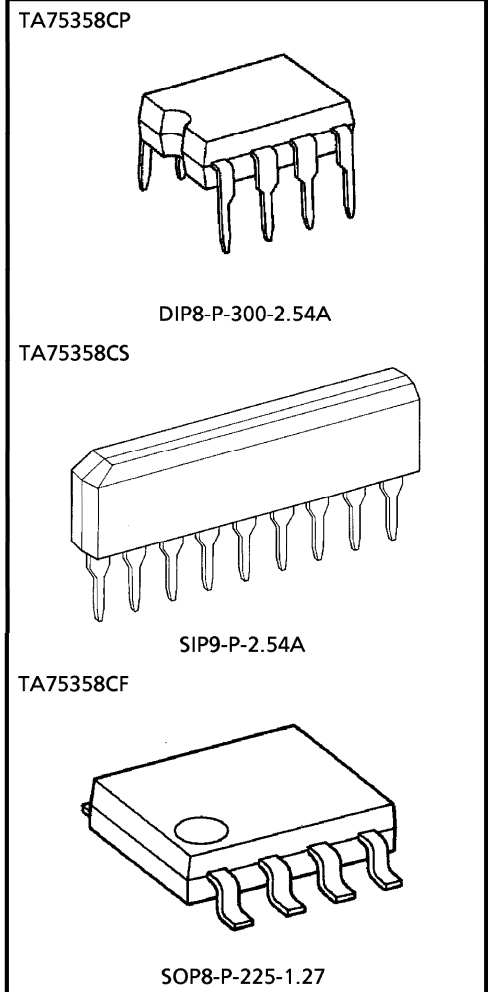


TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

**TA75358CP, TA75358CS, TA75358CF****DUAL OPERATIONAL AMPLIFIER****FEATURES**

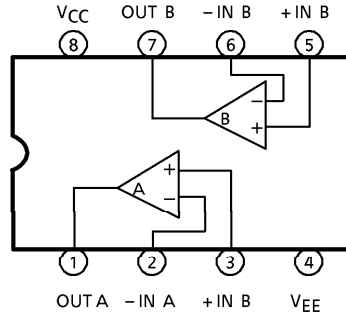
- In the Linear Mode the Input Common Mode Voltage Range Includes Ground.
- Two Internally Compensated OP Amps is Single Package.
- Low Power Dissipation and Power Drain Suitable for Battery Operation.
- Differential Input Voltage Range Equal to the Power Supply Voltage.
- Large Output Voltage Swing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



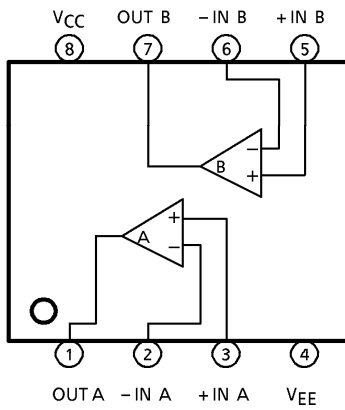
Weight  
 DIP8-P-300-2.54A : 0.5g (Typ.)  
 SIP9-P-2.54A : 0.9g (Typ.)  
 SOP8-P-225-1.27 : 0.1g (Typ.)

