Ordering number:ENN880C

Monolithic Digital IC

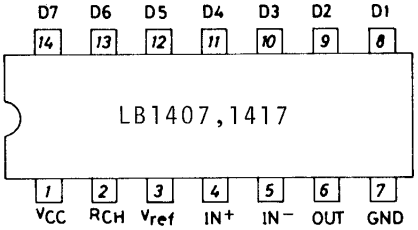
LB1407, 1417

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.

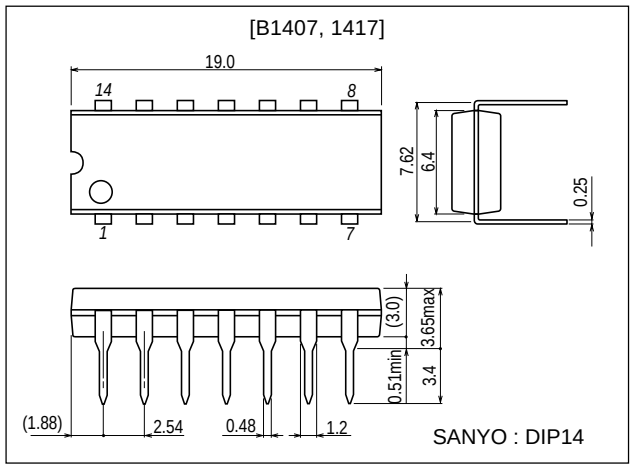
Pin Assignment



Package Dimensions

unit:mm

3003B-DIP14



Comparator Level at Ta = 25˚C, V_{CC}=12V

[LB1407]		dB scale		(Reference : Linear scale)	
Comparator level	Pin No.	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]		Linear scale		(Reference : dB scale)	
Comparator level	Pin No.	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

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Specifications

Absolute Maximum Ratings at Ta = 25˚C

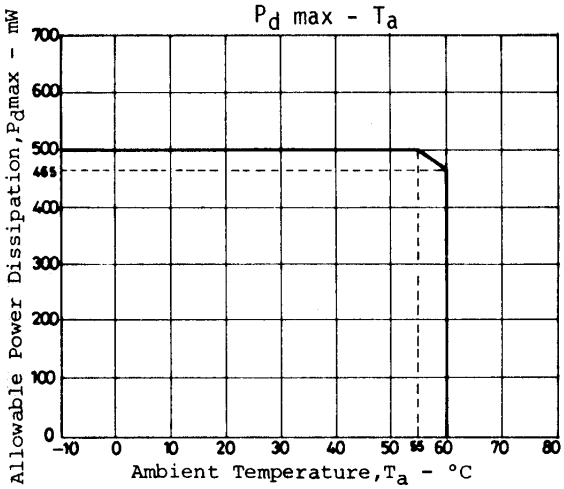
Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max	Pin 1	–0.3 to +18	V
Input voltage	V_{IN}	Pin 4, 5	–0.3 to +V_{CC}	V
D_1 to D_7 output voltage	$V_{OUT(D)}$	D_1 to D_7 OFF	–0.3 to +18	V
D_1 to D_9 output current	$I_{OL(D)}$	Pins 8 to 14, D_1 to D_7 ON	+30	mA
Reference flow-out 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	Pd max	Ta=55˚C	500	mW
Operating temperature	Topr		–20 to +60	˚C
Storage temperature	Tstg		–40 to +125	˚C

Allowable Operating Ranges at Ta = 25˚C

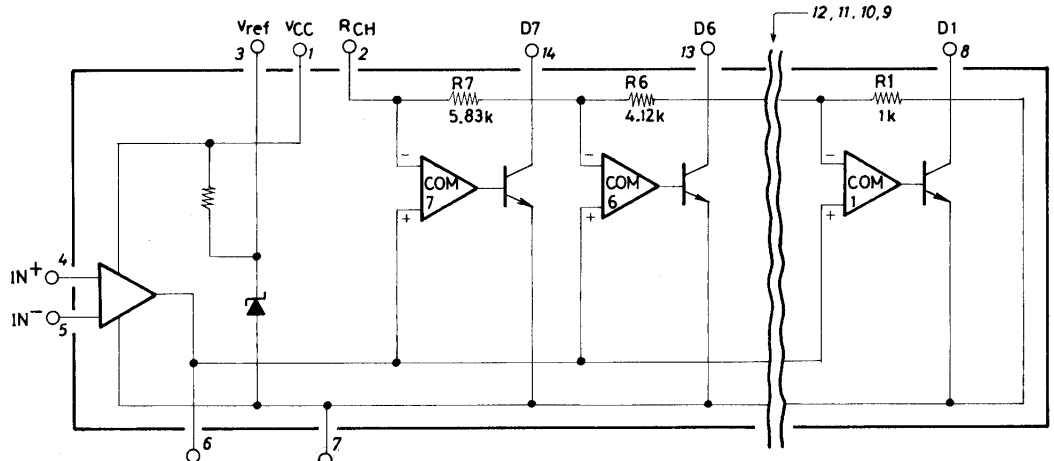
Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}	Pin 1	5.5 to 16	V
Input voltage	V_{IN}^+ or V_{IN}^-	Pin 4 or 5	–0.3 to V_{CC}	V
Output pin load resistance	R_L	Between pin 6 OUT and pin 7 GND.	15k to 20k	Ω

