



Advanced Analog Technology, Inc.

AAT1015

Details are subject to change without notice

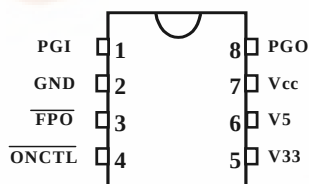
3-CHANNEL PC POWER SUPPLY SUPERVISOR

FEATURES

- 3-Channel PC Power Supply Supervisor
- Over Voltage Protection for 3.3V, 5V, 12V Output
- Under Voltage Protection for 3.3V, 5V Output with 75 ms Enable Delay
- Fault Protection Output with Open Drain Output
- Open Drain Power Good Output
- 300 ms Power Good Delay
- 2.3 ms $\overline{\text{ONCTL}}$ to $\overline{\text{FPO}}$ Turn Off Delay
- 38 ms $\overline{\text{ONCTL}}$ Signal De-Bounce
- 73 μs De-Bounce
- Latch Function Controlled by $\overline{\text{ONCTL}}$ and Protection Input.

PIN CONFIGURATION

TOP VIEW



(PDIP-8 PACKAGE)

GENERAL DESCRIPTION

The AAT1015 is a 3-channel PC switching power supply supervisor that provides Over Voltage Protection (OVP), Under Voltage Protection (UVP), and Power Good Indicator to monitor and control the output of the switching power supply system.

In addition to the implemented remote function from external signal, *i.e.*, On/Off Control ($\overline{\text{ONCTL}}$), over voltage fault protection and under voltage fault protection can also be directly triggered without external voltage divider. AAT1015 also greatly reduce the PCB board space for power supply system.

With a minimal number of external components, the AAT1015 offers a simple and cost effective solution.





FPO (Fault Protection Output)

NORMAL="LOW", FAULT="HIGH"

FPO indicates the fault condition of either Over Voltage or Under Voltage. When a fault state occurs, the FPO would be latched high and combined with a low PGO output.

PGO (Power Good Output)

NORMAL="HIGH", FAULT="LOW".

A Power Good signal will be issued with 300 ms delay after 3.3V, 5V, 12V and PGI are ready. Power Good Output should be low before the output voltage is out of regulation at turn-off.

OVP and UVP (Over Voltage Protection and Under Voltage Protection)

OVP monitors 3.3V, 5V, and 12V via V_{CC} pin, while UVP monitors 3.3V and 5V. OVP and UVP levels are determined by internal voltage dividers. The typical values are 3.9V, 6.1V, 13.8V for OVP and 2.2V, 3.5V for UVP, respectively.

$\overline{\text{ONCTL}}$ (On/Off Control)

On/Off Control is used to reset the latched state of $\overline{\text{FPO}}$ and to externally control the switching power supply system with a 38 ms de-bounce time. AAT1015 offers 2.3 ms delay time after de-bounce to trigger $\overline{\text{FPO}}$ when $\overline{\text{ONCTL}}$ switches from low to high

**PIN DESCRIPTION**

Pin No	Name	I/O	Description
1	PGI	I	Power Good Input Signal
2	GND		Ground
3	$\overline{\text{FPO}}$	O	Inverted Fault Protection Output, Open Drain Output Stage
4	$\overline{\text{ONCTL}}$	I	ON/OFF Control Input
5	V33	I	Over and Under Voltage Protection for 3.3V
6	V5	I	Over and Under Voltage Protection for 5V
7	V _{CC}	I	Supply Voltage and 12V Over Voltage Protection Input
8	PGO	O	Power Good Output Signal; Open Drain Output Stage

ABSOLUTE MAXIMUM RATINGS

Characteristics	Symbol	Value	Unit
Supply Voltage	V _{CC}	16	V
$\overline{\text{FPO}}$ Output Voltage	V _{FPO}	16	V
PGO Output Voltage	V _{PGO}	8	V
Supply Current	I _{CC}	1	mA
Operating Free-Air Temperature Range	T _C	– 20 to +85	°C
Storage Temperature Range	T _{storage}	– 45 to +125	°C

RECOMMENDED OPERATING CONDITIONS

		Test Condition	Min	Typ	Max	Unit
Supply Voltage, V _{CC}			4		15	V
Input Voltage, V _I	$\overline{\text{ONCTL}}$, V5, V33, PGI				7	V
Output Voltage	V _{FPO}				15	V
	V _{PGO}				7	V
Output Sink Current, I _O (Sink)	I _{FPO}				30	mA
	I _{PGO}				10	mA
Supply Voltage Rising Time, t _r		See Note 1	1			ms

Note 1: V_{CC} slew rate must be less than 14 V/ms.



