

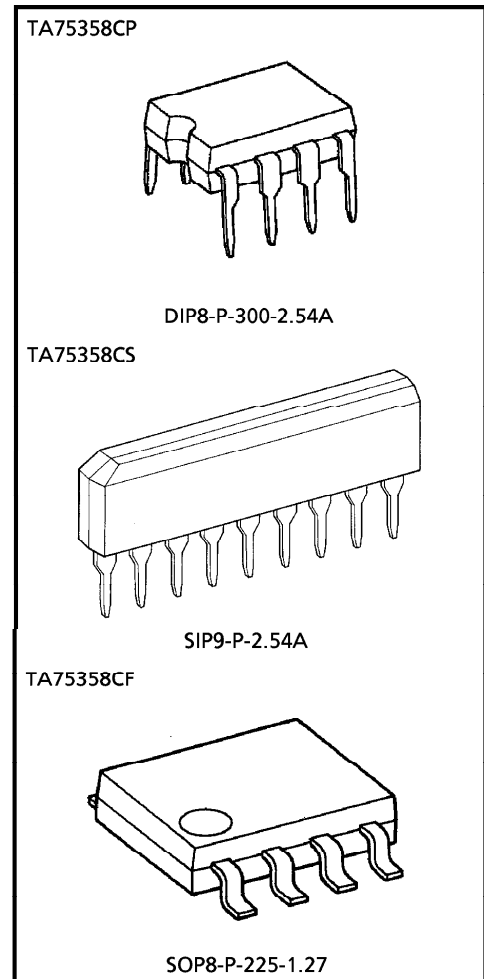
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

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.)



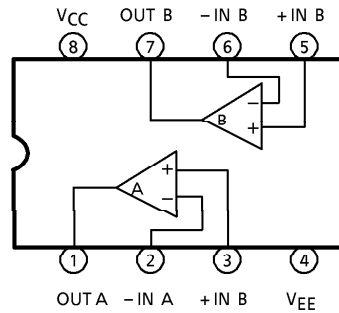
Weight	
DIP8-P-300-2.54A	: 0.5g (Typ.)
SIP9-P-2.54A	: 0.9g (Typ.)
SOP8-P-225-1.27	: 0.1g (Typ.)

961001EBA1

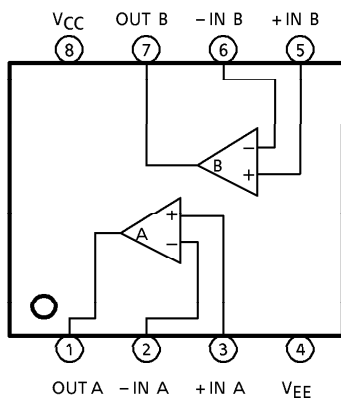
- TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.
- The products described in this document are subject to foreign exchange and foreign trade control laws.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.

PIN CONNECTION (TOP VIEW)

