M51849L,FP

COUNTER TIMER

DESCRIPTION

The M51849 is a semiconductor integrated circuit designed for controller of long time delay, consisting of 11 stage divider by IIL. The time base period of oscillator is extended 1024 times, determing by the 11 stage divider by ILL, and the maximum output period is 10 hours.

FEATURES

- Timing from 100ms through 10 hr max
- High current output can sink (30mA peak)
- Built-in stabilization zener
- Built-in power on reset

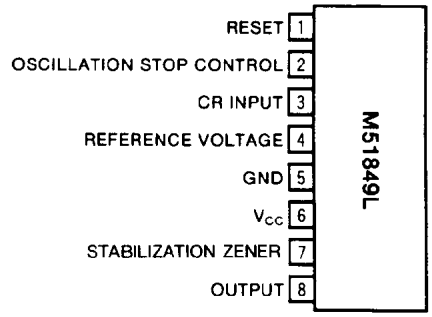
APPLICATION

Precision timing, time delay generation, Ultra-low-frequency oscillator

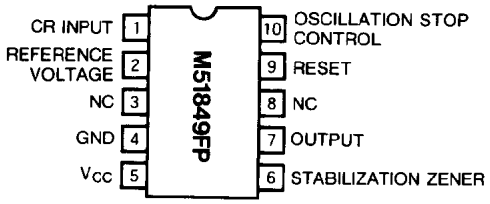
RECOMMENDED OPERATING CONDITIONS

Supply voltage ····· 5V~V_Z(V_Z=pin ⑦ Zener voltage)
Rated supply voltage ····· 6V±10%

PIN CONFIGURATION (TOP VIEW)



