

■ Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Rating	Unit
Supply voltage	V _{CC}	35	V
Peak output current	I _{O (peak)}	±2	A
Maximum continuous output current	I _{O (max.)}	±0.15	A
Power dissipation	P _D	1.5 *	W
Operating ambient temperature	T _{opr}	-30 to +85	°C
Storage temperature	AN8090	T _{stg}	°C
	AN8090S		
			-40 to +125

* For the AN8090S, Ta ≤ 25°C when mounting onto the glass epoxy substrate (substrate size=5cm × 5cm × 0.45cm)

■ Recommended Operating Range (Ta=25°C)

Parameter	Symbol	Range
Operating supply voltage range	V _{CC}	Stop voltage to 34V

■ Electrical Characteristics (Ta=25°C)

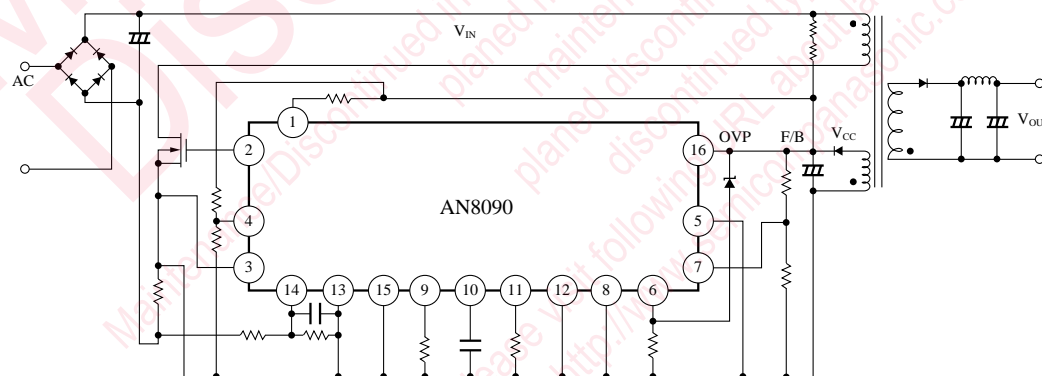
Parameter	Symbol	Condition	min	typ	max	Unit
Operating voltage range	V _{CC}		—	—	34	V
Start voltage	V _{CC (start)}		15.2	16	17.2	V
Stop voltage	V _{CC (stop)}		9	10	10.9	V
Start/stop voltage difference	DV _{CC}	DV _{CC} =V _{CC (start)} -V _{CC (stop)}	5	6	7	V
Prestart circuit current	I _{CCL}	V _{CC} =14.5V Ta=25°C	50	80	120	μA
		V _{CC} =14.5V -30°C ≤ Ta ≤ 85°C	40	80	160	μA
Circuit current	I _{CCO}	V _{CC} =30V	10	15	21	mA
ON/OFF pin H threshold voltage	V _{TH ON/OFF}		2.1	2.6	3.1	V
ON/OFF pin L threshold voltage	V _{TL ON/OFF}		1.9	2.4	2.9	V
ON/OFF pin hysteresis voltage	DV _{T ON/OFF}		0.1	0.2	0.3	V
Oscillation frequency	f _{osc}	R1=17kΩ, R2=22kΩ, CF=220pF	180	200	220	kHz
Duty ratio	G _{DUTY}	R1=17kΩ, R2=22kΩ, CF=220pF	45	48	51	%
Oscillation waveform upper limit voltage	V _{OSCH}		4	4.4	4.8	V
Oscillation waveform lower limit voltage	V _{OSCL}		1.8	2	2.2	V
Oscillation waveform upper/lower limit voltage difference	DV _{OSC}		2.1	2.4	2.7	V
Output low voltage	V _{OL1}	V _{CC} =18V, I _O =10mA	—	0.05	0.4	V
	V _{OL2}	V _{CC} =18V, I _O =100mA	—	0.7	1.4	V
	V _{OL3}	V _{CC} =5V, I _O =10mA	—	0.69	1	V
	V _{OL4}	V _{CC} =5V, I _O =100mA	—	1.3	2	V
Output high voltage	V _{OH1}	V _{CC} =18V, I _O =-10mA	16	16.5	—	V
	V _{OH2}	V _{CC} =18V, I _O =-100mA	15.5	16	—	V
Overheat protection operating temperature	T _{TS}		120	140	160	°C

