

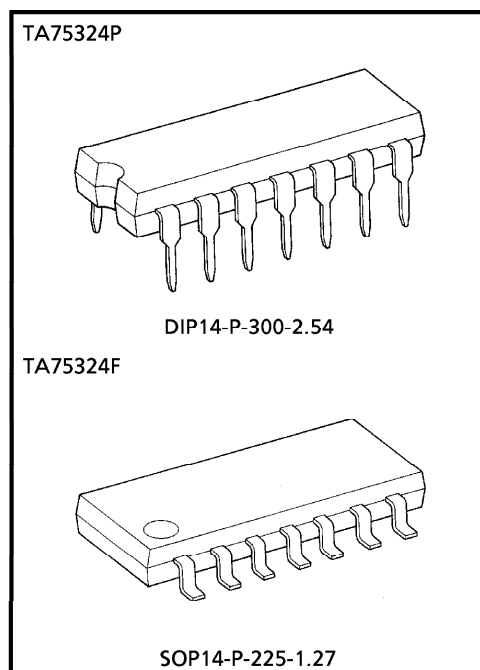
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA75324P, TA75324F

QUAD OPERATIONAL AMPLIFIER

FEATURES

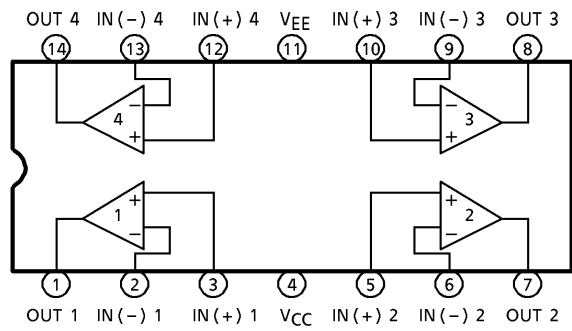
- In the Linear Mode the Input Common Mode Voltage Range Includes Ground.
- Four Internally Compensated OP Amp is Single Package.
- Low power Dissipation and Power Drain Suitable for Battery Operation.
- Differential Input Voltage Range Equal to the Power Supply Voltage.
- Wide Power Supply Voltage Range and Signal Power Supply.
- Large Output Voltage Swing : $0V \sim V_{CC} - 1.5V$
- Low Input Biasing Current : $I_I = 45nA$ (Typ.)



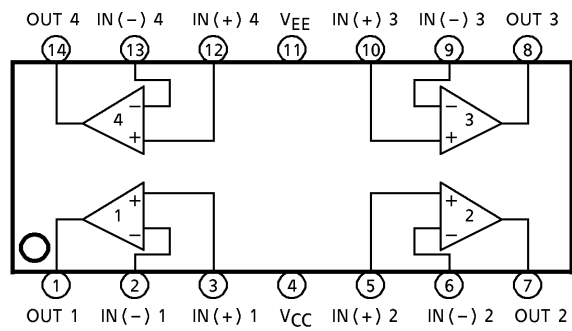
Weight
DIP14-P-300-2.54 : 1.0g (Typ.)
SOP14-P-225-1.27 : 0.2g (Typ.)

PIN CONNECTION (TOP VIEW)

