

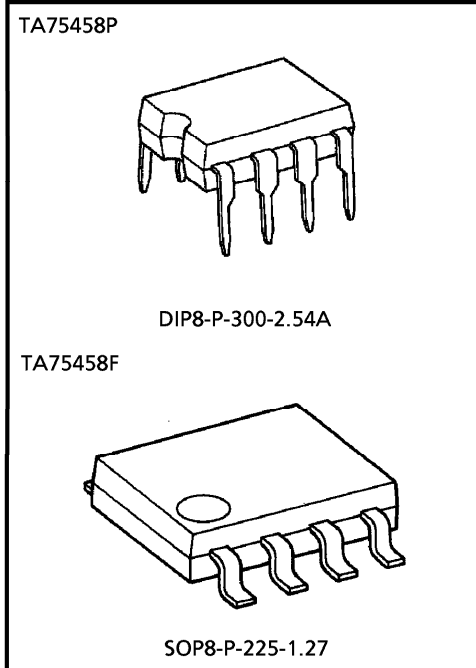
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA75458P, TA75458F

DUAL OPERATIONAL AMPLIFIER

FEATURES

- Pair of Internally Compensated High Performance Amplifier
- No Frequency Compensation Required
- No Latch-up
- Short Circuit Protection
- Side Common Mode and Differential Voltage Range
- Low Power Consumption

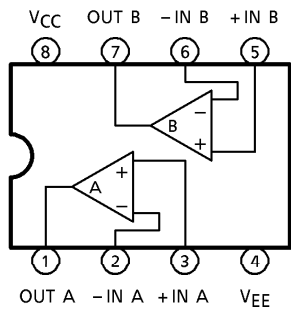


Weight

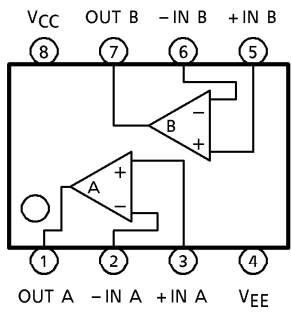
DIP8-P-300-2.54A : 0.5g (Typ.)
SOP8-P-225-1.27 : 0.1g (Typ.)

PIN CONNECTION (TOP VIEW)

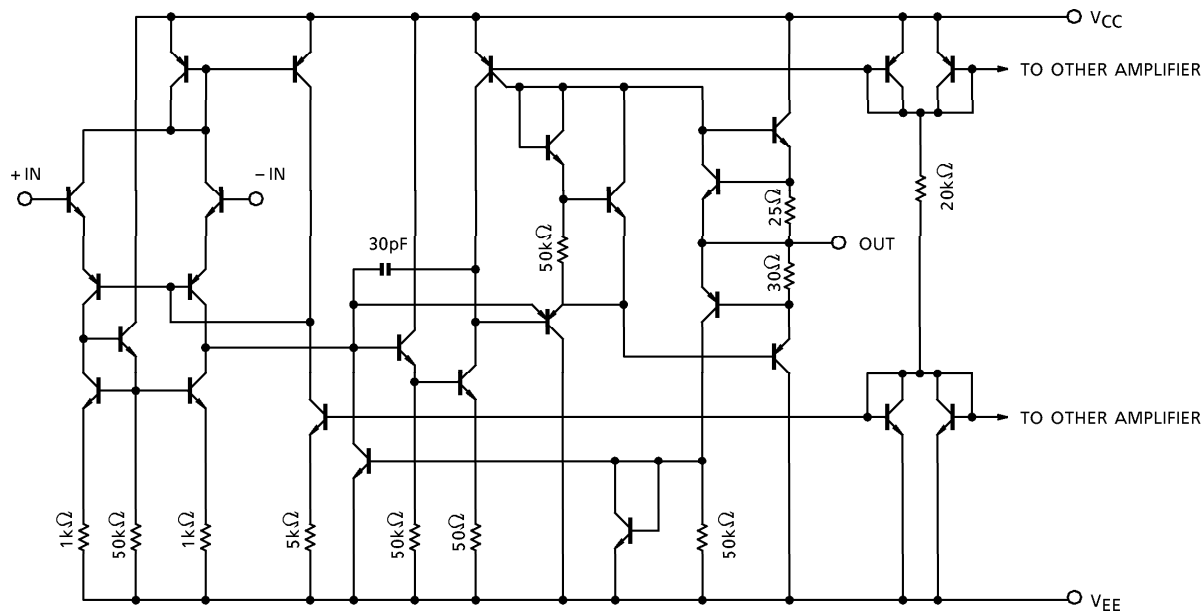
TA75458P



TA75458F



EQUIVALENT CIRCUIT



MAXIMUM RATINGS (Ta = 25°C)

