

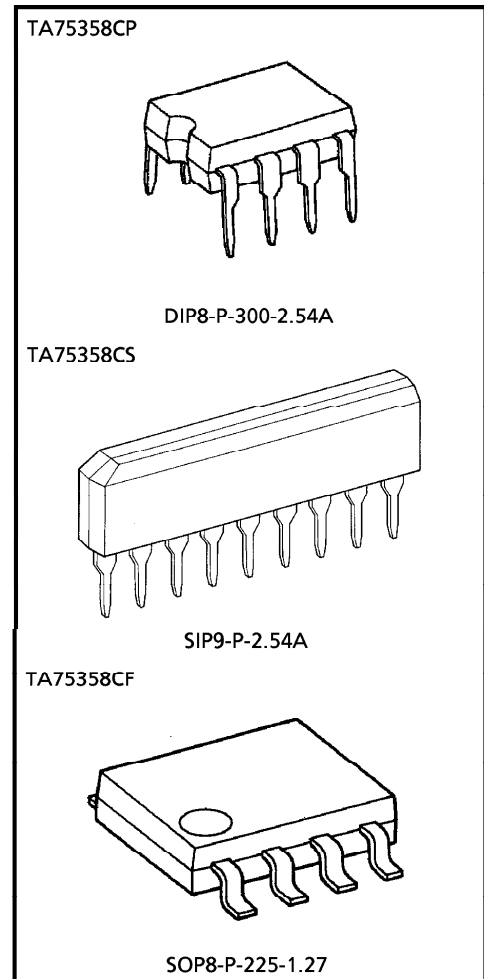
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

# TA75358CP, TA75358CS, TA75358CF

## DUAL OPERATIONAL AMPLIFIER

### FEATURES

- In the Linear Mode the Input Common Mode Voltage Range Includes Ground.
- Two Internally Compensated OP Amps is Single Package.
- Low Power Dissipation and Power Drain Suitable for Battery Operation.
- Differential Input Voltage Range Equal to the Power Supply Voltage.
- Large Output Voltage Swing :  $0V \sim V_{CC} - 1.5V$
- Wide Power Supply Voltage Range and Single Power Supply is Possible.
- Single Supply  $3V \sim 36V$  or Dual Supplies  $\pm 1.5V \sim 18V$ .
- Low Input Biasing Current :  $I_b = 45nA$  (Typ.)



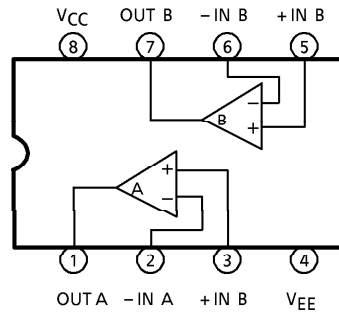
Weight	
DIP8-P-300-2.54A	: 0.5g (Typ.)
SIP9-P-2.54A	: 0.9g (Typ.)
SOP8-P-225-1.27	: 0.1g (Typ.)

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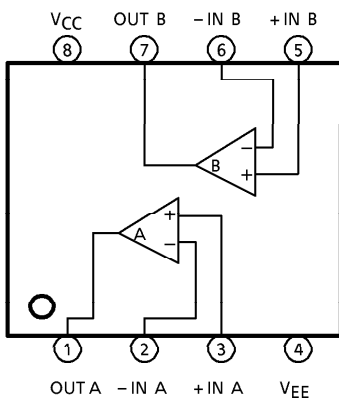
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**PIN CONNECTION (TOP VIEW)**