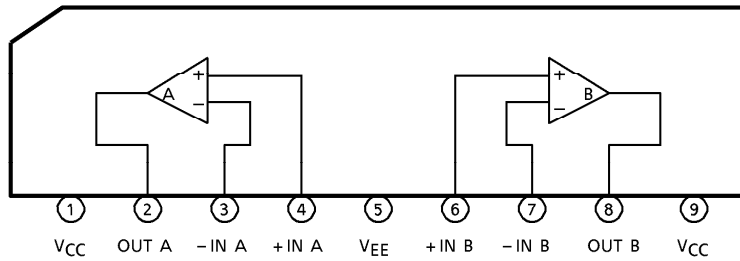
TA75358CP



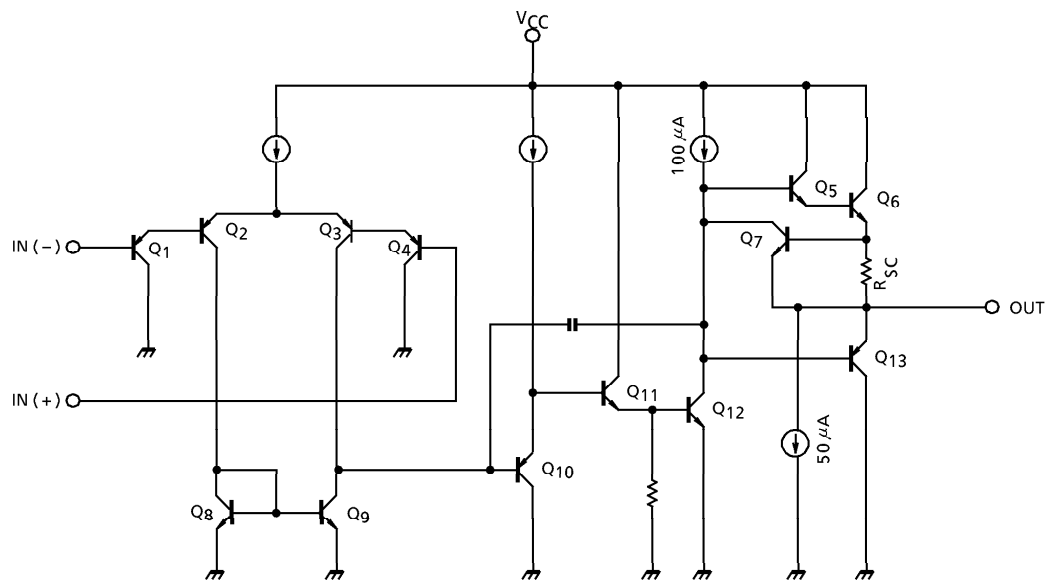
TA75358CF



TA75358CS



EQUIVALENT CIRCUIT



MAXIMUM RATINGS (Ta = 25°C)

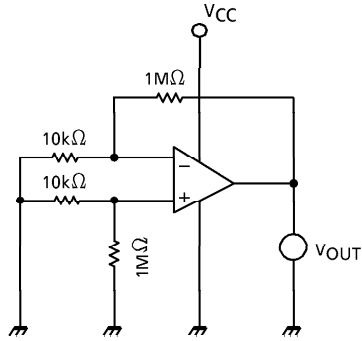
CHARACTERISTIC	SYMBOL	RATING	UNIT	
Supply Voltage	V_{CC}, V_{EE}	± 18 OR 36	V	
Differential Input Voltage	DV_{IN}	± 36	V	
Input Voltage	V_{IN}	-0.3~36	V	
Power Dissipation	TA75358CP	P _D	mW	
	TA75358CS			500
	TA75358CF			240
Operating Temperature	T _{opr}	-40~85	°C	
Storage Temperature	T _{stg}	-55~125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

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

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	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 / μs

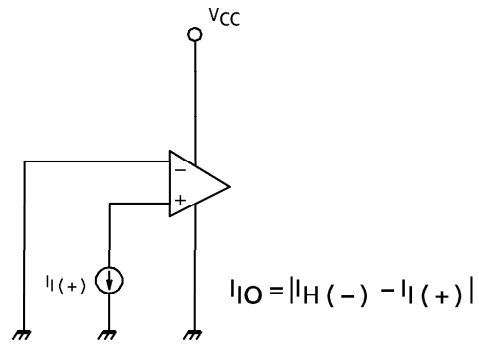
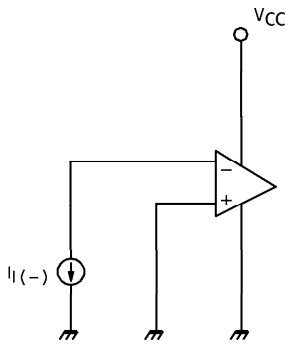
TEST CIRCUIT

