

Product Specification

XBLW SG3524

Pulse width modulation circuit of switching power supply

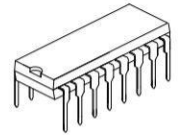
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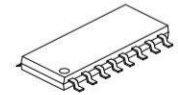
Summarize

The SG3524 is a pulse width modulation circuit for switching power supplies. It contains a reference voltage source, error amplifier, oscillator, pulse width modulation and pulse width control Flip-flop, dual alternating output, current limiting circuit and turn-off circuit. The circuit can be used for switching power supply control of any polarity, transformer-coupled DC-DC switching power supply, transformer pressurization and polarity conversion, and other power supply applications. SG3524 operating temperature is 0°C to +70°C.

DIP-16



SOP-16



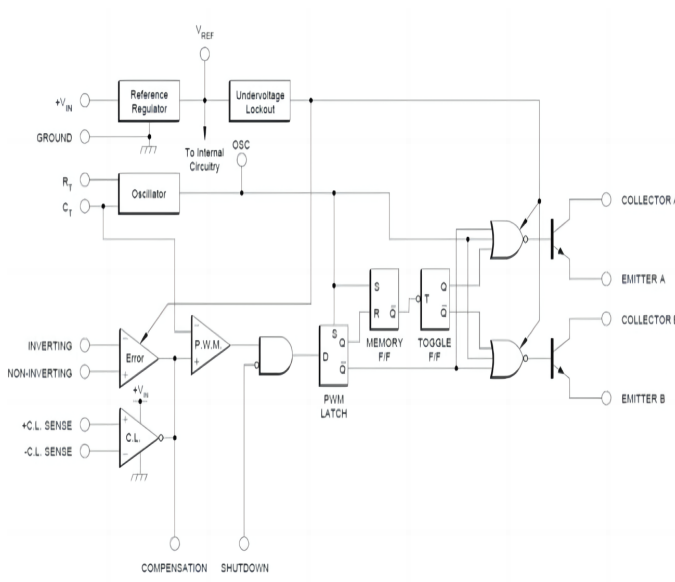
Characteristic

- With 5V reference voltage source. 100Hz to 300KHz oscillation frequency range. Good external synchronization function.
- contains two 50mA outputs.
- contains a current limiting circuit.
- Complete PWM control circuit.
- Single-ended or push-pull output.
- The total power consumption is less than 10mA.

Ordering information

Product Model	Package Type	Marking	Packing	Packing Qty
XBLW SG3524N	DIP-16	SG3524N	Tube	1000Pcs/Box
XBLW SG3524DTR	SOP-16	SG3524	Tape	2500Pcs/Reel

Functional block diagram



Pin diagram

INV. INPUT	1	16	V _{REF}
N.I. INPUT	2	15	+V _{IN}
OSC. OUTPUT	3	14	E _B
+C.L. SENSE	4	13	C _B
-C.L. SENSE	5	12	C _A
R _T	6	11	E _A
C _T	7	10	SHUTDOWN
GROUND	8	9	COMPENSATION

limit value

(Absolute maximum rating, if no other provisions, $T_{amb}=25^{\circ}C$)

Name (Symbol)	Price	Unit
input voltage(V_{in})	42	V
collector voltage	40	V
logic input voltage	-0.3~5.5	V
Current-limiting pin differential input(V_{sense})	-0.3~0.3	V
Each output current	100	mA
Voltage reference load	40	mA
Oscillating end charging current	5	mA
Working junction temperature	150	$^{\circ}C$
operating ambient temperature	0~70	$^{\circ}C$

Recommended working conditions

Name (Symbol)	Price	Unit
input voltage(V_{in})	8~40	V
collector voltage	0~40	V
Error amplifier common-mode input voltage	1.8~3.4-	V
Current-limiting pin differential input(V_{sense})	0.3~0.3	V
Each output current	0~50	mA
Voltage reference load	0~20	mA
Oscillating end charging current	0.03~2	mA
oscillation frequency	0.1~300	KHz
oscillation resistance(R_t)	1.8~100	K Ω
Oscillation capacitance(C_t)	1~1000	nF
Working junction temperature	150	$^{\circ}C$
operating ambient temperature	0~70	$^{\circ}C$

