



# TP5299

## Echo Processor IC

# *DataSheet*

*Version: 1.0*  
*July/2003*

<http://www.topro.com.tw>

**HQ:**

5F, No.10, Prosperity Road 1, Science-Based Industrial Park, Hsinchu 300, Taiwan, R.O.C  
300 新竹科學工業園區展業一路 10 號 5 樓

**TPE:**

5 F, No.27, Min Chuan W. Rd. Taipei 104, Taiwan, R.O.C  
104 台北市民權西路 27 號 5 樓

**SHENZHEN:**

Room 802, Tower A, World Trade Plaza, Fahong Rd., Fatian, Shenzhen, China  
深圳市福田區福虹路 9 號世貿廣場 A 座 802 室(郵編: 518033)

H.Q.: Tel:886-3-5632515 Fax:886-3-5641728

TPE.: Tel:886-2-25856858 Fax:886-2-25941104

SHENZHEN:TEL:755-3679985 Fax:755-3679518



# TP5299

## Echo Processor IC

### General Specification

TP5299 is an echo audio processor IC utilizing CMOS Technology which is equipped with ADC and DAC , high sampling frequency and an internal memory of 48K Digital processing is use to generate the delay time , it also features an internal VCO ( Voltage Control OSC ) circuit in the system clock , thereby , making the frequency easily adjustable. TP5299 boast of very low distortion ( THD < 0.5% ) and very low noise ( No < -90dBV ), thus producing high quality audio output .The pin assignments and application circuit are optimized for easy PCB layout and cost saving advantage.

### FEATURES

- Low Noise , No < -90dBV Typical
- Low Distortion , THD < 0.5 % Typical
- Least External Components
- Auto Reset Function
- External Adjustable VCO
- Low Idd

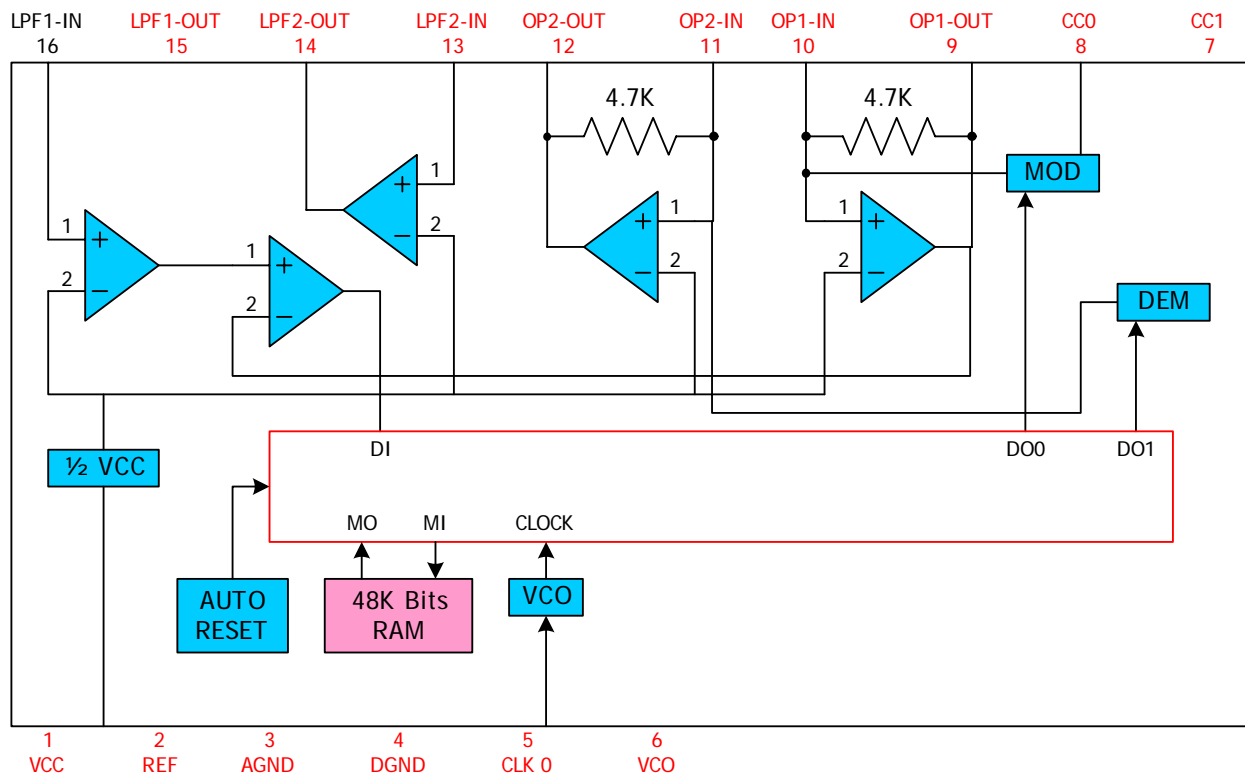
### APPLICATION

- Video Tape Recorder
- Video Compact Disk
- Television
- CD Player
- Car Stereo
- KARAOKE Mixer
- Electronic Musical Instrument
- Audio Equipment with Echo Processor