(1) V_{IO} , SVRR

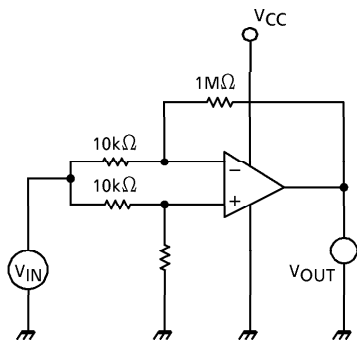


- $V_{IO} = V_{OUT} / 100$
 - $SVRR = 20 \log E \text{ (dB)}$
- $$E = \left| \frac{V_{OUT1} - V_{OUT2}}{V_{CC1} - V_{CC2}} \right| \times \frac{1}{100}$$
- V_{OUT1} : V_{OUT} ($V_{CC1} = 5V$)
 V_{OUT2} : V_{OUT} ($V_{CC2} = 10V$)

(2) I_I , I_{IO}

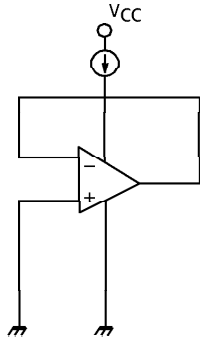


(3) CMV_{IN} , CMRR



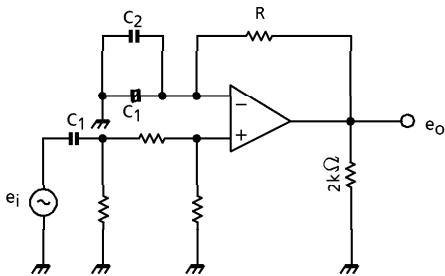
- $CMRR = 20 \log G_D / G_C \text{ (dB)}$
 G_D : DIFFERENTIAL VOLTAGE GAIN
 G_C : COMMON MODE VOLTAGE GAIN
- CMV_{IN} : $V_{IN} = 0V$
 $V_{CC} = 1.5V$ SUPPLIES

