

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA7796P, TA7796Z

5 BAND GRAPHIC EQUALIZER

TA7796P, TA7796Z are 5-Band graphic equalizer IC, which have 5 resonance circuit and an output buffer amplifier. 5 band graphic equalizer for one channel can be formed easily by externally connecting capacitors and variable resistors which fix f_0 (resonance frequency).

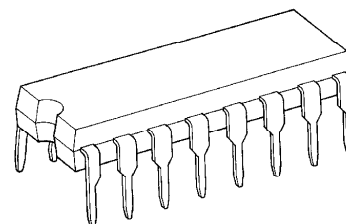
Dual inline package 16pin TA7796P

Zig-Zag inline package 16pin TA7796Z

FEATURES

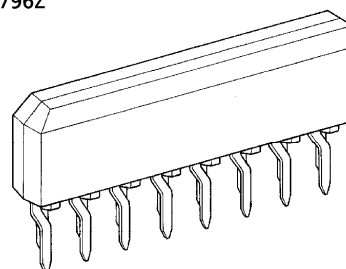
- Few External Parts
- Low Distortion
: THD = 0.007% (Typ.)
($V_O = 0.245V_{rms}$ (−10dBm), $f = 1.1kHz$ BW = 20~20kHz, FLAT)
- Low Noise
: $V_{no} = 3.0\mu V_{rms}$ (Typ.)
($R_g = 620\Omega$, $V_{in} = 0$, BW = 20~20kHz, FLAT)
- Wide Operating Supply Voltage Range
: $V_{CC} = 4.0 \sim 16V$ ($T_a = 25^\circ C$)

TA7796P



DIP16-P-300-2.54A

TA7796Z



ZIP16-P-1.27

Weight

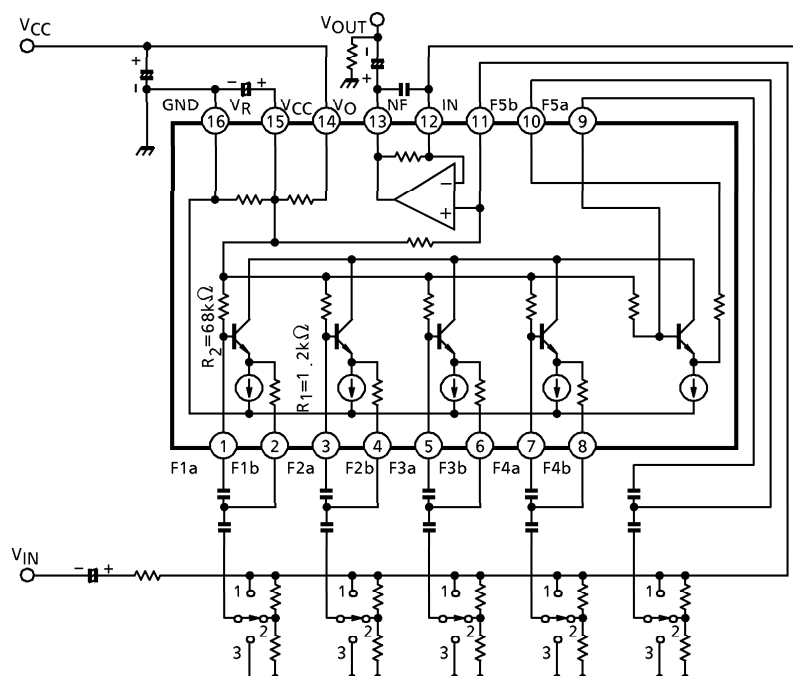
DIP16-P-300-2.54A	: 1.0g (Typ.)
ZIP16-P-1.27	: 0.99g (Typ.)

