

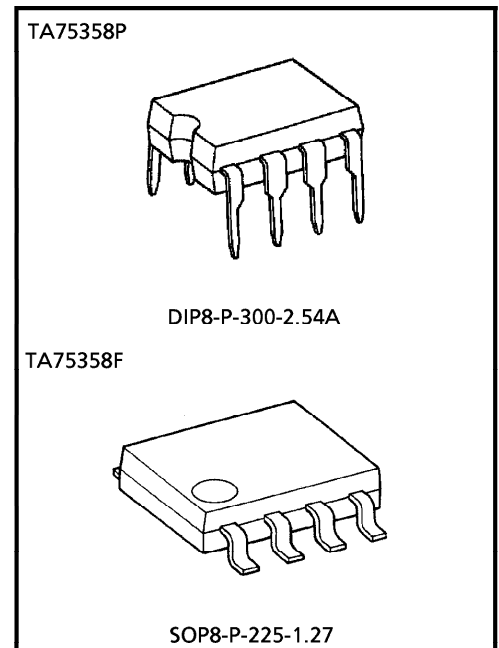
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA75358P, TA75358F

DUAL OPERATIONAL AMPLIFIER

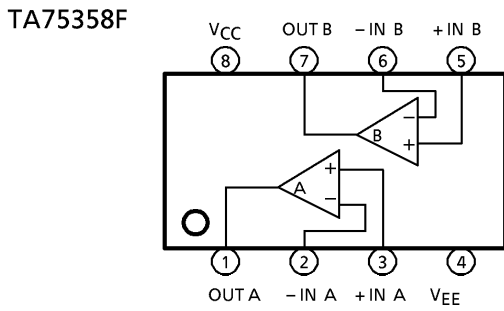
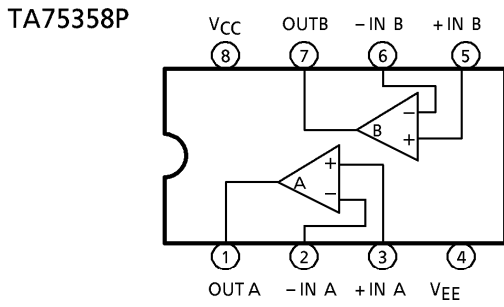
FEATURES

- In the linear mode the input common mode voltage range includes ground.
- Two internally compensated OP amps are in 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.
- Low input biasing current : $I_I = 45nA$ (Typ.)
- Wide Band Decompensated ($A_V \geq 20dB$).

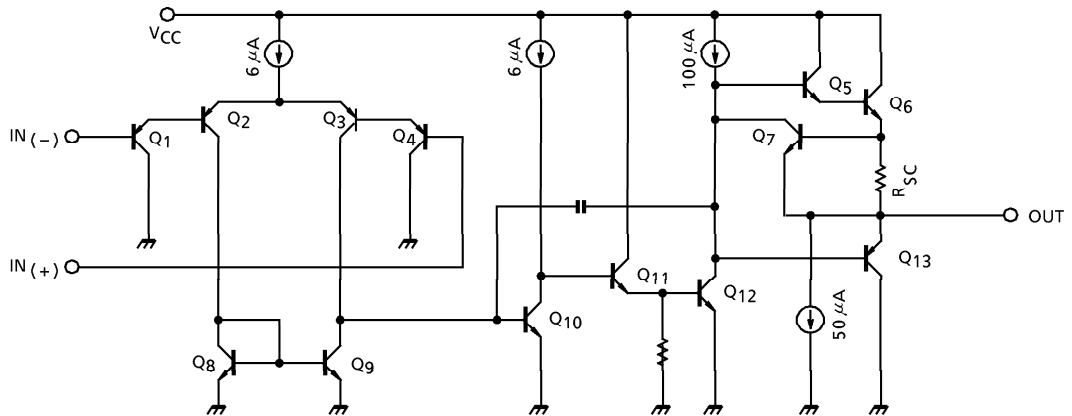


Weight
DIP8-P-300-2.54A : 0.5g (Typ.)
SOP8-P-225-1.27 : 0.1g (Typ.)

