普誠科技股份有限公司
Princeton Technology Corp.
Tel: 886-2-66296288
Fax: 886-2-29174598
URL: http://www.princeton.com.tw

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

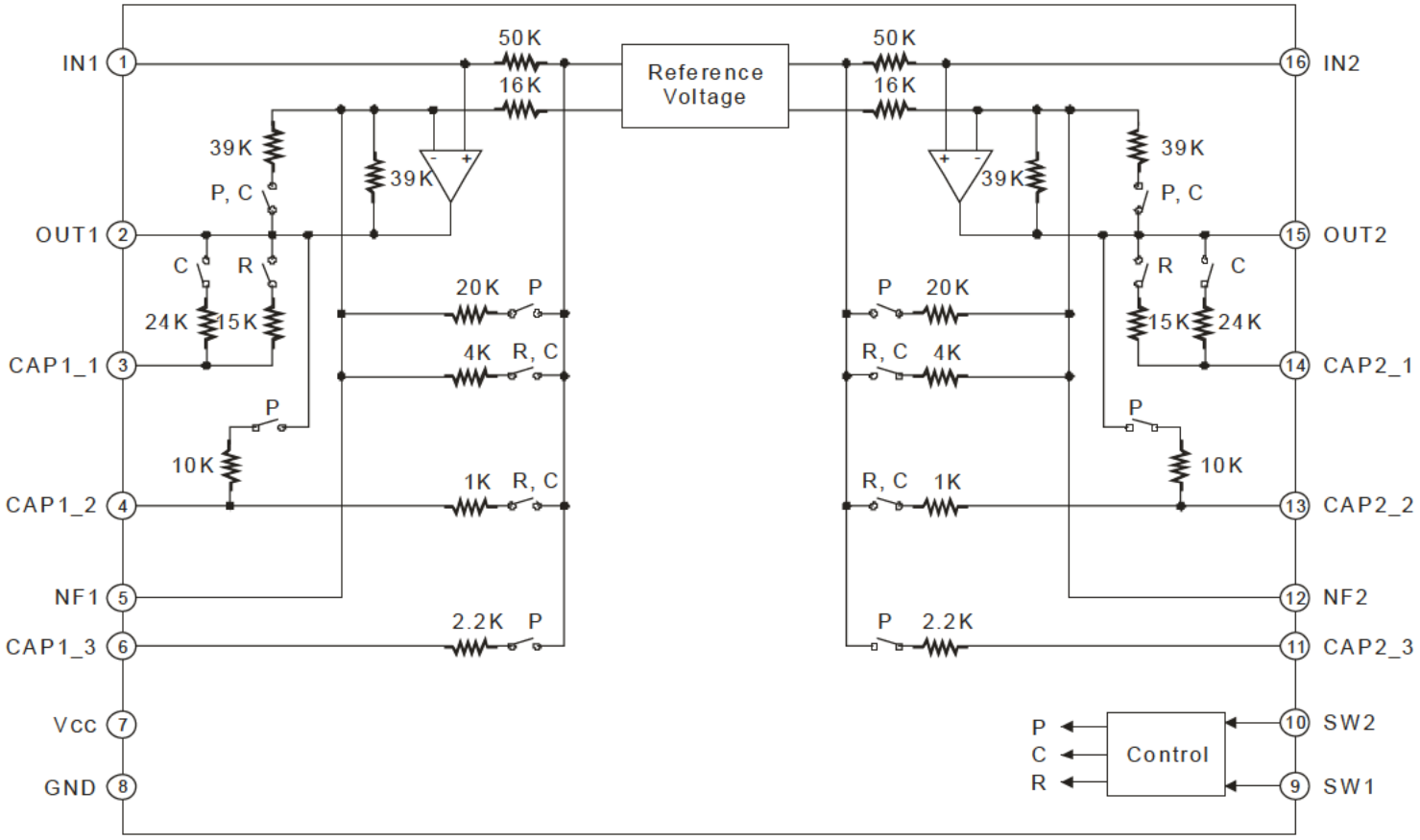
- CMOS technology
- Least external components
- Enhanced effects of PT2380
- Available in 16 Pins, DIP or SOP
- 4 sound effect selections available: Classical, Pops, Rock, and Normal/Flat
- Wide operating voltage range: Vcc=2 ~ 15V
- Two channels in the one chip
- Can be controlled by micro-processor 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

