TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

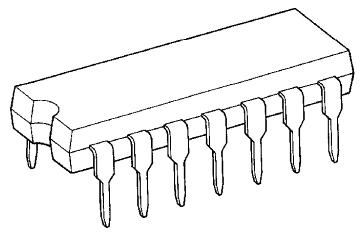
TA75324P, TA75324F

QUAD OPERATIONAL AMPLIFIER

FEATURES

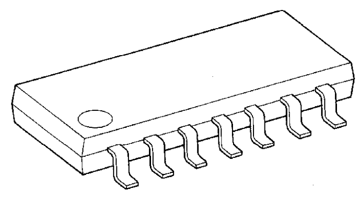
- In the Linear Mode the Input Common Mode Voltage Range Includes Ground.
- Four Internally Compensated OP Amp is Single Package.
- Low power Dissipation and Power Drain Suitable for Battery Operation.
- Differential Input Voltage Range Equal to the Power Supply Voltage.
- Wide Power Supply Voltage Range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

TA75324P



DIP14-P-300-2.54

TA75324F

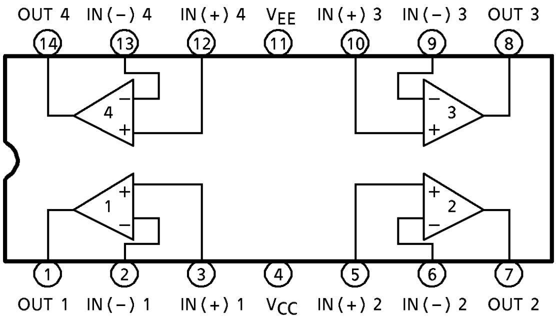


SOP14-P-225-1.27

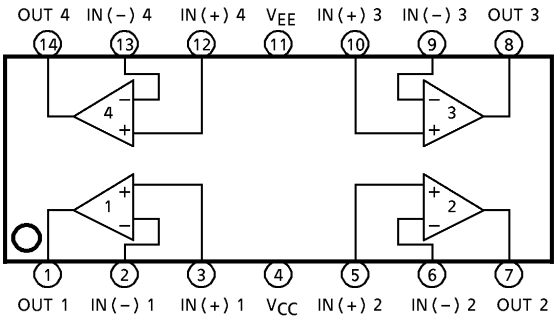
Weight
DIP14-P-300-2.54 : 1.0g (Typ.)
SOP14-P-225-1.27 : 0.2g (Typ.)

PIN CONNECTION (TOP VIEW)

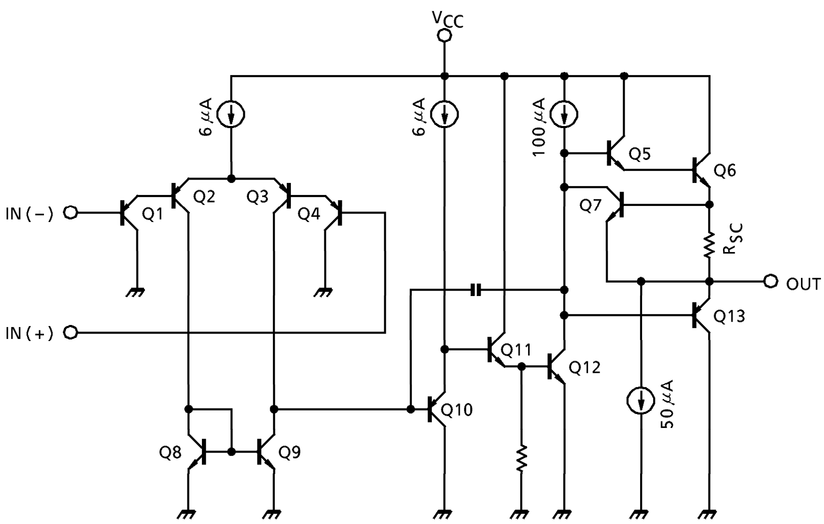
TA75324P



TA75324F



EQUIVALENT CIRCUIT



MAXIMUM RATINGS (Ta = 25°C)