Pin Descriptions

Pin No.		Symbol	Description
DIL	SO		
1	1	V_C	Pin to apply the supply voltage to the output transistor
2	2	V_{OUT}	IC output pin. Drives the MOS-FET or bipolar transistor.
3	3	$V_{OUT-COM}$	Output transistor ground pin
4	4	V_F	Detects the mean level of output pulses and provides output duty control and timer control.
5	7	ON/OFF	Pin to turn on/off the IC. The IC stops at "H" (output= "L") and starts at "L".
6	8	OVP	Detects an over-voltage and stops the IC ; the stop state is held.
7	9	V_{IN}	Pin to feed back the output voltage of the power supply. It has internal gain.
8	10	I_{IN}	Pin to feed back the output voltage of the power supply.
9	11	T_{ON}	Pin to connect the resistor which determines the tilting of the charge period of an internally oscillated triangular wave.
10	12	C_F	Pin to connect the capacitance which determines the frequency of an internally oscillated triangular wave.
11	13	T_{OFF}	Pin to connect the resistor which determines the tilting of the discharge period of an internally oscillated triangular wave.
12	14	C_T	Pin to connect the capacitance which determines a timer control frequency.
13	17	GND	Ground pin for the system.
14	18	CLM ⁻	Overcurrent detection pin on the negative potential side.
15	19	CLM ⁺	Overcurrent detection pin on the positive potential side.
16	20	V_{CC}	Pin to apply the supply voltage. Detects the start and stop voltage.
—	5	FIN (GND)	Pin directly connected to the IC chip. Joint use for discharge and GND.
—	6	FIN (GND)	Pin directly connected to the IC chip. Joint use for discharge and GND.
—	15	FIN (GND)	Pin directly connected to the IC chip. Joint use for discharge and GND.
—	16	FIN (GND)	Pin directly connected to the IC chip. Joint use for discharge and GND.

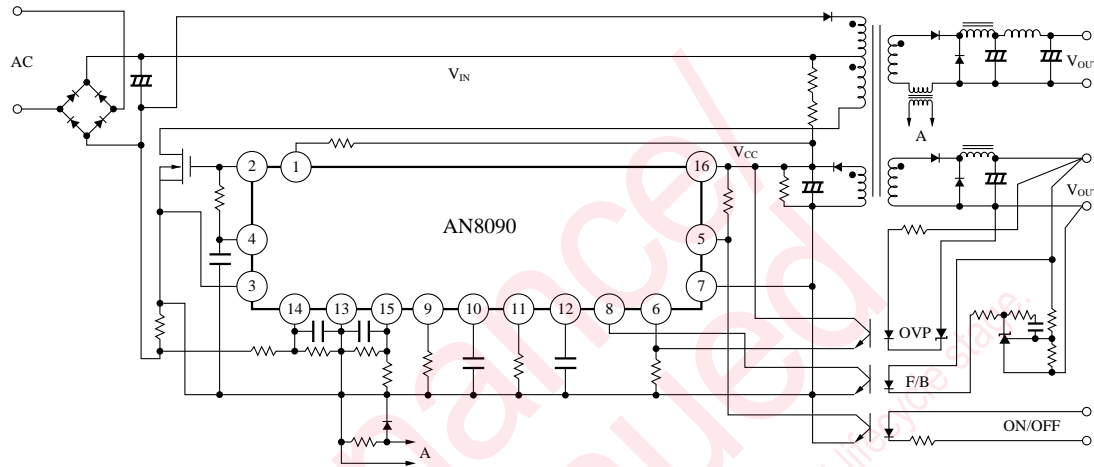
Application Circuit

- 1) AN8090 flyback application



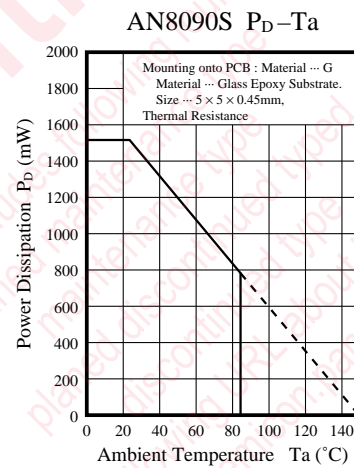
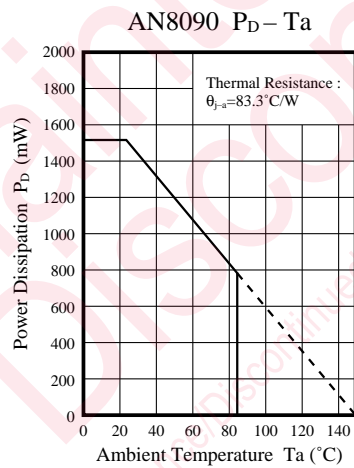
■ Application Circuit (cont.)