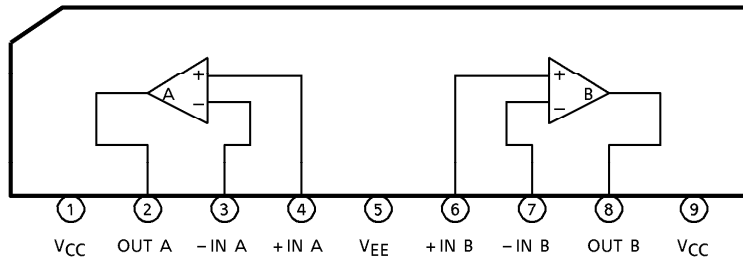
**TA75358CP**



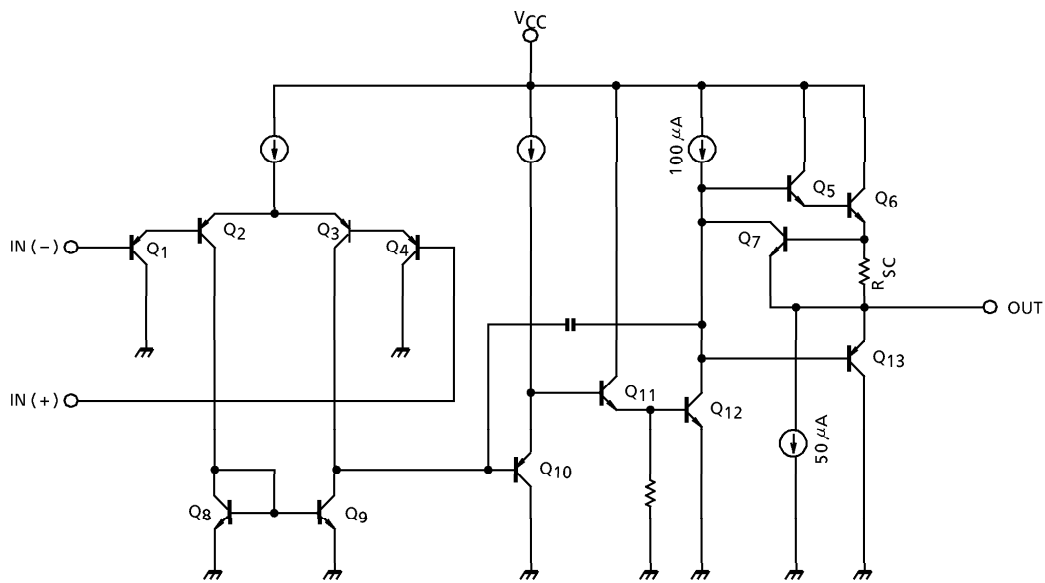
**TA75358CF**



**TA75358CS**



**EQUIVALENT CIRCUIT**



## MAXIMUM RATINGS (Ta = 25°C)

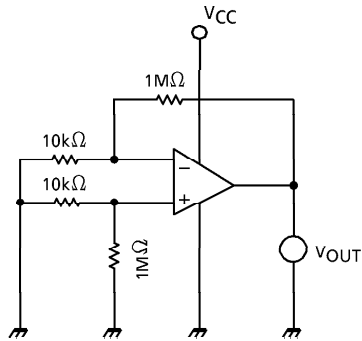
CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V <sub>CC</sub> , V <sub>EE</sub>	± 18 OR 36	V
Differential Input Voltage	DV <sub>IN</sub>	± 36	V
Input Voltage	V <sub>IN</sub>	- 0.3~36	V
Power Dissipation	TA75358CP	P <sub>D</sub>	mW
	TA75358CS		
	TA75358CF		
Operating Temperature	T <sub>opr</sub>	- 40~85	°C
Storage Temperature	T <sub>stg</sub>	- 55~125	°C

ELECTRICAL CHARACTERISTICS (V<sub>CC</sub> = 5V, V<sub>EE</sub> = GND, Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V <sub>IO</sub>	1	R <sub>g</sub> ≤ 10kΩ	—	2	7	mV
Input Offset Current	I <sub>IO</sub>	2	—	—	5	50	nA
Input Bias Current	I <sub>I</sub>	2	—	—	45	250	nA
Common Mode Input Voltage	CMV <sub>IN</sub>	3	V <sub>CC</sub> = 30V, V <sub>EE</sub> = GND	0	—	V <sub>CC</sub> - 1.5	V
Supply Current	I <sub>CC</sub> , I <sub>EE</sub>	4	R <sub>L</sub> = ∞, All OP Amps	—	0.7	1.2	mA
Voltage Gain	G <sub>V</sub>	5	R <sub>L</sub> ≥ 2kΩ	86	100	—	dB
Maximum Output Voltage Swing	V <sub>Op-p</sub>	6	R <sub>L</sub> = 2kΩ	0	—	V <sub>CC</sub> - 1.5	V
Common Mode Rejection Ratio	CMRR	3	—	60	85	—	dB
Supply Voltage Rejection Ratio	SVRR	1	R <sub>g</sub> = 10kΩ	60	100	—	dB
Source Current	I <sub>source</sub>	6	IN (-) = 0V, IN (+) = 1V	20	40	—	mA
Sink Current	I <sub>sink</sub>	6	IN (-) = 1V, IN (+) = 0V	10	20	—	mA
Unity Gain Cross Frequency	f <sub>T</sub>	—	—	—	0.6	—	MHz
Slew Rate	SR	—	—	—	0.3	—	V / μs

