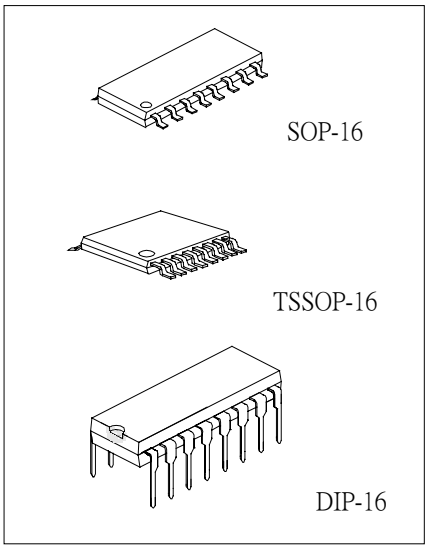
UTC BA9741 LINEAR INTEGRATED CIRCUIT

TWO-CHANNEL SWITCHING REGULATOR CONTORLLER



DESCRIPTION

The UTC BA9741 is a two-channel switching regulator controllers that use the PWM method. It can be used for DC to DC conversion for step-up, step-down, and inverting. The IC comes in a compact package, making it ideal for use in portable equipment.

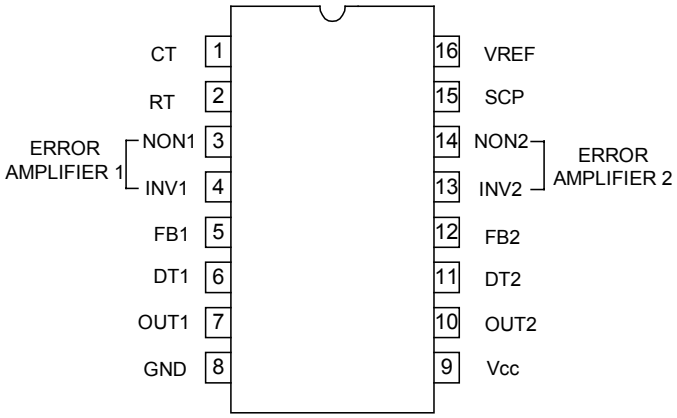
FEATURES

*High-accuracy reference voltage circuit (±1%).
*Time-latch, short-circuit protection circuit.
*Miss-operation prevention circuit for low-voltage input
*Reference voltage with output (2.5V)
*Rest period adjustment is possible over the entire duty range.

APPLICATION

*DC/DC converters for video cameras and notebook computers etc.

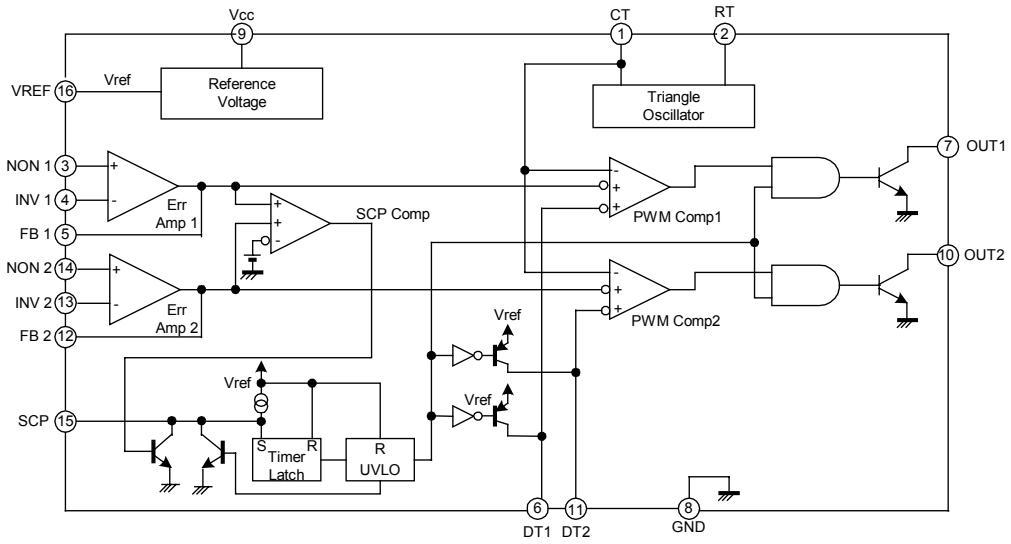
PIN CONFIGURATIONS



PIN DESCRIPTIONS

PIN NO.	PIN NAME	FUNCTOIN
1	CT	External timing capacitor
2	RT	External timing resistor
3	NON1	Positive input for error amplifier 1
4	INV1	Negative input for error amplifier 1
5	FB1	Error amplifier 1 output
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	Error amplifier 2 output
13	INV2	Negative input for error amplifier 2
14	NON2	Positive input for error amplifier 2
15	SCP	Time latch setting
16	VREF	Reference voltage output (2.5V)

