

AN5900

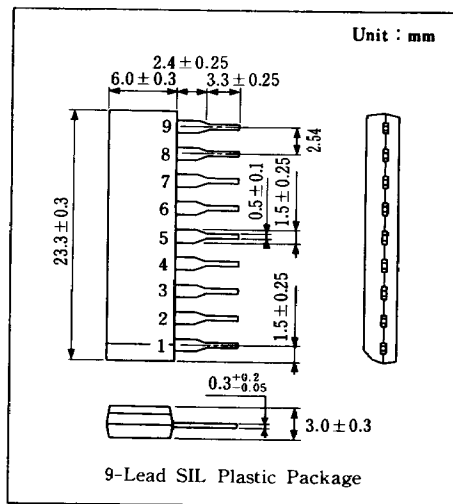
Switching Regulator Control Circuit

■ Outline

The AN5900 is an integrated circuit in which a PWM switching regulator control circuit and protect circuit are integrated on a single chip.

■ Features

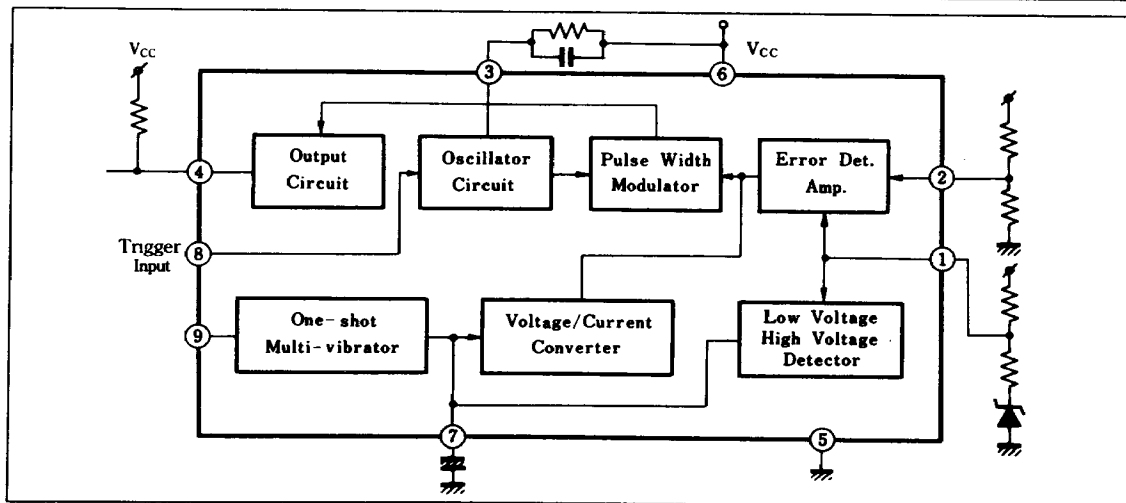
- Soft start circuit
- 0 ~ 0.7 duty
- Protection circuit for over voltage and current
- External trigger available
- High supply voltage protection
- Low supply voltage protection
- Reference voltage provided by external zener diode
- Compact 9-lead plastic SIL package for higher flexibility in PCB design



■ Pin

Pin No.	Pin Name
1	Ref. Voltage
2	Feedback
3	Oscillator
4	Output
5	GND
6	V _{CC}
7	Soft Start
8	Trigger
9	Protector

■ Block Diagram



Item		Symbol	Rating		Unit
Voltage	Supply Voltage	V _{CC}	14.0		V
	Circuit Voltage	V ₆₋₅	0	+14.4	V
		V ₁ , V ₂ , V ₄₋₅	0	V ₆₋₅	V
		V ₃₋₅	3	10	V
		V ₇₋₅	0	8	V
		V ₈ , V ₉₋₅	-3	+4	V
Current	Supply Current	I ₆	18.0		mA
	Circuit Current	I ₄	-1	+50	mA _{peak}
Power Dissipation		P _D	260		mW
Local Power Dissipation (Q ₁)		P _D (Q ₁)	60		mW
Temperature	Operating Ambient Temperature	T _{opr}	-20 ~ +75		°C
	Storage Temperature	T _{stg}	-55 ~ +150		°C

■ Electrical Characteristics ($V_{CC}=12V$, $T_a=25^{\circ}C$)

Item		Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Total Circuit Current		I _{tot}	1		8.4	10.5	12.6	mA
Oscillation Frequency		f _{osc}	1		14.0	14.8	15.6	kHz
Output Pulse Duty (max.)		tw(duty)	1		67	72	77	%
Output Pulse Duty (min.)		tw(duty)	1			0	0	%
Output Saturation Voltage (1)		V _{O(sat)(1)}	2	I ₄ = 10mA		0.10	0.30	V
Output Saturation Voltage (2)		V _{O(sat)(2)}	2	I ₄ = 50mA		0.62	1.00	V
High Supply Voltage Protection		V _{HVP}	1		13.2	13.9	14.6	V
Low Supply Voltage Protection		V _{LVP}	1		4.8	5.2	5.6	V
Input Voltage	Ext. Trigger Start	V _{t1}	1		0.66	0.71	0.76	V
	One-Shot Multi Start	V _{t2}	1		0.68	0.73	0.78	V

The circuit diagram shows the AN5900 timer in monostable mode. The input pulse is generated by a 25kHz Pulse Gen. connected to pin 1 through a 4.7kΩ resistor and switch SW₁. Pin 2 is connected to ground through a 15kΩ resistor and switch SW₂. Pin 3 is connected to V_{CC} (+12V) through a 0.0056μF capacitor and a 20kΩ resistor, and to ground through a 10μF capacitor and switch SW₃. Pin 4 is connected to V_{CC} through an 8.2kΩ resistor and switch SW₄. Pin 5 is connected to ground through a 22μF capacitor. Pin 6 is connected to a 1mA meter. Pin 7 is connected to ground through a 1kΩ resistor and switch SW₅. Pin 8 is connected to a 62V Zener diode. Pin 9 is connected to ground through a 1kΩ resistor and switch SW₆. The output of the timer (pin 10) is connected to an F. Counter and an Oscilloscope. The circuit is powered by a +12V V_{CC} source.

Item	SW ₁	SW ₂	SW ₃	SW ₄
I _{CC}	②	①	②	②
t _W (min)	①	①	②	②
V _{HVP}	②	①	②	②
V _{I1}	②	①	①	②
V _{I2}	②	②	②	①

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Item	Characteritics Value	Unit
Output Voltage	5.0	V
Output Current	10.0	A
Output Voltage Variable Range	4.5~5.8	V
Max. Output Voltage	68	W
Effective Efficiency	68	%
Output Voltage Stability	0.05% + <10mV	mV
Output Rise Time (full load)	80	ms
Output Rise Time (no load)	70	ms
Output Fall Time (full load)	30	ms