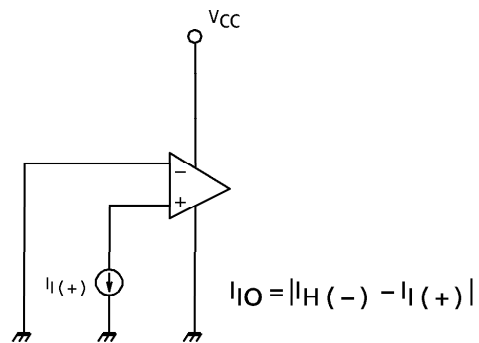
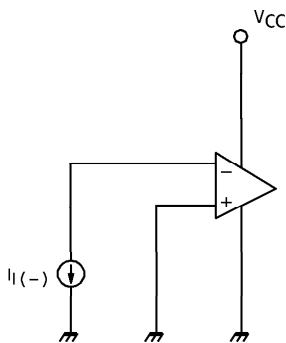
TEST CIRCUIT

(1)  $V_{IO}$ , SVRR

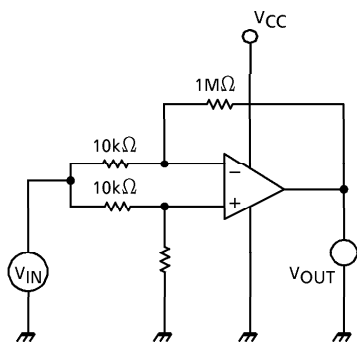


- $V_{IO} = V_{OUT} / 100$
  - $SVRR = 20 \log E$  (dB)
- $$E = \left| \frac{V_{OUT1} - V_{OUT2}}{V_{CC1} - V_{CC2}} \right| \times \frac{1}{100}$$
- $V_{OUT1}$  :  $V_{OUT}$  ( $V_{CC1} = 5V$ )  
 $V_{OUT2}$  :  $V_{OUT}$  ( $V_{CC2} = 10V$ )

(2)  $I_I$ ,  $I_{IO}$

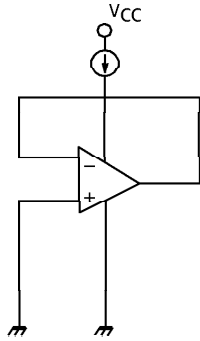


(3)  $CMV_{IN}$ , CMRR



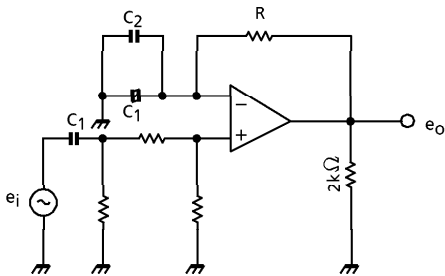
- $CMRR = 20 \log G_D / G_C$  (dB)
- $G_D$  : DIFFERENTIAL VOLTAGE GAIN
- $G_C$  : COMMON MODE VOLTAGE GAIN
- $CMV_{IN}$  :  $V_{IN} = 0V$   
 $V_{CC} = 1.5V$  SUPPLIES