2) AN8090 feed-forward application



■ Supplementary Descriptions

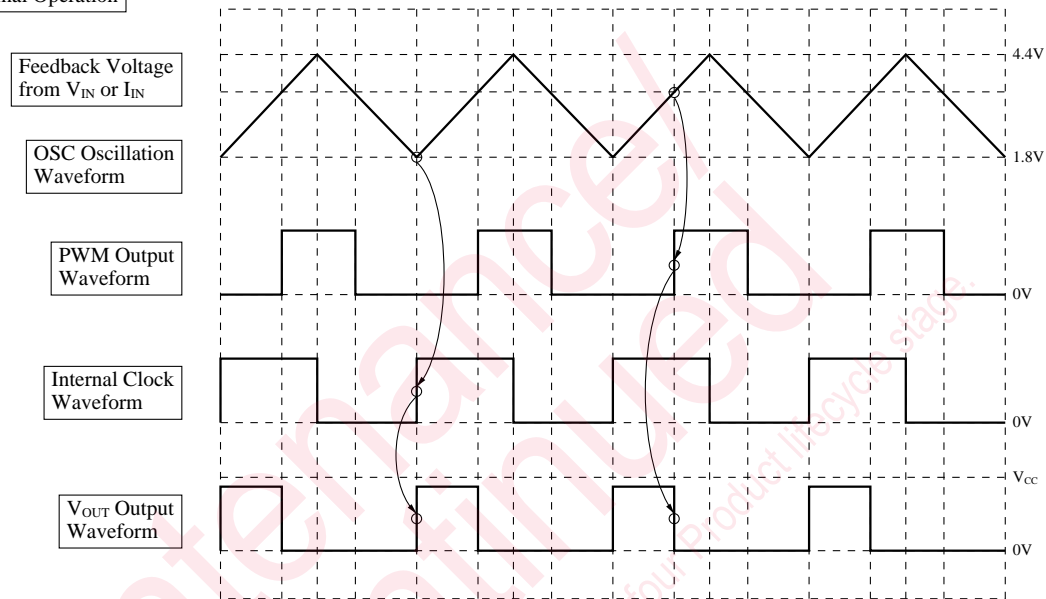
• Characteristic Charts



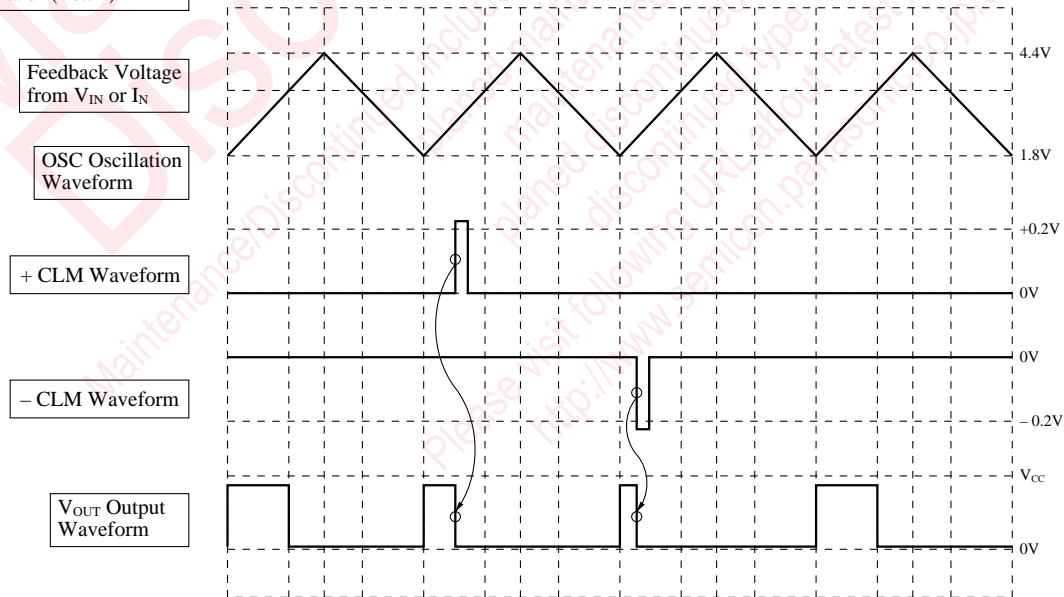
■ Supplementary Descriptions (cont.)

