

SANYO	No.1410B	LB1403N SERIES
5-Dot Red/Green LED Level Meter		

Use

- . AC level meters such as VU meters.
- . DC level meters such as signal meters.

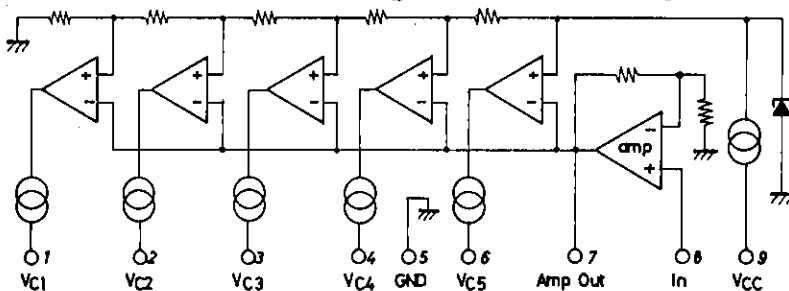
Features and Functions

- . Capable of generating a bar-display for input voltage with 5 LEDs.
- . Operates from either AC or DC input voltage because of on-chip rectifier amplifier.
- . Lighting levels remain stable to line regulation because of on-chip voltage reference.
- . LEDs are driven by a constant current ; stable to line regulation.
- . Power supply voltage range is wide (3.5 to 16V), for a wide range of applications.
- . Five types of ICs constitute the series with various lighting levels of the LEDs and driving currents.
- . SEP-9 pin package and fewer externally connected components result in smaller space requirements on the circuit board.
- . Low noise at LED lighted mode

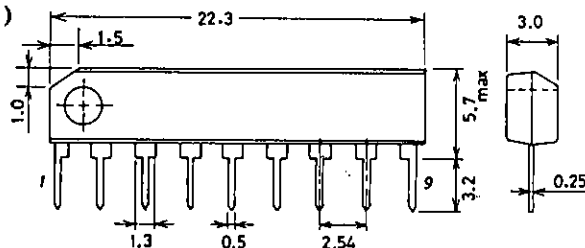
LB1403N Series

Type No.	V _{C3} lighting sensitivity	Comparator level	Constant LED current
LB1403N	85 mVrms typ	+6dB,+3dB,0dB,-5dB,-10dB	15 mA typ
LB1413N	105 mVrms typ	1.67V _{C3} ,1.33V _{C3} ,V _{C3} ,0.67V _{C3} ,0.33V _{C3}	15 mA typ
LB1423N	85 mVrms typ	+6dB,+3dB,0dB,-5dB,-10dB	7 mA typ
LB1433N	105 mVrms typ	1.67V _{C3} ,1.33V _{C3} ,V _{C3} ,0.67V _{C3} ,0.33V _{C3}	7 mA typ
LB1443N	85 mVrms typ	+6dB,+3dB,0dB,-6dB,-12dB	15 mA typ

Equivalent Circuit Block Diagram and Pin Assignment



Package Dimensions 3017B-S9IC
(unit: mm)



SANYO: SEP9

SANYO Electric Co., Ltd. Semiconductor Business Headquarters
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110 JAPAN

LB1403N, 1413N, 1423N, 1433N, 1443N

Absolute Maximum Ratings[LB1403N, 1413N, 1423N, 1433N, 1443N] at Ta=25°C unit

Maximum Supply Voltage	V _{CC} max	18	V
Allowable Power Dissipation	P _d max	1100	mW
Operating Temperature	T _{opr}	-25 to +75	°C
Storage Temperature	T _{stg}	-55 to +125	°C

Allowable Operating Conditions[LB1403N, 1413N, 1423N, 1433N, 1443N] at Ta=25°C

Supply Voltage	V _{CC}	min	typ	max	unit
		3.5	6	16	V

Electrical Characteristics[LB1403N] at Ta=25°C, V_{CC}=6V, f=1kHz min typ max unit

Current Dissipation	I _{CC}	V _{IN} =0	5	8	mA
Sensitivity	V _{IN}	Vc3 on-level	74	85	96 mVrms
Comparator Level 1	Vc1		-11.5	-10	-8.5 dB
Comparator Level 2	Vc2		-6	-5	-4 dB
Comparator Level 3	Vc3	Point of adjustment		0	dB
Comparator Level 4	Vc4		2.5	3	3.5 dB
Comparator Level 5	Vc5		5	6	7 dB
LED Constant Current	I _{LED}		11	15	18.5 mA
Input Bias Current	I _{INO}		-1.0	-0.3	µA