ELECTRICAL CHARACTERISTICS, $V_{CC} = 5\text{ V}$ (UNLESS OTHERWISE SPECIFIED)

Over Voltage Protection and Under Voltage Protection

Parameter			Test Condition	Min	Typ	Max	Unit
Over Voltage Threshold	V33			3.7	3.9	4.1	V
	V5			5.7	6.1	6.5	
	V_{CC}			13.2	13.8	14.4	
Under-Voltage Threshold	V33			2.0	2.2	2.4	V
	V 5			3.3	3.5	3.7	
	V_{CC}				3.8		

PGO and $\overline{\text{FPO}}$

Parameter		Test Condition	Min	Typ	Max	Unit
I_{LKG} Leakage Current (PGO)		PGO = 5 V			5	μA
V_{OL} Low Level Output Voltage (PGO)		$I_{sink} = 10\text{ mA}$			0.4	V
I_{LKG} Leakage Current ($\overline{\text{FPO}}$)		$V(\overline{\text{FPO}}) = 5\text{ V}$			5	μA
V_{OL} Low Level Output Voltage ($\overline{\text{FPO}}$)		$I_{sink} = 10\text{ mA}$			0.3	V
		$I_{sink} = 30\text{ mA}$			0.7	

PGI and $\overline{\text{ONCTL}}$

Parameter	Test Condition	Min	Typ	Max	Unit
Input Threshold Voltage (PGI)		1.10	1.15	1.20	V
Input Pull-Up Current ($\overline{\text{ONCTL}}$)	$\overline{\text{ONCTL}} = 0\text{ V}$		150		μA
High-Level Input Voltage ($\overline{\text{ONCTL}}$)		2.0			V
Low-Level Input Voltage ($\overline{\text{ONCTL}}$)				0.8	V



ELECTRICAL CHARACTERISTICS, $V_{CC} = 5\text{ V}$ (UNLESS OTHERWISE SPECIFIED)

