

Pulse width modulation circuit

Description :

The accuracy of the SG3525 chip plus 5.1V reference voltage is $\pm 1\%$. As the reference voltage value is within the input common mode range of the error amplifier, there is no need for an external resistor.

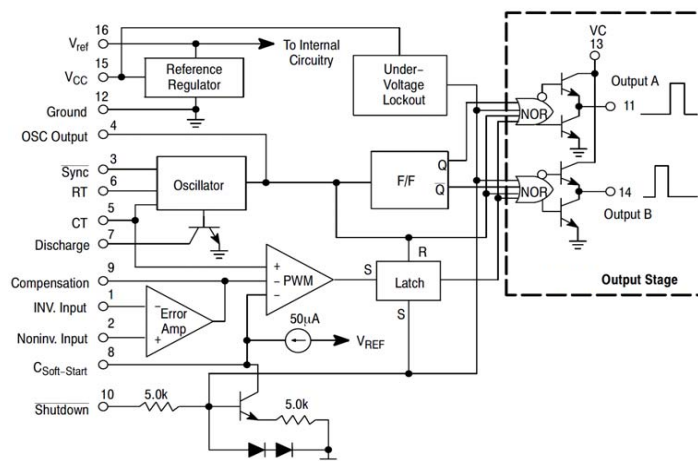
The SG3525 can operate in master-slave mode or synchronize with external clocks. The dead time can be adjusted by the resistance between the CT and the discharge terminal. Other functional circuits within the chip include: soft start circuit, shutdown circuit, and undervoltage circuit.

The output stage of the SG3525 control chip is a high-power totem pole output, with a source current and suction current exceeding 150mA. It provides a logic level of "or not" logic, and a low level when in the "off" state.

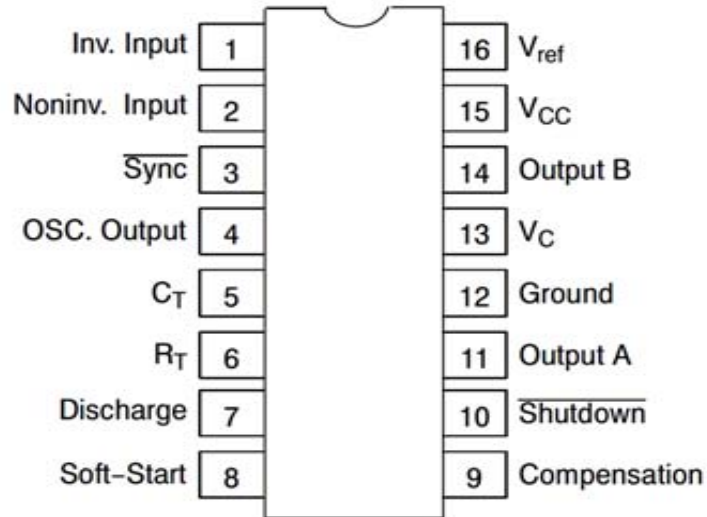
Features :

- Working voltage range 8~35V;
- 5.1V reference voltage, accuracy $\pm 1\%$;
- Oscillation frequency range: 100Hz~500KHz;
- Oscillator synchronization signal input terminal;
- Adjustable dead time;
- Built in soft start circuit;
- Step by step pulse shutdown;
- Input undervoltage locking with hysteresis voltage;
- PWM locking function, prohibiting multiple pulses;
- Packaging form: DIP/SOP16

Internal schematic diagram:



Pin Assignment :