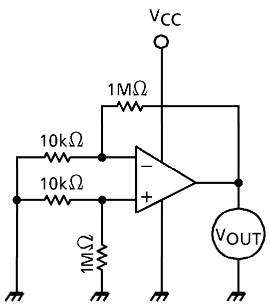
CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V_{CC}, V_{EE}	±18 OR 36	V
Differential Input Voltage		DV_{IN}	±36	V
Input Voltage		V_{IN}	−0.3~36	V
Power Dissipation	TA75324P	P_D	625	mW
	TA75324F		280	
Operating Temperature		T_{opr}	−40~85	°C
Storage Temperature		T_{stg}	−55~125	°C

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	$R_g \leqq 10k\Omega$	—	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	$R_L \geqq 2k\Omega$	86	100	—	dB
Maximum Output Voltage Swing	$V_{Op\text{-}p}$	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

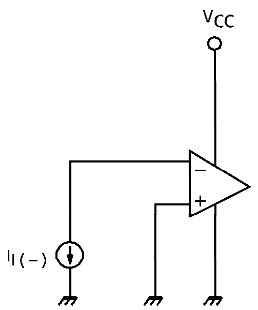


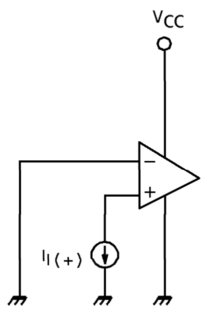
- $V_{IO} = V_{OUT} / 100$
- $SVRR = 20\ell og\ E$ (dB)

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

V_{OUT1} : V_{OUT} ($V_{CC1} = 5V$)
V_{OUT2} : V_{OUT} ($V_{CC2} = 10V$)

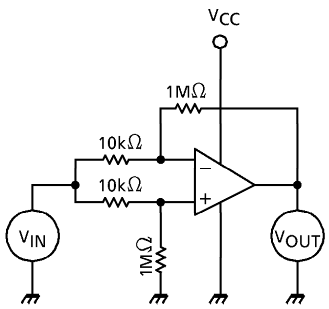
(2) I_I, I_{IO}





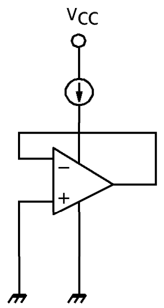
$I_{IO} = |I_{I(-)} - I_{I(+)}|$

(3) CMV_{IN}, CMRR



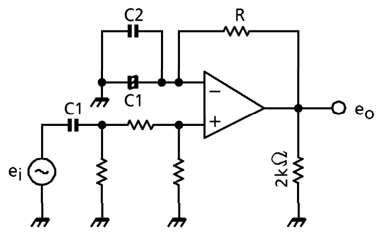
- $CMRR = 20\ell og \cdot G_D / G_C$ (dB)
  - G_D : DIFFERENTIAL VOLTAGE GAIN
  - G_C : COMMON MODE VOLTAGE GAIN
- CMV_{IN} : $V_{IN} = 0V$, $V_{CC} - 1.5V$ SUPPLES

(4) I_{CC}



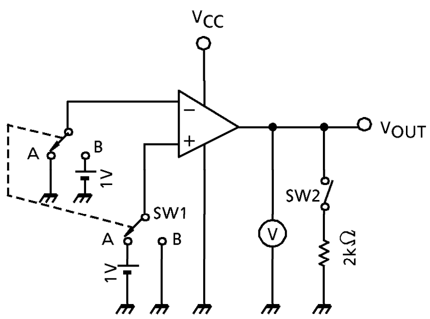
- I_{CC} : ($V_{CC} = 5V$)

(5) G_V



- $G_V = 20\ell og\ e_o / e_i$ (dB)
  $R \gg 1 / WC1$
  C1 : COUPLING CONDENSER
  C2 : HIGH FREQUENCY BYPASS CONDENSER

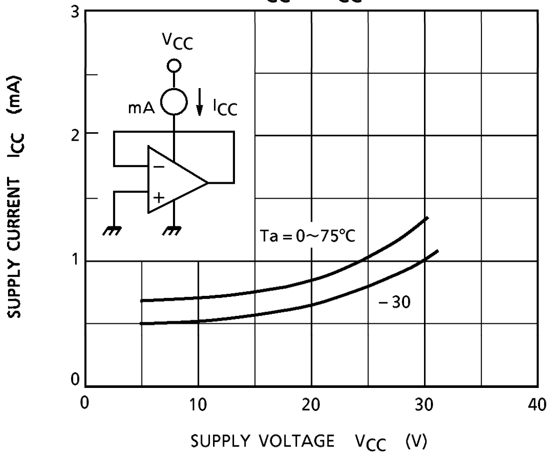
(6) $V_{Op\text{-}p}$, I_{source}, I_{sink}