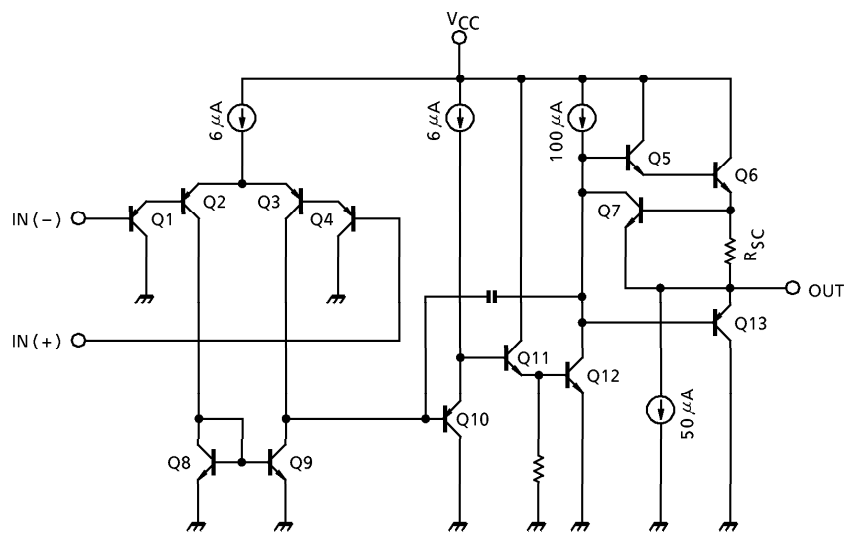
TA75324P



TA75324F



EQUIVALENT CIRCUIT



MAXIMUM RATINGS (Ta = 25°C)

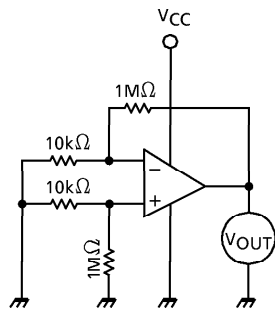
CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V_{CC}, V_{EE}	± 18 OR 36	V
Differential Input Voltage		DV_{IN}	± 36	V
Input Voltage		V_{IN}	$-0.3 \sim 36$	V
Power Dissipation	TA75324P	P_D	625	mW
	TA75324F		280	
Operating Temperature		T_{opr}	$-40 \sim 85$	°C
Storage Temperature		T_{stg}	$-55 \sim 125$	°C

ELECTRICAL CHARACTERISTICS ($V_{CC} = 5V$, $V_{EE} = GND$, Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V_{IO}	1	$R_g \leq 10k\Omega$	—	2	10	mV
Input Offset Current	I_{IO}	2	—	—	5	100	nA
Input Bias Current	I_I	2	—	—	45	250	nA
Common Mode Input Voltage	CMV_{IN}	3	$V_{CC} = 30V, V_{EE} = GND$	0	—	$V_{CC} - 1.5$	V
Supply Current	I_{CC}, I_{EE}	4	$R_L = \infty$, ALL OF Amps	—	0.7	1.2	mA
Voltage Gain	G_V	5	$R_L \geq 2k\Omega$	86	100	—	dB
Maximum Output Voltage Swing	V_{Op-p}	6	$R_L = 2k\Omega$	0	—	$V_{CC} - 1.5$	V
Common Mode Rejection Ratio	CMRR	3	—	60	85	—	dB
Supply Voltage Rejection Ratio	SVRR	1	$R_g = 10k\Omega$	60	100	—	dB
Source Current	I_{source}	6	$IN(-) = 0V_{DC}, IN(+) = 1V_{DC}$	20	40	—	mA
Sink Current	I_{sink}	6	$IN(-) = 1V_{DC}, IN(+) = 0V_{DC}$	10	20	—	mA

TEST CIRCUIT

(1) V_{IO} , SVRR



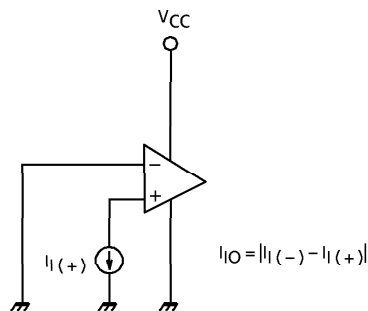
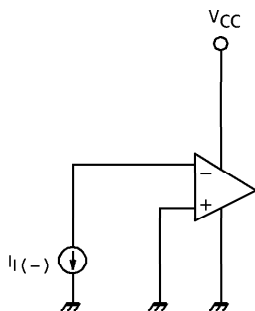
- $V_{IO} = V_{OUT} / 100$
- $SVRR = 20 \log E \text{ (dB)}$

$$E = \left| \frac{V_{OUT1} - V_{OUT2}}{V_{CC1} - V_{CC2}} \right| \times \frac{1}{100}$$

V_{OUT1} : V_{OUT} ($V_{CC1} = 5V$)

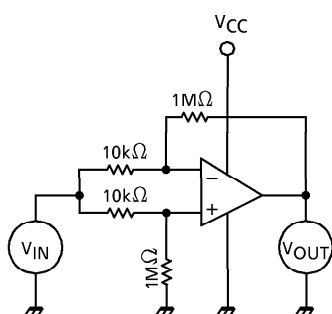
V_{OUT2} : V_{OUT} ($V_{CC2} = 10V$)

