



4-Mode Preset Equalizer IC

PT2381

DESCRIPTION

PT2381 is a pre-set equalizer IC utilizing CMOS Technology specially designed for audio equipment. It features four sound selections, namely: Classical, Pops, Rock and Normal/Flat which may be selected by the 2 control pins (SW1 and SW2).

PT2381 has 2 built-in channels - each containing an internal operation amplifier and selectable resistors. Thus, least external components are used. By connecting only 3 capacitors to each channel, the high performance pre-set equalizing function of this IC is achieved. Pin assignments and application circuit are optimized for easy PCB layout and cost saving for audio applications. PT2381 is housed in a 16-Pin DIP or SOP Package and is suitable for stereo applications.

FEATURES

- CMOS technology
- Least external components
- Enhanced effects of PT2380
- Available in 16 Pins, DIP or SOP
- 4 sound effect selections available: Classical, Pops, Rock, and Normal/Flat
- Wide operating voltage range: $V_{cc}=2 \sim 15V$
- Two channels in the one chip
- Can be controlled by micro-processor output pin which is compatible with TA2078, M62412 interface definition

APPLICATIONS

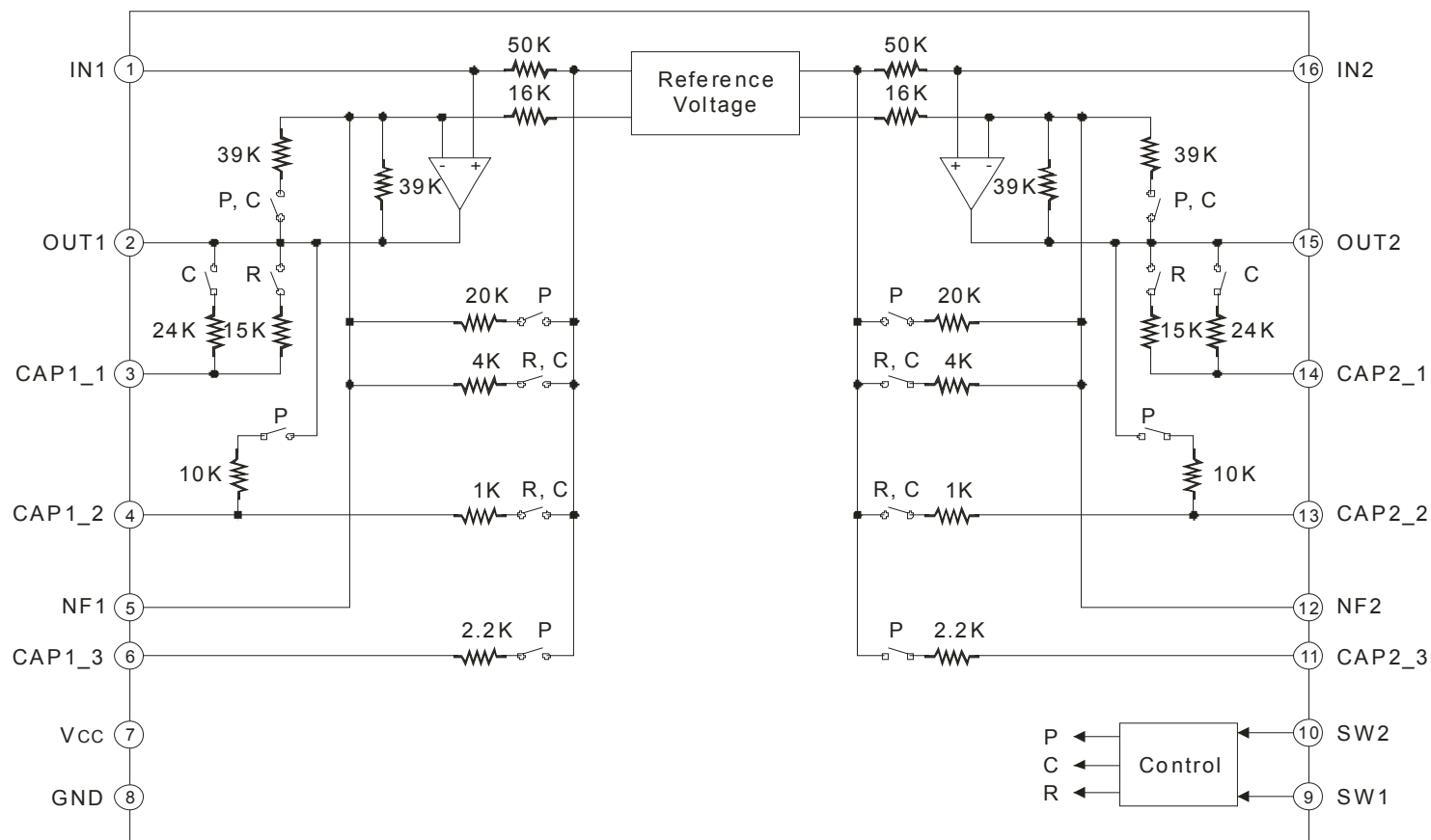
- Mini compo
- Car stereo
- Radio cassette recorders
- Multi-media speaker
- MPEG card
- Mini walk-man
- Other audio equipment



