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NTE4529B
Integrated Circuit
CMOS, Dual 4–Channel Analog Data Selector

Description:

The NTE4529B analog data selector is a dual 4–channel or single 8–channel device depending on the input coding. This 16–Lead DIP device is suitable for digital as well as analog applications, including various one–of–four and one–of–eight data selector functions. Since the device has bidirectional analog characteristics it can also be used as a dual binary to 1–of–4 or a binary 1–of–8 decoder.

Features:

- Data Paths are Bidirectional
- Quiescent Current = 1nA/Package (Typ) at 5Vdc
- 10Mhz Operation (Typ)
- 3–State Operation
- Linear “On” Resistance
- “On” Resistance 120Ω (Typ) at 15V
- Low Noise – $12nV/\sqrt{Cycle}$, f ≥ 1kHz (Typ)
- Supply Voltage Range: 3Vdc to 18Vdc
- Capable of Driving Two Low–Power TTL Loads, One Low–Power Schottky TTL Load or Two Loads Over the Rated Temperature Range

Absolute Maximum Ratings: (Voltages referenced to V_{SS})

DC Supply Voltage, V_{DD} . . . . . –0.5 to +18.0V
Input Voltage (All Inputs), V_{in} . . . . . –0.5 to V_{DD} to +0.5V
DC Current Drain (Per Pin), I 10mA
Operating Temperature Range, T_A . . . . . –55° to +125°C
Storage Temperature Range, T_{stg} . . . . . –65° to +150°C

Note 1. This device contains circuitry to protect the control inputs against damage du to high static voltages or electric fields; however, it is advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this high–impedance circuit. A destructive high–current mode may occur if V_{in} or V_{out} is not constrained to the range $V_S \le V_{in}$ or $V_{out} \le V_{DD}$.

Electrical Characteristics: (Note 2)

Parameter	Symbol	V_{SS} Vdc	V_{DD} Vdc	−55°C		+25°C			+125°C		Unit
				Min	Max	Min	Typ	Max	Min	Max	
Output Voltage “0” Level	V_{OL}	0.0	5.0	–	0.05	–	0	0.05	–	0.05	Vdc
V_{in} = V_{DD} or 0			10	–	0.05	–	0	0.05	–	0.05	Vdc
			15	–	0.05	–	0	0.05	–	0.05	Vdc
“1” Level	V_{OH}	0.0	5.0	4.95	–	4.95	5.0	–	4.95	–	Vdc
V_{in} = 0 or V_{DD}			10	9.95	–	9.95	10	–	9.95	–	Vdc
			15	14.95	–	14.95	15	–	14.95	–	Vdc
Input Voltage (Note 4) “0” Level	V_{IL}										
(V_O = 4.5 or 0.5Vdc)		0.0	5.0	–	1.5	–	2.25	1.5	–	1.5	Vdc
(V_O = 9.0 or 1.0Vdc)			10	–	3.0	–	4.50	3.0	–	3.0	Vdc
(V_O = 13.5 or 1.5Vdc)			15	–	4.0	–	6.75	4.0	–	4.0	Vdc
“1” Level	V_{IH}										
(V_O = 0.5 or 4.5Vdc)		0.0	5.0	3.5	–	3.5	2.75	–	3.5	–	Vdc
(V_O = 1.0 or 9.0Vdc)			10	7.0	–	7.0	5.50	–	7.0	–	Vdc
(V_O = 1.5 or 13.5Vdc)			15	11.0	–	11.0	8.25	–	11.0	–	Vdc
Input Current	I_{in}	0.0	15	–	±0.1	–	±0.00001	±0.1	–	±0.1	μAdc
Input Capacitance (V_{IN} = 0)	C_{in}										
Control		0.0	–	–	–	–	5.0	7.5	–	–	pF
Switch Input			–	–	–	–	8.0	–	–	–	pF
Switch Output			–	–	–	–	20	–	–	–	pF
Feed Through			–	–	–	–	0.3	–	–	–	pF
Quiescent Current	I_{DD}	–	5.0	–	1.0	–	0.001	1.0	–	60	μAdc
(Per Package)			10	–	1.0	–	0.002	1.0	–	60	μAdc
			15	–	2.0	–	0.003	2.0	–	120	μAdc
“ON” Reststance	R_{ON}										
(V_C = V_{DD}, R_L = 10Ωk)											
(V_{in} = +5.0Vdc)		−5.0	5.0	–	400	–	200	480	–	640	Ω
(V_{in} = −5.0Vdc)				–	400	–	200	480	–	640	Ω
(V_{in} = ±0.25Vdc)				–	400	–	190	480	–	640	Ω
(V_{in} = +7.5Vdc)		−7.5	7.5	–	240	–	160	270	–	400	Ω
(V_{in} = −7.5Vdc)				–	240	–	160	270	–	400	Ω
(V_{in} = ±0.25Vdc)				–	240	–	120	270	–	400	Ω
(V_{in} = +10Vdc)		0	10	–	400	–	180	480	–	640	Ω
(V_{in} = +0.25Vdc)				–	400	–	180	480	–	640	Ω
(V_{in} = +5.6Vdc)				–	400	–	220	480	–	640	Ω
(V_{in} = +15Vdc)		0	15	–	250	–	180	270	–	400	Ω
(V_{in} = +0.25Vdc)				–	250	–	180	270	–	400	Ω
(V_{in} = +9.3Vdc)				–	250	–	215	270	–	400	Ω
Δ“ON” Reststance	ΔR_{ON}										
Between any 2 circuits in a common package											
(V_{in} = ±5.0Vdc)		−5.0	5.0	–	–	–	15	–	–	–	Ω
(V_{in} = ±7.5Vdc)		−7.5	7.5	–	–	–	10	–	–	–	Ω

Note 2. Data labeled “Typ” is not to be used for design purposes but is intended as an indication of the device’s potential performance.

