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 ±0.2V
- LED Output Voltage: Constant Voltage
- LED Current: Constant Current by Means of an External Resistor
- Allowable Power Dissipation: $P_d$max = 1.15W @ T_A = +25°C

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

Maximum Supply Voltage (Pin8), V_{CC}max . . . . . –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, $V_{OUT(D)} \le V_{CC}$ at output (D_1 to D_5) OFF), $V_{OUT(D)}$ . . –0.3V to +10V
Reference Flow–Out Current (Pin5), I_{ref} . . . . . –1.0mA to 0mA
Allowable Power Dissipation, $P_d$max
  Without Heatsink 1.3W
  With 50 x 50 x 1mm^3 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°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

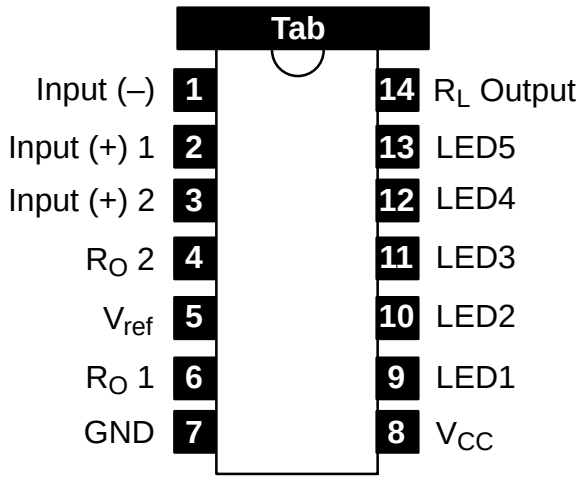
Electrical Characteristics: (T_A = +25°C, V_{CC} = 5V to 16V unless otherwise specified)