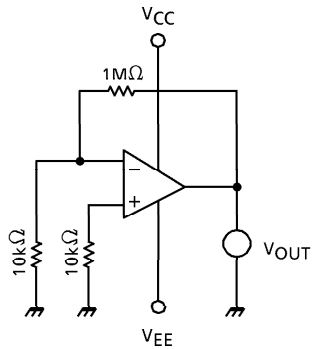
CHARACTERISTIC	SYMBOL	TA75458P	TA75458F	UNIT
Supply Voltage	V _{CC} , V _{EE}	+ 18, - 18	+ 18, - 18	V
Differential Input Voltage	DV _{IN}	± 30	± 30	V
Input Voltage	V _{IN}	V _{CC} ~V _{EE}	V _{CC} ~V _{EE}	V
Power Dissipation	P _D	500	240	mW
Operating Temperature	T _{opr}	- 40~85	- 30~75	°C
Ambient Temperature	T _{stg}	- 55~125	- 55~125	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 15V, V_{EE} = - 15V, Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CIR- CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage		V _{IO}	1	R _g ≤ 10kΩ	—	1	5	mV
Input Offset Current		I _{IO}	2		—	20	200	nA
Input Bias Current		I _I	2		—	80	500	nA
Common Mode Input Voltage		CMV _{IN}	3		± 12	± 13	—	V
Maximum Output Voltage		V _{OM}	4	R _L = 10kΩ	± 12	± 14	—	V
		V _{OMR}	4	R _L = 2kΩ	± 10	± 13	—	
Source Current		I _{source}	4		—	20	—	mA
Sink Current		I _{sink}	4		—	20	—	mA
Differential Input Impedance	Parallel Input Resistance	Z _{Di}	—	f = 20Hz Open Loop	0.3	1.0	—	MΩ
	Parallel Input Capacitance	C _i	—		—	6.0	—	pF
Output Impedance		Z _o	—	f = 20Hz	—	75	—	Ω
Voltage Gain (Open Loop)		G _V	7	V _{OUT} = ± 10V, R _L = 2kΩ	86	100	—	dB
Common Mode Input Signal Rejection Ratio		CMRR	3	f = 100Hz	70	90	—	dB
Supply Voltage Rejection Ratio		SVRR	1	R _g ≤ 10kΩ	—	30	150	μV/V
Power Bandwidth		f _W	—	G _V = 1, R _L = 2kΩ V _{OUT} = 20V _{p-p}	—	14	—	kHz
Slew Rate		SR	6	G _V = 1, R _L = 2kΩ	—	0.8	—	V / μs
Unity Gain Cross Frequency		f _T	7	Open Loop	—	1.1	—	MHz
Power Dissipation		P _D	5	V _O = 0V	—	70	170	mW
Input Offset Voltage Drift		ΔV _{IO} / ΔT	1	R _g ≤ 10kΩ, Ta = - 30~75°C	—	—	50	μV / °C
Supply Current		I _{CC} , I _{EE}	5		—	2.3	5.6	mA

TEST CIRCUIT

(1) V_{IO} , $\Delta V_{IO} / \Delta T$, SVRR



$$V_{IO} = V_{OUT} / 100 \text{ (V)}$$

$$\Delta V_{IO} / \Delta T = \{V_{IO} (25^\circ\text{C}) - V_{IO} (-30^\circ\text{C})\} / 55 \text{ (V / } ^\circ\text{C)}$$

