

TOSHIBA CMOS Linear Integrated Circuit Silicon Monolithic

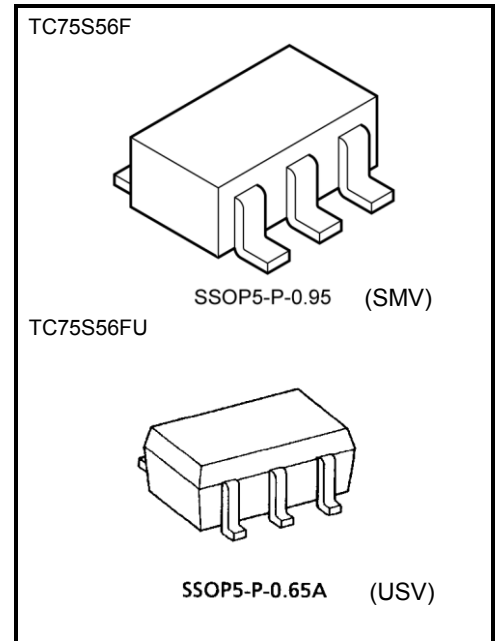
## TC75S56F, TC75S56FU

### Single Comparator

The TC75S56F/TC75S56FU 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 push-pull output stage can be directly connected to TTL or CMOS logic ICs, among others.

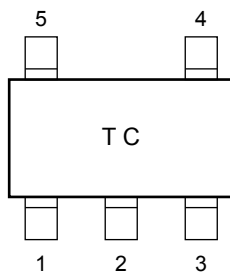
### Features

- Low-current power supply :  $I_{DD} = 10 \mu\text{A}$  (typ.)
- Single power supply operation :  $V_{DD} = \pm 0.9$  to  $\pm 3.5$  V or 1.8 to 7 V
- Wide common mode input voltage range :  $V_{SS}$  to  $V_{DD} - 0.9$  V
- Push-pull output circuit
- Low input bias current
- Small package

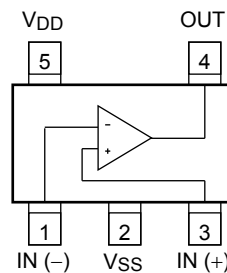


Weight  
 SSOP5-P-0.95 : 0.014 g (typ.)  
 SSOP5-P-0.65A : 0.006 g (typ.)

### Marking (top view)



### Pin Connection (top view)



Start of commercial production  
 1996-11

### Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Supply voltage	V <sub>DD</sub> , V <sub>SS</sub>	±3.5 or 7	V
Differential input voltage	DV <sub>IN</sub>	±7	V
Input voltage	V <sub>IN</sub>	V <sub>SS</sub> to V <sub>DD</sub>	V
Output Current	I <sub>OUT</sub>	±35	mA
Power dissipation	P <sub>D</sub>	200	mW
Operating temperature	T <sub>opr</sub>	-40 to 85	°C
Storage temperature	T <sub>stg</sub>	-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<sub>DD</sub> or drops below V<sub>SS</sub>. In addition, check the power-on timing.
- Do not subject the device to excessive noise.

