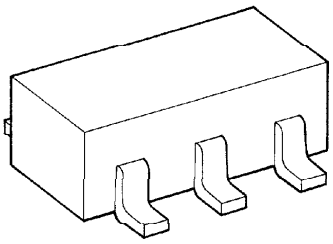
TOSHIBA CMOS LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TC75S56F, TC75S56FU

SINGLE COMPARATOR

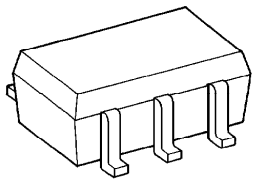
TC75S56F, TC75S56FU are CMOS type general-purpose single comparator capable of single power supply operation and using lower supply currents than the conventional bipolar comparators. Its push-pull output can connect directly to logical IC's such as TTL and CMOS circuits.

TC75S56F



SSOP5-P-0.95

TC75S56FU



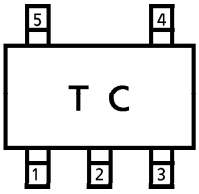
SSOP5-P-0.65A

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

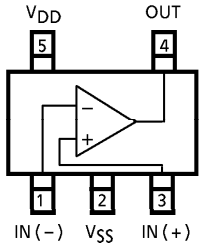
FEATURES

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

MARKING (TOP VIEW)



PIN CONNECTION (TOP VIEW)



961001EBA1

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	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	P_D	200	mW
Operating Temperature	T_{opr}	−40~85	°C
Storage Temperature	T_{stg}	−55~125	°C

(Note) Since this product sometimes brings about latchup, which is peculiar to CMOS devices, note the following points :

- Don't raise the voltage level of I/O pins beyond V_{DD}, nor lower it below V_{SS}. Consider the timing for power supply, too.
- Don't let any abnormal noise enter the device.

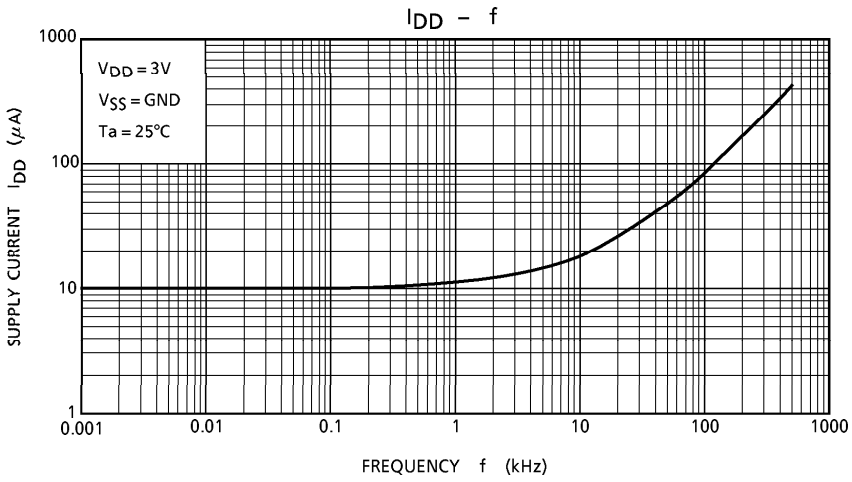
ELECTRICAL CHARACTERISTICS (V_{DD} = 5V, V_{SS} = GND, Ta = 25°C)

