

2-Channel Switching Regulator Controller

The CP9743 is a 2-channel switching regulator controller that uses a pulse width modulation (PWM) system. Both channels can be used for DC / DC converter operations including step up, step down, and inverting. Because the IC is compactly packaged, it is best suited for use as a power supply in portable equipment.

●Applications

DC / DC converters in VCRs, notebook computers, etc.

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●Features

- 1) Built-in reference voltage current ($\pm 1\%$).
- 2) Timer latch, short-circuit protection circuit is built in.
- 3) Circuit to prevent malfunction during low input voltage is built in.
- 4) Built-in reference voltage (2.505V) output pin.
- 5) Rest period is adjustable over the whole range of duty ratio.

●Absolute maximum ratings ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Limits	Unit
Power supply voltage	V_{CC}	36	V
Power dissipation	P_d	450*1	mW
Operating temperature	T_{opr}	$-40 \sim +85$	$^\circ\text{C}$
Storage temperature	T_{stg}	$-55 \sim +125$	$^\circ\text{C}$
Output pin current	I_o	120*2	mA
Output pin voltage	V_o	36	V

*1 Reduced by 4.5 mW for each increase in T_a of 1°C over 25°C
(when mounted on a board $50.0 \times 50.0 \times 1.6$ mm).

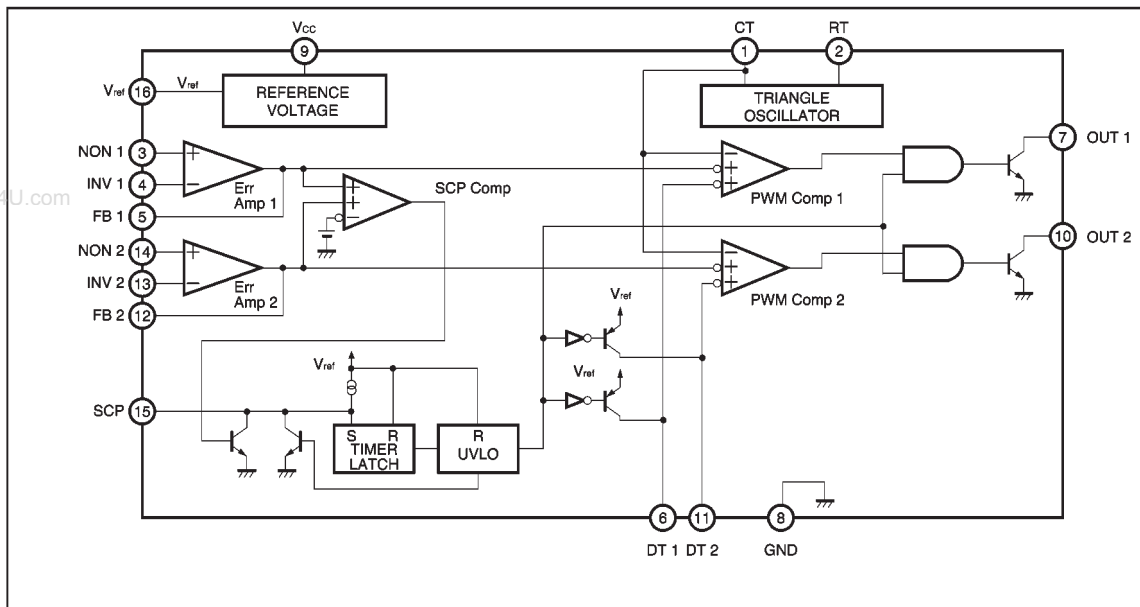
*2 Should not exceed P_d - or ASO-value.

●Recommended operating conditions ($T_a = 25^\circ$)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power supply voltage	V_{CC}	3.6	6.0	35	V
Output pin current	I_o	—	—	100	mA
Output pin voltage	V_o	—	—	35	V
Error amplifier input voltage	V_{OM}	0.3	—	1.6	V
Timing capacitance	C_{CT}	100	—	15000	pF
Timing resistance	R_{RT}	5.1	—	50	k Ω
Oscillation frequency	F_{osc}	10	—	800	kHz

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Pin No.	Pin name	Function
1	CT	External timing capacitance
2	RT	External timing resistance
3	NON1	Positive input for error amplifier 1
4	INV1	Negative input for error amplifier 1
5	FB1	Output for error amplifier 1
6	DT1	Output 1 dead time / soft start setting
7	OUT1	Output 1
8	GND	Ground
9	Vcc	Power supply
10	OUT2	Output 2
11	DT2	Output 2 dead time / soft start setting
12	FB2	Output for error amplifier 2
13	INV2	Negative input for error amplifier 2
14	NON2	Positive input for error amplifier 2
15	SCP	Timer latch setting
16	Vref	Reference voltage (2.505 V) output

