Data Sheet

Type Description: 4-Channel PC Power Supply Supervisors with OCP

Product Name: CG8525

Reversion: 1.00

Reversion Date: April 26, 2010

Page: 12 Pages

Issue Date: 2010/05/04

CG8525
4-Channel PC Power Supply Supervisors with OCP

Description

The CG8525 is a PC switching power supply monitor with minimum external components. It provides protection circuits, power-good output (PGO), fault protection output (FPOB) and on/off control (PSONB).

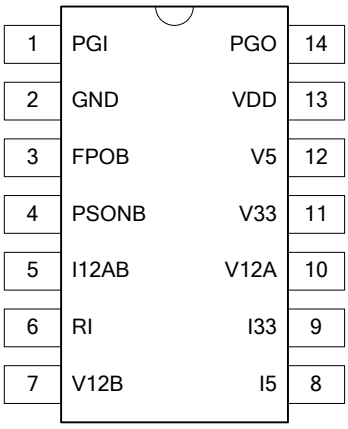
The over-voltage protection (OVP) and under-voltage protection (UVP) monitors V33, V5, V12A and V12B. The over-current protection (OCP) monitors V33&I33, V5&I5, V12A&I12A /I12AB and V12B&I12B/I12AB. When an OV or UV or OC condition is detected, the fault protection output (FPOB) is latched high and the power good output (PGO) go low. PSONB from low to high resets the latch. When OV, UV, OC and PGI are all right, the power good output (PGO) will be issue. A built-in 4ms delay and 38ms debounce for PSONB turn off FPOB.

Features

- Over-voltage protection (OVP) for +3.3V, +5V, +12VA and +12VB supplies
- Under-voltage protection (UVP) for +3.3V, +5V, +12VA and +12VB supplies
- Over-current protection (OCP) for +3.3V, +5V, +12VA and +12VB supplies
- Fault protection output (FPOB) with open drain output
- Power good output (PGO) with open drain output
- 300ms PGO delay time
- 38ms PSONB debounce time
- 35us OVP debounce time
- 73us UVP debounce time
- 20ms OCP debounce time
- 73us PGI debounce time
- 4ms FPOB turn off delay time
- 75ms UVP/OCP delay time

Pin Configuration (Top View)

