



TP5299

Echo Processor IC

DataSheet

Version: 1.0
July/2003

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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

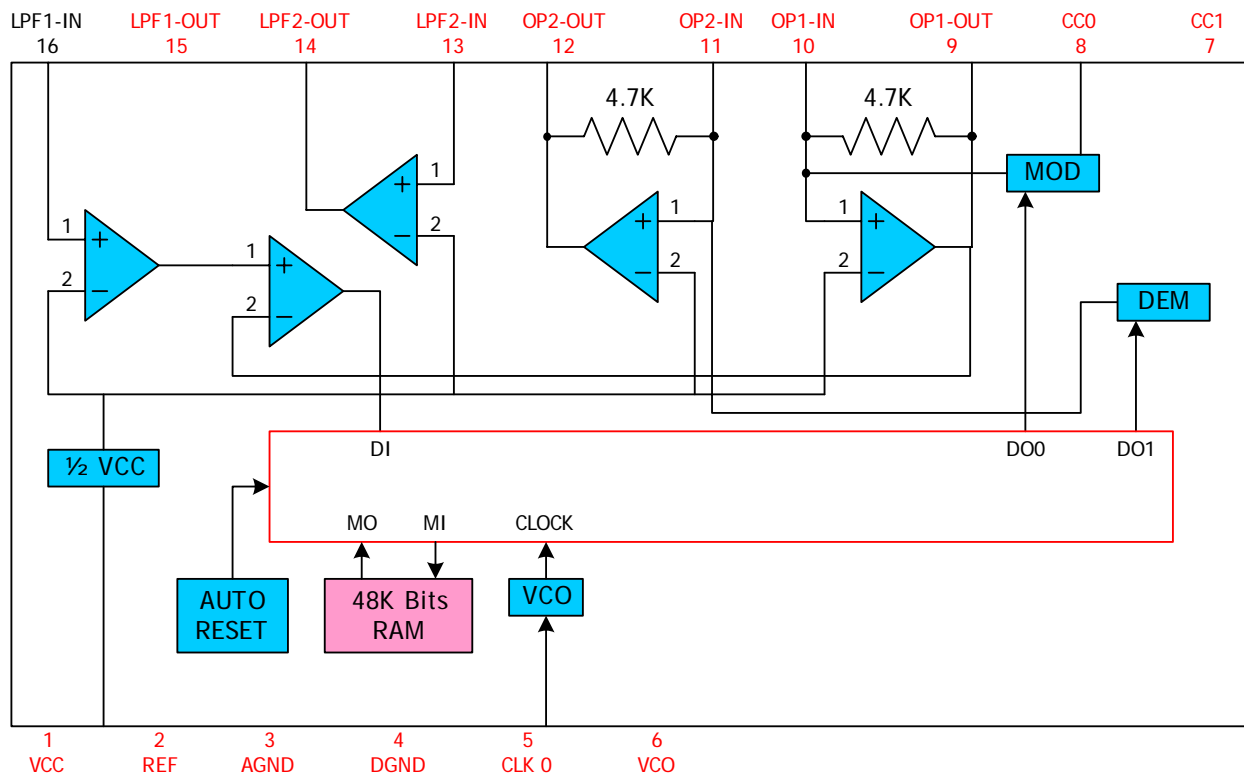
APPLICATION

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

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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 |



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Pin Description

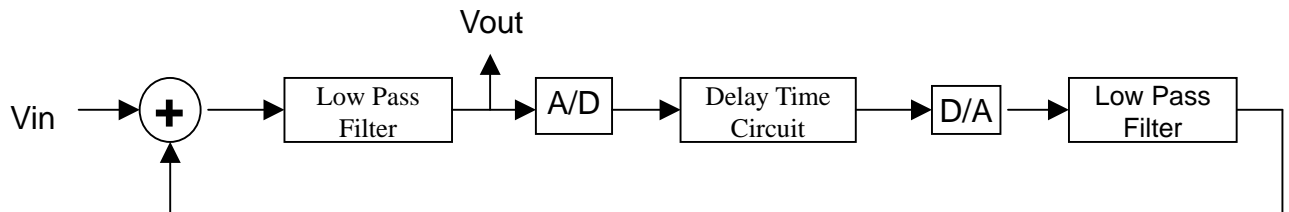
| Symbol | I/O | Name | No. |
|----------|-----|-------------------------|-----|
| Vcc | - | Analog Supply voltage | 1 |
| REF | - | Reference (1/2Vcc) | 2 |
| AGND | - | Analog GND | 3 |
| DGND | - | Digital GND | 4 |
| CLK_O | O | clock | 5 |
| VCO | I | Shift clock | 6 |
| CC1 | - | Current control 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 |