(4)  $I_{CC}$



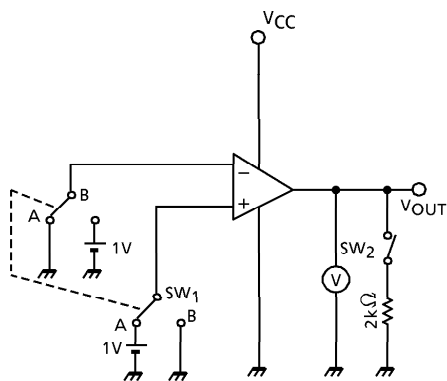
- $I_{CC} : V_{CC} = 5V$

(5)  $G_V$



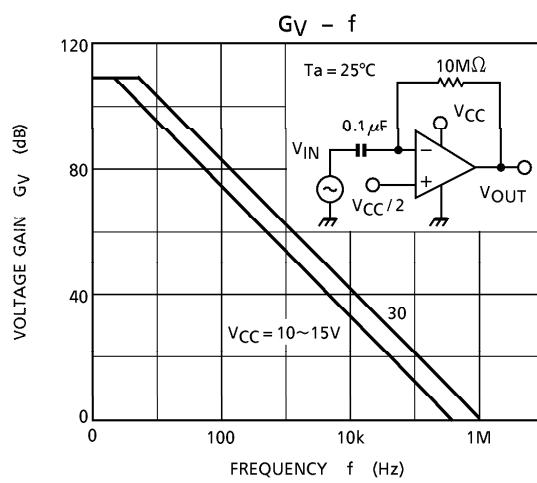
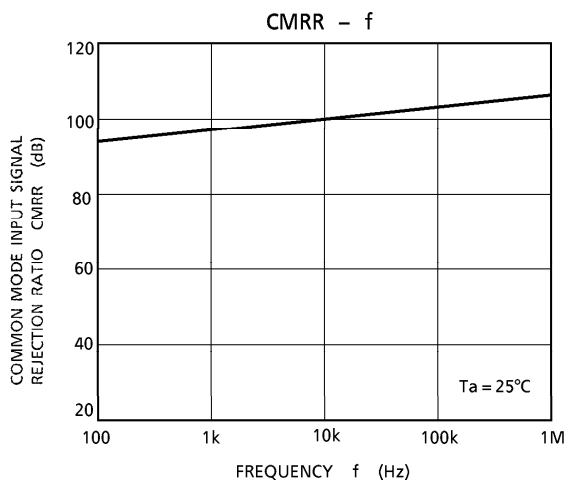
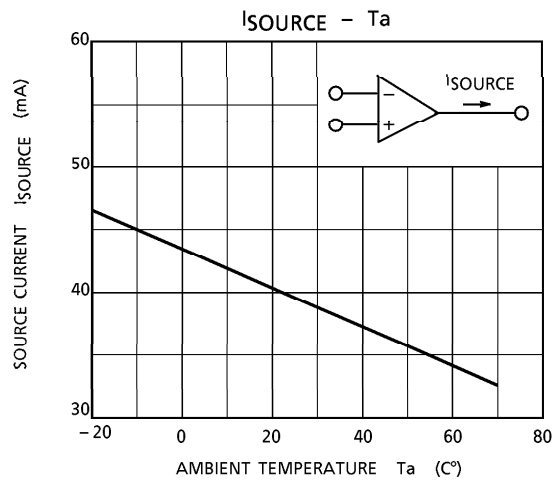