(4) I_{CC}



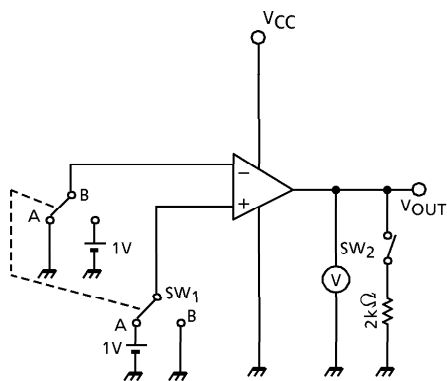
- $I_{CC} : V_{CC} = 5V$

(5) G_V



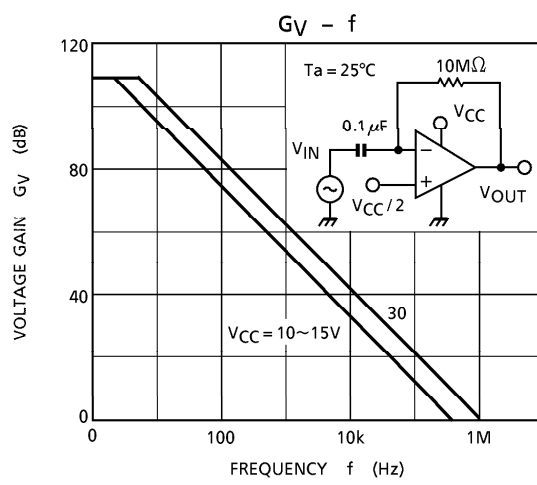
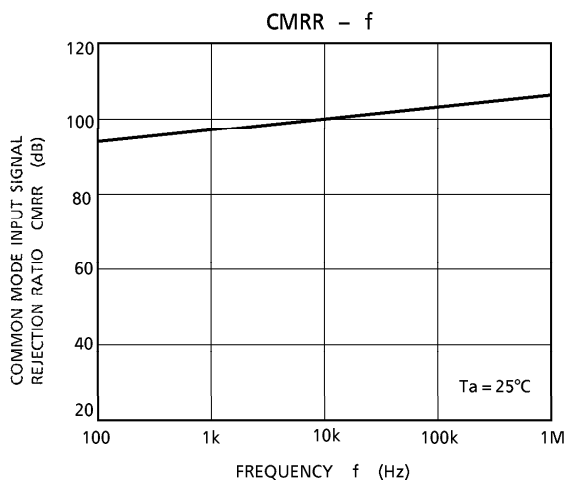
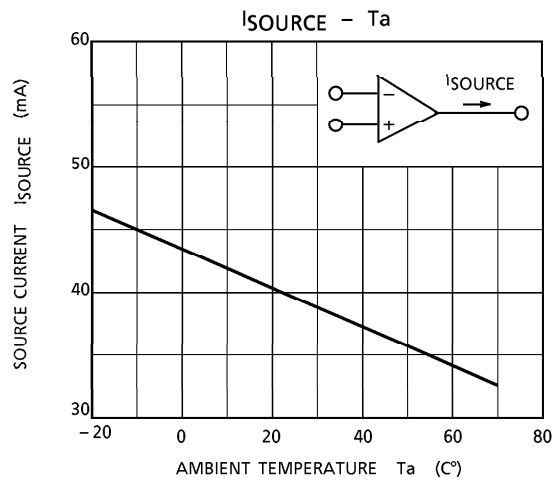
