

STRUCTURE

Silicon Monolithic Integrated Circuit

PRODUCT SERIES

5-Channel Switching Regulator Controller for Digital Still Camera

TYPE

BD9730KV

FEATURES

 BD9730KV is a 5-channel controller that includes all of the circuits required constructing a switching regulator.

The circuits on the chip include a triangular-wave oscillator, a reference voltage circuit, a PWM comparator, a C-MOS type driver, and a short-circuit-protector.

- The IC is capable of driving both FET and bipolar external transistors.
 (For bipolar transistors, the base current is user-adjustable.)
- Short Circuit Protector (SCP) for overload condition is included.
- The reference voltage of channel 1 and 5 can be selected externally.
- Channel 1,4 and 5 can be switched ON/OFF individually.
- Dead Time Control (DTC) for all channels is included for each channel.
- VQFP—48 PIN package

○Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Units
Power Supply Voltage	Vmax	- 0.3 to 12	V
Power Dissipation	Pd	400(*1)	mW
	Pa	900(*2)	mW
Operating Temperature	Topr	- 20 to +85	°C
Storage Temperature	Tstg	- 55 to +125	ొ

^(*1) With no external heat sink, the power dissipation reduces by 4.0 mW/°C over 25°C.

when mounted on a PCB (70.0mm × 70.0mm × 1.6mm).

ORecommended operating conditions

Devenueten	Cumphal		Units		
Parameter	Symbol	Min.	Тур.	Max.	Units
Power Supply Voltage	VCC	2.8	_	11	V
Oscillator Frequency	fosc	100	_	700	kHz
Output Current	IOUT	_	_	30	mA
Timing Resistor	RT	5	_	30	kΩ
Timing Capacitor	СТ	100	-	10000	pF
NON1,5 input range	VNON1,5	0.3	_	1.5	٧

(*3) VREGA drops under VCC=2.6V

^(*2) Reduced by 9.0 mW/°C over 25°C,



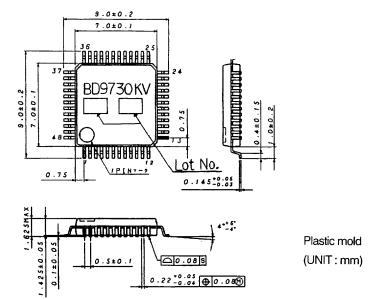
OElectrical characteristics (Ta=25°C, Vcc=6V, fosc=0.20MHz, STB1-5=3V, unless otherwise noted)

Parameter	Symbol		Spec.		Units	Conditions
		Min.	Тур.	Max.		1
Standby Current	lst			10	μΑ	STB1~5=0V
Circuit Current	lcc		4.5	9.5	mA	
[Reference Voltage]					,	
Reference Voltage	Vref	1.485_	1.5	1.515	V	lref=-1mA
Line Regulation	DVLi		4.0	12.5	mV	V∞=3.0V~9.5V
Load Regulation	DVLo		1.0	7.5	mV	lref=−0.1mA~−1mA
Short—Circuit Output	los	4	16	_	mA	Vref=0V
Current	100					VICI-0V
[Internal Regulator]						
REGA Output Voltage	VREGA	2.4	2.5	2.6		lreg=-1mA
[Over Current Shutdown]						
Channel 1 – 5 Threshold Voltage	Vsc1~5	1.425	1.5	1.575	V	VSCP1~5=2V~1V
[Protection Circuit]						
SCP Threshold Voltage	Vtsc	0.90	1.0	1.10	V	VSCP=0V~1.5V
SCP Standby Voltage	Vssc	_	22	170	mV	
SCP Output Current	Iscp	-2	-4	6	μΑ	VSCP=0.1V
[Triangular wave oscillator]						
Oscillator Frequency	f osc1	0.179	0.20	0.221	MHz	RT=24kΩ,CT=220pF
Frequency Stability (Vcc)	Df	_	1	5	%	Vcc=2.8V→9.5V
RT Output Voltage	VRT	0.78	1	1.22	V	
CT Output Current	Icso	32.2	46	59.8	μΑ	VCT=1.7V,RT=24kΩ
CT Input Current	Icsi	-29.4	-42	-54.6	μΑ	VCT=1.7V,RT=24kΩ
[Error Amp]				·····	-	
Low-level Output Voltage	VOL	_	_	0.3	V	INV=2V
High-level Output Voltage	VOH	VREGA -0.3V	_	-	٧	INV=0V
[PWM Comparator]		'		,		
DTC Input Current	IDT		-1	-5	μΑ	VDT=1V
	Vt0	-	1.49	_	V	V1:DUTY0%
Input Threshold Voltage	Vt100	_	1.95		V	V1:DUTY100%
[Output circuit]	<u></u>					
High-level Output	1017	VCC	VCC			In 10-1
Voltage on driving	VSATH	-0.3	-0.1	-	V	lo=10mA
Low-level Output			0.1			In 10mA
Voltage on driving	VSATL	_	0.1	0.3	V	lo=-10mA
Maximum Source				00		
Current	losource	-	_	30	mA	
Maximum Sink Current	losink	_	_	-30	mA	
[STB 1 - 5]		1		<u></u>		
STB Pull-down Resistor	RSTB	250	400	700	kΩ	
						1
STB Control ON	VSTBL	2.0	_	1 v 1	V	