**PIN CONNECTION (TOP VIEW)**

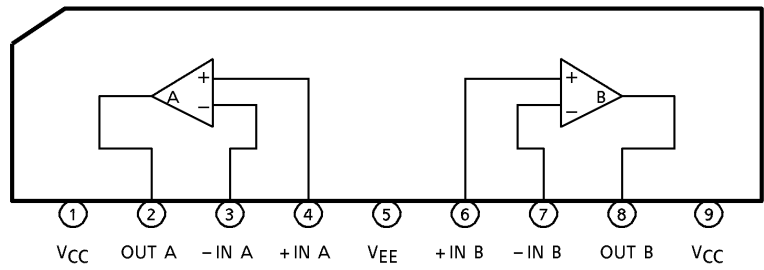
**TA75358CP**



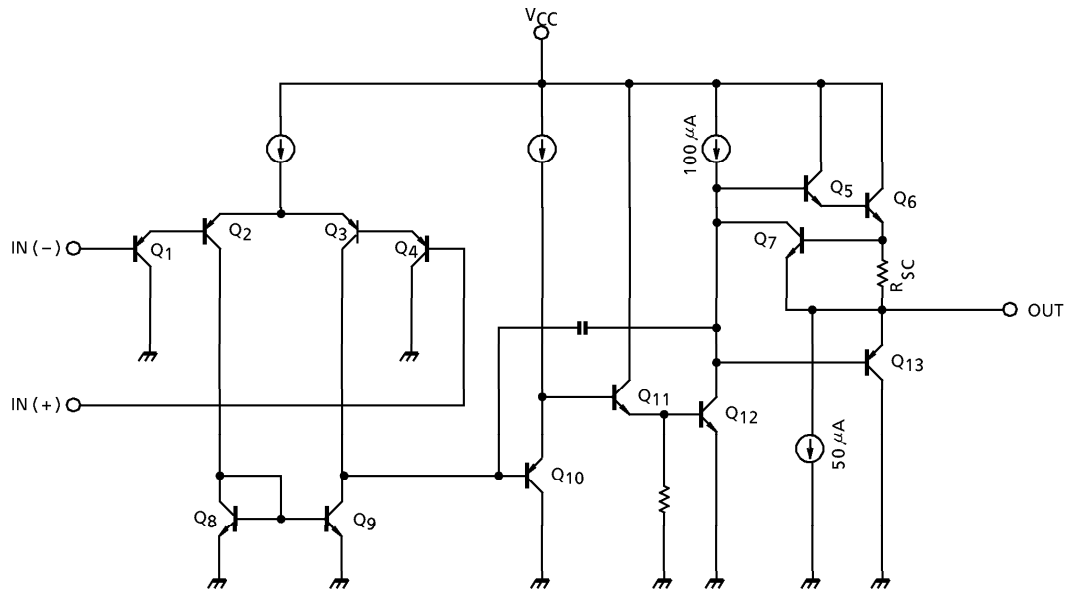
**TA75358CF**



**TA75358CS**



**EQUIVALENT CIRCUIT**



**MAXIMUM RATINGS (Ta = 25°C)**

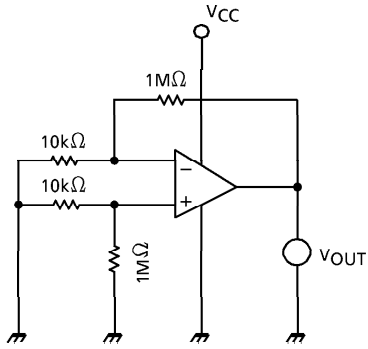
CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		$V_{CC}, V_{EE}$	$\pm 18$ OR 36	V
Differential Input Voltage		$DV_{IN}$	$\pm 36$	V
Input Voltage		$V_{IN}$	- 0.3~36	V
Power Dissipation	TA75358CP	$P_D$	500	mW
	TA75358CS			
	TA75358CF		240	
Operating Temperature		$T_{opr}$	- 40~85	°C
Storage Temperature		$T_{stg}$	- 55~125	°C

**ELECTRICAL CHARACTERISTICS ( $V_{CC} = 5V, V_{EE} = GND, T_a = 25^\circ C$ )**

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	$V_{IO}$	1	$R_g \leq 10k\Omega$	—	2	7	mV
Input Offset Current	$I_{IO}$	2	—	—	5	50	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	$R_L = \infty, \text{ All OP Amps}$	—	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	$IN(-) = 0V, IN(+) = 1V$	20	40	—	mA
Sink Current	$I_{sink}$	6	$IN(-) = 1V, IN(+) = 0V$	10	20	—	mA
Unity Gain Cross Frequency	$f_T$	—	—	—	0.6	—	MHz
Slew Rate	SR	—	—	—	0.3	—	V / $\mu s$

