TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

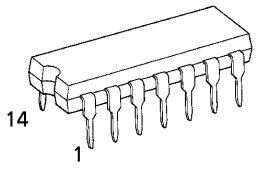
TC4069UBP, TC4069UBF, TC4069UBFN, TC4069UBFT

TC4069UB HEX INVERTER

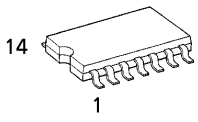
TC4069UB contains six circuits of inverters. Since the internal circuit is composed of a single stage inverter, this is suitable for the applications of CR oscillator circuits, crystal oscillator circuits and linear amplifiers in addition to its application as inverters.

Because of one stage gate configuration, the propagation time has been reduced.

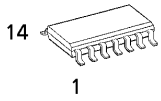
(Note) The JEDEC SOP (FN) is not available in Japan.



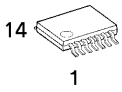
P (DIP14-P-300-2.54)
Weight : 0.96g (Typ.)



F (SOP14-P-300-1.27)
Weight : 0.18g (Typ.)



FN (SOL14-P-150-1.27)
Weight : 0.12g (Typ.)

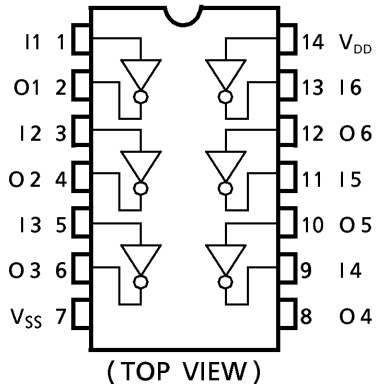


FT (TSSOP14-P-0044-0.65)
Weight : 0.06g (Typ.)

MAXIMUM RATINGS

CHARACTERISTIC	SYMBOL	RATING	UNIT
DC Supply Voltage	V_{DD}	$V_{SS}-0.5 \sim V_{SS}+20$	V
Input Voltage	V_{IN}	$V_{SS}-0.5 \sim V_{DD}+0.5$	V
Output Voltage	V_{OUT}	$V_{SS}-0.5 \sim V_{DD}+0.5$	V
DC Input Current	I_{IN}	±10	mA
Power Dissipation	P_D	300 (DIP) / 180 (SOIC)	mW
Operating Temperature Range	T_{opr}	−40~85	°C
Storage Temperature Range	T_{stg}	−65~150	°C

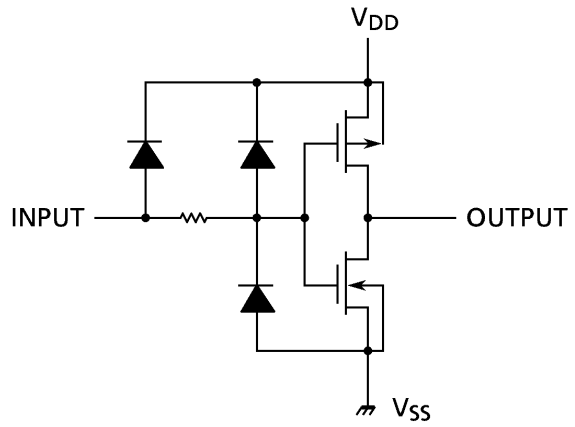
PIN ASSIGNMENT



(TOP VIEW)

CIRCUIT DIAGRAM

1 / 6 TC4069UB



RECOMMENDED OPERATING CONDITIONS (V_{SS} = 0V)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
DC Supply Voltage	V_{DD}		3	—	18	V
Input Voltage	V_{IN}		0	—	V_{DD}	V

STATIC ELECTRICAL CHARACTERISTICS (V_{SS} = 0V)