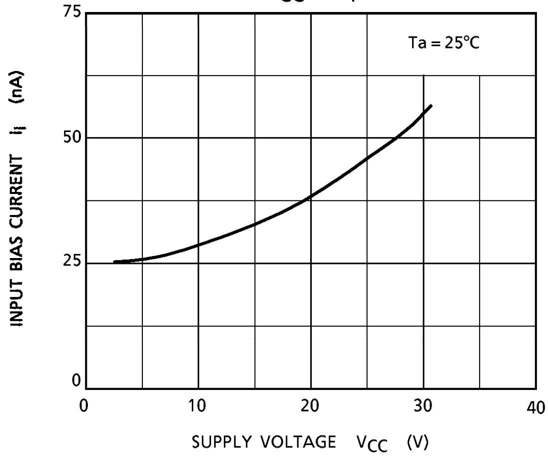
- $V_{Op\text{-}p}$
  V_{OH} : SW1 IS SIDE A, SW2 ON
  V_{OL} : SW1 IS SIDE B, SW2 ON
- I_{source}
  SW1 IS SIDE A, SW2 OFF
  $V_{OUT} \rightarrow 0V$ MEASURE
- I_{sink}
  SW1 IS SIDE B, SW2 OFF
  $V_{OUT} \rightarrow 5V$ MEASURE