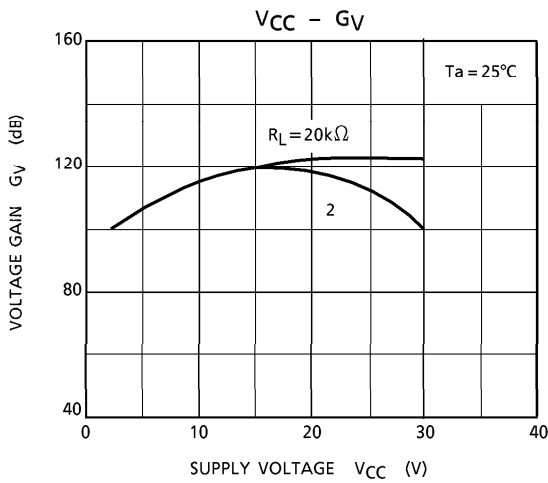
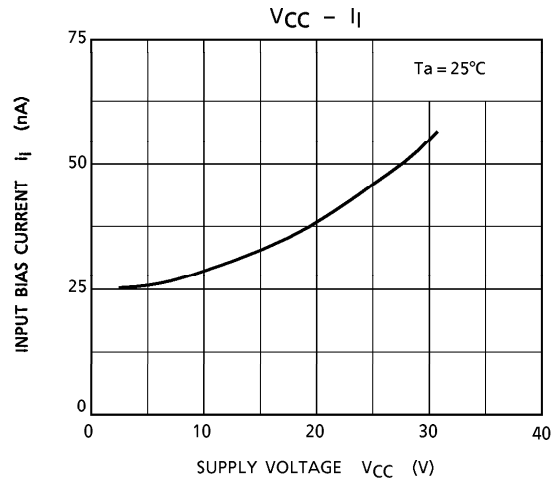
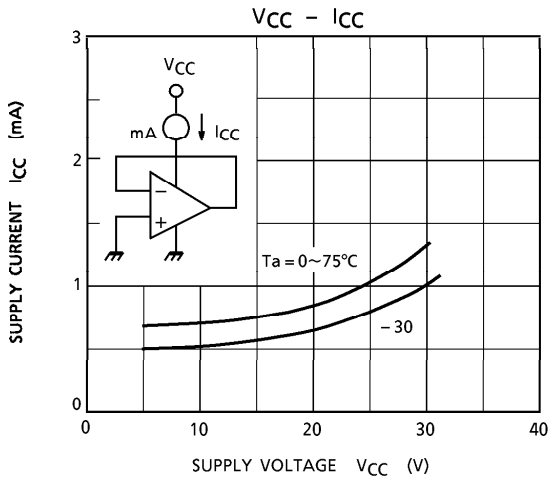
- $G_V = 20 \log e_o / e_i$  (dB)
- $R \gg 1 / \omega C_1$
- $C_1$  : COUPLING CONDENSER
- $C_2$  : HIGH FREQUENCY BYPASS CONDENSER