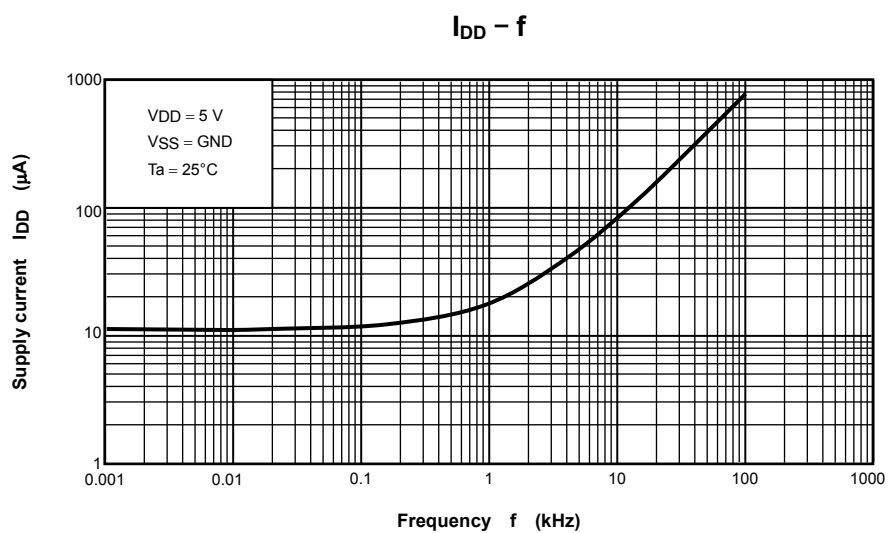
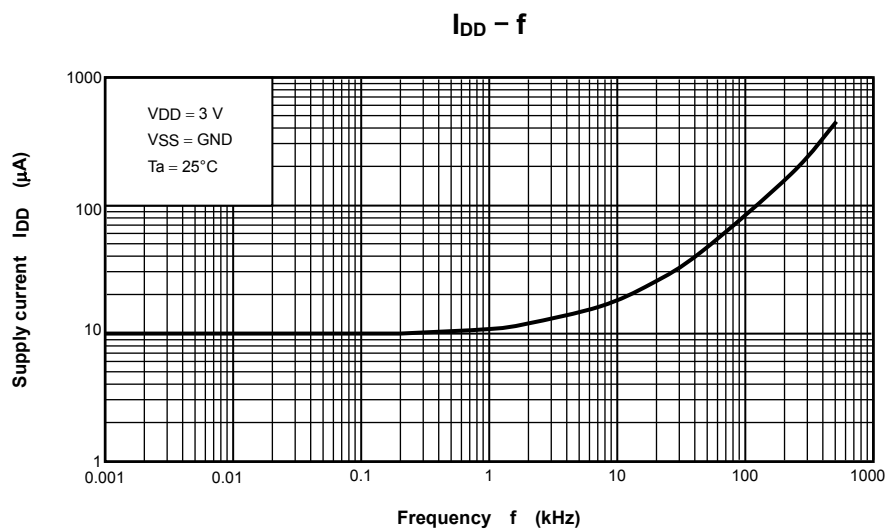
### Electrical Characteristics (unless otherwise specified, $V_{DD} = 5\text{ V}$ , $V_{SS} = \text{GND}$ , $T_a = 25^\circ\text{C}$ )

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Input offset voltage	$V_{IO}$	—	—	—	$\pm 1$	$\pm 7$	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	$\mu\text{A}$
Voltage gain	$G_V$	—	—	—	94	—	dB
Sink current	$I_{sink}$	—	$V_{OL} = 0.5\text{ V}$	13	25	—	mA
Source current	$I_{source}$	—	$V_{OH} = 4.5\text{ V}$	9	21	—	mA
Output voltage	$V_{OL}$	—	$I_{sink} = 5.0\text{ mA}$	—	0.1	0.3	V
	$V_{OH}$	—	$I_{source} = 5.0\text{ mA}$	4.7	4.9	—	
Operating supply voltage	$V_{DD}$	—	—	1.8	—	7.0	V
Propagation delay time (turn on)	$t_{PLH}$ (1)	—	Over drive = 100 mV	—	680	—	ns
	$t_{PLH}$ (2)	—	TTL step input	—	500	—	
Propagation delay time (turn off)	$t_{PHL}$ (1)	—	Over drive = 100 mV	—	250	—	ns
	$t_{PHL}$ (2)	—	TTL step input	—	380	—	
Response time	$t_{TLH}$	—	Over drive = 100 mV	—	60	—	ns
	$t_{THL}$	—	Over drive = 100 mV	—	8	—	

