

3-Channel Power Supply Supervisor

Features

- Over Voltage Protection and Lock Out for 3.3 V, 5 V, and 12 V
- Under Voltage Protection and Lock Out for 3.3 V and 5 V
- Fault Protection Output with Open Drain Output Stage
- Open Drain Power Good Output Signal for Power Good Input, 3.3 V and 5 V
- 300 ms Power Good Delay
- 2.3 ms $\overline{\text{PSON}}$ Control to $\overline{\text{FPO}}$ Turn-Off Delay
- 38 ms $\overline{\text{PSON}}$ Control Debounce
- 75 ms Delay for 3.3V and 5V Under Voltage Protection
- 73 μs Width Noise Deglitches
- Wide Power Supply Voltage Range from 4 V to 15 V
- Intelligent Under Voltage Protection to Prevent Instantaneously AC Power Black Out

Applications

- PC Switching Power Supply

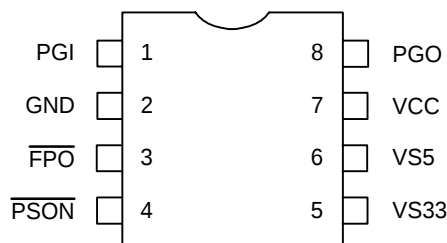
General Description

The APW1683 is designed to minimize the external components of personal-computer switching power supply systems. It provides protection circuits, power good indicator, fault protection output $\overline{\text{FPO}}$ and $\overline{\text{PSON}}$ control.

OVP (over voltage protection) monitors 3.3V, 5 V, and 12 V (12 V OV detects via V_{CC} terminal). UVP (under voltage protection) monitors 3.3V and 5V. When an OV or UV condition is detected, the PGO (power good output) is set to low and $\overline{\text{FPO}}$ is latched to high. $\overline{\text{PSON}}$ from low to high resets the protection latch. There is a 2.3ms turn-off delay from $\overline{\text{PSON}}$ to $\overline{\text{FPO}}$. There is no delay during turn on.

Power good feature monitors PGI, 3.3V and 5V under voltages, and issues a power good signal when they are ready.