Operating Current

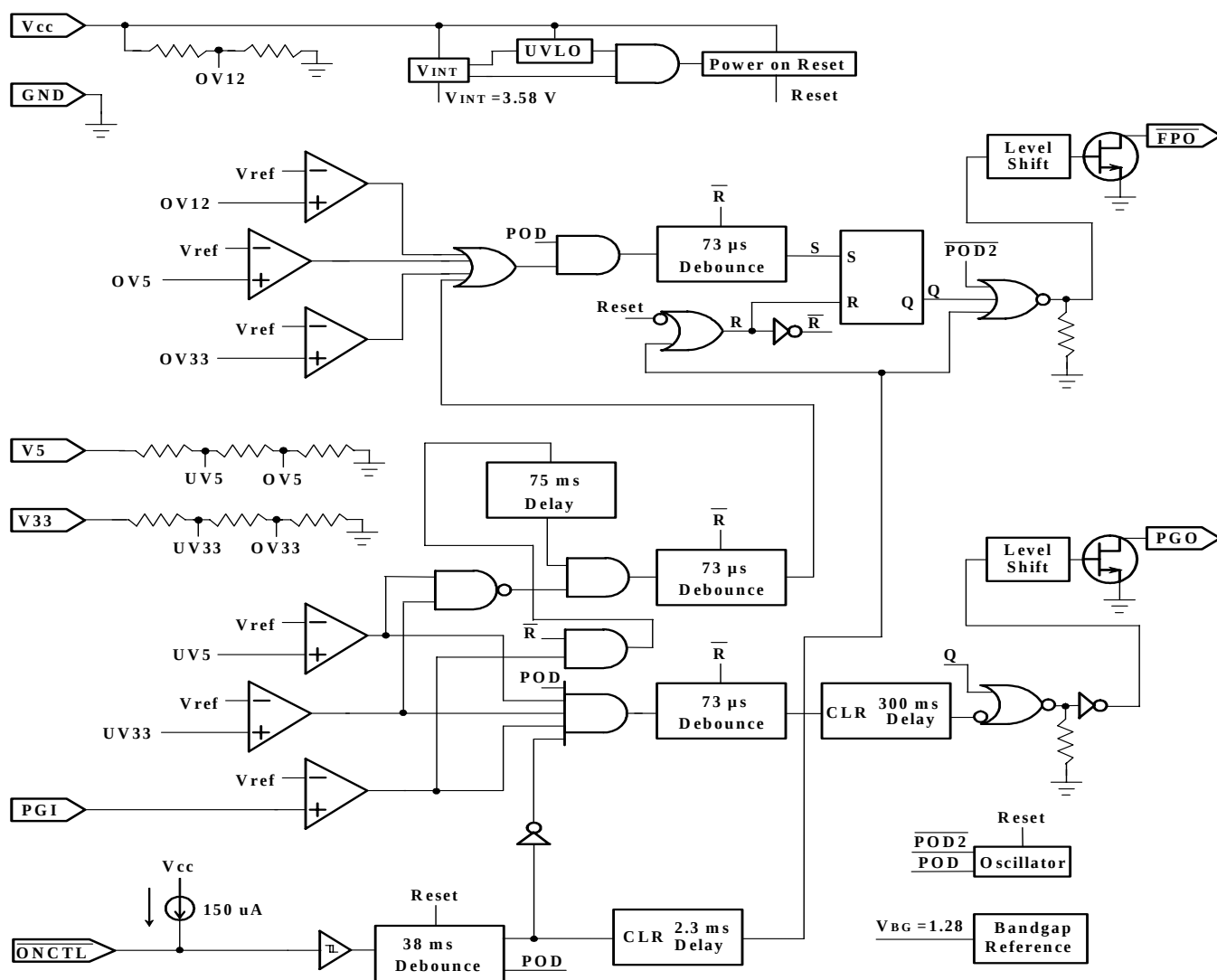
Parameter	Test Condition	Min	Typ	Max	Unit
I_{CC} Supply Current	$\overline{ONCTL} = 5\text{ V}$			1	mA

Switching Characteristics, $V_{CC} = 5\text{ V}$, $T_{op} = \text{Full Range}$

Parameter	Test Condition	Min	Typ	Max	Unit
t_{d1} PGO Delay Time		200	300	450	ms
t_{d2} Under Voltage Protection Delay Time		49	75	114	ms
t_{d3} $\overline{ONCTL}$ Off to $\overline{FPO}$ Delay		$t_{b1} + 1.1$	$t_{b1} + 2.3$	$t_{b1} + 4.4$	ms
t_{b1} $\overline{ONCTL}$ De-Bounce Time		24	38	57	ms
t_{b2} Noise De-Bounce Time		47	73	110	μs