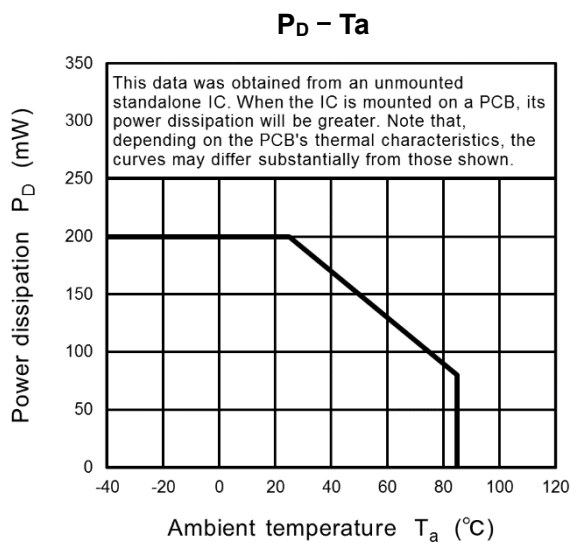
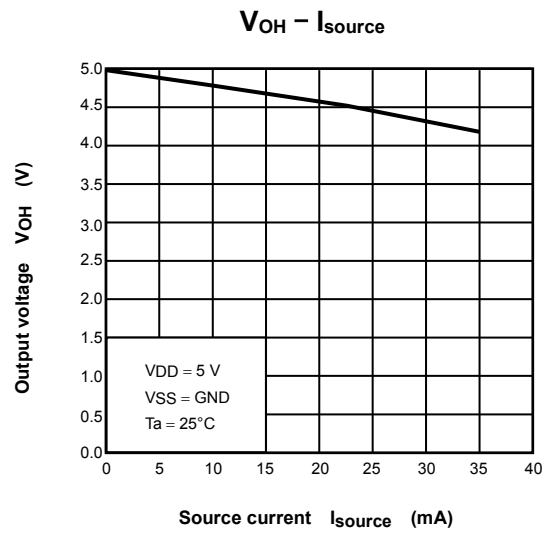
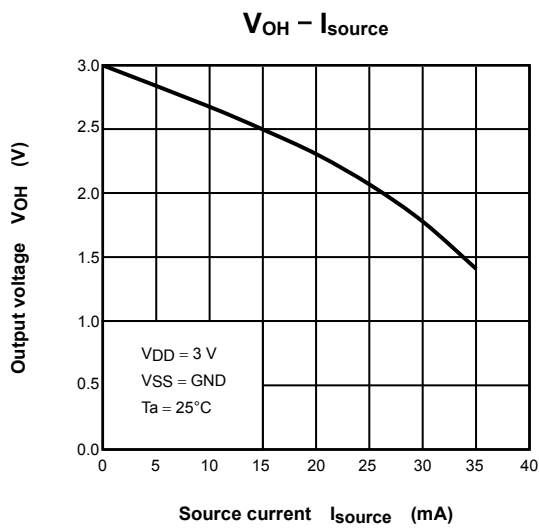
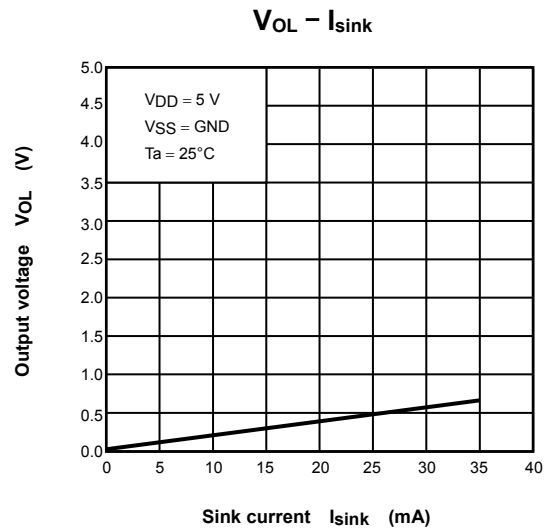
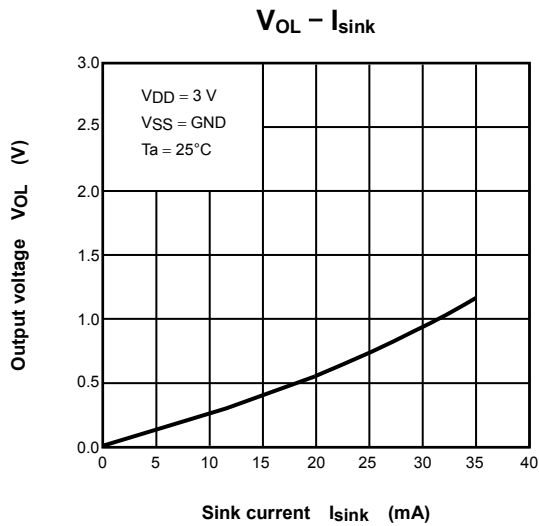
### Electrical Characteristics (unless otherwise specified, $V_{DD} = 3\text{ V}$ , $V_{SS} = \text{GND}$ , $T_a = 25^\circ\text{C}$ )

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Input offset voltage	$V_{IO}$	—	—	—	$\pm 1$	$\pm 7$	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	$\mu\text{A}$
Sink current	$I_{sink}$	—	$V_{OL} = 0.5\text{ V}$	6	18	—	mA
Source current	$I_{source}$	—	$V_{OH} = 2.5\text{ V}$	3	15	—	mA
Output voltage	$V_{OL}$	—	$I_{sink} = 5.0\text{ mA}$	—	0.15	0.35	V
	$V_{OH}$	—	$I_{source} = 5.0\text{ mA}$	2.65	2.85	—	
Propagation delay time (turn on)	$t_{PLH}$	—	Over drive = 100 mV	—	550	—	ns
Propagation delay time (turn off)	$t_{PHL}$	—	Over drive = 100 mV	—	250	—	ns
Response time	$t_{TLH}$	—	Over drive = 100 mV	—	30	—	ns
	$t_{THL}$	—	Over drive = 100 mV	—	8	—	