Electrical Characteristics[LB1413N] at Ta=25°C, V_{CC}=6V, f=1kHz min typ max unit

Current Dissipation	I _{CC}	V _{IN} =0	5	8	mA
Sensitivity	V _{IN}	Vc3 on-level	91	105	119 mVrms
Comparator Level 1	Vc1		0.28	0.33	0.40 mVrms
			·Vc3	·Vc3	·Vc3
Comparator Level 2	Vc2		0.59	0.67	0.75 mVrms
			·Vc3	·Vc3	·Vc3
Comparator Level 3	Vc3	Point of adjustment		V _{IN}	mVrms
Comparator Level 4	Vc4		1.25	1.33	1.42 mVrms
			·Vc3	·Vc3	·Vc3
Comparator Level 5	Vc5		1.48	1.67	1.87 mVrms
			·Vc3	·Vc3	·Vc3
LED Constant Current	I _{LED}		11	15	18.5 mA
Input Bias Current	I _{INO}		-1.0	-0.3	µA

Electrical Characteristics[LB1423N] at Ta=25°C, V_{CC}=6V, f=1kHz min typ max unit

Current Dissipation	I _{CC}	V _{IN} =0	5	8	mA
Sensitivity	V _{IN}	Vc3 on-level	74	85	96 mVrms
Comparator Level 1	Vc1		-11.5	-10	-8.5 dB
Comparator Level 2	Vc2		-6	-5	-4 dB
Comparator Level 3	Vc3	Point of adjustment		0	dB
Comparator Level 4	Vc4		2.5	3	3.5 dB
Comparator Level 5	Vc5		5	6	7 dB
LED Constant Current	I _{LED}		5	7	9.5 mA
Input Bias Current	I _{INO}		-1.0	-0.3	µA

Electrical Characteristics[LB1433N] at Ta=25°C, V_{CC}=6V, f=1kHz min typ max unit

Current Dissipation	I _{CC}	V _{IN} =0	5	8	mA
Sensitivity	V _{IN}	Vc3 on-level	91	105	119 mVrms
Comparator Level 1	Vc1		0.28	0.33	0.40 mVrms
			·Vc3	·Vc3	·Vc3
Comparator Level 2	Vc2		0.59	0.67	0.75 mVrms
			·Vc3	·Vc3	·Vc3
Comparator Level 3	Vc3	Point of adjustment		V _{IN}	mVrms

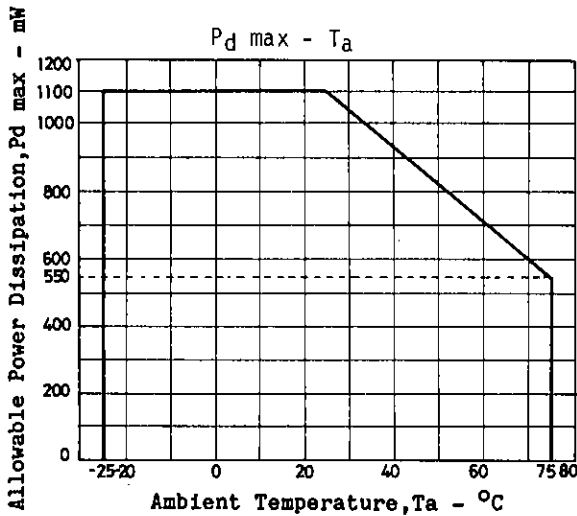
Continued on next page.

Continued from preceding page.

