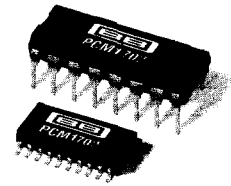
BURR - BROWN®



PCM1702P
PCM1702U

www.burr-brown.com/databook/PCM1702.html

BiCMOS Advanced Sign Magnitude 20-Bit DIGITAL-TO-ANALOG CONVERTER

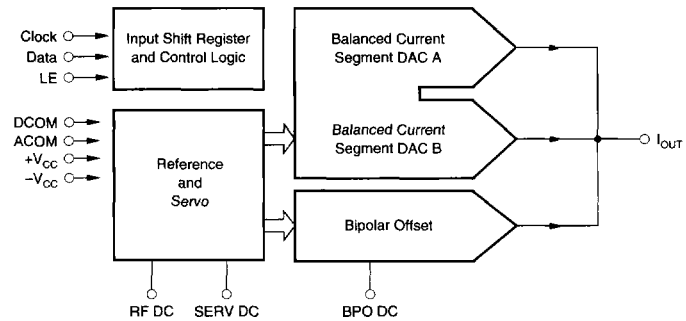
FEATURES

- ULTRA LOW –96dB max THD+N (No External Adjustment Required)
- NEAR-IDEAL LOW LEVEL OPERATION
- GLITCH-FREE OUTPUT
- 120dB SNR TYP (A-Weight Method)
- INDUSTRY STD SERIAL INPUT FORMAT
- FAST (200ns) CURRENT OUTPUT (±1.2mA)
- CAPABLE OF 16X OVERSAMPLING
- COMPLETE WITH REFERENCE
- LOW POWER (150mW typ)

DESCRIPTION

The PCM1702 is a precision 20-bit digital-to-analog converter with ultra-low distortion (–96dB typ with a full scale output). Incorporated into the PCM1702 is an advanced sign magnitude architecture that eliminates unwanted glitches and other nonlinearities around bipolar zero. The PCM1702 also features a very low noise (120dB typ SNR: A-weighted method) and fast settling current output (200ns typ, 1.2mA step) which is capable of 16X oversampling rates.

Applications include very low distortion frequency synthesis and high-end consumer and professional digital audio applications.



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Internet: http://www.burr-brown.com/ • FAXLine: (800) 548-6133 (US/Canada Only) • Cable: BBRCORP • Telex: 066-6491 • FAX: (520) 889-1510 • Immediate Product Info: (800) 548-6132

SPECIFICATIONS

All specifications at 25°C, $\pm V_{CC}$ and $+V_{DD} = \pm 5V$, unless otherwise noted.

PARAMETER	CONDITIONS	PCM1702P/U, -J, -K MIN	TYP	MAX	UNITS
RESOLUTION		20			Bits
DYNAMIC RANGE, THD + N at –60dB Referred to Full Scale, with A-weight			110		dB
DIGITAL INPUT					
Logic Family			TTL/CMOS Compatible		
Logic Level: V_{IH}		+2.4		$+V_{DD}$	V
V_{IL}		0		0.8	V
I_{IH}	$V_{IH} = +V_{DD}$			±10	µA
I_{IL}	$V_{IL} = 0V$			±10	µA
Data Format			Serial, MSB First, BTC[1]		
Input Clock Frequency			12.5	20.0	MHz
TOTAL HARMONIC DISTORTION + N[2]					
P/U V_O = 0dB	f_S = 352.8kHz[3], f = 1002Hz[4]		–92	–88	dB
V_O = –20dB	f_S = 352.8kHz[3], f = 1002Hz[4]		–82	–74	dB
V_O = –60dB	f_S = 352.8kHz[3], f = 1002Hz[4]		–46	–40	dB
P/U, -J V_O = 0dB	f_S = 352.8kHz[3], f = 1002Hz[4]		–96	–92	dB
V_O = –20dB	f_S = 352.8kHz[3], f = 1002Hz[4]		–83	–76	dB
V_O = –60dB	f_S = 352.8kHz[3], f = 1002Hz[4]		–48	–42	dB
P/U, -K V_O = 0dB	f_S = 352.8kHz[3], f = 1002Hz[4]		–100	–96	dB
V_O = –20dB	f_S = 352.8kHz[3], f = 1002Hz[4]		–84	–80	dB
V_O = –60dB	f_S = 352.8kHz[3], f = 1002Hz[4]		–50	–44	dB
ACCURACY					
Level Linearity	At –90dB Signal Level		±0.5		dB
Gain Error			±0.5	±3	%
Bipolar Zero Error[5]			±0.25		%
Gain Drift	0°C to 70°C		±25		ppm of FSR/°C
Bipolar Zero Drift	0°C to 70°C		±5		ppm of FSR/°C
Warm-up Time			1		minute
IDLE CHANNEL SNR[6]	Bipolar Zero, A-weighted Filter	110	120		dB
ANALOG OUTPUT					
Output Range			±1.2		mA
Output Impedance			1.0		kΩ
Settling Time	(±0.003% of FSR, 1.2mA Step)		200		ns
Glitch Energy			No Glitch Around Zero		
POWER SUPPLY REQUIREMENTS					
Supply Voltage Range: $+V_{CC} = +V_{DD}$		+4.75	+5.00	+5.25	V
$-V_{CC} = -V_{DD}$		–4.75	–5.00	–5.25	V
Combined Supply Current: $+I_{CC}$	$+V_{CC} = +V_{DD} = +5V$		+5.00	+9.0	mA
Combined Supply Current: $-I_{CC}$	$-V_{CC} = -V_{DD} = -5V$		–25.00	–41.0	mA
Power Dissipation	$\pm V_{CC} = \pm V_{DD} = \pm 5V$		150	250	mW
TEMPERATURE RANGE					
Operating		–25		+85	°C
Storage		–55		+125	°C