# TP5299

## Echo Processor IC

### Block Diagram



### PIN CONFIGURATION

VDD	1	16	LPF1-IN
REF	2	15	LPF1-OUT
AGND	3	14	LPF2-OUT
DGND	4	13	LPF2-IN
CLK-O	5	12	OP2-OUT
VCO	6	11	OP2-IN
CC1	7	10	OP1-IN
CC0	8	9	OP1-OUT



# TP5299

## Echo Processor IC

### Pin Description

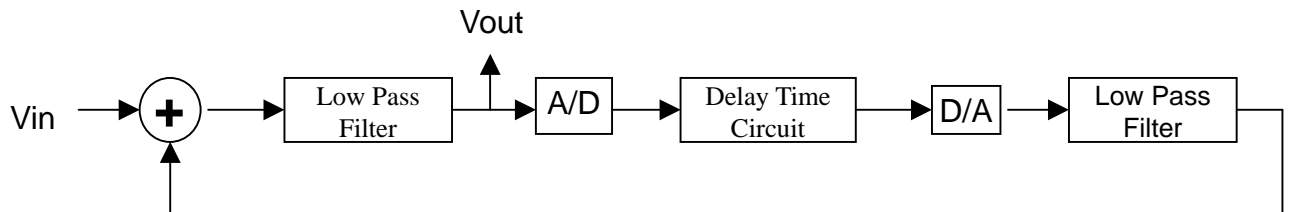
Symbol	I/O	Name	No.
Vcc	-	Analog Supply voltage	1
REF	-	Reference ( 1/2Vcc )	2
AGND	-	Analog GND	3
DGND	-	Digital GND	4
CLK_O	O	clock	5
VCO	I	Shift clock	6
CC1	-	Current control 2	7
CC0	-	Current control 1	8
OP1-OUT	O	OP-AMP1 output	9
OP1-IN	I	OP-AMP1 input	10
OP2-IN	I	OP-AMP2 input	11
OP2-OUT	O	OP-AMP2 output	12
LPF2-IN	I	OP-AMP2 input	13
LPF2-OUT	O	OP-AMP2 output	14
LPF1-OUT	O	Low pass filter1 output	15
LPF1-IN	I	Low pass filter1 input	16

# TP5299

## Echo Processor IC

### Function Description

#### Echo Mode



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Ratings	Units
Vcc	Supply voltage	6.5	V
Icc	Supply current	100	mA
Pd	Power dissipation	1.7	W
Topr	Operating temperature	-20 75	
Tstg	Storage temperature	-25 125	



# TP5299

## Echo Processor IC

### RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Limits			Units
		Min	Typ	Max	
Vcc	Supply voltage	4.5	5	5.5	V
fck	Clock frequency		4	5	MHz

