

TOSHIBA CMOS Linear Integrated Circuit Silicon Monolithic

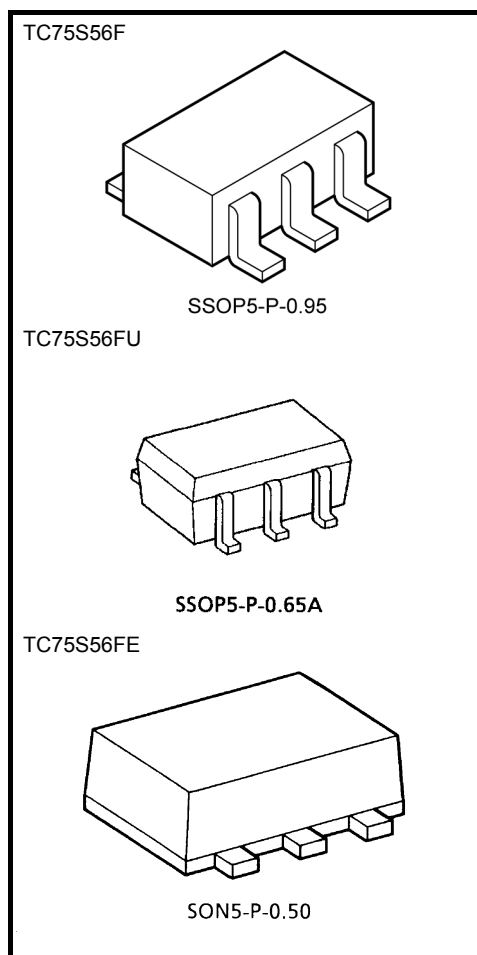
TC75S56F, TC75S56FU, TC75S56FE

Single Comparator

The TC75S56F/TC75S56FU/TC75S56FE 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

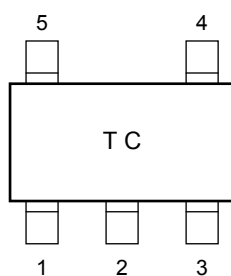
- Low-current power supply : $I_{DD} = 10 \mu A$ (typ.)
- Single power supply operation
- Wide common mode input voltage range: V_{SS} to $V_{DD} - 0.9 V$
- Push-pull output circuit
- Low input bias current
- Small package



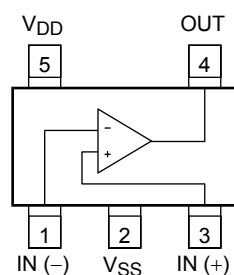
Weight

SSOP5-P-0.95 : 0.014 g (typ.)
 SSOP5-P-0.65A : 0.006 g (typ.)
 SON5-P-0.50 : 0.003 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_{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_{OUT}	± 35	mA
Power dissipation	TC75S56F/FU	P_D	200	mW
	TC75S56FE		100	
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.

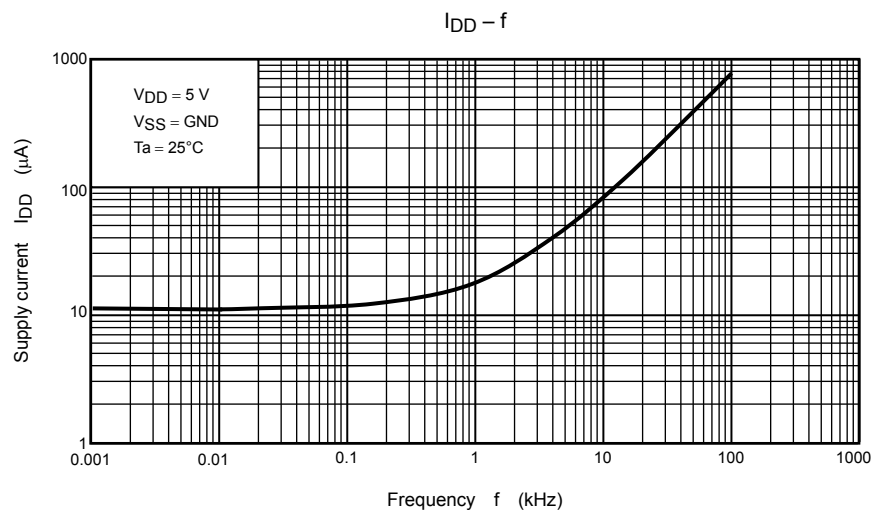
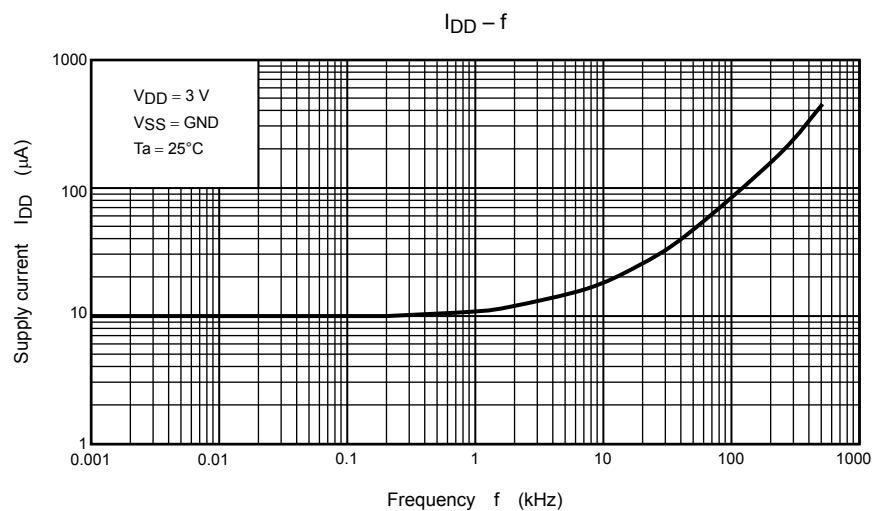
Electrical Characteristics (unless otherwise specified, $V_{DD} = 5\text{ V}$, $V_{SS} = \text{GND}$, $T_a = 25^\circ\text{C}$)

