SANYO No.624D

LB1416,1426,1436

Monolithic Digital IC

LEVEL METER

General Description of Functions

- Indication format : The input level is indicated in the form of a bar by means of 5 LEDs (green/red LED : drivable).
- Input amplifier : 2 half-wave rectification amplifiers are built in.
- Input amplifier output : Of 2 input amplifiers, the amplifier whose input is larger takes procedence.
- Comparator level : LB1416 : +6, +3, 0, -5, -10 [dB] (Log scale)
  LB1426 : +3, +2.4, +1.8, +1.2, +0.6 [V] (Linear scale)
  LB1436 : +9, +6, +3, 0 -5 [dB] (Log scale)
- Offset voltage of input amplifier : If the amplifier gain is taken as 20dB, the output voltage is within ±150mV.
- Supply voltage : Wide range of supply voltage : 5.0 to 16V.
- Reference voltage Vref : 2.8±0.2 V.
- LED output voltage : Constant voltage.
- LED current : Constant current by means of an external resistor.
- Allowable power dissipation : 1.15W at Ta=35°C

Comparator Level at Ta=25°C, V_{CC}=5.0 to 16V.

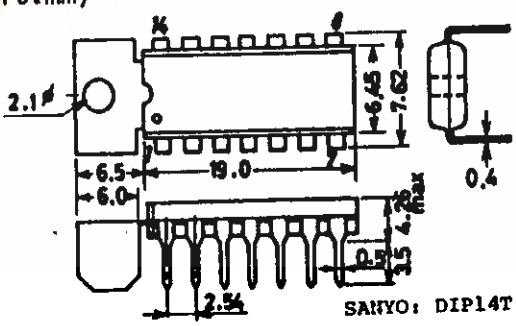
Comparator Level	Symbol	Pin No.	Conditions	LB1416 min	LB1416 typ	LB1416 max	LB1416 unit	LB1426 min	LB1426 typ	LB1426 max	LB1426 unit
D5	GD_5	Pin 13	V_{RO2}=3.0V, V_{RO1}=0V	5.5	6.0	6.5	dB	2.9	3.0	3.1	V
D4	GD_4	Pin 12		2.5	3.0	3.5	dB	2.3	2.4	2.5	V
D3	GD_3	Pin 11		-0.5	0	0.5	dB	1.7	1.8	1.9	V
D2	GD_2	Pin 10		-6.0	-5.0	-4.0	dB	1.1	1.2	1.3	V
D1	GD_1	Pin 9		-12	-10	-8	dB	0.5	0.6	0.7	V

Comparator Level	Symbol	Pin No.	Conditions	LB1436 min	LB1436 typ	LB1436 max	LB1436 unit
D5	GD_5	Pin 13	V_{RO2}=3.0V, V_{RO1}=0V	8.5	9.0	9.5	dB
D4	GD_4	Pin 12		5.5	6.0	6.5	dB
D3	GD_3	Pin 11		2.5	3.0	3.5	dB
D2	GD_2	Pin 10		-1	0	1	dB
D1	GD_1	Pin 9		-7	-5.0	-3.5	dB

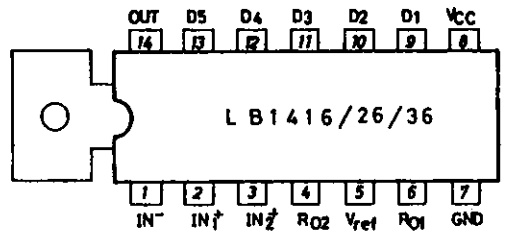
Note) LB1416 : Definition of 0dB in case of V_{ref}=3.0V. When reference voltage V_{RO2} of the comparator is 3V, 1.5V is taken as 0dB.

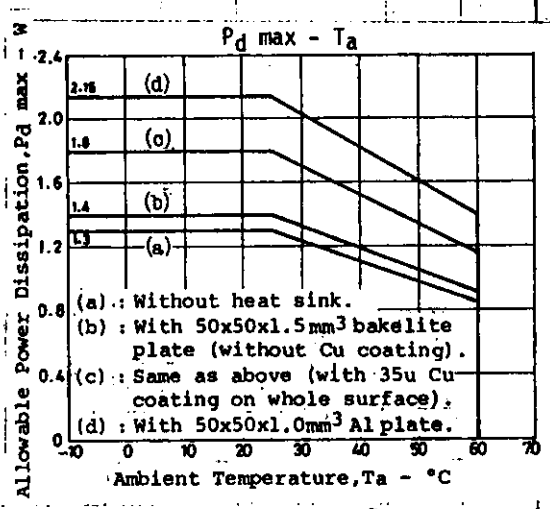
LB1436 : Definition of 3dB in case of V_{ref}=3.0V. When reference voltage V_{RO2} of the comparator is 3V, 1.5V is taken as 3dB.