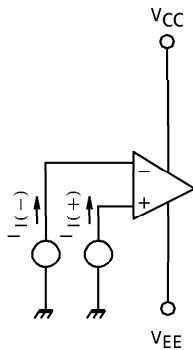
$$\Delta V_{IO} / \Delta T = \{V_{IO} (75^\circ\text{C}) - V_{IO} (25^\circ\text{C})\} / 50 \text{ (V / } ^\circ\text{C)}$$

$$\text{SVRR} = (V_{IO1} - V_{IO2}) / 5 \text{ (}\mu\text{V / V)}$$

$$V_{IO1} : V_{CC}, \text{ AT } V_{EE} = \pm 17.5\text{V}$$

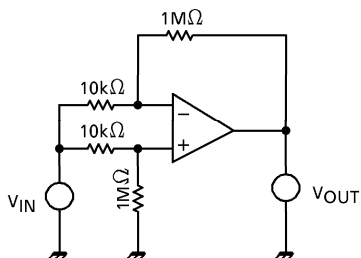
$$V_{IO2} : V_{CC}, \text{ At } V_{EE} = \pm 12.5\text{V}$$

(2) I_I , I_{IO}



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

(3) CMV_{IN} , CMRR



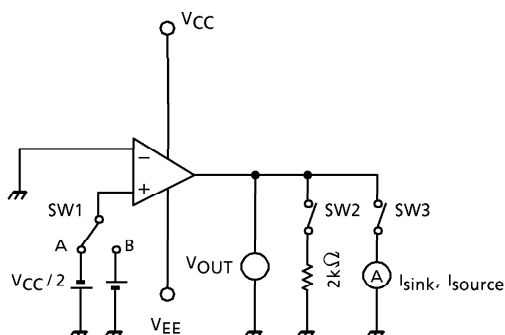
$$\text{CMV}_{IN} : V_{OUT} = \pm 1\text{V (DC)}$$

$$V_{IN} = \text{MEASURE}$$

$$\text{CMRR} : \text{RATIO OF } G_{\text{diff}} \text{ vs } G_{\text{CM}}$$

$$\text{CMRR} = 20 \log \frac{G_{\text{diff}}}{G_{\text{CM}}} \text{ (dB)}$$

(4) V_{OM} , V_{OMR} , I_{sink} , I_{source}



$V_{OM}(+)$: SW1 IS SIDE B, SW2 OFF, SW3 OFF

$V_{OM}(-)$: SW1 IS SIDE A, SW2 OFF, SW3 OFF

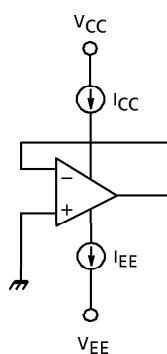
$V_{OMR}(+)$: SW1 IS SIDE B, SW2 ON, SW3 OFF

$V_{OMR}(-)$: SW1 IS SIDE A, SW2 ON, SW3 OFF

I_{sink} : SW1 IS SIDE A, SW2 OFF, SW3 ON

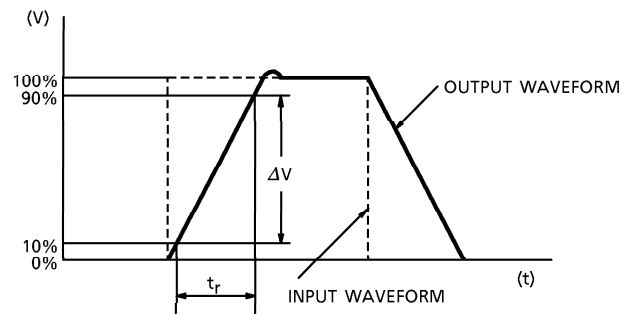
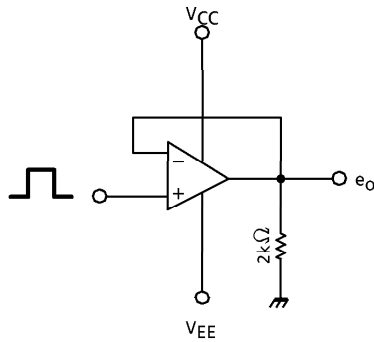
I_{source} : SW1 IS SIDE B, SW2 OFF, SW3 ON