Electric parameter

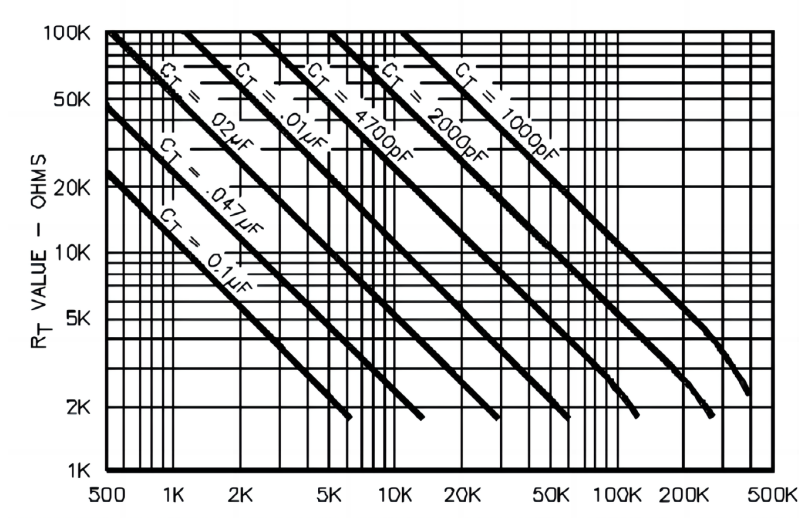
(Without special instructions, $V_{in}=20V$, $T_A=25^{\circ}C$)

Symbol	Parameter	Condition	SG3524			Unit
			MIN.	TYP.	MAX.	
Reference voltage part Vref (without explanation, $I_L = 0mA$)						
Vref	output voltage		4.8	5.0	5.2	V
Line Reg	Voltage linearity	$V_{in}=8V\sim 40V$			30	mV
Load Reg	Load linearity	$I_L = 0$ to 20mA			50	mV
Short current	Reference short-circuit current	$V_{REF} = 0V$	25		150	mA
Oscillator (without explanation $F_{OSC} = 40KHz$, $R_T = 2.9KW$, $C_T = 0.01\mu F$)						
Fosc	oscillation frequency		36		44	KHz
	Frequency voltage drift	$V_{IN} = 8V$ to 40V			1	%
MaxFosc	maximum frequency of oscillation	$R_T = 2K$, $C_T = 1nF$	200	400		KHz
	Peak of oscillation		3		3.9	V
	Valley value of oscillation waveform		0.6		1.2	V
Pulse Width	Oscillation pulse width		0.3		1.5	us
Error amplifier Part EA (without explanation, $V_{cm}=2.5V$)						
Vio	input offset voltage				10	mV
Ib	input bias current				10	uA
Iio	input offset current				2	uA
Av	Dc open loop gain		60			dB
Vol	output low level	$V_{PIN 1} - V_{PIN 2} > 150mV$		0.2	0.5	V
Voh	Output high level	$V_{PIN 2} - V_{PIN 1} > 150mV$	3.8	4.2		V
CMR	Input common mode suppression	$V_{CM} = 1.8V$ to 3.4V	70			dB
PWM comparator section						
Min Duty	Minimum duty cycle	$V_{COMP} = 0.5V$			0	%
Max Duty	Maximum duty cycle	$V_{COMP} = 3.6V$	45	49		%
Current limiting circuit part Current Limit Amplifier ($V_{CM} = 0V$)						
Vsense	Input threshold voltage		180		220	mV
Ib	input bias current				200	uA
Circuit off part Shutdown						
Vth	The threshold voltage is turned off		0.5	0.8	1.2	V
Output part (per output)						
Cleak	Collector leakage current	$V_{CE} = 40V$			50	uA
Vcsat	Collector pressure drop	$I_C = 50mA$			2	V

