

<b>SANYO</b>	NO.880C	<b>LB1407, 1417</b>
	<b>AC/DC Voltage Level Meter</b>	

**Features and Functions**

- . The LB1407 and LB1417 are based on dB scale and linear scale respectively.
- . The input level is indicated in the form of a bar by means of 7 red/green LEDs.
- . The LED current is made variable with an external resistor.
- . An input amplifier is built in.
- . A wide range of supply voltages is available from 5.5V to 16V.

Comparator Level at  $T_a=25^\circ\text{C}$ ,  $V_{CC}=12\text{V}$

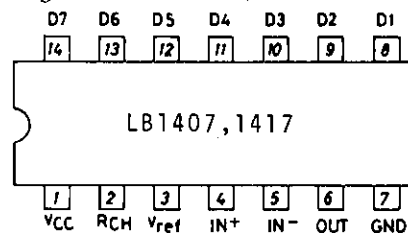
[LB1407]

Comparator level	Pin No.	dB scale		(Reference: Linear scale)	
		typ	unit	typ	unit
D1	8	-20	dB	150	mV
D2	9	-10	dB	485	mV
D3	10	-6	dB	770	mV
D4	11	-3	dB	1090	mV
D5	12	0	dB	1530	mV
D6	13	3	dB	2150	mV
D7	14	6	dB	3000	mV

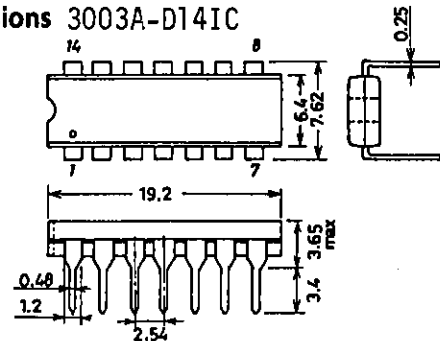
[LB1417]

Comparator level	Pin No.	Linear scale		(Reference: dB scale)	
		typ	unit	typ	unit
D1	8	430	mV	-14.0	dB
D2	9	840	mV	-8.0	dB
D3	10	1280	mV	-4.4	dB
D4	11	1700	mV	-1.9	dB
D5	12	2150	mV	0	dB
D6	13	2570	mV	1.6	dB
D7	14	3000	mV	2.9	dB

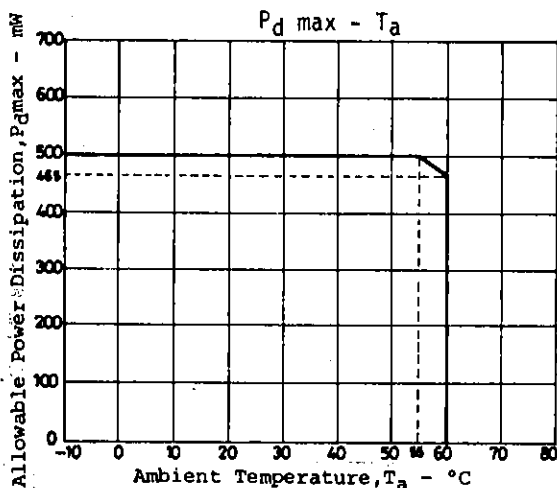
**Pin Assignment**



**Package Dimensions 3003A-D14IC (unit: mm)**



SANYO: DIP14



Absolute Maximum Ratings at  $T_a=25^\circ\text{C}$

				unit
Maximum Supply Voltage	$V_{CCmax}$	Pin 1	-0.3 to +18	V
Input Voltage	$V_{IN}$	Pin 4,5	-0.3 to $V_{CC}$	V
D <sub>1</sub> to D <sub>7</sub> Output Voltage	$V_{OUT(D)}$	D <sub>1</sub> to D <sub>7</sub> OFF	-0.3 to +18	V
D <sub>1</sub> to D <sub>9</sub> Output Current	$I_{OL(D)}$	Pins 8 to 14, D <sub>1</sub> to D <sub>7</sub> ON	+30	mA
Reference Flow-out Current	$I_{ref}$	Pin 3	-1 to 0	mA
$V_{OUT}$ Supply Voltage	$V_{OUT}$	Pin 6	-0.3 to +6	V
Allowable Power Dissipation	$P_{dmax}$	$T_a=55^\circ\text{C}$	500	mW
Operating Temperature	$T_{opr}$		-20 to +60	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-40 to +125	$^\circ\text{C}$

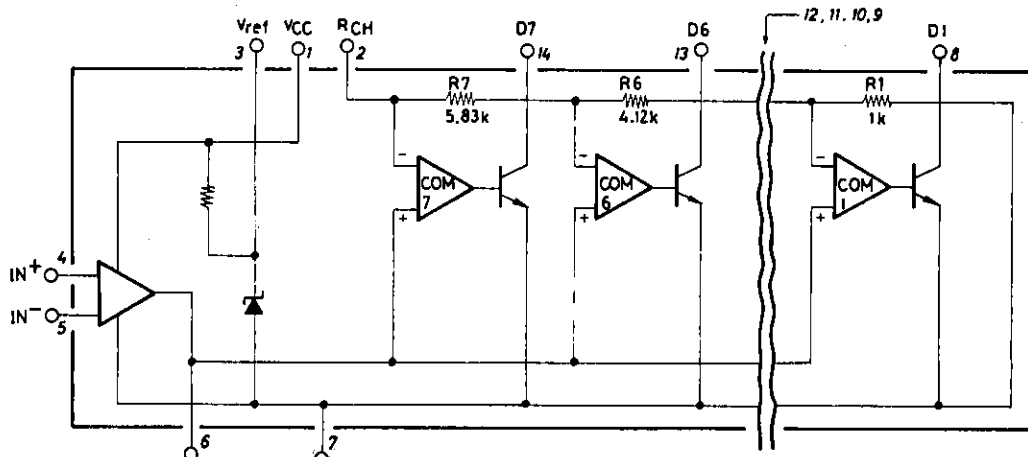
Allowable Operating Conditions at  $T_a=25^\circ\text{C}$

				unit
Recommended Supply Voltage	$V_{CC}$	Pin 1	+5.5 to +16	V
Input Voltage	$V_{IN+}$ or $V_{IN-}$	Pin 4 or 5	-0.3 to $V_{CC}$	V
Output Pin Load Resistance	$R_L$	Between pin 6 OUT and pin 7 GND.	15k to 20k	ohm

