Voltage Mode PWM Controller **SDC7500**

General Description

The SDC7500 incorporates all the functions required in the construction of a pulse-width modulation switching circuit. Designed primarily for switching power supply control, it offers the systems engineer the flexibility to tailor control circuitry to its own application.

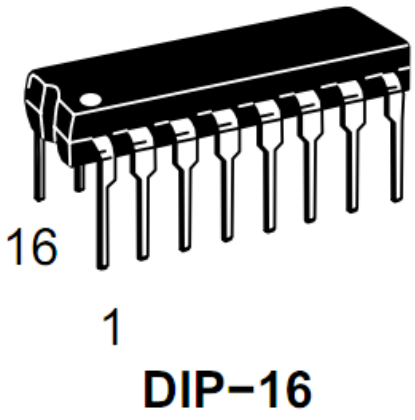
Applications

- PC power supply
- DC-DC convertor

Features

- Complete PWM power control circuitry
- Uncommitted outputs for 200mA sink or source current
- Output control for single ended or push pull operation
- Internal regulator provides a stable 5V reference supply with 5% tolerance
- Adjustable deadtime control
- Package: DIP-16

Pin Configuration



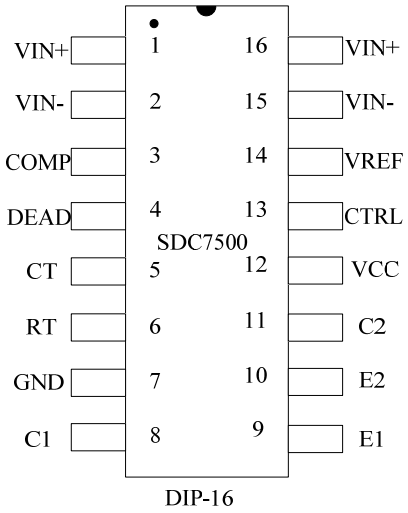


Figure 1. Pin Configuration

Pin Number	Pin Name	Function
1, 16	IN+	Amplifier positive input
2, 15	IN-	Amplifier negative input
3	COMP	Compensation pin
4	DEAD	Dead time control
5	CT	Oscillate capacitor pin, external timing capacitor
6	RT	Oscillate resistor pin, external timing resistor
7	GND	Ground
8, 11	C1, C2	Output transistor collector

9,10	E1, E2	Output transistor emitter
12	VCC	Power supply pin
13	CTRL	Output control pin
14	VREF	Reference pin