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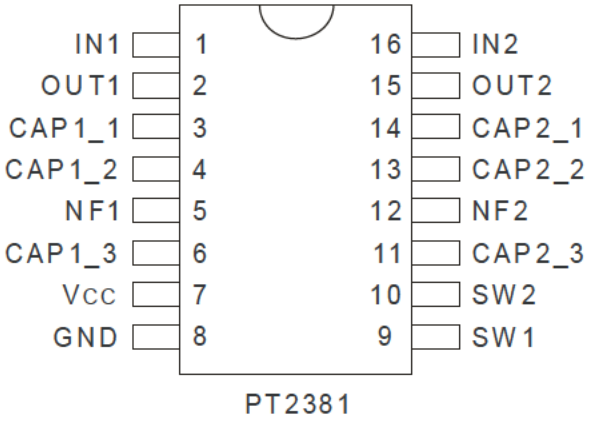
BLOCK DIAGRAM



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

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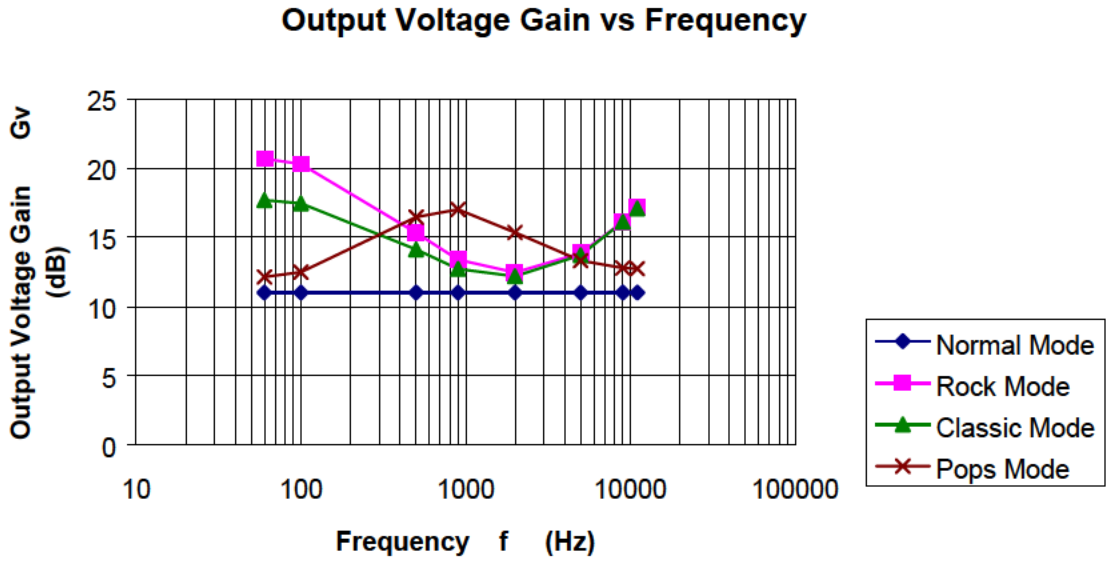
FUNCTION DESCRIPTION

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 ≤ 1V
2. High: SW1/SW2 ≥ 3.5V for V_{CC}=5 ~ 12V

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



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ABSOLUTE MAXIMUM RATINGS

(Unless otherwise specified, Ta=25℃)

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

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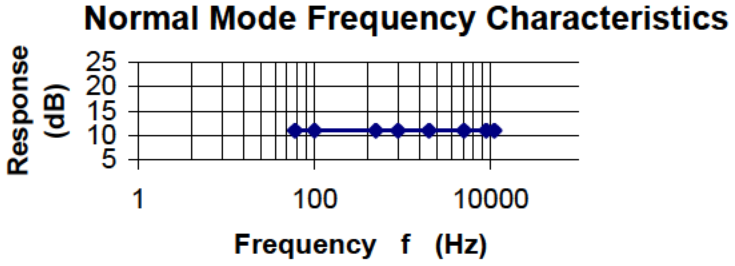
ELECTRICAL CHARACTERISTICS

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, VCC=12.0V, Vi=0.1Vrms and f=1KHz)