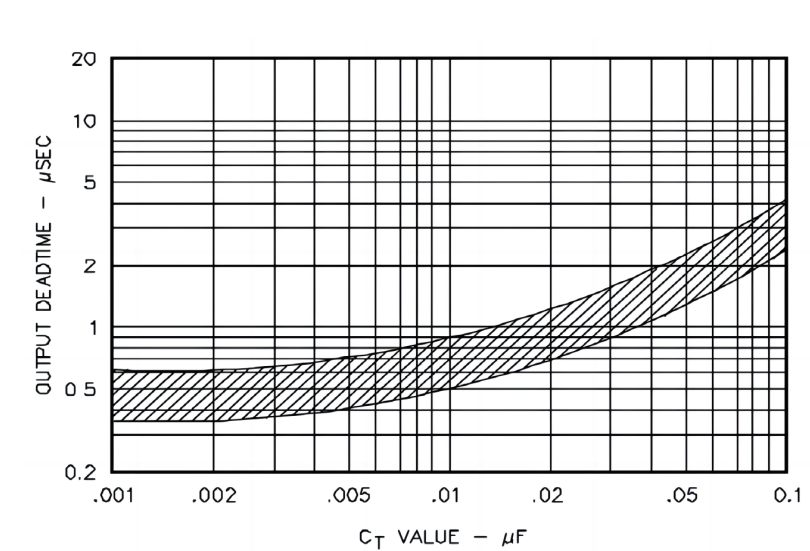
Character	Test ondition	Symbol	Parameter value			Unit
			MIN.	TYP.	MAX.	
Initiation control						
Low current input	V (pin3) =0.4V	ISTL		-25	-200	μA
High current input	V (pin13) =2.4V	ISTH		25	200	μA
	V (pin13) =Vref			75		
Integral part						
Standby current (pin 6 is reference voltage, other input and output are open)	Vcc=15V	Icc		6	10	mA
	Vcc=40V			9	15	
Average power current (see 2 for test circuit diagram)	Vcc=15V; RT=12kΩ; CT=0.01μF; V (pin14) =2.0V			7.5		mA
Symbol	Parameter	Ondition	Parameter value			Unit
			MIN.	TYP.	MAX.	
Ve	Emitter output voltage	IE = 50mA	17			V
Rise time	Collector output rise time	RC = 2K			0.4	us
Fall time	Collector output drop time	RC = 2K			0.2	us
Circuit whole						
Icc	Static working current	VIN = 40V			10	mA

Applications and notes

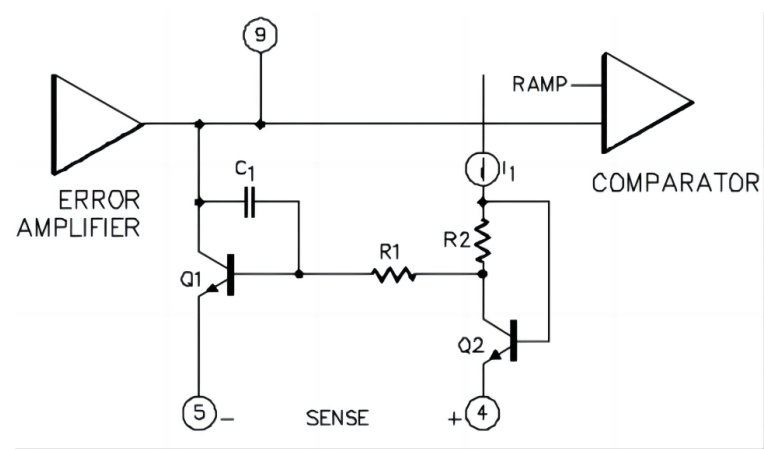
1. Table 1(Relation between oscillation frequency and Rt and Ct)