CG8525-140



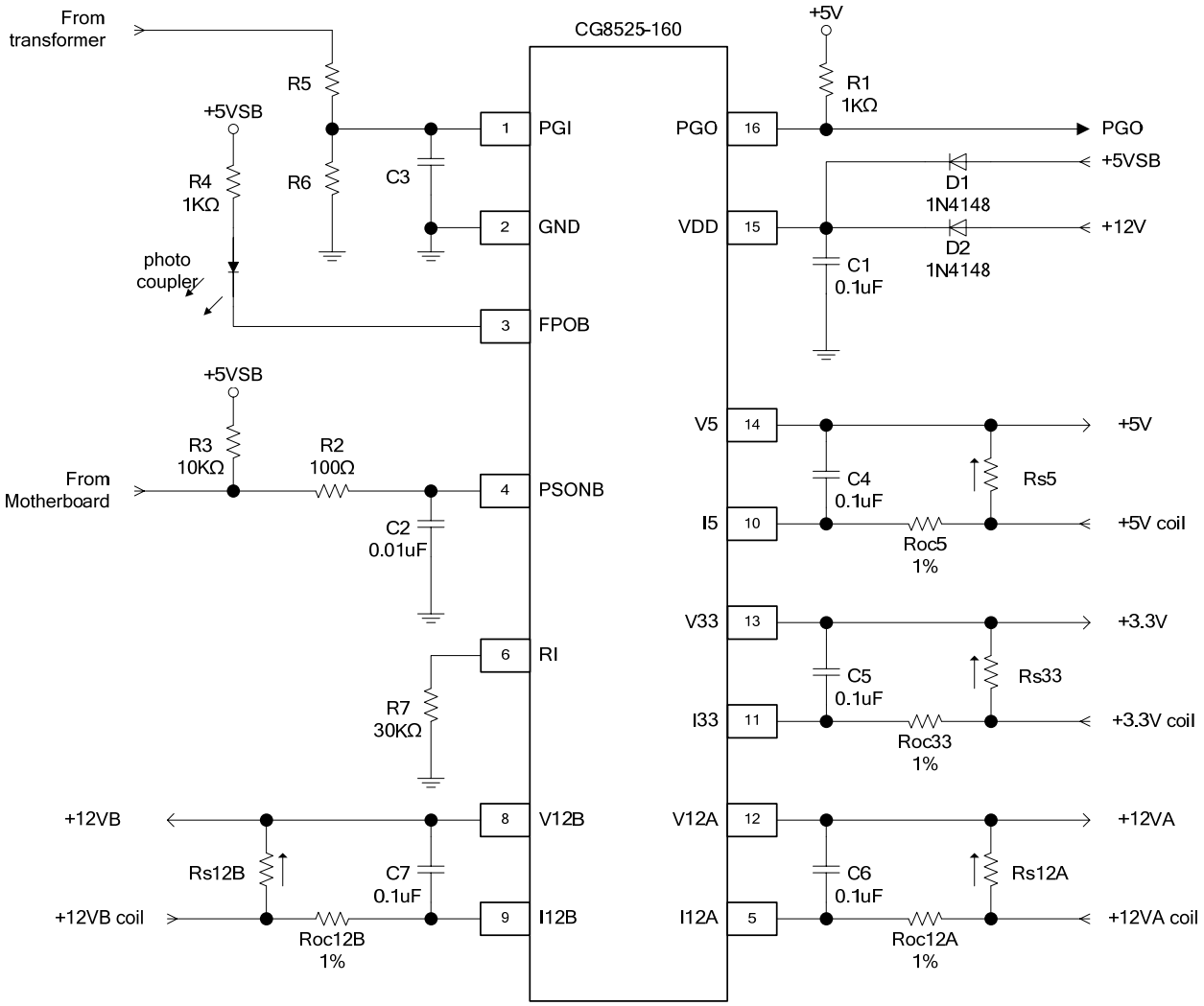
CG8525-160

CG8525-161

Ordering Information

Order Number	Package Type	Packing	Top Marking
CG8525DX140-U	PDIP-14 (RoHS)	Tube	CG8525DX140
CG8525DX160-U	PDIP-16 (RoHS)	Tube	CG8525DX160
CG8525DX161-U	PDIP-16 (RoHS)	Tube	CG8525DX161
CG8525SX140-U	SOP-14 (RoHS)	Tube	CG8525SX140
CG8525SX160-U	SOP-16 (RoHS)	Tube	CG8525SX160
CG8525SX161-U	SOP-16 (RoHS)	Tube	CG8525SX161