PIN CONNECTION (TOP VIEW)



EQUIVALENT CIRCUIT



MAXIMUM RATINGS (Ta = 25°C)

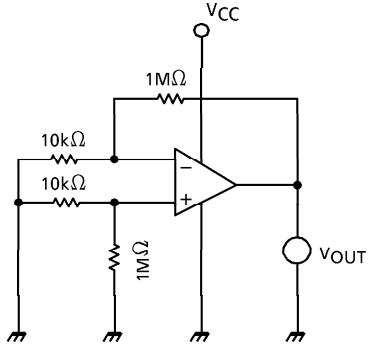
CHARACTERISTIC	SYMBOL	TA75358P	TA75339F	UNIT
Supply Voltage	V _{CC} , V _{EE}	± 18 OR 36	± 18 OR 36	V
Differential Input Voltage	DV _{IN}	± 36	± 36	V
Input Voltage	V _{IN}	- 0.3~36	- 0.3~36	V
Power Dissipation	P _D	500	240	mW
Operating Temperature	T _{opr}	- 40~85	- 40~85	°C
Storage Temperature	T _{stg}	- 55~125	- 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 ≤ 10kΩ	—	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 = ∞, All OP Amps	—	0.7	1.2	mA
Voltage Gain	G _V	5	R _L ≥ 2kΩ	86	100	—	dB
Maximum Output Voltage Swing	V _{Op-p}	6	R _L = 2kΩ	0	—	V _{CC} - 1.5	V
Common Mode Rejection Ratio	CMRR	3	—	60	85	—	dB
Supply Voltage Rejection Ratio	SVRR	1	R _g = 10kΩ	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	—	—	—	1.5	—	MHz
Slew Rate	S _R	—	—	—	0.8	—	V / μs

TEST CIRCUIT

(1) V_{IO} , SVRR



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

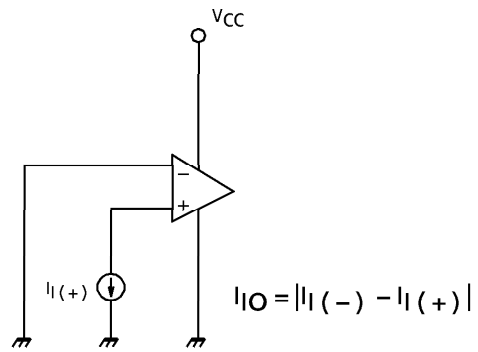
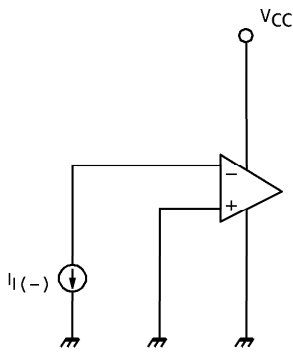
- $SVRR = 20 \log E \text{ (dB)}$

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

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

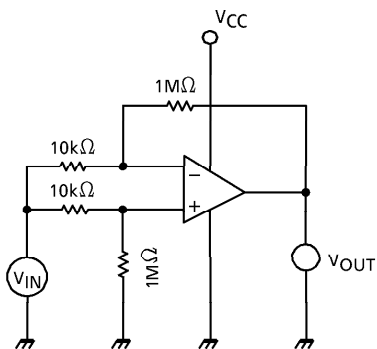
$V_{OUT2} : V_{OUT} (V_{CC2} = 10V)$

(2) I_I , I_{IO}



$$I_{IO} = |I_1(-) - I_1(+)|$$

(3) CMV_{IN} , CMRR



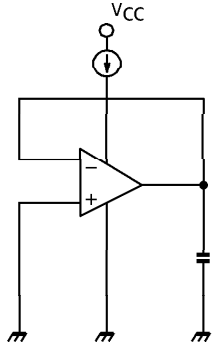
- $CMRR = 20 \log G_D / G_C \text{ (dB)}$