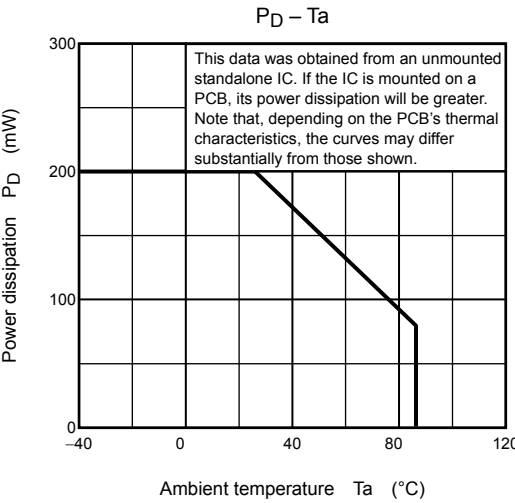
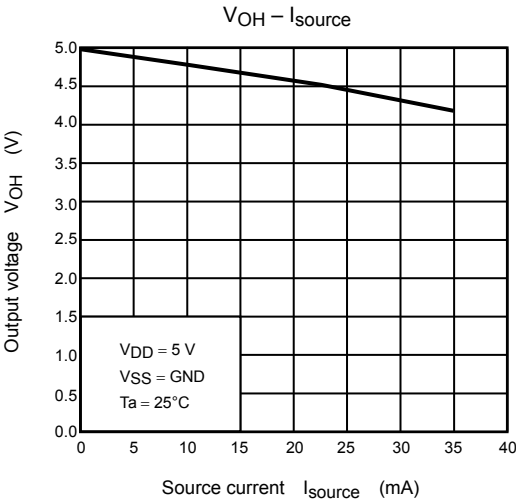
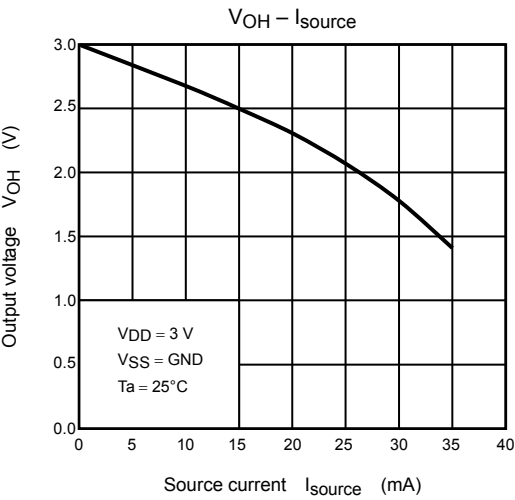
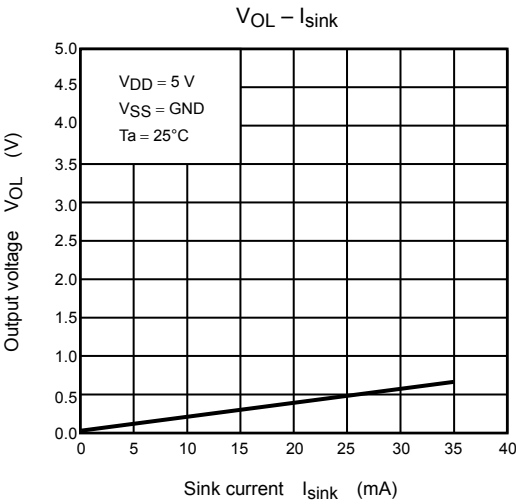
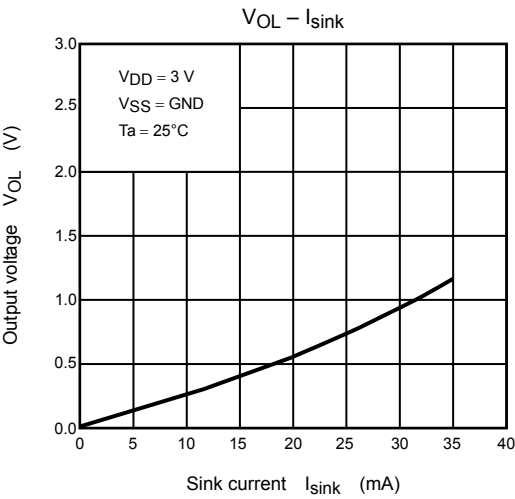
Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Input offset voltage	V_{IO}	—	—	—	± 1	± 7	mV
Input offset current	I_{IO}	—	—	—	1	—	pA
Input bias current	I_I	—	—	—	1	—	pA
Common mode input voltage	CMV_{IN}	—	—	0	—	4.1	V
Supply current	$I_{DD} \text{ (Note)}$	—	—	—	11	22	μA
Voltage 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}	—	$I_{\text{sink}} = 5.0\text{ mA}$	—	0.1	0.3	V
	V_{OH}	—	$I_{\text{source}} = 5.0\text{ mA}$	4.7	4.9	—	
Operating supply voltage	V_{DD}	—	—	1.8	—	7.0	V
Propagation delay time (turn on)	$t_{PLH} \text{ (1)}$	—	Over drive = 100 mV	—	680	—	ns
	$t_{PLH} \text{ (2)}$	—	TTL step input	—	500	—	
Propagation delay time (turn off)	$t_{PHL} \text{ (1)}$	—	Over drive = 100 mV	—	250	—	ns
	$t_{PHL} \text{ (2)}$	—	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}	—	—	—	± 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	$I_{DD} \text{ (Note)}$	—	—	—	10	20	μA
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}	—	$I_{\text{sink}} = 5.0\text{ mA}$	—	0.15	0.35	V
	V_{OH}	—	$I_{\text{source}} = 5.0\text{ mA}$	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.

