www.agelectronica.com
www.agelectronica.com

NTE ELECTRONICS, INC.
44 FARRAND STREET
BLOOMFIELD, NJ 07003
(973) 748–5089

NTE2011/NTE2012/NTE2013/NTE2014/NTE2015
Integrated Circuit
7–Channel Darlington Array/Driver

Description:

The NTE2011 through NTE2015 are high–voltage, high–current Darlington arrays in a 16–Lead DIP type package and are comprised of seven silicon NPN Darlington pairs on a common monolithic substrate. All units have open–collector outputs and integral diodes for inductive load transient suppression.

Peak inrush currents to 600mA (NTE2011, NTE2013, NTE2014) or 750mA (NTE2012, NTE2015) are permissible, making them ideal for driving tungstun filament lamps.

The NTE2011 is a general purpose array that may be used with standard bi–polar digital logic using external current limiting, or with most PMOS or CMOS directly. This device is pinned with outputs opposite inputs to facilitate printed wiring board layouts.

The NTE2012 is designed for use with 14V to 25V PMOS devices. Each input has a Zener diode and resistor in series to limit the input current to a safe value in that application. The Zener diode also gives this device excellent noise immunity.

The NTE2013 has a 2.7kΩ series base resistor for each Darlington pair, allowing operation directly with TTL or CMOS operating at a supply voltage of 5V. This device will handle numerous interface needs – particularly those beyond the capabilities of standard logic buffers.

The NTE2014 has a 10.5kΩ series input resistor that permits operation directly from CMOS or PMOS outputs utilizing supply voltages of 6V to 15V. The required input current is below that of the NTE2013, while the required input voltage is less than that required by the NTE2012.

The NTE2015 is designed for use with standard TTL and Schottky TTL, with which higher output currents are required and loading of the logic output is not a concern. This device will sink a minimum of 350mA when driven from a “totem pole” logic output.

Absolute Maximum Ratings: (T_A = +25°C for any one Darlington pair unless otherwise specified)

Output Voltage, V_{CE} 50V
Input Voltage, V_{IN}
  NTE2012, NTE2013, NTE2014 . . . . . 30V
  NTE2015 . . . . . 15V
Continuous Collector Current. I_C
  NTE2011, NTE2013, NTE2014 . . . . . 500mA
  NTE2012, NTE2015 . . . . . 600mA
Continuous Input Current, I_{IN} 25mA
Power Dissipation, P_D
  One Darlington Pair 1W
  Total Device (Note 1) 2W
Operating Ambient Temperature Range, T_A . . . . . –20° to +85°C
Storage Temperature Range, T_{stg} . . . . . –55° to +150°C

Note 1. Derate at the rate of 16.6mW/°C above +25°C.

Note 2. Under normal operating conditions, these devices will sustain 350mA per output with $V_{CE(sat)}$ = 1.6V at +70°C with a pulse width of 20ms and a duty cycle of 34%.

www.agelectronica.com
www.agelectronica.com

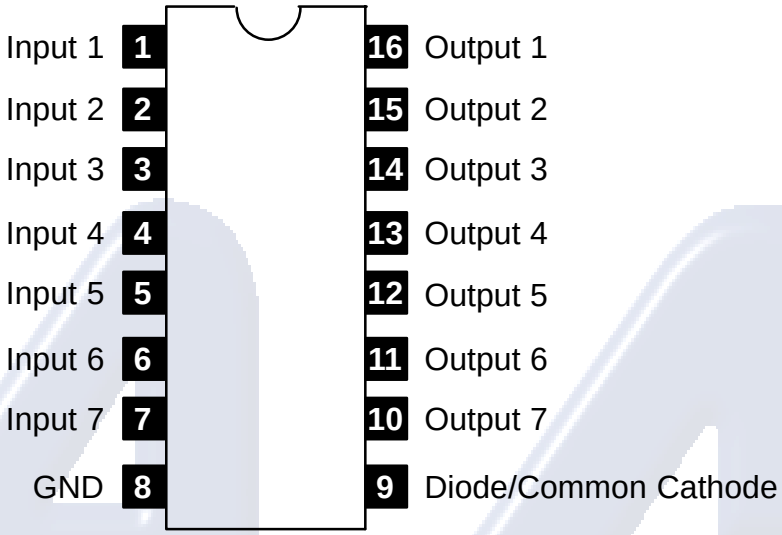
Electrical Characteristics: (T_A = +25° unless otherwise specified)