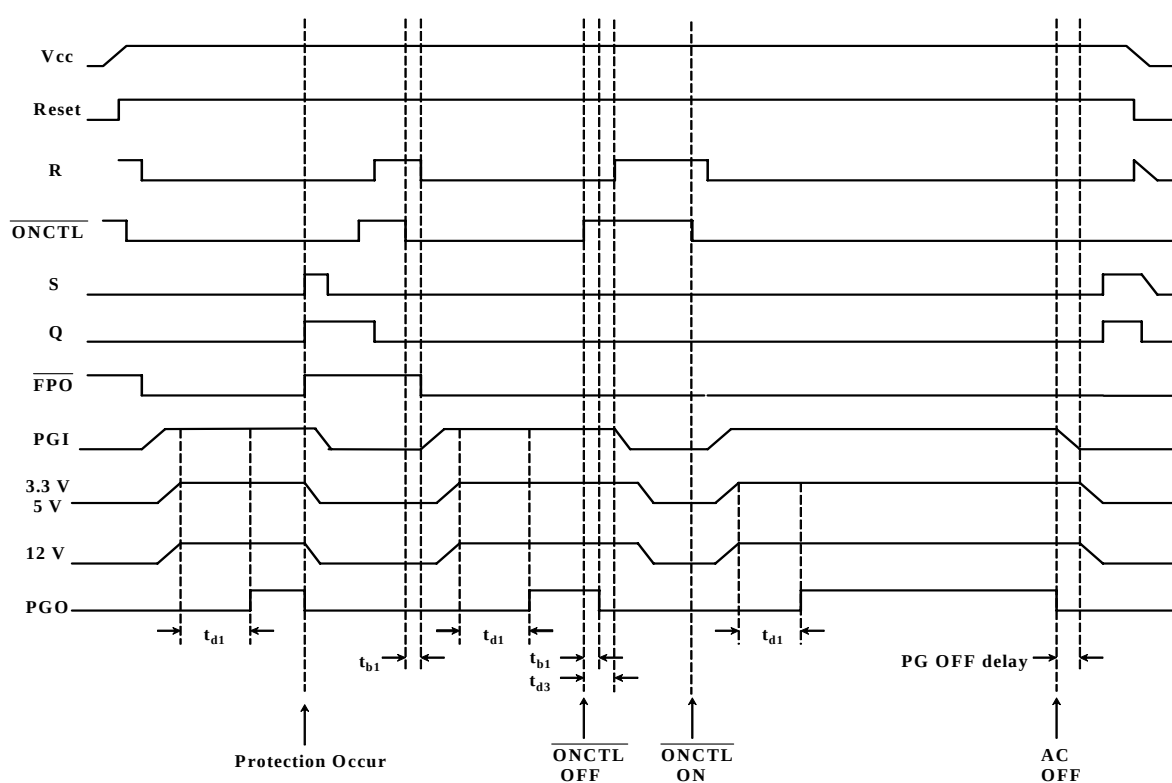


BLOCK DIAGRAM



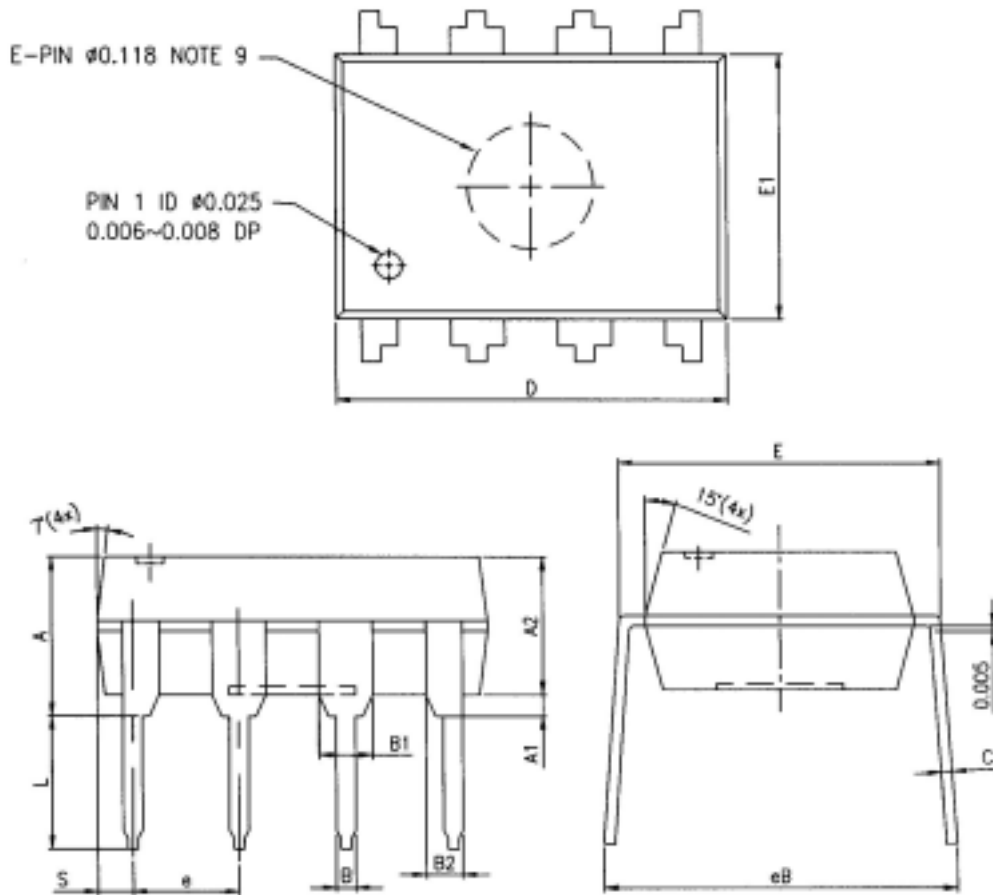


TIMING CHART





PACKAGE DIMENSION





PACKAGE DIMENSION (CONT.)

SYMBOL	DIMENSION IN MILLIMETERS			DIMENSION IN INCHES		
	MIN	TYP	MAX	MIN	TYP	MAX
A	3.6	3.9	4.2	0.142	0.154	0.165
A1	0.38	-----	-----	0.015	-----	-----
A2	3.25	3.30	3.45	0.128	0.130	0.136
B	0.36	0.46	0.56	0.014	0.018	0.022
B1	1.400	1.524	1.650	0.055	0.060	0.065
B2	0.813	0.990	1.170	0.032	0.039	0.046
C	0.20	0.25	0.33	0.008	0.010	0.013
D	9.12	9.30	9.53	0.359	0.366	0.375
E	7.62	7.87	8.26	0.300	0.310	0.325
E1	6.20	6.35	6.60	0.244	0.250	0.260
e	-----	2.54	-----	-----	0.100	-----
L	3.18	-----	-----	0.125	-----	-----
eB	8.38	-----	9.40	0.330	-----	0.370
S	0.71	0.84	0.97	0.028	0.033	0.038

NOTES:

1. CONTROLLING DIMENSION: INCH.
2. LEAD FRAM MATERIAL: C194.
3. PACKAGE DIMENSION EXCLUDE MOLDING FLASH.
4. AFTER SOLDER PLATING, LEAD THICKNESS WILL BE 0.013" MAX.
5. AFTER SOLDER DIPPING, LEAD THICKNESS WILL BE 0.020" MAX.
6. THE MAX. ALLOWABLE MOLDING FLASH IS 0.010".
7. TOLERANCE: 0.010" UNLESS OTHERWISE SPECIFIED.
8. OTHERWISE DIMENSION FOLLOW ACCEPTABLE SPECS.
9. THE BOTTOM E – PIN INDENT IS MARKED AS BELOW.