Electrical Characteristics at  $T_a=25^\circ\text{C}, V_{CC}=12\text{V}$  (Unless  $V_{CC}$  is otherwise specified)

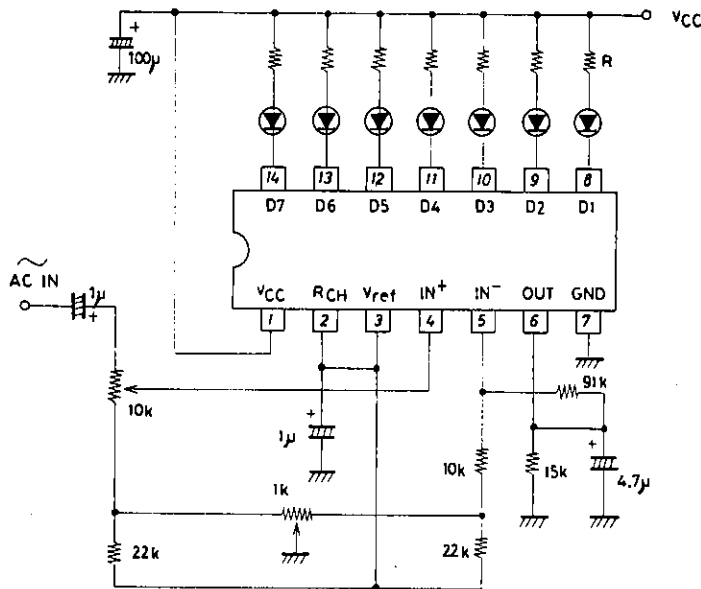
			min	typ	max	unit
Input Bias Current (Amplifier)	$I_{IN+}(A)$	Pin4, $V_{IN+}=0\text{V}, V_{IN-}=3\text{V}$ GND=0V	-2		0	$\mu\text{A}$
	$I_{IN-}(A)$	Pin5, $V_{IN+}=3\text{V}, V_{IN-}=0\text{V}$ GND=0V	-2		0	$\mu\text{A}$
Input Bias Current (Comparator) + Output Leak Current	$I_{IN+}(C) + I_{OL}(A)$	Pin6, $V_{IN+}=0\text{V}, V_{IN-}=3\text{V}$ , OUT=0V, GND=0V	-10		0	$\mu\text{A}$
Offset Voltage (1)	$V_{offset(1)}$	Pin6, $V_{CC}=6\text{V}, V_{IN+}=V_{IN-}=0\text{V}$ , GND=-6V, GAIN=20dB	-150		+150	mV
Offset Voltage (2)	$V_{offset(2)}$	Pin6, $V_{IN+}=V_{IN-}=0\text{V}$ , GND=0V, GAIN=20dB	0		+150	mV
Reference Voltage	$V_{ref}$	Pin2, $I_{ref}=0$ to 1mA	2.7		3.1	V
Current Dissipation	$I_{CC}$	Pin1, $V_{IN+}=3\text{V}, V_{IN-}=0\text{V}$		8	15	mA
Amplifier Gain	$V_G$	Open loop		30		dB
Output Flow-out Current	$I_{OH}$	Pin6, $V_{IN+}=3\text{V}, V_{IN-}=0\text{V}$ $V_{OUT}=0\text{V}$			-10	mA
Pin D Output ON Voltage	$V_{OL(D)}$	Pin8 to 14, D <sub>1</sub> to D <sub>7</sub> , $I_{OL}=20\text{mA}$ , $V_{IN+}=3\text{V}, V_{IN-}=0\text{V}$			1.2	V
Pin D Output Leak Current	$I_{OH(D)}$	Pin8 to 14, D <sub>1</sub> to D <sub>7</sub> , $V_{IN+}=0\text{V}$ , $V_{IN-}=3\text{V}, V_{D1} \text{ to } D_7=12\text{V}$			10	$\mu\text{A}$
Output Voltage (Amplifier) $V_{OH}$		Pin6, $V_{CC}=5.5\text{V}, V_{IN+}=3\text{V}$ , $V_{IN-}=0\text{V}, R_L=15\text{kohms}$	4			V
		Pin6, $V_{CC}=12\text{V}, V_{IN+}=3\text{V}$ , $V_{IN-}=0\text{V}, R_L=15\text{kohms}$	9.5			V

Equivalent Circuit



Unit (resistance:  $\Omega$ ) Internal resistors :  $R_5(2.92\text{k}), R_4(2.07\text{k}), R_3(1.85\text{k}), R_2(2.16\text{k})$   
 $(R_1 \text{ to } R_7 \text{ of LB1417 are all } 2.85\text{kohm}).$

## Application Circuit

Unit (resistance:  $\Omega$ , capacitance: F)

Current flowing to LED :

$$I_{LED} = \frac{V_{CC} - 3}{R}$$

(Example) Assuming  $I_{LED}=10\text{mA}$  at  $V_{CC}=12\text{V}$ , R is :

$$R = \frac{12 - 3}{10 \times 10^{-3}} = \frac{9}{10 \times 10^{-3}} = 900\Omega$$

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