

# UTC BA9741A LINEAR INTEGRATED CIRCUIT

## TWO-CHANNEL SWITCHING REGULATOR CONTROLLER

### DESCRIPTION

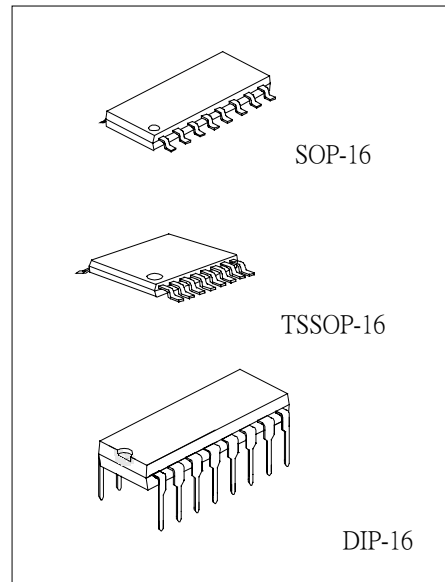
The UTC BA9741A is a two-channel switching regulator controllers that use the PWM method. It can be used for DC to DC conversion for step-up, step-down, and inverting. The IC comes in a compact package, making it ideal for use in portable equipment.

### FEATURES

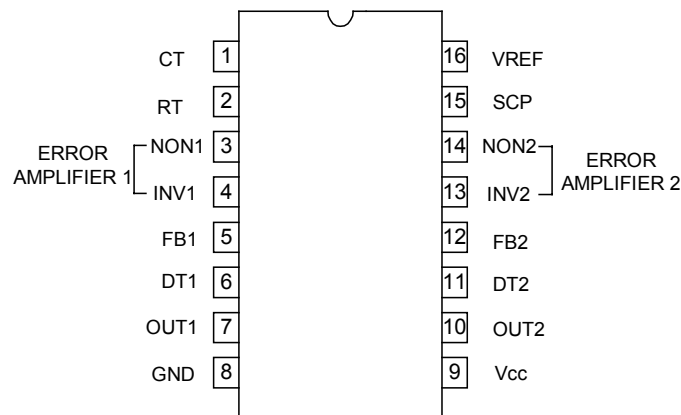
- \*High-accuracy reference voltage circuit ( $\pm 1\%$ ).
- \*Time-latch, short-circuit protection circuit.
- \*Miss-operation prevention circuit for low-voltage input
- \*Reference voltage with output (2.5V)
- \*Rest period adjustment is possible over the entire duty range.

### APPLICATION

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



### PIN CONFIGURATIONS

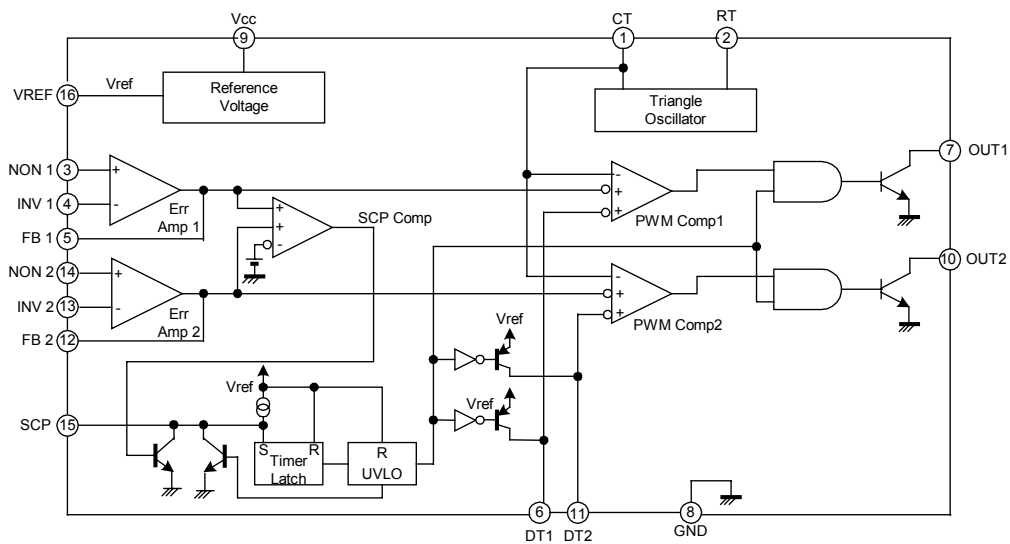


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## PIN DESCRIPTIONS

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



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## ABSOLUTE MAXIMUM RATINGS( Ta=25°C )