NOTES: (1) Binary Two's Complement coding. (2) Ratio of ($Distortion_{RMS}$ + $Noise_{RMS}$)/$Signal_{RMS}$. (3) D/A converter sample frequency (8 x 44.1kHz; 8x oversampling). (4) D/A converter output frequency (signal level). (5) Offset error at bipolar zero. (6) Measured using an OPA627 and 5kΩ feedback and an A-weighted filter.

ABSOLUTE MAXIMUM RATINGS (DIP Package)

Power Supply Voltage	±6.5VDC
Input Logic Voltage	DGND—0.3V–+V_{DD}+0.3V
Operating Temperature	–25°C to +85°C
Storage Temperature	–55°C to +125°C
Power Dissipation	500mW
Lead Temperature (soldering, 10s)	260°C

ABSOLUTE MAXIMUM RATINGS (SOP Package)

Power Supply Voltage	±6.5VDC
Input Logic Voltage	DGND—0.3V–+V_{DD}+0.3V
Operating Temperature	–25°C to +85°C
Storage Temperature	–55°C to +125°C
Power Dissipation	300mW
Lead Temperature (soldering, 5s)	260°C

PIN ASSIGNMENTS (DIP Package)

PIN	MNEMONIC	PIN	MNEMONIC
1	DATA	9	+V_{CC}
2	CLOCK	10	BPO DC
3	+V_{DD}	11	I_{OUT}
4	DCOM	12	ACOM
5	–V_{DD}	13	ACOM
6	LE	14	SERV DC
7	NC	15	REF DC
8	NC	16	–V_{CC}

PIN ASSIGNMENTS (SOP Package)

PIN	MNEMONIC	PIN	MNEMONIC
1	DATA	11	+V_{CC}
2	CLOCK	12	BPO DC
3	NC	13	NC
4	+V_{DD}	14	I_{OUT}
5	DCOM	15	ACOM
6	–V_{DD}	16	ACOM
7	LE	17	SERV DC
8	NC	18	NC
9	NC	19	RFE DC
10	NC	20	–V_{CC}

PACKAGE INFORMATION

PRODUCT	PACKAGE	PACKAGE DRAWING NUMBER[1]
PCM1702P	16-Pin Plastic DIP	180
PCM1702U	20-Pin Plastic SOP	248

NOTE: (1) For detailed drawing and dimension table, please see end of data sheet, or Appendix C of Burr-Brown IC Data Book.

GRADE MARKING (SOP Package)

PRODUCT	PACKAGE
PCM1702U	Marked PCM1702.
PCM1702U-J	Marked with white dot by pin 10.
PCM1702U-K	Marked with red dot by pin 10.

ELECTROSTATIC DISCHARGE SENSITIVITY

This integrated circuit can be damaged by ESD. Burr-Brown recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

CONNECTION DIAGRAM