4-Mode Preset Equalizer IC

PT2381

BLOCK DIAGRAM



where:

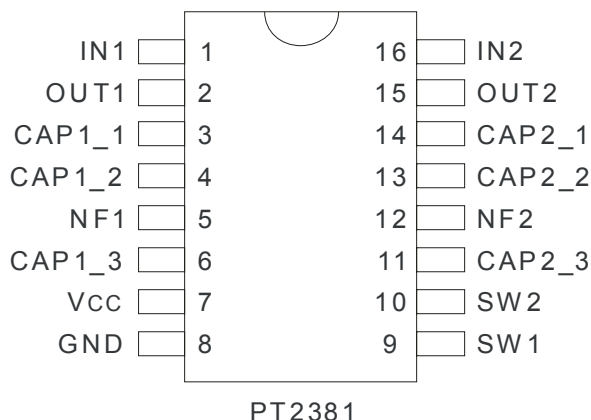
1. N=Normal/Flat Mode
2. C=Classic Mode
3. P=Pops Mode
4. R=Rock Mode



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PIN CONFIGURATION



PIN DESCRIPTION

Pin Name	I/O	Description	Pin No.
IN1	I	Signal Input Pin 1	1
OUT1	O	Signal Output Pin 1	2
CAP1_1	-	This pin is connected to Pin 5 by an external Capacitor	3
CAP1_2	-	This pin is connected to Pin 5 by an external Capacitor	4
NF1	-	Feedback Node 1	5
CAP1_3	-	This pin is connected to Pin 5 by an external Capacitor	6
V _{CC}	-	Positive Power Supply	7
GND	-	Ground	8
SW1	I	Mode Switch 1	9
SW2	I	Mode Switch 2	10
CAP2_3	-	This pin is connected to Pin 12 by an external Capacitor	11
NF2	-	Feedback Node 2	12
CAP2_2	-	This pin is connected to Pin 12 by an external Capacitor	13
CAP2_1	-	This pin is connected to Pin 12 by an external Capacitor	14
OUT2	O	Signal Output Pin 2	15
IN2	I	Signal Input Pin 2	16



4-Mode Preset Equalizer IC

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FUNCTION DESCRIPTION

PT2381 is pre-set to 4 modes: Normal/Flat, Rock, Classical and Pops. These 4 modes may be selected using two switches, namely: SW1 (Pin. No.9) and SW2 (Pin No.10). Please refer to the SW1 & SW2 Mode Conditions below.

