# <u>TOSHIBA</u>

TOSHIBA CMOS Linear Integrated Circuit Silicon Monolithic

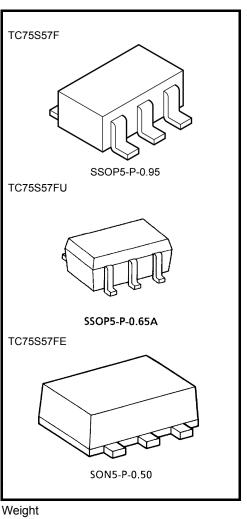
# TC75S57F,TC75S57FU,TC75S57FE

#### Single Comparator

The TC75S57F/TC75S57FU/TC75S57FE is a CMOS generalpurpose 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.

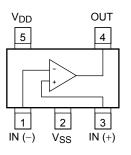
#### Features

- Low-current power supply
- $I_{DD} = 100 \ \mu A (typ.)$
- Single power supply operation
- Wide common mode input voltage range  $V_{SS} \sim V_{DD} 0.9 V$
- Push-pull output circuit
- Low input bias current
- Small package

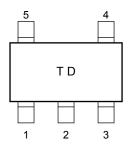


SSOP5-P-0.95 : 0.014 g (typ.) SSOP5-P-0.65A : 0.006 g (typ.) SON5-P-0.50 : 0.003 g (typ.)

### Pin Connection (top view)



### Marking (top view)



### 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		DVIN	±7	V	
Input voltage		V <sub>IN</sub>	V <sub>SS</sub> ~V <sub>DD</sub>	V	
Output Current		I <sub>OUT</sub>	±35	mA	
Power dissipation	TC75S57F/FU	Pa	200	mW	
	TC75S57FE	PD	100	IIIVV	
Operating temperature		T <sub>opr</sub>	-40~85	°C	
Storage temperature		T <sub>stg</sub>	-55~125	°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, $V_{DD} = 5 V$ , $V_{SS} = GND$ , $Ta = 25^{\circ}C$ )

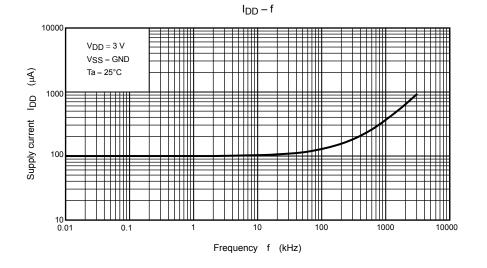
Characteristics	Symbol	Test Circuit	Test Condition	Min	Тур.	Max	Unit
Input offset voltage	V <sub>IO</sub>		—	_	±1	±7	mV
Input offset current	I <sub>IO</sub>		_	_	1	_	pА
Input bias current	lj	_	—	—	1	—	pА
Common mode input voltage	CMVIN	_	—	0	_	4.1	V
Supply current	I <sub>DD</sub> (Note)		_	_	110	220	μA
Voltage gain	GV		_	_	94	_	dB
Sink current	I <sub>sink</sub>		V <sub>OL</sub> = 0.5 V	13	25	_	mA
Source current	I <sub>source</sub>		V <sub>OH</sub> = 4.5 V	9	21	_	mA
Output voltage	V <sub>OL</sub>	_	I <sub>sink</sub> = 5.0 mA	—	0.1	0.3	V
	V <sub>OH</sub>	_	I <sub>source</sub> = 5.0 mA	4.7	4.9	—	
Operating supply voltage	V <sub>DD</sub>	_	—	1.8	_	7.0	V
Propagation delay time (turn on)	<sup>t</sup> PLH (1)		Over drive = 100 mV	_	140	_	ns
	t <sub>PLH</sub> (2)	_	TTL step input	_	90	_	
Propagation delay time (turn off)	<sup>t</sup> PHL (1)		Over drive = 100 mV	_	90	_	ns
	t <sub>PHL</sub> (2)		TTL step input		70	_	
Response time	t <sub>TLH</sub>		Over drive = 100 mV		11	_	- ns
	t <sub>THL</sub>		Over drive = 100 mV		7		

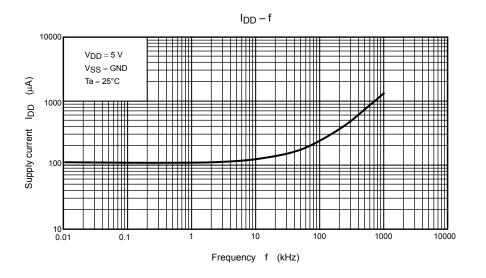
#### Electrical Characteristics (unless otherwise specified, $V_{DD} = 3 V$ , $V_{SS} = GND$ , $Ta = 25^{\circ}C$ )