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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 | |



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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

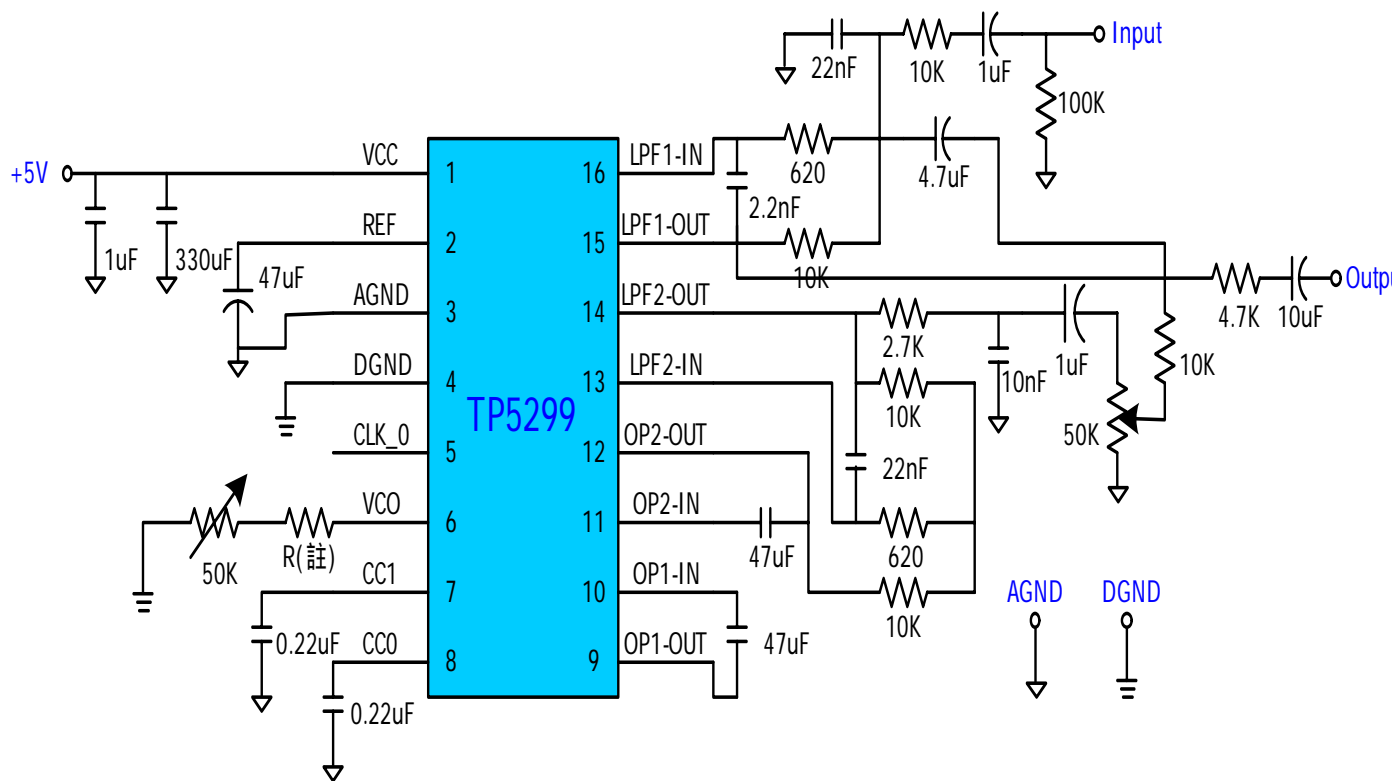
Vcc=5.0V , fin=1KHz , Vi=100mVrms , fck=4MHz , Ta=25

| 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 |

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TP5299 ECHO APPLICATION CIRCUIT

