TOSHIBA CMOS Linear Integrated Circuit Silicon Monolithic

TC75S57F,TC75S57FU,TC75S57FE

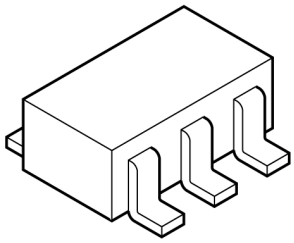
Single Comparator

The TC75S57F/TC75S57FU/TC75S57FE 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

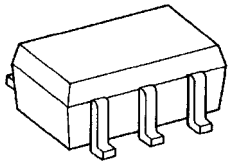
- Low-current power supply : I_{DD} = 100 μA (typ.)
- Single power supply operation
- Wide common mode input voltage range : V_{SS}~V_{DD} − 0.9 V
- Push-pull output circuit
- Low input bias current
- Small package

TC75S57F



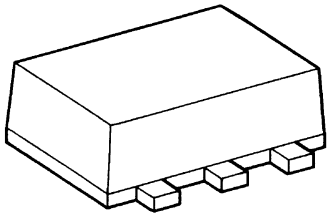
SSOP5-P-0.95

TC75S57FU



SSOP5-P-0.65A

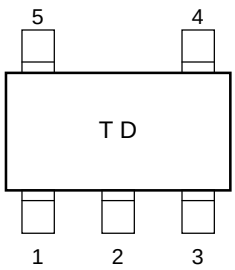
TC75S57FE



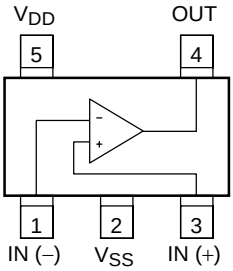
SON5-P-0.50

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)



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_{OUT}	±35	mA
Power dissipation	TC75S57F/FU	P_D	200	mW
	TC75S57FE		100	
Operating temperature		T_{opr}	−40~85	°C
Storage temperature		T_{stg}	−55~125	°C

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°C)

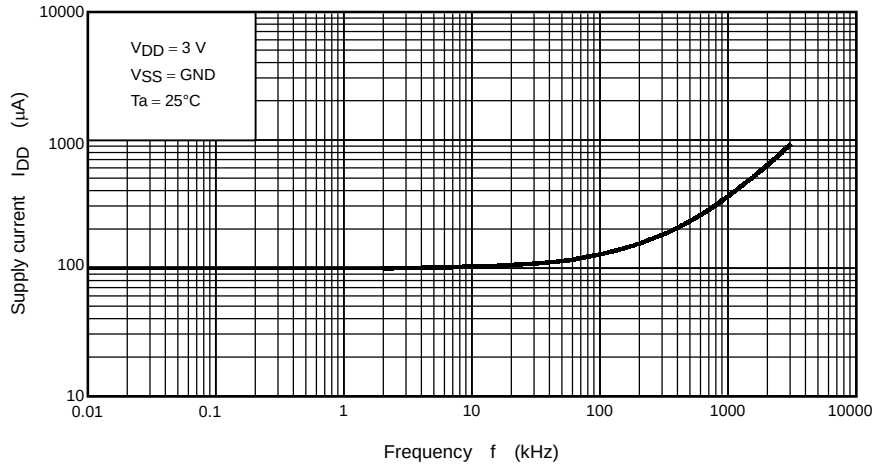
Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Input offset voltage	V_{IO}	—	—	—	±1	±7	mV
Input offset current	I_{IO}	—	—	—	1	—	pA
Input bias current	I_I	—	—	—	1	—	pA
Common mode input voltage	CMV_{IN}	—	—	0	—	4.1	V
Supply current	I_{DD} (Note)	—	—	—	110	220	μA
Voltage gain	G_V	—	—	—	94	—	dB
Sink current	I_{sink}	—	V_{OL} = 0.5 V	13	25	—	mA
Source current	I_{source}	—	V_{OH} = 4.5 V	9	21	—	mA
Output voltage	V_{OL}	—	I_{sink} = 5.0 mA	—	0.1	0.3	V
	V_{OH}	—	I_{source} = 5.0 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	—	140	—	ns
	$t_{PLH\ (2)}$	—	TTL step input	—	90	—	
Propagation delay time (turn off)	$t_{PHL\ (1)}$	—	Over drive = 100 mV	—	90	—	ns
	$t_{PHL\ (2)}$	—	TTL step input	—	70	—	
Response time	t_{TLH}	—	Over drive = 100 mV	—	11	—	ns
	t_{THL}	—	Over drive = 100 mV	—	7	—	