TEST CIRCUIT

(1)  $V_{IO}$ , SVRR



- $V_{IO} = V_{OUT} / 100$

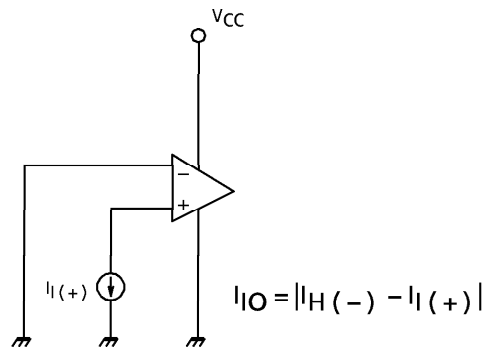
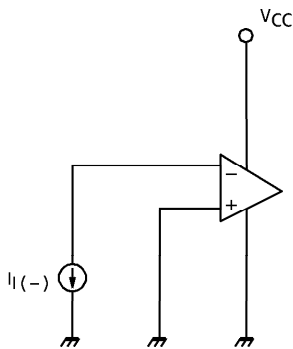
- $SVRR = 20 \log E \text{ (dB)}$

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

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

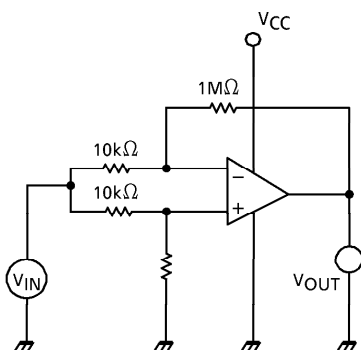
$V_{OUT2} : V_{OUT} (V_{CC2} = 10V)$

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



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

(3)  $CMV_{IN}$ , CMRR



- $CMRR = 20 \log G_D / G_C \text{ (dB)}$

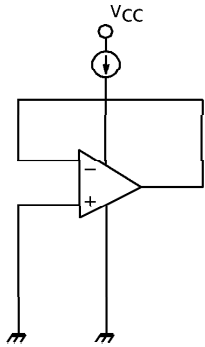
$G_D$  : DIFFERENTIAL VOLTAGE GAIN