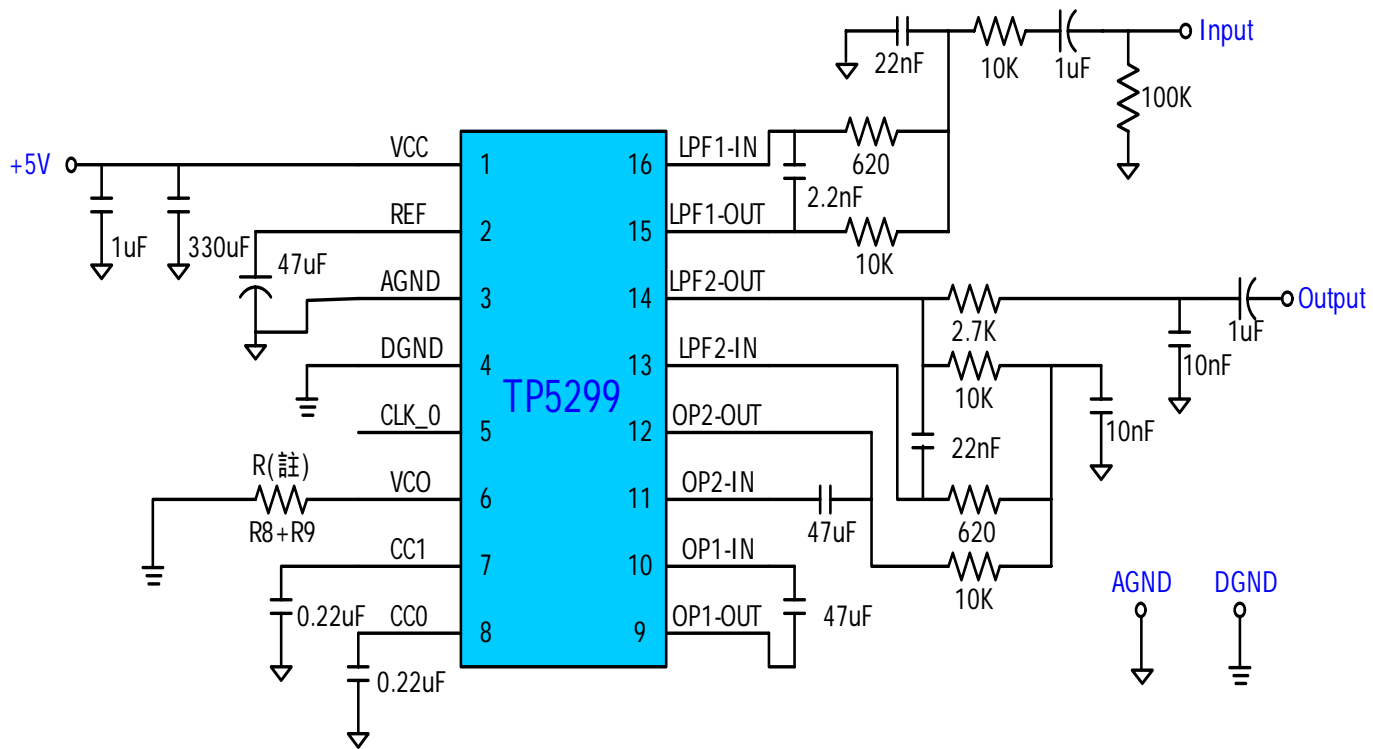


NOTE: The range of external resistor value is in between 10k and 50k ohms,
 While 10k ohms is recommended.
 When the value of the resistor(R) increaseS,the range of the Delay Time is
 increased as well.