G_D : DIFFERENTIAL VOLTAGE GAIN

G_C : COMMON MODE VOLTAGE GAIN

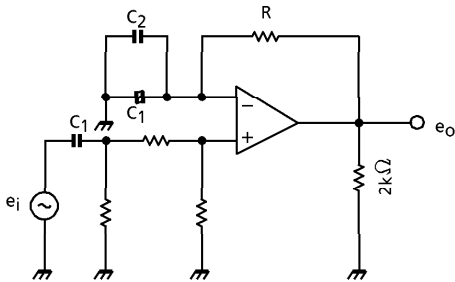
- $CMV_{IN} : V_{IN} = 0V, V_{CC} - 1.5V \text{ SUPPLIES}$

(4) I_{CC}



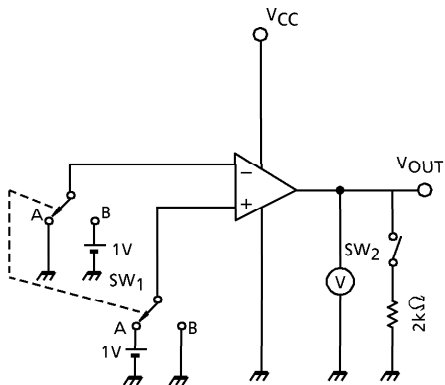
- $I_{CC} : V_{CC} = 5V$

(5) G_V



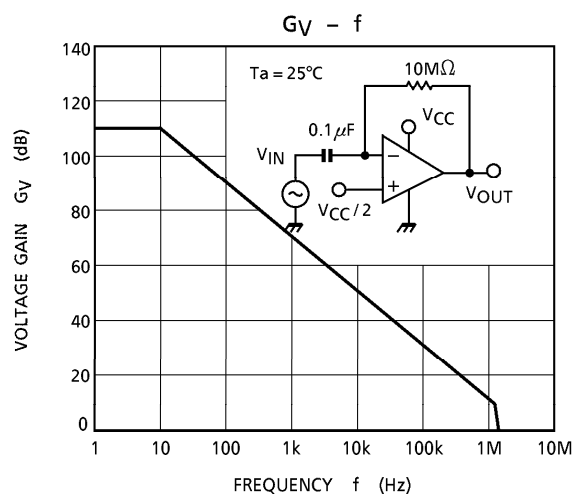