Pin Description

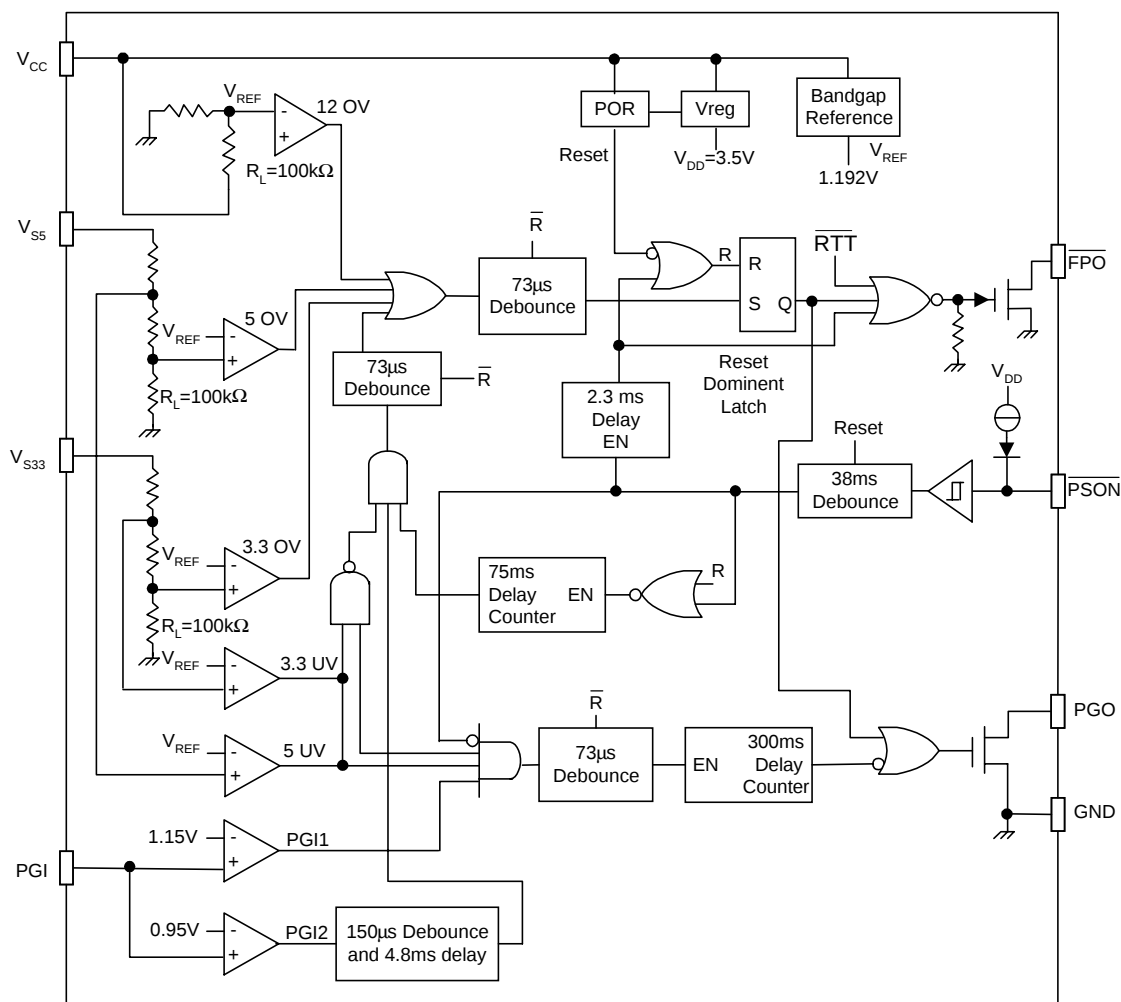


Ordering Information

APW1683 □□-□□ Handling Code Temp. Range Package Code	Package Code J : DIP - 8 Temp. Range C : 0 to 70 °C Handling Code TU : Tube
--	--

ANPEC reserves the right to make changes to improve reliability or manufacturability without notice, and advise customers to obtain the latest version of relevant information to verify before placing orders.

Block Diagram



Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
V_{CC}	Supply Voltage	16	V
V_{S5}, V_{S33}	5V and 3.3V Input Voltage(Note 1)	8	V
$\overline{FPO}$	Fault Protection Output Voltage	16	V
$\overline{PSON}$	ON/OFF Control Input Voltage(Note 1)	8	V
PGI	Power Good Input Voltage(Note 1)	8	V
PGO	Power Good Output Voltage(Note 1)	8	V
T_A	Ambient Temperature Range	0 to 70	°C
T_{STG}	Storage Temperature Range	-65 to +150	°C
T_L	Lead Temperature (Soldering, 10 second)	260	°C

Note 1: For a short period (<1 sec) over voltage test, these pins can withstand up to 12V.

Pin Function Description

Terminal Name	NO.	I/O	Terminal Function Description
V_{S33}	5	I	3.3 V over/under voltage protection input pin
V_{S5}	6	I	5 V over/under voltage protection input pin
GND	2		Ground
$\overline{FPO}$	3	O	Inverted fault protection output, open drain output stage
PGI	1	I	Power good input signal pin
PGO	8	O	Power good output signal pin, open drain output stage
$\overline{PSON}$	4	I	ON/OFF control input pin
V_{CC}	7	I	Supply voltage/12 V over voltage protection input pin

Function Table

PGI	$\overline{PSON}$	UV Condition (3.3 V or 5V)	OV Condition (3.3V, 5V, or 12V)	$\overline{FPO}$	PGO
<0.95V	L	no	no	L	L
<0.95V	L	no	yes	H	L
<0.95V	L	yes	no	L	L
0.95V<PGI<1.15V	L	no	no	L	L
0.95V<PGI<1.15V	L	no	yes	H	L
0.95V<PGI<1.15V	L	yes	no	H	L
PGI>1.15V	L	no	no	L	H
PGI>1.15V	L	no	yes	H	L
PGI>1.15V	L	yes	no	H	L
X	H	X	X	H	L

X = don't care

$\overline{FPO}$ = L means: fault is NOT latched

$\overline{FPO}$ = H means: fault is latched

PGO = L means: fault

PGO = H means: NO fault

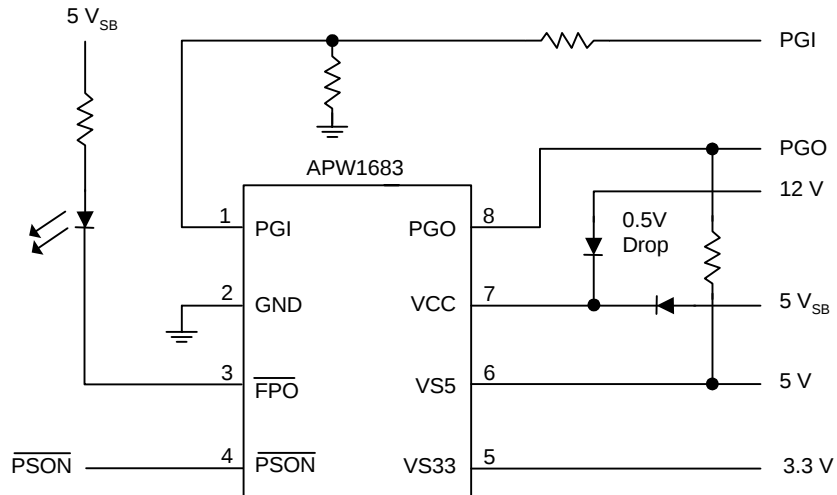
Thermal Characteristics

Symbol	Parameter	Value	Unit
R_{THJA}	Thermal Resistance from Junction to Ambient in Free Air DIP-8	129	K/W