Absolute Maximum Ratings

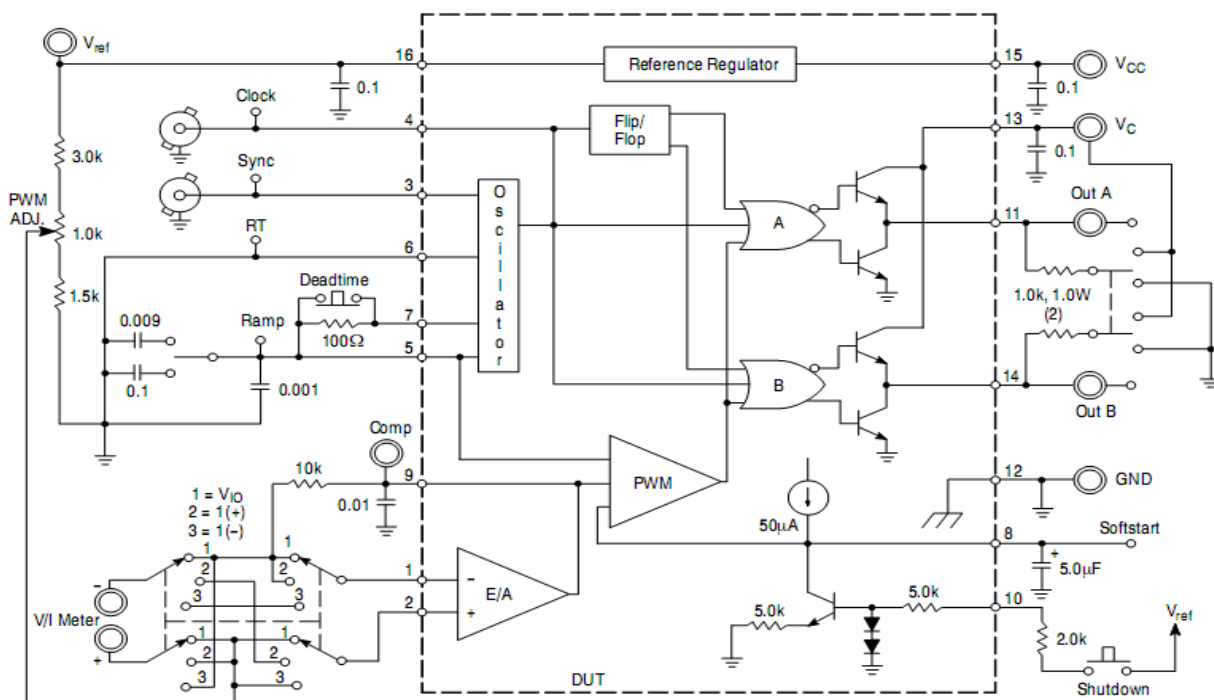
parameter	symbol	value	unit
supply voltage	V _i	40	V
collector supply voltage	V _C	40	V
Charging current of oscillator	I _{OSC}	5	mA
Output source current	I _o	400	mA
Reference output current	I _R	50	mA
Power consumption T _{amb} =70°C	P _{tot}	1000	mW
operation temperature	T _{op}	0 to 70	°C
Junction temperature range	T _j	- 55 to 150	°C
Storage Temperature Range	T _{stg}	- 65 to 150	°C

Electrical parameters (Vcc=20V)

parameter	symbol	condition	min	typ	max	unit
Reference source						
Reference output voltage	VREF	TJ = 25°C	5.0	5.1	5.2	V
Line rules	Δ VREF	VCC = 8 to 35V	-	9	20	mV
Load Regulation	Δ VREF	IREF = 0 to 20mA	-	20	50	mV
Short circuit output current	ISC	VREF = 0, TJ = 25°C	-	80	100	mA
Total output change	Δ VREF	Line, load and temperature	4.95	-	5.25	V
Temperature Stability	STT		-	20	50	mV
Long term stability	ST	TJ = 125°C, 1 KHRS	-	20	50	mV
oscillator section						
Initial accuracy	ACCUR	TJ = 25°C	-	3	6	%
Frequency varies with voltage	Δ f/ Δ VCC	VCC = 8 to 35V	-	0.8	2	%
Maximum frequency	f(MAX)	RT = 2K Ω , CT = 470pF	400	430	-	KHz
lowest frequency	f(MIN)	RT = 200K Ω , CT = 0.1 μ F	-	60	-	Hz
Clock amplitude	V(CLK)		3	4	-	V
Clock width	tW(CLK)	TJ = 25°C	0.3	0.6	1	us
Synchronization threshold	VTH(SYNC)		1.2	2	2.8	V
Synchronous input current	II(SYNC)	Sync = 3.5V	-	1.3	2.5	mA
Error amplifier section(VCM = 5.1V)						
input offset voltage	VIO		-	1.5	10	mV
Input Bias Current	IBIAS		-	1	10	μ A
Input Offset Current	IIO		-	0.1	1	μ A
open loop voltage gain	GVO	RL \geq 10M Ω	60	80	-	dB
Common Mode Rejection Ratio	CMRR	VCM = 1.5 to 5.2V	60	90	-	dB
Power Supply Rejection Ratio	PSRR	VCC = 8 to 3.5V	50	60	-	dB
PWM comparator section						
Minimum Duty Cycle	D(MIN)		-	-	0	%
Maximum duty cycle	D(MAX)		45	49	-	%