Case Outline 3005A-D14TIC (unit:mm)

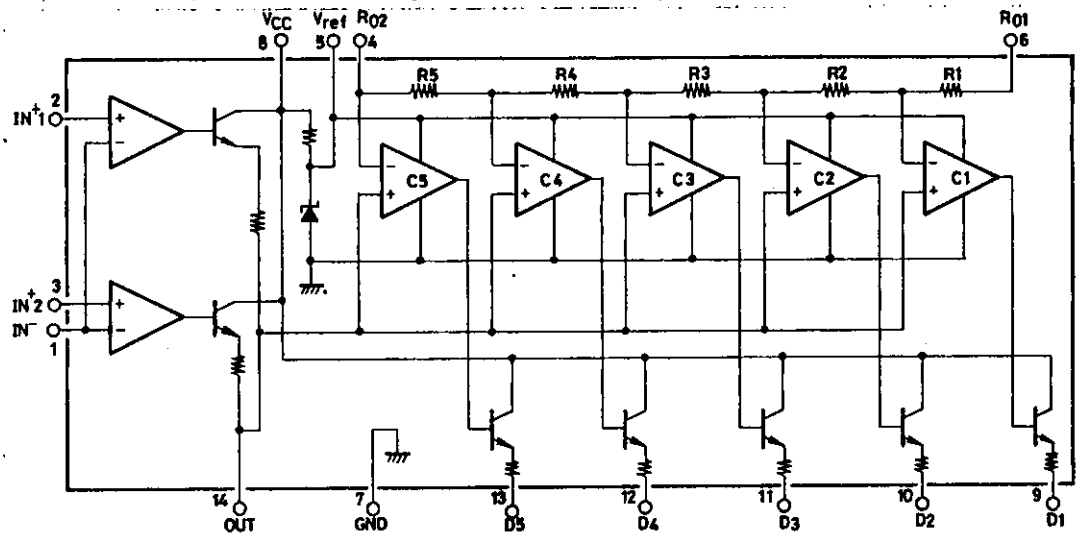


Pin Assignment





Equivalent Circuit Block Diagram



Absolute Maximum Ratings at Ta=25°C

		Pin No.	Conditions	unit
Maximum Supply Voltage	V_{CC}max	8		-0.3 to +18 V
Input Voltage	V_{IN}	1,2,3		-0.3 to V_{CC} V
Output Voltage	V_{OUT}	14		-0.3 to +8 V
	$V_{OUT(D)}$	9 to 13	$V_{OUT(D)} \leqq V_{CC}$ at output (D_1 to D_5) OFF	-0.3 to +10 V
Reference Flow-out Current	I_{ref}	5		-1.0 to 0 mA
Allowable Power Dissipation	$P_d$max		Without heat sink	1.3 W
			With 50 x 50 x 1 mm³ Al plate	2.15 W
Operating Temperature	Topg			-10 to +60 °C
Storage Temperature	Tstg			-40 to +125 °C

(Note)

- A voltage of V_{CC} + 0.3V or more must not be applied to the input and output pins.
- For the details of allowable power dissipation, refer to the Pd - Ta characteristics.

Allowable Operating Conditions at Ta=25°C

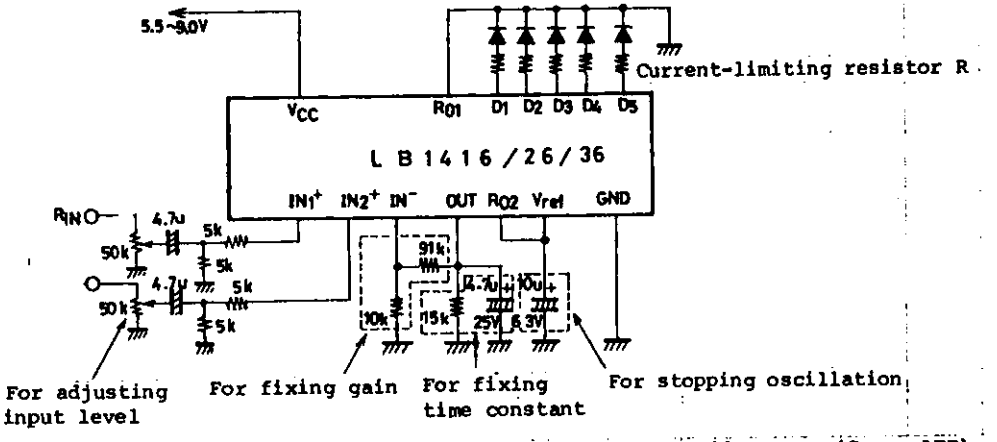
		Pin No.	Conditions	unit
Supply Voltage	V_{CC}	8		+5 to +16 V
Input Voltage	V_{IN1+2}	2,3		-0.3 to V_{CC} V
Output Pin Load Resistance	$R_{L\,OUT}$	14	Between OUT (pin14) and GND (pin7).	15k to 20k ohm