961001EBA2

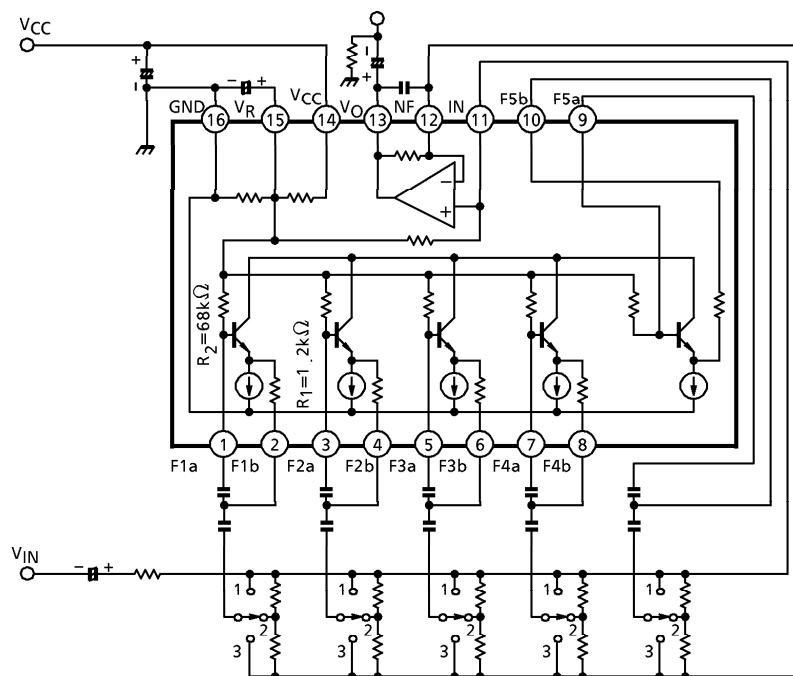
- TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing 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.

BLOCK DIAGRAM

TA7796P



TA7796Z



MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	16	V
Power Dissipation	P_D (Note)	750	mW
Operating Temperature	T_{opr}	$-30 \sim 75$	$^\circ\text{C}$
Storage Temperature	T_{stg}	$-55 \sim 150$	$^\circ\text{C}$

(Note) Derated above $T_a = 25^\circ\text{C}$ in the proportion of $6\text{mW}/^\circ\text{C}$ for TA7796P, TA7796Z.

ELECTRICAL CHARACTERISTICS (Unless otherwise specified, $V_{CC} = 8\text{V}$, $f = 1.1\text{kHz}$, $R_L = 10\Omega$, $T_a = 25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Quiescent Current	I_{CCQ}	—	$V_{in} = 0$	3.5	6.1	9.3	mA
Voltage Gain	G_V (FLT)	—	$V_{out} = 0.775V_{rms}$ (0dBm)	-2.5	-0.5	1.5	dB
	G_V (BST)	—	$V_{out} = 0.775V_{rms}$ (0dBm), $f = 110\text{Hz}$	10.0	11.5	14.0	
		—	$V_{out} = 0.775V_{rms}$ (0dBm), $f = 340\text{Hz}$	10.0	11.5	14.0	
		—	$V_{out} = 0.775V_{rms}$ (0dBm), $f = 1.1\text{kHz}$	10.0	11.5	14.0	
		—	$V_{out} = 0.775V_{rms}$ (0dBm), $f = 3.4\text{kHz}$	10.0	11.5	14.0	
		—	$V_{out} = 0.775V_{rms}$ (0dBm), $f = 11\text{kHz}$	10.0	11.5	14.0	
	G_V (CUT)	—	$V_{out} = 0.775V_{rms}$ (0dBm), $f = 110\text{Hz}$	-14.0	-11.5	-10.0	
		—	$V_{out} = 0.775V_{rms}$ (0dBm), $f = 340\text{Hz}$	-14.0	-11.5	-10.0	
		—	$V_{out} = 0.775V_{rms}$ (0dBm), $f = 1.1\text{kHz}$	-14.0	-11.5	-10.0	
		—	$V_{out} = 0.775V_{rms}$ (0dBm), $f = 3.4\text{kHz}$	-14.0	-11.5	-10.0	
		—	$V_{out} = 0.775V_{rms}$ (0dBm), $f = 11\text{kHz}$	-14.0	-11.5	-10.0	
Total Harmonic Distortion	THD (FLT)	—	$V_{out} = 0.245V_{rms}$ (-10dBm)	—	0.007	0.10	%
Output Noise Voltage	V_{no} (FLT)	—	$R_g = 620\Omega$, $V_{in} = 0$, $BW = 20 \sim 20\text{kHz}$	—	3.0	8.0	μV_{rms}