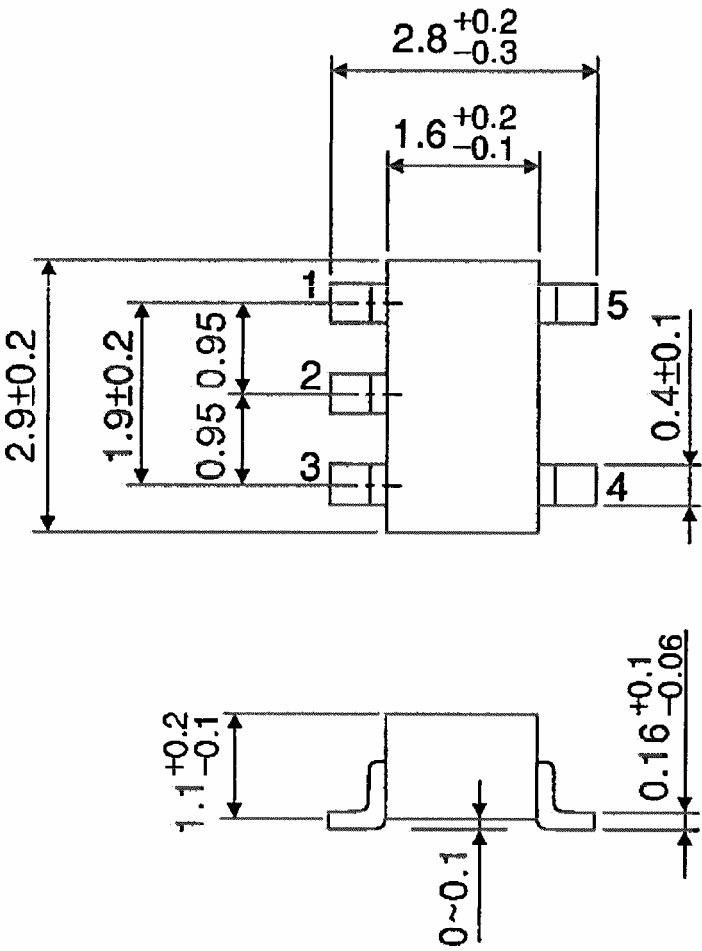




Package Dimensions

SSOP5-P-0.95

Unit : mm

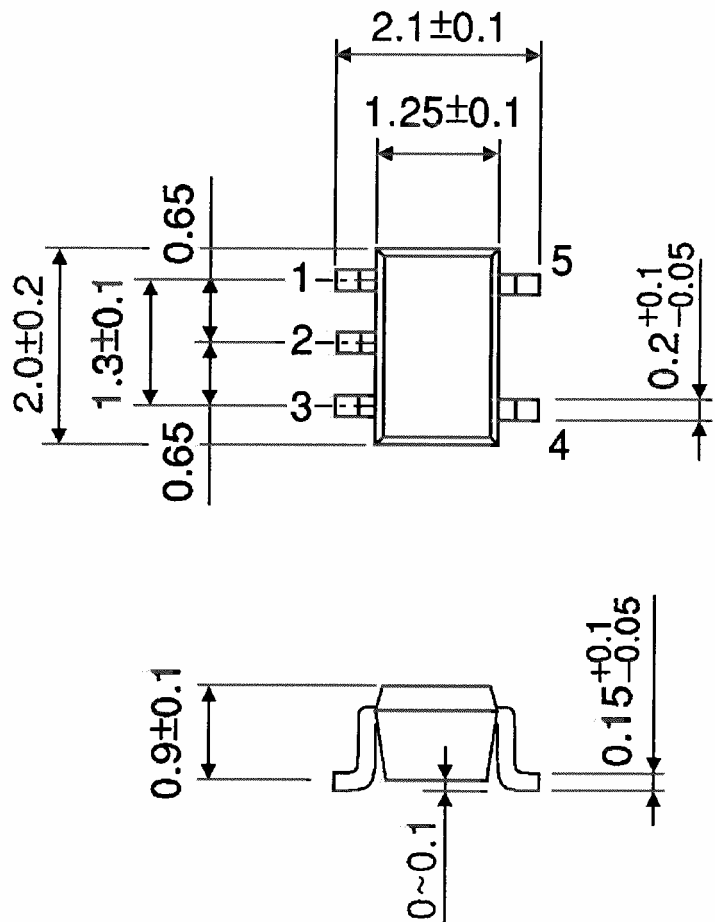


Weight: 0.014 g (typ.)

Package Dimensions

SSOP5-P-0.65A

Unit : mm

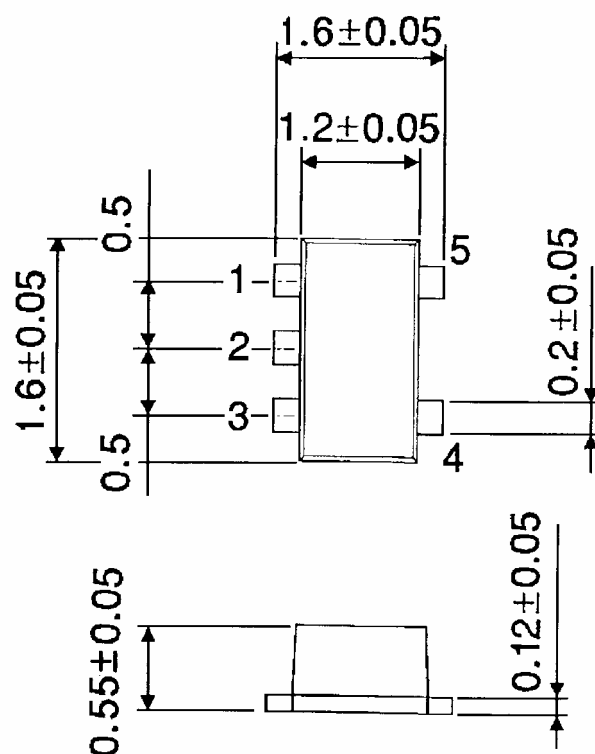


Weight: 0.006 g (typ.)

Package Dimensions

SON5-P-0.50

Unit : mm



Weight: 0.003 g (typ.)

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Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

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