Characteristics	Symbol	Test Circuit	Test Condition	Min	Тур.	Max	Unit
Input offset voltage	V <sub>IO</sub>		—		±1	±7	mV
Input offset current	l <sub>IO</sub>		_	_	1	_	pА
Input bias current	lį		—		1		pА
Common mode input voltage	CMVIN		—	0		2.1	V
Supply current	I <sub>DD</sub> (Note)		—		100	200	μA
Sink current	I <sub>sink</sub>		V <sub>OL</sub> = 0.5 V	6	18	_	mA
Source current	I <sub>source</sub>		V <sub>OH</sub> = 2.5 V	3	15	_	mA
Output voltage	V <sub>OL</sub>		I <sub>sink</sub> = 5.0 mA	_	0.15	0.35	v
	V <sub>OH</sub>		I <sub>source</sub> = 5.0 mA	2.65	2.85	_	
Propagation delay time (turn on)	t <sub>PLH</sub>	_	Over drive = 100 mV	_	110	_	ns
Propagation delay time (turn off)	t <sub>PHL</sub>	_	Over drive = 100 mV		90		ns
Response time	t <sub>TLH</sub>		Over drive = 100 mV	_	7		ns
	t <sub>THL</sub>		Over drive = 100 mV		8		

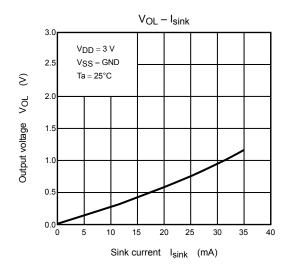
Note: This device's current consumption increases as its operating frequency increases. Note that the power dissipation should not exceed the allowable power dissipation.

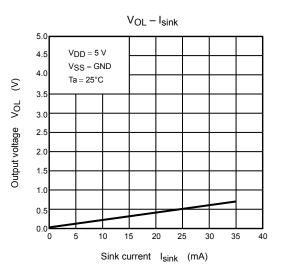
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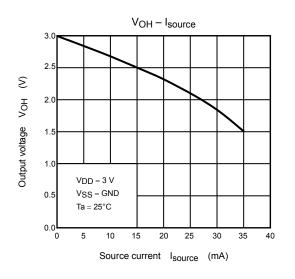


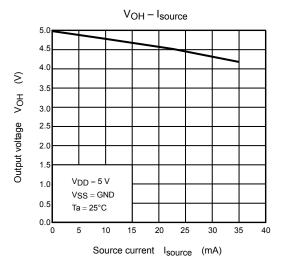


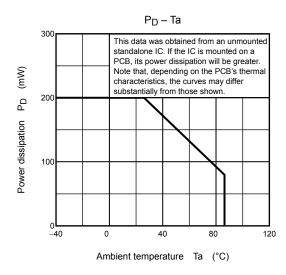
# **TOSHIBA**









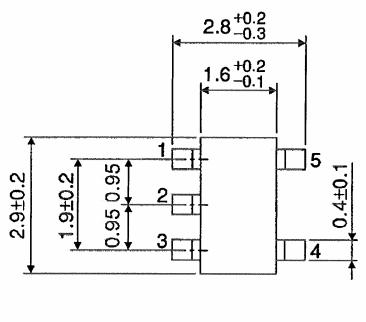


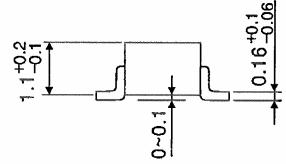
# **TOSHIBA**

### **Package Dimensions**

SSOP5-P-0.95

Unit : mm

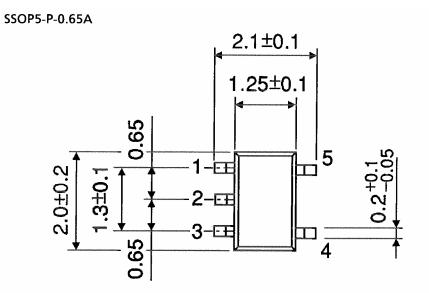




Weight: 0.014 g (typ.)

Unit : mm

### **Package Dimensions**



0.9±0.1 0.15<sup>+0.15</sup>

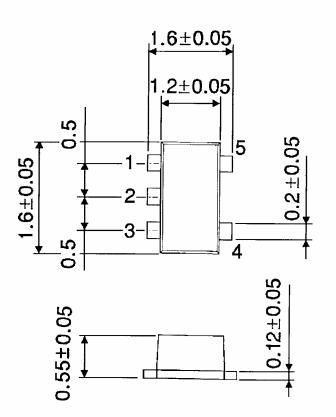
Weight: 0.006 g (typ.)

# **TOSHIBA**

## Package Dimensions

SON5-P-0.50

Unit : mm



Weight: 0.003 g (typ.)

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20070701-EN GENERAL

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