SUPERVISOR IC for POWER SUPPLY

General Description

The IN1C12VAA is a switching power supply supervisor which monitors voltage and current outputs.

It can minimize external components of switching power supply systems in personal computer.

The Over / Under Voltage Protection (OVP / UVP) monitors V12A input voltage level.

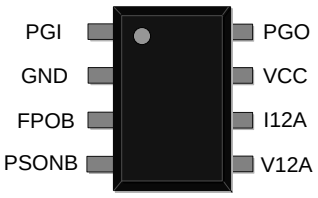
The Over Current Protection (OCP) monitor V12A & I12A input current sense.

When detect the fault voltage level, the FPOB is latched High.

Features

- The Over / Under Voltage Protection (OVP/ UVP) monitors V12A input voltage and the Over Current Protection (OCP) monitor V12A & I12A input current sense.
- 1 ms time delay for UVP.
- 14 us time delay for OVP.
- 370 ms time delay for OCP.
- 300 ms time delay for PGO.
- The UVP/OCP would been disabled when PGI < 1.2V.
- The OVP/UVP are latch mode.
- The OCP is Auto recovery mode.

Pin Configurations



Pin Name	Pin Type	Description
PGI	I	Power good input signal pin
GND	-	Ground. Connect this pin to the circuit ground.
FPOB	O	Fault protection output pin, open drain output
PSONB	I	Input for calibration
V12A	I	over voltage & under voltage & over current sense input pin
I12A	I	over current sense input pin
VCC	I	Power supply
PGO	O	Power good output signal pin, open drain output

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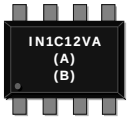
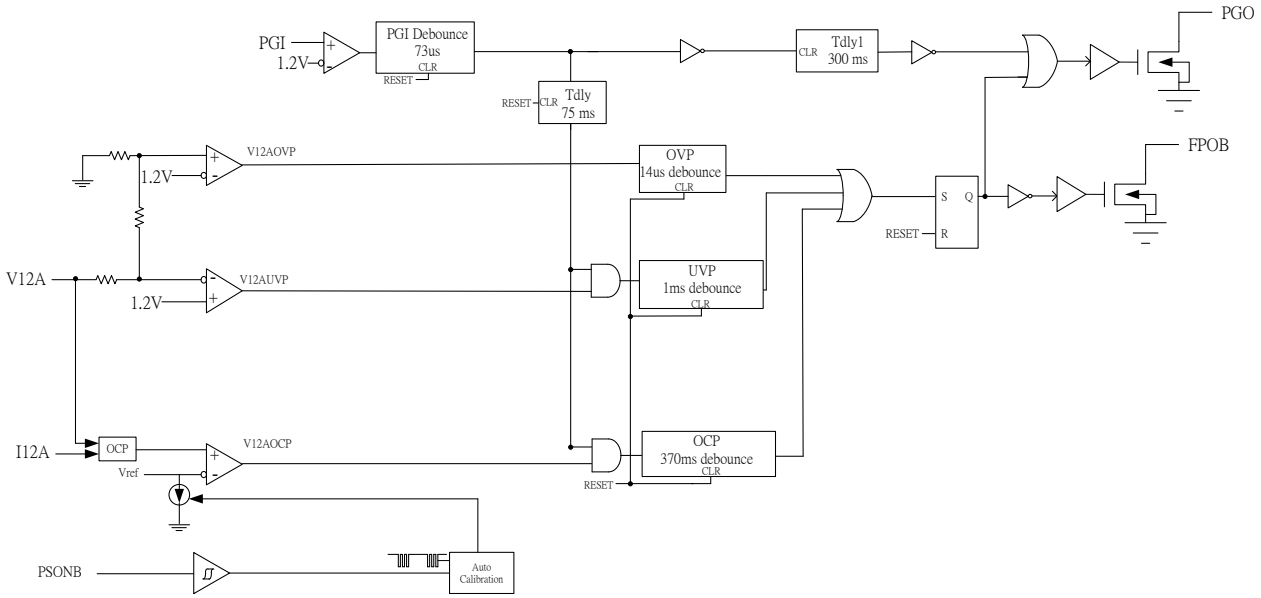
Marking Information



(A) – Lot No.