$G_C$  : COMMON MODE VOLTAGE GAIN

- $CMV_{IN} : V_{IN} = 0V$

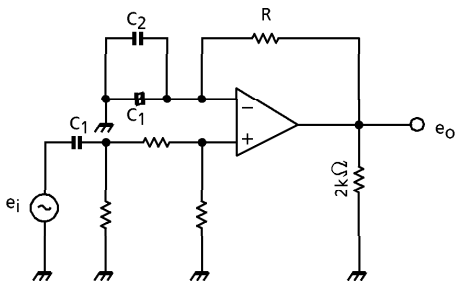
$V_{CC} - 1.5V \text{ SUPPLIES}$

(4)  $I_{CC}$



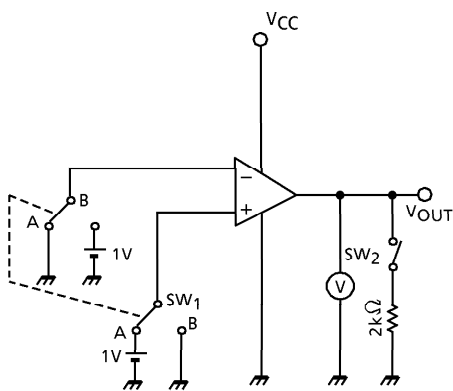
- $I_{CC} : V_{CC} = 5V$

(5)  $G_V$



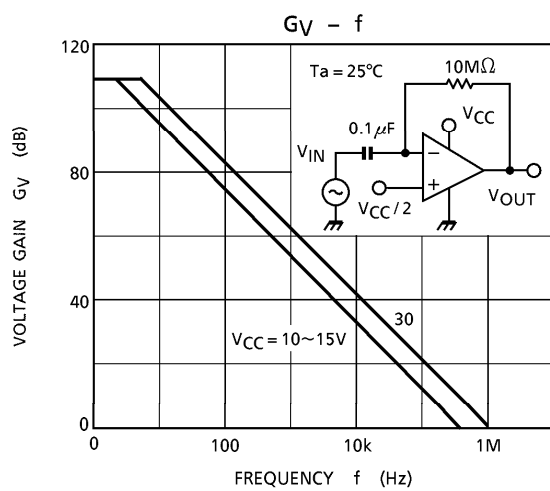
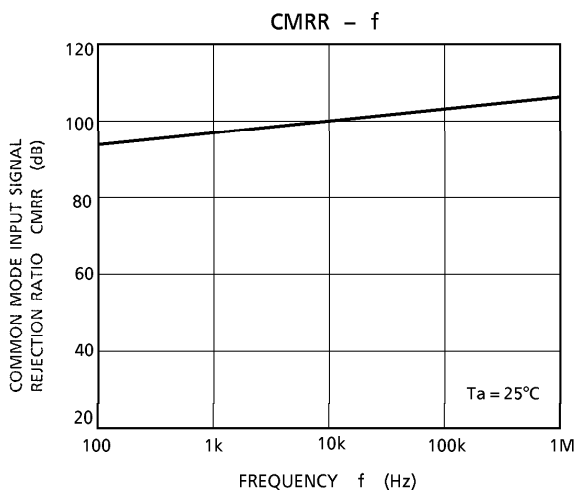
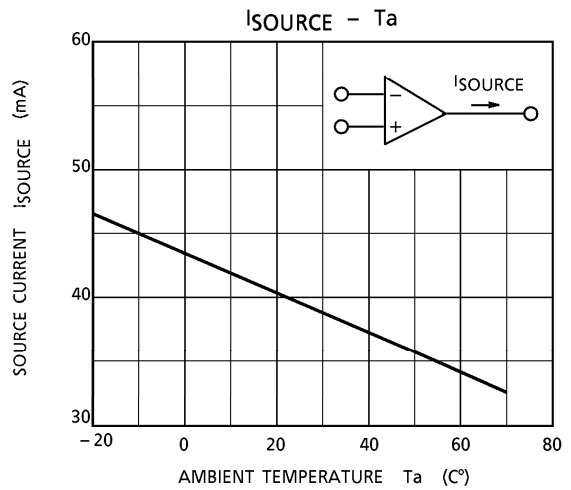
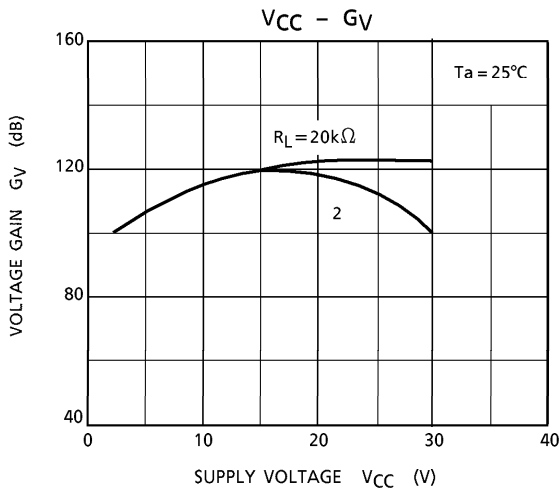
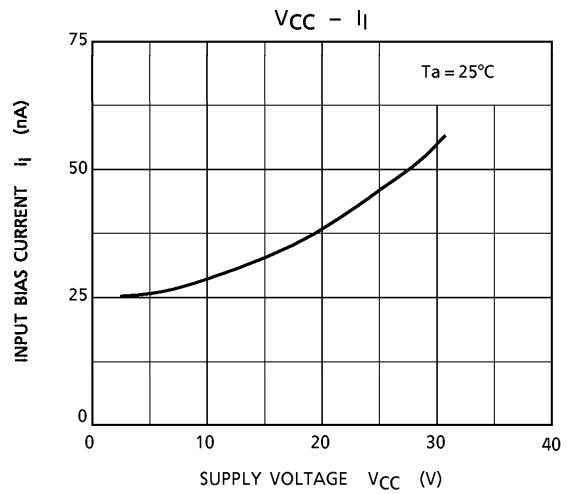
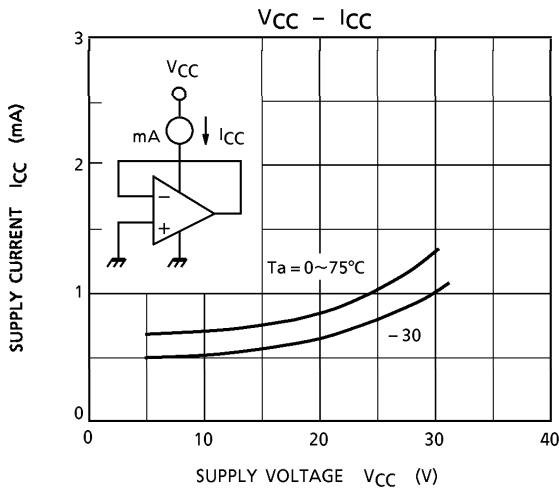
- $G_V = 20 \log e_o / e_i$  (dB)
- $R \gg 1 / \omega C_1$
- $C_1$  : COUPLING CONDENSER
- $C_2$  : HIGH FREQUENCY BYPASS CONDENSER