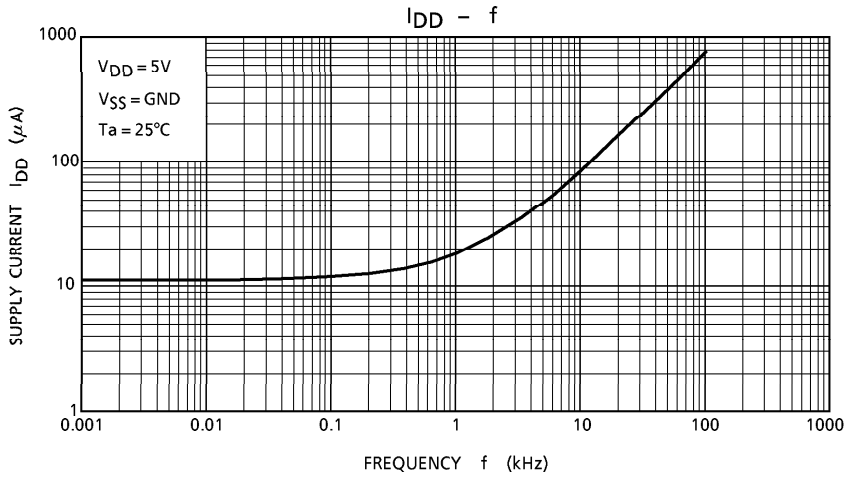
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V_{IO}	—	—	—	±1	±7	mV
Input Offset Current	I_{IO}	—	—	—	1	—	pA
Input Bias Current	I_I	—	—	—	1	—	pA
Common Mode Input Voltage	CMV_{IN}	—	—	0	—	4.1	V
Supply Current	I_{DD} (Note)	—	—	—	11	22	μA
Voltage Gain	G_V	—	—	—	94	—	dB
Sink Current	I_{sink}	—	V_{OL} = 0.5V	13	25	—	mA
Source Current	I_{source}	—	V_{OH} = 4.5V	9	21	—	mA
Output Voltage	V_{OL}	—	I_{sink} = 5.0mA	—	0.1	0.3	V
	V_{OH}	—	I_{source} = 5.0mA	4.7	4.9	—	
Operating Supply Voltage	V_{DD}	—	—	1.8	—	7.0	V
Propagation Delay Time (Turn ON)	t_{PLH} (1)	—	Over drive = 100mV	—	680	—	ns
	t_{PLH} (2)	—	TTL step input	—	500	—	
Propagation Delay Time (Turn OFF)	t_{PHL} (1)	—	Over drive = 100mV	—	250	—	ns
	t_{PHL} (2)	—	TTL step input	—	380	—	
Response Time	t_{TLH}	—	Over drive = 100mV	—	60	—	ns
	t_{THL}	—	Over drive = 100mV	—	8	—	

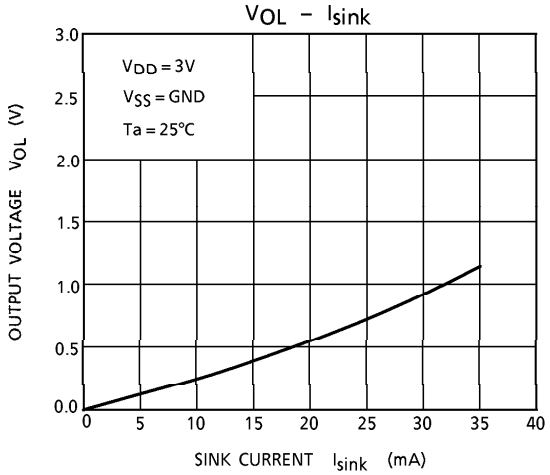
ELECTRICAL CHARACTERISTICS (V_{DD} = 3V, V_{SS} = GND, Ta = 25°C)

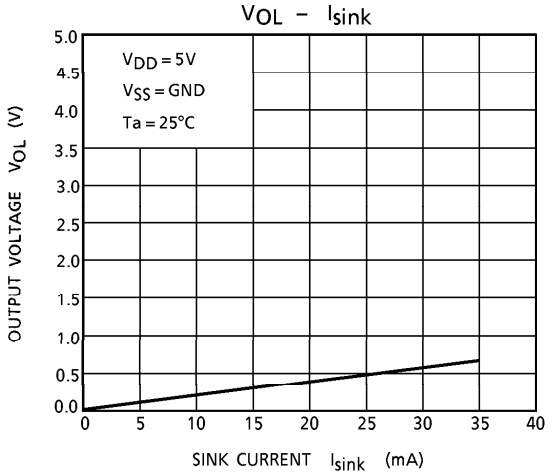
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V_{IO}	—	—	—	±1	±7	mV
Input Offset Current	I_{IO}	—	—	—	1	—	pA
Input Bias Current	I_I	—	—	—	1	—	pA
Common Mode Input Voltage	CMV_{IN}	—	—	0	—	2.1	V
Supply Current	I_{DD} (Note)	—	—	—	10	20	μA
Sink Current	I_{sink}	—	V_{OL} = 0.5V	6	18	—	mA
Source Current	I_{source}	—	V_{OH} = 2.5V	3	15	—	mA
Output Voltage	V_{OL}	—	I_{sink} = 5.0mA	—	0.15	0.35	V
	V_{OH}	—	I_{source} = 5.0mA	2.65	2.85	—	
Propagation Delay Time (Turn ON)	t_{PLH}	—	Over drive = 100mV	—	550	—	ns
Propagation Delay Time (Turn OFF)	t_{PHL}	—	Over drive = 100mV	—	250	—	ns
Response Time	t_{TLH}	—	Over drive = 100mV	—	30	—	ns
	t_{THL}	—	Over drive = 100mV	—	8	—	