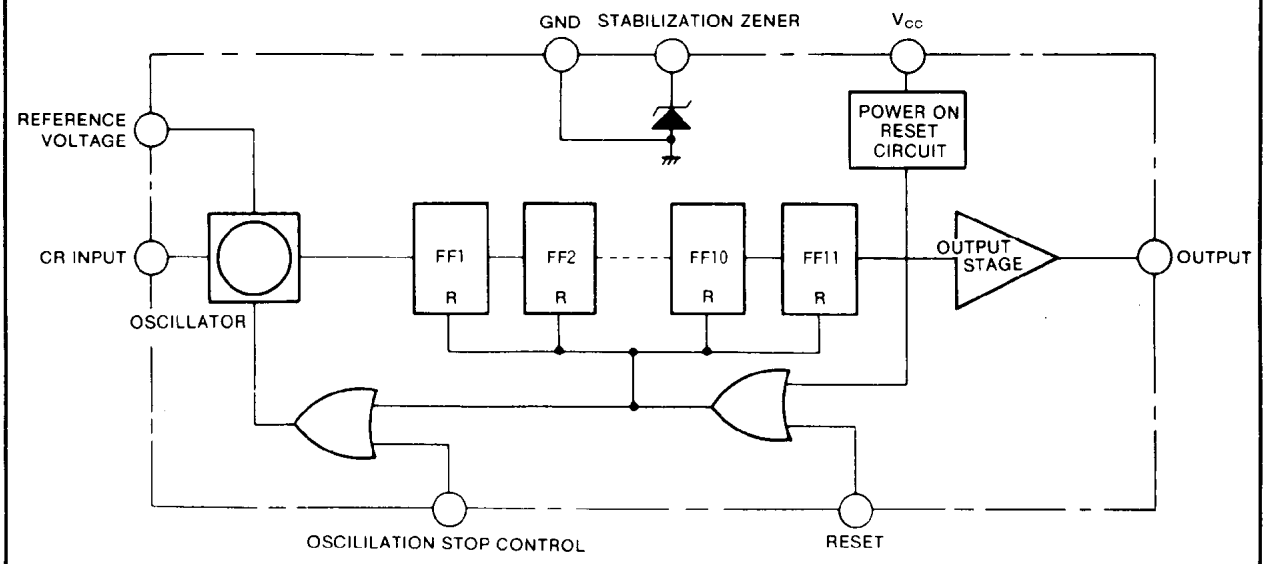
Outline 8P5



Outline 10P2-C

NC : NO CONNECTION

BLOCK DIAGRAM



MITSUBISHI ELECTRIC

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

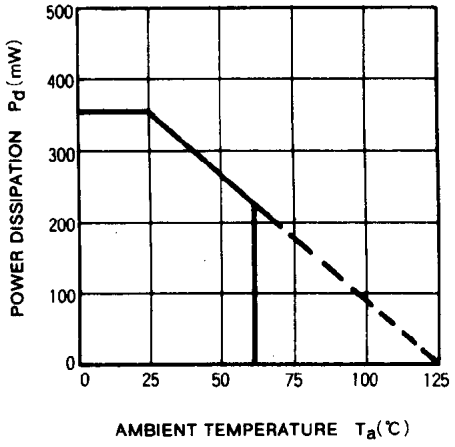
Symbol	Parameter	Conditions	Ratings	Unit
V_{CC}	Supply voltage		7.0	V
I_Z	Zener current		20	mA
I_O	Output sink current		30	mA
P_d	Power dissipation		360 (L/FP)	mW
K_θ	Thermal derating	$T_a \geq 25$℃	3.6 (L/FP)	mW/℃
Topr	Operating temperature		0～+60	℃
Tstg	Storage temperature		−40～+125	℃

ELECTRICAL CHARACTERISTICS (T_a=25℃, V_{CC}=6V unless otherwise noted)

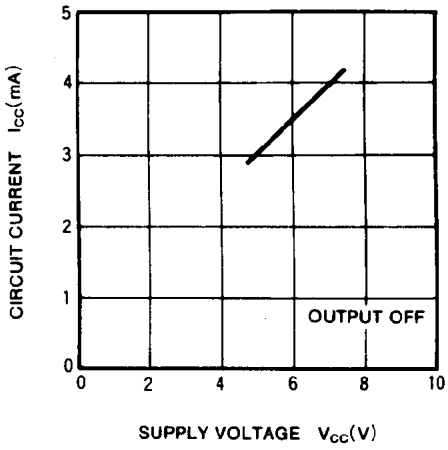
Symbol	Parameter	Test conditton	Limits			Unit
			Min	Typ	Max	
I_{CC}	Circuit current	V_{CC}=6.0V		3.5	6.0	mA
V_Z	Zener voltage	I_Z=1mA	6.0	6.4	6.8	V
V_R	Reset voltage			1.5	1.8	V
I_R	Reset current			0.1		mA
V_{OS}	Oscillation stop voltage			1.6	1.9	V
I_{OS}	Oscillation stop input current			0.1		mA
V_{OH}	High output voltage	I_{source}=10mA	4.0	4.5		V
V_{OL}	Low output voltage	I_{sink}=10mA		0.2	0.6	V
—	Disposion possible time		100			ms
—	Timing accuracy			5.0		%
—	Temperature coefficient			500		ppm/℃
—	Supply voltage rejection ratio			0.1		%/V
—	rise time			150		ns

TYPICAL CHARACTERISTICS (T_a=25℃, unless otherwise noted)

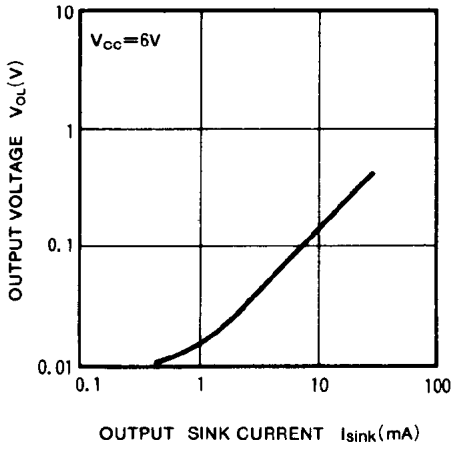
THERMAL DERATING (MAXIMUM RATING)