(2) I_I , I_{IO}



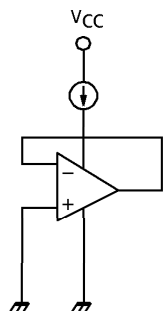
$$I_{IO} = |I_I (-) - I_I (+)|$$

(3) CMV_{IN} , CMRR



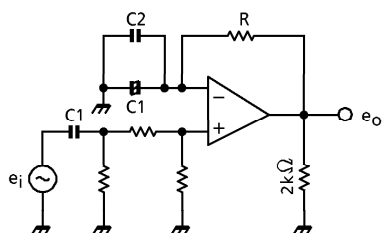
- $CMRR = 20 \log \cdot G_D / G_C \text{ (dB)}$
 G_D : DIFFERENTIAL VOLTAGE GAIN
 G_C : COMMON MODE VOLTAGE GAIN
- CMV_{IN} : $V_{IN} = 0V$, $V_{CC} - 1.5V$ SUPPLIES

(4) I_{CC}



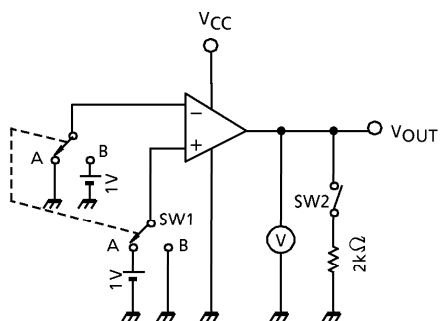
