

# APLUS 巨華積體電路(股) AP777- Magic Sensor IC

AP777 is a motion detector IC , This IC uses the variation of electric field to detector a moving object . In order to meet the requirement of different application , this IC has 3 kinds of input pins that can be used to control the range of sensitivities , the sampling time , and the output time duration . A regulator circuit is designed in AP777 to provide a stable power supply for the IC . BUSY is an output pin that will be activated when electric field variation is detected .

## ● Features :

1. Sample rate adjustable .
2. Output duration adjustable, Sensitivity adjustable .
3. Two kinds of polarity .
4. Auto shutdown circuit designed in .
5. Output pattern is mask programmable .
6. Built-in standby circuit . Low cost Sensor .

## ● Electrical Characteristics :

System	Description	Test condition	Limit			Unit
			Min.	Typ	Max.	
VDD	Supply voltage		2.4	3.0	5.0	V
V <sub>IL</sub>	Input voltage low	VDD=3V	-	-	0.3VDD	V
V <sub>IH</sub>	Input voltage high	VDD=3V	0.7VSS			V
VGN		VDD=3V,C <sub>VGN</sub> =2.2uF	-	2.18		V
I <sub>OP</sub>	Operating current	VDD=3V,OSCA=155KHz,OSCvin2=4.3MHz		4.8		mA
I <sub>STB</sub>	Standby current	VDD=3V,OSCA=155KHz,OSCvin2=4.3MHz		0.56		mA
I <sub>STD</sub>	Shut down current	VDD=3V		1		uA
OSCA	Operating frequency	VDD=3V,Rosc=330K		155		KHz

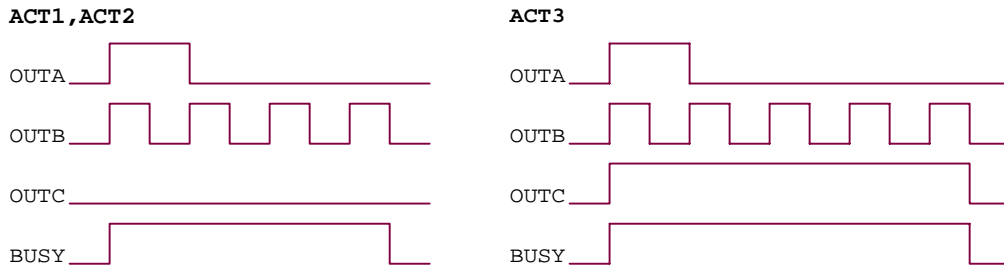
SLA2	SLA1	SLA0		SLC2	SLC1	SLC0		DB	DA	Frequency
0	0	0	最靈敏	0	0	0	Sample rate 的寬度最窄	0	0	OSCvin2 < 14OSCA
0	0	1		0	0	1				
0	1	0	次靈敏	0	1	0	次窄	0	1	OSCvin2 < 28OSCA
0	1	1		0	1	1				
1	0	0		1	0	0		1	0	OSCvin2 < 58OSCA
1	0	1		1	0	1				

## ● OSCA=135KHz

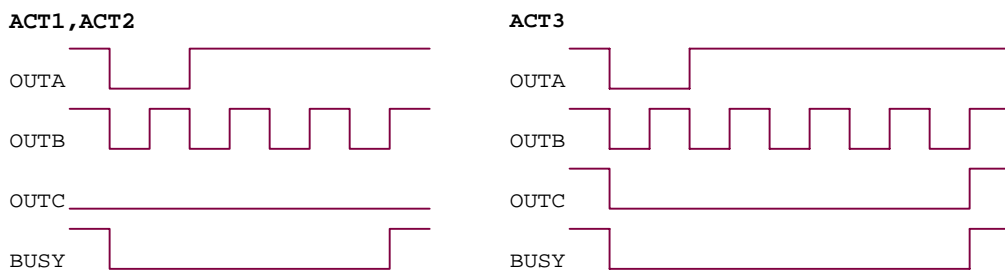
SLB2	SLB1	SLB0	BUSY(Sec.)	OUTA(Sec.)	OUTB(Sec.)	OUTC(Sec.)
0	0	1	0.12	0.03	0.011	0.12
0	1	0	0.24	0.06	0.022	0.24
0	1	1	0.48	0.12	0.044	0.48
1	0	0	0.96	.024	0.088	0.96
1	0	1	1.92	.048	0.176	1.92
1	1	0	3.84	.096	0.352	3.84
1	1	1	7.68	1.94	0.728	7.68