### ELECTRICAL CHARACTERISTICS

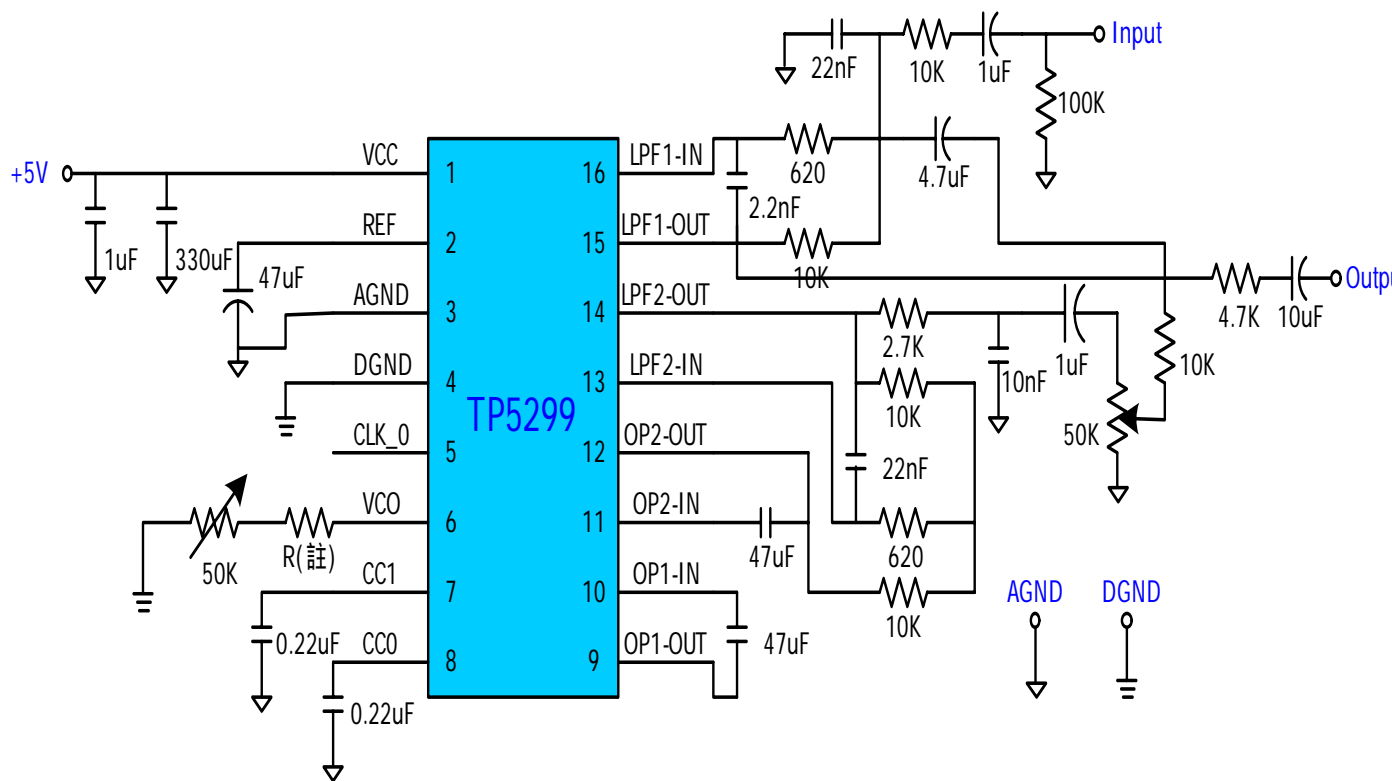
Vcc=5.0V , fin=1KHz , Vi=100mVrms , fck=4MHz , Ta=25

Symbol	Parameter	Test conditions	Min	Typ	Max	Units
Vcc	Supply voltage		4.5	5.0	5.5	V
Icc	Circuit current	No signal		30	40	mA
Gv	Voltage gain	RL=47Kohms		-0.5	2.5	dB
Vomax	Maximum output voltage	THD=10%	1.5	2	2.8	Vrms
THD	Output distortion	Filter=Audio		0.3	1.0	%
No	Output noise voltage	Filter=A-Weighting		-90	-80	dBV
PSRR	power supply rejection ratio	Vcc=-20dBV(0.1Vrms) f=100Hz		-40	-30	dB

