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AN8086S

Low Voltage Operation IC for DC-DC Converter

■ Overview

The AN8086S is an IC for controlling a DC-DC converter suitable for the switching power supply of various portable equipment. It can operate with input voltage 1.1V or more. The AN8086S is based on AN8083S with the output voltage in the secondary side changed to 3.6V.

■ Features
- Operatable with low voltage input (PV_{CC}>1.1V)
- Decreased voltage detection circuit built-in
- Short-circuit protection feature built-in
- Provided with reset output
- Synchronizable with outside clock
- Low consumption current in stand-by mode

Unit : mm

16-lead SOP package (SOP016-P-0225A)

■ Block Diagram

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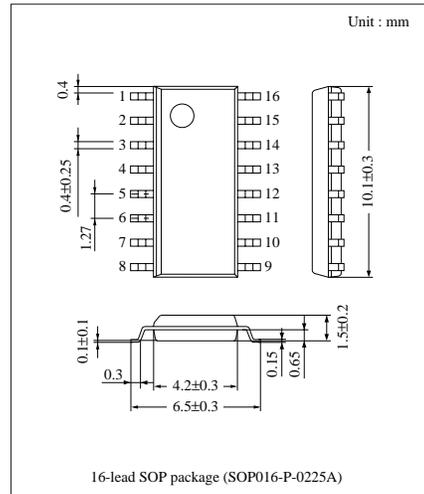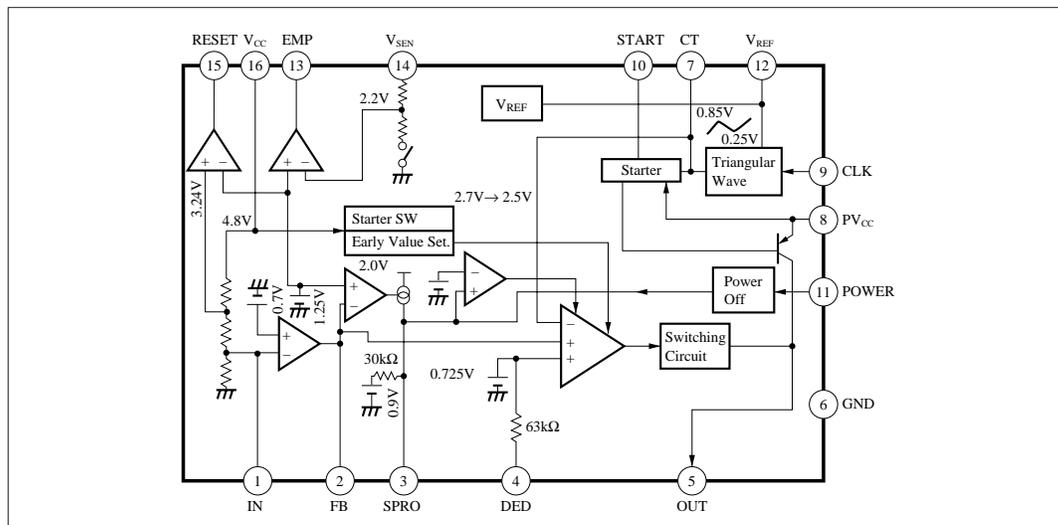
■ Absolute Maximum Ratings (Ta=25˚C)

Parameter	Symbol	Rating	Unit
Supply Voltage	V_{CC}	14.4	V
	PV_{CC}	14.4	
Power Dissipation	P_D	380	mW
Operating Ambient Temperature	T_{opr}	−20 ~ +75	˚C
Storage Temperature	T_{stg}	−55 ~ +125	˚C

■ Recommended Operating Range (Ta=25˚C)

Parameter	Symbol	Range
Operating Supply Voltage Range	V_{CC}	3.6V ~ 12V
	PV_{CC}	1.1V ~ 12V

■ Electrical Characteristics (Ta=25˚C)

| Parameter	Symbol	Condition	min.	typ.	max.	Unit
Power V_{CC} Stand-by Mode Supply Current	I_{PVCC}	V_{CC}=0V, PV_{CC}=3V	—	—	2	μA
Power V_{CC} No Load Supply Current	I_{PVCC}	V_{CC}=3.1V, PV_{CC}=3V	—	1.2	3	mA
Output Voltage	V_O		—	3.6	—	V
Reset Output Threshold Voltage	$V_{TH(RESET)}$		$V_{TH}\times0.85$	$V_{TH}\times9$	$V_{TH}\times0.95$	V
Decreased Voltage Detection Threshold Voltage	$V_{TH(VSEN)}$		2.1	2.2	2.3	V
Short-Circuit Protection Operating Voltage	$V_{O(SPRO)}$	V_{IN}=0V, V_{POWER}=2V	1.35	—	2.1	V
Short-Circuit Protection Operating Voltage	$V_{O(SPRO)}$	V_{IN}=1V, V_{POWER}=0V	1.7	—	3.2	V
Triangular oscillation Frequency in Normal Operation	f_{OSC1}	R_{REF}=33kΩ, CT=330pF	60	70	80	kHz
Triangular oscillation Frequency at Start	f_{OSC2}	R_{REF}=33kΩ, CT=330pF V_{CC}=1.9V, PV_{CC}=3V	80	100	120	kHz
Output Voltage	$V_{OH(OUT)}$	I_O=−20mA, V_{CT}=0V	1.2	—	1.6	V
Output Voltage	$V_{OL(OUT)}$	I_O=20mA, V_{CT}=1V	—	—	0.4	V