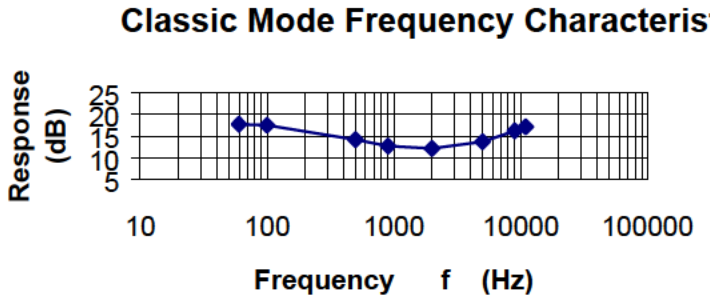
Parameter			Symbol	Condition	Data	Unit
Circuit operation current			I_{CC}	V_{CC}=12.0 V, Vi=0.0 V	8.0	mA
Preset Mode	Normal Mode Voltage Gain	Bass	GBn	f=80Hz	11	dB
		Mid	GMn	f=1KHz	11	dB
		Treble	GTn	f=10KHz	11	dB
	Rock Mode Voltage Gain	Bass	GBr	f=80Hz	20	dB
		Mid	GMr	f=1KHz	13	dB
		Treble	GTr	f=10KHz	17	dB
	Classic Mode Voltage Gain	Bass	GBc	f=80Hz	17	dB
		Mid	GMc	f=1KHz	12	dB
		Treble	GTc	f=10KHz	17	dB
	Pops Mode Voltage Gain	Bass	GBp	f=80Hz	12	dB
		Mid	GMp	f=1KHz	17	dB
		Treble	GTp	f=10KHz	13	dB
Maximum output voltage			VOM	f=1KHz Vcc=5V,Vi=0.3Vrms Vcc=12V,Vi=0.8Vrms	 1.5 4.0	Vrms
Total harmonic distortion			THD	BW=400Hz~30KHz A-Weighting	0.02	%
Output noise voltage			VNO	BW=400Hz~30KHz A-Weighting, Vi=0.0V	50	μVrms
Input resistor			Ri		50	KΩ