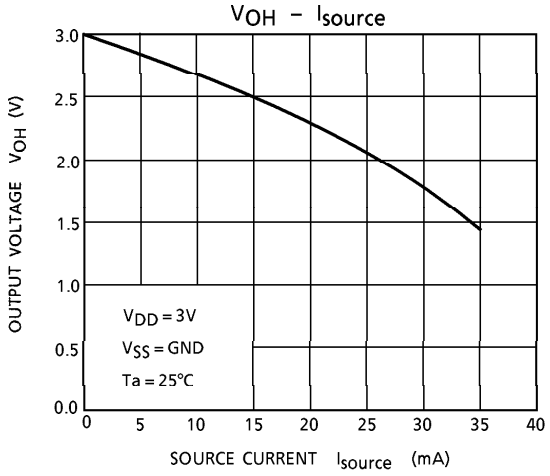
(Note) Since this product causes an increase in current consumption with a rise in operational frequency, make sure that power consumption does not exceed the allowable dissipation.

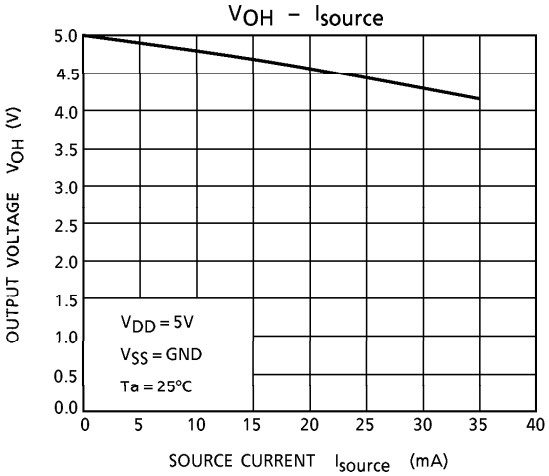

I_{DD} – f
V_{DD} = 3V
V_{SS} = GND
Ta = 25°C
SUPPLY CURRENT I_{DD} (μA)
1000
100
10
1
0.001
0.01
0.1
1
10
100
1000
FREQUENCY f (kHz)

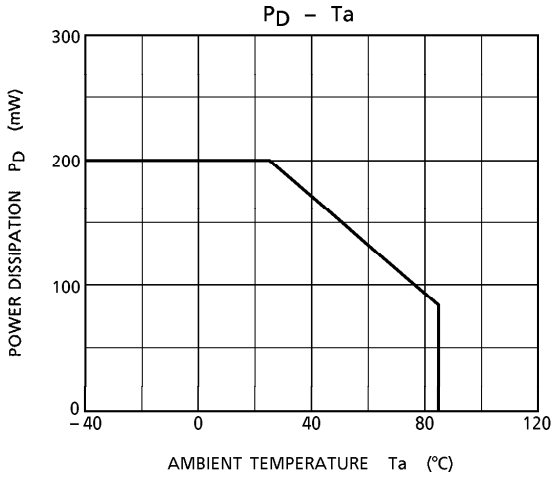

I_{DD} – f
V_{DD} = 5V
V_{SS} = GND
Ta = 25°C
SUPPLY CURRENT I_{DD} (μA)
1000
100
10
1
0.001
0.01
0.1
1
10
100
1000
FREQUENCY f (kHz)


V_{OL} – I_{sink}
V_{DD} = 3V
V_{SS} = GND
Ta = 25°C
OUTPUT VOLTAGE V_{OL} (V)
SINK CURRENT I_{sink} (mA)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
5
10
15
20
25
30
35
40


V_{OL} – I_{sink}
V_{DD} = 5V
V_{SS} = GND
Ta = 25°C
OUTPUT VOLTAGE V_{OL} (V)
SINK CURRENT I_{sink} (mA)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
0
5
10
15
20
25
30
35
40


V_{OH} – I_{source}
V_{DD} = 3V
V_{SS} = GND
Ta = 25°C
OUTPUT VOLTAGE V_{OH} (V)
SOURCE CURRENT I_{source} (mA)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
5
10
15
20
25
30
35
40