Electrical Characteristics (unless otherwise specified, V_{DD} = 3 V, V_{SS} = GND, Ta = 25°C)

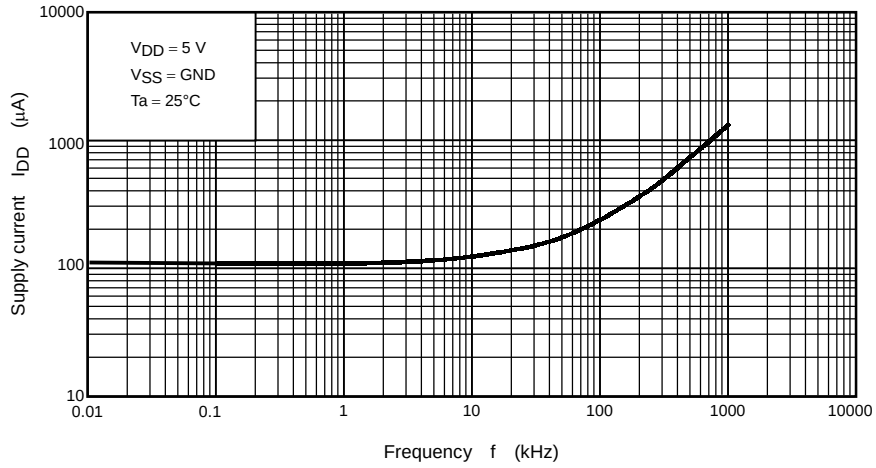
Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Input offset voltage	V_{IO}	—	—	—	±1	±7	mV
Input offset current	I_{IO}	—	—	—	1	—	pA
Input bias current	I_I	—	—	—	1	—	pA
Common mode input voltage	CMV_{IN}	—	—	0	—	2.1	V
Supply current	I_{DD} (Note)	—	—	—	100	200	μA
Sink current	I_{sink}	—	V_{OL} = 0.5 V	6	18	—	mA
Source current	I_{source}	—	V_{OH} = 2.5 V	3	15	—	mA
Output voltage	V_{OL}	—	I_{sink} = 5.0 mA	—	0.15	0.35	V
	V_{OH}	—	I_{source} = 5.0 mA	2.65	2.85	—	
Propagation delay time (turn on)	t_{PLH}	—	Over drive = 100 mV	—	110	—	ns
Propagation delay time (turn off)	t_{PHL}	—	Over drive = 100 mV	—	90	—	ns
Response time	t_{TLH}	—	Over drive = 100 mV	—	7	—	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.

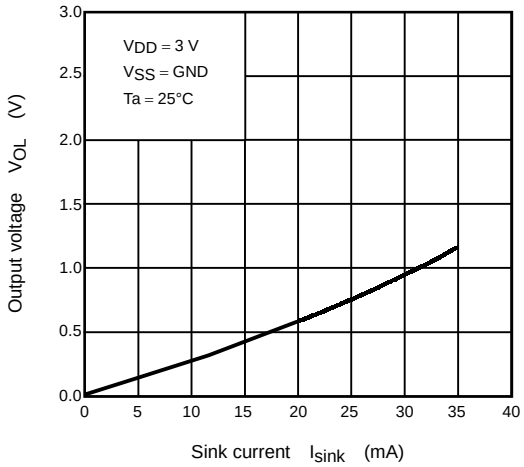
I_{DD} – f


10000
1000
100
10
Supply current I_{DD} (μA)
V_{DD} = 3 V
V_{SS} = GND
Ta = 25°C
0.01
0.1
1
10
100
1000
10000
Frequency f (kHz)

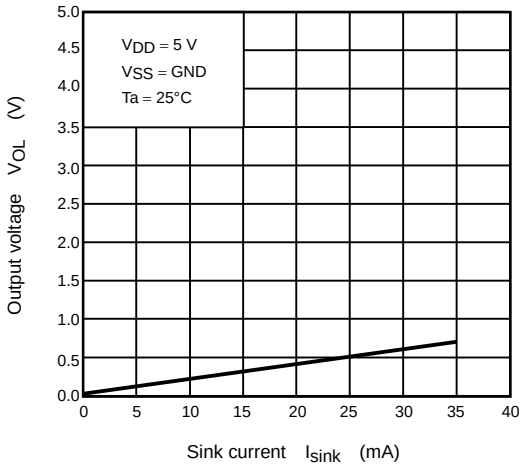
I_{DD} – f


10000
1000
100
10
Supply current I_{DD} (μA)
V_{DD} = 5 V
V_{SS} = GND
Ta = 25°C
0.01
0.1
1
10
100
1000
10000
Frequency f (kHz)