# TP5299

## Echo Processor IC

### TP5299 ECHO APPLICATION CIRCUIT

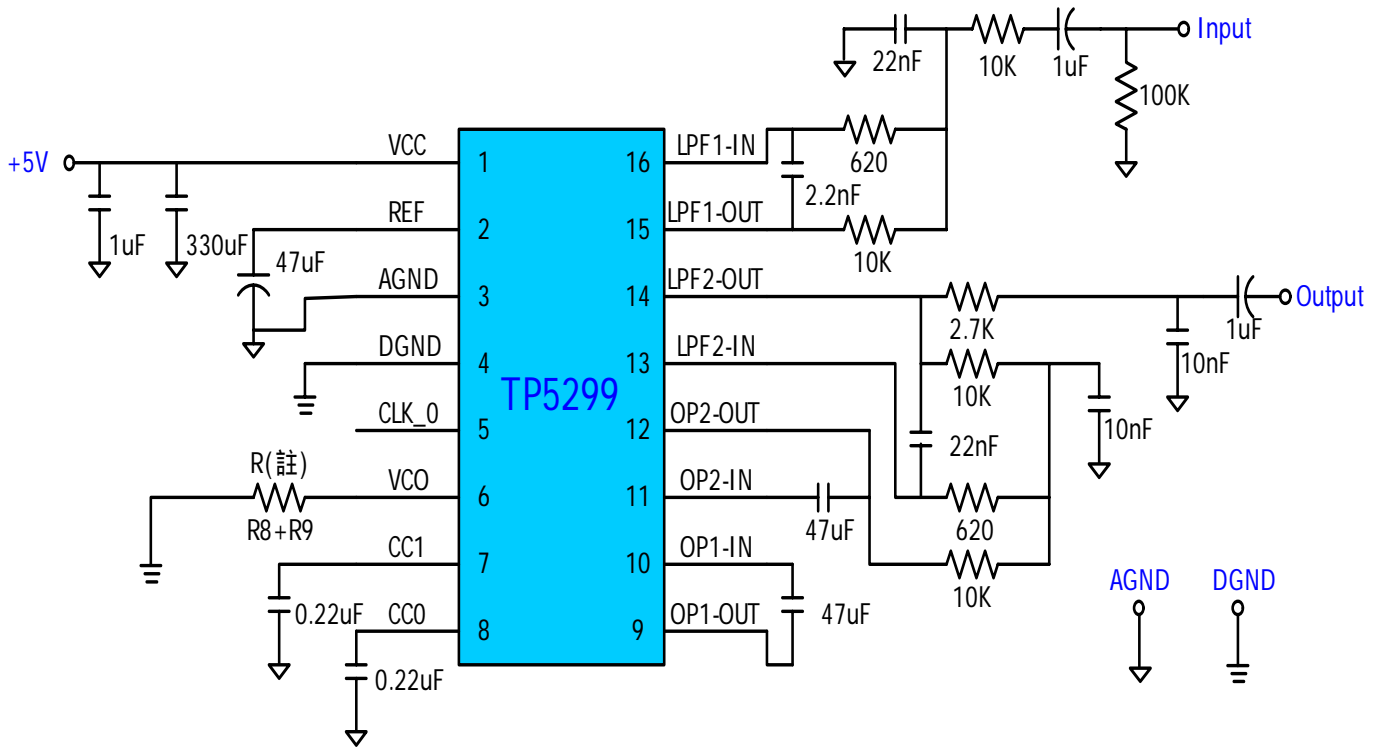


NOTE: The range of external resistor value is in between 10k and 50k ohms,  
 While 10k ohms is recommended.  
 When the value of the resistor(R) increaseS,the range of the Delay Time is  
 increased as well.

# TP5299

## Echo Processor IC

### TP5299 SURROUND/DELAY APPLICATION CIRCUIT



NOTE: Please refer to Table 1 for the Resistor/Delay Time values



# TP5299

## Echo Processor IC

R	86.3K	69K	56.3K	48.8K	41.9K	37.2K	32.5K	29.4K
fck	2.0M	2.5M	3.0M	3.5M	4.0M	4.5M	5.0M	5.5M
td	393ms	314ms	262ms	225ms	196ms	175ms	158ms	143ms
THD	1.0%	0.8%	0.63%	0.53%	0.46%	0.41%	0.36%	0.33%

R	26.8K	23.7K	22.1K	20.7K	19K	17.7K	16.3K	13.7K
fck	6.0M	6.5M	7.0M	7.5M	8.0M	8.5M	9.0M	10M
td	131ms	121ms	112ms	105ms	98ms	93ms	87.4ms	79ms
THD	0.29%	0.27%	0.25%	0.25%	0.23%	0.22%	0.21%	0.19%

R	12.5K	10.3K	9.1K	7.9K	6.7K	4K	0.6K
fck	11M	12M	13M	14M	15M	16M	17M
td	71ms	66ms	60ms	56ms	52ms	49ms	46ms
THD	0.18%	0.16%	0.15%	0.15%	0.15%	0.15%	0.14%

