M51911L
M51912L

6-STEP BAR TYPE LED LEVEL INDICATOR

DESCRIPTION

The M51911L/M51912L is a semiconductor integrated circuit consisting of a circuit designed for LED level meters.
It is capable of bar type display for 6 LEDs according to a input level. AC or DC signal can be inputed because of built-in superior half-wave rectification OP Amp. Output is a cascade connection of a pair of LEDs, so current for display is half. Display level of the M51911L is logarithmical scale, +3, 0, −3, −7, −12, −18dB.

The M51912L is a companion products to the M51911L, display level is linear scale, 208mV step.

FEATURES

- Built-in superior half-wave rectification OP Amp.
  Cut off frequency ····· 500kHz(typ.)
  Input offset voltage ····· 2mV(typ.)
- Output current is decided by internal circuit, so has few external parts. ····· I_O=13mA(typ.)
- Built-in reference voltage for threshold level It has little dependence on supply voltage and temperature ····· V_{REF}=1.25V(typ.)
- Range of supply voltage in wide ····· 4 ~15V
- Amp gain is decided by internal circuit ····· 17dB(typ.)

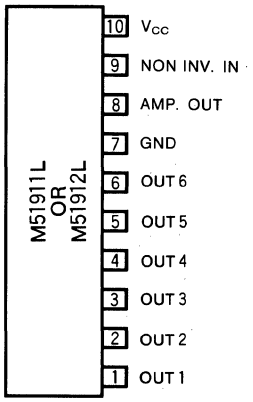
APPLICATION

Signal meters, VU meters, tuning meters, and other general display applications.

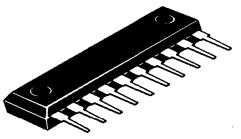
RECOMMENDED OPERATING CONDITIONS

Supply voltage range ····· 4 ~15V
Rated supply voltage ····· 9V±10%

PIN CONFIGURATION (TOP VIEW)

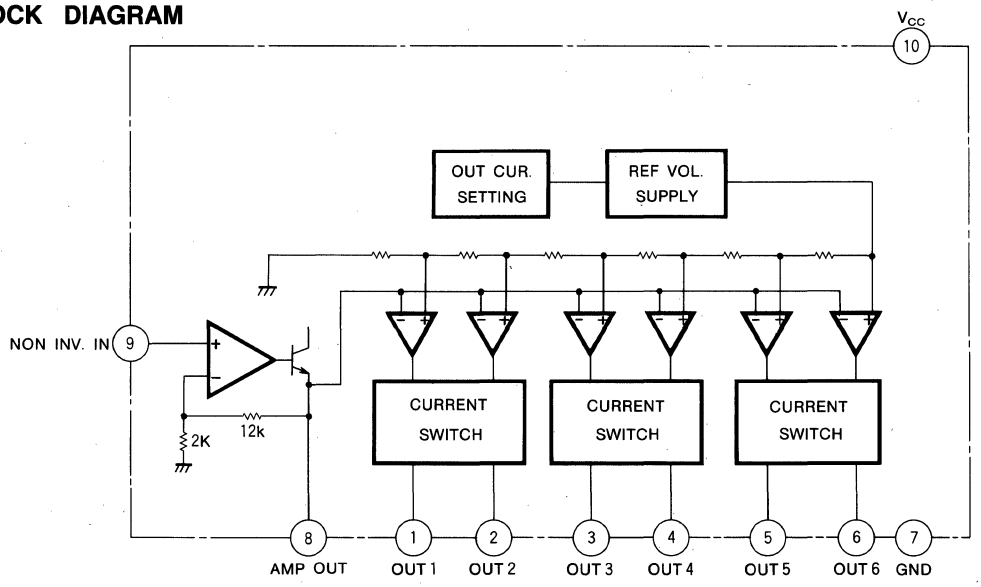


Outline 10P5



10-pin molded plastic SIL

BLOCK DIAGRAM



MITSUBISHI ELECTRIC

ABSOLUTE MAXIMUM RATINGS (T_a=25℃, unless otherwise noted)