Electrical Characteristics

Symbol	Parameter	Test Conditions	APW1683			Unit
			Min.	Typ.	Max.	
Over Voltage Protection						
	Over Voltage Threshold	V _{S33}	3.7	3.9	4.1	V
		V _{S5}	5.7	6.1	6.5	
		V _{CC}	13.2	13.8	14.4	
I _{LKG}	Leakage Current ($\overline{FPO}$)	V($\overline{FPO}$)=5V			5	μA
V _{OL}	Low Level Output Voltage ($\overline{FPO}$)	I _{SINK} = 10mA			0.3	V
		I _{SINK} = 30mA			0.7	
V _{OH}	$\overline{FPO}$ Pin Pull High Voltage				15	V
PGI and PGO						
	Input Threshold Voltage (PGI)	PGI1	1.1	1.15	1.2	V
		PGI2	0.9	0.95	1.0	
	Under Voltage threshold	V _{S33}	2.0	2.2	2.4	V
		V _{S5}	3.3	3.5	3.7	
	Under Voltage Protection Delay Time (3.3V and 5V)		49	75	114	ms
I _{LKG}	Leakage Current (PGO)	PGO=5V			5	μA
V _{OL}	Low Level Output Voltage (PGO)	Sink Current = 10mA			0.4	V
V _{OH}	PGO Pin Pull High Voltage				7	V
$\overline{PSON}$ Control						
	Input Pull-Up Current	$\overline{PSON}$ = 0V		150		μA
	High-Level Input Voltage		2.4			V
	Low-Level Input Voltage				1.2	V
Total Device						
V _{CC}	Supply Voltage		4		15	V
I _{CC}	Supply Current	$\overline{PSON}$ =5V			1	mA
Switching Characteristics						
t _{d1}	Delay time (PGI to PGO)		200	300	450	ms
t _b	Debounce Time ($\overline{PSON}$)		24	38	57	ms
T _{dg}	Noise Deglitch Time		47	73	110	μs
t _{d2}	Delay Time ($\overline{PSON}$ to $\overline{FPO}$)		t _b +1.1	t _b +2.3	t _b +4	ms

Typical Application Circuit



Customer Service

Anpec Electronics Corp.

Head Office :

5F, No. 2 Li-Hsin Road, SBIP,
Hsin-Chu, Taiwan, R.O.C.
Tel : 886-3-5642000
Fax : 886-3-5642050

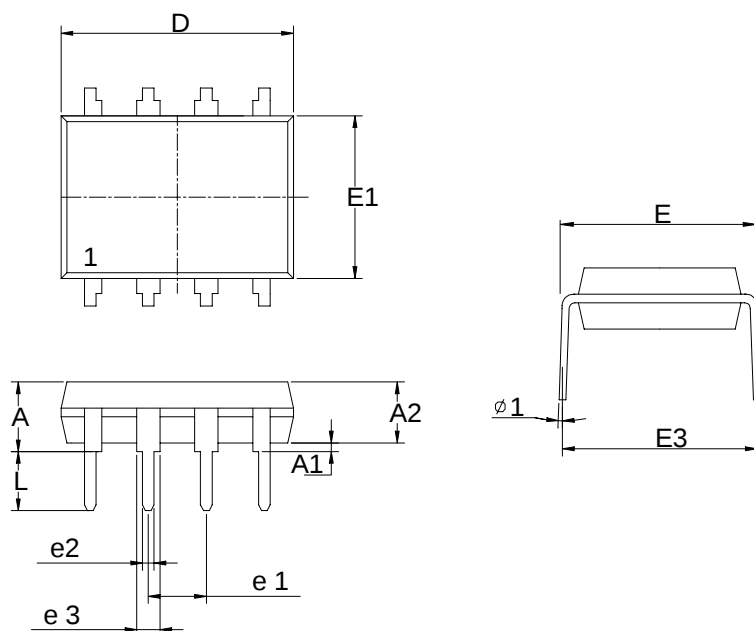
Taipei Branch :

7F, No. 137, Lane 235, Pac Chiao Rd.,
Hsin Tien City, Taipei Hsien, Taiwan, R. O. C.
Tel : 886-2-89191368
Fax : 886-2-89191369

The timing diagram illustrates the relationship between the PGO pin and other system signals. The signals shown are VDD, Reset, R, $\overline{\text{PSDN}}$, S, Q, $\overline{\text{FPO}}$, PGI, 3.3V, 5V, 12V, and PGO. The diagram includes several timing parameters: t_{d1} (PGO delay), t_b (PGO pulse width), t_{d2} (PGO delay), t_{d1} (PGO delay), PG Off Delay, and AC OFF. The diagram also shows the state of the PGO pin during PSN OFF and PSN ON events.

Packaging Information

PDIP-8pin (Reference JEDEC Registration MS-001)



Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A		5.33		0.210
A1	0.38		0.015	
A2	2.92	3.68	0.115	0.145
D	9.02	10.16	0.355	0.400
e1	2.54BSC		0.100BSC	
e2	0.36	0.56	0.014	0.022
e3	1.14	1.78	0.045	0.070
E	7.62 BSC 8.26		0.300 BSC 0.325	
E1	6.10	7.11	0.240	0.280
E3		10.92		0.430
L	2.92	3.81	0.115	0.150
φ 1	0°	15°	0°	15°