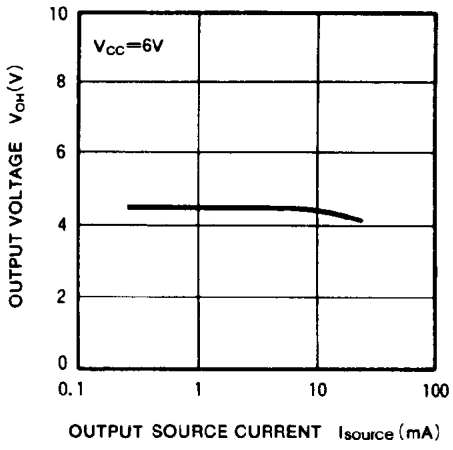
CIRCUIT CURRENT VS. SUPPLY VOLTAGE



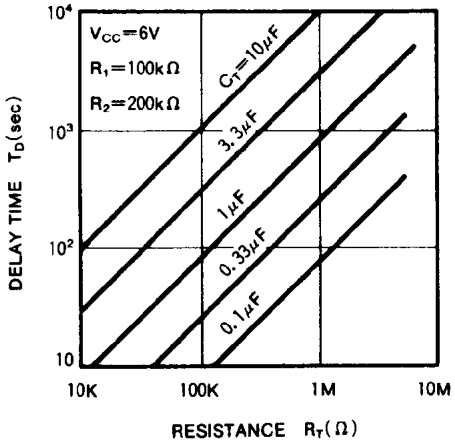
OUTPUT VOLTAGE VS. OUTPUT SINK CURRENT



OUTPUT VOLTAGE VS. OUTPUT SOURCE CURRENT



RESISTANCE VS. DELAY TIME



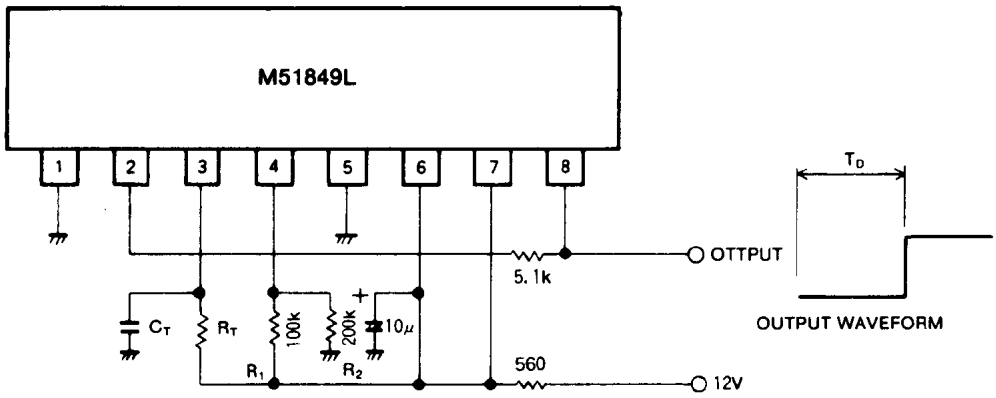
MITSUBISHI ELECTRIC

PIN DESCRIPTION

1. Reset pin <pin①(L), pin⑨(FP)>
   This pin is used to stop counter operation. If the pin is in the high state, the counter is cleared and oscillation is stopped. Connect this pin to GND, if not used.
2. Oscillation stop control pin <pin②(L), pin⑩(FP)>
   If the pin is in the high state, the oscillation stops. But the status of counter is not maintained, and therefore, if the pin is reset to the low state, timing operation is resumed. Connect the pin to GND, if not used.
3. CR input pin <pin③(L), pin①(FP)>
   The capacitor C_T and resistor R_T are connected to this pin. The oscillation period is given in the following equation. The resistor R_T should be 1kΩ or above.
4. Reference voltage pin <pin④(L), pin②(FP)>
   The highest voltage for the oscillation level is supplied at this pin. The voltage should be set at approximately 2/3 V_{CC} by a variable resistor or resistor division (R_1, R_2). The capacitor C_T is corrected by minutely adjusting this voltage by a variable resistor. The voltage can be set between 0.4V to 0.8V. The oscillator may not function if the voltage is outside this range.
5. Stabilization zener pin <pin⑦(L), pin⑥(FP)>
   A zener diode of approximately 6.4V is connected between this pin and pin ⑤ (GND). Set the resistance so that the zener current is 5mA.
6. Output pin <pin⑧(L), pin⑦(FP)>
   The output voltage changes from the low state to the high state when the oscillation period is 1024 times of T_0, and the voltage returns from the high state to the low state when the period is 2048 times for one cycle. The voltage can sink or source up to 10mA(typ.). Care must be taken in power supply variation in the integrated circuit when the output load current is large.

APPLICATION EXAMPLE

Monostable operation



The delay time in the above application example is given by :

$T_D \fallingdotseq 800 C_T \cdot R_T (sec)$

The timing resistor R_T should be 1kΩ or above.

Precautions for use

1. CR input pin <pin③(L), pin①(FP)> must not be directly connected to V_{CC} to avoid destruction of the integrated circuit.
2. Timing accuracy should be fine-tune to use external resister series with R_T when that need less than ±5%.
3. This integrated operates at ultra-low supply voltage. Therefore it is very sensitive to external noise and is subject to misoperation.
   A capacitor must be connected near the V_{CC} pin <pin ⑥(L), pin⑤(FP)> to avoid noise.