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Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
〈Reference voltage section〉						
Output voltage	V_{ref}	2.48	2.505	2.53	V	$I_{ref}=1\text{mA}$
Input stability	V_{DLI}	—	1	10	mV	$V_{CC}=3.6\sim35\text{V}$
Load stability	V_{DLO}	—	1	10	mV	$I_{ref}=0\sim5\text{mA}$
〈Triangular wave oscillator section〉						
Oscillation frequency	F_{OSC}	320	400	480	kHz	$R_{RT}=10\text{k}\Omega$, $C_{CT}=220\text{pF}$
Frequency variation	F_{DV}	—	1	—	%	$V_{CC}=3.6\sim35\text{V}$
〈Protection circuit section〉						
Threshold voltage	V_{IT}	1.48	1.64	1.80	V	
Standby voltage	V_{STB}	—	50	100	mV	No pull-up
Latch voltage	V_{LT}	—	30	100	mV	No pull-up
Source current	I_{SCP}	1.5	2.5	3.5	μA	
Comparator threshold voltage	V_{CT}	0.95	1.05	1.15	V	5pin, 12pin
〈Rest period adjustment circuit section〉						
Input threshold voltage ($f_{osc}=10\text{kHz}$)	V_{I0}	1.87	1.97	2.07	V	Duty cycle=0%
	V_{I100}	1.38	1.48	1.58	V	Duty cycle=100%
ON duty cycle	D_{ON}	45	55	65	%	V_{ref} is divided by 13k and 27k Ω resistors
Input bias current	I_{BDT}	—	0.1	1	μA	$DT1$, $DT2=2.0\text{V}$
Latch mode source current	I_{DT}	200	560	—	μA	$DT1$, $DT2=0\text{V}$
Latch input voltage	V_{DT}	2.28	2.48	—	V	$I_{DT}=40\mu\text{A}$
〈Low-input malfunction prevention circuit section〉						
Threshold voltage	V_{UT}	2.23	2.53	2.83	V	
〈Error amplifier section〉						
Input offset voltage	V_{IO}	—	—	6	mV	
Input offset current	I_{IO}	—	—	30	nA	
Input bias current	I_{IB}	—	15	100	nA	
Open loop gain	AV	70	85	—	dB	
Common-mode input voltage	V_{OM}	0.3	—	1.6	V	$V_{CC}=3.6\sim35\text{V}$
Common-mode rejection ratio	$CMRR$	60	80	—	dB	
Maximum output voltage	V_{OH}	2.3	2.5	—	V	
Minimum output voltage	V_{OL}	—	0.7	0.9	V	
Output sink current	I_{OI}	3	20	—	mA	$FB=1.25\text{V}$
Output source current	I_{OO}	45	75	—	μA	$FB=1.25\text{V}$
〈PWM comparator section〉						
Input threshold voltage ($f_{osc}=10\text{kHz}$)	V_{I0}	1.87	1.97	2.07	V	Duty cycle=0%
	V_{I100}	1.38	1.48	1.58	V	Duty cycle=100%
〈Output section〉						
Saturation voltage	V_{SAT}	—	0.8	1.2	V	$I_O=75\text{mA}$
Leakage current	I_{REAK}	—	—	5	μA	$V_O=35\text{V}$
〈Total device〉						
Standby current	I_{CCS}	—	1.3	1.8	mA	When output is OFF
Average current dissipation	I_{CCA}	—	1.6	2.3	mA	$R_{RT}=10\text{k}\Omega$

©Not designed for radiation resistance.

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1F-5 NO.66 SEC.2 NAN-KAN RD., LUCHU, TAOYUAN, TAIWAN

Tel:886-3-3214525

Fax:886-3-3521052

Email: server@ceramate.com.tw

Http: www.ceramate.com.tw

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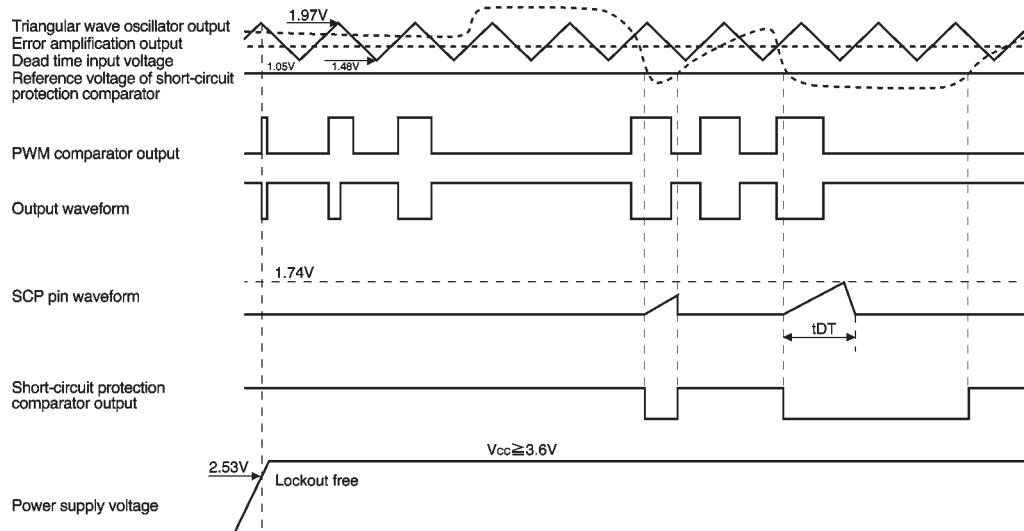