CHARACTERISTICS

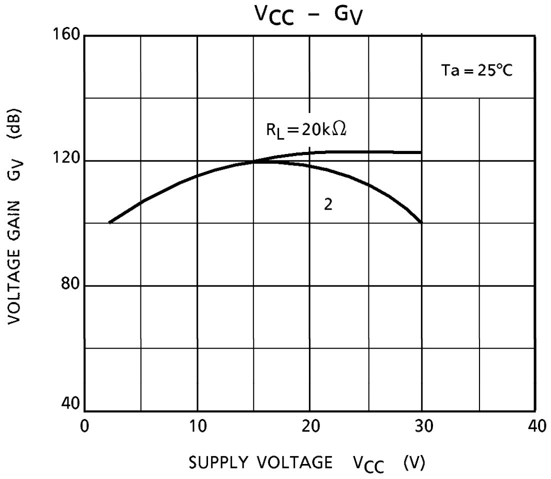
V_{CC} – I_{CC}



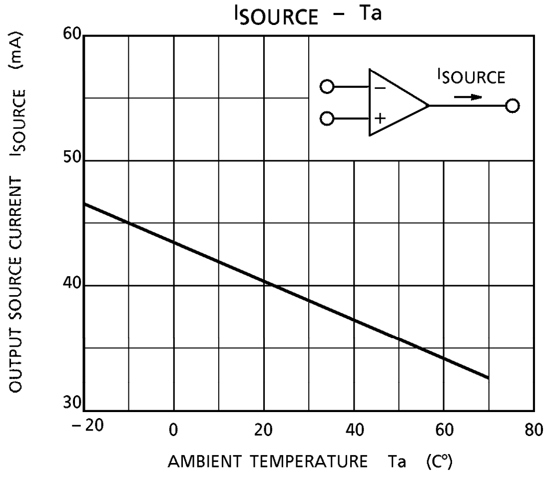
V_{CC} – I_I



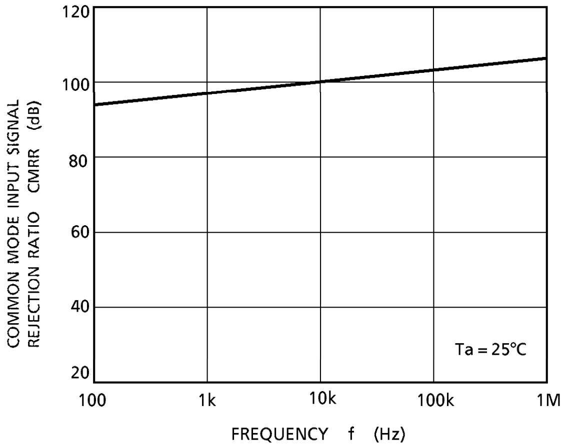
V_{CC} – G_V



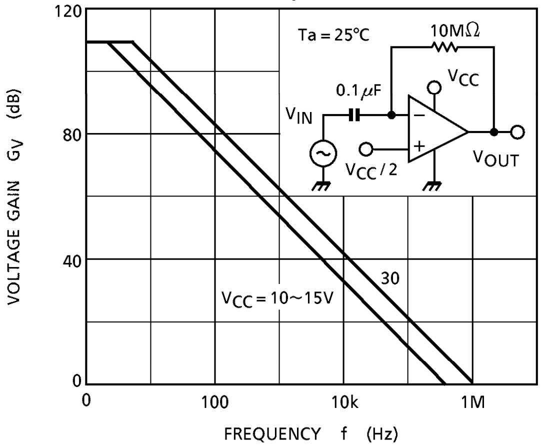
I_{SOURCE} – Ta



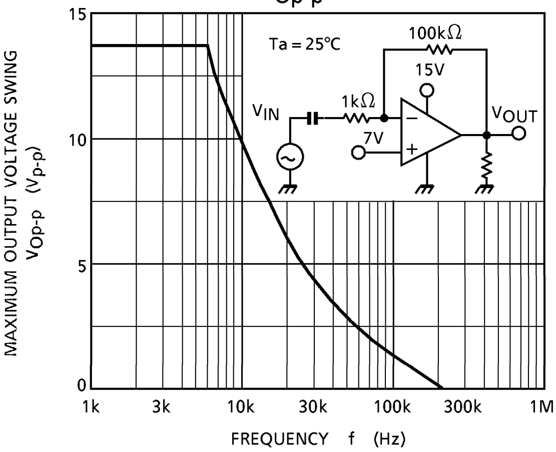