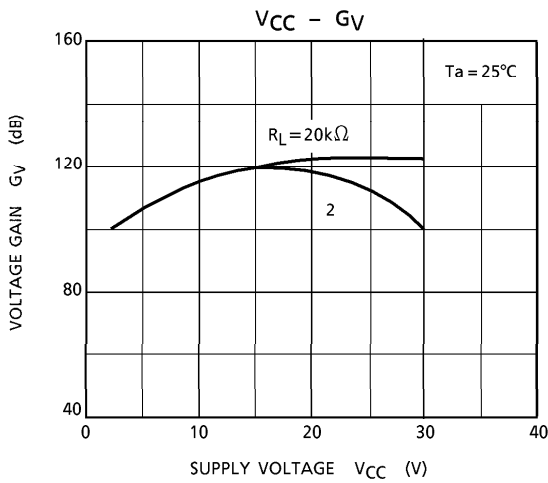
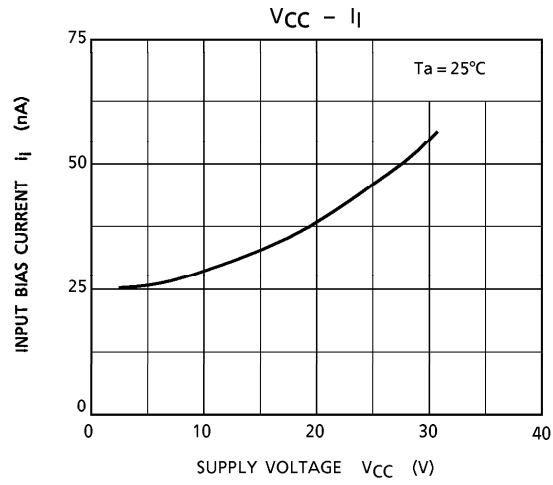
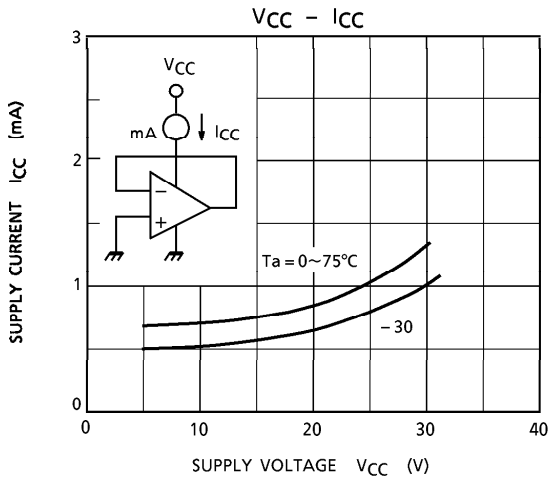
- $G_V = 20 \log e_o / e_i$ (dB)
- $R \gg 1 / \omega C_1$
- C_1 : COUPLING CONDENSER
- C_2 : HIGH FREQUENCY BYPASS CONDENSER