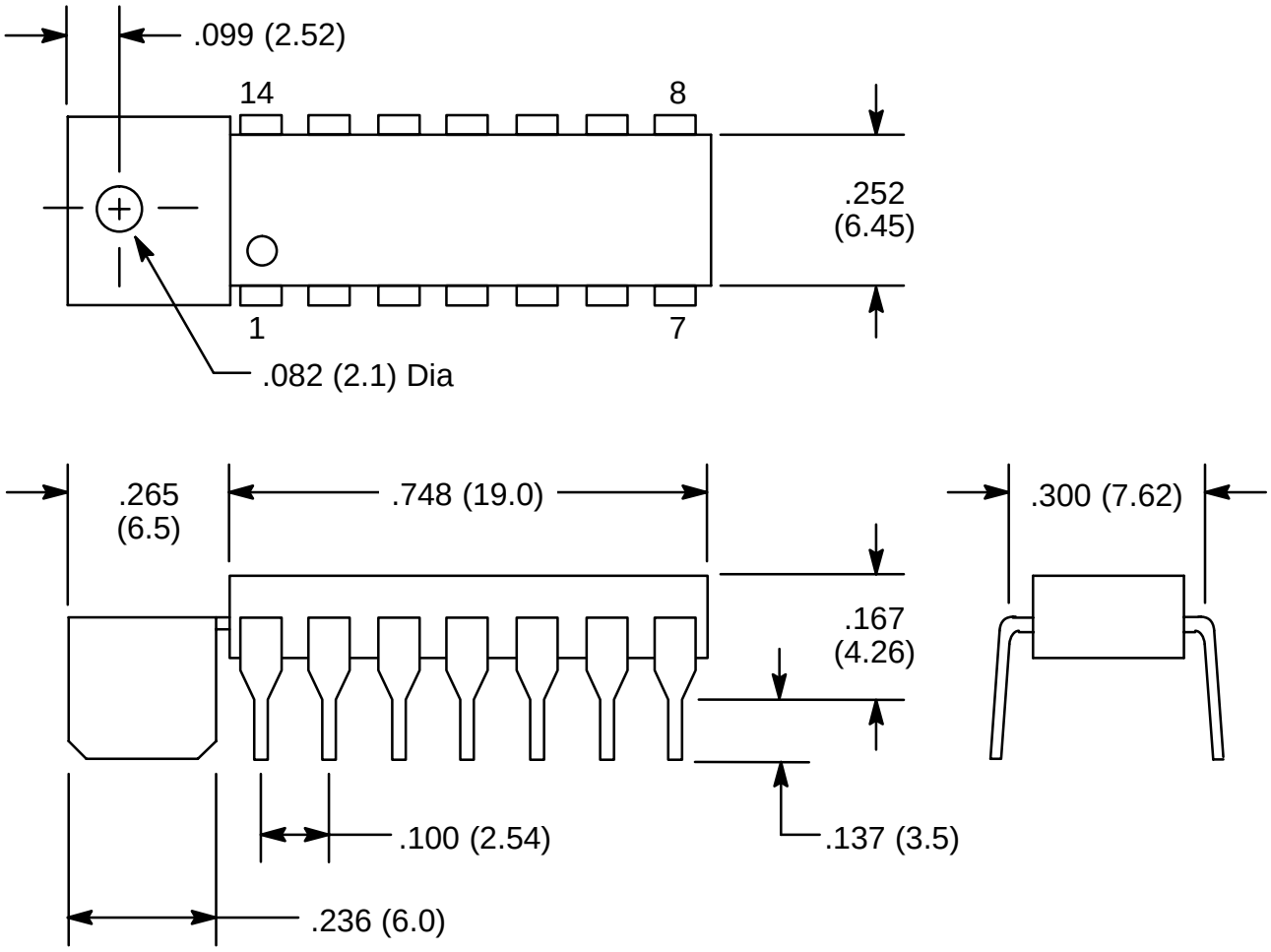
Parameter	Symbol	Pin #	Test Conditions	Min	Typ	Max	Unit
Input Bias Current (Amplifier)	$I_{DC}(IN^-)$	1	V_{IN}^- = 0V, $V_{IN1}^+ = V_{IN2}^+$ = 1V	–4	–	0	µA
	I_{DC} (IN_1^+)	2	V_{IN}^- = 1V, $V_{IN1}^+ = V_{IN2}^+$ = 0V	–2	–	0	µA
	I_{DC} (IN_2^+)	3	V_{IN}^- = 1V, $V_{IN1}^+ = V_{IN2}^+$ = 0V	–2	–	0	µA
Input Bias Current (Comparator)	I_{DC} (–C)	4, 6	V_{IN}^- = 0V, $V_{IN1}^+ = V_{IN2}^+$ = 1V, $V_{RO1} = V_{RO2}$ = 0V	–5	–	0	µA
	I_{DC} (+C)	14	V_{IN}^- = 1V, $V_{IN1}^+ = V_{IN2}^+$ = 0V, V_{OUT} = 0V, $V_{RO1} = V_{RO2} = V_{ref}$	–5	–	0	µA
Amplifier Offset Voltage (Amplifier)	V_{OFF}(1)	14	V_{CC} = 6V to 12V, Amp Gain = 20dB	–150	–	+150	mV
	V_{OFF}(2)			–150	–	+150	mV
Reference Voltage	V_{ref}	5	I_{ref} = 0 to –0.3mA	2.6	–	3.0	V
Pin D Output Current (D_1 to D_5)	I_{OL} (D)	9 to 13	V_{IN}^- = 0V, $V_{IN1}^+ = V_{IN2}^+$ = 1V, $V_{D1\ to\ 5}$ = 2.0V to 2.3V	–25	–18	–10	mA
Pin D Output Leakage Current	I_{OFF} (D)	9 to 13	V_{IN}^- = 1V, $V_{IN1}^+ = V_{IN2}^+$ = 0V, $V_{D1\ to\ 5}$ = 0V	–50	–	0	µA
Output Pin Output Flow–Out Current	I_{OH} (1)	14	V_{IN}^- = 1V, $V_{IN1}^+ = V_{CC}$, V_{IN2}^+ = 0V, V_{OUT} = 0V	–	–	–3	mA
	I_{OH} (2)		V_{IN}^- = 1V, V_{IN1}^+ = 0V, $V_{IN2}^+ = V_{CC}$, V_{OUT} = 0V	–	–	–3	mA
Current Dissipation	I_{CC}	8	V_{IN}^- = 1V, $V_{IN1}^+ = V_{IN2}^+$ = 0V	–	12	25	mA
Amplifier Gain	V_{G1}, V_{G2}	–	Open Loop	30	–	–	dB

Comparator Level: (T_A = +25°C, V_{CC} = 5V to 16V unless otherwise specified)

Comparator Level	Symbol	Pin #	Test Conditions	Min	Typ	Max	Unit
LED5 (D5)	GD_5	13	V_{RO1} = 0V, V_{RO2} = 3V	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




.099 (2.52)
14
8
.252
(6.45)
1
7
.082 (2.1) Dia
.265
(6.5)
.748 (19.0)
.300 (7.62)
.167
(4.26)
.100 (2.54)
.137 (3.5)
.236 (6.0)