



**ELECTRONICS, INC.**  
 44 FARRAND STREET  
 BLOOMFIELD, NJ 07003  
 (973) 748-5089

## NTE1511 Integrated Circuit 5-Step LED Driver for Linear Scale

**Description:**

The NTE1511 is an integrated circuit in an 14-Lead DIP type package designed for use in level meter applications. This device is capable of driving 5 LEDs to create a bar-type display. In accordance with the input level, the uppermost LED brightness varies to form a linear indicator, making the NTE1511 ideal for use in signal meters and VU meters. A low-voltage reference power supply is built-in, so that the only external components required are LEDs, resistors, and capacitors.

**Features:**

- Wide Supply Voltage Range: +5V to +16V
- Reference Voltage:  $V_{ref} = 2.8V \pm 0.2V$
- LED Output Voltage: Constant Voltage
- LED Current: Constant Current by Means of an External Resistor
- Allowable Power Dissipation:  $P_{dmax} = 1.15W @ T_A = +25^\circ C$

**Absolute Maximum Ratings:** ( $T_A = +25^\circ C$  unless otherwise specified)

Maximum Supply Voltage (Pin8), $V_{CCmax}$ .....	-0.3V to +18V
Input Voltage (Pin1, Pin2, Pin3), $V_{IN}$ .....	-0.3V to $V_{CC}$
Output Voltage (Pin14), $V_{OUT}$ .....	-0.3V to +8.0V
Output Voltage (Pin9 to Pin13, $V_{OUT(D)} \leq V_{CC}$ at output (D <sub>1</sub> to D <sub>5</sub> ) OFF), $V_{OUT(D)}$ ..	-0.3V to +10V
Reference Flow-Out Current (Pin5), $I_{ref}$ .....	-1.0mA to 0mA
Allowable Power Dissipation, $P_{dmax}$	
Without Heatsink .....	1.3W
With 50 x 50 x 1mm <sup>3</sup> Al plate .....	2.15W
Operating Temperature Range, $T_{opr}$ .....	-10° to +60°C
Storage Temperature Range, $T_{stg}$ .....	-40° to +125°C

Note 1. A voltage of  $V_{CC}+0.3V$  or more must not be applied to the input and output pins.

**Recommended Operating Conditions:** ( $T_A = +25^\circ C$  unless otherwise specified)

Parameter	Symbol	Pin #	Test Conditions	Min	Typ	Max	Unit
Supply Voltage	$V_{CC}$	8		5	-	16	V
Input Voltage	$V_{IN1^+, 2}$	2, 3		-0.3	-	$V_{CC}$	V
Output Pin Load Resistance	$R_{LOUT}$	14	Between OUT (Pin14) and GND (Pin7)	15	-	20	kΩ

**Electrical Characteristics:** ( $T_A = +25^\circ\text{C}$ ,  $V_{CC} = 5\text{V}$  to  $16\text{V}$  unless otherwise specified)

Parameter	Symbol	Pin #	Test Conditions	Min	Typ	Max	Unit
Input Bias Current (Amplifier)	$I_{DC}(IN^-)$	1	$V_{IN^-} = 0\text{V}$ , $V_{IN1^+} = V_{IN2^+} = 1\text{V}$	-4	-	0	$\mu\text{A}$
	$I_{DC}(IN_1^+)$	2	$V_{IN^-} = 1\text{V}$ , $V_{IN1^+} = V_{IN2^+} = 0\text{V}$	-2	-	0	$\mu\text{A}$
	$I_{DC}(IN_2^+)$	3	$V_{IN^-} = 1\text{V}$ , $V_{IN1^+} = V_{IN2^+} = 0\text{V}$	-2	-	0	$\mu\text{A}$
Input Bias Current (Comparator)	$I_{DC}(-C)$	4, 6	$V_{IN^-} = 0\text{V}$ , $V_{IN1^+} = V_{IN2^+} = 1\text{V}$ , $V_{RO1} = V_{RO2} = 0\text{V}$	-5	-	0	$\mu\text{A}$
	$I_{DC}(+C)$	14	$V_{IN^-} = 1\text{V}$ , $V_{IN1^+} = V_{IN2^+} = 0\text{V}$ , $V_{OUT} = 0\text{V}$ , $V_{RO1} = V_{RO2} = V_{ref}$	-5	-	0	$\mu\text{A}$
Amplifier Offset Voltage (Amplifier)	$V_{OFF}(1)$	14	$V_{CC} = 6\text{V}$ to $12\text{V}$ , Amp Gain = $20\text{dB}$	-150	-	+150	mV
	$V_{OFF}(2)$			-150	-	+150	mV
Reference Voltage	$V_{ref}$	5	$I_{ref} = 0$ to $-0.3\text{mA}$	2.6	-	3.0	V
Pin D Output Current (D <sub>1</sub> to D <sub>5</sub> )	$I_{OL}(D)$	9 to 13	$V_{IN^-} = 0\text{V}$ , $V_{IN1^+} = V_{IN2^+} = 1\text{V}$ , $V_{D1\text{ to }5} = 2.0\text{V}$ to $2.3\text{V}$	-25	-18	-10	mA
Pin D Output Leakage Current	$I_{OFF}(D)$	9 to 13	$V_{IN^-} = 1\text{V}$ , $V_{IN1^+} = V_{IN2^+} = 0\text{V}$ , $V_{D1\text{ to }5} = 0\text{V}$	-50	-	0	$\mu\text{A}$
Output Pin Output Flow-Out Current	$I_{OH}(1)$	14	$V_{IN^-} = 1\text{V}$ , $V_{IN1^+} = V_{CC}$ , $V_{IN2^+} = 0\text{V}$ , $V_{OUT} = 0\text{V}$	-	-	-3	mA
	$I_{OH}(2)$		$V_{IN^-} = 1\text{V}$ , $V_{IN1^+} = 0\text{V}$ , $V_{IN2^+} = V_{CC}$ , $V_{OUT} = 0\text{V}$	-	-	-3	mA
Current Dissipation	$I_{CC}$	8	$V_{IN^-} = 1\text{V}$ , $V_{IN1^+} = V_{IN2^+} = 0\text{V}$	-	12	25	mA
Amplifier Gain	$V_{G1}$ , $V_{G2}$	-	Open Loop	30	-	-	dB

**Comparator Level:** ( $T_A = +25^\circ\text{C}$ ,  $V_{CC} = 5\text{V}$  to  $16\text{V}$  unless otherwise specified)

Comparator Level	Symbol	Pin #	Test Conditions	Min	Typ	Max	Unit
LED5 (D5)	$GD_5$	13	$V_{RO1} = 0\text{V}$ , $V_{RO2} = 3\text{V}$	2.9	3.0	3.1	dB
LED4 (D4)	$GD_4$	12		2.3	2.4	2.5	dB
LED3 (D3)	$GD_3$	11		1.7	1.8	1.9	dB
LED3 (D2)	$GD_2$	10		1.1	1.2	1.3	dB
LED1 (D1)	$GD_1$	9		0.5	0.6	0.7	dB

**Pin Connection Diagram**