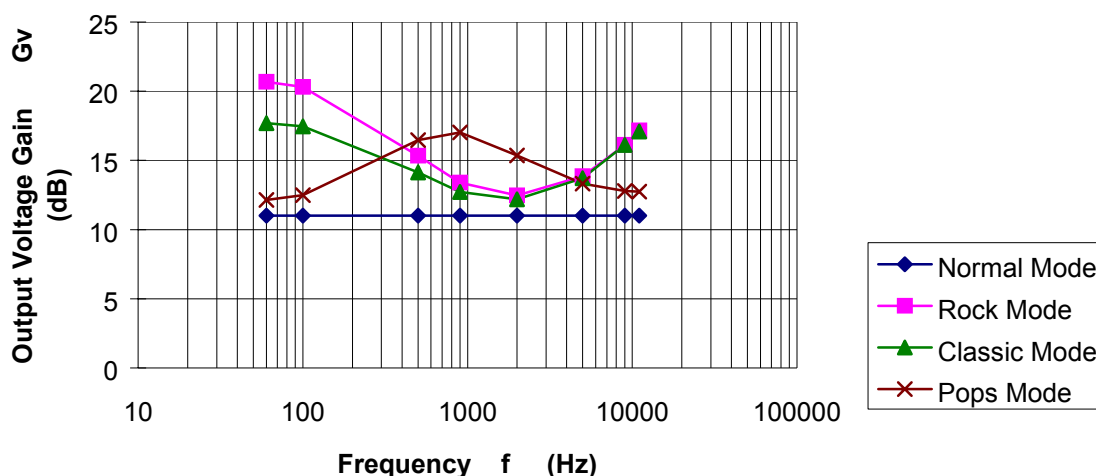
Mode	SW1	SW2
Normal/Flat	Low	Low
Rock	Low	High
Classic	High	Low
Pops	High	High

where:

1. Low: $SW1/SW2 \leq 1V$
2. High: $SW1/SW2 \geq 3.5V$ for $V_{CC}=5 \sim 12V$

The Output Voltage Gain vs. the Frequency Graph for the 4 preset modes is given below:

Output Voltage Gain vs Frequency





4-Mode Preset Equalizer IC

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ABSOLUTE MAXIMUM RATINGS

(Unless otherwise specified, Ta=25°C)

Parameter	Symbol	Ratings	Unit
Supply voltage	V _{CC} max	15	V
Power dissipation (Ta ≤ 25°C)	Pd	1000	mW
Thermal derating (Ta > 25°C)	Ko	10.0	mW/°C
Operating temperature	Topr	-40 ~ +85	°C
Storage temperature	Tstg	-65 ~ +150	°C
Switch input voltage range	VI	-0.3 ~ V _{CC} +0.3	V



4-Mode Preset Equalizer IC

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ELECTRICAL CHARACTERISTICS

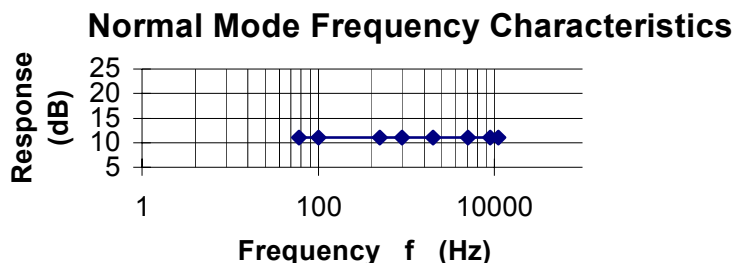
In order to best describe this IC, an application example is hereby given. The application example's electrical characteristics are enumerated below.