**Note : R = External Resistor ( Ohms )**

**fck = Clock Frequency(Hz)**

**td = Delay Time**

**THD = Total Harmonic**

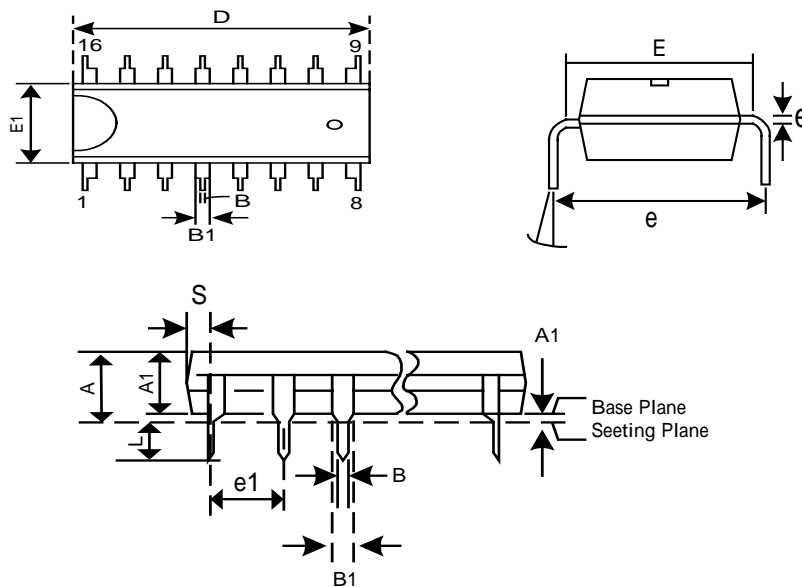
**TABLE 1: RESISTOR/DELAY TIME VALUES**

# TP5299

## Echo Processor IC

### ORDER INFORMATION

#### DIP Package

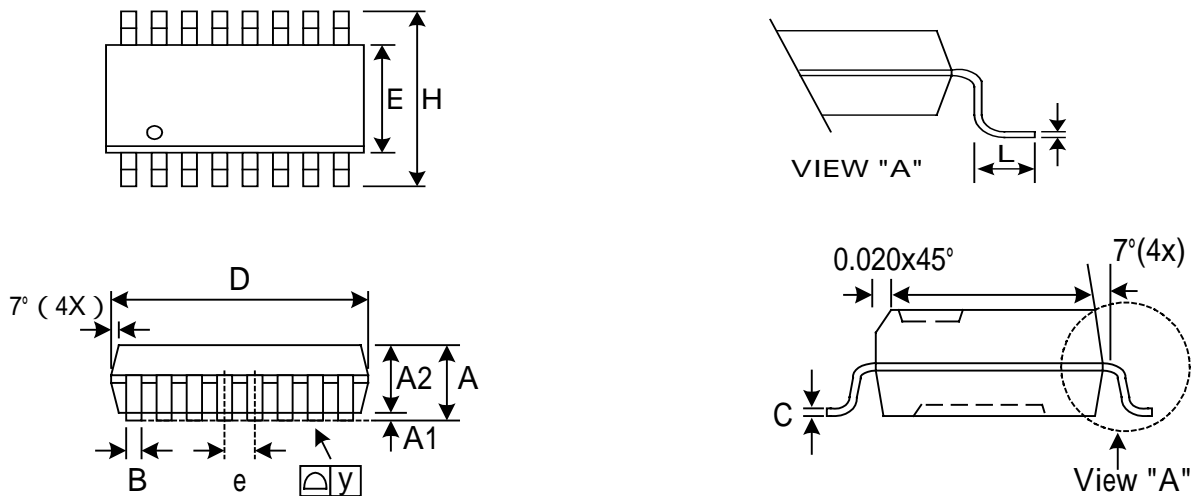


Symbol	Inch	mm
A	0.175 ( MAX )	4.45 ( MAX )
A <sub>1</sub>	0.010 ( MIN )	0.25 ( MIN )
A <sub>2</sub>	0.130+0.005	3.30+0.13
B	0.018+0.004 0.018-0.002	0.46+0.10 0.46-0.05
B <sub>1</sub>	0.006+0.004 0.060-0.002	1.52+0.10 1.52-0.05
C	0.010+0.004 0.010-0.002	0.25+0.10 0.25-0.05
D	0.750	19.05
E	0.300+0.010	7.62+0.25
E <sub>1</sub>	0.250+0.005	6.35+0.13
E <sub>1</sub>	0.100+0.010	2.54+0.25
L	0.130+0.010	3.30+0.25
	0° 15'	0° 15'
e <sub>Δ</sub>	0.355+0.020	9.02+0.51
S	0.040 ( MAX )	1.02 ( MAX )

# TP5299

## Echo Processor IC

### SO Package



Symbol	mm			Inch		
	Min	Ratings	Max	Min	Ratings	Max
A	2.36	2.49	2.64	0.093	0.098	0.104
A1	0.10	-	0.30	0.004	-	0.012
A2	-	2.31	-	-	0.091	-
B	0.33	0.41	0.51	0.13	0.016	0.020
C	0.18	0.23	0.28	0.007	0.009	0.011
D	12.60	10.31	10.49	0.397	0.406	0.413
E	7.39	7.49	7.59	0.291	0.295	0.299
E	-	1.27	-	-	0.050	-
H	10.01	10.31	10.64	0.394	0.406	0.419
L	0.38	0.81	1.27	0.015	0.032	0.050
Y	-	-	0.10	-	-	0.004
	0°	-	8°	0°	-	8°