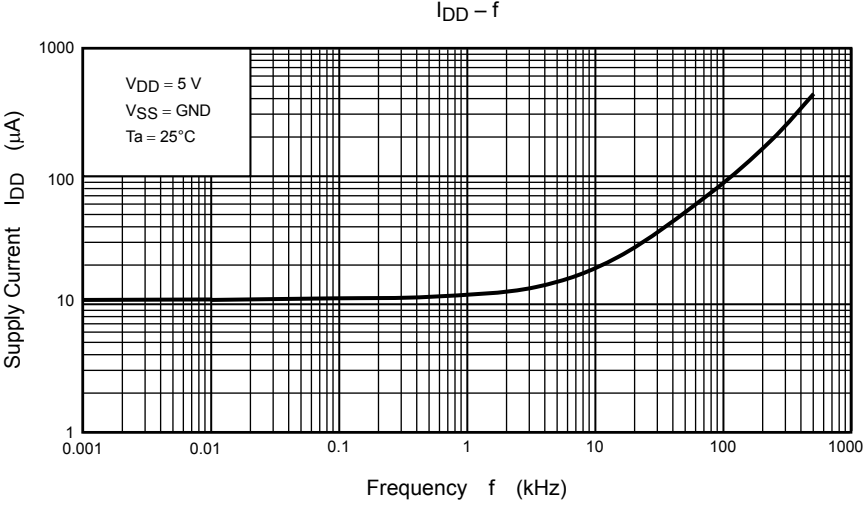
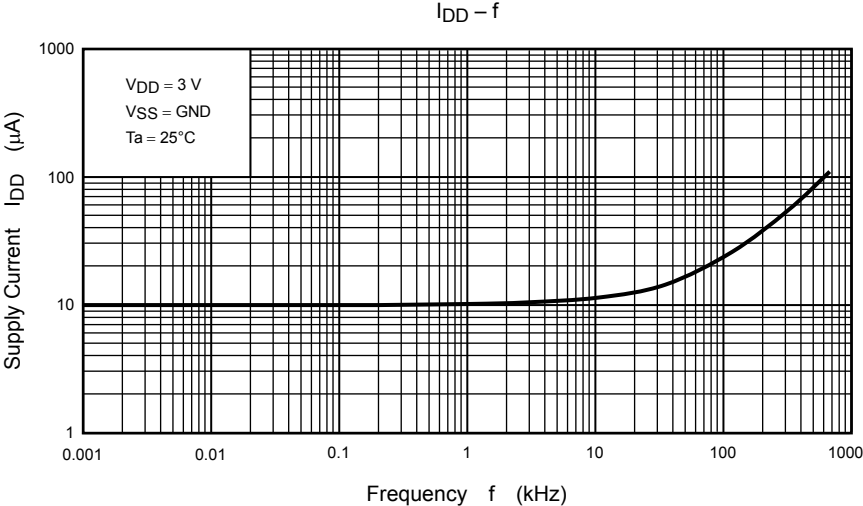
Electrical Characteristics ($V_{DD} = 5\text{ V}$, $V_{SS} = \text{GND}$, $T_a = 25^\circ\text{C}$)

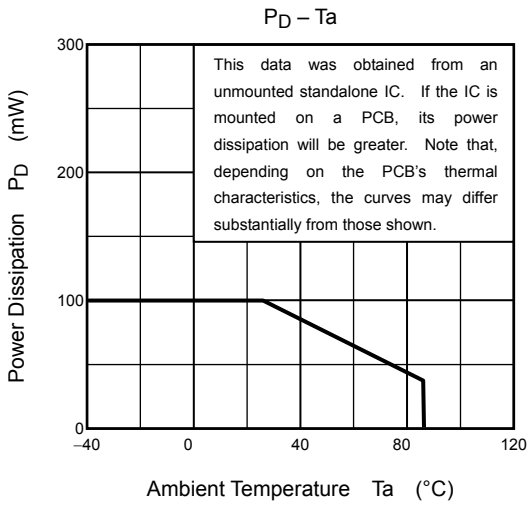
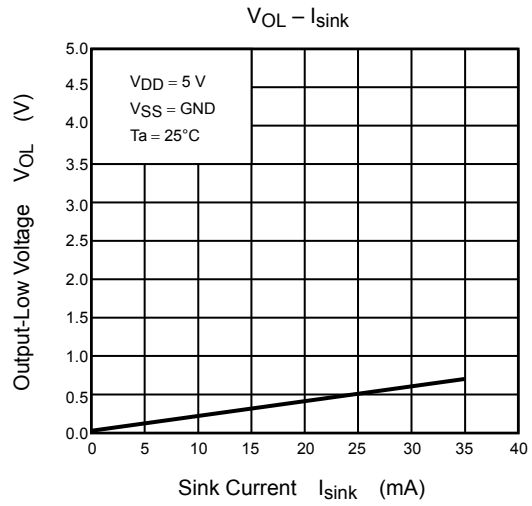
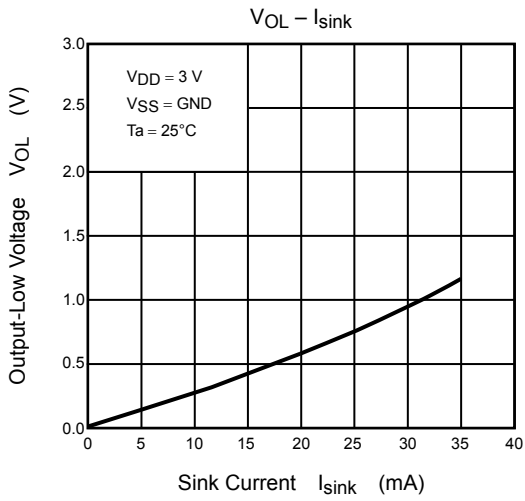
Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Input Offset Voltage	V_{IO}	—	—	—	± 1	± 7	mV
Input Offset Current	I_{IO}	—	—	—	1	—	pA
Input Bias Current	I_I	—	—	—	1	—	pA
Common Mode Input Voltage	CMV_{IN}	—	—	0	—	4.1	V
Supply Current	I_{DD} (Note)	—	—	—	11	22	μA
Voltage Gain	G_V	—	—	—	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}	—	$I_{sink} = 5.0\text{ mA}$	—	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	—	800	—	ns
	t_{PLH} (2)	—	TTL Step Input	—	620	—	
Propagation Delay (Turn Off)	t_{PHL} (1)	—	Over Drive = 100 mV	—	230	—	ns
	t_{PHL} (2)	—	TTL Step Input	—	350	—	
Response Time	t_{TLH}	—	Over Drive = 100 mV	—	190	—	ns
	t_{THL}	—	Over Drive = 100 mV	—	6	—	