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS(Ta=25°C)

PARAMETER	SYMBOL	VALUE	UNIT
Power Supply Voltage	Vcc	36	V
Power Dissipation (note 1) SOP-16 DIP-16	Pd	 500 650	mW
Operating Temperature	Topr	-40 to 85	°C
Storage Temperature	Tstg	-55 to 125	°C
Output Current	Io	120(note 2)	mA
Output Voltage	Vo	36	V

Note 1: When mounted on 70mm*70mm*1.6mm glass epoxy board.
Reduced by 5.0mW,for each increase in Ta of 1°C over 25°C
Note 2: Should not exceed Pd and ASO values.

RECOMMENDED OPERATING CONDITIONS(Ta=25°C)

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT
Power Supply Voltage	Vcc	3.6	6.0	35	V
Output Current	Io			100	mA
Output Voltage	Vo			35	V
Error Amplifier Input Voltage	V_{OM}	0.3		1.6	V
Timing Capacitor	C_{CT}	100		15000	pF
Timing Resistor	R_{RT}	5.1		50	kΩ
Oscillator Frequency	F_{OSC}	10		800	kHz

ELECTRICAL CHARACTERISTICS(TA=25°C ,V_{CC}=6V,UNLESS OTHERWISE NOTED.)

PARAMETER	SYMBOL	TEST CONIDITIONS	MIN	TYP.	MAX	UNIT
REFERENCE VOLTAGE BLOCK						
Output Voltage	Vref	Iref =1mA	2.4	2.5	2.6	V
Input Stability	V_{DLI}	Vcc =3.6~35V		1	10	mV
Load Stability	V_{DLO}	Iref =0~5mA		1	10	mV
TRIANGULAR WAVE OSCILLATOR						
Oscillation Frequency	Fosc	R_{RT}=10 kΩ ,C_{CT}=220pF	320	400	480	kHz
Frequency Deviation	F_{DV}	Vcc=3.6~35V		1		%
PROTECTION CIRCUIT						
Threshold Voltage	V_{IT}		1.48	1.64	1.80	V
Standby Voltage	V_{STB}	No pull up		50	100	mV
Latch Voltage	V_{LT}	No pull up		30	100	mV
Source Current	I_{SCP}		1.5	2.5	3.5	μA
Comparator Threshold Voltage	V_{CT}	5Pin,12Pin	0.9	1.05	1.2	V
REST PERIOD ADJUSTMENT CIRCUIT						
Input Threshold Voltage (fosc=10kHz)	V_{t0}	Duty Cycle =0%	1.79	1.97	2.15	V
	V_{t100}	Duty Cycle =100%	1.32	1.48	1.64	V

PARAMETER	SYMBOL	TEST CONIDITIONS	MIN	TYP.	MAX	UNIT
On Duty Cycle	D_{ON}	Divide Vref using 13 kΩ and27 kΩ	45	55	65	%
Input Bias Current	I_{BDT}	DT1,DT2=2.0V		0.1	1	μA
Latch Mode Source Current	I_{DT}	DT1,DT2=0V	200	560		μA
Latch Input Voltage	V_{DT}	I_{DT}=40μA	2.28	2.48		V
LOW-VOLTAGE INPUT MISS-OPERATION PREVENTION CIRCUIT						
Threshold Voltage	V_{UT}			2.53		V
ERROR AMPLIFIER						
Input Offset Voltage	V_{IO}				6	mV
Input Offset Current	I_{IO}				30	nA
Input Bias Current	I_{IB}			15	100	nA
Open Circuit Gain	AV		70	85		dB
Common-mode Input Voltage range	VOM	Vcc=3.6~35V	0.3		1.6	V
Common-mode Rejection Ratio	CMRR		60	80		dB
Maximum Output Voltage	V_{OH}		2.3	2.5		V
Minimum Input Voltage	V_{OL}			0.7	0.9	V
Output Sink Current	I_{OI}	FB=1.25V	3	20		mA
Output Source Current	I_{OO}	FB=1.25V	45	75		μA
PWM COMPARATOR						
Input Threshold Voltage (fosc=10kHz)	V_{t0}	Duty Cycle =0%	1.79	1.97	2.15	V
	V_{t100}	Duty Cycle =100%	1.32	1.48	1.64	V
OUTPUT BLOCK						
Saturation Voltage	V_{SAT}	Io=75mA		0.8	1.2	V
Leak Current	I_{REAK}	Vo=35V		0	5	μA
TOTAL DEVICE						
Standby Current	Iccs	When output is off		1.3	1.8	mA
Average Current Consumption	I_{CCA}	R_{RT}=10 kΩ		1.6	2.3	mA