Typical Application Circuit

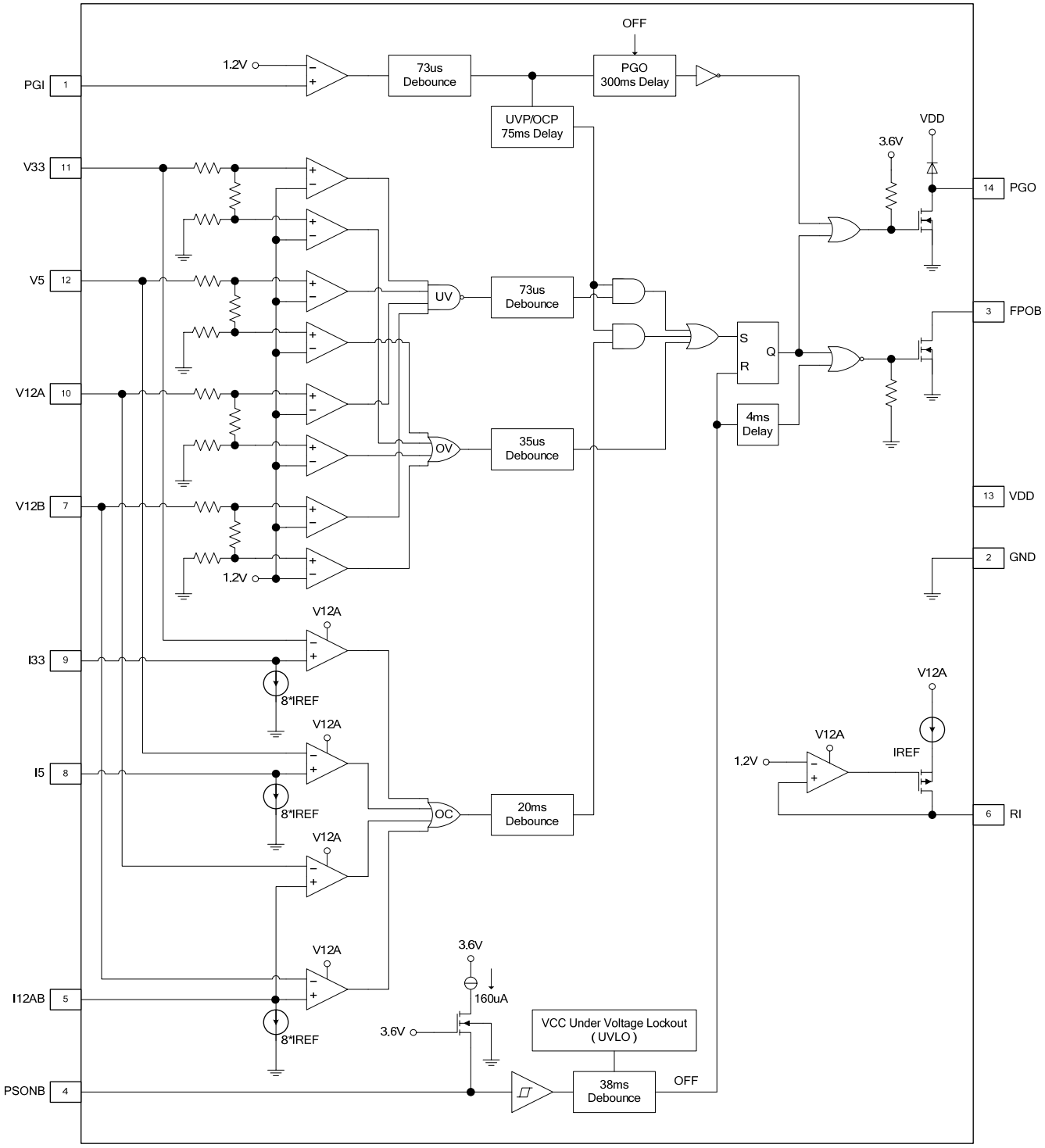


Pin Description

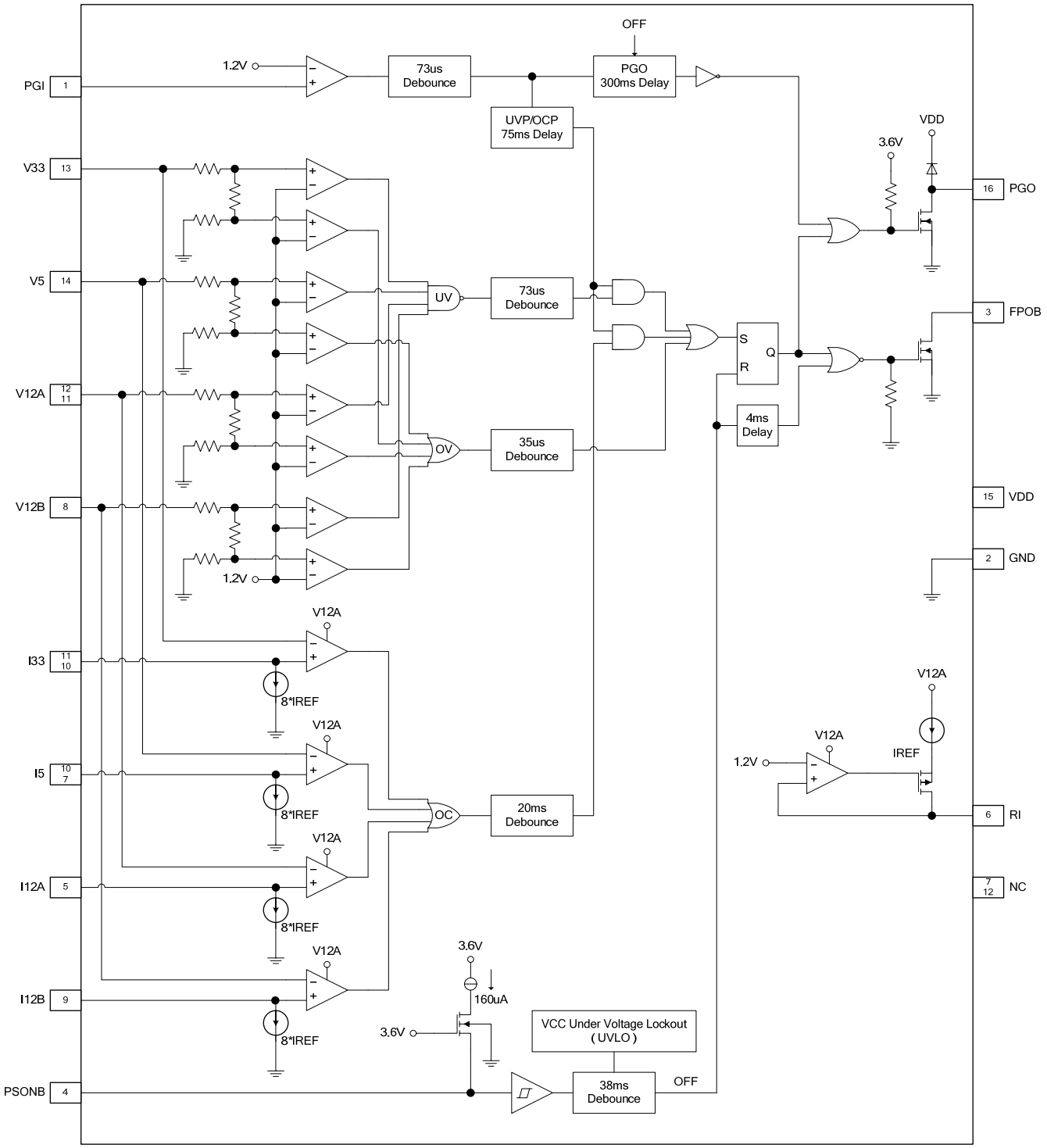
Pin Number			Pin Name	Function
140	160	161		
1	1	1	PGI	AC power good input pin.
2	2	2	GND	Ground.
3	3	3	FPOB	Open drain output of the fault protection.
4	4	4	PSONB	ON/OFF control input pin.
-	5	5	I12A	+12VA over current protection sense input.
5	-	-	I12AB	+12VA & +12VB over current protection sense input.
6	6	6	RI	Current sense adjust input.
-	7	12	NC	No connection.
7	8	8	V12B	+12VB input pin for OVP, UVP and OCP.
-	9	9	I12B	+12VB over current protection sense input.
8	10	7	I5	+5V over current protection sense input.
9	11	10	I33	+3.3V over current protection sense input.
10	12	11	V12A	+12VA input pin for OVP, UVP and OCP.
11	13	13	V33	+3.3V input pin for OVP, UVP and OCP.
12	14	14	V5	+5V input pin for OVP, UVP and OCP.
13	15	15	VDD	Power supply.
14	16	16	PGO	Open drain output of power good signal.

Block Diagram

CG8525-140



CG8525-160 / CG8525-161



Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units
Supply Voltage	V_{DD}, V12A	-0.3	16	V
Supply Voltage Rising Time	V_{DD}	1	-	ms
Input Voltage	PGI,PSONB,V5,V33,I5,I33,RI	-0.3	7	V
	V12B,I12A,I12B,I12AB	-0.3	16	V
Output Voltage	PGO, FPOB	-0.3	16	V
Operating Temperature Range		-40	85	°C
Storage Temperature Range		-65	150	°C
Soldering Temperature		-	260	°C

Note: Stresses above those listed may cause permanent damage to the devices.