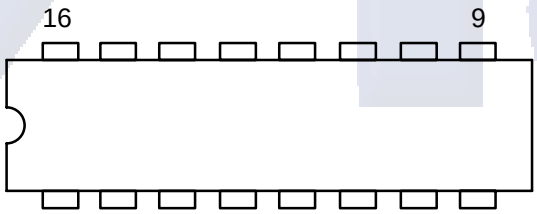
Parameter	Symbol	Device	Test Conditions	Min	Typ	Max	Unit
Output Leakage Current	I_{CEX}	All	V_{CE} = 50V, T_A = +25°C	–	–	50	µA
			V_{CE} = 50V, T_A = +70°C	–	–	100	µA
		NTE2012	V_{CE} = 50V, T_A = +70°C, V_{IN} = 6V	–	–	500	µA
		NTE2014	V_{CE} = 50V, T_A = +70°C, V_{IN} = 1V	–	–	500	µA
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	NTE2011 NTE2013 NTE2014	I_C = 100mA, I_B = 250µA	–	0.9	1.1	V
			I_C = 200mA, I_B = 350µA	–	1.1	1.3	V
			I_C = 350mA, I_B = 500µA	–	1.3	1.6	V
		NTE2012 NTE2015	I_C = 200mA, I_B = 350µA	–	1.1	1.3	V
			I_C = 350mA, I_B = 500µA	–	1.3	1.6	V
			I_C = 500mA, I_B = 600µA	–	1.7	1.9	V
Input Current	$I_{IN(ON)}$	NTE2012	V_{IN} = 17V	–	0.82	1.25	mA
		NTE2013	V_{IN} = 3.85V	–	0.93	1.35	mA
		NTE2014	V_{IN} = 5V	–	0.35	0.50	mA
			V_{IN} = 12V	–	1.0	1.45	mA
		NTE2015	V_{IN} = 3V	–	1.5	2.4	mA
	$I_{IN(OFF)}$	All	I_C = 500µA, T_A = +70°C	50	60	–	µA
Input Voltage	$V_{IN(ON)}$	NTE2012	V_{CE} = 2V, I_C = 500mA	–	–	17	V
		NTE2013	V_{CE} = 2V, I_C = 200mA	–	–	2.4	V
			V_{CE} = 2V, I_C = 250mA	–	–	2.7	V
			V_{CE} = 2V, I_C = 300mA	–	–	3.0	V
		NTE2014	V_{CE} = 2V, I_C = 125mA	–	–	5.0	V
			V_{CE} = 2V, I_C = 200mA	–	–	6.0	V
			V_{CE} = 2V, I_C = 275mA	–	–	7.0	V
			V_{CE} = 2V, I_C = 350mA	–	–	8.0	V
		NTE2015	V_{CE} = 2V, I_C = 350mA	–	–	2.6	V
DC Forward Current Transfer Ratio	h_{FE}	NTE2011	V_{CE} = 2V, I_C = 350mA	1000	–	–	
Input Capacitance	C_{IN}	All		–	15	25	pF
Turn–On Delay	t_{PLH}	All	0.5 E_{in} to 0.5 E_{out}	–	0.25	1.0	µs
Turn–Off Delay	t_{PHL}	All	0.5 E_{in} to 0.5 E_{out}	–	0.25	1.0	µs
Clamp Diode Leakage Current	I_R	All	V_R = 50V, T_A = +25°C	–	–	50	µA
			V_R = 50V, T_A = +70°C	–	–	100	µA
Clamp Diode Forward Voltage	V_F	All	I_F = 350mA	–	1.7	2.0	V

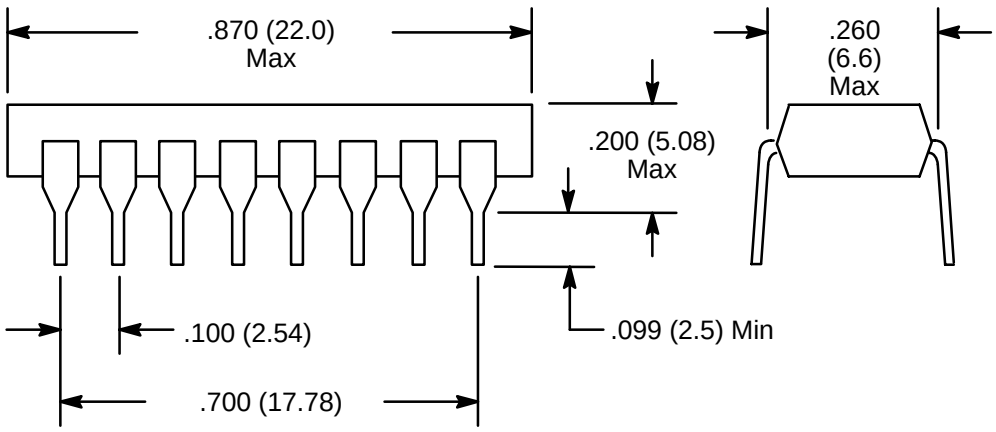
www.agelectronica.com
www.agelectronica.com

www.agelectronica.com
www.agelectronica.com

Pin Connection Diagram







www.agelectronica.com
www.agelectronica.com
www.agelectronica.com
www.agelectronica.com