AN5900

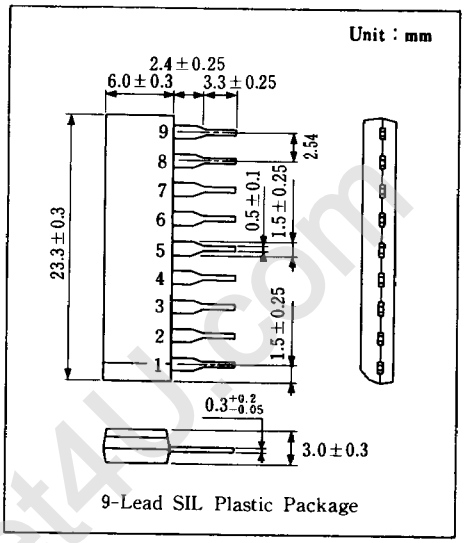
Switching Regulator Control Circuit

■ 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

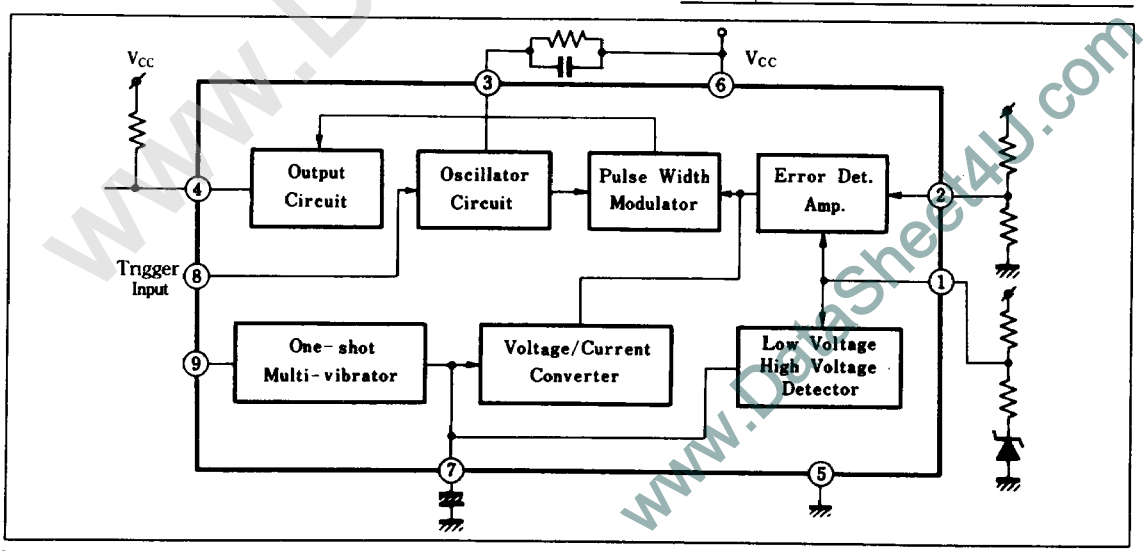


9-Lead SIL Plastic Package

■ Pin

Pin No.	Pin Name
1	Ref. Voltage
2	Feedback
3	Oscillator
4	Output
5	GND
6	Vcc
7	Soft Start
8	Trigger
9	Protector

■ Block Diagram



■ Absolute Maximum Ratings (Ta=25°C)

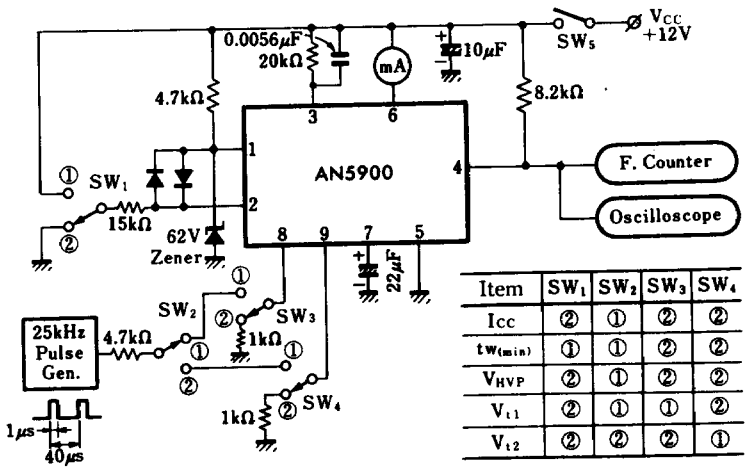
Item		Symbol	Rating		Unit
Voltage	Supply Voltage	V_{CC}	14.0		V
	Circuit Voltage	V_{6-5}	0	+14.4	V
		V_1, V_2, V_{4-5}	0	V_{6-5}	V
		V_{3-5}	3	10	V
		V_{7-5}	0	8	V
		V_8, V_{9-5}	−3	+4	V
Current	Supply Current	I_6	18.0		mA
	Circuit Current	I_4	−1	+50	mA_{peak}
Power Dissipation		P_D	260		mW
Local Power 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