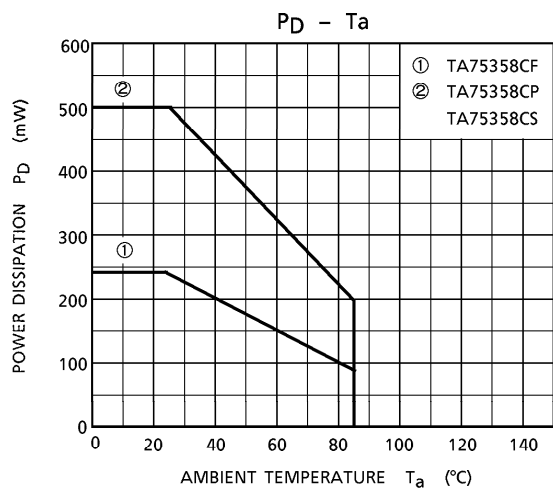
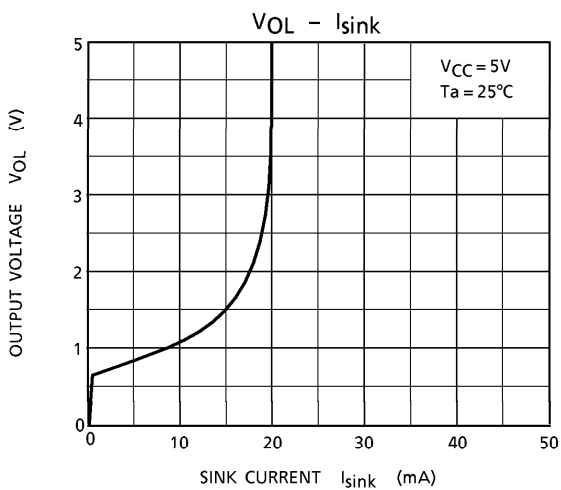
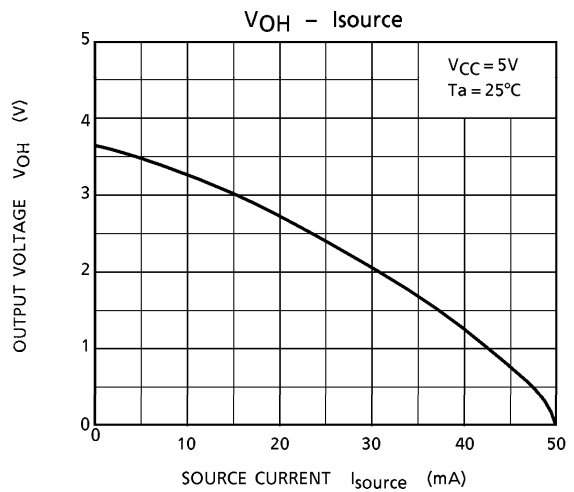
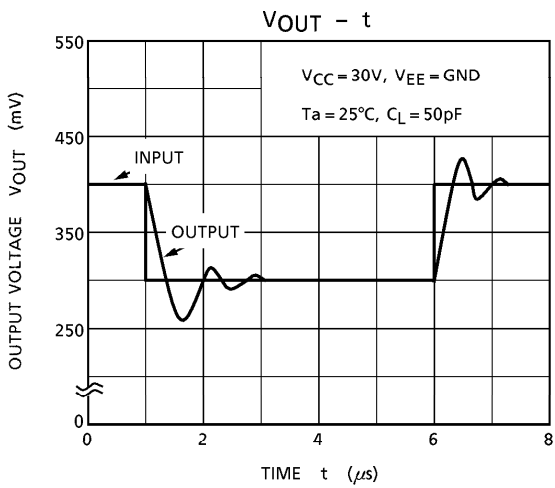
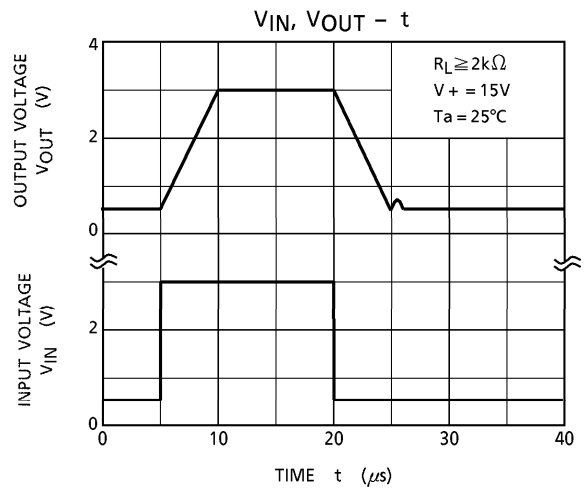
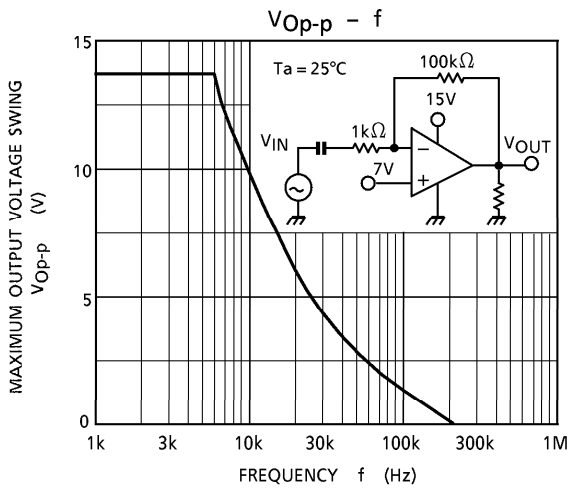
(6)  $V_{Op-p}$ ,  $I_{source}$ ,  $I_{sink}$