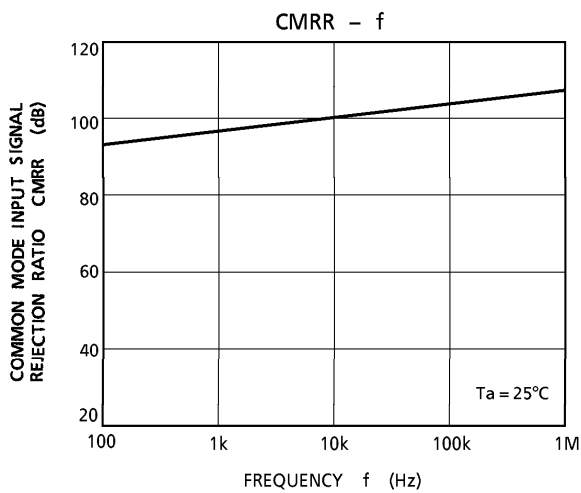
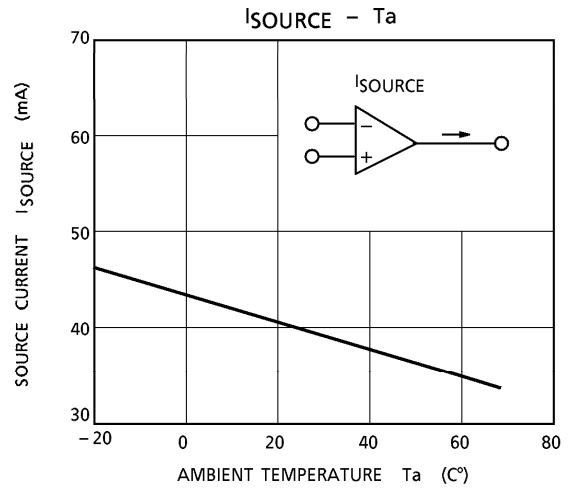
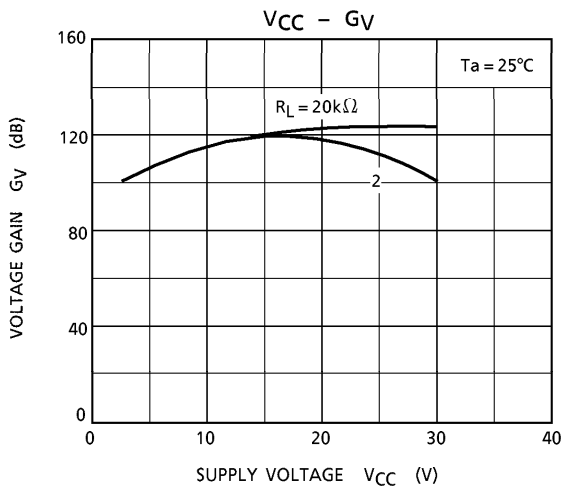
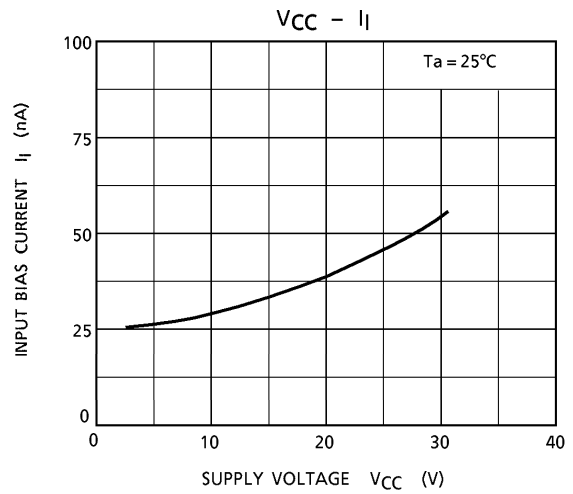
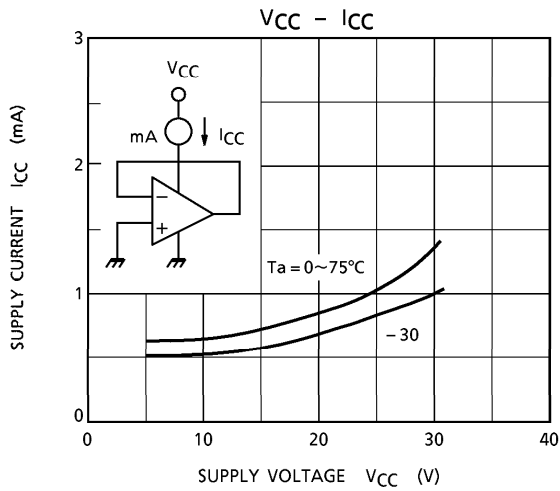
- $G_V = 20 \log e_o / e_i$ (dB)
- $R \gg 1 / W_{C1}$
- C_1 : COUPLING CONDENSER
- C_2 : HIGH FREQUENCY BYPASS CONDENSER