Electrical Characteristics at T_a=25°C, V_{CC}=5 to 16V

		Pin No.	Conditions	min	typ	max	unit
Input Bias Current (Amplifier)	$I_{DC}(IN^-)$	1	V_{IN}^-=0V, V_{IN1}^+=V_{IN2}^+=1V	-4		0	uA
	$I_{DC}(IN1^+)$	2	V_{IN}^-=1V, V_{IN1}^+=V_{IN2}^+=0V	-2		0	uA
	$I_{DC}(IN2^+)$	3	V_{IN}^-=1V, V_{IN1}^+=V_{IN2}^+=0V	-2		0	uA
Input Bias Current (Comparator)	$I_{DC}(-C)$	4,6	V_{IN}^-=0V, V_{IN1}^+=V_{IN2}^+=1V, V_{RO1}=V_{RO2}=0V	-5		0	uA
	$I_{DC}(+C)$	14	V_{IN}^-=1V, V_{IN1}^+=V_{IN2}^+=0V, V_{OUT}=0V, V_{RO1}=V_{RO2}=V_{ref}	-5		0	uA
Amplifier Offset Voltage (Amplifier)	$V_{OFF}(1)$	14	V_{CC}=6 to 12V, amp gain= 20dB	-150		+150	mV
	$V_{OFF}(2)$	14	V_{CC}=6 to 12V, amp gain= 20dB	-150		+150	mV
Reference Voltage	V_{ref}	5	I_{ref}=0 to -0.3mA	2.6		3.0	V
Pin D Output Current D1 to D5	$I_{OL}(D)$	9 to 13	V_{IN}^-=0V, V_{IN1}^+=V_{IN2}^+=1V, $V_{D1\ to\ 5}$=2.0 to 2.3V	-25	-18	-10	mA
Pin D Output Leak Current	$I_{OFF}(D)$	9 to 13	V_{IN}^-=1V, V_{IN1}^+=V_{IN2}^+=0V, $V_{D1\ to\ 5}$=0V	-50		0	uA
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
	$I_{OH}(2)$	14	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	VG1		Open loop	30			dB
	VG2		Open loop	30			dB

Sample Application Circuit

1. VU meter (Using one IC)

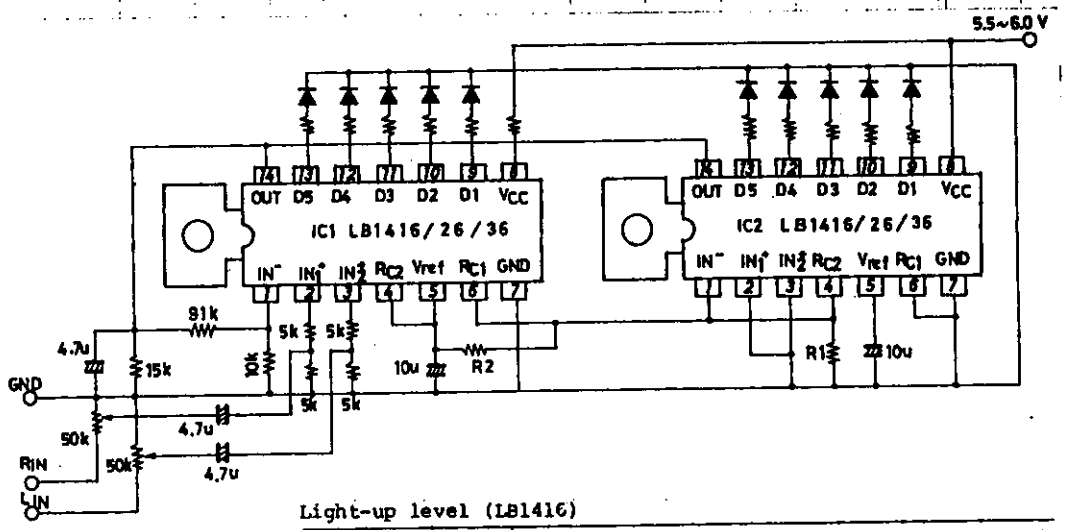


R=0ohm : LED current 18mA typ. (Green LED)

R=150ohms : LED current 6mA typ. (Red LED)

(Note) Use a heat sink so that Pdmax. is not exceeded.

2. VU meter (Using two IC's)



Light-up level (LB1416)

R1	R2	LED No.	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
3.3k	3.3k	dB (typ.)	-18	-13	-8	-5	-2	-1	0	1.5	2.5	4
2.2k	3.9k		-19	-14	-9	-6	-3	-1.5	0	2	3	5

The variation in the resistance ratio of R1, R2 is desirable to be within ±10%.