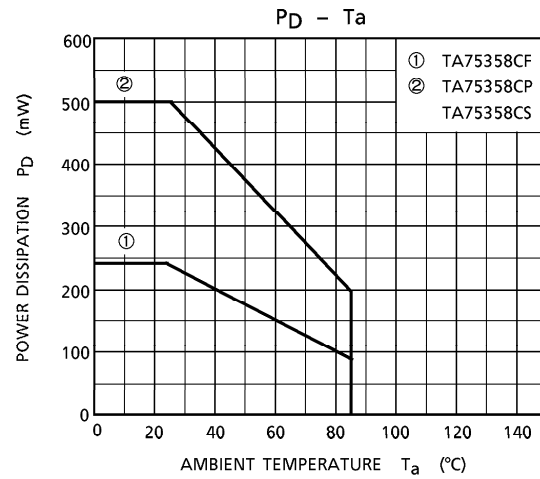
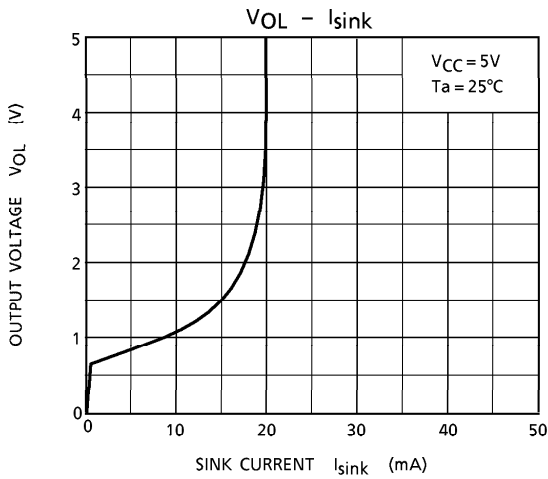
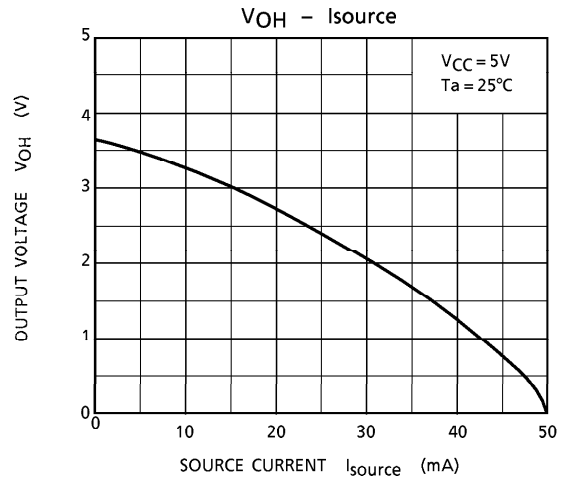
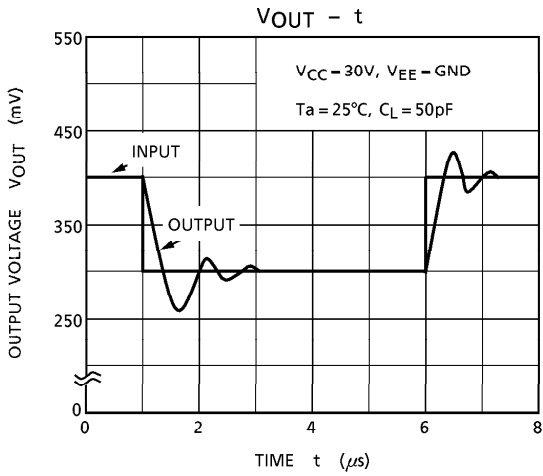
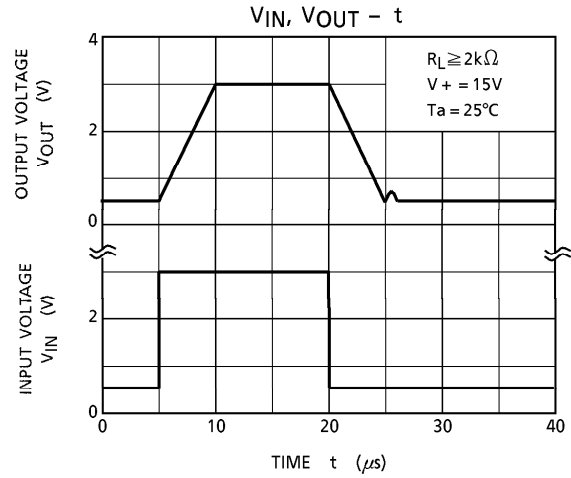
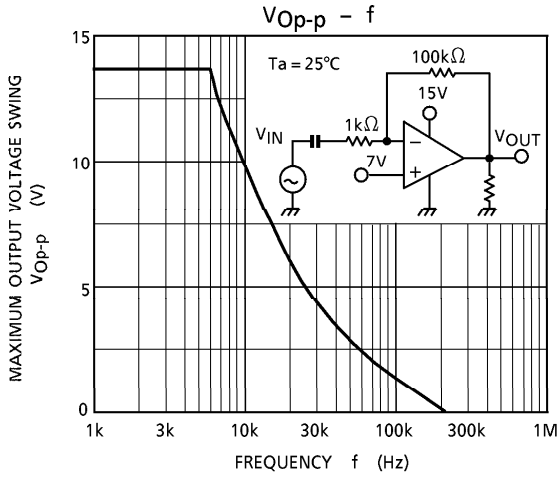
(6) V_{Op-p} , I_{source} , I_{sink}