Electrical Characteristics (T_A=25℃, V_{DD} = 5V, unless otherwise noted.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
VDD Power Supply						
VDD Operating Voltage	V_{DD}		4	5	15	V
IDD Supply Current	I_{DD}	PSONB=5V	-	0.5	1	mA
VDD Start-up Voltage			-	3.4	3.6	V
VDD Under Voltage Lockout after Start-up			2.8	3.0	-	V
Over Voltage and Under Voltage Detection						
Over Voltage Threshold	V33		3.7	3.8	3.9	V
	V5		5.7	5.85	6.0	V
	V12A,V12B		13.3	13.65	14.0	V
Under Voltage Threshold	V33		2.55	2.69	2.83	V
	V5		4.1	4.3	4.47	V
	V12A,V12B		9.5	10	10.5	V
PGI Threshold Voltage	PGI1		1.16	1.20	1.24	V
Temperature Coefficient of Voltage	TCV		-0.02		0.02	% / ℃
Over Current Protection (OCP)						
Input Offset Voltage of OCP Comparators	Vos		-6	0	6	mV
Output voltage of RI pin	RI		1.16	1.20	1.24	V
Ratio of Pull-down Current to RI pin Sink Current	K		7.5	8	8.5	
Pull-down Current	I33,I5,I12A,I12B,I12AB	RI=30KΩ	290	320	350	uA
Output						
Low Level Output Voltage	$V_{OL\ (FPOB)}$	I_{SINK}=20mA	-	-	0.4	V
	$V_{OL\ (PGO)}$	I_{SINK}=20mA	-	-	0.4	V
Leakage Current of FPOB and PGO	I_{LKG}		-1	0	1	uA
PSONB Control						
High Level Input Voltage	V_{IH}		1.8	1.55	-	V
Low Level Input Voltage	V_{IL}		-	1.25	1.0	V
Pull-up Current			60	160	260	uA
Timing						
PSONB Debounce Time	t_{db1}		24	38	52	mS
OVP Debounce Time	t_{db2}		20	35	50	uS
UVP Debounce Time	t_{db3}		47	73	100	uS
OCP Debounce Time	t_{db4}		15	20	25	mS
PGI Debounce Time	t_{db5}		47	73	100	uS
PGO Delay Time	t_{delay1}		200	300	400	mS
FPOB Turn-off Time (PGO to FPOB)	t_{delay2}		2	4	6	mS
UVP/OCP Enable Delay Time	$t_{delay3-1}$	PGI < PGI1	Disable UVP/OCP check			
	$t_{delay3-2}$	PGI > PGI1	49	75	100	mS