SOUND FREQUENCY CHARACTERISTICS OF THE APPLICATION EXAMPLE

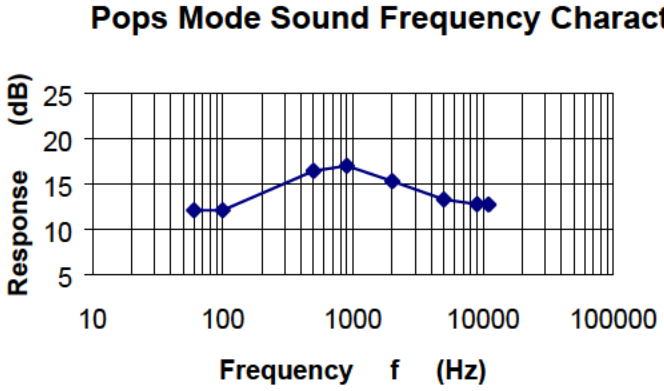
NORMAL MODE



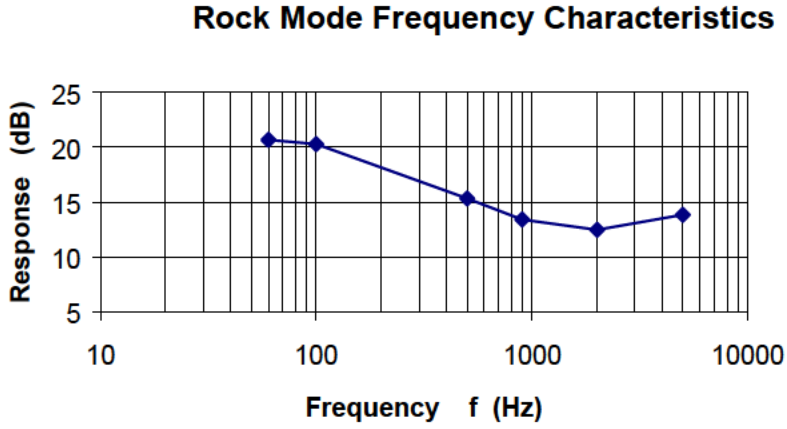
CLASSIC MODE



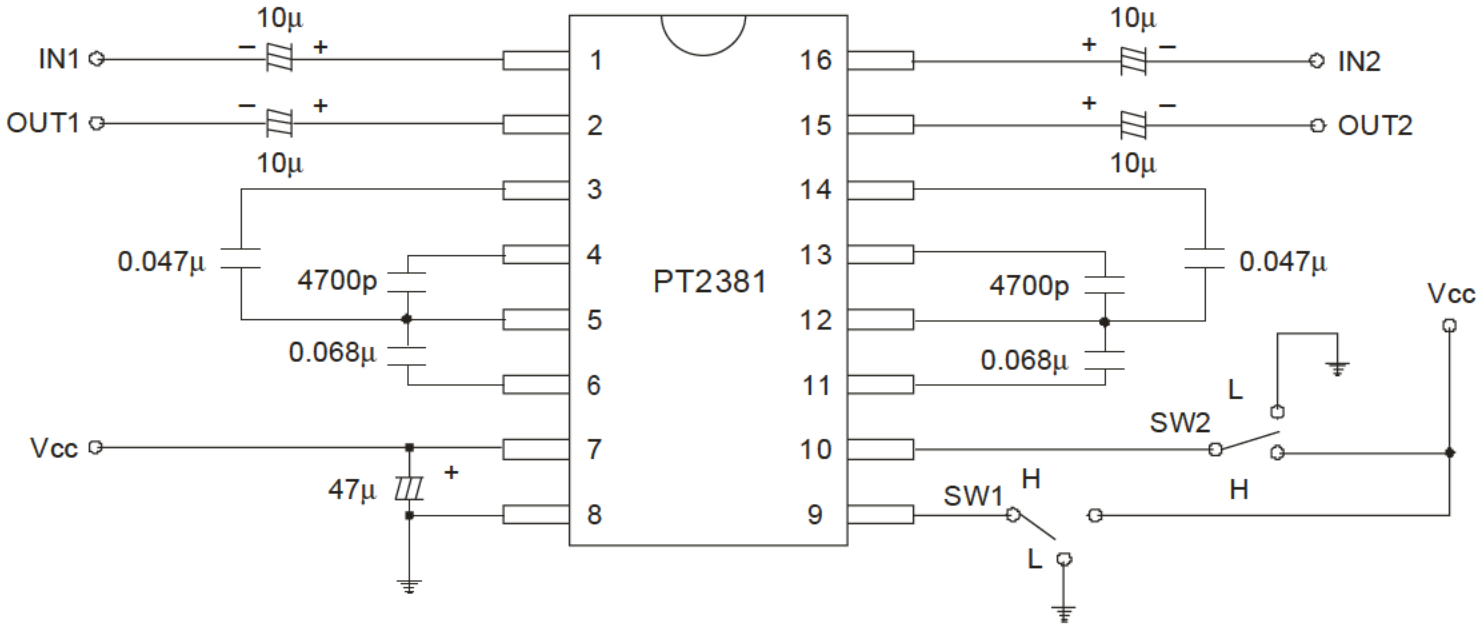
POPS MODE



ROCK MODE

