



ELECTRONICS, INC.
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NTE1514 and NTE1515 Integrated Circuit 5-Step LED Driver for Logarithmic Scale

Features:

- Useful for Both AC and DC Level Meter as VU Meter or Signal Meter
- Wide Supply Voltage Range: $V_{CC} = 4.4V$ to $12V$
- DC Amplifier Included

Comparator Level: ($T_A = +25^{\circ}C$, $V_{CC} = 6V$, $I_{ref} = 5mA$)

Level	Pin	Test Conditions	NTE1514			NTE1515			Unit
			Min	Typ	Max	Min	Typ	Max	
D5	14	$V_{R02} = 2.6V$ to $3V$, $V_{R02} = 0V$	5.5	6.0	6.5	1.6	2.0	2.4	dB
D4	13	$V_{R02} = 2.6V$ to $3V$, $V_{R02} = 0V$	2.5	3.0	3.5	-0.4	0	+0.4	dB
D3	12	$V_{R02} = 2.6V$ to $3V$, $V_{R02} = 0V$	-0.5	0	0.5	-3.6	-3.0	-2.4	dB
D2	11	$V_{R02} = 2.6V$ to $3V$, $V_{R02} = 0V$	-6.0	-5.0	-4.0	-8.0	-7.0	-6.0	dB
D1	10	$V_{R02} = 2.6V$ to $3V$, $V_{R02} = 0V$	-12	-10	-8.0	-17	-15	-13	dB

Note 1. Definition of 0dB: when voltage of OUT_2 is 2.37V ($R_{02} = 3V$, $R_{01} = 0V$).
 when voltage of OUT_2 is 1.50V ($R_{02} = 3V$, $R_{01} = 0V$).

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

- Maximum Supply Voltage (Pin4), V_{CCmax} -0.3V to +14V
- Input Voltage (Pin2, Pin3), V_{IN} -0.3V to +14V
- Current at Pin C (Pin1), I_C 0.1mA to 2mA
- Output Voltage,
 - Pin16 (Note 2), $V_{OUT(1)}$ -0.3V to +12V
 - Pin15, $V_{OUT(2)}$ -0.3V to +12V
 - Pin10 to Pin14, V_{OUT} -0.3V to 14V
- Reference Current (Pin6), I_{ref} 0 to 10mA
- Allowable Power Dissipation ($T_A = +55^{\circ}C$, Total), P_dmax 500mW
- Operating Temperature Range, T_{opr} -10° to $+60^{\circ}C$
- Storage Temperature Range, T_{stg} -40° to $+125^{\circ}C$

Note 2. When OUT_1 is off and OUT_2 is connected to GND (Pin8) through 12k Ω .

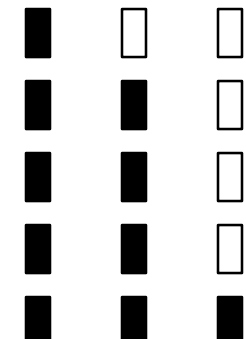
Note 3. Notice inhibit to supply any voltage to input and output pin larger than $V_{CC}+0.3V$ (Especially beware of power switch on). Pin D₁ to D₅ should be connected to V_{CC} at no use of LED's.

Allowable Operating Condition: ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Supply Voltage (Pin4), V_{CC} 4.4 to 12V
 Reference Current (Pin6), I_{ref} 2.5 to 9.0mA
 Load Resistance (Pin15, inserted between OUT_2 and GND), R_{L2} 15 to 20k Ω

Electrical Characteristics: ($T_A = +25^\circ\text{C}$, $V_{CC} = 4.4\text{V}$ to 12V , $I_{ref} = 5\text{mA}$ unless otherwise specified)