TYP. DC VOLTAGE OF EACH TERMINAL

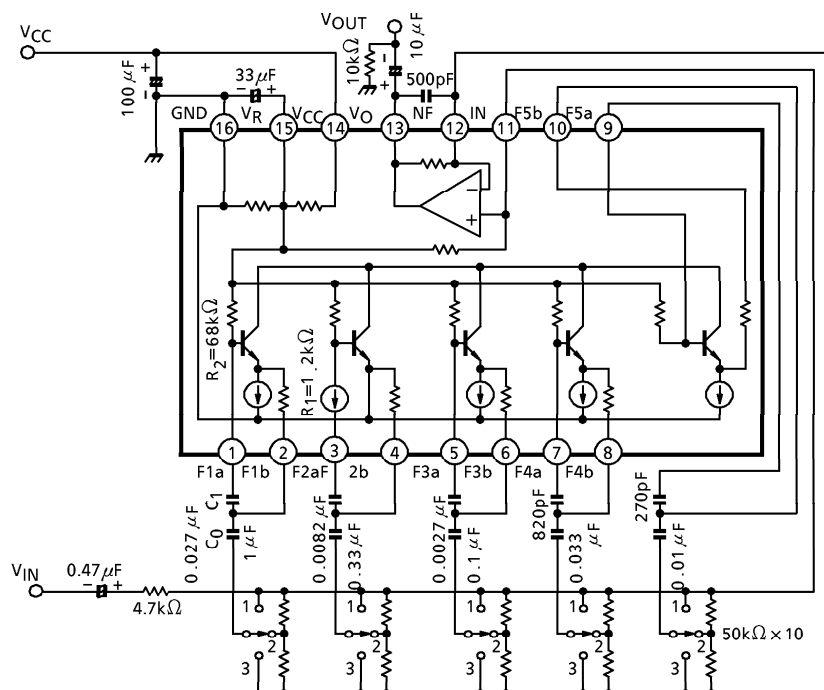
TA7796P ($V_{CC} = 8\text{V}$, $T_a = 25^\circ\text{C}$)

TERMINAL No.	1	2	3	4	5	6	7	8
DC-VOLTAGE (V)	4.70	3.35	4.70	3.35	4.70	3.35	4.70	3.35
TERMINAL No.	9	10	11	12	13	14	15	16
DC-VOLTAGE (V)	4.70	3.35	4.00	4.00	4.00	8.00	4.70	0

TA7796Z ($V_{CC} = 8\text{V}$, $T_a = 25^\circ\text{C}$)

TERMINAL No.	1	2	3	4	5	6	7	8
DC-VOLTAGE (V)	4.70	3.35	4.00	4.00	4.00	8.00	4.70	0
TERMINAL No.	9	10	11	12	13	14	15	16
DC-VOLTAGE (V)	4.70	3.35	4.70	3.35	4.70	3.35	4.70	3.35

TEST CIRCUIT TA7796P



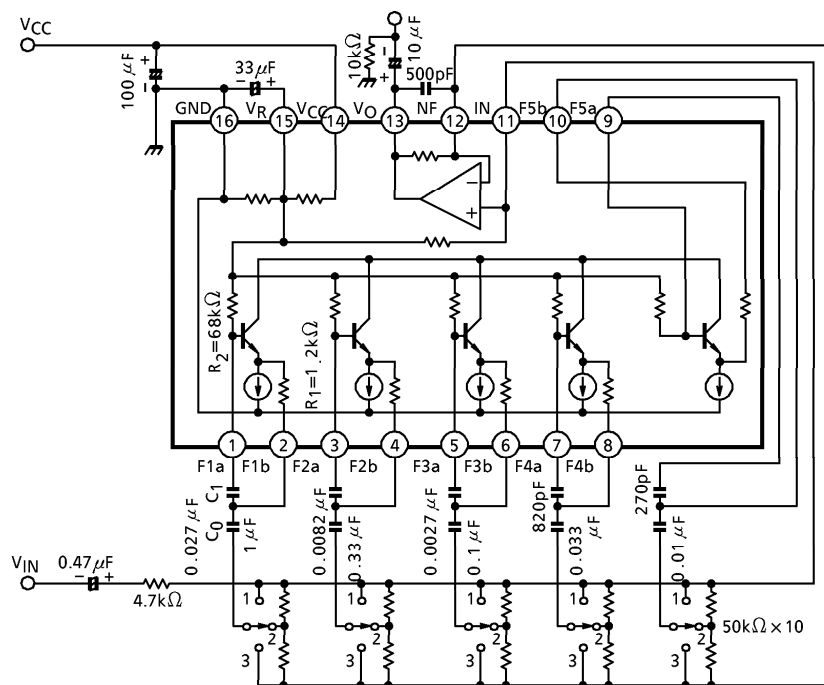
- 1 : CUT 2 : FLAT 3 : BOOST
- f_o (Resonance Frequency)

$$f_o = \frac{1}{2\pi \sqrt{C_0 \cdot C_1 \cdot R_1 \cdot R_2}}$$

($R_1 = 1.2k\Omega$, $R_2 = 68k\Omega$,
on chip resistor)

