

**NTE2057
 Integrated Circuit
 Dual 16–Bit Digital–to–Analog Converter
 for CD and DAT Players**

Description:

The NTE2057 is a monolithic integrated dual 16–bit digital –to–analog converter (DAC) in a 28–Lead DIP type package designed for use in Hi–Fi digital audio equipment such as compact disc players, digital tape, or cassette recorders.

Features:

- Selectable Input Format: Offset Binary or Two’s Complement
- Internal Timing and Control Circuit
- TTL–Compatible Digital Inputs
- High Maximum Input Bit Rate and Fast Settling Time
- 6Mbits/s Data Rate
- Low Linearity Error (1/2 LSB typ)
- Fast Settling (1μs typ)

Applications:

- Compact Disc Players
- Digital Audio Tape, and Cassette Recorders and Players
- Waveform Generation

Absolute Maximum Ratings:

Supply Voltage Range, V_{DD}	
Pin28 (V_{DD})	+7V
Pin26 (V_{DD1})	–7V
Pin15 (V_{DD2})	–17V
Junction Temperature Range, T_J	–55° to +150°C
Operating Ambient Temperature Range, T_A	–20° to +70°C
Storage Temperature Range, T_{stg}	–65° to +150°C
Electrostatic Handling (Note 1), V_{ES}	–1000 to +1000V

Note 1. Discharging a 250pF capacitor through a 1kΩ series resistor.

DC and AC Electrical Characteristics: ($V_{DD} = +5V$, $V_{DD1} = -5V$, $V_{DD2} = -15V$, $T_A = +25^\circ C$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply						
Supply Voltage Range Pin28	V_{DD}		4.0	5.0	6.0	V
Pin26	$-V_{DD1}$		4.5	5.0	6.0	V
Pin15	$-V_{DD2}$		14.0	15.0	16.0	V
Supply Currents Pin28	I_{DD}		–	45	60	mA
Pin26	$-I_{DD1}$		–	45	75	mA
Pin15	$-I_{DD2}$		–	25	60	mA
Resolution			–	16	–	bits
Inputs						
Input Current (Pin3, Pin4) Digital Inputs Low	I_{IL}	$< 0.8V$	–	–	TBD	mA
Digital Inputs High	I_{IH}	$> 2.0V$	–	–	TBD	μA
Input Frequency At Clock Input (Pin4)	f_{SCK}		–	–	6	MHz
At Clock Input (Pin2)	f_{BCK}		–	–	–	MHz
At Data Inputs (Pin3, Pin4)	f_{DAT}		–	–	–	MHz
At Word Select Input (Pin1)	f_{WS}		–	–	–	kHz
Input Capacitance of Digital Inputs	C_I		–	12	–	pF
Oscillator						
Oscillator Frequency ^w /Internal Capacitor	f_{OSC}		150	200	250	kHz
Analog Outputs (AOL, AOR)						
Output Voltage Compliance	V_{CC}		TBD	–	TBD	mV
Full-Scale Current	I_{FS}		3.4	4.0	4.6	mA
Zero-Scale Current	$\pm I_{ZS}$		–	TBD	–	nA
Full-Scale Temperature Coefficient	TC_{FS}	$T_A = -20^\circ$ to $+70^\circ C$	–	± 200	–	ppm/ $^\circ C$
Linearity Error Integral	E_1	$T_A = +25^\circ C$	–	0.5	–	LSB
		$T_A = -20^\circ$ to $+70^\circ C$	–	TBD	–	LSB
Linearity Error Differential	E_{D1}	$T_A = +25^\circ C$	–	0.5	1.0	LSB
		$T_A = -20^\circ$ to $+70^\circ C$	–	TBD	–	LSB
Signal-to-Noise Ratio + THD	S/N	Note 2	90	95	–	dB
Setting Time to ± 1 LSB	t_{CS}		–	1	–	μs
Channel Separation	\square		80	TBD	–	dB
Unbalance Between Outputs	ΔI_{FS}		–	0.1	0.2	dB
Time Delay Between Outputs	t_D		–	–	1	μs
Power Supply Ripple Rejection (Note 3)	RR	$V_{DD} = +5V$	–	TBD	–	dB
		$V_{DD1} = -5V$	–	TBD	–	dB
		$V_{DD2} = -15V$	–	TBD	–	dB

Note 2. Signal-to-noise ratio + THD with 1kHz full-scale sine wave generated at a sampling rate of 176.4kHz.

Note 3. $V_{RIPPLE} = 1\%$ of supply voltage and $f_{RIPPLE} = 100Hz$.

DC and AC Electrical Characteristics (Cont'd): ($V_{DD} = +5V$, $V_{DD1} = -5V$, $V_{DD2} = -15V$, $T_A = +25^\circ C$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Analog Outputs (AOL, AOR) (Cont'd)						
Signal-to-Noise Ratio at Bipolar Zero	S/N		-	-100	-	dB
Timing						
Rise Time	t_R		-	-	35	ns
Fall Time	t_F		-	-	35	ns
Bit Clock Cycle Time	t_{CY}		160	-	-	ns
Bit Clock High Time	t_{HB}		48	-	-	ns
Bit Clock Low Time	t_{LB}		48	-	-	ns
Bit Clock Fall Time to Latch Rise Time	t_{FBRL}		0	-	-	ns
Bit Clock Rise Time to Latch Fall Time	t_{RBFL}		0	-	-	ns
Data Setup Time to Bit Clock	t_{SDB}		32	-	-	ns
Data Hold Time to Bit Clock	t_{HDB}		0	-	-	ns
Data Setup Time to System Clock	t_{SDS}		32	-	-	ns
Word Select Hold Time to System Clock	t_{HWS}		0	-	-	ns
Word Select Setup Time to System Clock	t_{SWS}		32	-	-	ns
Bit Clock Fall Time to System Clock Rise Time	t_{FBRS}		32	-	-	ns
System Clock Rise Time to Bit Clock Fall Time	t_{RSFB}		32	-	-	ns
System Clock Fall Time to Bit Clock Rise Time	t_{FSRB}		50	-	-	ns
Bit Clock Rise Time to System Clock Fall Time	t_{RBFS}		0	-	-	ns
Latch Enable Low Time	t_{LLE}		20	-	-	ns
Latch Enable High Time	t_{HLE}		32	-	-	ns

Pin Connection Diagram