• Timing Charts

In Case of Normal Operation



In Case of Current Limiting Operation (Note 1)

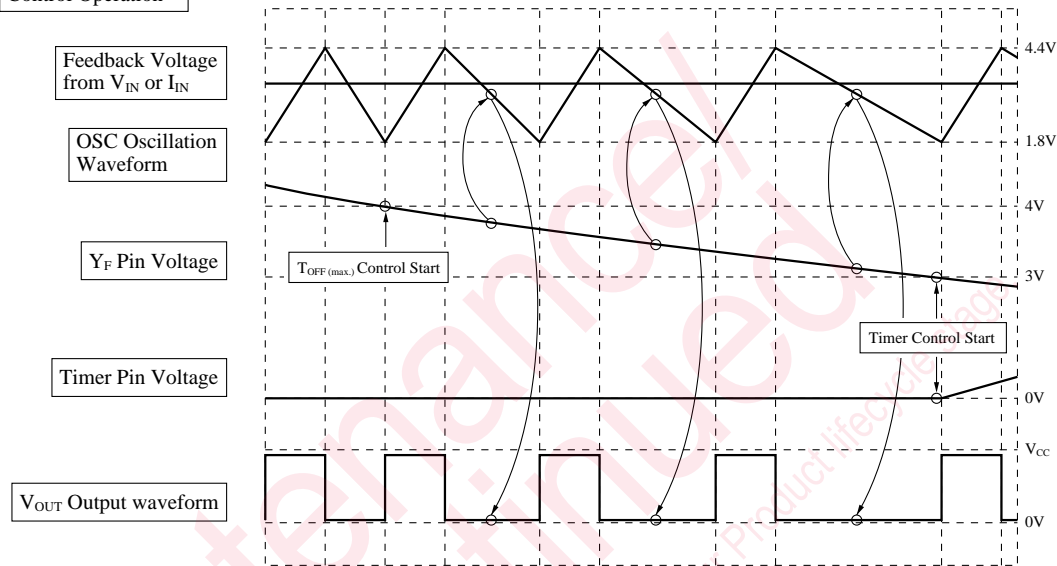


Note 1) The V_F pin voltage should be higher than the $T_{OFF(max)}$ control start voltage ($\leq 4V$).

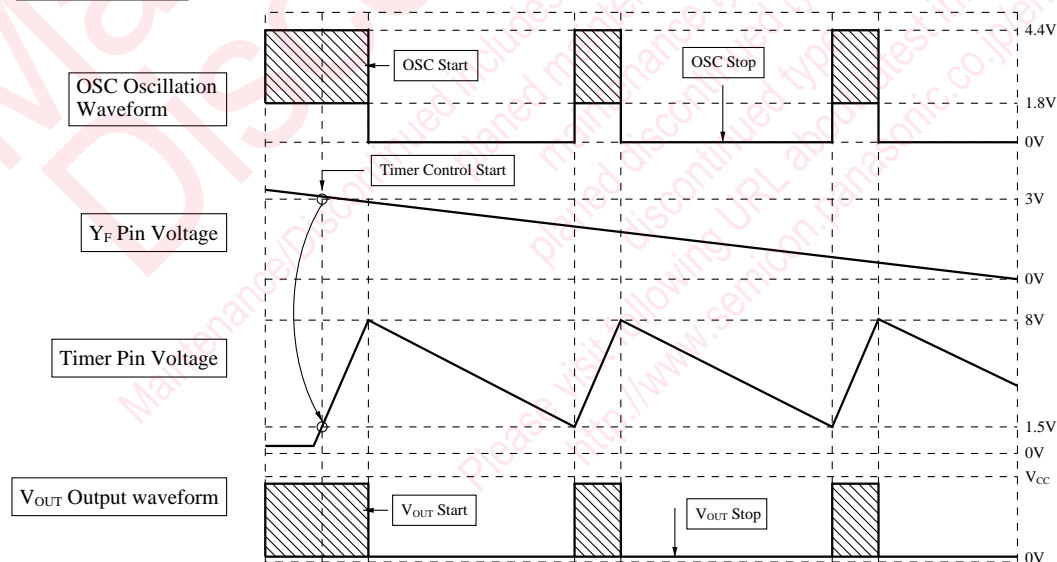
■ Supplementary Descriptions (cont.)

• Timing Charts (cont.)

In Case of $T_{OFF(max)}$ Control Operation Note 2)



In Case of Timer Control Operation Note 3)



Note 2) In case of current limiting operation ($CLM+ \geq 0.2V$ and $CLM- \geq -0.2V$), $T_{OFF(max)}$ control and timer control work.
 Note 3) Even during timer control operation, the OFF period of OSC (V_{OUT}) is controlled by $T_{OFF(max)}$ control.

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