Symbol	Parameter	Conditions	Limits	Unit
V_{CC}	Supply voltage		16	V
BV_O	Output voltage		16	V
V_{IN}	Input voltage	Pin⑨—GND	−2～V_{CC}	V
$I_⑧$	Pin⑧ issued current		−1	mA
$V_⑧$	Pin⑧ voltage	Pin⑧—GND	6	V
P_d	Power dissipation		1100	mW
K_θ	Thermal derating	T_a≧25℃	8.8	mW/℃
T_{opr}	Operating temperature		−20～+75	℃
T_{stg}	Storage temperature		−40～+125	℃

M51911L
ELECTRICAL CHARACTERISTICS (T_a=25℃, V_{CC}=9V)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
V_{CC}	Supply voltage range		4.0		16.0	V
I_{CC1}	Circuit current	All outs are off, V⑨=0V		3.5	5.6	mA
I_{CC2}	Circuit current	All outs are on, V⑨=200mV		4.0	6.4	mA
I_{IB}	Input amp bias current	V⑨=0V	−500	−150		nA
A_V	Input amp gain			17		dB
V_{th1}	OUT 1 threshold voltage	Amp gain=17dB Threshold voltage is V⑨—GND	6.3	11.2	16.8	mV_{rms}
			−23	−18	−14.5	dB
V_{th2}	OUT 2 threshold voltage		16.8	22.5	28.3	mV_{rms}
			−14.5	−12	−10	dB
V_{th3}	OUT 3 threshold voltage		33.7	40	47.6	mV_{rms}
			−8.5	−7	−5.5	dB
V_{th4}	OUT 4 threshold voltage		56.6	63.5	71.3	mV_{rms}
			−4	−3	−2	dB
V_{th5}	OUT 5 threshold voltage		79.9	89.7	100.6	mV_{rms}
			−1	0	+1	dB
V_{th6}	OUT 6 threshold voltage		112.9	126.6	142.2	mV_{rms}
			+2	+3	+4	dB
I_O	Output sink current		8.5	13	18	mA
I_{OL}	Output leakage current	Output voltage=V_{CC}			1	μA
$R_⑧$	Pin⑧ internal resistor	V⑧=0.3V	9	14	19	kΩ

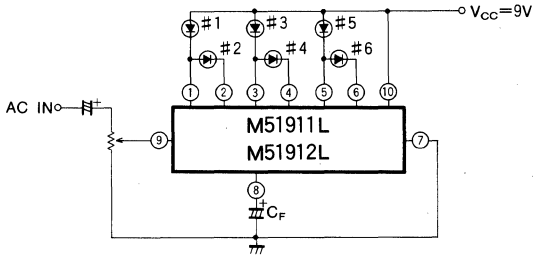
M51912L
ELECTRICAL CHARACTERISTICS (T_a=25℃, V_{CC}=9V)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
V_{CC}	Supply voltage range		4		16	V
I_{CC1}	Circuit current	All outs are off, V⑨=0V		3.5	5.6	mA
I_{CC2}	Circuit current	All outs are on, V⑨=200mV		4	6.4	mA
I_{IB}	Input amp bias current	V⑨=0V	−500	−150		nA
A_V	Input amp gain			17		dB
V_{th1}	OUT 1 threshold voltage	Amp gain=17dB Threshold voltage is V⑨−GND	22	29	36	mV
V_{th2}	OUT 2 threshold voltage		49	59	69	mV
V_{th3}	OUT 3 threshold voltage		75	89	103*	mV
V_{th4}	OUT 4 threshold voltage		102*	119	136*	mV
V_{th5}	OUT 5 threshold voltage		128*	149	170*	mV
V_{th6}	OUT 6 threshold voltage		153*	179	205	mV
I_O	Output sink current		8.5	13	18	mA
I_{OL}	Output leakage current	Output voltage=V_{CC}			1	μA
$R_⑧$	Pin⑧ internal resistor	V⑧=0.3V	9	14	19	kΩ

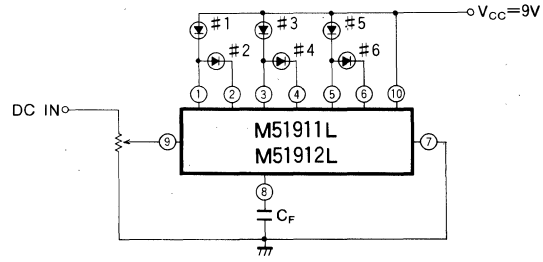
(NOTES : *No overlap in a IC)