Table 1. Pin Configuration

Functional Block Diagram

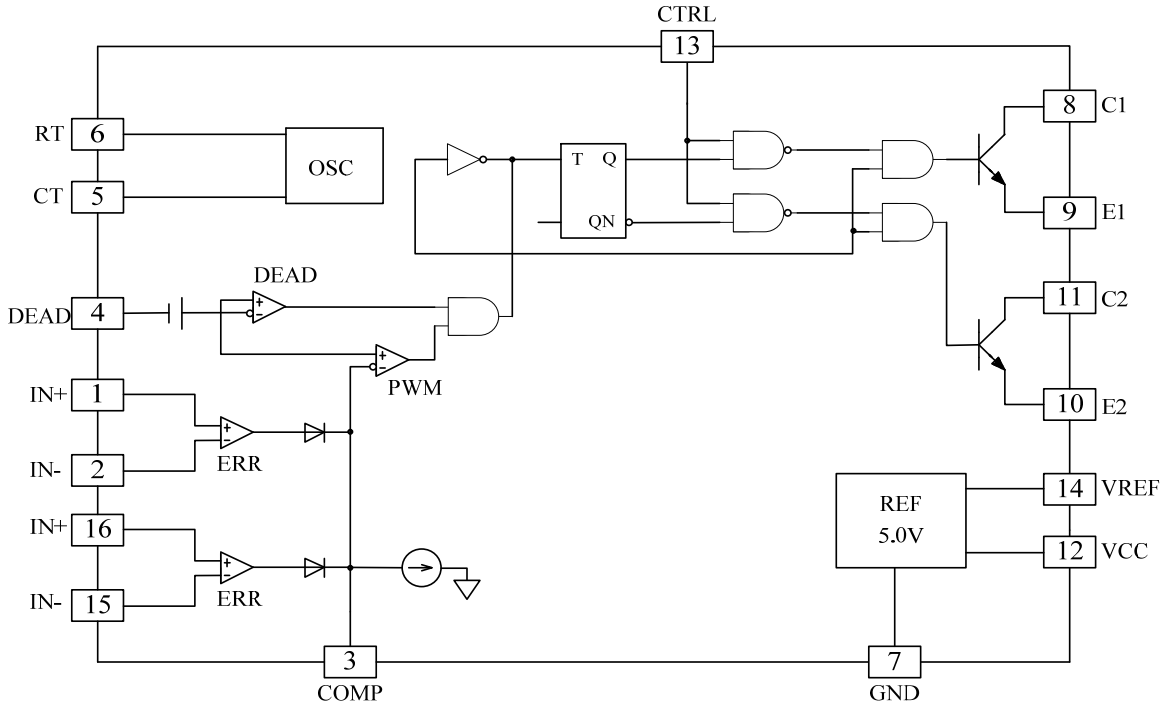


Figure 2. Functional Block Diagram

Absolute Maximum Ratings（NOTE：Stresses greater than those listed under Absolute Maximum Ratings may cause permanent damage to the device.）

Parameter	Symbol	Value	Unit
Power Supply Voltage VCC	Vcc	42	V
Amplifier Input Voltage	Vi	VCC+0.3	V
Collector Output Voltage	Vo	42	V
Collector Output Current	Ico	200	mA
Total Dissipation power	PD	1000	mW
Operating Temperature	Topr	-25~85	℃
Storage Temperature	Tstg	-65~150	℃

Table 2. Absolute Maximum Ratings

Electrical Characteristics（Vcc=15.0V, f=1KHz, Ta=25℃, unless otherwise specified.）

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
REFERENCE SECTION						
Output Voltage	Vref	Iref=1mA	4.90	5.00	5.10	V
Input Regulation	Delta_VV	VCC=7V~40V		2	25	mV
Output Regulation	Delta_VL	Iref=1mA~10mA		1	15	mV
Short-circuit Output Current	Isc	Vref=0V,Ta=25℃		55		mA
Output Voltage Change with Temperature	Delta_VT	ΔTA=MIN TO MAX		0.2	1	%
PWM SECTION						
Input Threshold Voltage	Vth	DUTY=0		4	4.5	V
Input Sink Current	Isink	VPIN3=0.7V	0.3	0.7		mA
OSCILLATOR SECTION						
Frequency	Fosc	CT=1nF RT=12KΩ	23	29	34	KHz
Standard Deviation of Frequency	Delta	ALL Value of CT RT TA constant		10		%
Frequency Change with Temperature	Delta_FT	TA=MIN TO MAX			12	%
Frequency Change with Voltage	Delta_FV	VCC=7V~40V		0.1		%
AMPLIFIER SECTION						
Input Offset Voltage	Voffset	Vo（PIN3）=2.5V		2	10	mV
Input Offset Current	Ioffset	Vo（PIN3）=2.5V		25	250	nA
Input Bias Current	Ibias	Vo（PIN3）=2.5V		0.2	1	uA
Output Sink Current	Isink	VCOMP=0.5V	0.3	0.7		mA
Output Source Current	Isourse	VCOMP=3.5V	-2			mA
Common-mode Input Voltage Range	VI	VCC=7V~40V	-0.3~VCC			V
Open-loop Voltage Amplification	GV	ΔVo=0.5V~3.5V	70	95		dB
Unity-gain Bandwidth	Fband			800		KHz
Common-mode Rejection Ratio	Rrej	VCC=40V	65	80		dB
DEAD TIME CONTROL SECTION						
Input Bias	Ibias	VI=0~5.25V		-2	-10	uA
Maximum Duty Cycle	Gv	VI（PIN4）=0	45			%
Input Threshold Voltage	Vth	DUTY=0		2.7	3.3	V
Input Threshold Voltage	Vth	DUTY=MAX	0			
POWER CURRENT SECTION						
Standby Supply Current	ICC1	VCC=15V		6	10	mA
Standby Supply Current	ICC	VCC=40V		9	15	mA
Average Supply Current	Iav	VPIN4=2V		7.5		mA