- $I_{CC} : (V_{CC} = 5V)$

(5) G_V



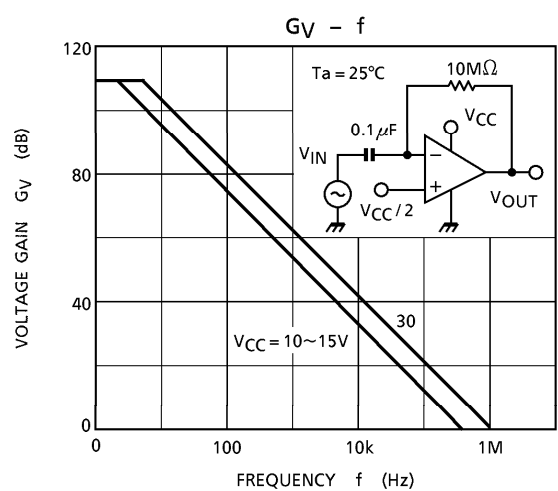
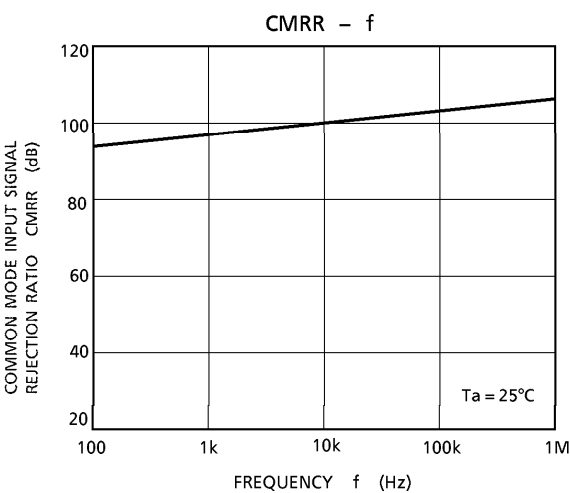
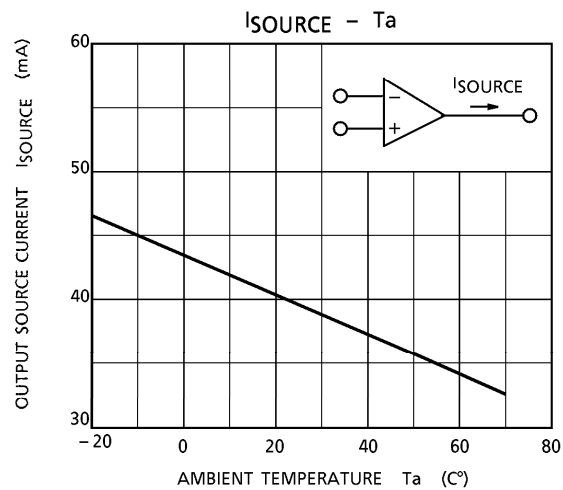
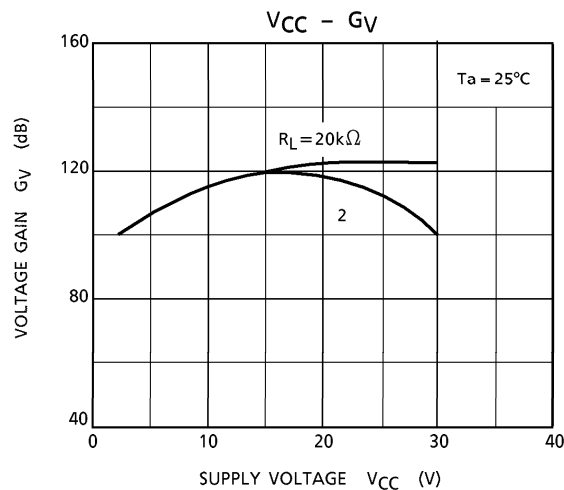
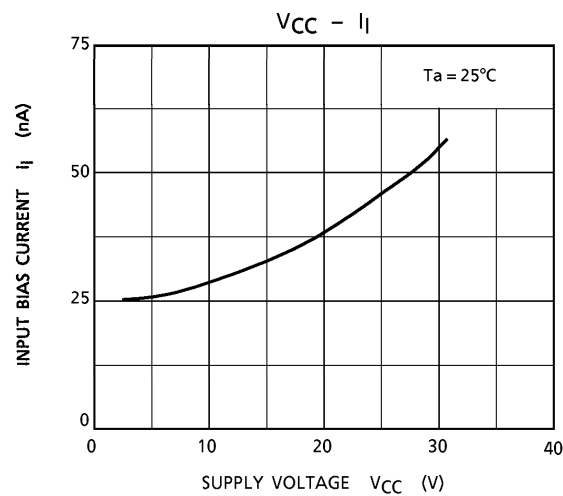
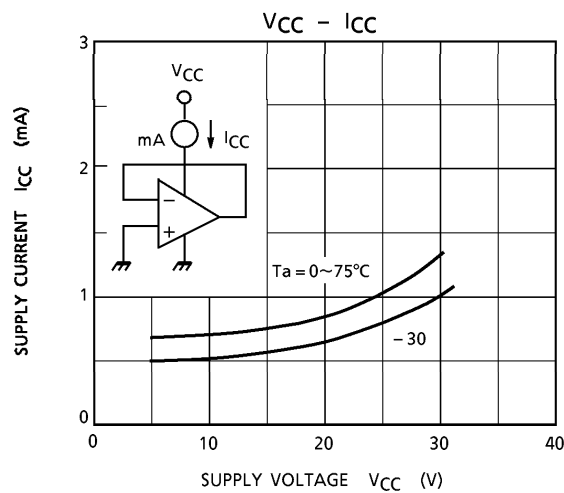
- $G_V = 20 \log e_o / e_i$ (dB)
 $R \gg 1 / \omega C_1$
 C_1 : COUPLING CONDENSER
 C_2 : HIGH FREQUENCY BYPASS CONDENSER