2. Table 2 (Relationship between dead zone time and Ct)

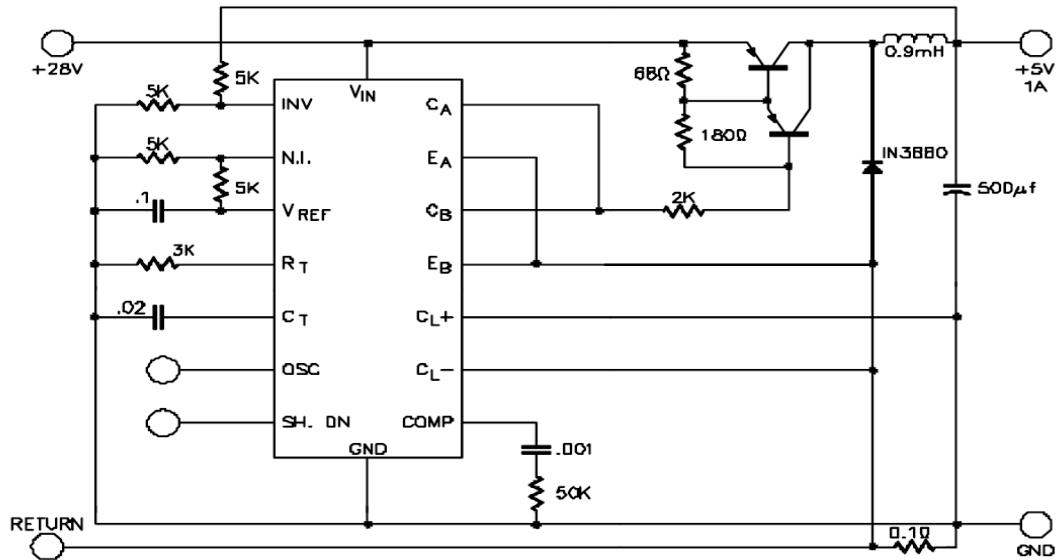


3. Internal current limiting circuit diagram

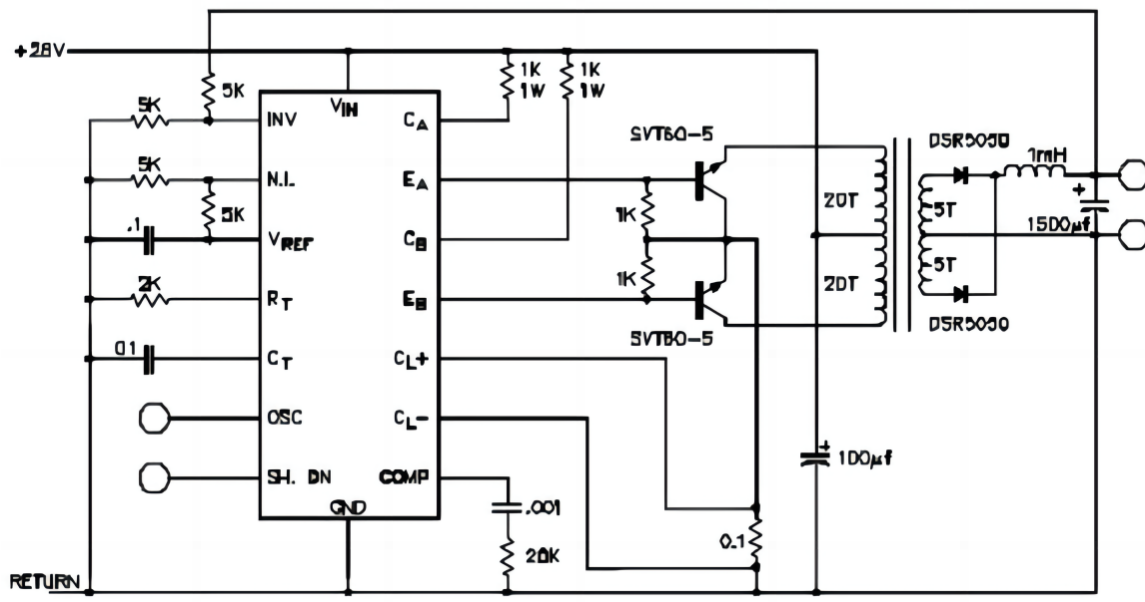


$$\text{C.L. Threshold} = V_{BE}(Q1) + I_1 \cdot R_2 - V_{BE}(Q2) = I_1 \cdot R_2 \sim 200 \text{ mV}$$