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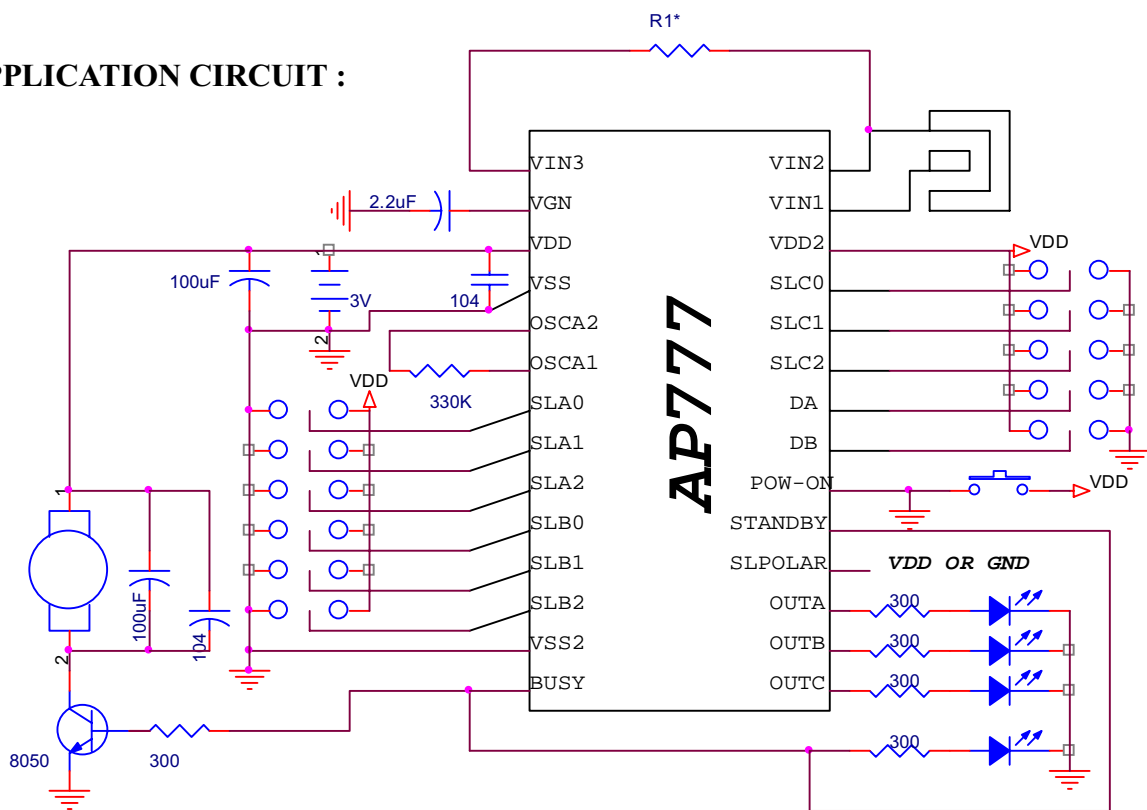
## ● SLPOLAR=VDD



## ● SLPOLAR=GND



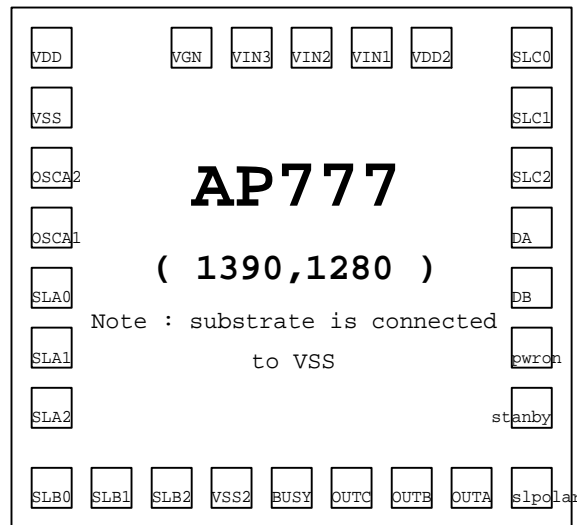
## ● APPLICATION CIRCUIT :



- R1\*會因 VIN1 與 VIN2 鐵片大小而阻值會有所不同,VIN1 的鐵片要比 VIN2 的鐵片小
- DB,DA : 設定頻率範圍(建議使用 01)  
 SLC2~SLC0 : 設定 SAMPLE RATE 的寬度(建議使用 101) .  
 SLB2~SLB0 : 設定 OUTC~OUTA 與 BUSY 的時間(建議使用 110) .  
 SLA2~SLA0 : 設定靈敏度(建議使用 001) .

