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NTE7005
Integrated Circuit
2–Phase Stepping Motor Driver

Description:

The NTE7005 monolithic power IC is a dual bridge driver in a 16–Lead DIP type package. The maximum driving current and voltage is 330mA x 12V per bridge. Therefore, the best use for this part is in a two–phase bipolar stepping motor driving the head actuator of a 3, to 5.25–inch Floppy Disk Drive.

Features:

- 330mA Output Current Capability
- Dual Bridge Included
- Power Save
- Single Input Direction Control
- Low Output Saturation Voltage
- Low Supply Current
- Low Input Current
- Compatible with TTL, LSTTL, and 5V CMOS
- Thermal Shutdown

Absolute Maximum Ratings: (T_A = +25°C, Note 1 unless otherwise specified)

Logic Stage Supply Voltage, V_{CC} 7V
Seeking Supply Voltage, V_{s1} 15V
Holding Supply Voltage, V_{s2} 7V
Input Voltage, V_i . . . . . 0 to V_{CC}
Peak Seeking Current ($t \le 5ms$), I_o(peak) 500mA
DC Seeking Current, I_{os} 330mA
DC Holding current, I_{OH} 200mA
Power Dissipation (Note 2), P_T 2W
Junction Temperature, T_J . . . . . +150°C
Operating Junction Temperature Range, T_{opr} . . . . . –20° to +125°C
Storage Temperature Range, T_{stg} . . . . . –55° to +125°C

Note 1. The absolute maximum ratings are limiting values, to be applied individually, beyond which the device may be permanently damaged. Functional operation under any of these conditions is not guaranteed. Exposing a circuit to its absolute maximum rating for extended periods of time may affect the device's reliability.

Note 2. Thermal resistance is as follows:
$R_{thJA}1 \le$ +60°C/W (Soldered on a print circuit board)
$R_{thJA}2 \le$ +35°C/W (Soldered on a print circuit covered with copper sufficiently)
$R_{thJA}3 \le$ +15°C/W (Soldered on Pin4, Pin5, Pin12, and Pin13 with an infinite heat sink)

Recommended Operating Conditions:

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Logic Stage Supply Voltage	V_{CC}		4.5	5.0	5.5	V
Seeking Supply Voltage	V_{s1}		10.2	12.0	13.8	V
Holding Supply Voltage	V_{s2}		4.5	5.0	5.5	V

Electrical Characteristics: (T_A = +25°C, V_{CC} = 5V, V_{s2} = 5V, V_{s1} = 12V unless otherwise specified)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
Input Low Voltage	V_{IL}			–	–	0.8	V
Input High Voltage	V_{IH}			2.0	–	–	V
Input Low Current	I_{IL}	V_I = 0.8V		–	–	±10	µA
Input High Current	I_{IH}	V_I = 2V		–	1.0	±10	µA
		V_I = 5.5V		–	0.5	1.0	mA
Supply Current	I_{CC}	PS = 0.8V, I_o = 0	V_{CC}	–	25	33	mA
			V_{s1}, Note 3	–	10	20	mA
			V_{s2}, Note 4	–	–	1.0	mA
		PS = 2V, I_o = 0	V_{CC}	–	25	33	mA
			V_{s1}, Note 3	–	3	5	mA
			V_{s2}, Note 4	–	5	10	mA
Output Transistor Breakdown Voltage	$V_{(BR)CER}$	I_C = 10mA		18	–	–	V
V_{s1} Saturation Voltage	$V_{CE(sat)}1$	PS = 0.8V, I_o = 330mA, Note 5		–	1.5	2.0	V
V_{s2} Saturation Voltage	$V_{CE(sat)}2$	PS = 2V, I_o = 130mA, Note 5		–	1.5	2.0	V
Clamp Diode Forward Voltage	V_F	I_F = 330mA	Upper	–	5	–	V
			Lower	–	1.5	–	V
Delay Time	t_{PLH}	I_o = 330mA		–	1	5	µs
	t_{PHL}			–	1	5	µs

Note 3. Sum of V_{S1} (ϕ1) and V_{S1}(ϕ2) current
Note 4. Sum of V_{S2} (ϕ1) and V_{S2} (ϕ2) current
Note 5. Sum of upper and lower saturation voltages

Truth Table (For each bridge):

Power Save Direction		ΦOut	$\overline{\Phi}$Out
L	L	L	H+
L	H	H+	L
H	L	L	H–
H	H	H–	L

Note: L = Low voltage state
H+ = High voltage state (Seeking transistors ON)
H– = High voltage state (Holding transistors ON)

Pin Connection Diagram