- $V_{Op-p}$   
 $V_{OH}$  : 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

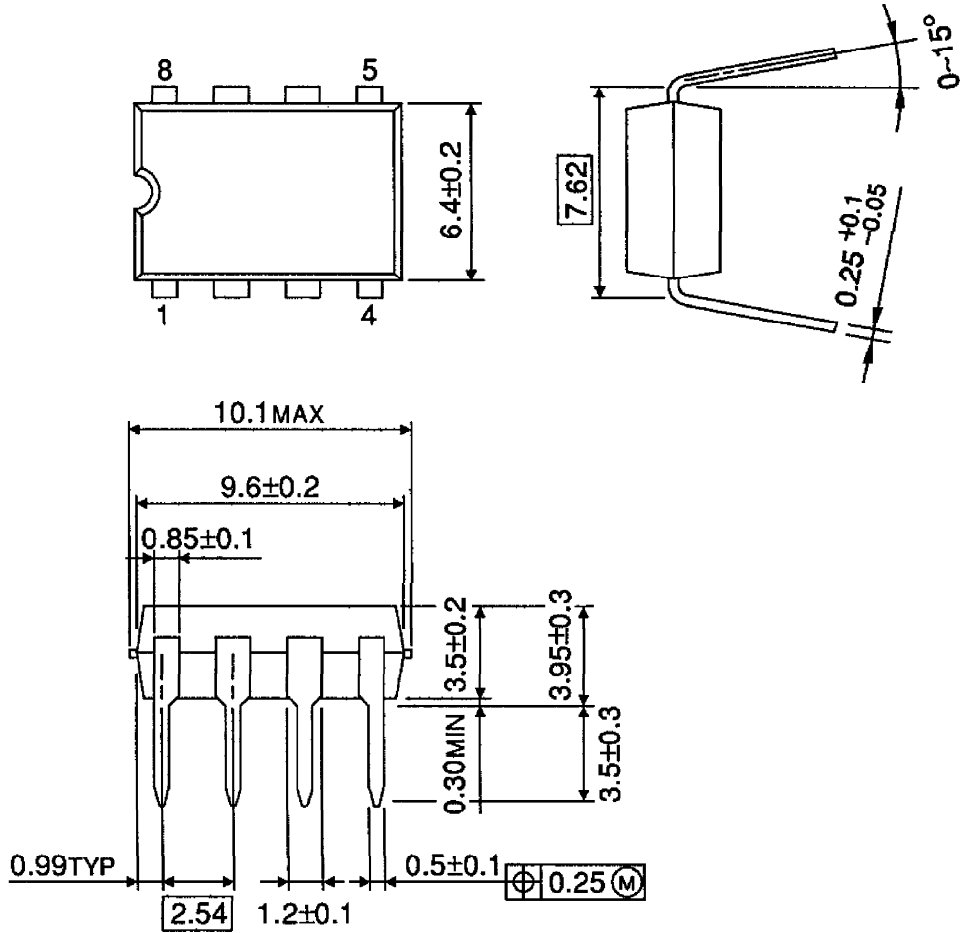