CMRR – f



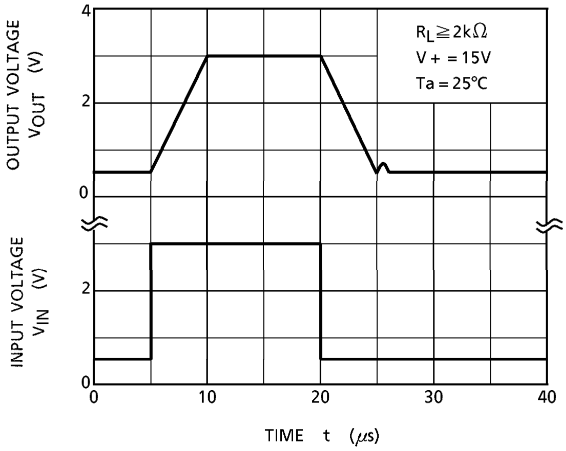
G_V – f



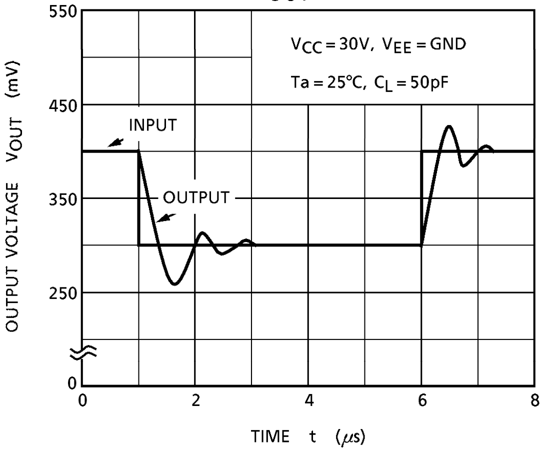
V_{Op-p} – f



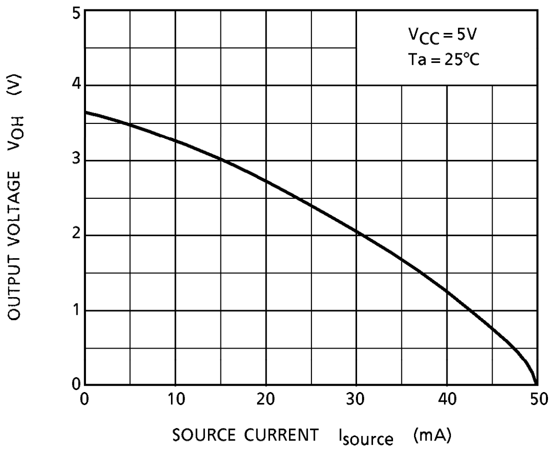
V_{IN}, V_{OUT} – t



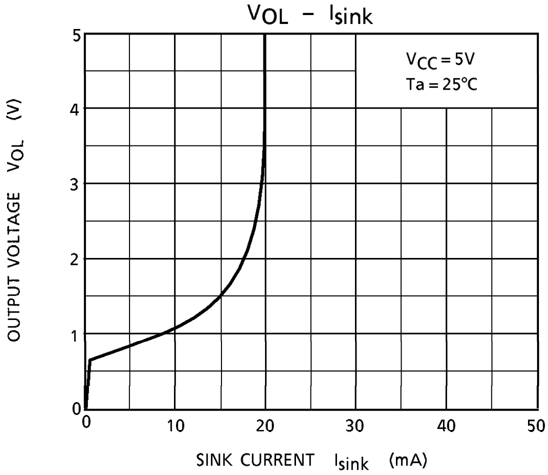
V_{OUT} – t



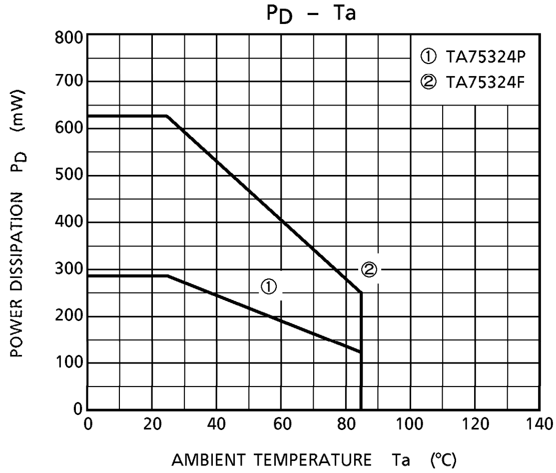