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TP5299 SURROUND/DELAY APPLICATION CIRCUIT



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



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| | | | | | | | | |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|
| 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

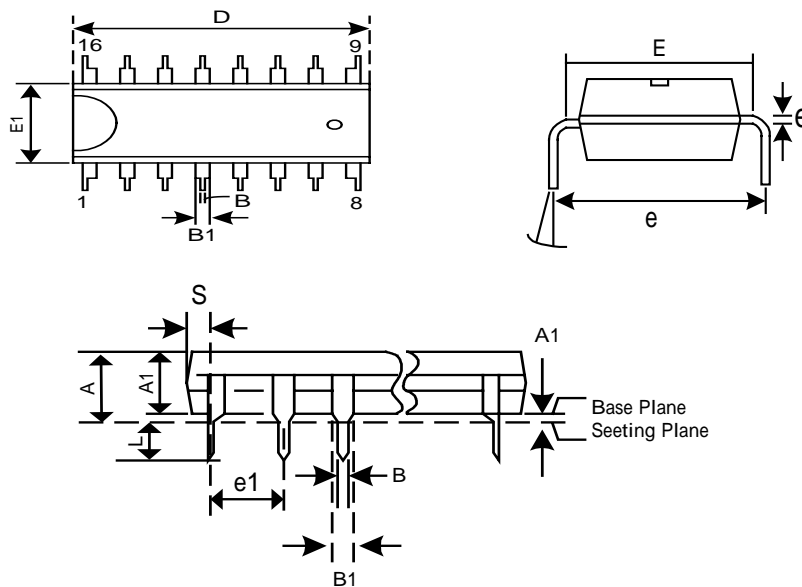
TABLE 1: RESISTOR/DELAY TIME VALUES

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ORDER INFORMATION

DIP Package

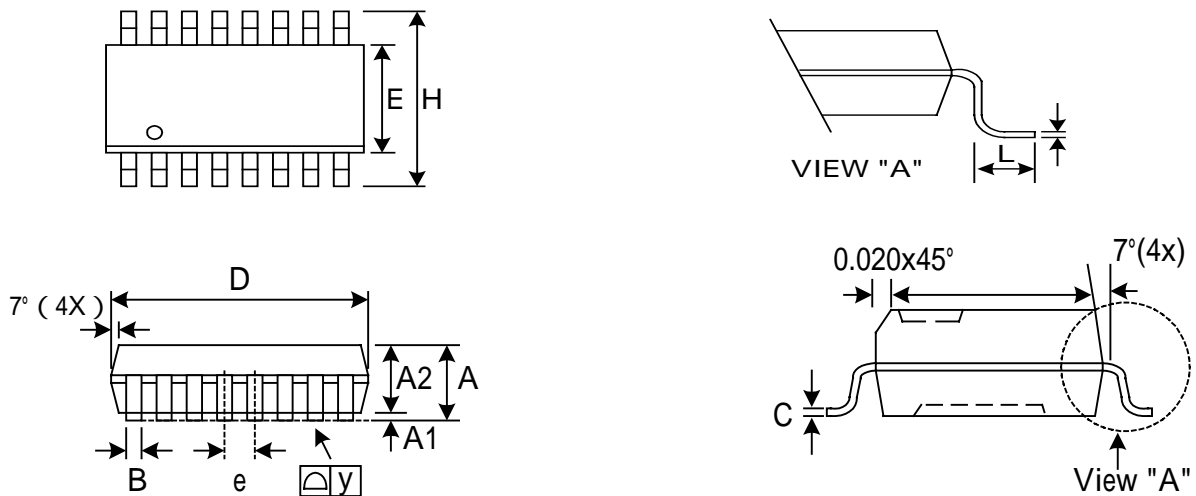


| Symbol | Inch | mm |
|----------------|----------------------------|------------------------|
| A | 0.175 (MAX) | 4.45 (MAX) |
| A ₁ | 0.010 (MIN) | 0.25 (MIN) |
| A ₂ | 0.130+0.005 | 3.30+0.13 |
| B | 0.018+0.004 0.018-0.002 | 0.46+0.10 0.46-0.05 |
| B ₁ | 0.006+0.004 0.060-0.002 | 1.52+0.10 1.52-0.05 |
| 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 ₁ | 0.250+0.005 | 6.35+0.13 |
| E ₁ | 0.100+0.010 | 2.54+0.25 |
| L | 0.130+0.010 | 3.30+0.25 |
| | 0° 15' | 0° 15' |
| e _Δ | 0.355+0.020 | 9.02+0.51 |
| S | 0.040 (MAX) | 1.02 (MAX) |

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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° |