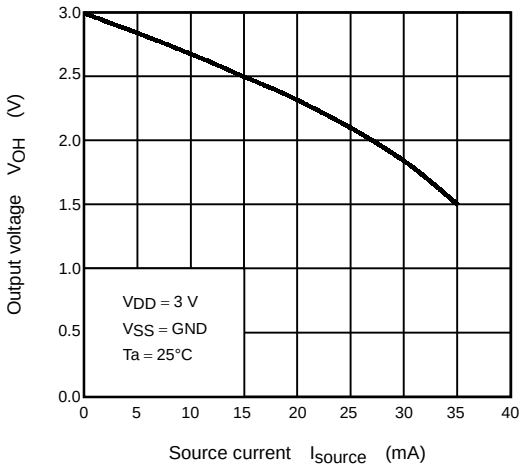
$V_{OL} - I_{sink}$



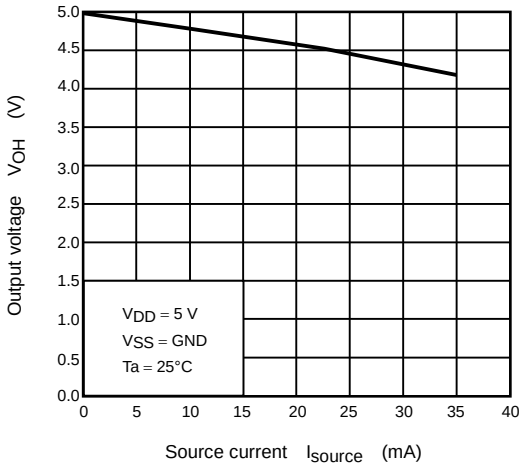
$V_{OL} - I_{sink}$



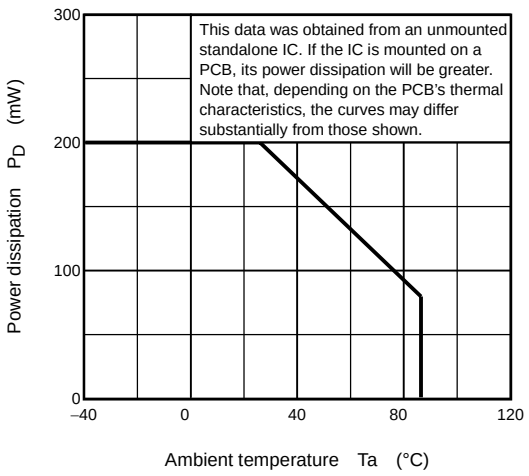
$V_{OH} - I_{source}$



$V_{OH} - I_{source}$

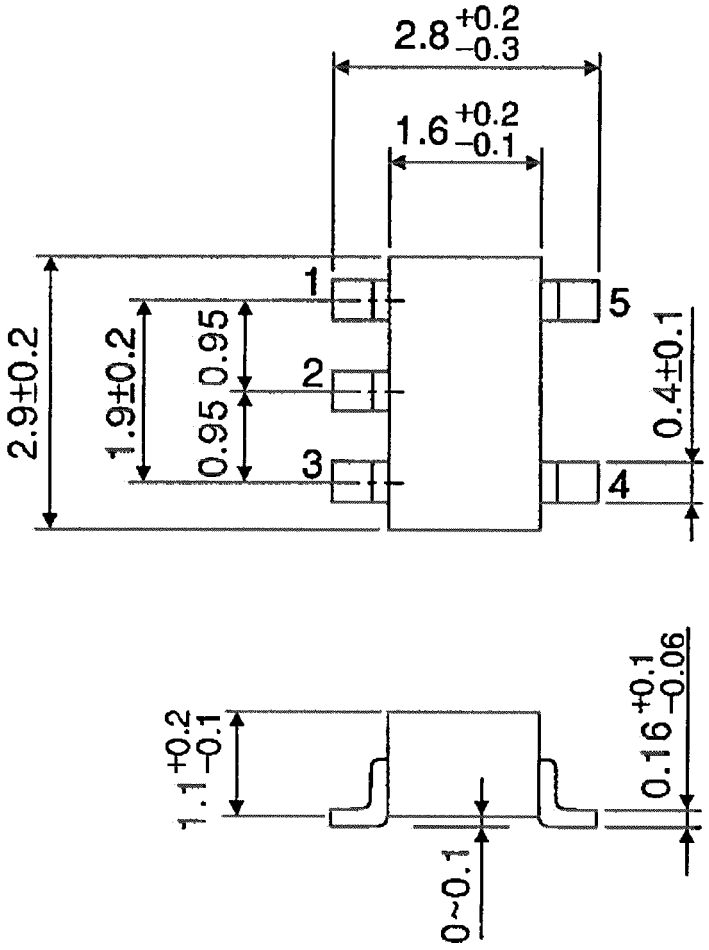


$P_D - Ta$



Package Dimensions