C_0 (F)	C_1 (F)	f_o (Hz)
1μ	0.027μ	107
0.33μ	0.0082μ	340
0.1μ	0.0027μ	1.07k
0.033μ	820p	3.40k
0.01μ	270p	10.7k

TA7796Z

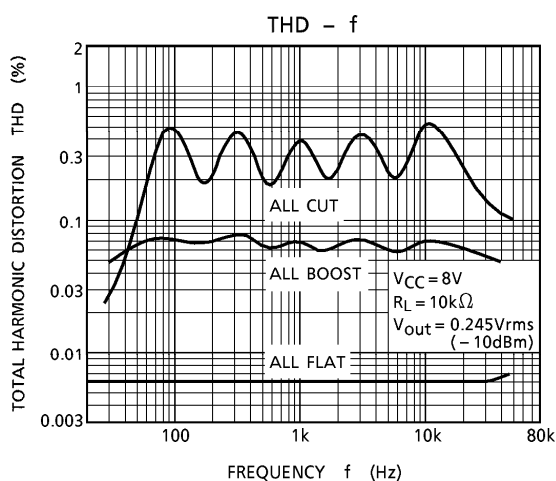
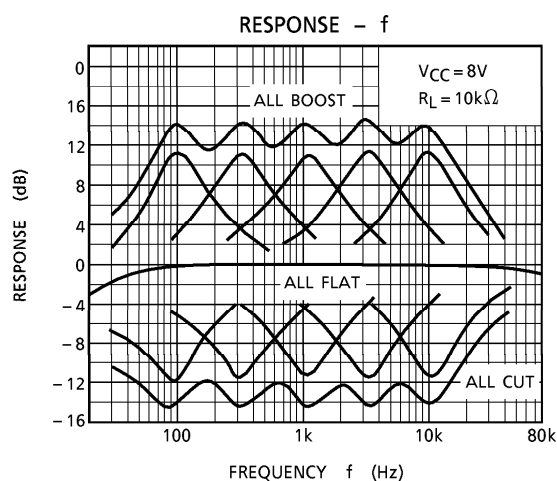
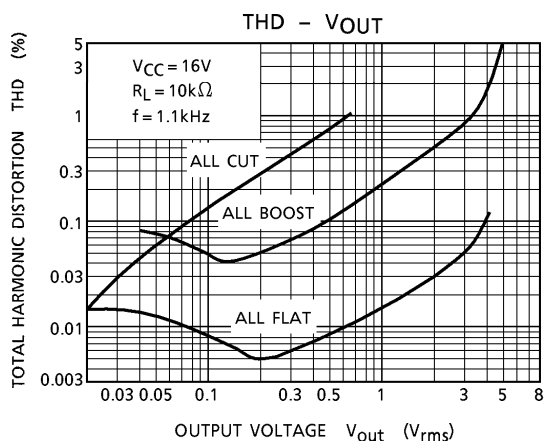
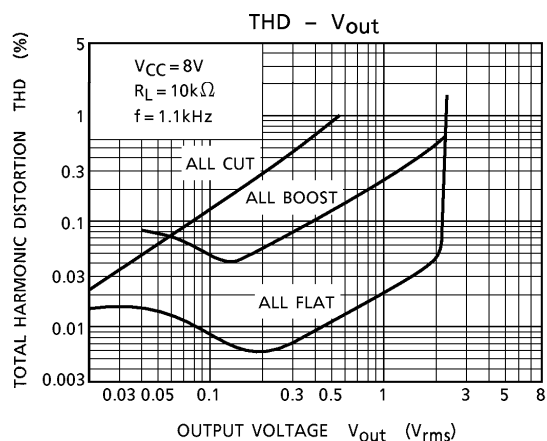
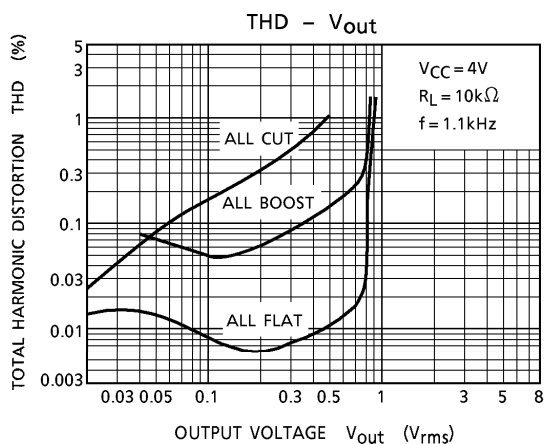
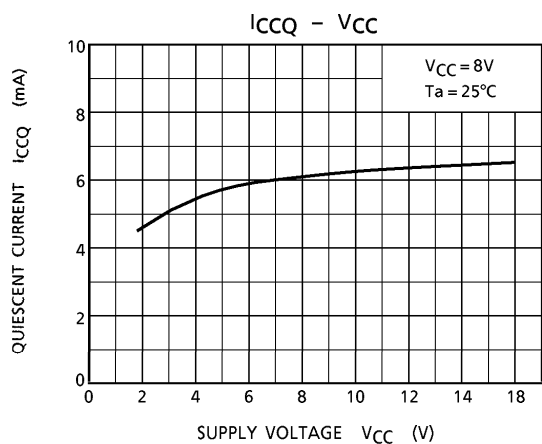