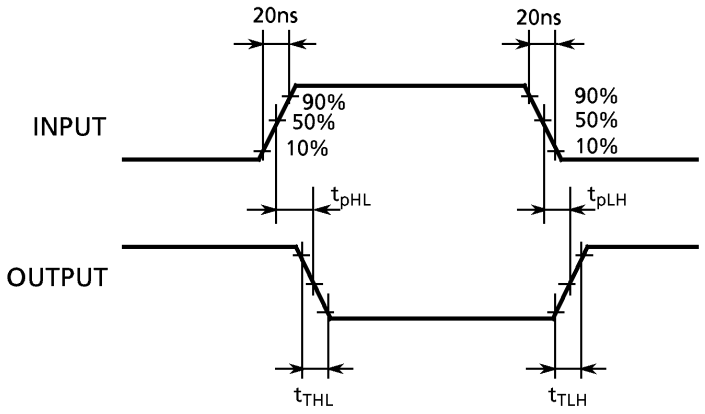
CHARACTERISTIC	SYM-BOL	TEST CONDITION	V_{DD} (V)	−40°C		25°C			85°C		UNIT
				MIN.	MAX.	MIN.	TYP.	MAX.	MIN.	MAX.	
High-Level Output Voltage	V_{OH}	$\|I_{OUT}\| < 1\mu A$ $V_{IN} = V_{SS}, V_{DD}$	5 10 15	4.95 9.95 14.95	— — —	4.95 9.95 14.95	5.00 10.00 15.00	— — —	4.95 9.95 14.95	— — —	V
Low-Level Output Voltage	V_{OL}	$\|I_{OUT}\| < 1\mu A$ $V_{IN} = V_{SS}, V_{DD}$	5 10 15	— — —	0.05 0.05 0.05	— — —	0.00 0.00 0.00	0.05 0.05 0.05	— — —	0.05 0.05 0.05	
Output High Current	I_{OH}	V_{OH} = 4.6V V_{OH} = 2.5V V_{OH} = 9.5V V_{OH} = 13.5V $V_{IN} = V_{SS}$	5 5 10 15	−0.61 −2.50 −1.50 −4.00	— — — —	−0.51 −2.10 −1.30 −3.40	−1.0 −4.0 −2.2 −9.0	— — — —	−0.42 −1.70 −1.10 −2.80	— — — —	mA
Output Low Current	I_{OL}	V_{OL} = 0.4V V_{OL} = 0.5V V_{OL} = 1.5V $V_{IN} = V_{DD}$	5 10 15	0.61 1.50 4.00	— — —	0.51 1.30 3.40	1.2 3.2 12.0	— — —	0.42 1.10 2.80	— — —	
Input High Voltage	V_{IH}	V_{OUT} = 0.5V, 4.5V V_{OUT} = 1.0V, 9.0V V_{OUT} = 1.5V, 13.5V $\|I_{OUT}\| < 1\mu A$	5 10 15	4.0 8.0 12.0	— — —	4.0 8.0 12.0	— — —	— — —	4.0 8.0 12.0	— — —	mA
Input Low Voltage	V_{IL}	V_{OUT} = 0.5V, 4.5V V_{OUT} = 1.0V, 9.0V V_{OUT} = 1.5V, 13.5V $\|I_{OUT}\| < 1\mu A$	5 10 15	— — —	1.0 2.0 3.0	— — —	— — —	1.0 2.0 3.0	— — —	1.0 2.0 3.0	
Input Current "H" Level	I_{IH}	V_{IL} = 18V	18	—	0.1	—	10^{-5}	0.1	—	1.0	μA
Input Current "L" Level	I_{IL}	V_{IL} = 0V	18	—	−0.1	—	-10^{-5}	−0.1		−1.0	
Quiescent Supply Current	I_{DD}	$V_{IN} = V_{SS}, V_{DD}$ *	5 10 15	— — —	0.25 0.50 1.00	— — —	0.001 0.001 0.002	0.25 0.50 1.00	— — —	7.5 15.0 30.0	

* All valid input combinations.

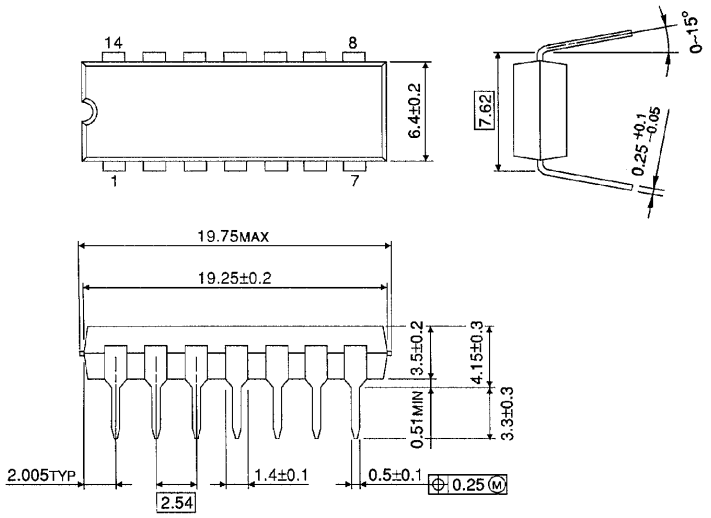
DYNAMIC ELECTRICAL CHARACTERISTICS (Ta = 25°C, Vss = 0V, C_L = 50pF)

CHARACTERISTIC	SYMBOL	TEST CONDITION	V_{DD}(V)	MIN.	TYP.	MAX.	UNIT
Output Transition Time (Low to High)	t_{TLH}		5	—	70	200	ns
			10	—	35	100	
			15	—	30	80	
Output Transition Time (High to Low)	t_{THL}		5	—	70	200	
			10	—	35	100	
			15	—	30	80	
Propagation Delay Time (Low to High)	t_{pLH}		5	—	55	110	
			10	—	30	60	
			15	—	25	50	
Propagation Delay Time (High to Low)	t_{pHL}		5	—	55	110	
			10	—	30	60	
			15	—	25	50	
Input Capacitance	C_{IN}			—	7.5	15	pF