Note 3. The formulas given are for the typical characteristics only at +25°C.

Note 4. Noise immunity specified for worst−case input combination.
Noise margin for both “1” and “0” = 1.0Vdc min @ V_{DD} = 5Vdc
2.0Vdc min @ V_{DD} = 10Vdc
2.5Vdc min @ V_{DD} = 15Vdc

Switching Characteristics: (T_A = +25°C, Note 2)

Parameter	Symbol	V_{SS} Vdc	V_{DD} Vdc	Min	Typ	Max	Unit
Propagation Delay Time, V_{in} to V_{out} (C_L = 50pF, R_L = 1kΩ)	t_{PLH}, t_{PHL}	0.0	5.0	–	20	40	ns
			10	–	10	20	ns
			15	–	8.0	15	ns
Propagation Delay Time, Control to Output V_{in} = V_{DD} or V_{SS} (V_{in} ≤ 10Vdc, C_L = 50pF, R_L = 1kΩ)	t_{PHL}, t_{PLH}	0.0	5.0	–	200	400	ns
			10	–	80	160	ns
			15	–	50	120	ns
Crosstalk, Control to Output (C_L = 50pF, R_L = 1kΩ, R_{out} = 10kΩ)	–	0.0	5.0	–	5.0	–	mV
			10	–	5.0	–	mV
			15	–	5.0	–	mV
Maximum Control Input Pulse Frequency (C_L = 50pF, R_L = 1kΩ)	–	0.0	5.0	–	5.0	–	MHz
			10	–	10	–	MHz
			15	–	12	–	MHz
Noise Voltage (f = 100Hz)	–	0.0	5.0	–	24	–	nV/$\sqrt{\text{Cycle}}$
			10	–	25	–	nV/$\sqrt{\text{Cycle}}$
			15	–	30	–	nV/$\sqrt{\text{Cycle}}$
(f = 100kHz)			5.0	–	12	–	nV/$\sqrt{\text{Cycle}}$
			10	–	12	–	nV/$\sqrt{\text{Cycle}}$
			15	–	15	–	nV/$\sqrt{\text{Cycle}}$
Sine Wave (Distortion) (V_{in} = 1.77Vdc, RMS Centered at 0.0Vdc, R_L = 10kΩ, f = 1kHz)	–	–5.0	5.0	–	0.36	–	%
Input/Output Leakage Current	–						
(V_{in} = +5.0Vdc, V_{out} = –5.0Vdc)		–5.0	5.0	–	±0.001	±125	nA
(V_{in} = –5.0Vdc, V_{out} = +5.0Vdc)		–5.0	5.0	–	±0.001	±125	nA
(V_{in} = +7.5Vdc, V_{out} = –7.5Vdc)		–7.5	7.5	–	±0.0015	±250	nA
(V_{in} = –7.5Vdc, V_{out} = +7.5Vdc)		–7.5	7.5	–	±0.0015	±250	nA
Insertion Loss (V_{in} = 1.77Vdc RMS Centered at 0.0Vdc, f = 1Mhz, I_{loss} = 20 Log_{10} V_{out}/V_{in})	–						
(R_L = 1kΩ)		–5.0	5.0	–	2.0	–	dB
(R_L = 10kΩ)				–	0.8	–	dB
(R_L = 100kΩ)				–	0.25	–	dB
(R_L = 1MΩ)				–	0.01	–	dB

Note 2. Data labeled “Typ” is not to be used for design purposes but is intended as an indication of the device’s potential performance.

Note 3. The formulas given are for the typical characteristics only at +25°C.

Switching Characteristics (Cont'd): (T_A = +25°C, Note 2)

Parameter	Symbol	V_{SS} Vdc	V_{DD} Vdc	Min	Typ	Max	Unit
Bandwidth (–3dB) (V_{in} = 1.77Vdc RMS Centered at 0.0Vdc) (R_L = 1kΩ)	BW	–5.0	5.0	–	35	–	MHz
(R_L = 10kΩ)				–	28	–	MHz
(R_L = 100kΩ)				–	27	–	MHz
(R_L = 1MΩ)				–	26	–	MHz
Feedthrough and Crosstalk (20 Log_{10} V_{out}/V_{in}) = –50dB (R_L = 1kΩ)	–	–5.0	5.0	–	850	–	kHz
(R_L = 10kΩ)				–	100	–	kHz
(R_L = 100kΩ)				–	12	–	kHz
(R_L = 1MΩ)				–	1.5	–	kHz

Note 2. Data labeled "Typ" is not to be used for design purposes but is intended as an indication of the device's potential performance.

Note 3. The formulas given are for the typical characteristics only at +25°C.

Truth Table

ST_X	ST_Y	B	A	Z	W	Function
1	1	0	0	X0	Y0	Dual 4–Channel Mode 2 Outputs
1	1	0	1	X1	Y1	
1	1	1	0	X2	Y2	
1	1	1	1	X3	Y3	
1	0	0	0	X0		Single 8–Channel Mode 1 Output (Z and W tied together)
1	0	0	1	X1		
1	0	1	0	X2		
1	0	1	1	X3		
0	1	0	0	Y0		
0	1	0	1	Y1		
0	1	1	0	Y2		
0	1	1	1	Y3		
0	0	DC	DC	High Impedance		

DC = Don't Care

Pin Connection Diagram