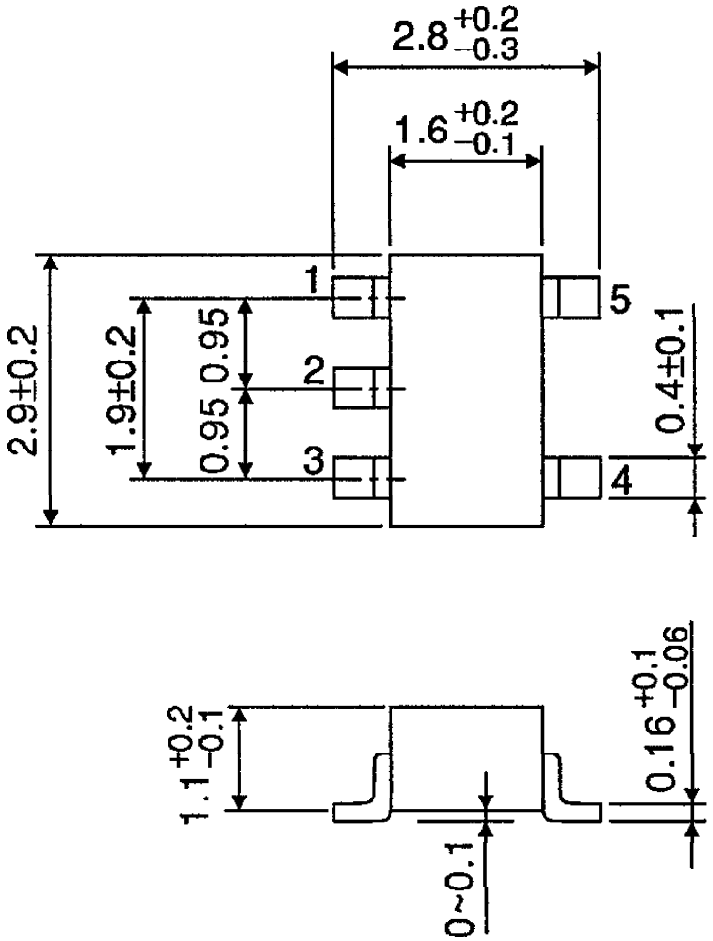

V_{OH} – I_{source}
V_{DD} = 5V
V_{SS} = GND
Ta = 25°C
OUTPUT VOLTAGE V_{OH} (V)
SOURCE CURRENT I_{source} (mA)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
0
5
10
15
20
25
30
35
40


P_D – Ta
POWER DISSIPATION P_D (mW)
AMBIENT TEMPERATURE Ta (°C)
0
100
200
300
– 40
0
40
80
120

OUTLINE DRAWING

SSOP5-P-0.95

Unit : mm

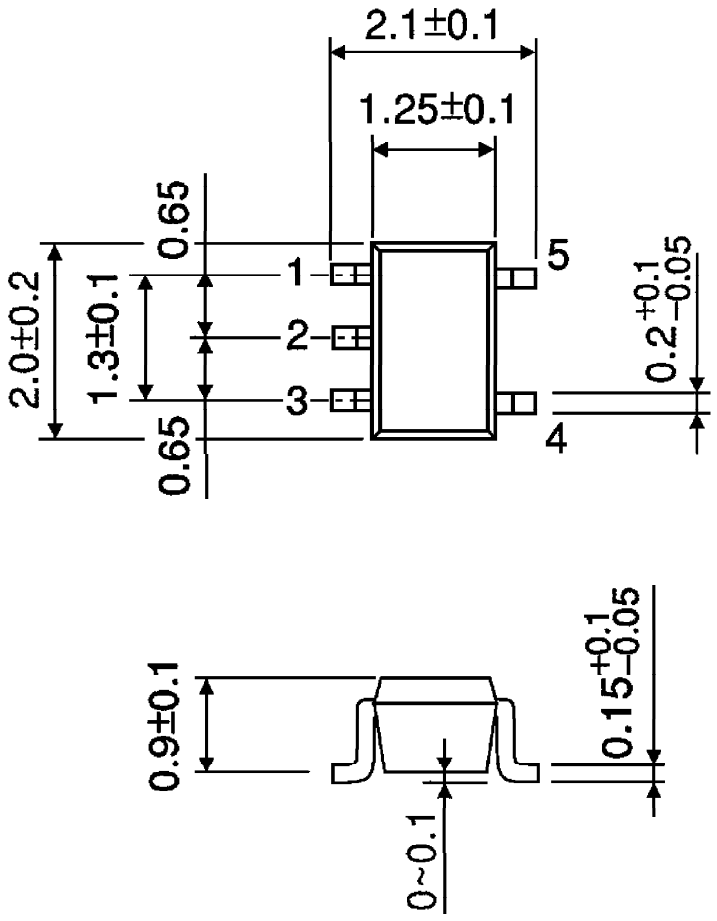


Weight : 0.014g (Typ.)

OUTLINE DRAWING

SSOP5-P-0.65A

Unit : mm



Weight : 0.006g (Typ.)