PARAMETER	SYMBOL	VALUE	UNIT
Power Supply Voltage	Vcc	36	V
Power Dissipation (note 1)	Pd		
SOP-16		500	mW
DIP-16		650	
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	Vom	0.3		1.6	V
Timing Capacitor	CCT	100		15000	pF
Timing Resistor	RRT	5.1		50	kΩ
Oscillator Frequency	FOSC	10		800	kHz

## ELECTRICAL CHARACTERISTICS( TA=25°C ,Vcc=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	VDLI	Vcc =3.6~35V		1	10	mV
Load Stability	VULO	Iref =0~5mA		1	10	mV
TRIANGULAR WAVE OSCILLATOR						
Oscillation Frequency	Fosc	RRT=10 kΩ ,CCT=220pF	320	400	480	kHz
Frequency Deviation	Fdv	Vcc=3.6~35V		1		%
PROTECTION CIRCUIT						
Threshold Voltage	VIT		1.48	1.64	1.80	V
Standby Voltage	VSTB	No pull up		50	100	mV
Latch Voltage	VLT	No pull up		30	100	mV
Source Current	ISCP		1.5	2.5	3.5	μA
Comparator Threshold Voltage	VCT	5Pin,12Pin	0.9	1.05	1.2	V
REST PERIOD ADJUSTMENT CIRCUIT						
Input Threshold Voltage (fosc=10kHz)	Vt0	Duty Cycle =0%	1.79	1.97	2.15	V
	Vt100	Duty Cycle =100%	1.32	1.48	1.64	V

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PARAMETER	SYMBOL	TEST CONIDITIONS	MIN	TYP.	MAX	UNIT
On Duty Cycle	DON	Divide Vref using 13 k $\Omega$ and 27 k $\Omega$	45	55	65	%
Input Bias Current	I <sub>BDT</sub>	DT1,DT2=2.0V		0.1	1	$\mu$ A
Latch Mode Source Current	I <sub>DT</sub>	DT1,DT2=0V	200	560		$\mu$ A
Latch Input Voltage	V <sub>DT</sub>	I <sub>DT</sub> =40 $\mu$ A	2.28	2.48		V
<b>LOW-VOLTAGE INPUT MISS-OPERATION PREVENTION CIRCUIT</b>						
Threshold Voltage	V <sub>UT</sub>			2.53		V
<b>ERROR AMPLIFIER</b>						
Input Offset Voltage	V <sub>IO</sub>				6	mV
Input Offset Current	I <sub>IO</sub>				30	nA
Input Bias Current	I <sub>IB</sub>			15	100	nA
Open Circuit Gain	A <sub>V</sub>		70	85		dB
Common-mode Input Voltage range	V <sub>OM</sub>	V <sub>CC</sub> =3.6~35V	0.3		1.6	V
Common-mode Rejection Ratio	CMRR		60	80		dB
Maximum Output Voltage	V <sub>OH</sub>		2.3	2.5		V
Minimum Input Voltage	V <sub>OL</sub>			0.7	0.9	V
Output Sink Current	I <sub>OI</sub>	FB=1.25V	3	20		mA
Output Source Current	I <sub>OO</sub>	FB=1.25V	45	75		$\mu$ A
<b>PWM COMPARATOR</b>						
Input Threshold Voltage (f <sub>osc</sub> =10kHz)	V <sub>t0</sub>	Duty Cycle =0%	1.79	1.97	2.15	V
	V <sub>t100</sub>	Duty Cycle =100%	1.32	1.48	1.64	V
<b>OUTPUT BLOCK</b>						
Saturation Voltage	V <sub>SAT</sub>	I <sub>O</sub> =75mA		0.8	1.2	V
Leak Current	I <sub>REAK</sub>	V <sub>O</sub> =35V		0	5	$\mu$ A
<b>TOTAL DEVICE</b>						
Standby Current	I <sub>CCS</sub>	When output is off		1.3	1.8	mA
Average Current Consumption	I <sub>CCA</sub>	R <sub>RT</sub> =10 k $\Omega$		1.6	2.3	mA