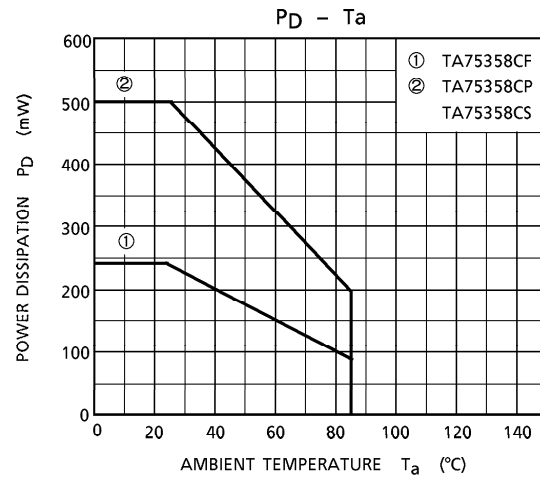
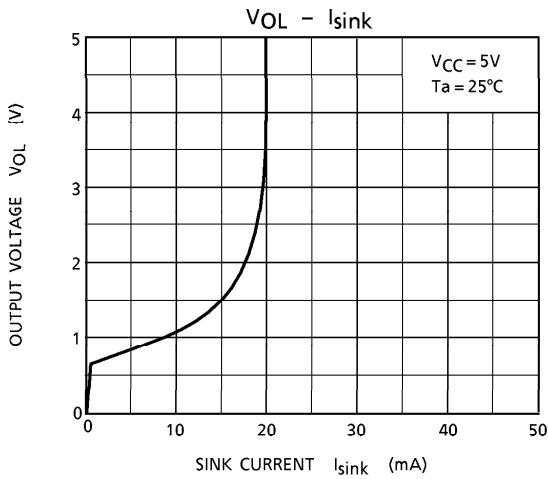
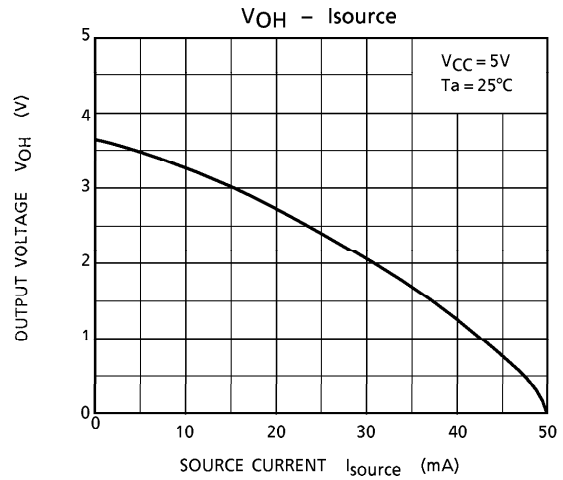
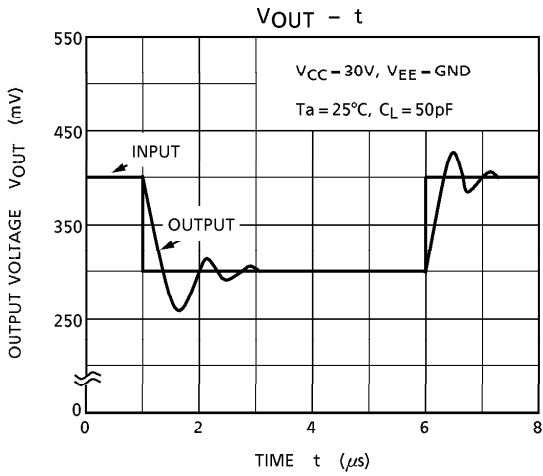
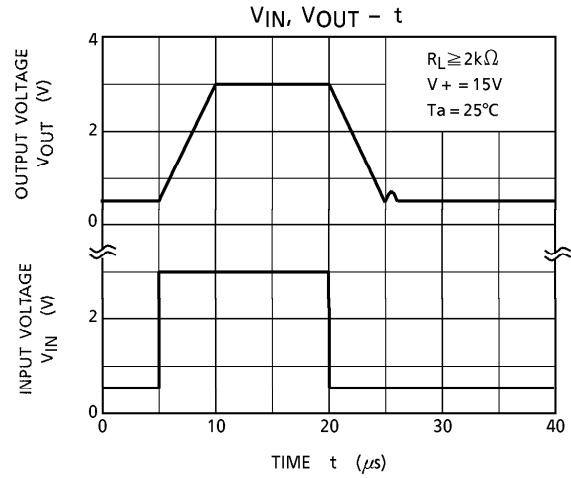
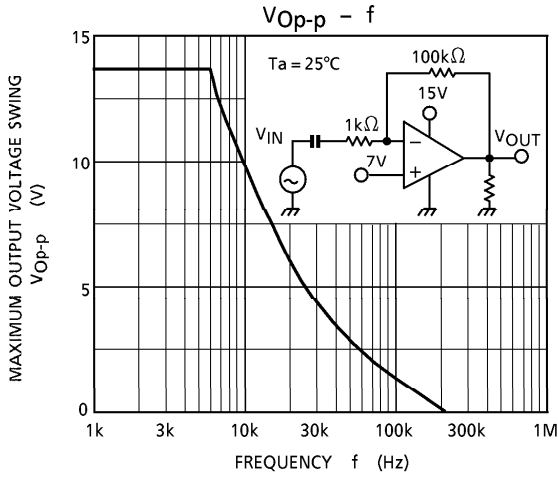
(6)  $V_{Op-p}$ ,  $I_{source}$ ,  $I_{sink}$