CHARACTERISTICS





**PACKAGE DIMENSIONS**  
DIP8-P-300-2.54A

Unit : mm

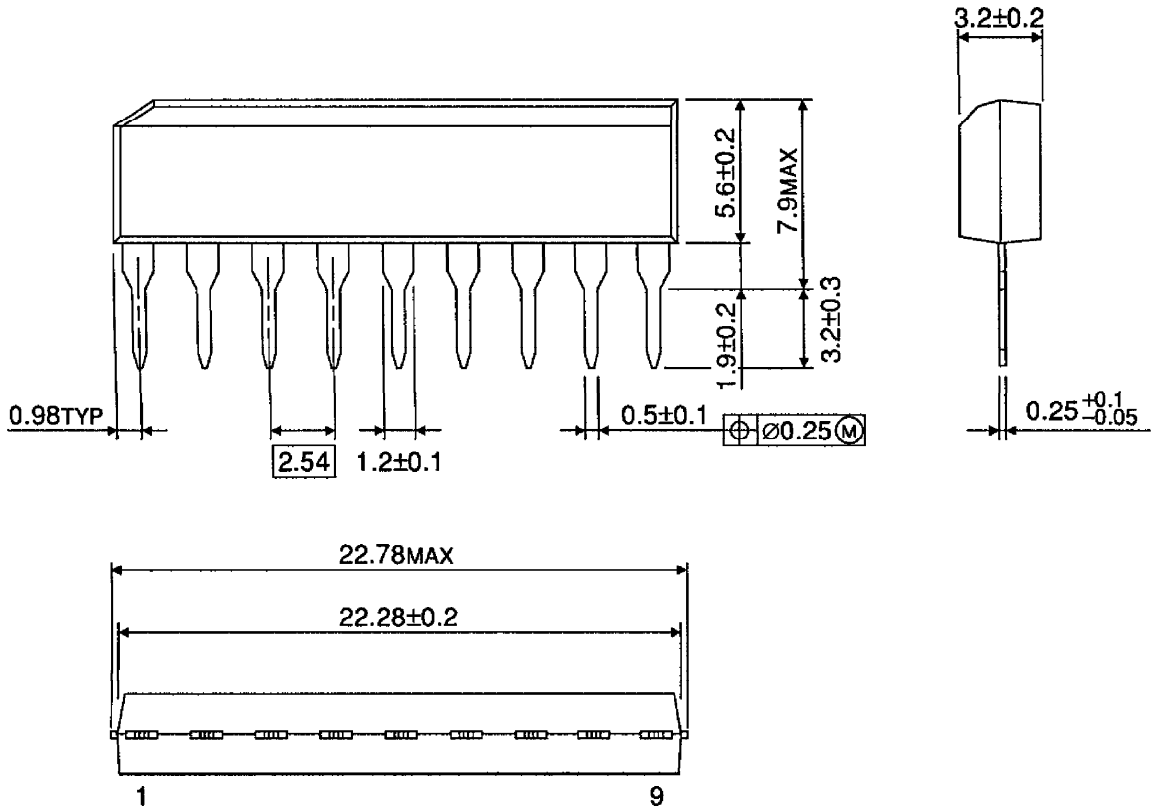


Weight : 0.5g (Typ.)