APPLICATION EXAMPLES

(1) AC input application circuit



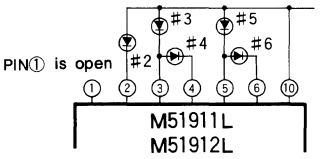
(2) DC input application circuit



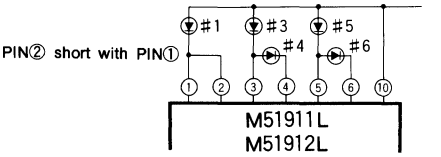
Note : 1. Output current is decided by internal circuit : 13mA(typ.)
2. Amp gain is decided by internal resistor : 17dB(typ.)
3. Recovery time : CF×14kΩ(typ.)
4. Attack time : CF×430Ω(typ.)

(3) In case of use fewer than 6 pieces of LED

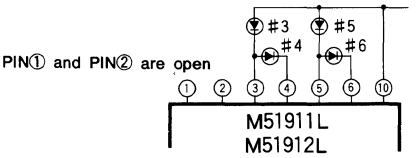
1. In case of no use of #1 LED



2. In case of no use of #2 LED

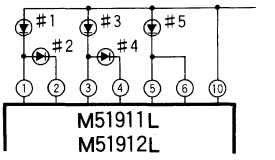


3. In case of no use of #1 and #2 LEDs



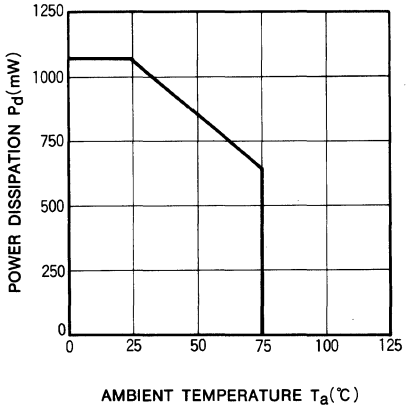
4. In case of no use of some of #3~#6 LEDs

Connect similar to 1 ~ 3 according that the number of LED is odd or even. For example in case of no use of #6 LED connect similar to the case of no use of #2 LED.

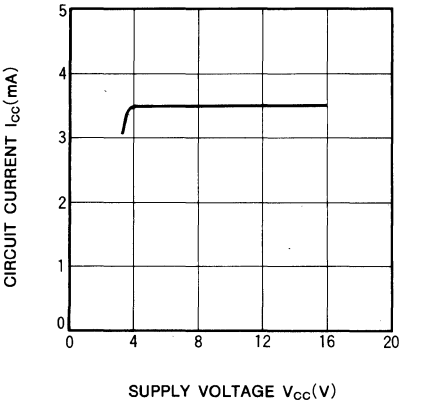


TYPICAL CHARACTERISTICS (T_a=25℃, V_{CC}=9V, unless otherwise noted)

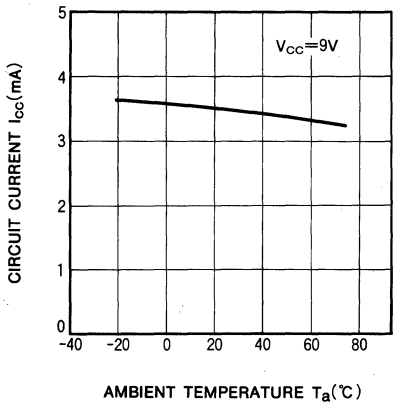
THERMAL DERATING (MAXIMUM RATING)