Timing Diagram

Fig.1 Normal ➔ Short Circuit ➔ OVP

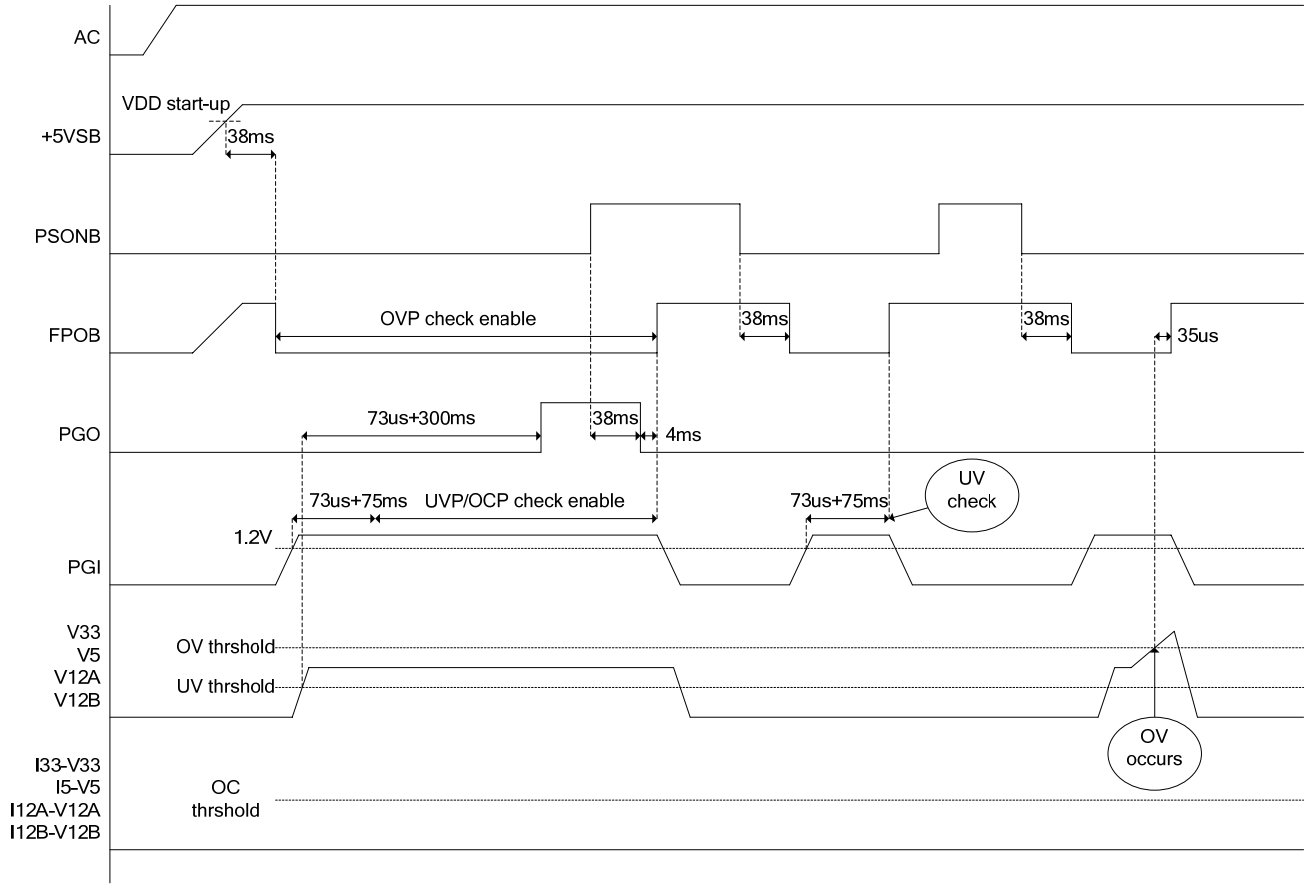
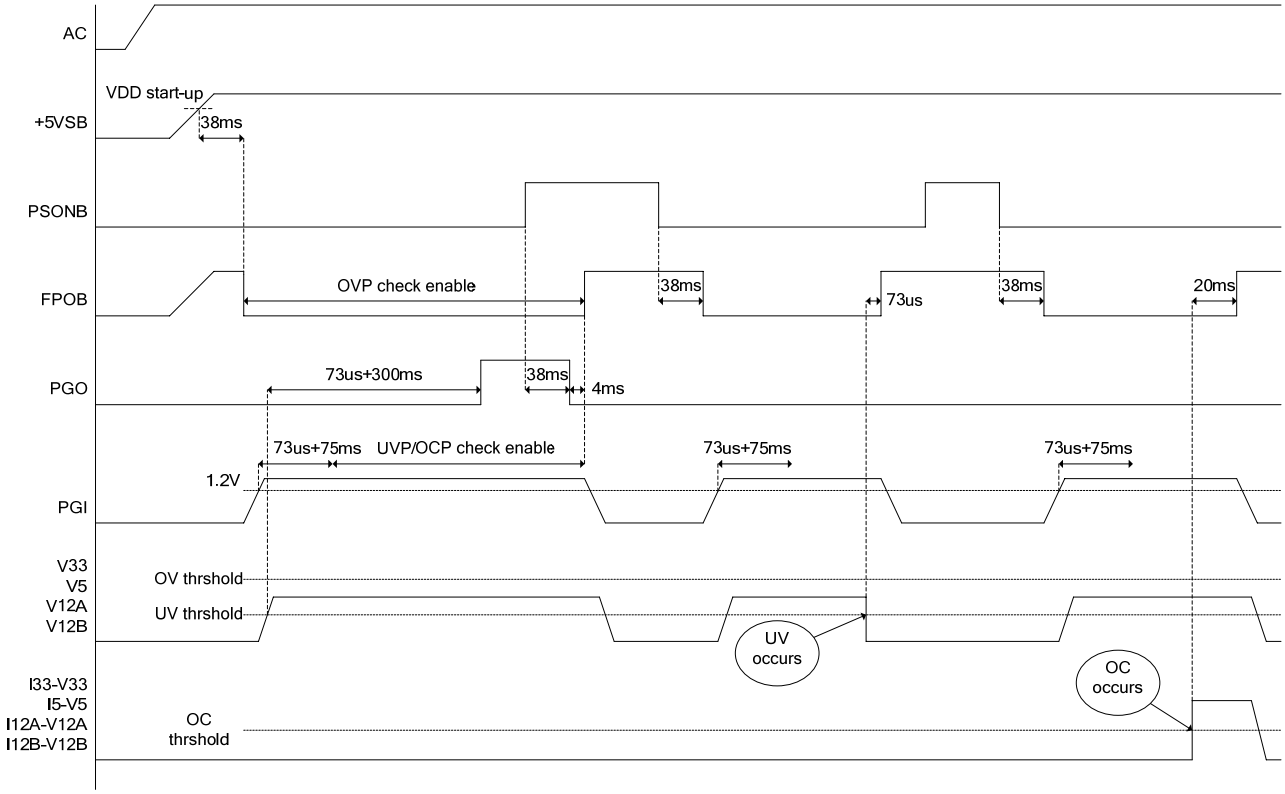
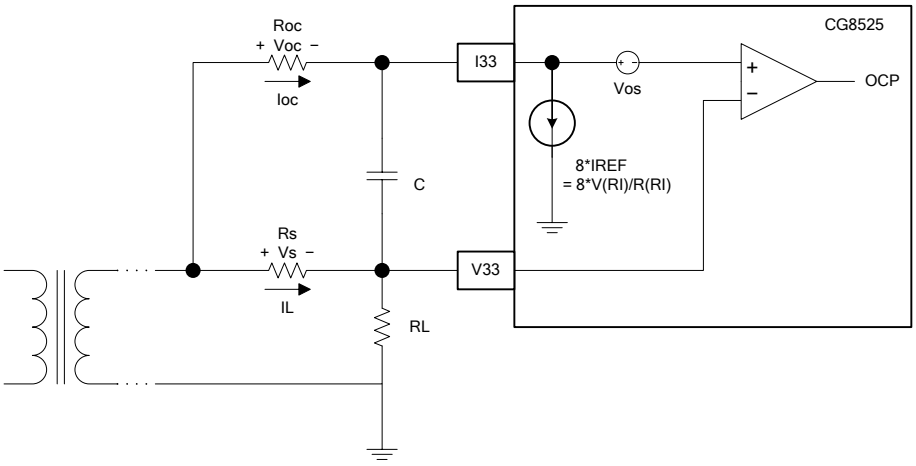


Fig.2 Normal ➔ UVP ➔ OCP



Application Hints

Over Current Protection（OCP）



The Over-Current Protection（OCP）monitors V33&I33, V5&I5, V12A&I12A/I12AB and V12B&I12B/I12AB. When an over-current condition appears more than 20ms, the FPOB output goes high latch. Also, this fault condition will be latched until PSONB is toggled from low to high or VDD is removed.