## TIMING CHART

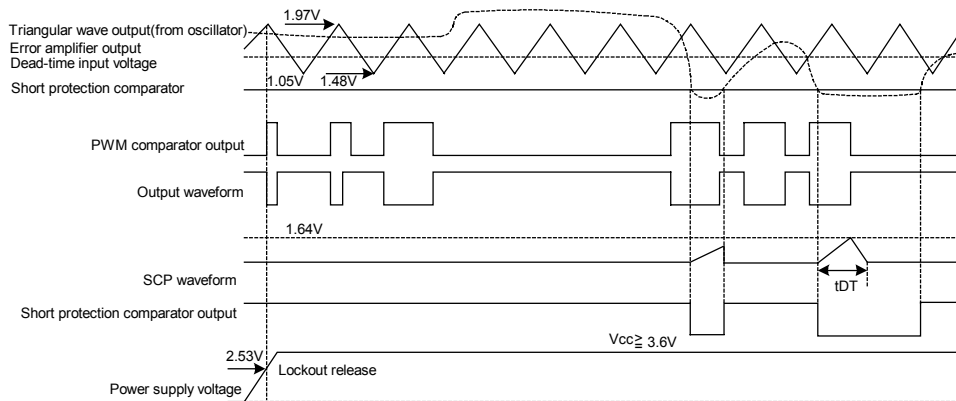
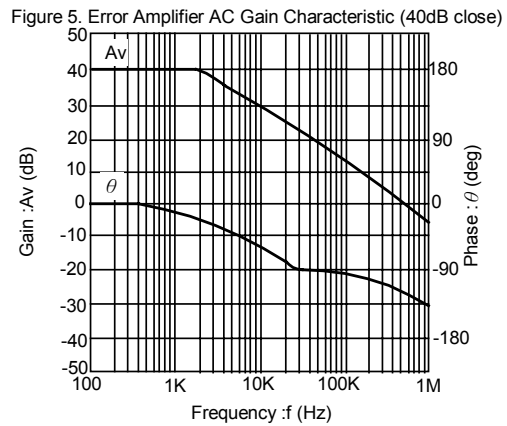
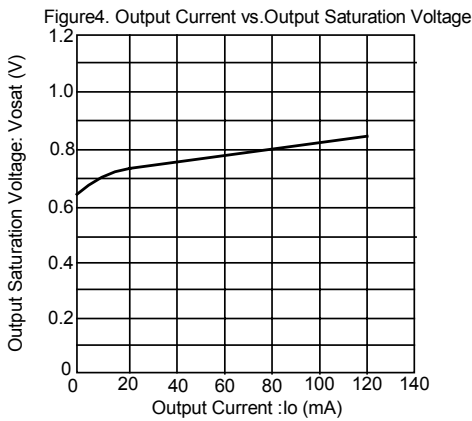
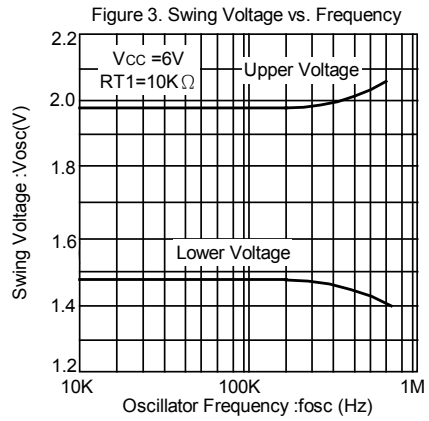
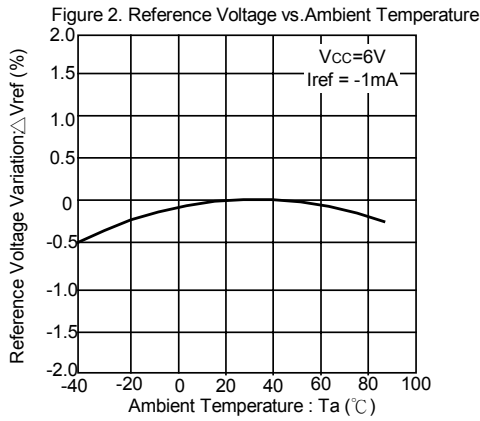


Figure. 1

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## ELECTRICAL CHARACTERISTIC CURVES



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