(B) – Date Code: xxxx

Functional Block Diagram



Absolute Maximum Ratings

Parameter		Min.	Max.	Unit.
Supply Voltage, VCC		-0.3	17.6	V
Input Voltage	PGI, PSONB	-0.3	17.6	V
Input Voltage	V12A, I12A	-0.3	17.6	V
Output Voltage	FPOB	-0.3	17.6	V
ESD Voltage Protection	HBM		4	KV
Operating temperature		-20	85	°C
Storage temperature		-55	150	°C

Recommended Operating Conditions

Parameter		Condition	Min	Typ.	Max.	Un
Supply Voltage, VCC		Normal mode	4	12	16	V
Input Voltage	PGI, PSONB				16	V
Input Voltage	V12A, I12A				16	V
Output Voltage	FPOB				16	V

Electrical Specifications

VDD=16V, T_A=25ºC, unless otherwise noted.

Over Voltage Protection

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Over Voltage threshold	VOVP			14		V

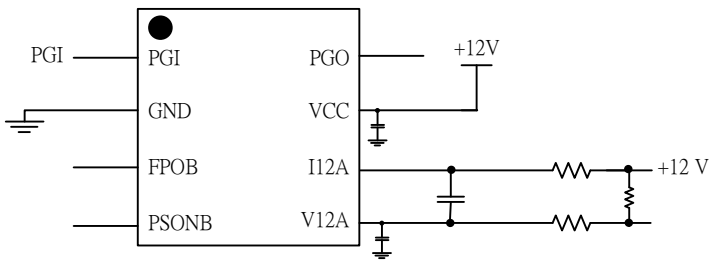
Under Voltage Protection

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Under Voltage threshold	VUVP			9		V

SWITCHING CHARACTERISTICS, Vcc=5V

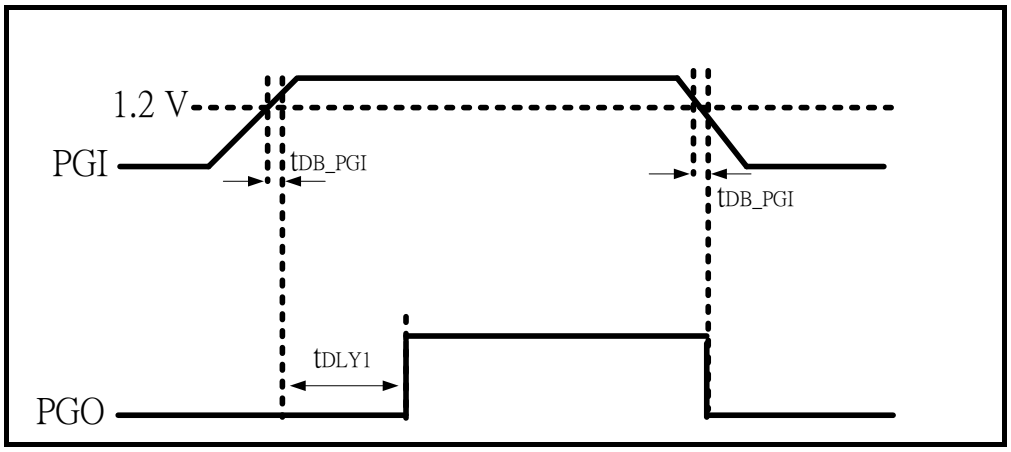
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
De-bounce time for PGI	t_{DB_PGI}			73		us
De-bounce time for UVP	t_{DB_UVP}			1		ms
De-bounce time for OVP	t_{DB_OVP}			14		us
De-bounce time for OCP	t_{DB_OCP}			370		ms
Delay time to enable UVP, OCP	t_{DLY}	PGI > 1.2V		75		ms
Delay time PGI to PGO	t_{DLY1}			300		ms