V_{OH} – I_{source}



V_{OL} – I_{sink}

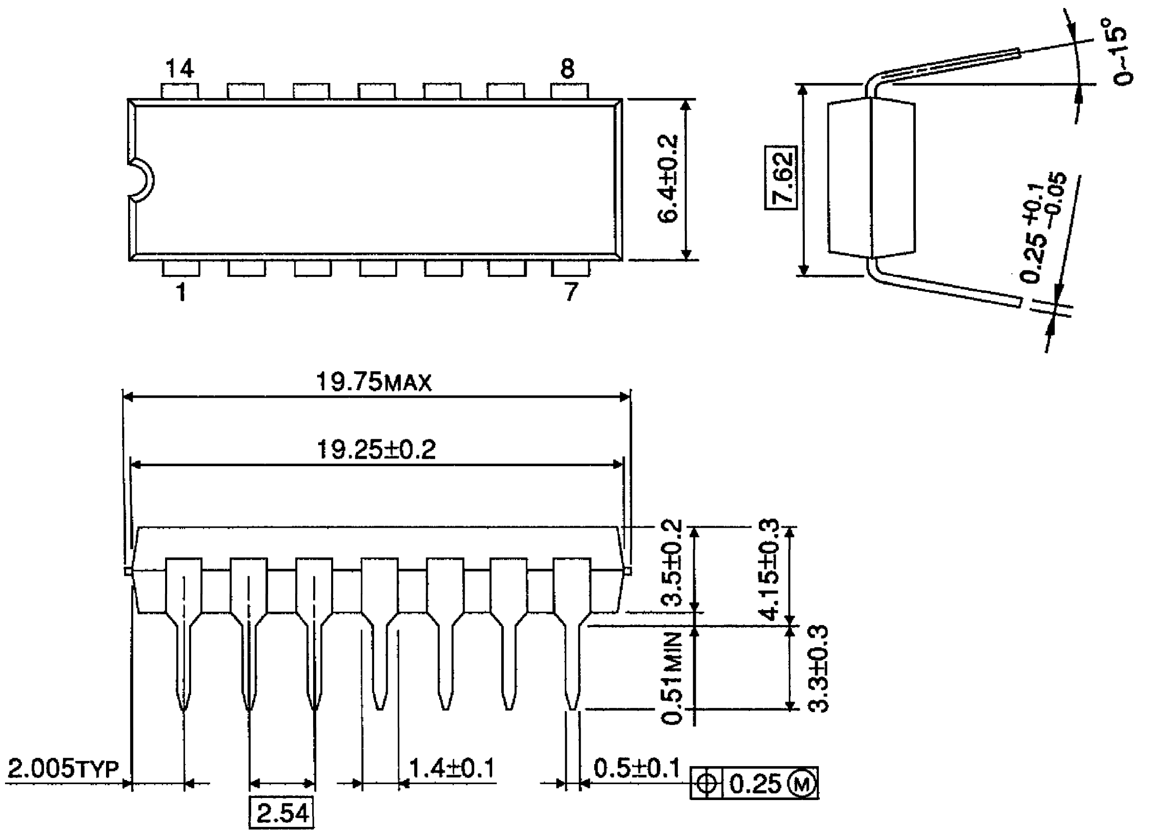


P_D – Ta



OUTLINE DRAWING

DIP14-P-300-2.54 Unit : mm

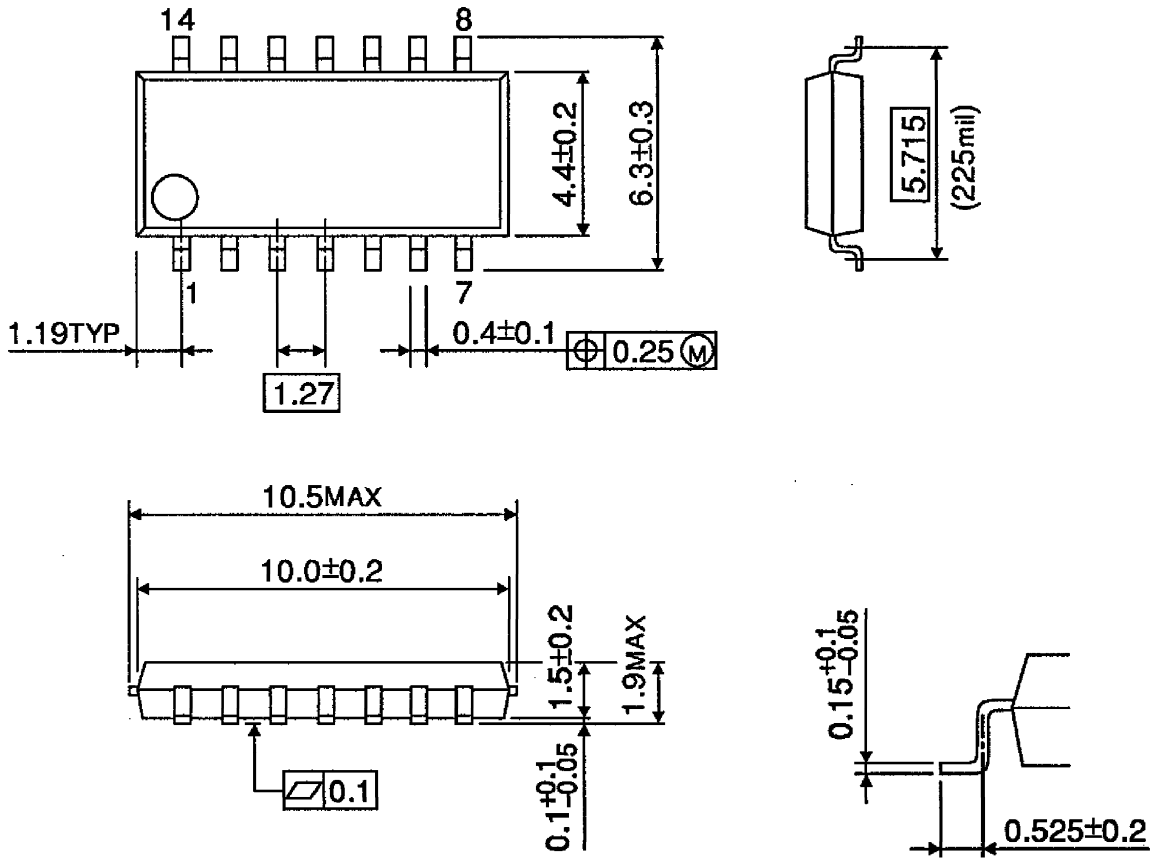


Weight : 1.0g (Typ.)

OUTLINE DRAWING

SOP14-P-225-1.27

Unit : mm



Weight : 0.2g (Typ.)