(5) I_{CC} , I_{EE} , P_D

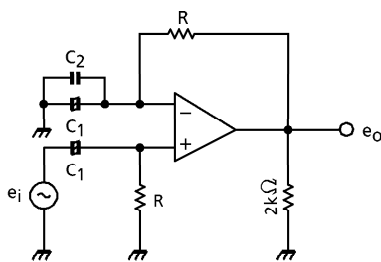


$$P_D = V_{CC} \cdot I_{CC} + V_{EE} \cdot I_{EE} \text{ (W)}$$

(6) SR



(7) G_V , f_T



G_V

$R \gg 1 / \omega C_1$

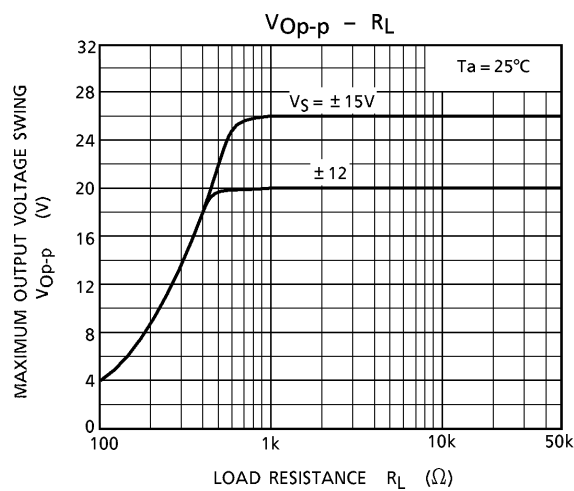
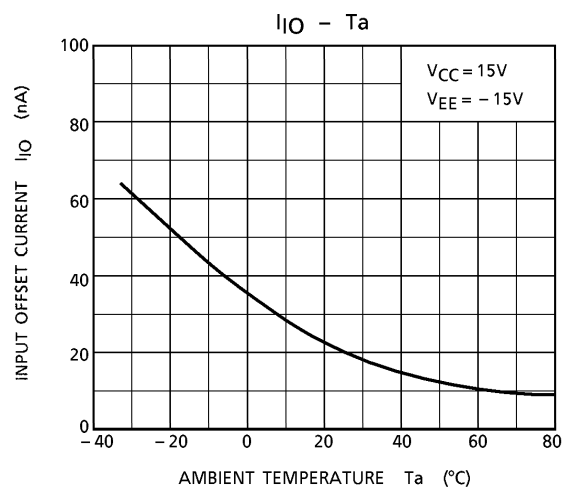
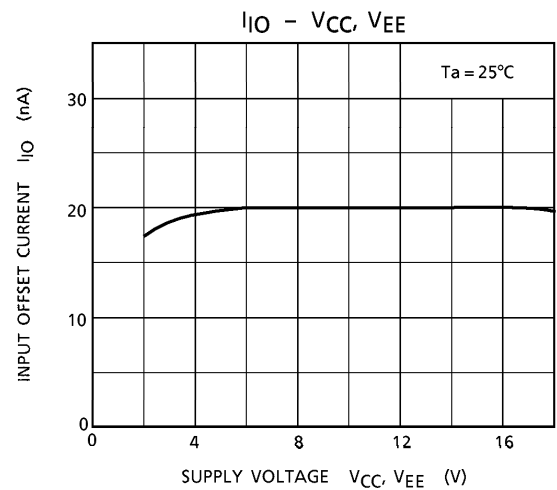
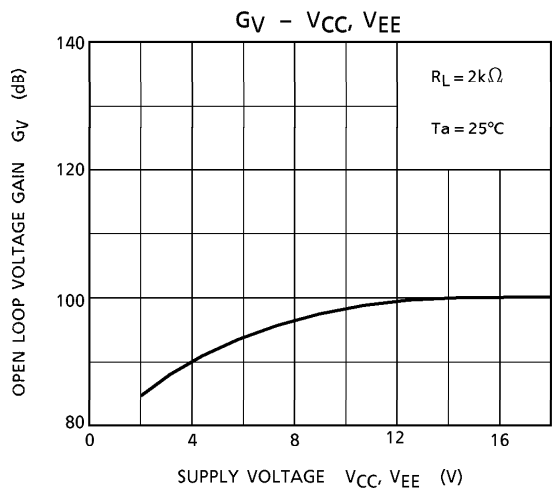
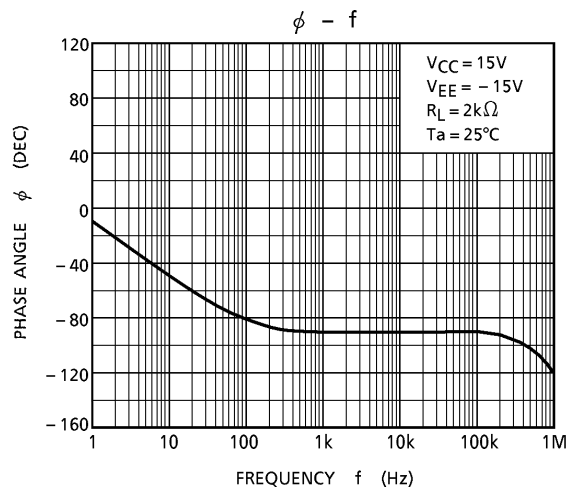
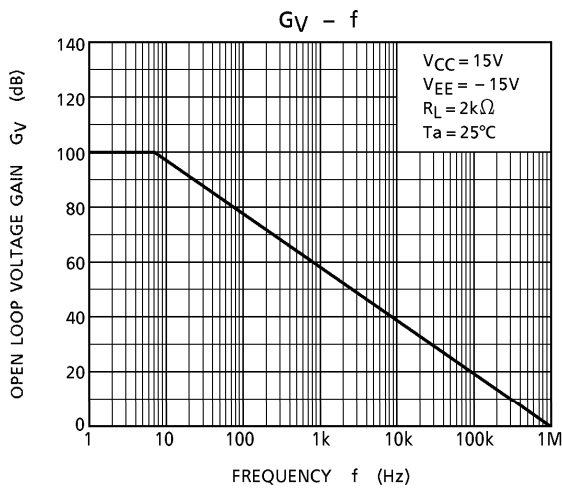
C_1 : COUPLING CONDENSER