OUTPUT SECTION							
Collector off-state Current		IC	VCE=40V VCC=40V		2	100	uA
Emitter off-state Current		IE	VCC=VC=40V VE=0			-100	uA
Collector-emitter Saturation Voltage	Common-emitter	Vsat	VE=0，IC=100mA		1.0	1.3	V
	Emitter-follower	Vsat	VC=15V IE=-100mA		1.5	2.5	V
Output Control Input Current		Ii	VI=Vref			3.5	mA
SWITCHING CHARACTERISTICS							
Output Voltage Rise Time		Tr	Common-emitter configuration		100	200	ns
Output Voltage Fall Time		Tf			25	100	ns
Output Voltage Rise Time		Tr	Emitter-follower configuration		100	200	ns
Output Voltage Fall Time		Tf			40	100	ns

Table 3. Electrical Characteristics

Typical Performance Characteristics

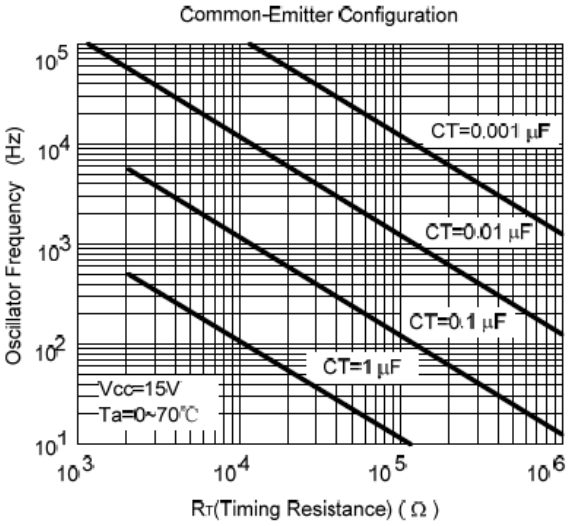


Figure 3. oscillator frequency and frequency variation VS timing resistance

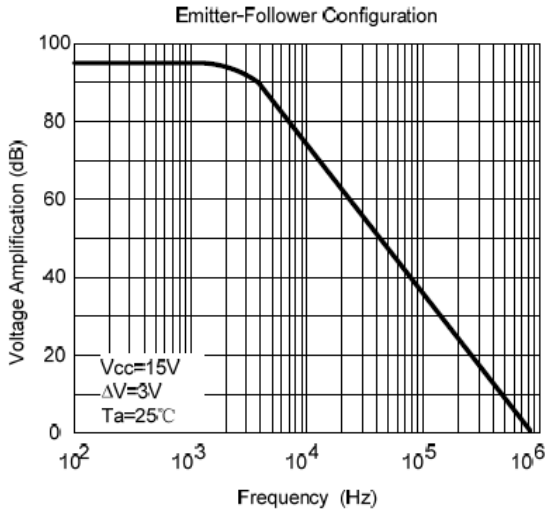


Figure4. amplifier voltage amplification

Typical Application

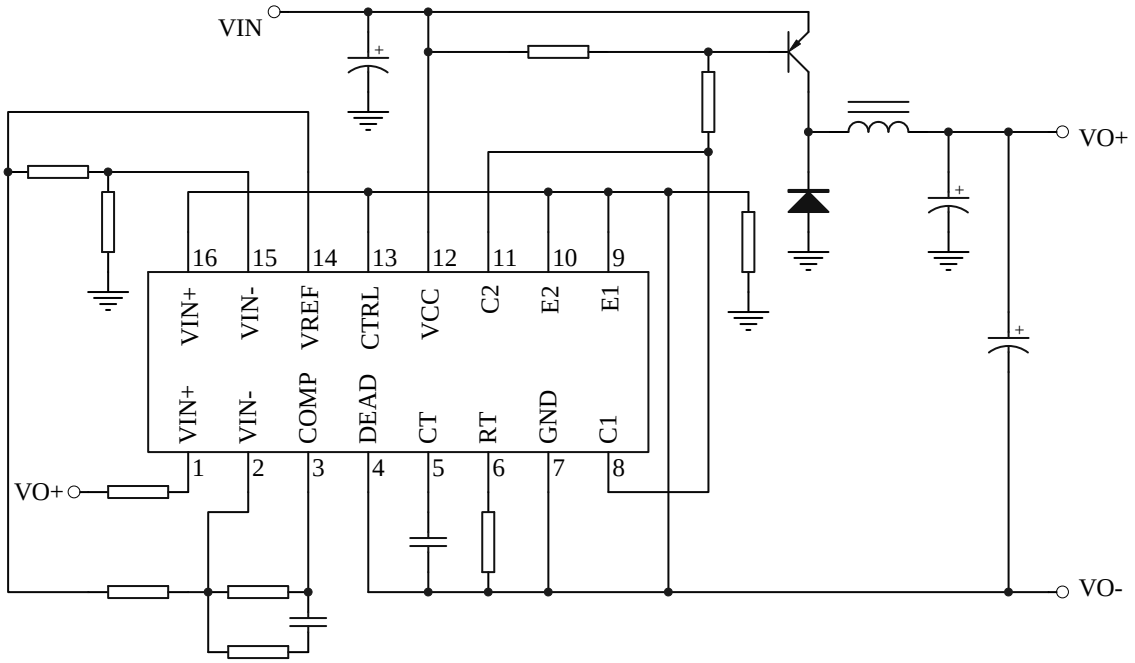
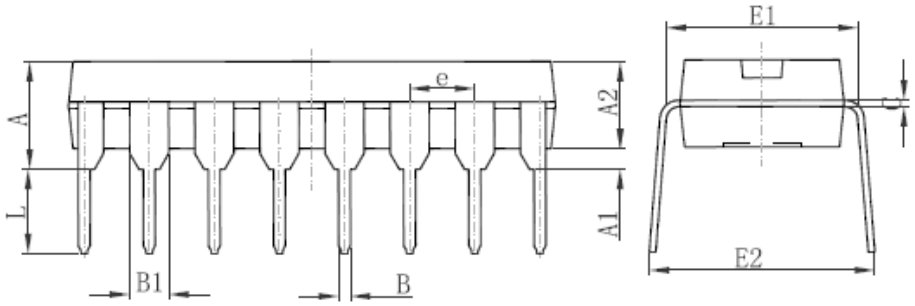