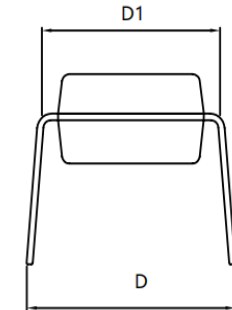
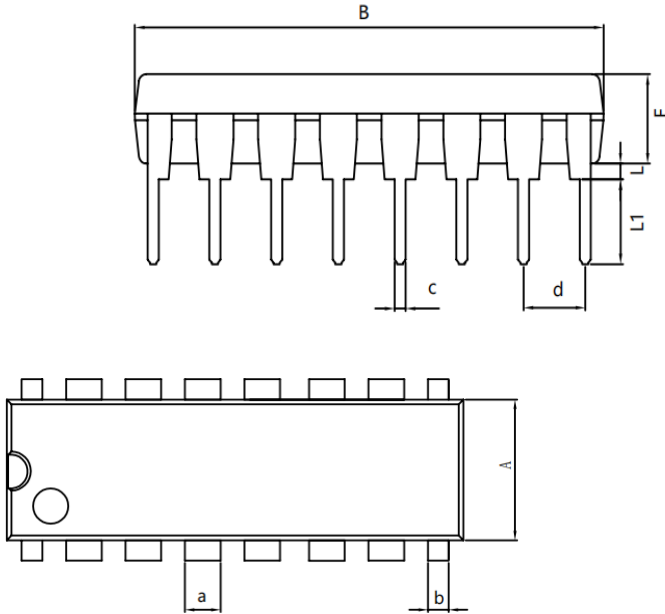
Input threshold voltage	VTH1	Zero duty cycle	0.7	0.9	-	V
Input threshold voltage	VTH2	Maximum duty cycle	-	3.2	3.6	V
Soft start part						
Soft start current	ISOFT	VSD = 0V, VSS = 0V	25	51	80	μ A
Soft start low-level voltage	VSL	VSD = 25V	-	0.3	0.7	V
Turn off threshold voltage	VTH(SD)		0.6	0.8	1	V
Turn off input current	IN(SD)	VSD = 2.5V	-	0.3	1	mA
Output section						
Low output voltage I	VOL I	ISINK = 20mA	-	0.1	0.4	V
Low output voltage II	VOL II	ISINK = 100mA	-	0.05	2	V
High output voltage I	VOH I	ISOURCE = 20mA	18	19	-	V
High output voltage II	VOH II	ISOURCE = 100mA	17	18	-	V
under-voltage lockout	VUV	V8 and V9 = High	6	7	8	V
Collector leakage current	ILKG	VCC = 35V	-	80	200	μ A
rise time	tR	CL = 1 μ F, T _J = 25°C	-	80	600	ns
fall time	tF	CL = 1 μ F, T _J = 25°C	-	70	300	ns
Standby current						
Power supply current	ICC	VCC = 35V	-	12	20	mA

Test Line



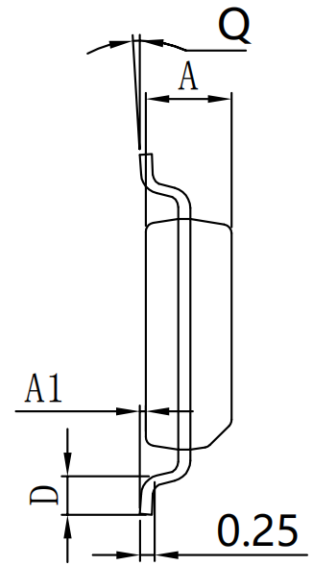
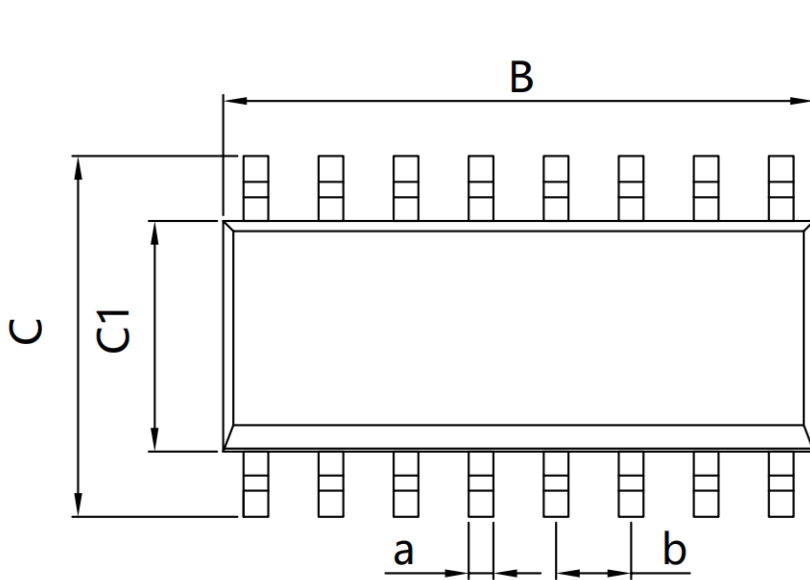
PACKAGE MECHANICAL DATA

DIP16



Dimensions In Millimeters					
Symbol :	Min :	Max :	Symbol :	Min :	Max :
A	6.100	6.680	L	0.500	0.800
B	18.940	19.560	a	1.524 TYP	
D	8.200	9.200	b	0.889 TYP	
D1	7.42	7.820	c	0.457 TYP	
E	3.100	3.550	d	2.540 TYP	
L	0.500	0.800			

SOP16



Dimensions In Millimeters					
Symbol :	Min :	Max :	Symbol :	Min :	Max :
A	1.225	1.570	D	0.400	0.950
A1	0.100	0.250	Q	0°	8°
B	9.800	10.00	a	0.420 TYP	
C	5.800	6.250	b	1.270 TYP	
C1	3.800	4.000			