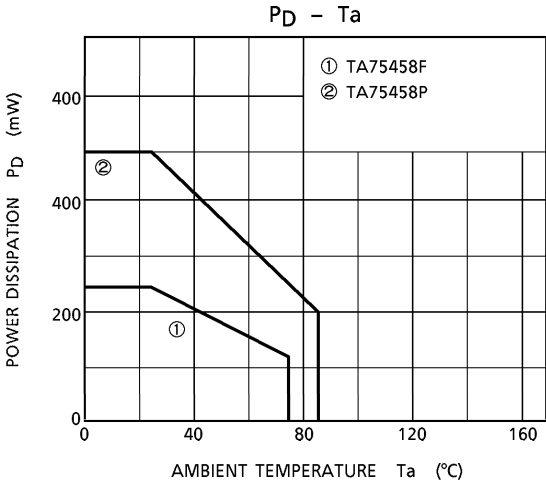
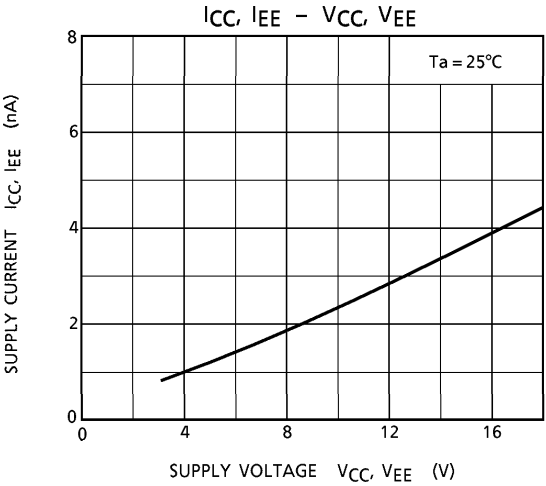
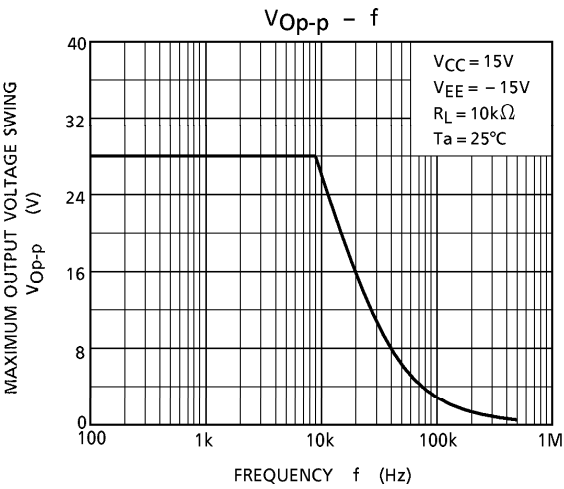
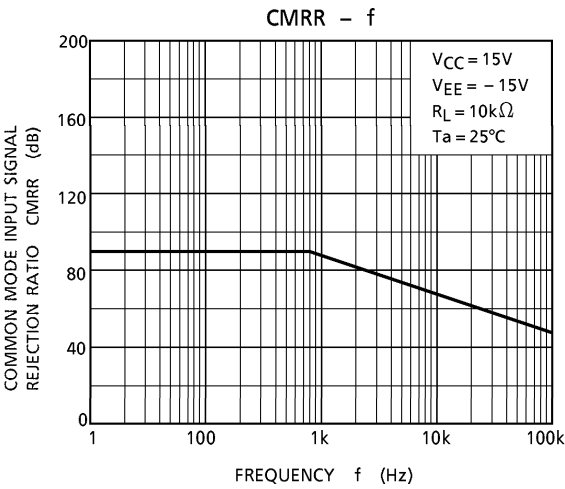
C_2 : HIGH FREQUENCY BYPASS CONDENSER
0.1 μ F