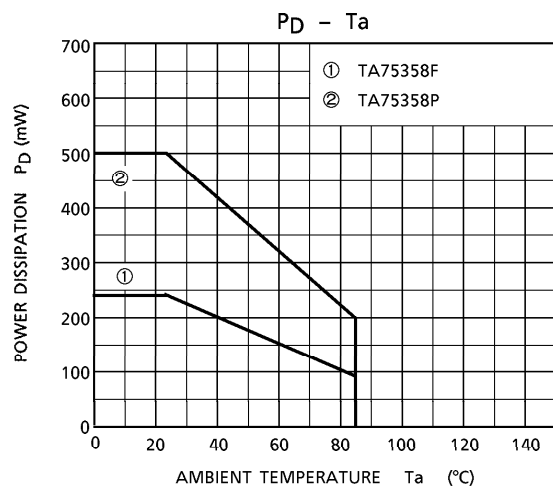
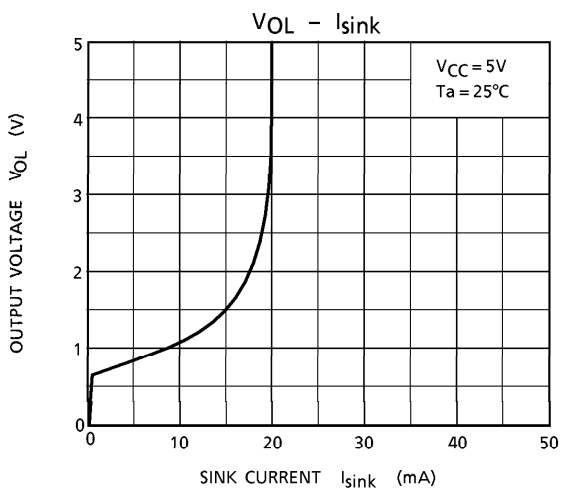
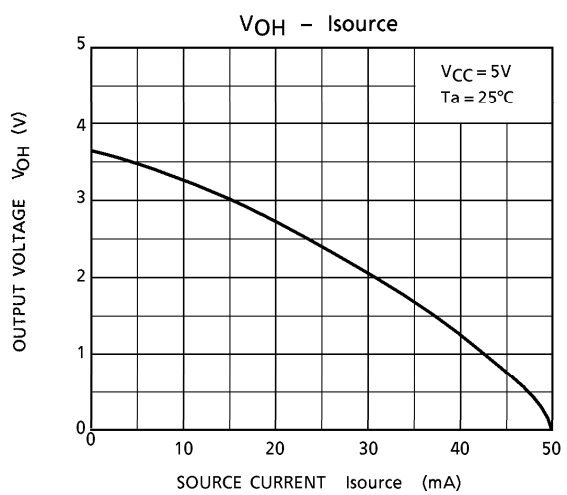
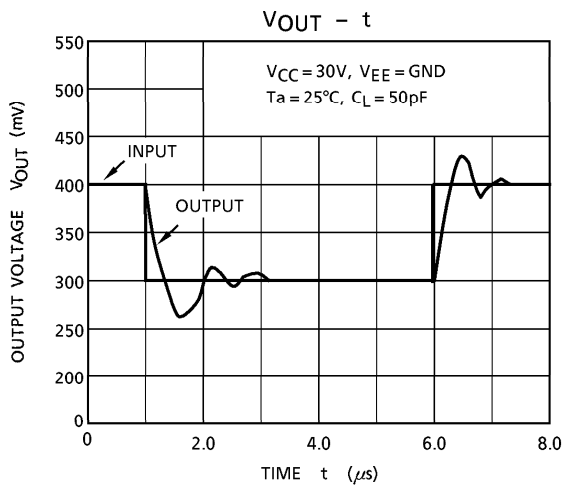
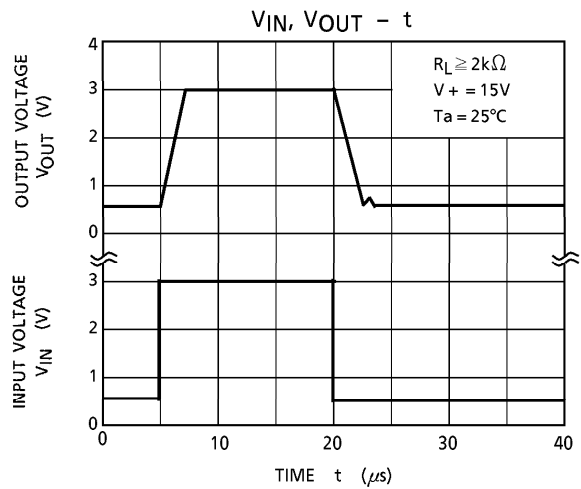
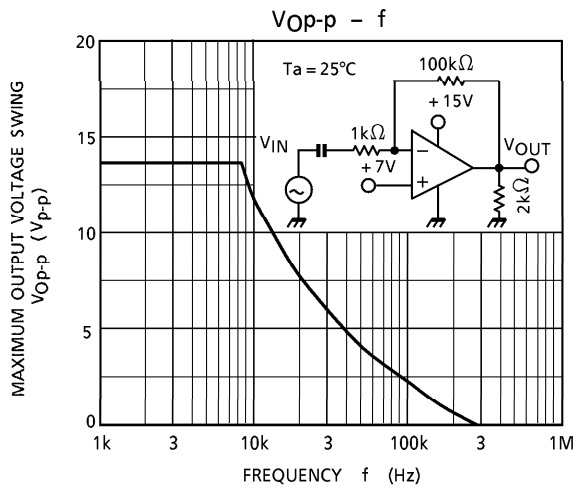
(6) V_{Op-p} , I_{source} , I_{sink}