Fig.1

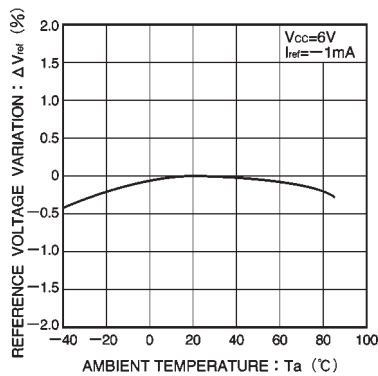


Fig.2 Reference voltage variation vs. ambient temperature

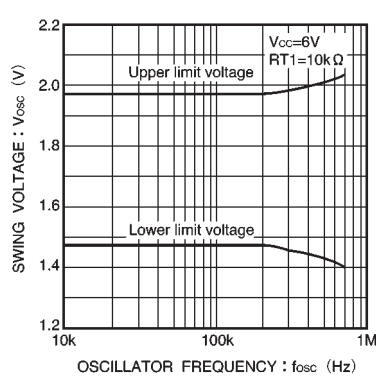


Fig.3 Swing voltage vs. oscillation frequency

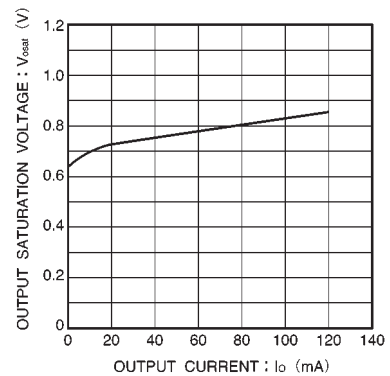


Fig.4 Output saturation voltage vs. output current

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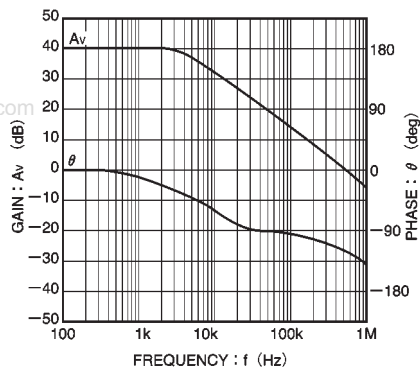
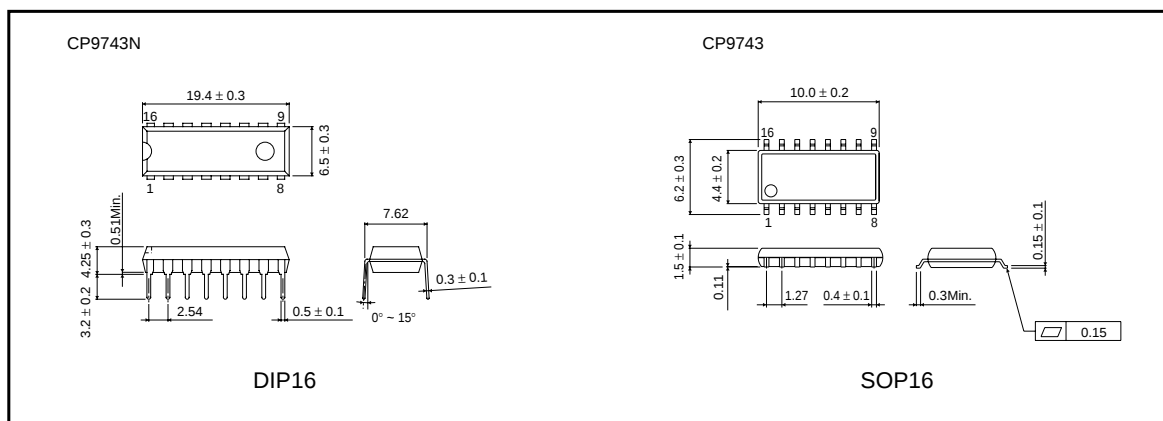


Fig.5 Gain and phase plotted against frequency for the error amplifier (40dB close)

● External dimensions (Units: mm)



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