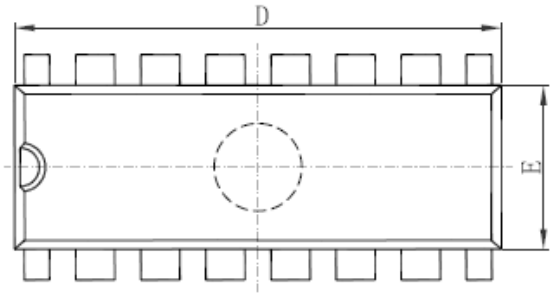


Figure 5. Typical Application

Package Dimension





Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	3.710	4.310	0.146	0.170
A1	0.510		0.020	
A2	3.200	3.600	0.126	0.142
B	0.380	0.570	0.015	0.022
B1	1.524(BSC)		0.060(BSC)	
C	0.204	0.360	0.008	0.014
D	18.800	19.200	0.740	0.756
E	6.200	6.600	0.244	0.260
E1	7.320	7.920	0.288	0.312
e	2.540(BSC)		0.100(BSC)	
L	3.000	3.600	0.118	0.142
E2	8.400	9.000	0.331	0.354

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Shaoxing Devechip Microelectronics Co.,Ltd

http://www.sdc-semi.com/

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Contact us:

Headquarters of Shaoxing
Address:, Tian Mu Road, No13
Easter City, Shaoxing, Zhengjiang,.China
Zip code:312000
Tel:(86) 0575-8861 6750
Fax:(86) 0575-8862 2882

Shenzhen Branch
Address: 22A Shangbu building, Nan Yuan Road, NO.68
Futian District, Shenzhen
Zip code:518031
Tel:(86) 0755-8366 1155
Fax:(86) 0755-8301 8528