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



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

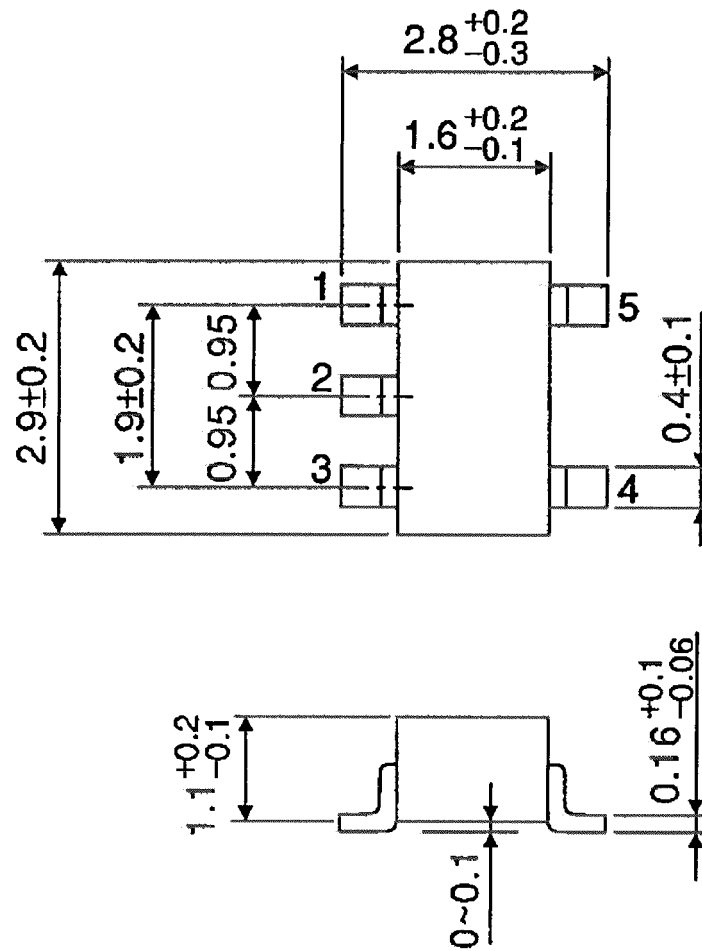


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### Package Dimensions

SSOP5-P-0.95

Unit : mm

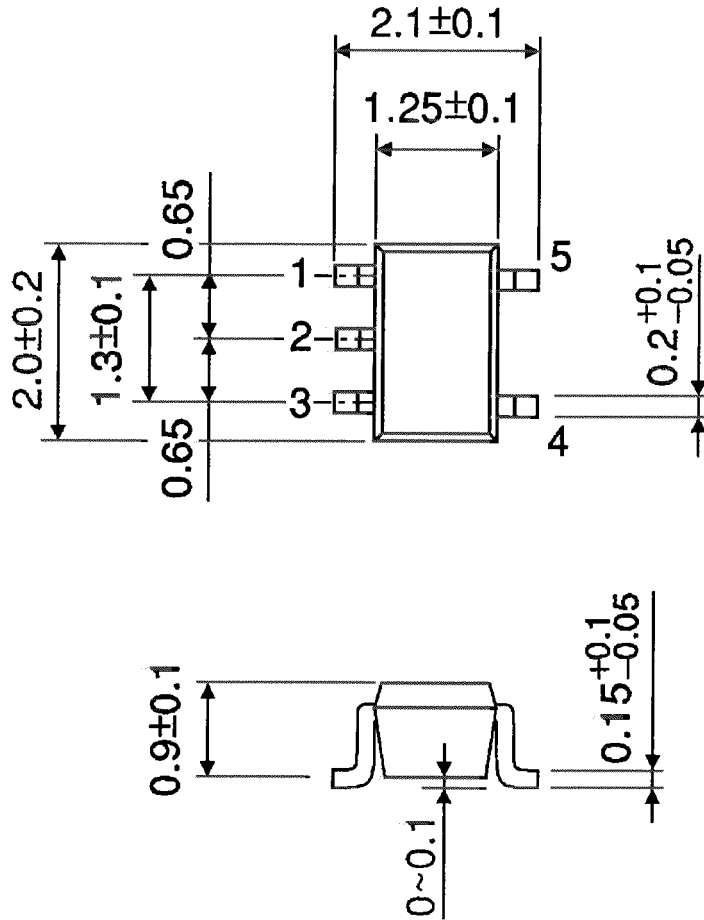


Weight: 0.014 g (typ.)

### Package Dimensions

SSOP5-P-0.65A

Unit : mm



Weight: 0.006 g (typ.)

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