The resistor of RI pin connected to ground will provide a precise current IREF for the OCP operation. The input offset voltage Vos of OCP comparators are typical 0mV. We suggest that the OCP sense voltage Vs is large than 100mV. And the capacitor C is used to avoide power on fail or dynamic load fail. We suggest C > 0.1uF.

As shown in above, the over current of IL is determined by Rs, Roc and Ioc.

$$IREF = \frac{V(RI)}{R(RI)} \qquad \text{L L L } (1)$$

$$IL,ocp \times Rs = (Ioc \times Roc) + Vos$$

$$\Rightarrow Roc = \frac{\left[(IL,ocp \times Rs) - Vos\right]}{8 \times IREF} \qquad \text{L L L } (2)$$

Following is an example on calculating Roc.
Let IL,ocp=20A, Rs=5mΩ, V(RI)=1.2V, R(RI)=30KΩ, V_{OS}=0mv

$$IREF = \frac{V(RI)}{R(RI)} = \frac{1.2}{30K\Omega} = 40uA$$

$$Roc = \frac{\left[(IL,ocp \times Rs) - Vos\right]}{8 \times IREF} = \frac{20A \times 5m\Omega - 0mv}{8 \times 40uA} = 312.5\Omega$$

The tolerance of parameter K, V(RI), R(RI), Roc and Rs would be proportioned to the tolerance of OCP current.

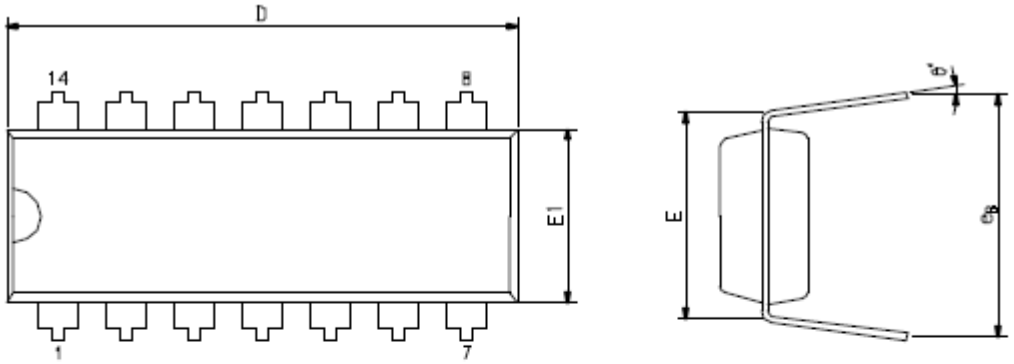
The ratio of $\frac{Vos}{(IL,ocp \times Rs)}$ would be proportioned to the tolerance of OCP current.

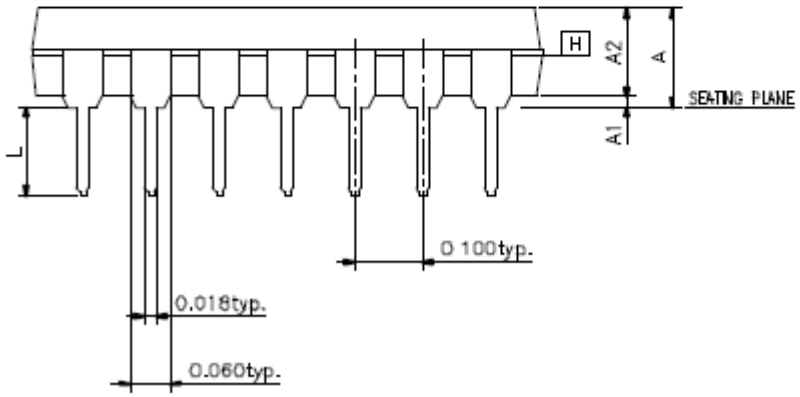
Let V_{OS}=± 6mv, IL,ocp=20A, Rs=5mΩ, then the tolerance of OCP current is ± 6mv / 100mv = ± 6%

Package Outlines

Package Dimensions
PDIP-14 (300mil)