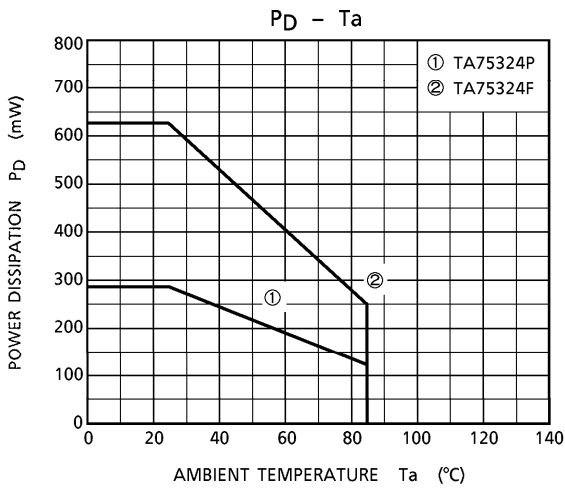
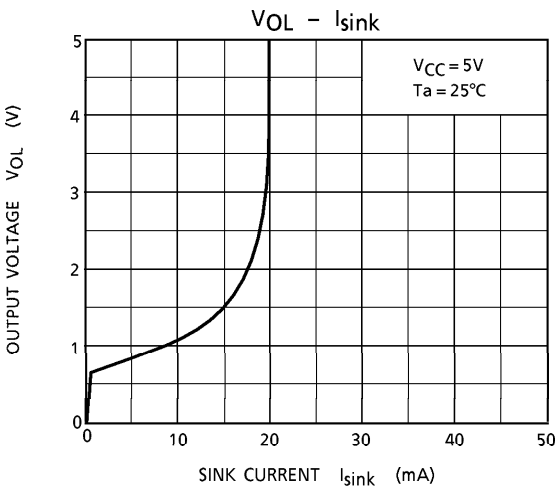
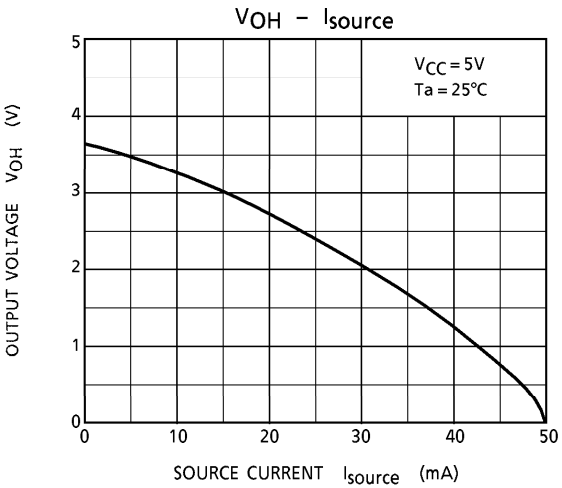
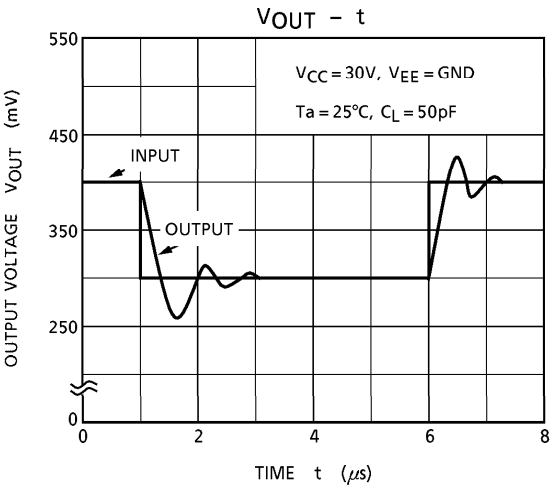
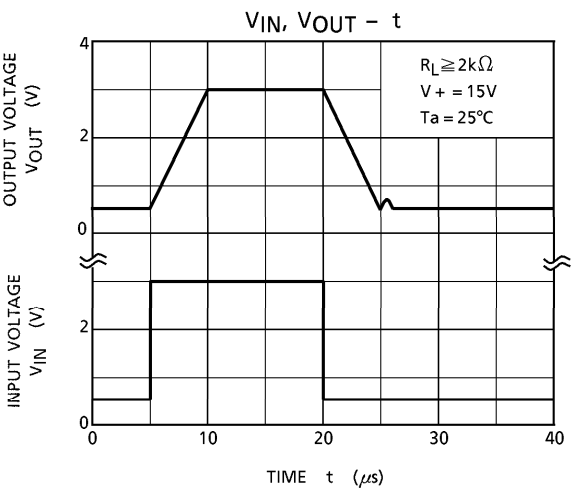
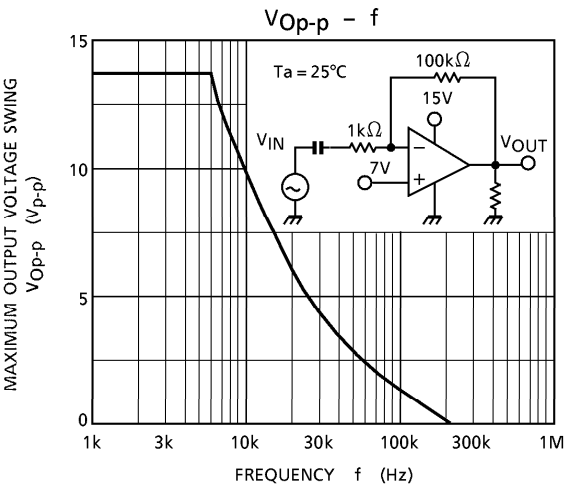
(6) V_{Op-p} , I_{source} , I_{sink}