(Unless otherwise specified, $V_{CC}=12.0V$, $V_i=0.1V_{rms}$ and $f=1KHz$)

Parameter			Symbol	Condition	Data	Unit
Circuit operation current			I _{CC}	V _{CC} =12.0 V, V _i =0.0 V	8.0	mA
Preset Mode	Normal Mode Voltage Gain	Bass	GB _n	f=80Hz	11	dB
		Mid	GM _n	f=1KHz	11	dB
		Treble	GT _n	f=10KHz	11	dB
	Rock Mode Voltage Gain	Bass	GB _r	f=80Hz	20	dB
		Mid	GM _r	f=1KHz	13	dB
		Treble	GT _r	f=10KHz	17	dB
	Classic Mode Voltage Gain	Bass	GB _c	f=80Hz	17	dB
		Mid	GM _c	f=1KHz	12	dB
		Treble	GT _c	f=10KHz	17	dB
	Pops Mode Voltage Gain	Bass	GB _p	f=80Hz	12	dB
		Mid	GM _p	f=1KHz	17	dB
		Treble	GT _p	f=10KHz	13	dB
Maximum output voltage			VOM	f=1KHz V _{cc} =5V, V _i =0.3V _{rms} V _{cc} =12V, V _i =0.8V _{rms}	1.5 4.0	V _{rms}
Total harmonic distortion			THD	BW=400Hz~30KHz A-Weighting	0.02	%
Output noise voltage			VNO	BW=400Hz~30KHz A-Weighting, V _i =0.0V	50	μV _{rms}
Input resistor			R _i		50	KΩ

SOUND FREQUENCY CHARACTERISTICS OF THE APPLICATION EXAMPLE

NORMAL MODE



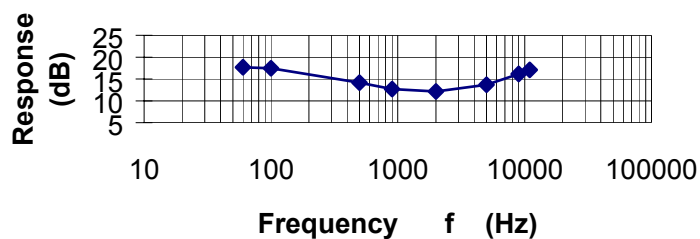


4-Mode Preset Equalizer IC

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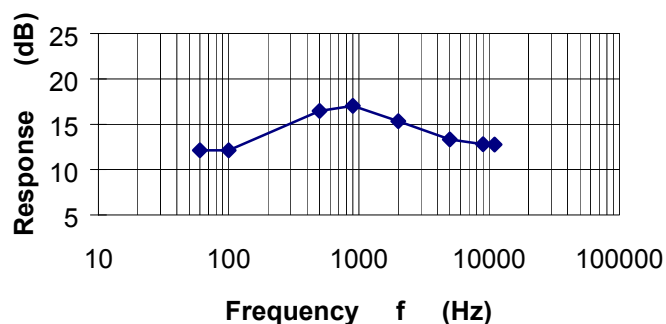
CLASSIC MODE