- 1 : CUT 2 : FLAT 3 : BOOST
- f_o (Resonance Frequency)

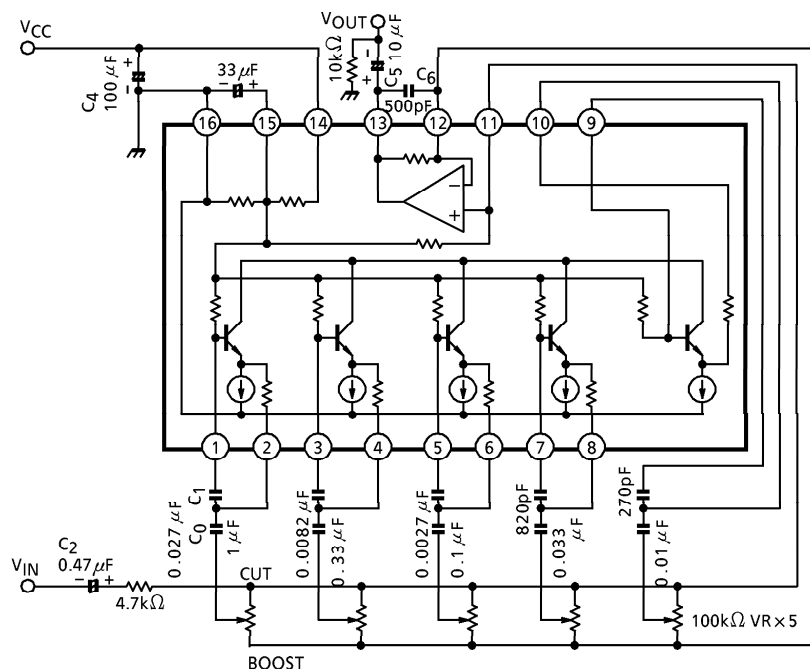
$$f_o = \frac{1}{2\pi \sqrt{C_0 \cdot C_1 \cdot R_1 \cdot R_2}}$$

($R_1 = 1.2k\Omega$, $R_2 = 68k\Omega$,
on chip resistor)

C_0 (F)	C_1 (F)	f_o (Hz)
1μ	0.027μ	107
0.33μ	0.0082μ	340
0.1μ	0.0027μ	1.07k
0.033μ	820p	3.40k
0.01μ	270p	10.7k