4. Single-end output application (terminal output control can reach 0~90% duty cycle)

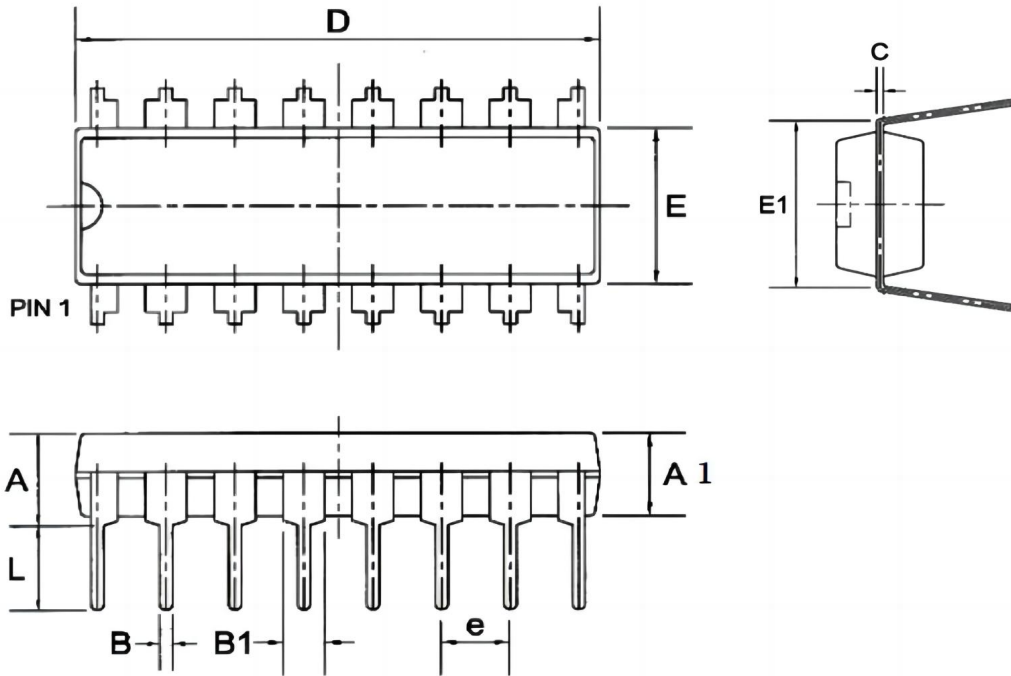


5. Push-pull output application



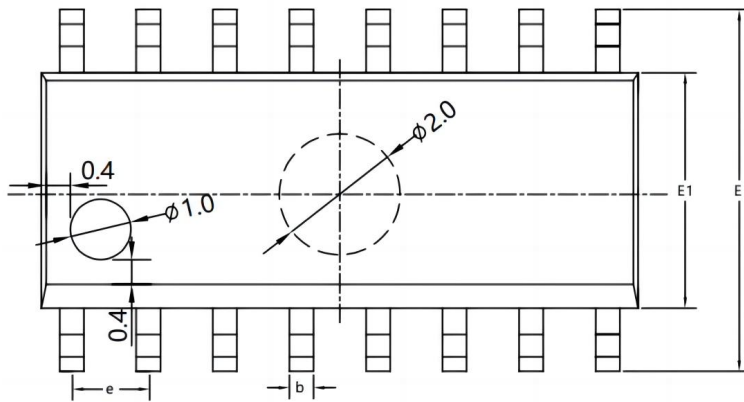
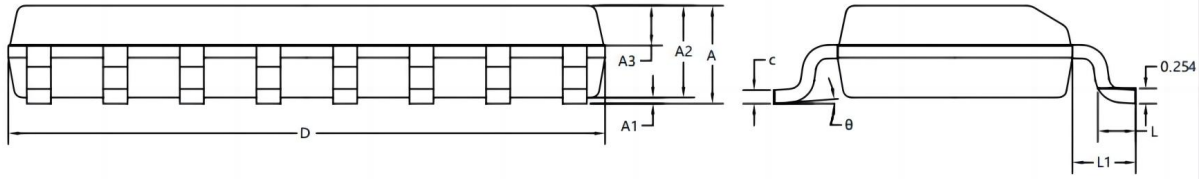
Package dimensions and outline drawings

DIP16



Symbol	Dimensions in Millimeters		
	Min	Nom	Max
A	--	--	4.31
A1	3.15	3.30	3.65
B	--	0.50	--
B1	--	1.6	--
C	--	0.27	--
D	19.00	19.20	19.60
E	6.20	6.50	6.60
E1	--	8.0	--
e	--	2.3	--
L	3.00	3.20	3.60

SOP16



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	1.50	1.60	1.70
A1	0.10	0.15	0.25
A2	1.40	1.45	1.50
A3	0.60	0.65	0.70
b	0.30	0.40	0.50
c	0.15	0.20	0.25
D	9.80	9.90	10.00
E	5.80	6.00	6.20
E1	3.85	3.90	3.95
e	1.27BSC		
L	0.50	0.60	0.70
L1	1.05BSC		
θ	0°	4°	8°

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