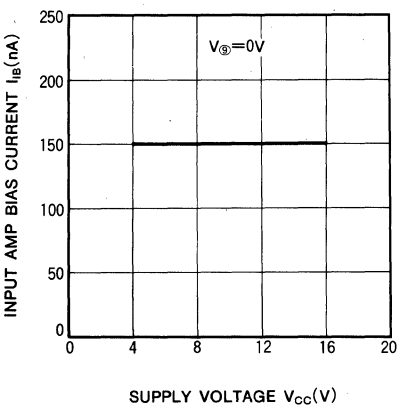
CIRCUIT CURRENT VS SUPPLY VOLTAGE



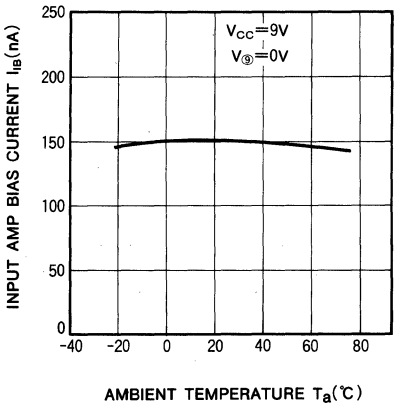
CIRCUIT CURRENT VS AMBIENT TEMPERATURE



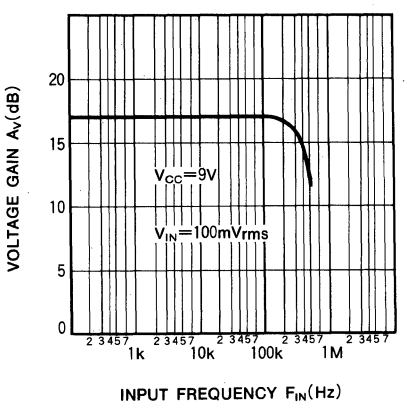
INPUT AMP BIAS CURRENT VS SUPPLY VOLTAGE



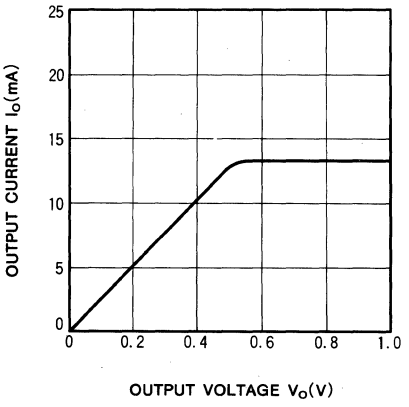
INPUT AMP BIAS CURRENT VS AMBIENT TEMPERATURE



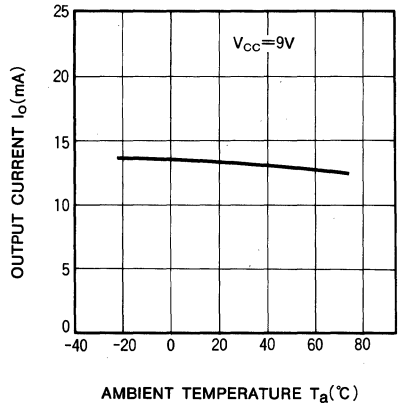
VOLTAGE GAIN VS INPUT FREQUENCY



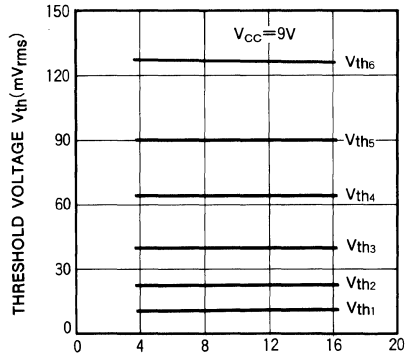
OUTPUT CURRENT VS OUTPUT VOLTAGE



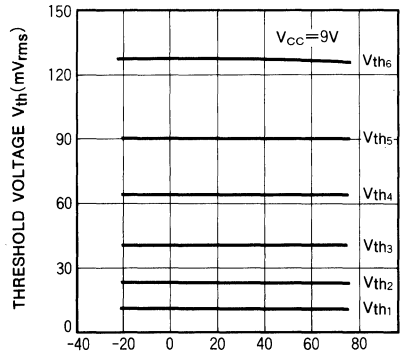
OUTPUT CURRENT VS AMBIENT TEMPERATURE



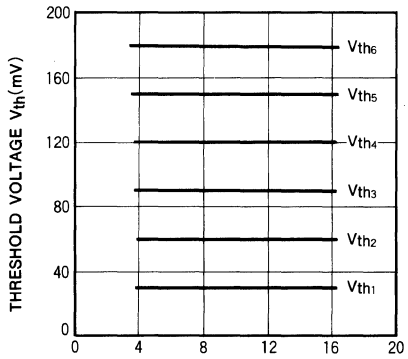
THRESHOLD VOLTAGE VS SUPPLY VOLTAGE (M51911L)



THRESHOLD VOLTAGE VS AMBIENT TEMPERATURE (M51911L)



THRESHOLD VOLTAGE VS SUPPLY VOLTAGE (M51912L)



THRESHOLD VOLTAGE VS AMBIENT TEMPERATURE (M51912L)