- V_{Op-p}
 V_{OH} : SW1 IS SIDE A, SW2 ON
 V_{OL} : SW1 IS SIDE B, SW2 ON
- I_{source}
SW1 IS SIDE A, SW2 OFF
 $V_{OUT} \rightarrow 0V$ MEASURE
- I_{sink}
SW1 IS SIDE B, SW2 OFF
 $V_{OUT} \rightarrow 5V$ MEASURE

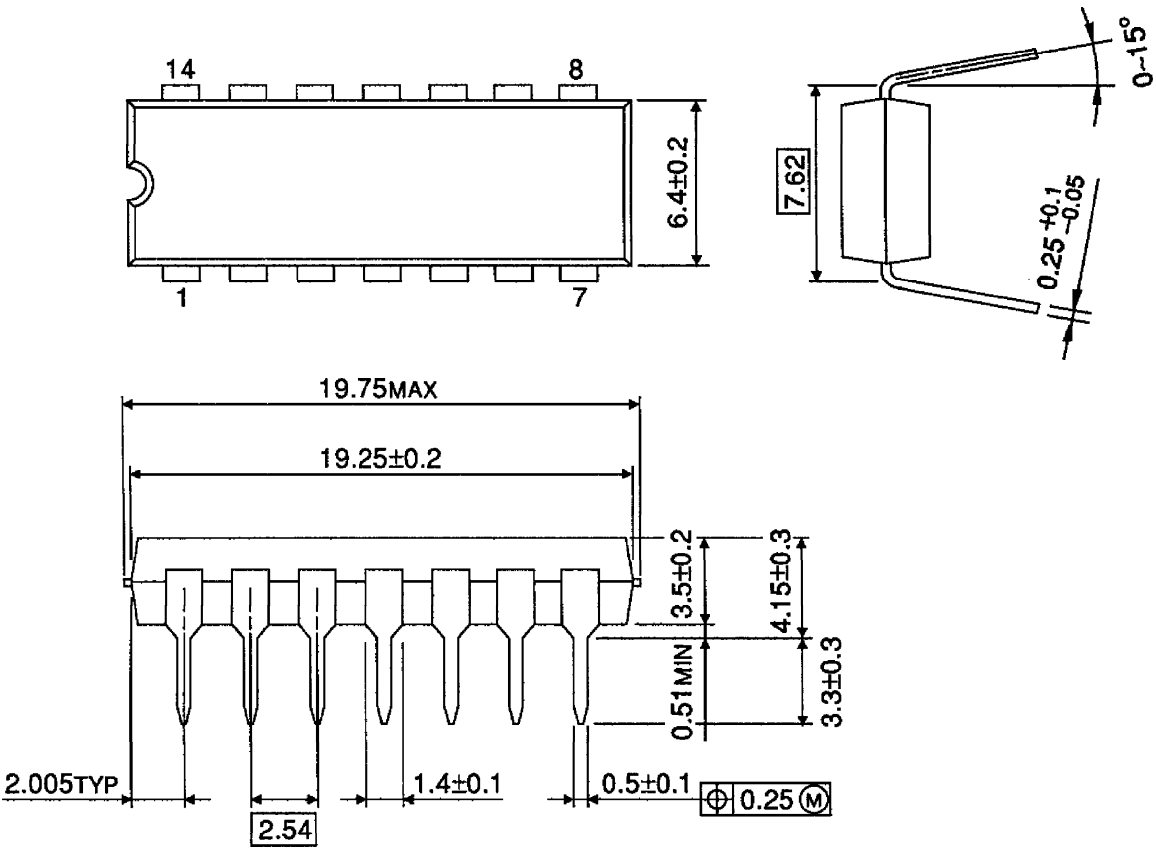
CHARACTERISTICS





PACKAGE DIMENSIONS