Plastic Dual In-line Package
UNIT : inch / mm

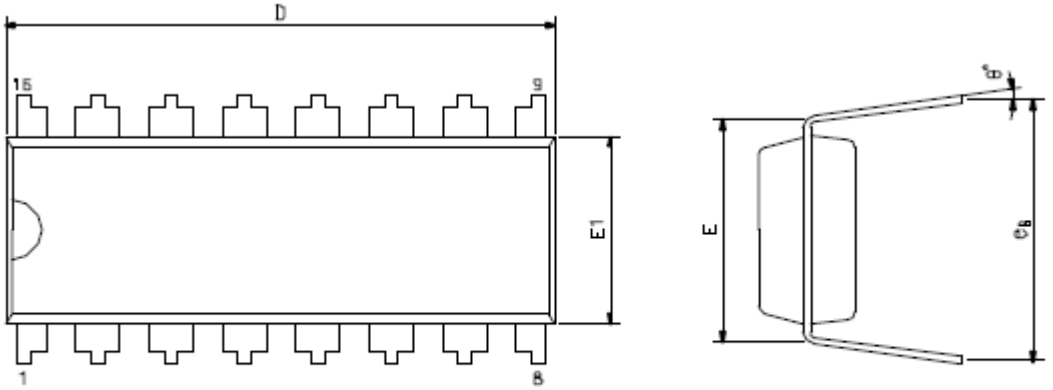


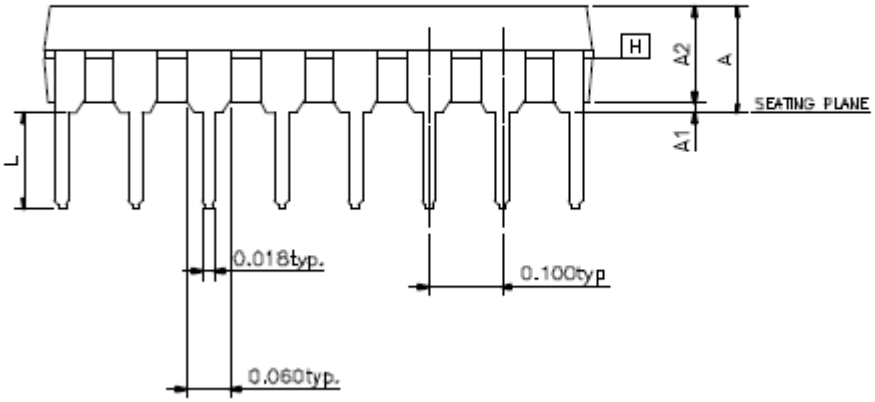


Symbols	Dimensions in inches			Dimensions in millimeters		
	MIN.	NOR.	MAX.	MIN.	NOR.	MAX.
A	---	---	0.215	---	---	5.461
A1	0.010	---	---	0.254	---	---
A2	0.120	0.133	0.145	3.048	3.378	3.683
D	0.730	0.755	0.780	18.542	19.177	19.812
E	0.300 BSC			0.762 BSC		
E1	0.240	0.253	0.265	6.096	6.426	6.731
L	0.110	0.133	0.155	2.794	3.378	3.937
eB	0.320	0.350	0.380	8.128	8.890	9.652
θ	0°	7°	15°	0°	7°	15°

Package Dimensions
PDIP-16 (300mil)

Plastic Dual In-line Package
UNIT : inch / mm





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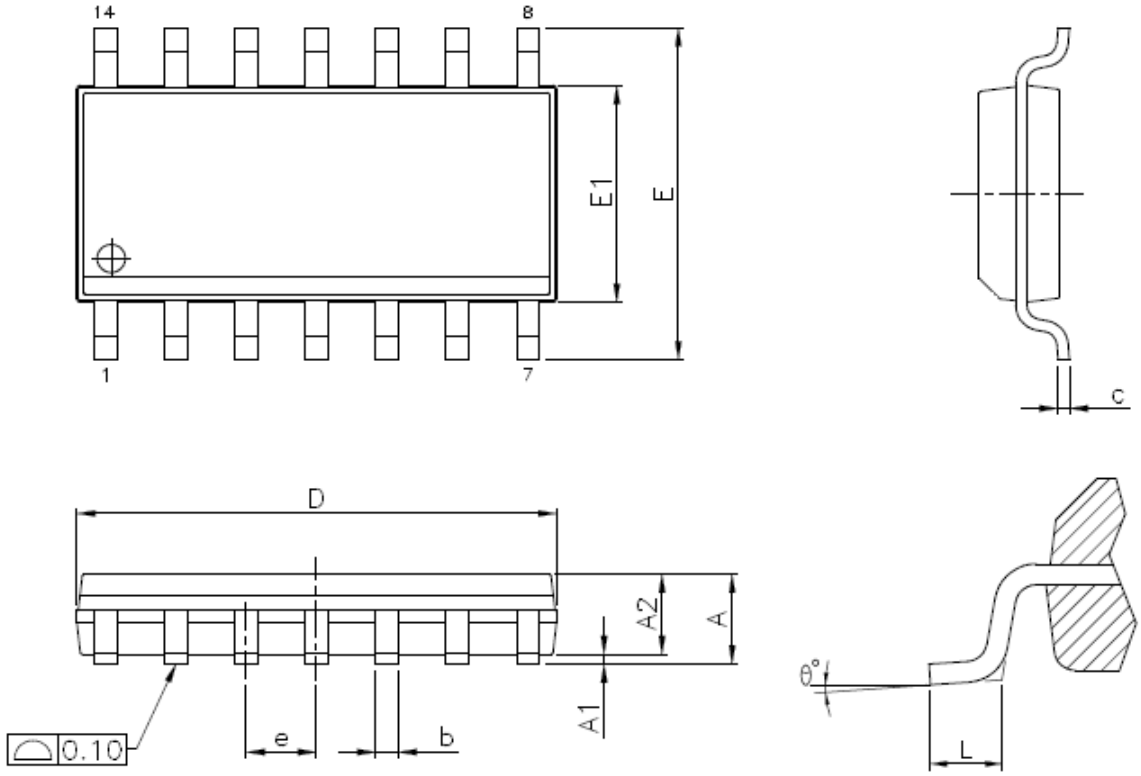
A	---	---	0.215	---	---	5.461
A1	0.010	---	---	0.254	---	---
A2	0.120	0.133	0.145	3.048	3.378	3.683
D	0.730	0.755	0.780	18.542	19.177	19.812
E	0.300 BSC			7.620 BSC		
E1	0.240	0.253	0.265	6.096	6.426	6.731
L	0.110	0.133	0.155	2.794	3.378	3.937
eB	0.320	0.350	0.380	8.128	8.890	9.652
θ	0°	7°	15°	0°	7°	15°

