



NO.880C

Monolithic Digital IC

LB1407, 1417

AC/DC Voltage Level Meter

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

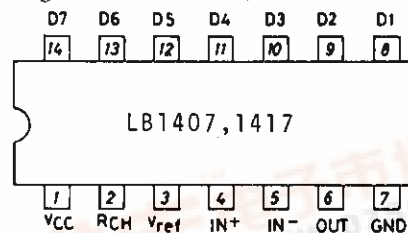
[LB1407]

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

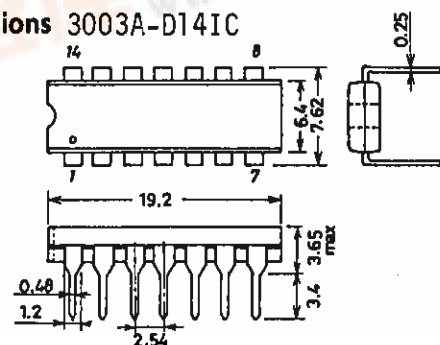
[LB1417]

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

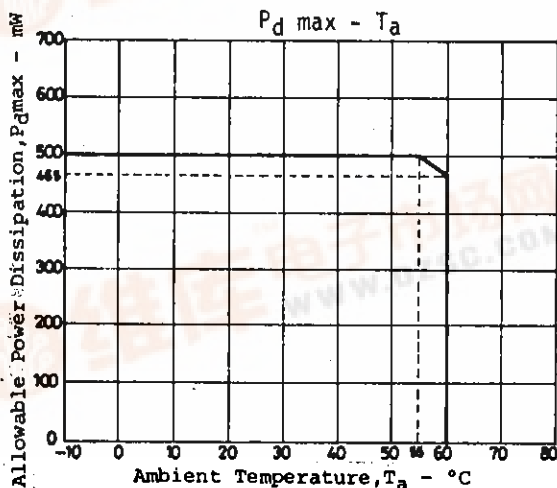
Pin Assignment



Package Dimensions 3003A-D14IC (unit: mm)



SANYO: DIP14



LB1407,1417

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 ₁ to D ₇ Output Voltage	$V_{OUT(D)}$	D ₁ to D ₇ OFF	-0.3 to +18	V
D ₁ to D ₉ Output Current	$I_{OL(D)}$	Pins 8 to 14, D ₁ to D ₇ 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	$^\circ\text{C}$

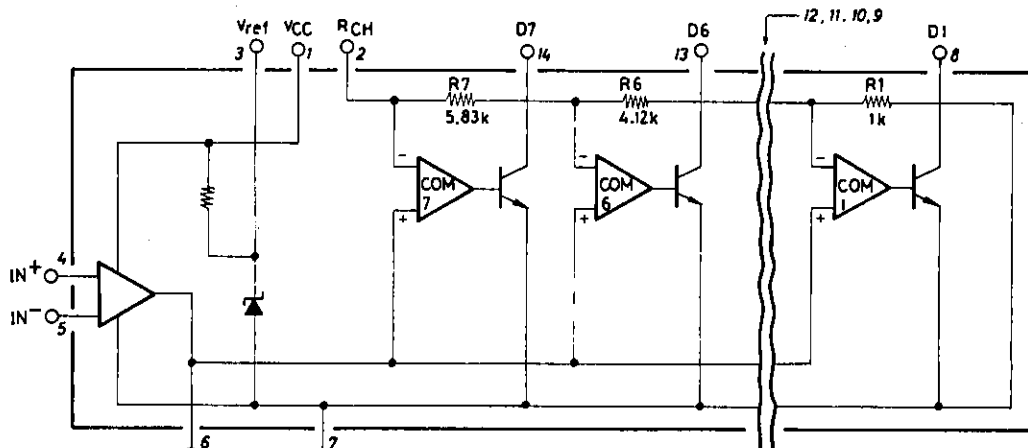
Allowable Operating Conditions at $T_a=25^\circ\text{C}$

				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)

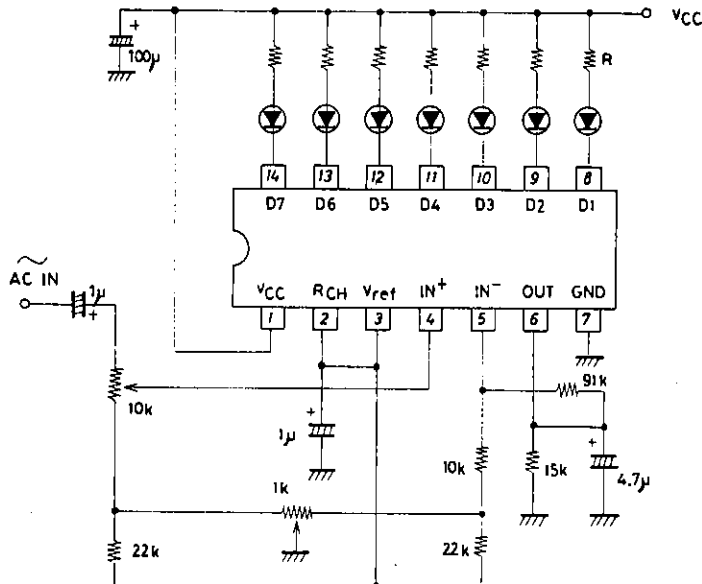
			min	typ	max	unit
Input Bias Current (Amplifier)	$I_{IN}^+(A)$	Pin4, $V_{IN}^+=0\text{V}, V_{IN}^-=3\text{V}$ GND=0V	-2		0	μA
	$I_{IN}^-(A)$	Pin5, $V_{IN}^+=3\text{V}, V_{IN}^-=0\text{V}$ GND=0V	-2		0	μA
Input Bias Current (Comparator) + Output Leak Current	$I_{IN}^+(C) + I_{OL}(A)$	Pin6, $V_{IN}^+=0\text{V}, V_{IN}^-=3\text{V}$, OUT=0V, GND=0V	-10		0	μA
Offset Voltage (1)	$V_{offset(1)}$	Pin6, $V_{CC}=6\text{V}, V_{IN}^+=V_{IN}^-$ =0V, 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 ₁ to D ₇ , $I_{OL}=\text{20mA}$, $V_{IN}^+=3\text{V}, V_{IN}^-=0\text{V}$			1.2	V
Pin D Output Leak Current	$I_{OH(D)}$	Pin8 to 14, D ₁ to D ₇ , $V_{IN}^+=0\text{V}$, $V_{IN}^-=3\text{V}, V_{D1}$ to $D_7=12\text{V}$			10	μA
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: Ω) Internal resistors: R5 (2.92k), R4 (2.07k), R3 (1.85k), R2 (2.16k) (R1 to R7 of LB1417 are all 2.85kohm).

Application Circuit

Unit (resistance: Ω , 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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