$G_V = 20 \log e_o / e_i$ (dB)

f_T INPUT FREQUENCY AT $e_i = e_o$

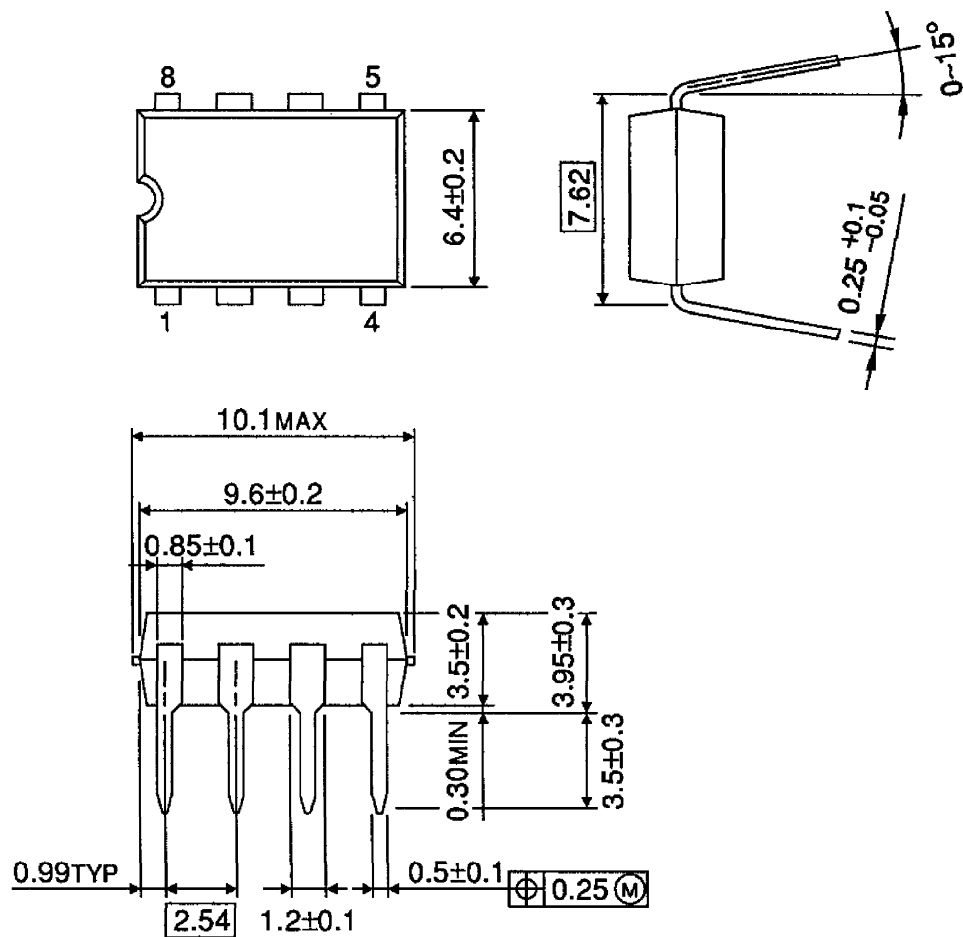
CHARACTERISTICS