Package Dimensions
SOP-14

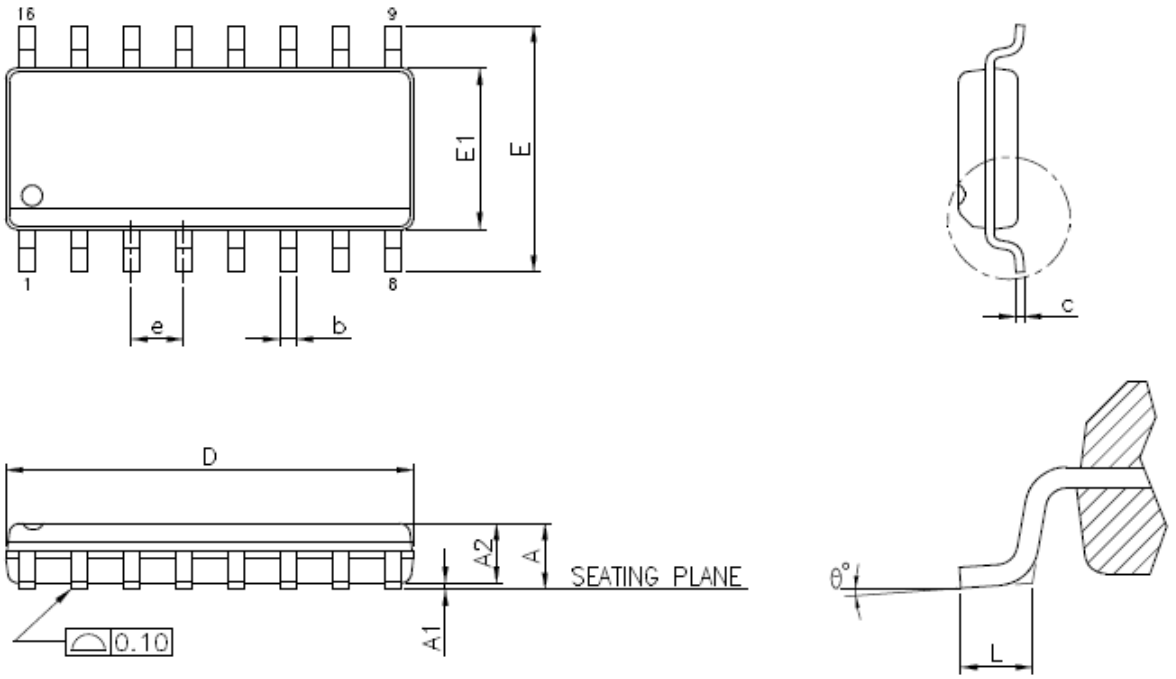
Plastic Dual In-line Package
UNIT : inch / mm



Symbols	Dimensions In inch		Dimensions In millimeters	
	Min.	Max.	Min.	Max.
A	------	0.072	------	1.837
A1	0.004	0.010	0.095	0.263
A2	0.047	------	1.187	------
b	0.012	0.021	0.294	0.535
c	0.004	0.010	0.095	0.263
D	0.341 BSC		8.650 BSC	
E	0.236 BSC		6.000 BSC	
E1	0.154 BSC		3.900 BSC	
e	0.050 BSC		1.270 BSC	
L	0.015	0.052	0.380	1.333
θ	0°	8°	0°	8°

Package Dimensions
SOP-16 (Standard)

Small Outline Package
UNIT : inch / mm



Symbols	Dimensions In inch		Dimensions In millimeters	
	Min.	Max.	Min.	Max.
A	------	0.072	------	1.837
A1	0.004	0.010	0.095	0.263
A2	0.047	------	1.187	------
b	0.012	0.021	0.294	0.535
c	0.004	0.010	0.095	0.263
D	0.390 BSC		9.900 BSC	
E	0.236 BSC		6.000 BSC	
E1	0.154 BSC		3.900 BSC	
e	0.050 BSC		1.270 BSC	
L	0.015	0.052	0.380	1.333
θ	0°	8°	0°	8°

Update History

Revision	Date	Update
1.00	April 26, 2010	Preliminary version

奇高（Chipgoal)IC与其他品牌IC对照表

Pin Out	Chipgoal	伟诠	点晶	崇贸/仙童	东方腾(英士达)	华芯微	士兰微	绍兴光大	德仪
20	CG8002	WT7522	X	SG6105	X	HS8108 HS8109	SD6109	X	X
16	CG8010	WT7520	X	X	EST7502	HS8110	SC8100	SDC2921	X
8	CG8513	WT7510-N080 WT7502-N085 WT751002	X	SG6510	X	X	X	X	TI3510
8	CG8511	WT7502-N084	PS113 PS113A	X	X	X	X	X	X
14 / 16	CG8525	WT7525	X	X	X	X	X	X	X

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深圳市瑞芯茂电子有限公司

Add：深圳市宝安区西乡金海路金海商务大厦 **1** 栋 **516** 室

Tel:+86-755-8398 6881

Fax:+86-755-8398 0881

E-mail:sky@fusepro.com.cn

zhaoyue.336@qq.com

Http:www.fusepro.com.tw