APPLICATION CIRCUIT

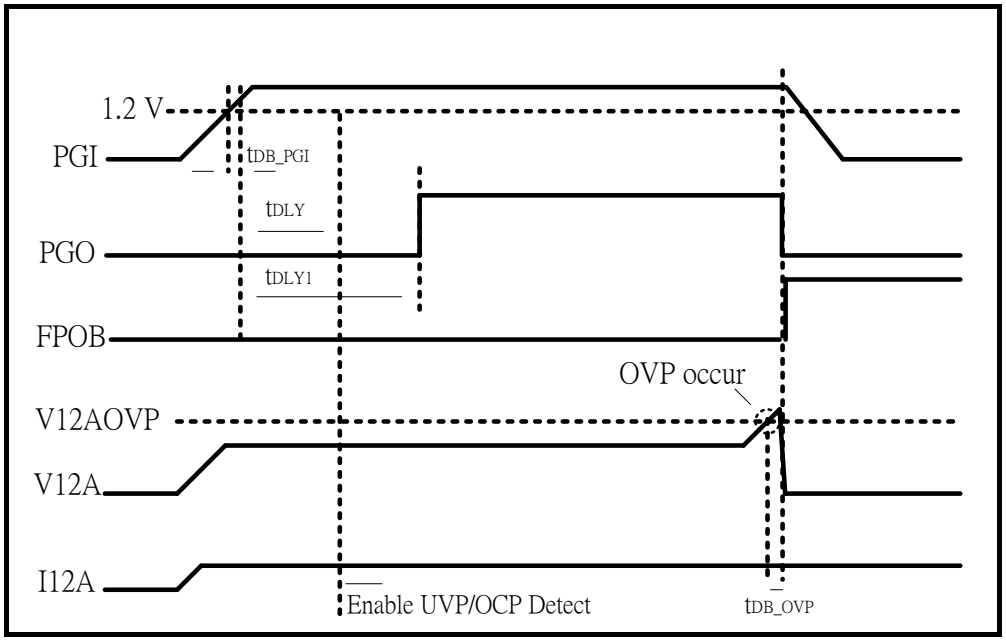


Application Timing Waveform

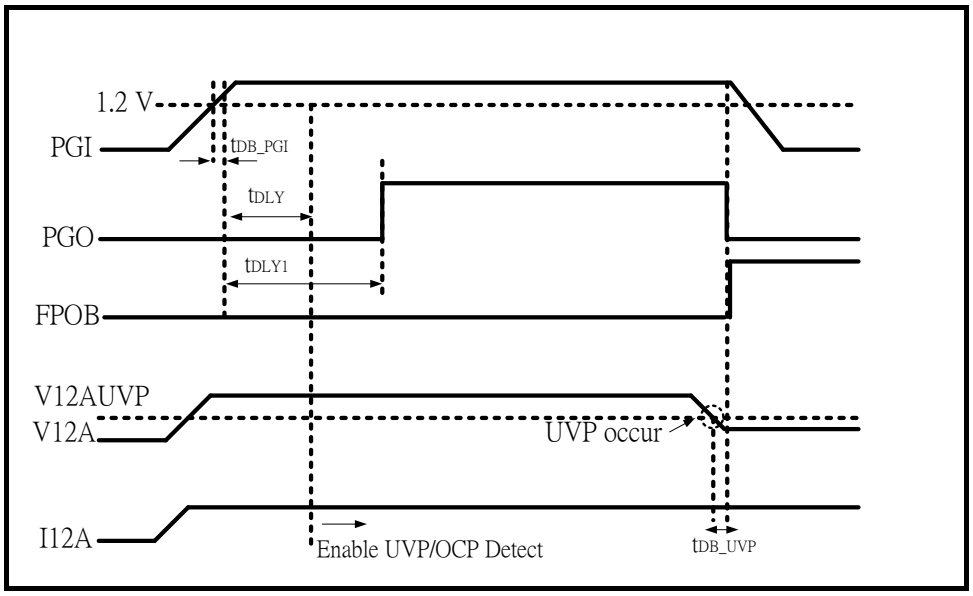
(1) PGI &PGO



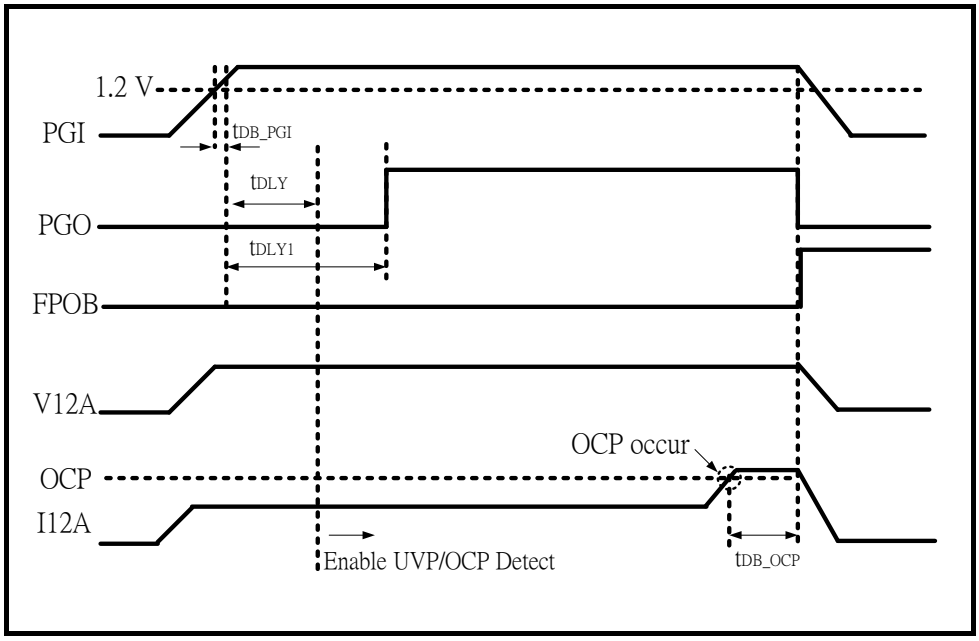
(2) OVP



(3) UVP



(4) OCP

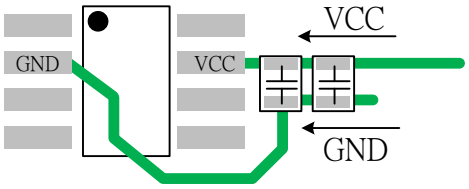


Function table

Function	PGI	PGO	OVP	UVP	OCP	FPOB
VCC<Supply Voltage IC OFF	L	L	N	N	N	L
PGI=L ,OVP	L	L	Y	N	N	H
PGI=L ,UVP Disable	L	L	N	Y	N	L
PGI=L ,OCP Disable	L	L	N	N	Y	L
PGI=H	H	H	N	N	N	L
OVP	H	L	Y	N	N	H
UVP	H	L	N	Y	N	H
OCP	H	L	N	N	Y	H

LAYOUT

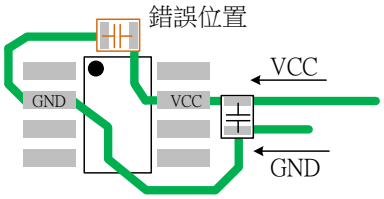
對於IC各腳位的周遭多伴有一些電阻、電容等元件，為了能將各元件的能力有效發揮，因此會定義各個元件的位置、走線路徑、線寬等。如下圖為一般正常的元件擺放及走線示意， VCC, V12A是以先經過兩顆濾波電容，最後才到IC焊點，並且兩顆電容元件應盡可能靠近IC端。