PACKAGE DIMENSIONS
DIP8-P-300-2.54A

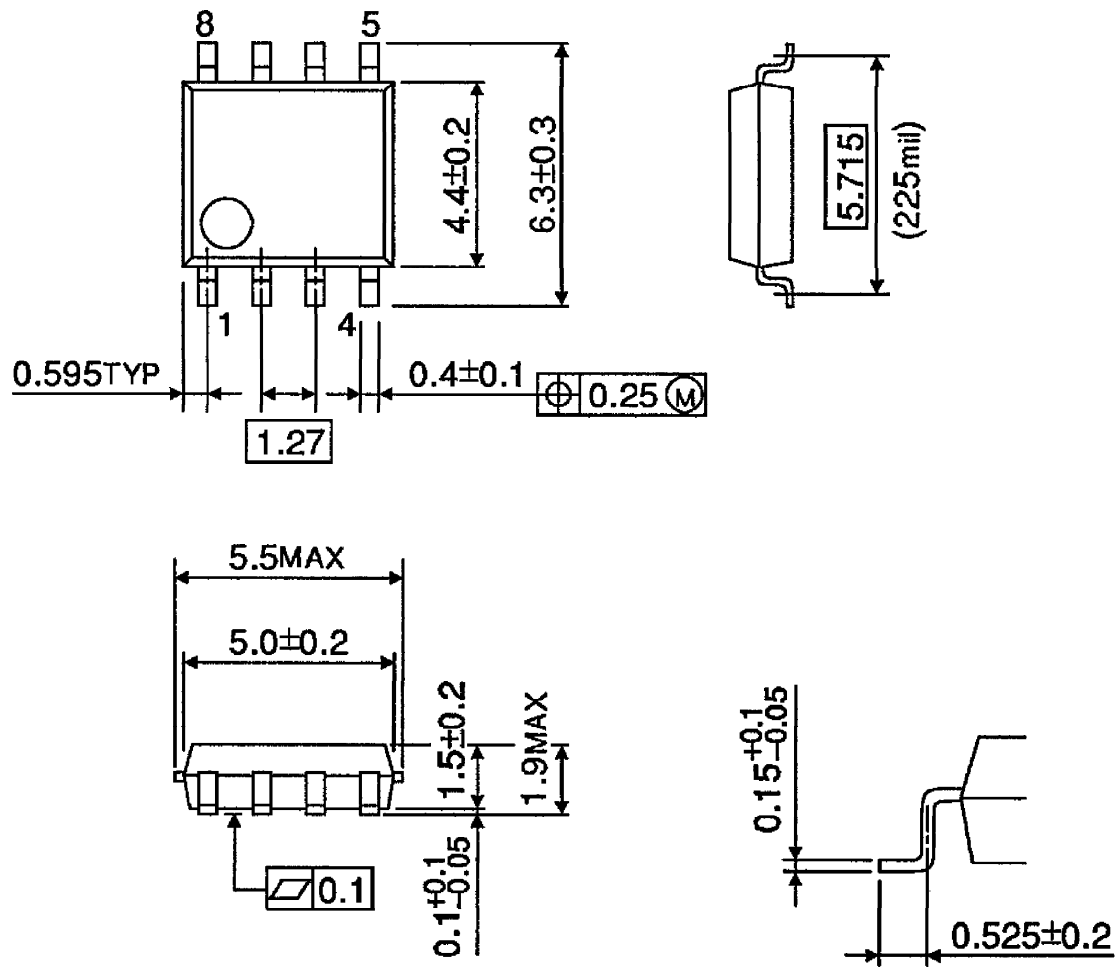
Unit : mm



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.