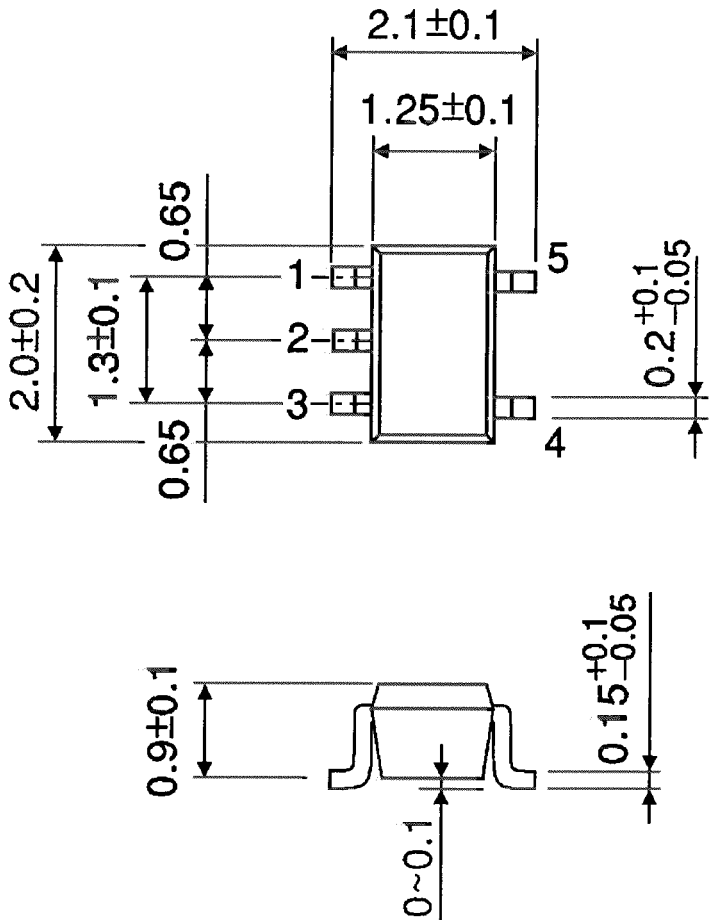
SSOP5-P-0.95 Unit : mm



Weight: 0.014 g (typ.)

Package Dimensions

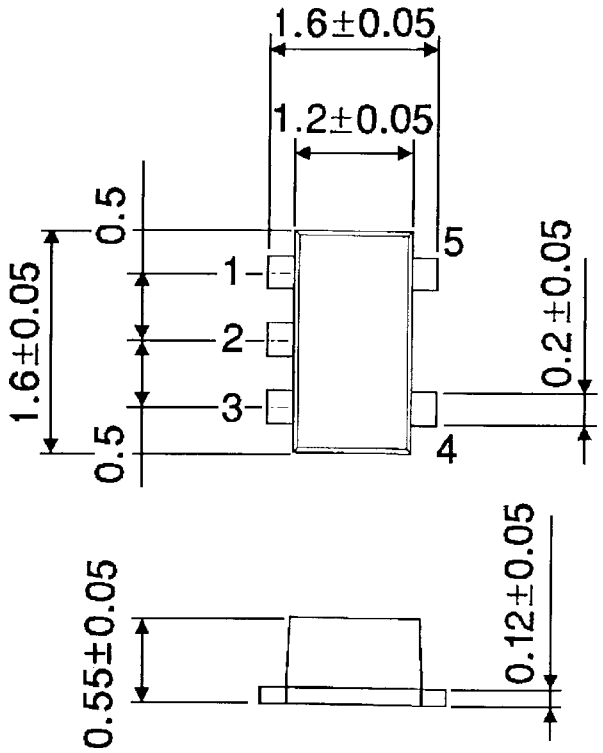
SSOP5-P-0.65A Unit : mm



Weight: 0.006 g (typ.)

Package Dimensions

SON5-P-0.50 Unit : mm



Weight: 0.003 g (typ.)

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