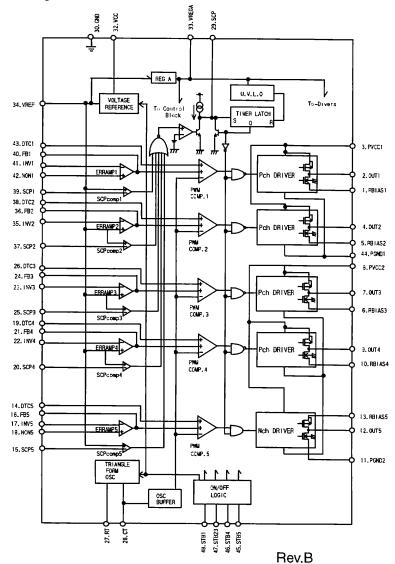
ONot designed for radiation resistance.

ROHM

PACKAGE



OBlock Diagram



Pin No.	Pin Name			
1,5,6,10,13	RBIAS 1,2,3,4,5			
14,19,26,38,43	DTC 5,4,3,2,1			
15,20,25,37,39	SCP 5,4,3,2,1			
16,21,24,36,40	FB 5,4,3,2,1			
17,22,23,35,41	INV 5,4,3,2,1			
18,42	NON 5,1			
27	RT			
28	CT			
29	SCP			
30	GND			
33	VREGA			
32	VCC			
34	VREF			
44	PGND 1			
45,46,47,48	STB 5,4,2-3,1			
2,4,7,9,12	OUT 1,2,3,4,5			
3	PVCC 1			
8	PVCC 2			
11	PGND 2			



ONOTE FOR USE

(1) Absolute maximum rating

The device may be destroyed when applied voltage or operating temperature exceeds its absolute maximum rating. Because the source, such as short mode or open mode, cannot be identified if the device is destroyed, it is important to take physical safety measures (such as fusing) if a special mode in excess of absolute rating limits is to be implemented.

(2) Supply line

Since the motor's reverse electromotive force gives rise to the return of regenerative current, measures should be taken to establish a channel for the current, such as adding a capacitor between the power supply and GND. In determining the approach to take, make sure that no problems will be posed by the various characteristics involved, such as capacitance loss at low temperatures with an electrolytic capacitor.

(3) GND potential

Make sure the potential for the GND pin is always kept lower than the potentials of all other pins, regardless of the operating mode.

(4) Thermal design

Be sure to factor in allowable power dissipation (Pd) in actual operation, and to build sufficient margin into the thermal design to accommodate this power loss.

(5) Operation in strong magnetic fields

Use in strong electromagnetic fields may cause malfunctions. Exercise caution with respect to electromagnetic fields.

(6) ASO

Set the parameters so that output Tr will not exceed the absolute maximum rating or ASO value when the IC is used.

(7) Thermal shutdown circuit

This IC is provided with a built-in thermal shutdown (TSD) circuit, which is activated when the chip temperature reaches the threshold value listed below. When TSD is on, the device goes to high impedance mode. Note that the TSD circuit is provided for the exclusive purpose shutting down the IC in the presence of extreme heat, and is not designed to protect the IC per se or guarantee performance when or after extreme heat conditions occur. Therefore, do not operate the IC with the expectation of continued use or subsequent operation once the TSD is activated.

(8) Mutual impedance

Use short and wide wiring tracks for the main supply and ground to keep the mutual impedance as small as possible. Use inductor and capacitor network to keep the ripple voltage minimum.

(9) Voltage of STB pin

The threshold voltages of STB pin are 0.3V and 2.0V. STB state is set below 0.3V while action state is set beyond 2.0V. The region between 0.3V and 2.0V is not recommended and may cause improper operation.

(10) Setting Max Duty

Max duty limit might not work normally at high frequency. Consider adequate margin when operating circuit above the maximum allowable switching frequency.

(11) Please use the same power supply of driver block as that of main block.

This IC can't be used on the application that arbitrary voltage is applied to driver block.

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