**PACKAGE DIMENSIONS**  
SIP9-P-2.54A

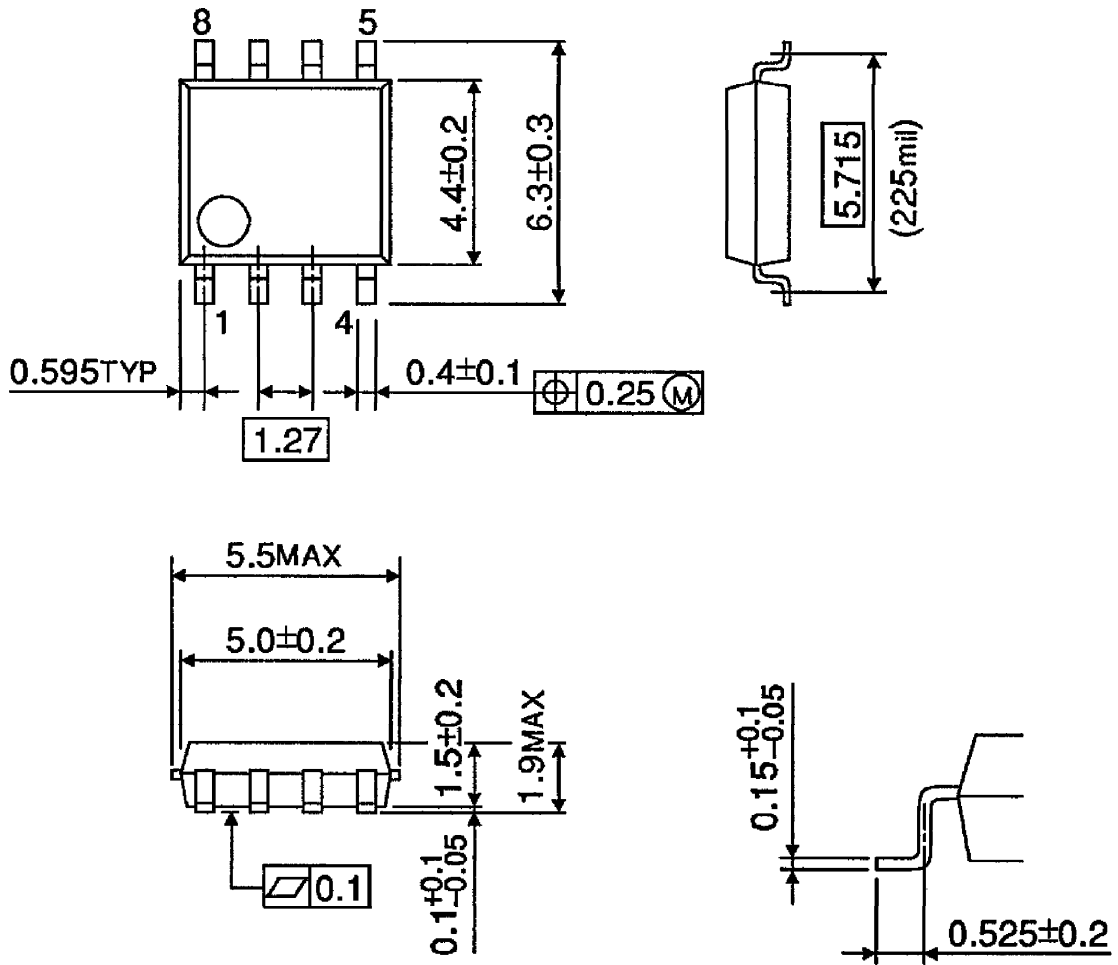
Unit : mm



Weight : 0.9g (Typ.)

**PACKAGE DIMENSIONS**  
SOP8-P-225-1.27

Unit : mm



Weight : 0.1g (Typ.)

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000707EBA

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