WAVEFORM FOR MEASUREMENT OF DYNAMIC CHARACTERISTICS

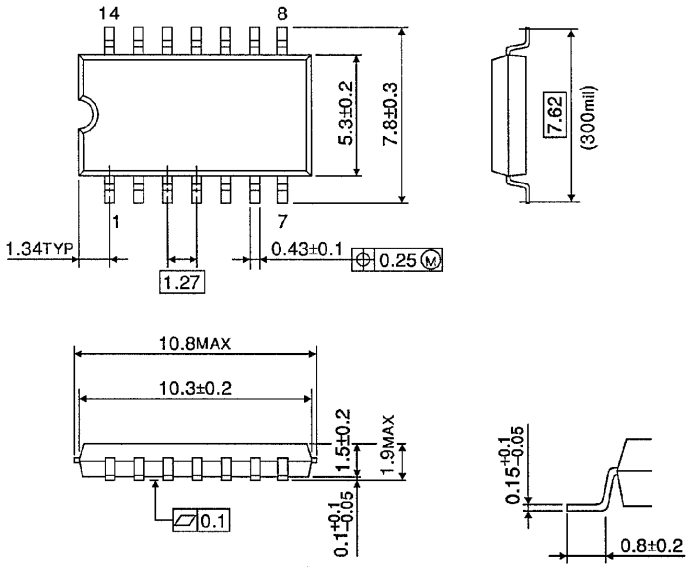


DIP 14PIN PACKAGE DIMENSIONS (DIP14-P-300-2.54) Unit in mm



Weight : 0.96g (Typ.)

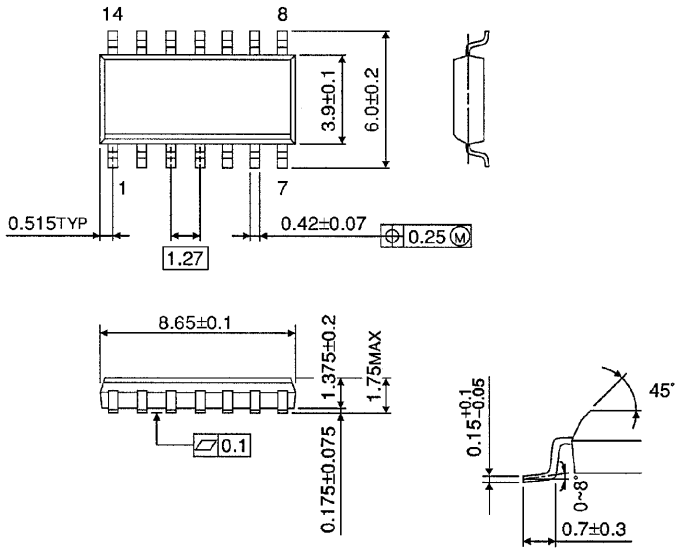
SOP 14PIN (200mil BODY) PACKAGE DIMENSIONS (SOP14-P-300-1.27) Unit in mm



Weight : 0.18g (Typ.)

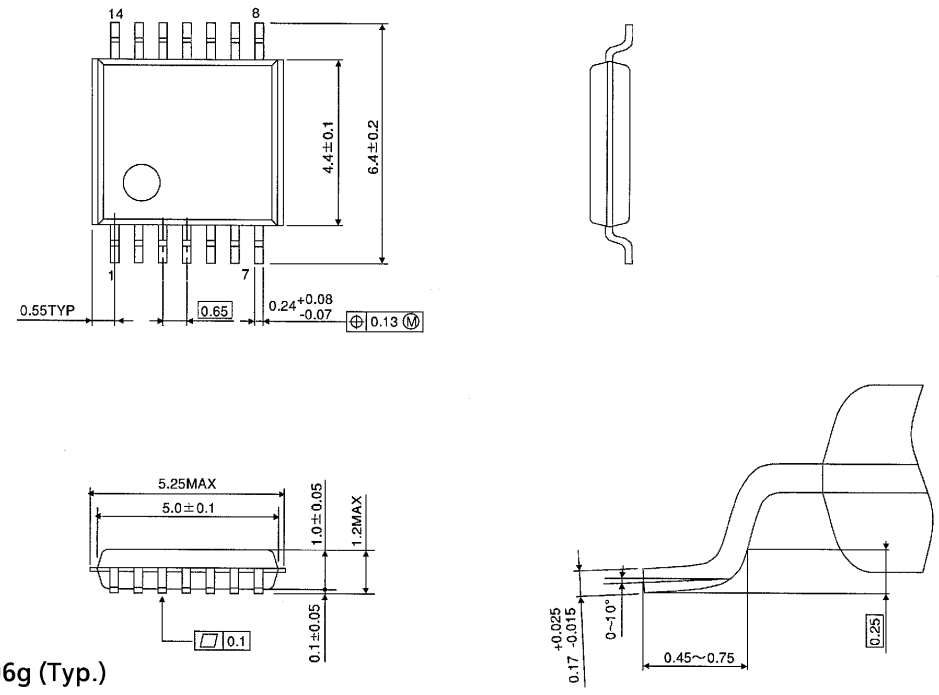
SOP 14PIN (150mil BODY) PACKAGE DIMENSIONS (SOL14-P-150 -1.27) Unit in mm

(Note) This package is not available in Japan.



Weight : 0.12g (Typ.)

TSSOP 14PIN (170mil BODY) PACKAGE DIMENSIONS (TSSOP14-P-0044-0.65) Unit in mm



Weight : 0.06g (Typ.)

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