Note : ⊕ is flow-in current to the circuit, while ⊖ is flow-out current

■ Electrical Characteristics (V_{CC}=12V, Ta=25°C)

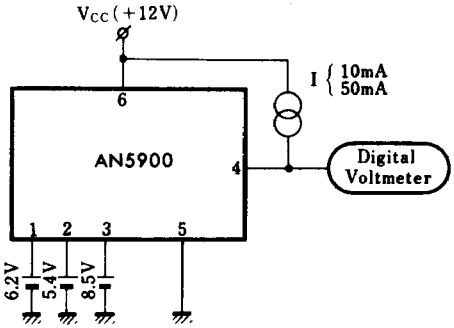
Item		Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Total Circuit Current		I_{tot}	1		8.4	10.5	12.6	mA
Oscillation Frequency		f_{osc}	1		14.0	14.8	15.6	kHz
Output Pulse Duty (max)		$t_{W(duty)}$	1		67	72	77	%
Output Pulse Duty (min)		$t_{W(duty)}$	1			0	0	%
Output Saturation Voltage (1)		$V_{O(sat)(1)}$	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

Test Circuit 1 (I_{tot}, f_{osc}, $t_{W(duty)}$, V_{HVP}, V_{LVP}, V_{t1}, V_{t2})

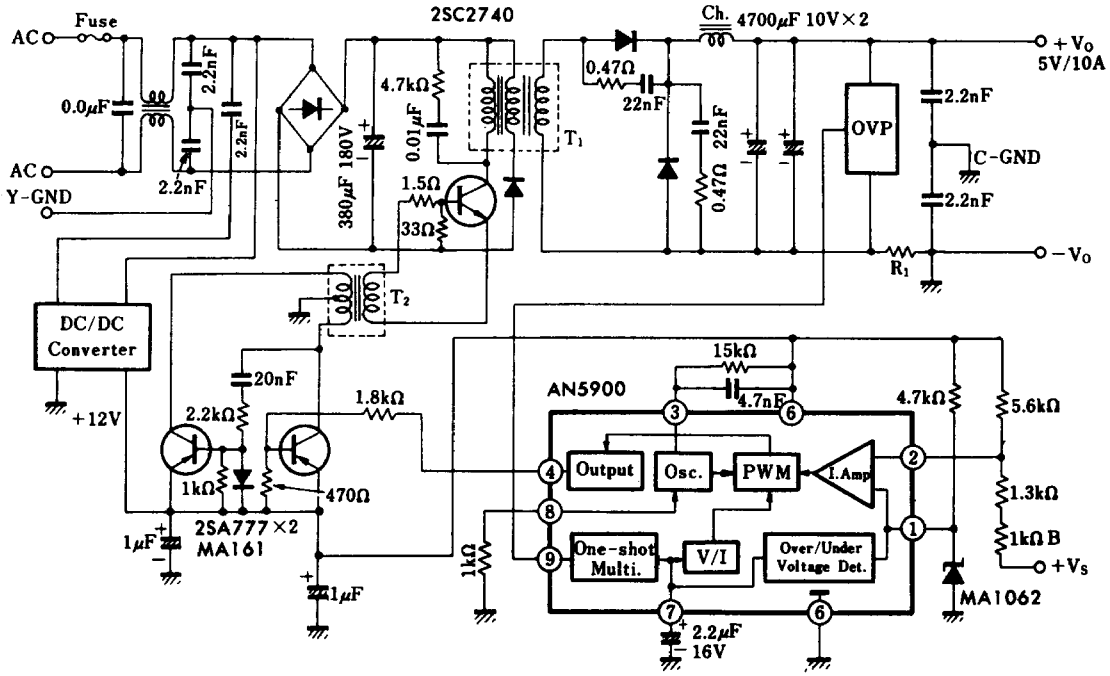


Item	SW1	SW2	SW3	SW4
Icc	②	①	②	②
$t_{W(min)}$	①	①	②	②
V_{HVP}	②	①	②	②
V_{t1}	②	①	①	②
V_{t2}	②	②	②	①

Test Circuit 2 ($V_{O(sat)}$)



■ Application Circuit



■ Typical Circuit Characteristics

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