Classic Mode Frequency Characteristics



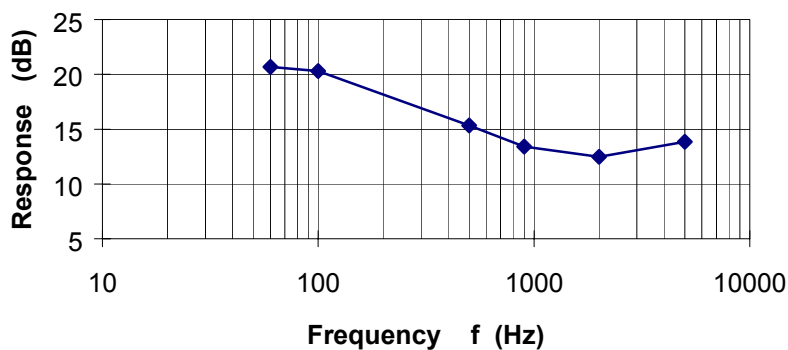
POPS MODE

Pops Mode Sound Frequency Characteristics



ROCK MODE

Rock Mode Frequency Characteristics

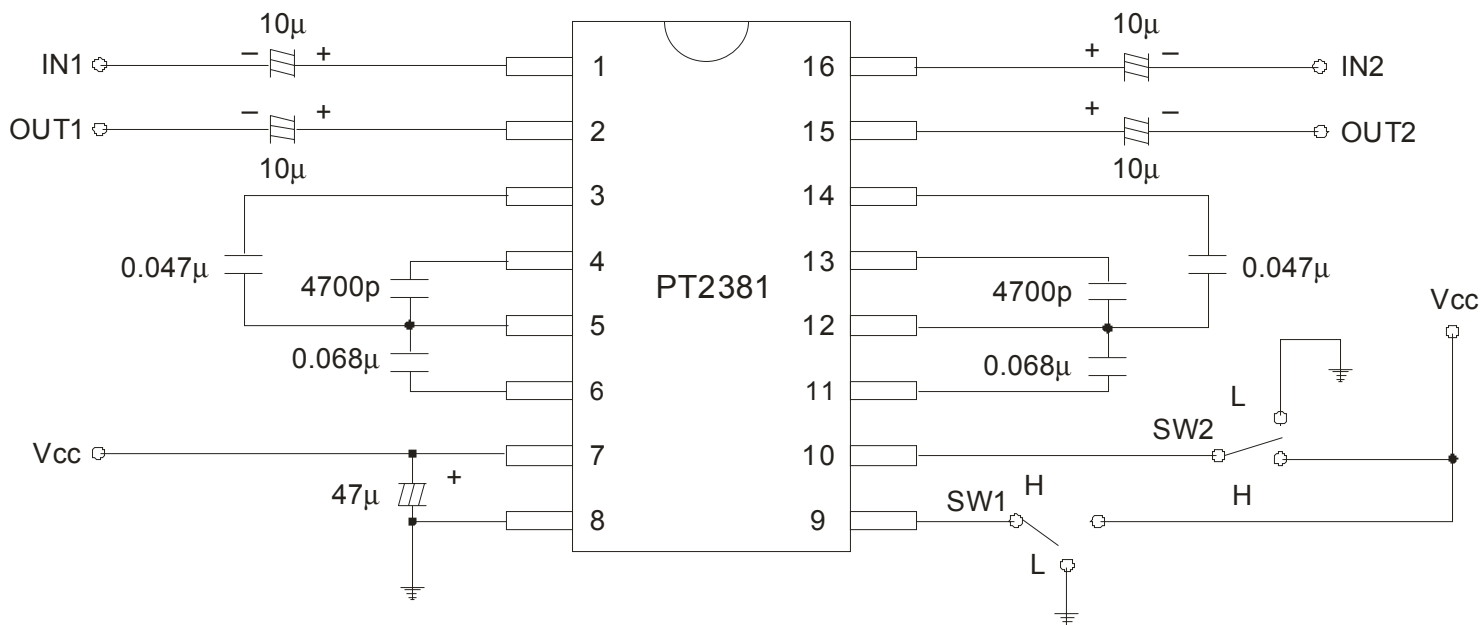




4-Mode Preset Equalizer IC

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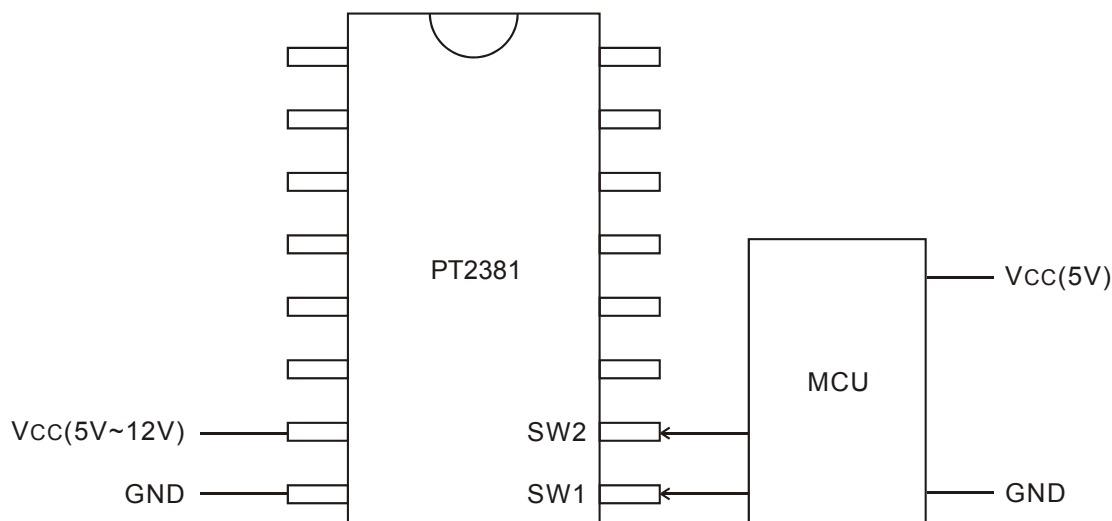
APPLICATION CIRCUIT