DIP14-P-300-2.54

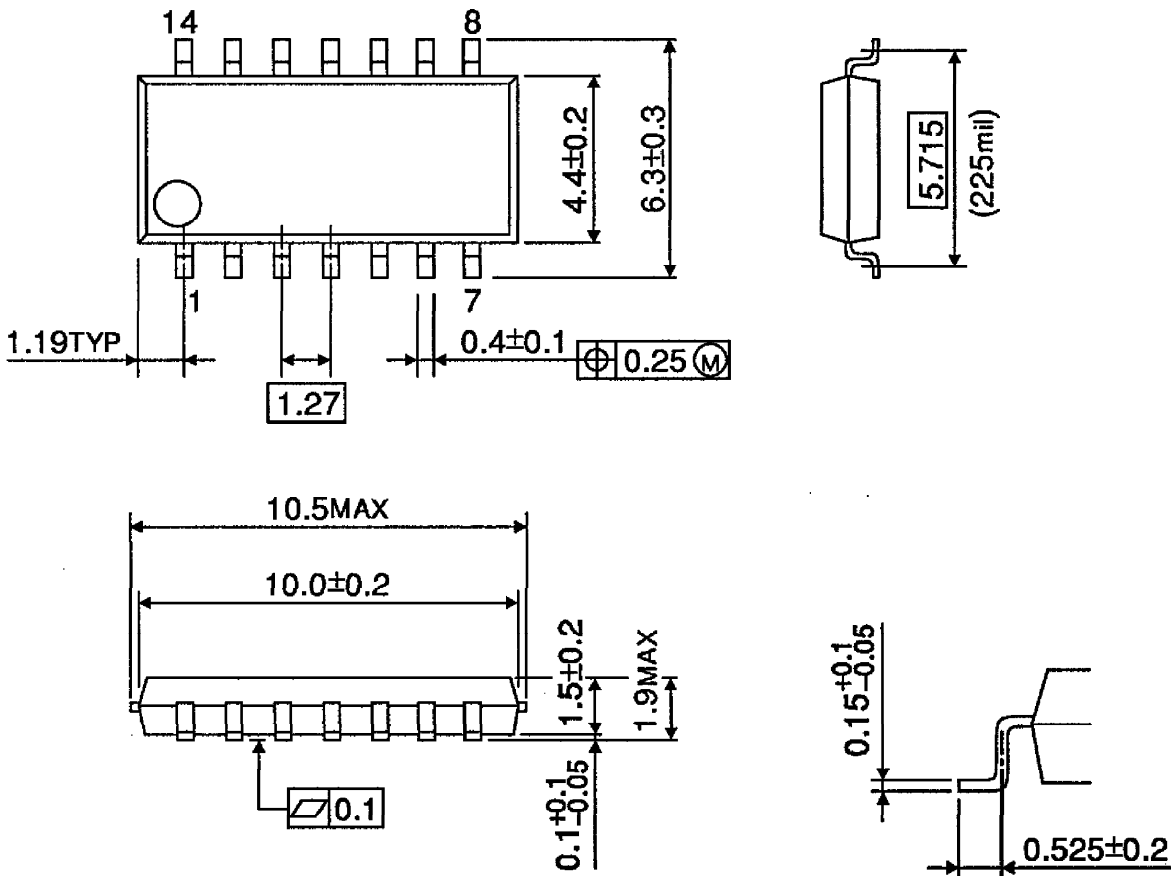
Unit : mm



Weight : 1.0g (Typ.)

PACKAGE DIMENSIONS
SOP14-P-225-1.27

Unit : mm



Weight : 0.2g (Typ.)

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000707EBA

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