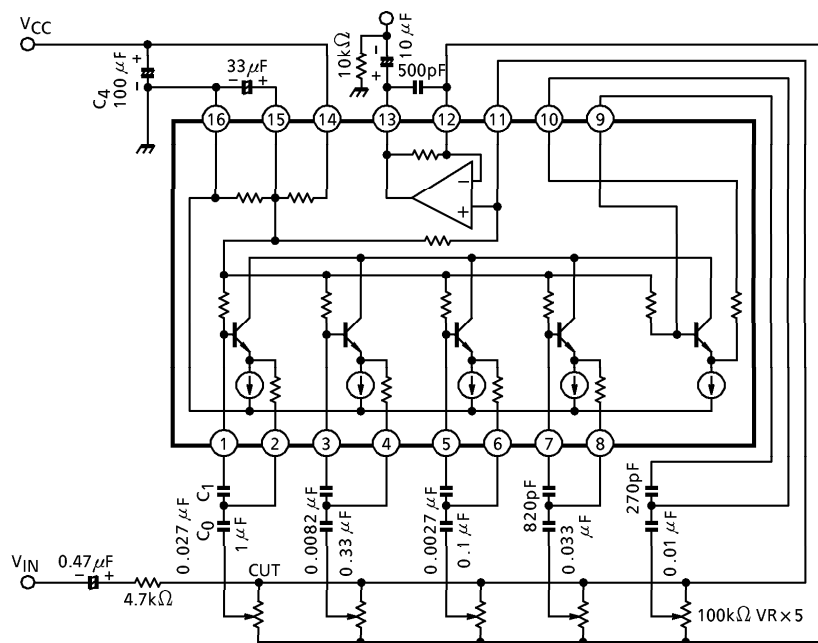


APPLICATION
TA7796P



- Description of external parts.
 - C_0, C_1 : Capacitors used to fix f_o (resonance frequency).
 - C_2 : Input capacitor.
 - C_3 : Decoupling capacitor.
 - C_4 : Power capacitor.
 - C_5 : Output capacitor.