Electrical Characteristics at Ta = 25˚C, V_{CC}=12V (Unless V_{CC} is otherwise specified)

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Input bias current (Amplifier)	I_{IN}^+(A)	Pin 4, V_{IN}^+=0V, V_{IN}^-=3V, GND=0V	–2		0	µA
	I_{IN}^-(A)	Pin 5, V_{IN}^+=3V, V_{IN}^-=0V, GND=0V	–2		0	µA
Input bias current (Comparator)+output leak current	I_{IN}^+(C)+ I_{OL}(A)	Pin 6, V_{IN}^+=0V, V_{IN}^-=3V, OUT=0V, GND=0V	–10		0	µA
Offset voltage (1)	$V_{offset1}$	Pin 6, V_{CC}=6V, V_{IN}^+=V_{IN}^-=0V, GND=–6V, GAIN=20dB	–150		+150	mV
Offset voltage (2)	$V_{offset2}$	Pin 6, V_{IN}^+=V_{IN}^-=0V, GND=0V, GAIN=20dB	0		+150	mV
Reference voltage	V_{ref}	Pin 2, I_{ref}=0 to 1mA	2.7		3.1	V
Current drain	I_{CC}	Pin 1, V_{IN}^+=3V, V_{IN}^-=0V		8	15	mA
Amplifier gain	VG	Open loop	30			dB
Output flow-out current	I_{OH}	Pin 6, V_{IN}^+=3V, V_{IN}^-=0V, V_{OUT}=0V			–10	mA
Pin D output ON voltage	$V_{OL(D)}$	Pin 8 to 14, D_1 to D_7, I_{OL}=20mA, V_{IN}^+=3V, V_{IN}^-=0V			1.2	V
Pin D output leak current	$I_{OH(D)}$	Pin 8 to 14, D1 to D7, V_{IN}^+=0V, V_{IN}^-=3V, V_{D1} to D_7=12V			10	µA
Output voltage (Amplifier)	V_{OH}	Pin 6, V_{CC}=5.5V, V_{IN}^+=3V, V_{IN}^-=0V, R_L=15kΩ	4			V
		Pin 6, V_{CC}=12V, V_{IN}^+=3V, V_{IN}^-=0V, R_L=15kΩ	9.5			V



Equivalent Circuit

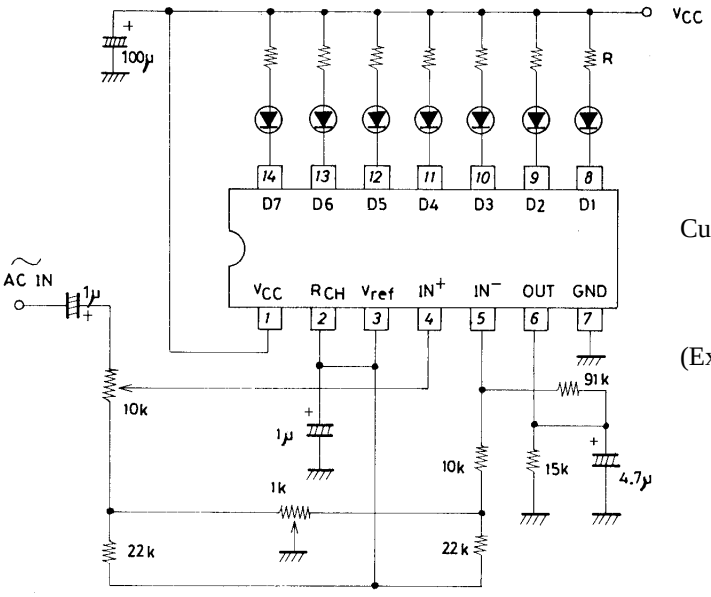


Unit (resistance: Ω)

Internal resistors : R5 (2.92k), R4 (2.07k), R3 (1.85k), R2 (2.16k) (R_1 to R_7 of LB1417 are all 2.85kΩ).

Application Circuit

Unit (resistance: Ω, capacitance: F)



Current flowing to LED :

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

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

$$R=\frac{12-3}{10\times10^{-3}}=\frac{9}{10\times10^{-3}}=900\Omega$$