Note) Unless otherwise specified, V_{CC}=4.8V, PV_{CC}=3V

■ Application Circuit Example
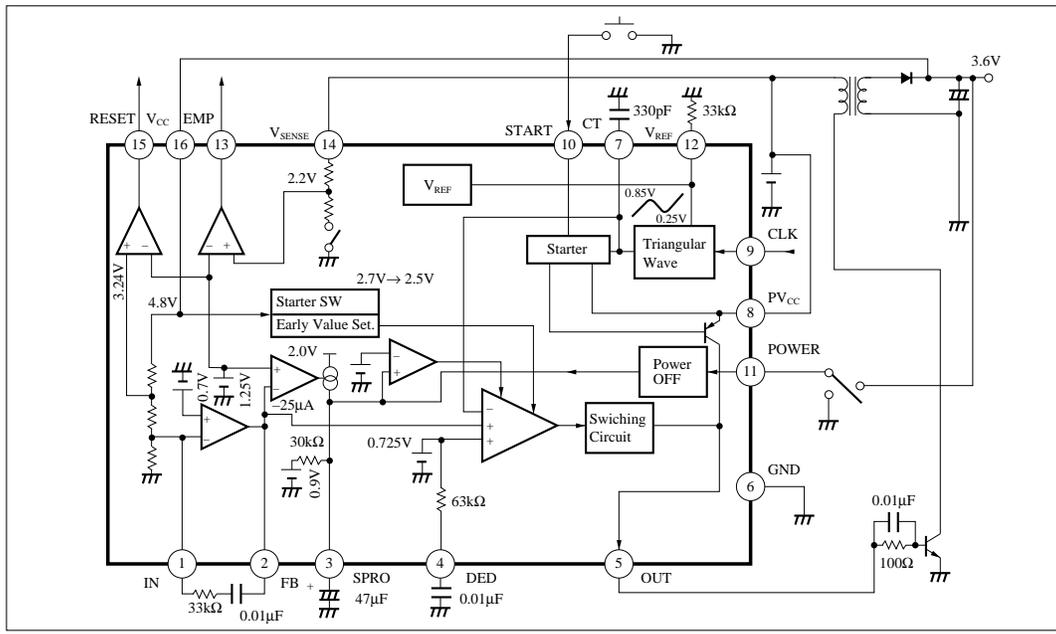
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■ Pin Description

Pin No.	Symbol	Description
1	IN	• Input pin for error amplifier • Threshold voltage ; 0.7V
2	FB	• Output pin for error amplifier
3	SPRO	• Short-circuit protection input pin If output of error amplifier does not become "L" when $t = CV_{th}/I_{SPRO}$ output of IC is not switched. $I_{SPRO} = 25\mu A$ $V_{th} = 0.9V$
4	DED	• Dead time control input Maximum duty ratio set to 85%.
5	OUT	• Switching output pin Output current ; $I_O = 20mA$ (max.)
6	GND	• GND pin
7	CT	• Triangular oscillating capacitor pin $T_1 = \dfrac{CV}{I \ (Discharged)}$ $T_2 = \dfrac{CV}{I \ (Charged)}$ $f = \dfrac{1}{T_1 + T_2}$ $I \ (Discharged) = 52\mu A$ $I \ (Charged) = 30\mu A$ $V = 0.58V$ In normal operation
8	PV_{CC}	• DC voltage input pin Operates with 1.1V or more.
9	CLK	• Clock input · It is used to synchronize triangular oscillation with clock input and operates at rise edge of clock. · The threshold level is TTL level. · It is open when not used.
10	START	• Start pin · Starts switching of starter (start at "L") · Threshold voltage, $PV_{CC} - 0.9V$
11	POWER	• Power ON/OFF pin Output ON/OFF switching pin (Output is off at "L.")
12	V_{REF}	• Reference voltage pin · 1.25V output · Charged and discharged current of triangular oscillation is determined by external R. $I \ (Charged) = \dfrac{V_{REF} - 0.7}{R_{REF} + 1k\Omega}$ $I \ (Discharged) = 1.40 \times I \ (Charged)$
13	EMP	• Decreased voltage detection output pin "H" when detected by open collector output form
14	V_{SEN}	• Decreased voltage detection input pin · Threshold voltage ; 2.2V
15	Reset	• Reset output pin · "H" when V_{CC} becomes $V_O \times 0.9V$ or more · Open collector output form
16	V_{CC}	• DC voltage input pin Operates with 3.6V or more.
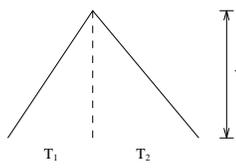
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