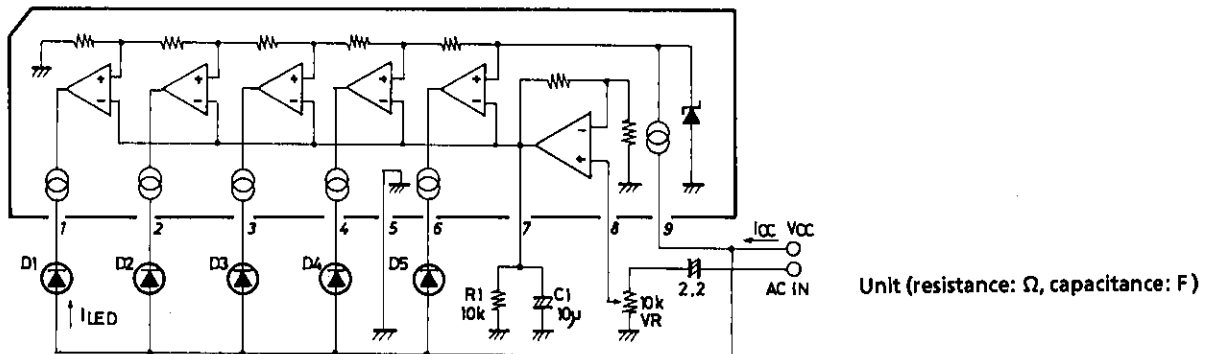
		min	typ	max	unit
Comparator Level 4	Vc4	1.25	1.33	1.42	mVrms
Comparator Level 5	Vc5	1.48	1.67	1.87	mVrms
LED Constant Current	I_{LED}	5	7	9.5	mA
Input Bias Current	I_{INO}	-1.0	-0.3		μA

Electrical Characteristics [LB1443N] at $T_a=25^\circ C, V_{CC}=6V, f=1kHz$

		min	typ	max	unit	
Current Dissipation	I_{CC}	$V_{IN}=0$	5	8	mA	
Sensitivity	V_{IN}	Vc3 on-level	74	85	mVrms	
Comparator Level 1	Vc1	-14	-12	-10	dB	
Comparator Level 2	Vc2	-7	-6	-5	dB	
Comparator Level 3	Vc3	Point of adjustment			0	dB
Comparator Level 4	Vc4	2.5	3	3.5	dB	
Comparator Level 5	Vc5	5	6	7	dB	
LED Constant Current	I_{LED}	11	15	18.5	mA	
Input Bias Current	I_{INO}	-1.0	-0.3		μA	



Sample Application Circuit and Test Circuit (AC input VU meter)



* Capacitor to be omitted when used as a DC-input signal meter.

- C_1, R_1 time constant:
The response time can be varied by varying the C_1, R_1 time constant (mainly the C_1 value).

Continued on next page.

Continued from preceding page.

When the C_1, R_1 time constant is larger:

..... The response time (attack time and release time) is made slower.

When the C_1, R_1 time constant is smaller:

..... The response time (attack time and release time) is made faster.

. Considerations relative to P_d max of the package:

Due to the constant current I_{LED} , most of the power consumed by the circuits is consumed within the IC.

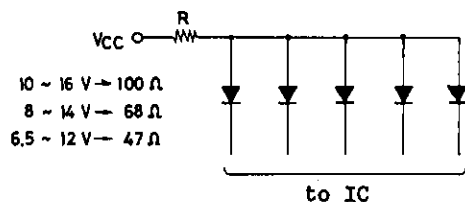
When lighting the five LEDs continuously for a prolonged length of time, make sure that V_{CC} does not exceed:

LB1403N, 1413N, 1443N $V_{CC}=9V$

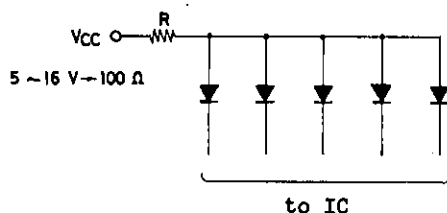
LB1423N, 1433N $V_{CC}=14V$

When using a higher power supply voltage, insert a resistor in series with the LEDs to restrain the power consumed within the IC package.

For LB1403N, 1413N, 1443N:



For LB1423N, 1433N:



■ No products described or contained herein are intended for use in surgical implants, life-support systems, aerospace equipment, nuclear power control systems, vehicles, disaster/crime-prevention equipment and the like, the failure of which may directly or indirectly cause injury, death or property loss.

■ Anyone purchasing any products described or contained herein for an above-mentioned use shall:

- ① Accept full responsibility and indemnify and defend SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors and all their officers and employees, jointly and severally, against any and all claims and litigation and all damages, cost and expenses associated with such use:
- ② Not impose any responsibility for any fault or negligence which may be cited in any such claim or litigation on SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors or any of their officers and employees jointly or severally.

■ Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production. SANYO believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.