TIMING CHART

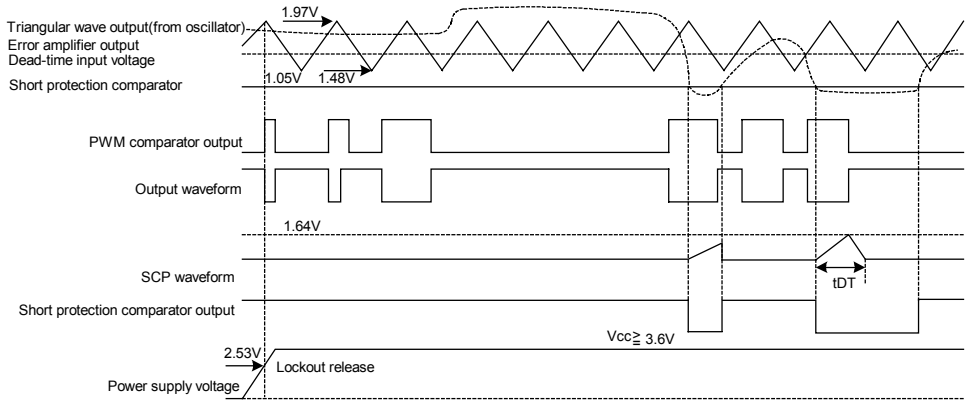


Figure. 1

ELECTRICAL CHARACTERISTIC CURVES

Figure 2. Reference Voltage vs.Ambient Temperature

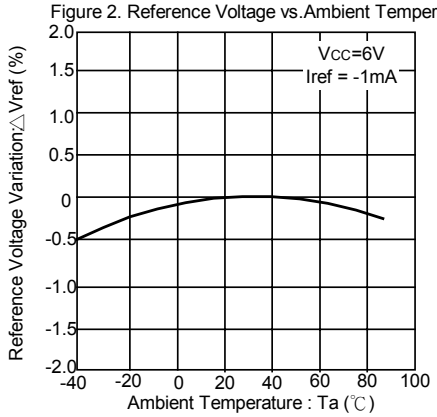


Figure 3. Swing Voltage vs. Frequency

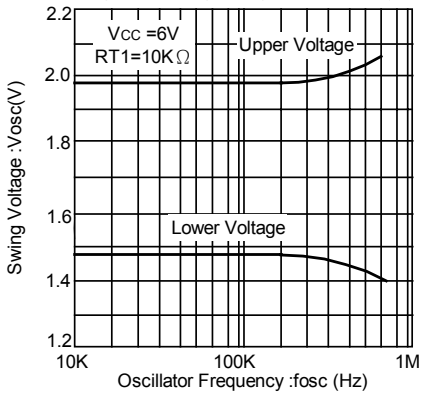


Figure4. Output Current vs.Output Saturation Voltage

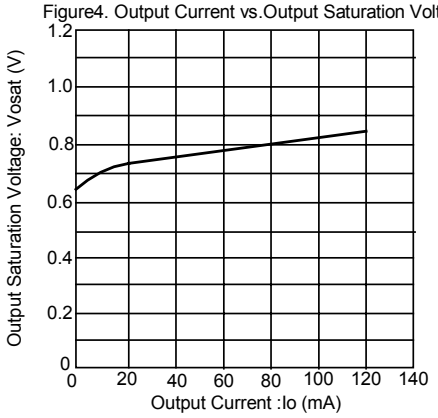
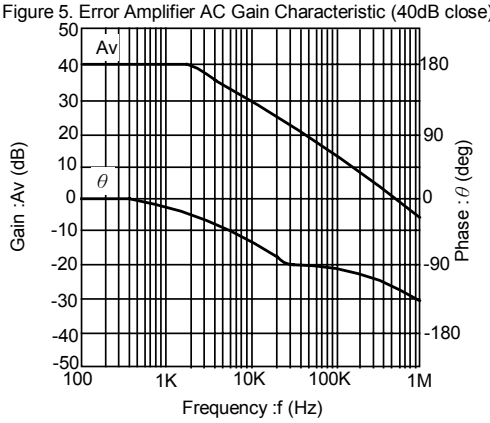


Figure 5. Error Amplifier AC Gain Characteristic (40dB close)



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