- 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

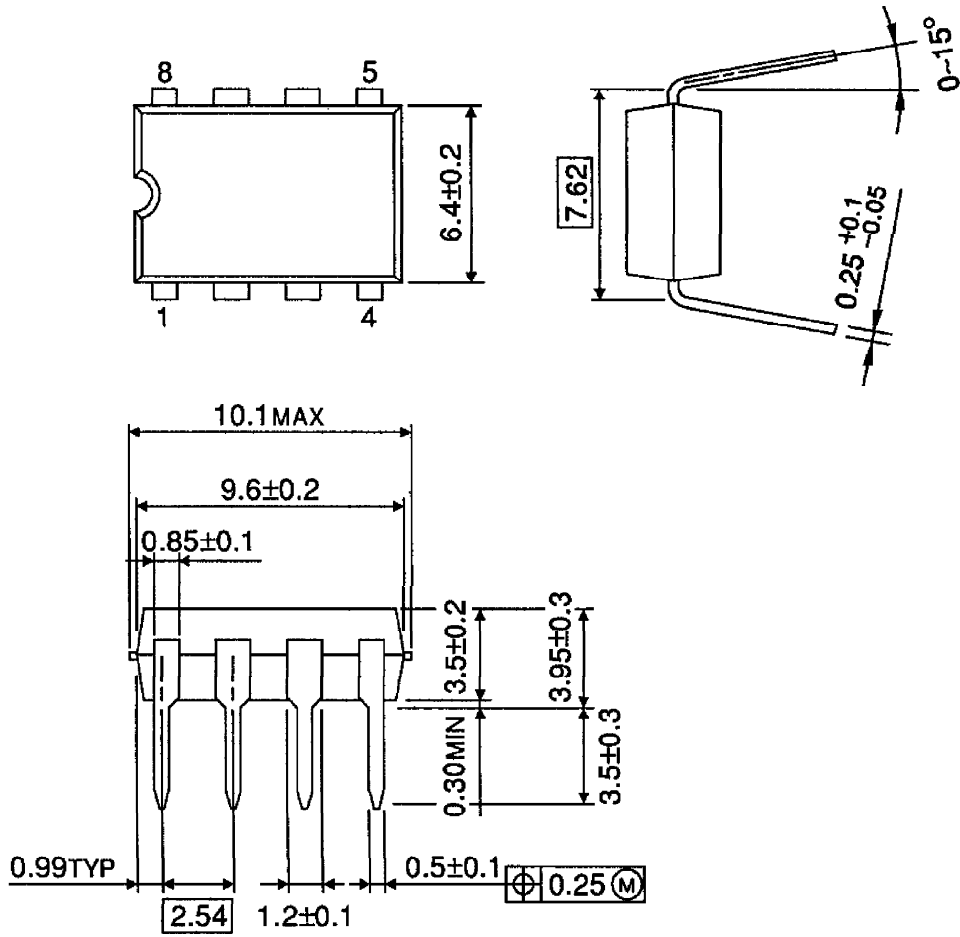
CHARACTERISTICS





PACKAGE DIMENSIONS
DIP8-P-300-2.54A

Unit : mm

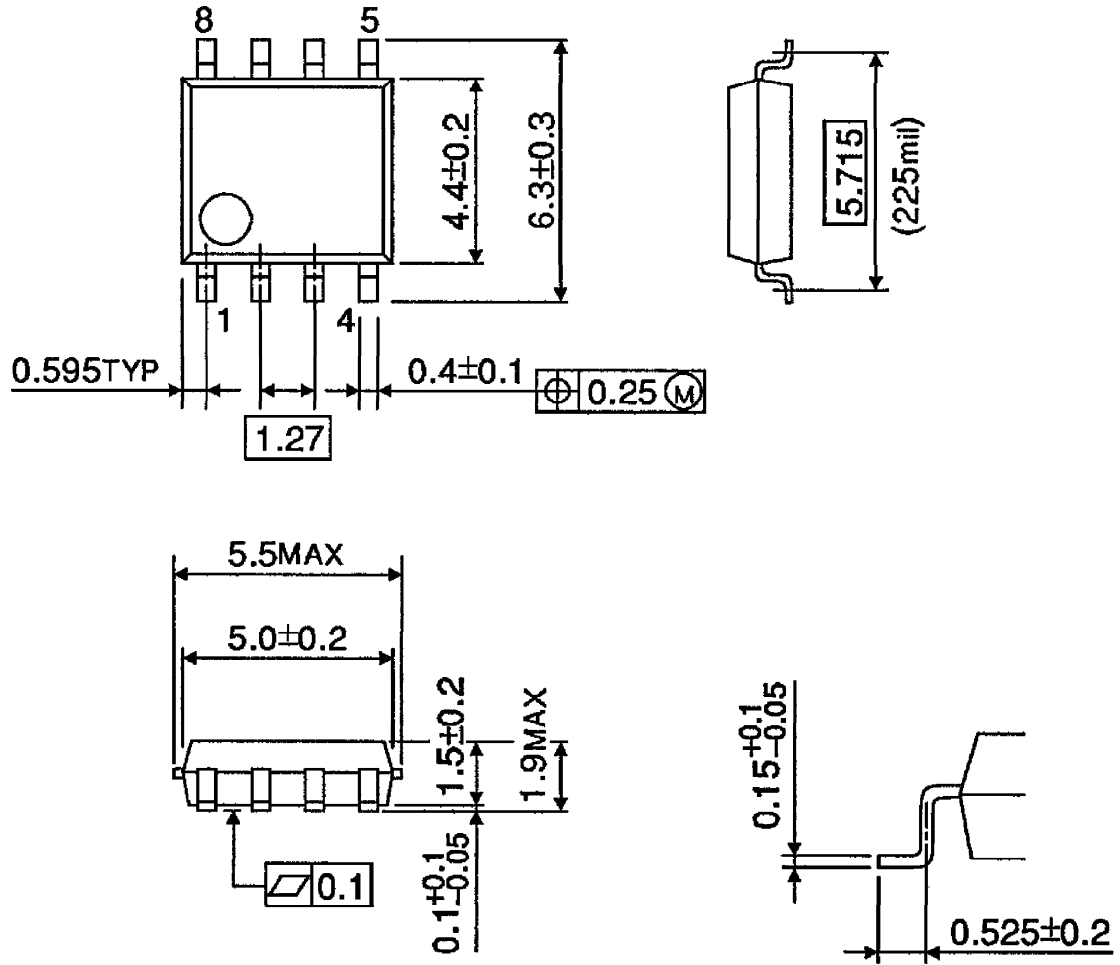


Weight : 0.5g (Typ.)

PACKAGE DIMENSIONS

SOP8-P-225-1.27

Unit : mm



Weight : 0.1g (Typ.)

RESTRICTIONS ON PRODUCT USE

000707EBA

- TOSHIBA is continually working to improve the quality and 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 comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products 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 TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.
- The products described in this document are subject to the foreign exchange and foreign trade 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.