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● **BONDING PAD DIAGRAM :**



PAD	X ( um )	Y ( um )	PAD	X ( um )	Y ( um )
VIN3	603	1193	OUTC	846	88
VGN	448	1193	OUTB	997	88
VDD	93	1193	OUTA	1149	88
VSS	93	1037	SLPOLAR	1303	88
OSCA2	88	886	STANDBY	1303	279
OSCA1	88	734	PWRON	1303	431
SLA0	88	582	DB	1303	582
SLA1	88	431	DA	1303	734
SLA2	88	279	SLC2	1303	886
SLB0	88	88	SLC1	1303	1037
SLB1	239	88	SLC0	1303	1193
SLB2	391	88	VDD2	1078	1193
VSS2	542	88	VIN1	913	1193
BUSY	694	88	VIN2	758	1193

- SLPOLAR : polarity pin . used to change the polarity of BUSY , OUTA,OUTB,OUTC and STABDBY .
- PWRON : when connect this pin to VSS , AP777 will enter shutdown state, if nothing is detected for a period of time .
- STANDBY : this pin can be used to disable the detecting process of AP777 ,  
If connect this pin to BUSY , then dectecing process will be disable .  
When SLPOLAR pin is high , this pin is high disable .
- OUTA,OUTB,OUTC : LED output drivers . the polarity determined by SLPOLAR .
- BUSY : BUST pin is used to indicate that the system is activated.the polarity of this pin is determined by SLPOLAR pin. When SLPOLAR =1 ,this pin is high active .

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- **POWER MODE SETTING ( By PIN20 )**

- a. Auto Shut-Down (PIN 20 → “0”), IC will shut-down after 2 minutes automatically.  
In this MODE, current consumption is about 5 uA
- b. Stand-By (PIN20 → “1”), Auto-Shut-Down is Disable. Current consumption is about 500uA

- **TRIGGER MODE SETTING (By PIN18,PIN19)**

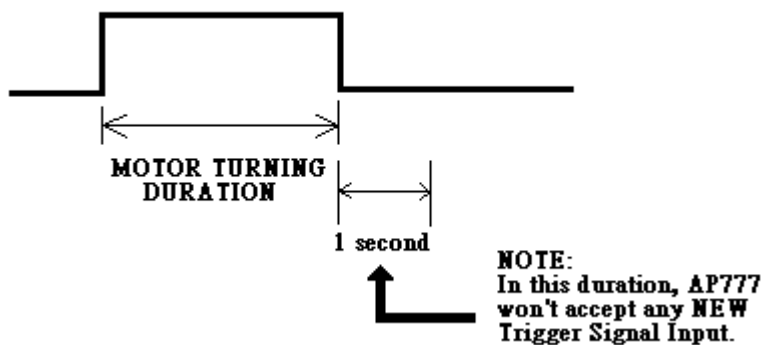
- a. SLPOLAR(PIN18→”0”) ==》 StandBy (PIN19) “0”→ Normal (Retrigger)  
“1”→StandBy(Irretrigger)
- b. SLPOLAR(PIN18→”1”) ==》 StandBy (PIN19) “0”→StandBy(Irretrigger)  
“1”→Normal(Retrigger)

- **LED DRIVING POLARITY SETTING(By PIN 18)**

- a. SLPOLAR(PIN18→”0”) ==》 Active LOW for LED
- b. SLPOLAR(PIN18→”1”) ==》 Active High for LED

- **One second Delay Duration Limited**

When AP777 is triggered and there exists an one-second duration that AP777 will not accept any NEW TRIGGER SIGNAL after motor stopping turning.



- **OUTPUT (PIN 14, PIN15, PIN16, PIN17)**

- a. OUTA (PIN14)→ Busy High /Short Duration
- b. OUTB (PIN15)→ Square Wave Output
- c. OUTC (PIN16)→ becomes High when the hand approaches the sensor most closely
- d. OUTD (PIN17)→ Busy High / Duration depends on the setting of SLB2~0