- 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

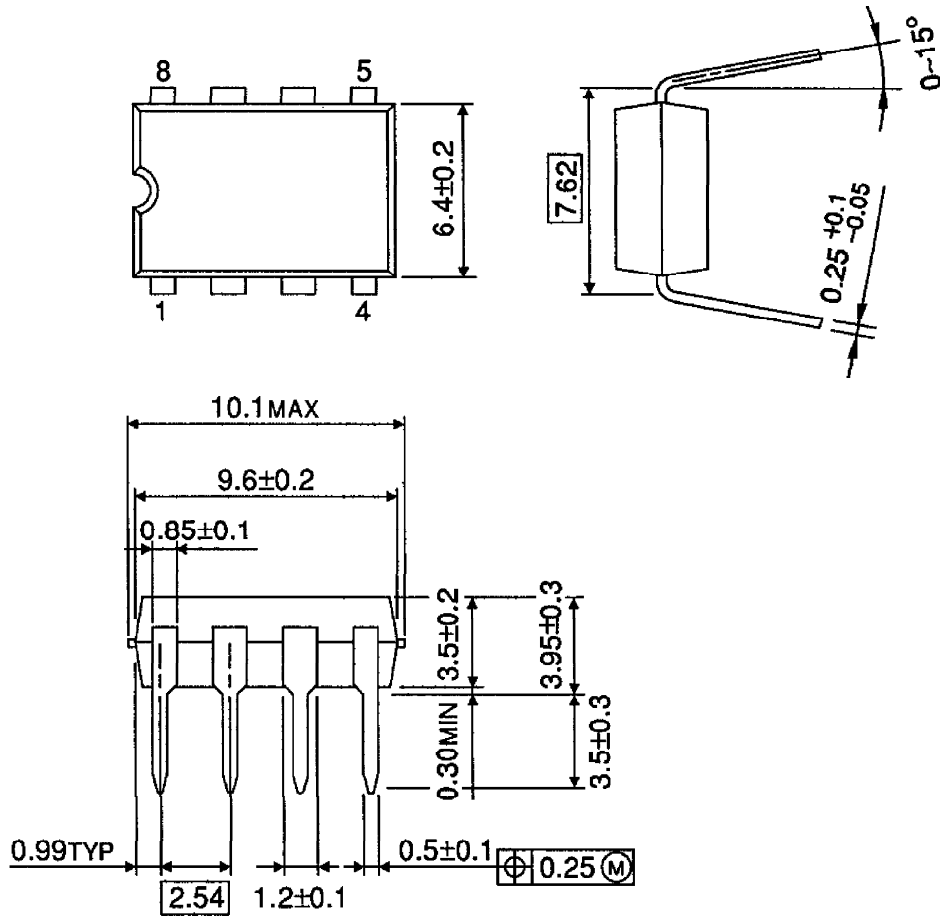
CHARACTERISTICS





OUTLINE DRAWING
DIP8-P-300-2.54A

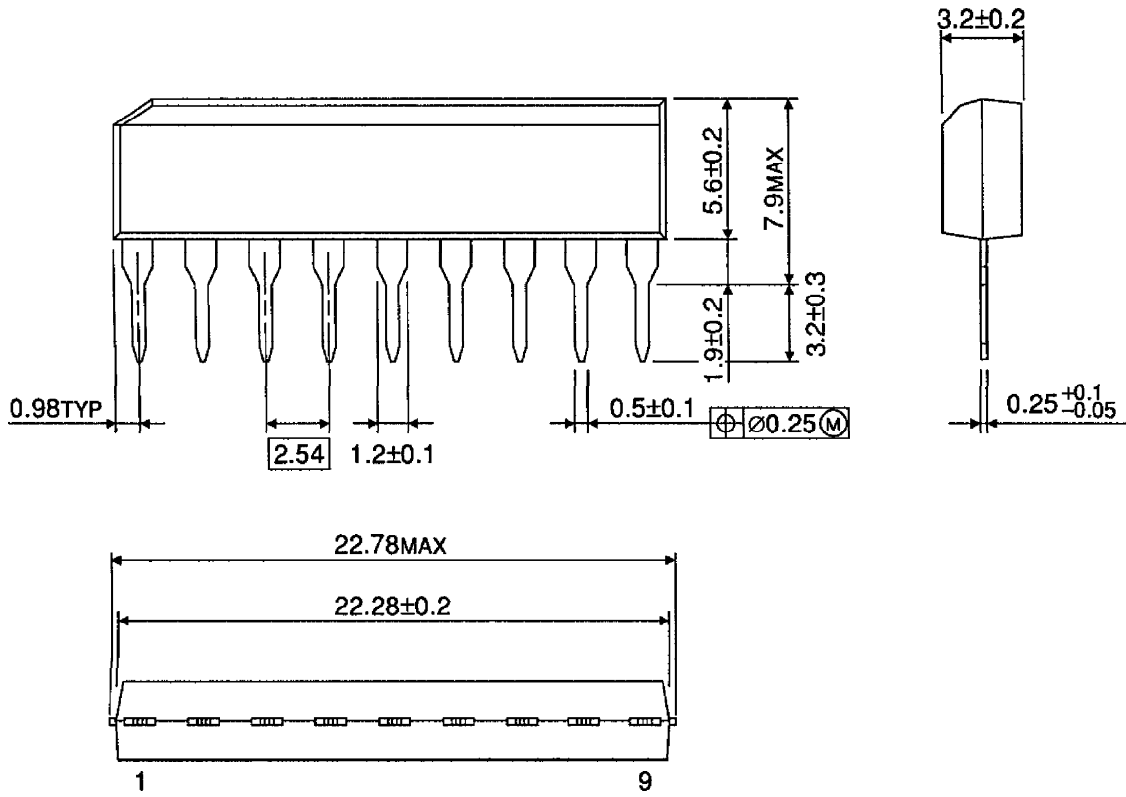
Unit : mm



Weight : 0.5g (Typ.)