佈局重點：

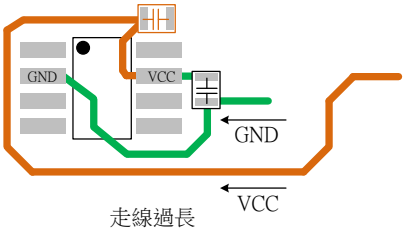
*元件擺放位置：

電容主要是為了對IC做濾波，因此若將電容位置偏離太遠，電容濾波效果有限



*走線路徑：

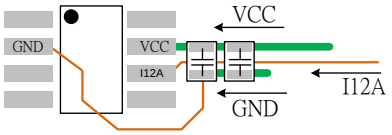
若是因元件擺置位置因此必須採長距離佈線，此時應修正元件及走線方式，必須以最短路徑進行走線



走線過長

*走線寬度：

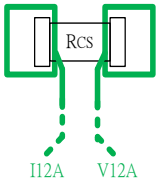
過細的走線恐受到雜訊干擾，同時走線的線阻也較大，因此建議的走線寬度至少要在15mil (0.38mm)以上



走線過細

*取樣位置：

電流的偵測是以電阻兩端的壓降取樣，因此取樣的位置最好是從電阻中心抽頭，不可從電阻周遭大面積鋪銅取樣。鋪銅的阻抗易受溫度影響，重載下發生的阻值變化會影響取樣精準度。另右述I12A, V12A應獨立拉線進入IC，勿與其他功能合併使用避免干擾影響校正取樣準度。



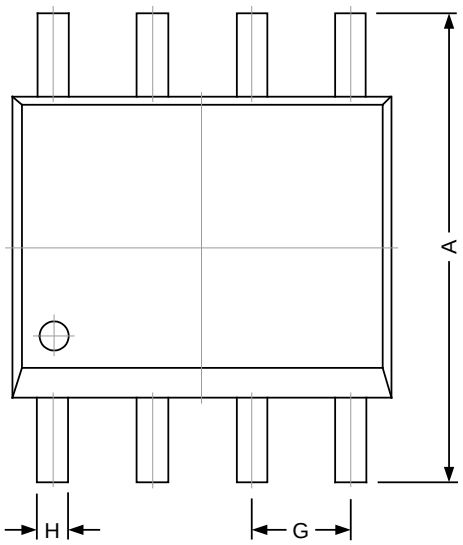
從RCS”中心”引出走線

建議走線

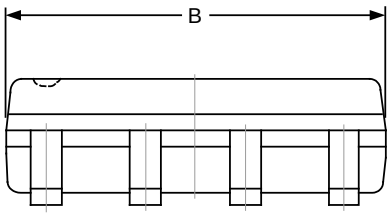
不建議走線

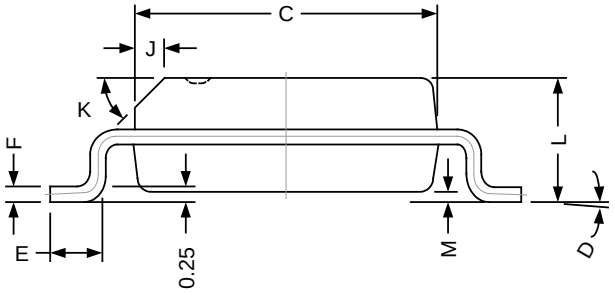
Package Outline

SOP-8



REF.	DIMENSIONS	
	Millimeter	
	Min.	Max.
A	5.80	6.20
B	4.80	5.00
C	3.80	4.00
D	0°	8°
E	0.40	0.90
F	0.19	0.25
M	0.10	0.25
H	0.35	0.49
L	1.35	1.75
J	0.375 REF.	
K	45°	
G	1.27 TYP.	





Revision History

R00_20221228

Initial Release

R01_20230105

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