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} (Note)	—	—	—	10	20	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}	—	$I_{sink} = 5.0\text{ mA}$	—	0.15	0.35	V
Propagation Delay (Turn On)	t_{PLH}	—	Over Drive = 100 mV	—	590	—	ns
Propagation Delay (Turn Off)	t_{PHL}	—	Over Drive = 100 mV	—	230	—	ns
Response Time	t_{TLH}	—	Over Drive = 100 mV	—	170	—	ns
	t_{THL}	—	Over Drive = 100 mV	—	5	—	

Note: The current consumption of this device increases as its operating frequency increases. Note that the power dissipation should not exceed the allowable power.

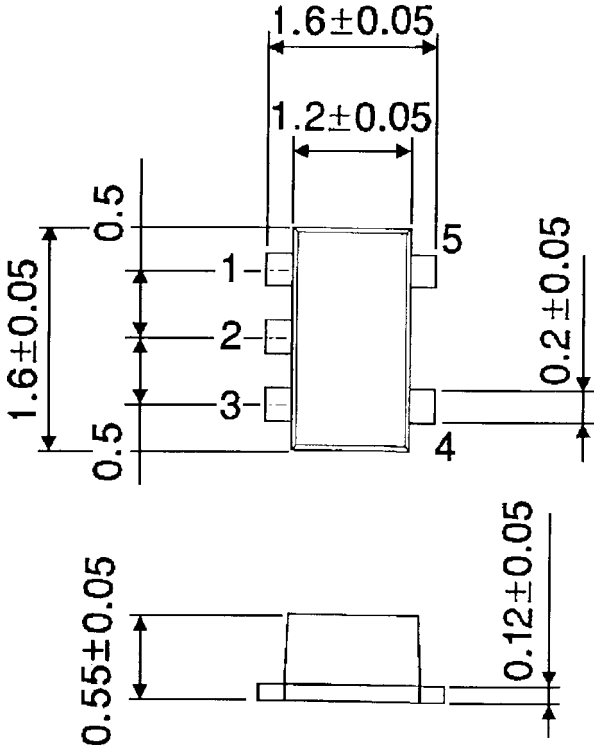




Package Dimension

SON5-P-0.50

Unit : mm

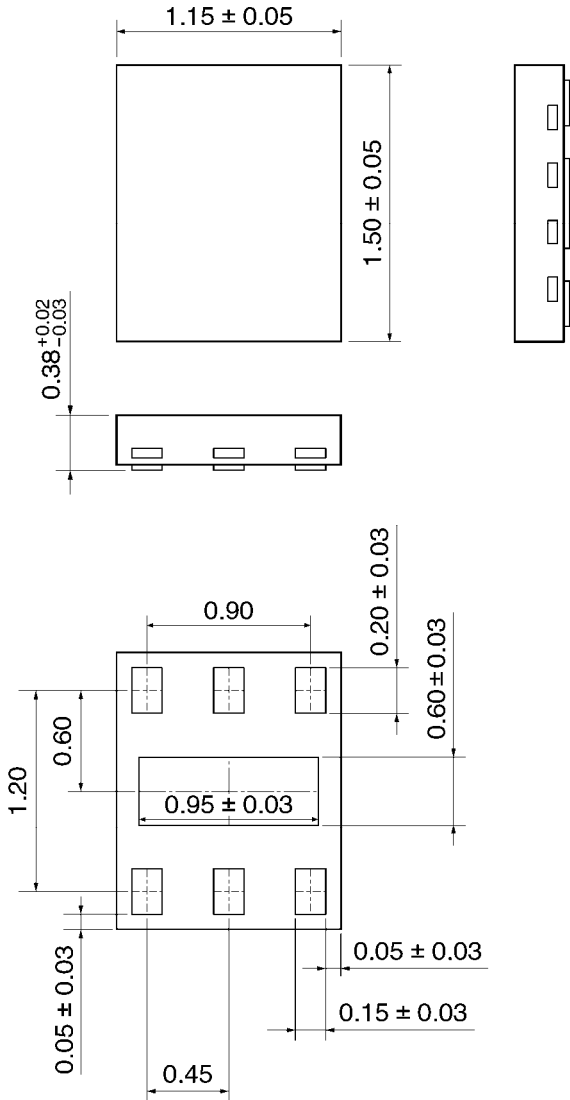


Weight: 0.003 g (typ.)

Package Dimension

CSON6-P-0.45

Unit: mm



Weight: 0.002 g (typ.)

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