- $V_{Op-p}$   
 $V_{OH}$  : SW<sub>1</sub> IS SIDE A, SW<sub>2</sub> ON  
 $V_{OL}$  : SW<sub>1</sub> IS SIDE B, SW<sub>2</sub> ON
- $I_{source}$   
 SW<sub>1</sub> IS SIDE A, SW<sub>2</sub> OFF  
 $V_{OUT} \rightarrow 0V$  MEASURE
- $I_{sink}$   
 SW<sub>1</sub> IS SIDE B, SW<sub>2</sub> OFF  
 $V_{OUT} \rightarrow 5V$  MEASURE

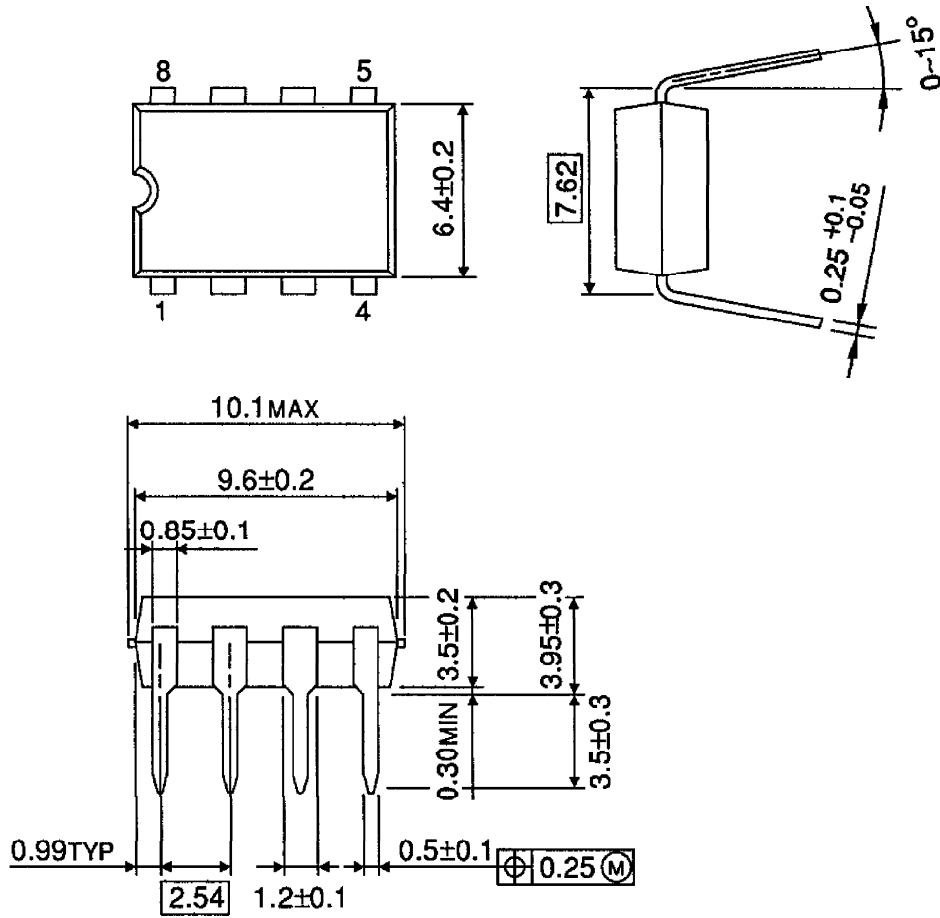
CHARACTERISTICS





OUTLINE DRAWING  
DIP8-P-300-2.54A

Unit : mm

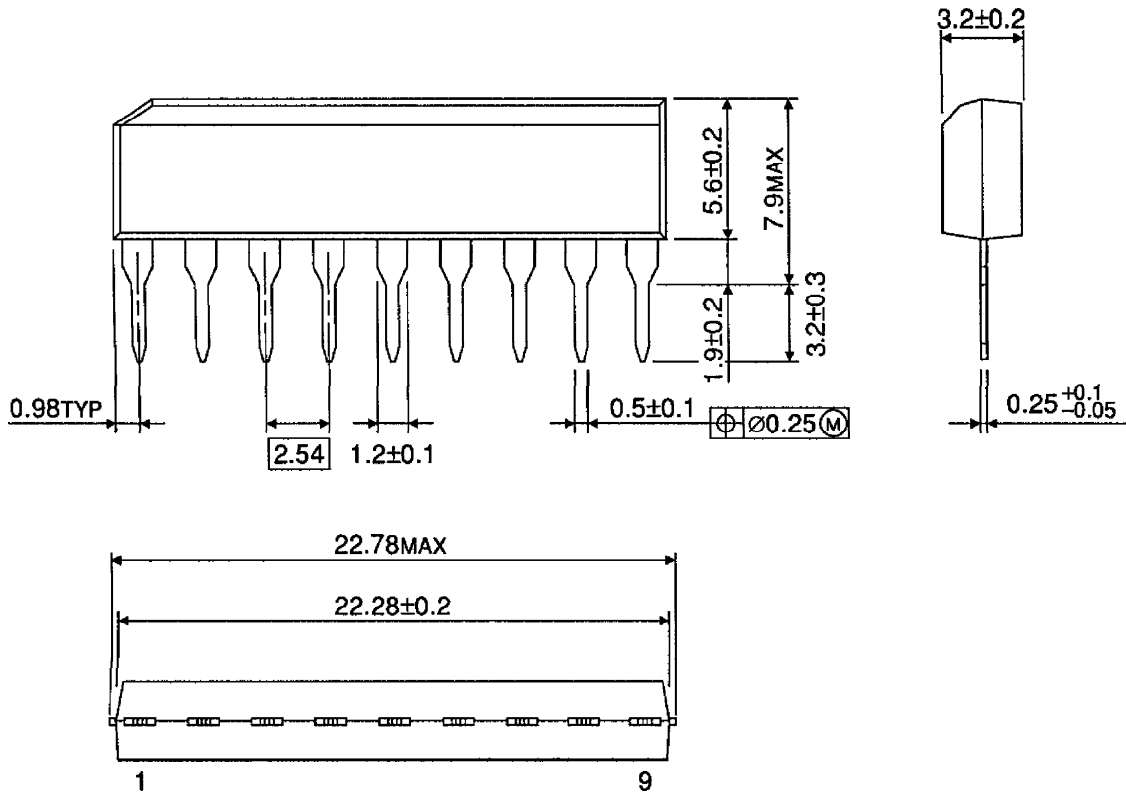


Weight : 0.5g (Typ.)



OUTLINE DRAWING  
SIP9-P-2.54A

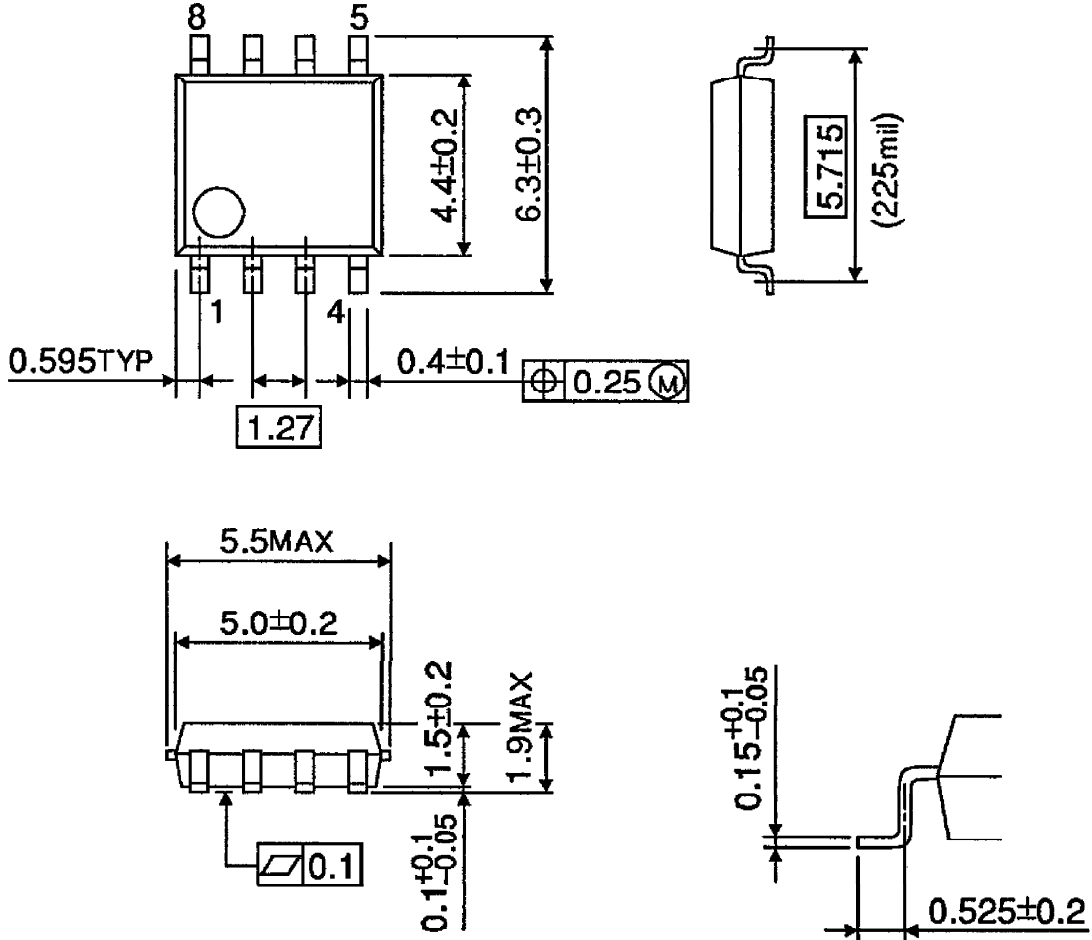
Unit : mm



Weight : 0.9g (Typ.)

OUTLINE DRAWING  
SOP8-P-225-1.27

Unit : mm



Weight : 0.1g (Typ.)