Parameter	Symbol	Pin	Test Conditions	Min	Typ	Max	Unit
Input Bias Current (Amp Section)	$I_{IN+}(A)$	2	$V_{CC} = 12\text{V}$, $V_{IN+} = 10\text{V}$, $V_{IN-} = 0\text{V}$	-2	-	0	μA
	$I_{IN-}(A)$	3	$V_{CC} = 12\text{V}$, $V_{IN+} = 0\text{V}$, $V_{IN-} = 10\text{V}$	-2	-	0	μA
Input Bias Current (Comparator Section)	$I_{IN+}(C)$	5, 7	$V_{CC} = 12\text{V}$, $V_{IN+} = 10\text{V}$, $V_{IN-} = 0\text{V}$, $V_{R01} = 0\text{V}$, $V_{R02} = 0\text{V}$	-10	-	0	μA
	$I_{IN-}(C)$	15	$V_{CC} = 12\text{V}$, $V_{IN+} = 0\text{V}$, $V_{IN-} = 10\text{V}$, $V_{R01} = V_{R02} = V_{ref}$, $V_{OUT2} = 0\text{V}$	-10	-	0	μA
Reference Voltage	V_{ref}	6	$I_{ref} = 2.5\text{mA}$ to 9.0mA	2.6	-	3.0	V
Amp Offset Voltage (Amp Section)	V_{offset}	15	Amp Gain 20dB	-500	-	+500	mV
Output Flow-in Current	$I_{OL}(1)$	16	OUT_1 : $V_{OUT1} = 0.5\text{V}$, $V_{IN+} = 0\text{V}$, $V_{IN-} = 4\text{V}$	0.2	-	-	mA
Output Flow-out Current	$I_{OH}(1)$	16	OUT_1 : $V_{OUT1} = 3.7\text{V}$, $V_{IN+} = 4\text{V}$, $V_{IN-} = 0\text{V}$	-	-	-20	μA
	$I_{OH}(2)$	15	OUT_2 : $V_{CC} = 4.4\text{V}$, $V_{OUT2} = 0\text{V}$	-	-	-3.1	mA
	$I_{OH}(2)$	15	OUT_2 : $V_{CC} = 12\text{V}$, $V_{OUT2} = 0\text{V}$	-	-	-7.0	mA
Output Flow-in Current	$I_{OL}(D)$	10 to 14	D_1 to D_5 : $V_{CC} = 4.4\text{V}$, V_{D1} to $V_{D5} = 2.3\text{V}$, $V_{IN-} = 0\text{V}$, $V_{IN+} = 3\text{V}$, $V_{R02} = 3\text{V}$	3.0	-	7.5	mA
			D_1 to D_5 : $V_{CC} = 12\text{V}$, V_{D1} to $V_{D5} = 9.7\text{V}$, $V_{IN-} = 0\text{V}$, $V_{IN+} = 9\text{V}$, $V_{R02} = 9\text{V}$	3.0	-	7.5	mA
Output Leak Current	$I_{OH}(D)$	10 to 14	D_1 to D_5 : $V_{CC} = 12\text{V}$, $V_{IN+} = 0\text{V}$, $V_{IN-} = 9\text{V}$, $V_{R02} = 9\text{V}$	-	-	50	μA
Current Dissipation	I_{CC}	4	$V_{CC} = 12\text{V}$, $V_{IN+} = 0\text{V}$, $V_{IN-} = 10\text{V}$	-	8	15	mA
Amp Gain	V_G		Open Looped	30	-	-	dB

<p style="text-align: center;">VU Level Meter</p> <div style="display: flex; justify-content: space-around; margin-bottom: 10px;"> +3dB 0dB -10dB </div> <table style="margin: 0 auto; border-collapse: collapse;"> <tr> <td style="width: 30px; height: 20px; background-color: black;"></td> <td style="width: 30px; height: 20px; border: 1px solid black;"></td> <td style="width: 30px; height: 20px; border: 1px solid black;"></td> </tr> <tr> <td style="width: 30px; height: 20px; background-color: black;"></td> <td style="width: 30px; height: 20px; background-color: black;"></td> <td style="width: 30px; height: 20px; border: 1px solid black;"></td> </tr> <tr> <td style="width: 30px; height: 20px; background-color: black;"></td> <td style="width: 30px; height: 20px; background-color: black;"></td> <td style="width: 30px; height: 20px; border: 1px solid black;"></td> </tr> <tr> <td style="width: 30px; height: 20px; background-color: black;"></td> <td style="width: 30px; height: 20px; background-color: black;"></td> <td style="width: 30px; height: 20px; border: 1px solid black;"></td> </tr> <tr> <td style="width: 30px; height: 20px; background-color: black;"></td> <td style="width: 30px; height: 20px; background-color: black;"></td> <td style="width: 30px; height: 20px; background-color: black;"></td> </tr> </table> <p style="text-align: center; margin-top: 10px;">Input Level</p>																<p style="text-align: center;">Pin Connection Diagram</p>  <table style="margin: 0 auto; border-collapse: collapse;"> <tr> <td style="width: 60px;">Capacitor</td> <td style="width: 20px; text-align: center;">1</td> <td style="width: 100px;"></td> <td style="width: 20px; text-align: center;">16</td> <td>Output (1)</td> </tr> <tr> <td>Input (-)</td> <td style="text-align: center;">2</td> <td></td> <td style="text-align: center;">15</td> <td>Output (2)</td> </tr> <tr> <td>Input (+)</td> <td style="text-align: center;">3</td> <td></td> <td style="text-align: center;">14</td> <td>LED5</td> </tr> <tr> <td>V_{CC}</td> <td style="text-align: center;">4</td> <td></td> <td style="text-align: center;">13</td> <td>LED4</td> </tr> <tr> <td>R_{O2}</td> <td style="text-align: center;">5</td> <td></td> <td style="text-align: center;">12</td> <td>LED3</td> </tr> <tr> <td>V_{ref}</td> <td style="text-align: center;">6</td> <td></td> <td style="text-align: center;">11</td> <td>LED2</td> </tr> <tr> <td>R_{O1}</td> <td style="text-align: center;">7</td> <td></td> <td style="text-align: center;">10</td> <td>LED1</td> </tr> <tr> <td>GND</td> <td style="text-align: center;">8</td> <td></td> <td style="text-align: center;">9</td> <td>N.C.</td> </tr> </table>	Capacitor	1		16	Output (1)	Input (-)	2		15	Output (2)	Input (+)	3		14	LED5	V_{CC}	4		13	LED4	R_{O2}	5		12	LED3	V_{ref}	6		11	LED2	R_{O1}	7		10	LED1	GND	8		9	N.C.
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