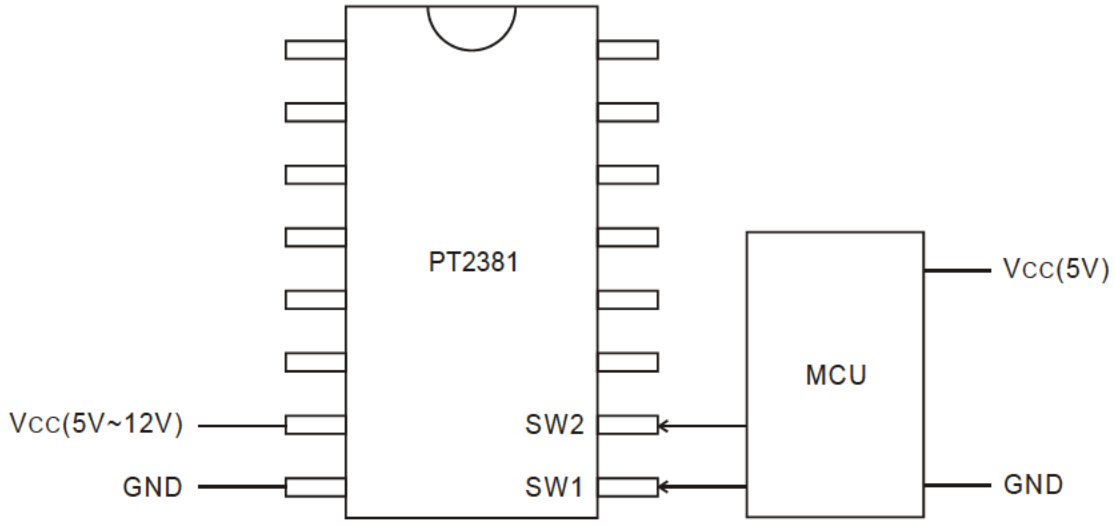


APPLICATION CIRCUIT



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



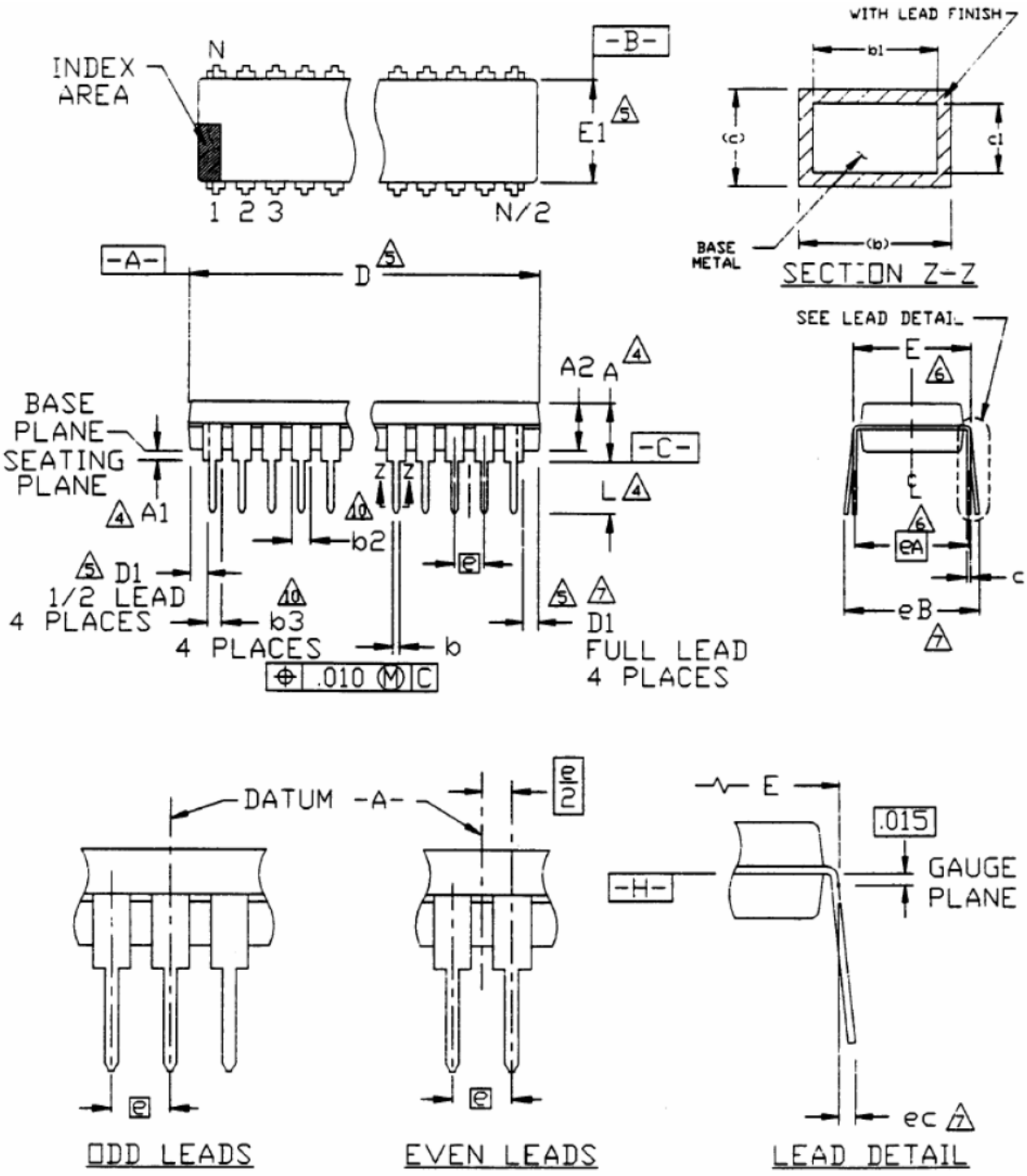
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ORDER INFORMATION