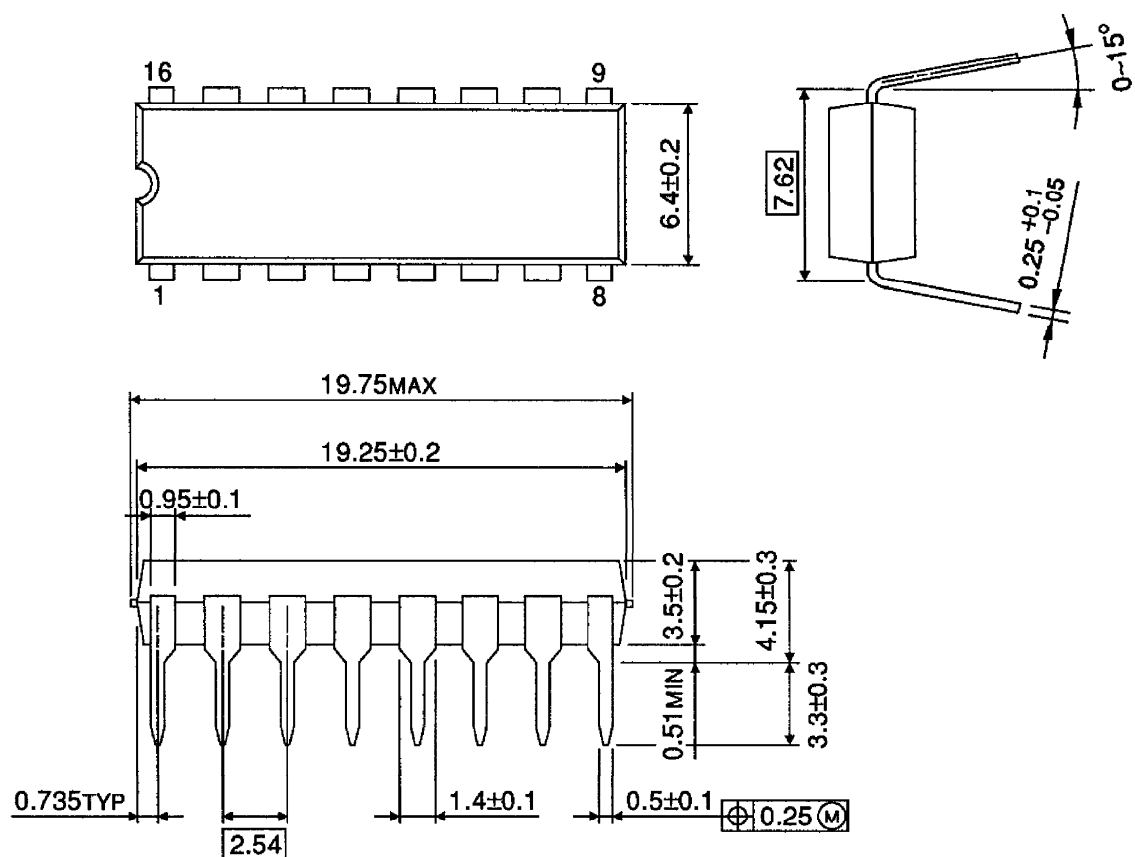
TA7796Z



- Description of external parts.
 - C_0, C_1 : Capacitors used to fix f_o (resonance frequency).
 - C_2 : Input capacitor.
 - C_3 : Decoupling capacitor.
 - C_4 : Power capacitor.
 - C_5 : Output capacitor.

OUTLINE DRAWING DIP16-P-300-2.54A

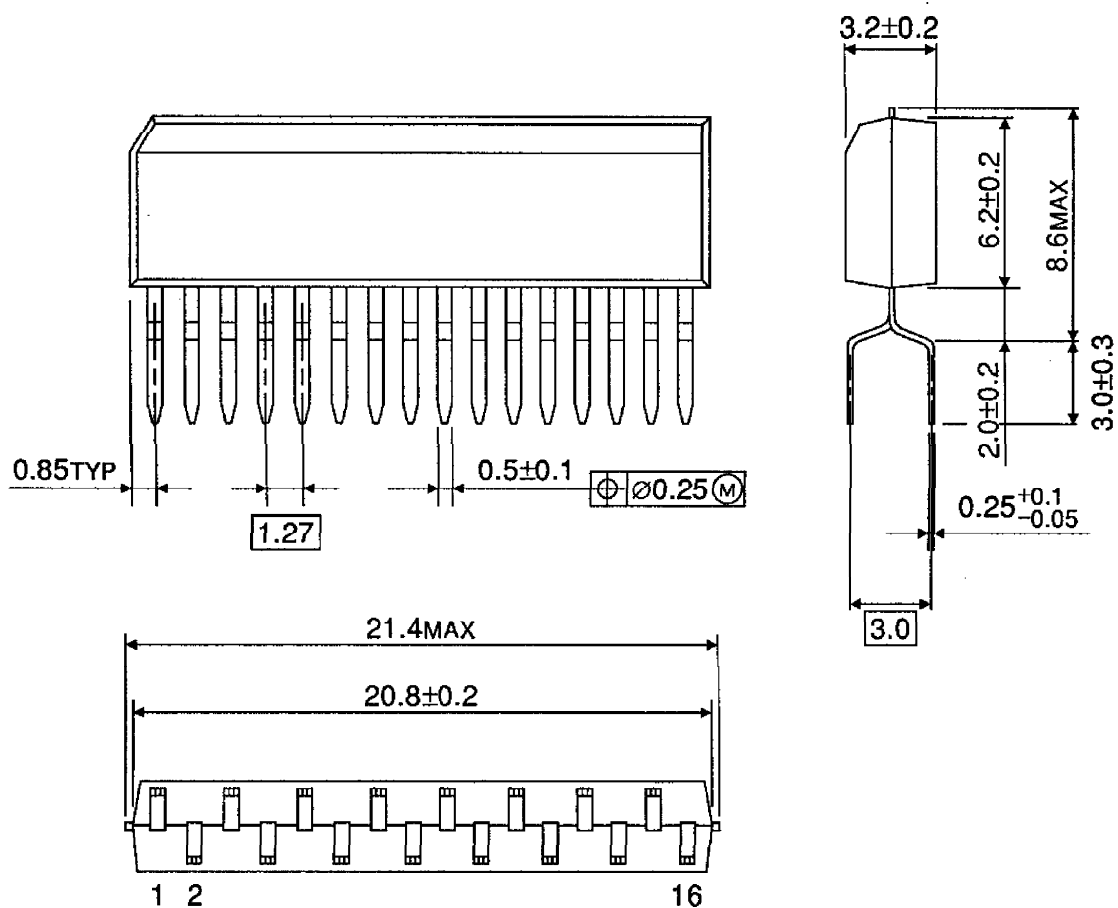
Unit : mm



Weight : 1.0g (Typ.)

OUTLINE DRAWING
ZIP16-P-1.27

Unit : mm



Weight : 0.99g (Typ.)