Note:

The Capacitor's Polarity of Pins: IN1, IN2, OUT1, OUT2 are dependent on the applied DC Level of Pins IN1, IN2, OUT1, OUT2.

APPLICATION CIRCUIT WITH MICRO-CONTROLLER CONNECTION





ORDER INFORMATION

Valid Part Number	Package Type	Top Code
PT2381	16 Pins DIP, 300mil	PT2381
PT2381-S	16 Pins SOP, 300mil	PT2381-S

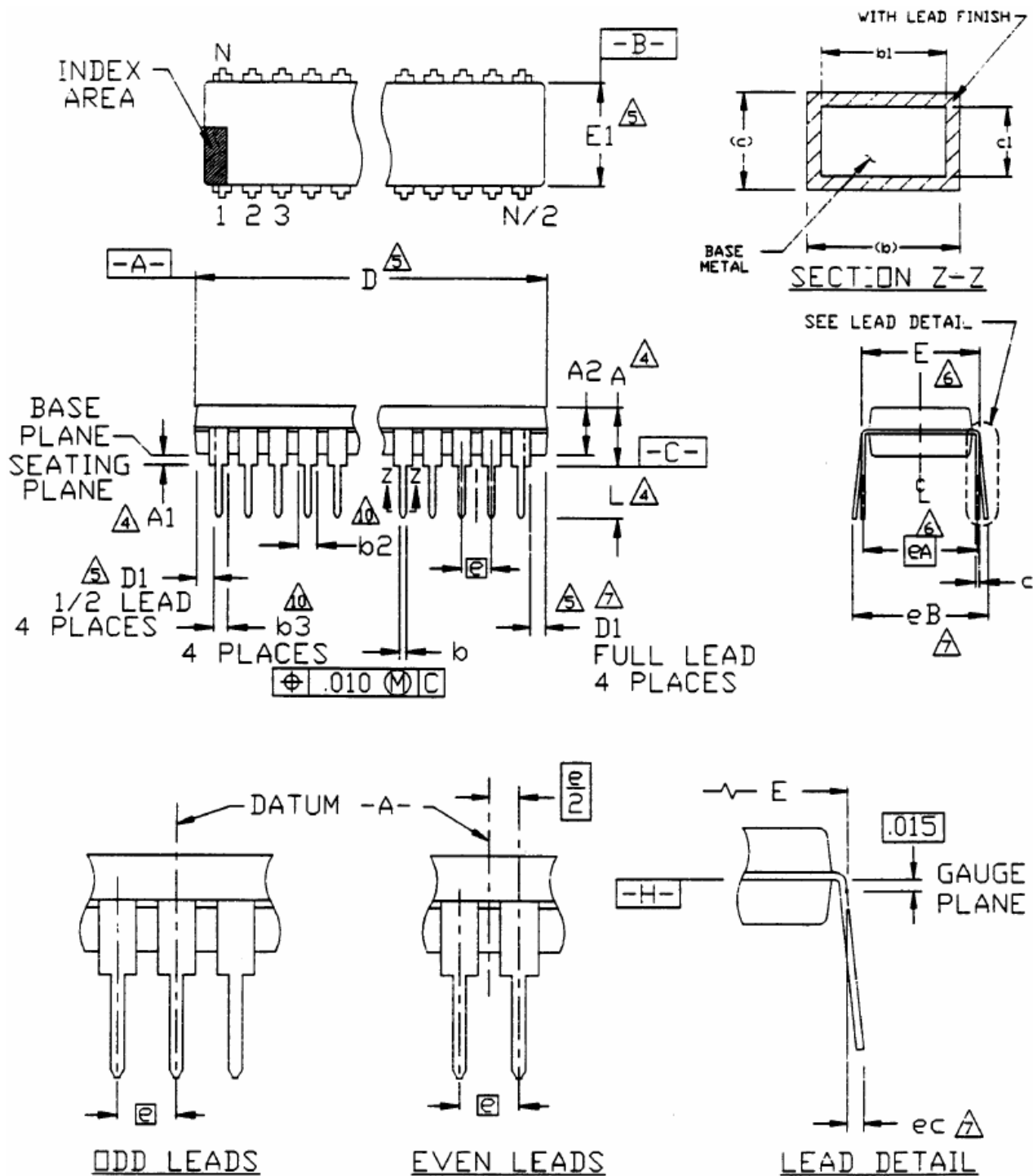


4-Mode Preset Equalizer IC

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PACKAGE INFORMATION

16 PINS, DIP, 300MIL





4-Mode Preset Equalizer IC

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Symbol	Dimensions In Inches		
	Min.	Nom.	Max.
A	-	-	0.210
A1	0.015	-	-
A2	0.115	0.130	0.195
b	0.014	0.018	0.022
b1	0.014	0.018	0.020
b2	0.045	0.060	0.070
b3	0.030	0.039	0.045
c	0.008	0.010	0.014
c1	0.008	0.010	0.011
D	0.780	0.790	0.800
D1	0.005	-	-
E	0.300	0.310	0.325
E1	0.240	0.250	0.280
e	0.100 bsc.		
eA	0.300 bsc.		
eB	-	-	0.430
eC	0.000	-	0.060
L	0.115	0.130	0.150

Notes:

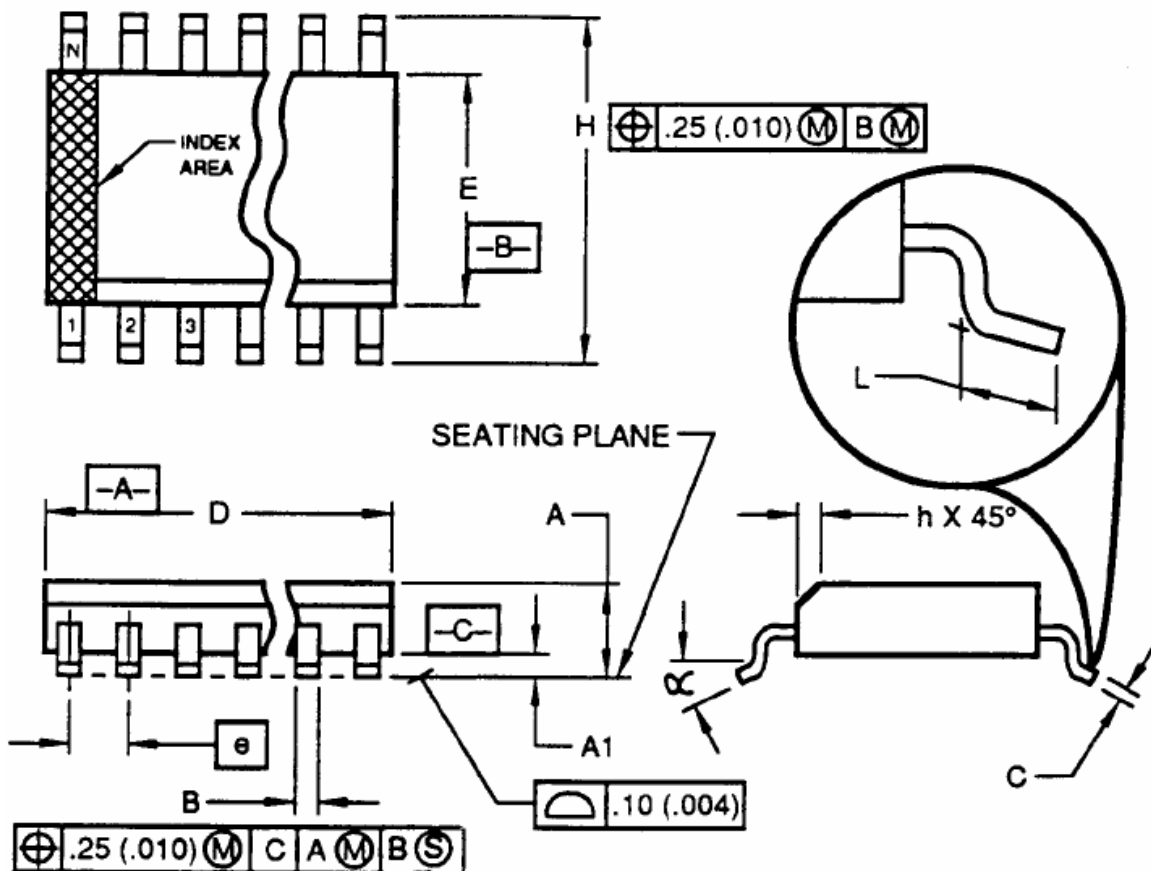
1. All dimensions are in INCHES.
 2. Dimensioning and tolerancing per ANSI Y14.5M-1982.
 3. Dimension "A", "A1" and "L" are measured with the package seated in JEDEC Seating Plane Gauge GS-3
 4. "D", "D1" and "E1" dimensions do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.010 inch.
 5. "E" and "eA" measured with the leads constrained to be perpendicular to datum $\square C$.
 6. "eB" and "eC" are measured at the lead tips with the leads unconstrained.
 7. N is the number of the terminal positions (N=16)
 8. Pointed or rounded lead tips are preferred to ease insertion.
 9. "b2" and "b3" maximum dimensions are not include dambar protrusions. Dambar protrusions shall not exceed 0.010 inch (0.25mm)
 10. Distance between leads including Dambar protrusions to be 0.005 inch minimum.
 11. Datum plane $\square H$ coincident with the bottom of lead, where lead exits body.
 12. Refer to JEDEC MS-001, Variation AB.
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4-Mode Preset Equalizer IC

PT2381

16 PINS, SOP, 300MIL



Symbol	Dimensions In Millimeter		
	Min.	Nom.	Max.
A	2.35		2.65
A1	0.10		0.30
B	0.33		0.51
C	0.23		0.32
D	10.10		10.50
E	7.40		7.60
e	1.27 bsc.		
H	10.00		10.65
h	0.25		0.75
L	0.40		1.27
α	0°		8°



4-Mode Preset Equalizer IC

PT2381

Notes:

1. Dimensioning and tolerancing per ANSI Y14.5M-1982.
2. Dimension "D" does not include mold flash, protrusions or gate burrs. Mold Flash, protrusion or gate burrs shall not exceed 0.15mm (0.006 in) per side.
3. Dimension "E" does not include interlead flash or protrusions. Interlead flash or protrusions shall not exceed 0.25mm (0.010 in) per side.
4. The chamfer on the body is optional. If it is not present, a visual index feature must be located within the crosshatched area.
5. "L" is the length of the terminal for soldering to a substrate.
6. N is the number of the terminal positions (N=16)
7. The lead width "B" as measured 0.36mm (0.014 in) or greater above the seating plane, shall not exceed a maximum value of 0.61mm (0.24 in).
8. Controlling dimension: MILLIMETER.
9. Refer to JEDEC MS-013, Variation AA.

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