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

PACKAGE INFORMATION

16 PINS, DIP, 300MIL



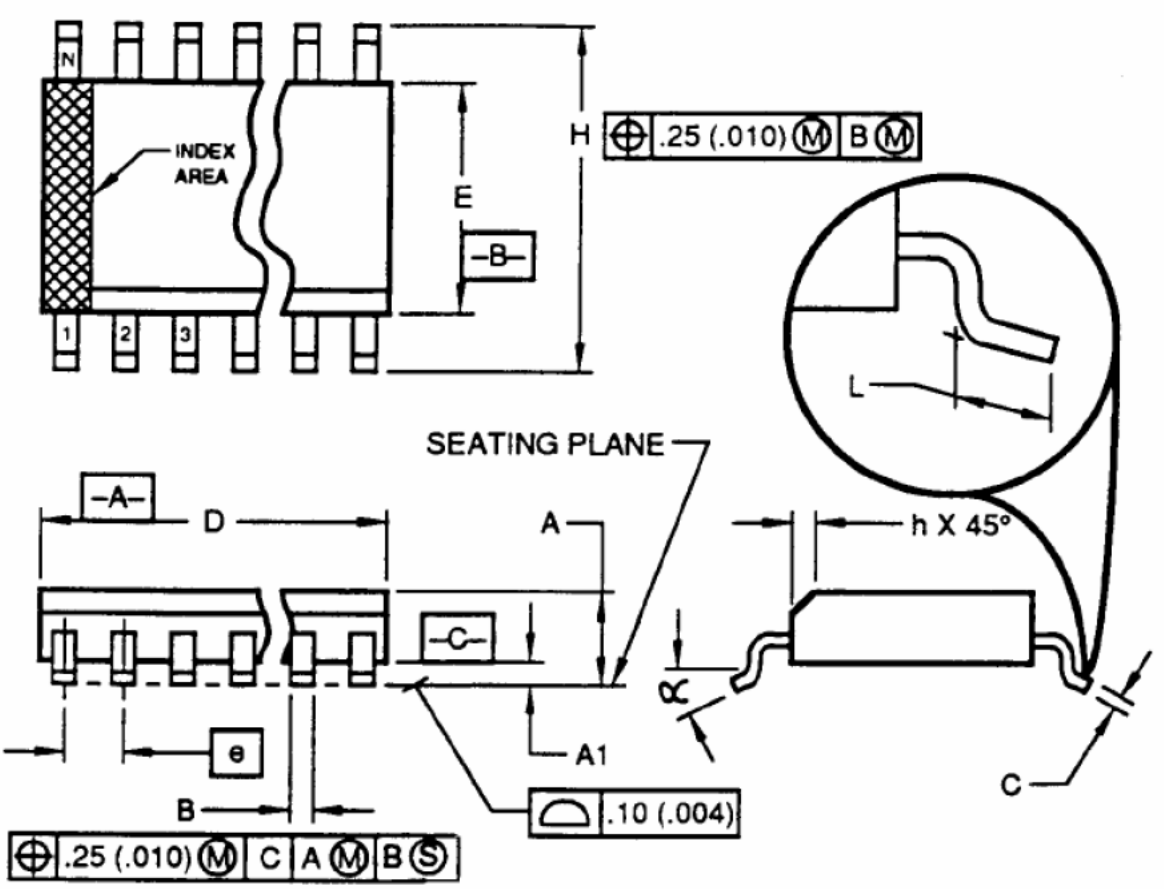
Symbol	Dimensions In Inches		
	Min.	Nom.	Max.
A	-	-	0.210
A1	0.015	-	-
A2	0.115	0.130	0.195
b	0.014	0.018	0.022
b1	0.014	0.018	0.020
b2	0.045	0.060	0.070
b3	0.030	0.039	0.045
c	0.008	0.010	0.014
c1	0.008	0.010	0.011
D	0.780	0.790	0.800
D1	0.005	-	-
E	0.300	0.310	0.325
E1	0.240	0.250	0.280
e	0.100 bsc.		
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 -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 -H- coincident with the bottom of lead, where lead exits body.
12. Refer to JEDEC MS-001, Variation AB.

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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°

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. 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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