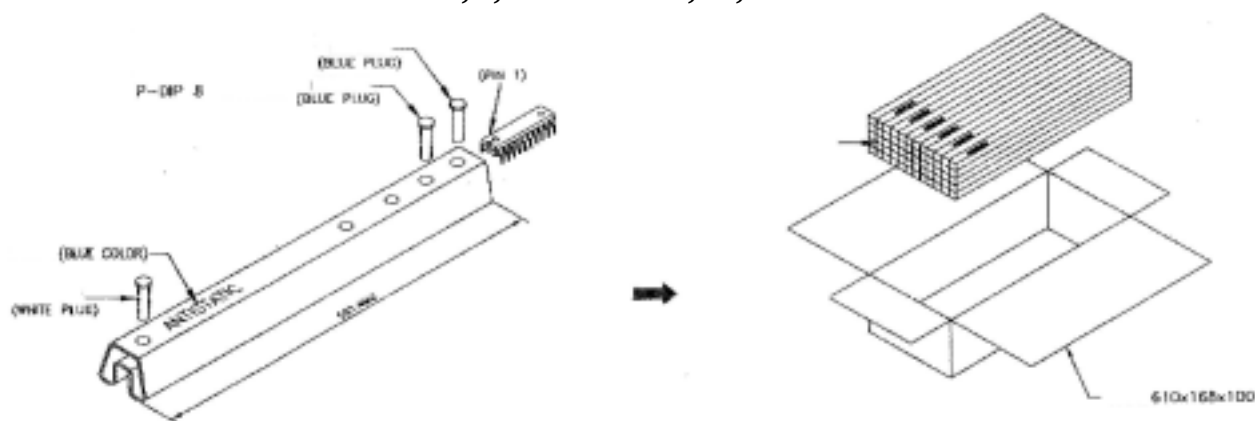
X : A-T
Y : 0-9

10. PACKAGE DIMENSION IS IN COMPLIANCE WITH JEDEC STANDARD MS-001 AB JUL85' ISSUE B.



TAPE AND REEL

PACKING METHOD: 60PCS/TUBE, 3,000PCS/BOX, 12,000PCS/CARTON

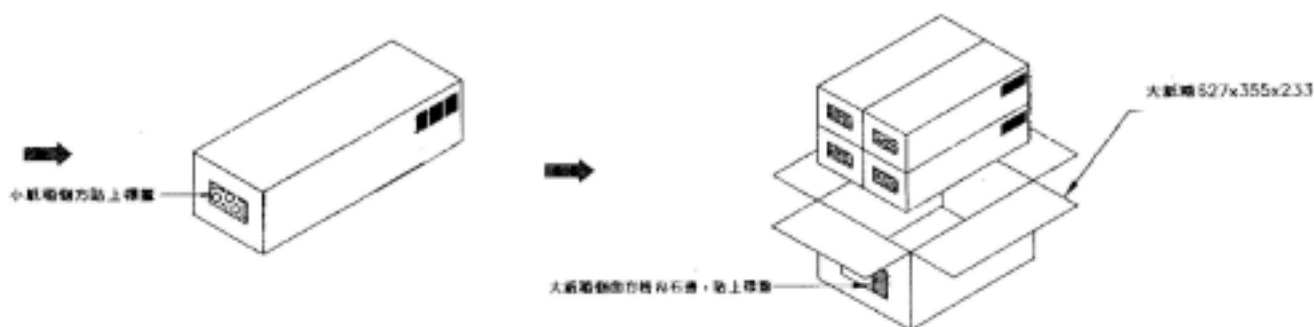


POSITION OF THE PRODUCT INSIDE OF THE PLASTIC TUDE

NOTE: 60PCS/TUBE

→ TUBES ARE PLACED IN SMALL PAPER
BOXES, WITH THE WHITE PLUG FACING
THE SIDE WITH MARKING

NOTE: 50TUBES/B



MARKING FOR THE SMALL PAPER BOX SHOULD BE POSITIONED AS SHOWN ABOVE

NOTE: USE CLEAR TAPE TO SEAL THE SMALL
BOX INSTEAD OF QA SEAL

→ POSITION LABEL ON THE RIGHT
CORNER OF THE BLANK BOXES
MARKING ON THE LARGE BOX AS
SHOWN ABOVE

NOTE: 4 SMALL BOXES/LARGE BOX, WITH NO QA
SEAL

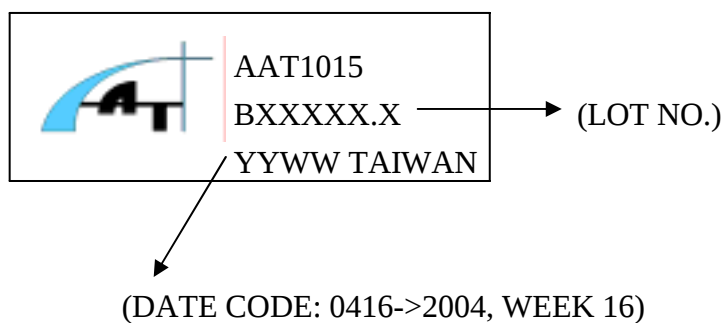


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PART MARKING

PDIP8 TOP MARKING



NOTE: PDIP8 HAS NO BACK MARKING.