OUTLINE DRAWING
SIP9-P-2.54A

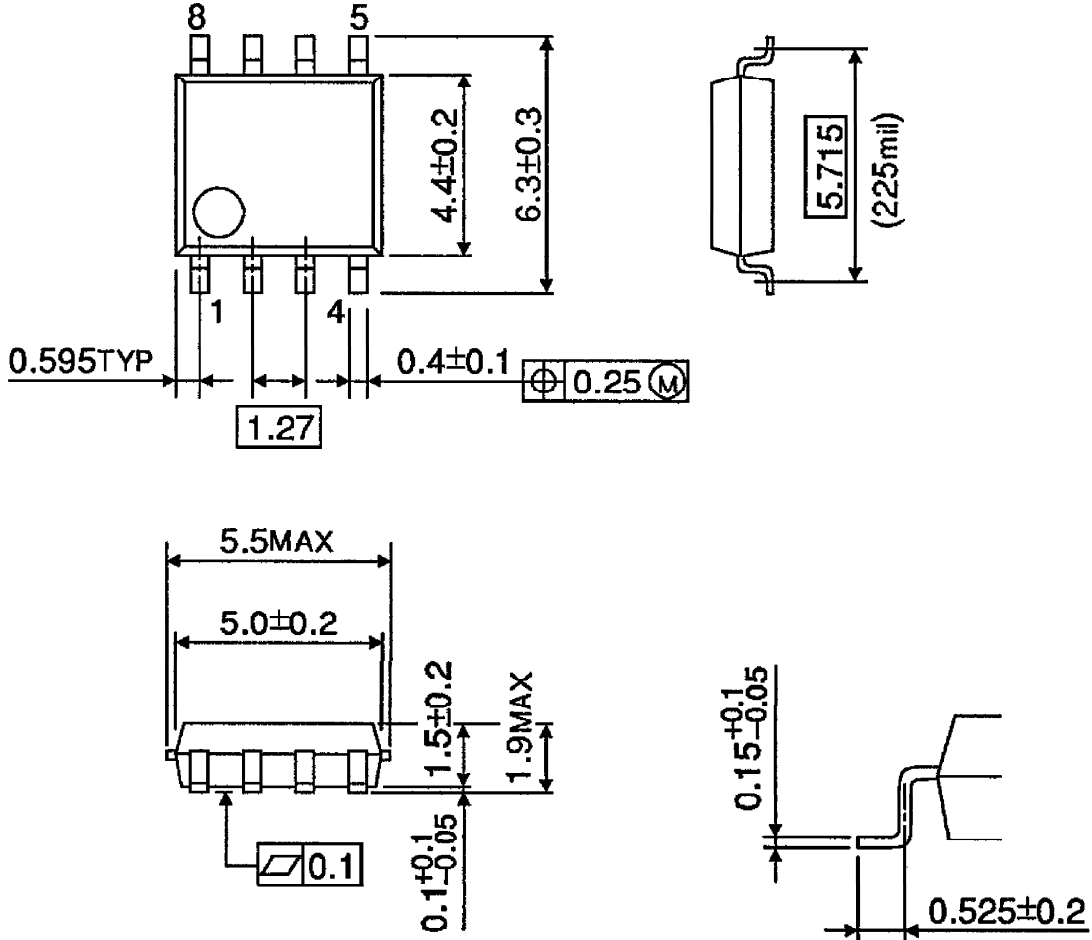
Unit : mm



Weight : 0.9g (Typ.)

OUTLINE DRAWING
SOP8-P-225-1.27

Unit : mm



Weight : 0.1g (Typ.)