STRUCTURE Silicon Monolithic Integrated Circuit

NAME OF PRODUCT DC-AC Inverter Control IC

TYPE **ＢＤ９２１７Ｆ /ＢＤ９２１７ＦＶ**

FUNCTION

- 20V High voltage process
- 1ch control with Full-Bridge
- Lamp current and voltage sense feed back control
- Sequencing easily achieved with Soft Start Control
- Short circuit protection with Timer Latch
- Under Voltage Lock Out
- Mode-selectable the operating or stand-by mode by stand-by pin
- Automatic Judge function for External synchronization of lamp oscillation
- BURST mode controlled by PWM and DC input

○Absolute Maximum Ratings（Ｔａ＝２５℃）

Parameter	Symbol	Limits	Unit
Supply Voltage	VCC	20	V
REG PIN	VREG	15	V
Operating Temperature Range	Topr	-40～+85	℃
Storage Temperature Range	Tstg	-55～+150	℃
Maximum Junction Temperature	Tjmax	+150	℃
Power Dissipation	Pd	※1 1024 (BD9217FV)	mW
		※2 688 (BD9217F)	

*1 Pd derate at 8.2mW/℃ for temperature above Ta = 25℃ (When mounted on a PCB 70.0mm×70.0mm×1.6mm)

*2 Pd derate at 5.5mW/℃ for temperature above Ta = 25℃ (When mounted on a PCB 70.0mm×70.0mm×1.6mm)

○Operating condition

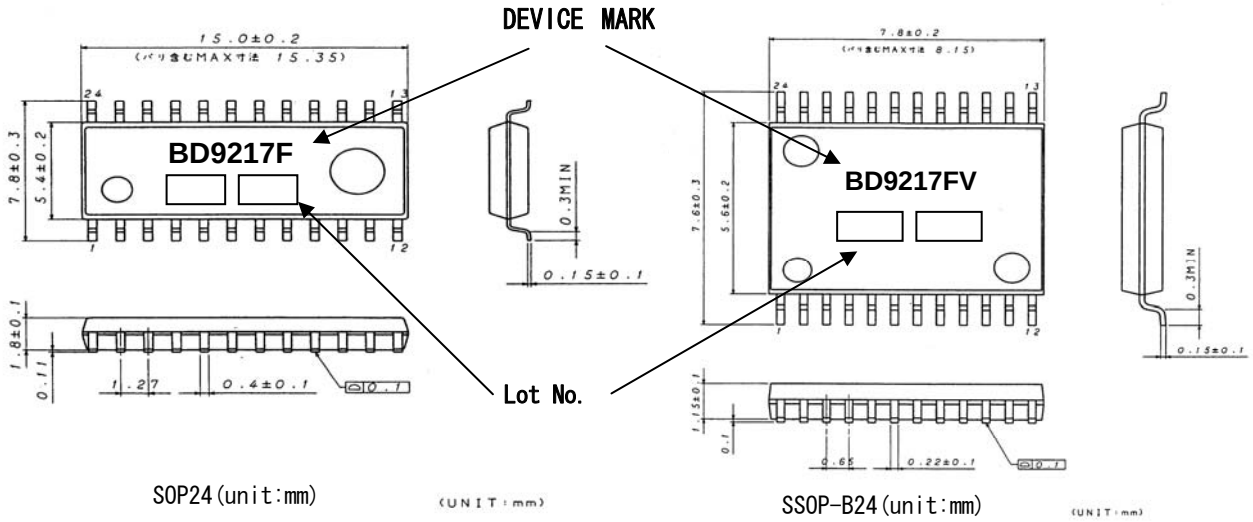
Parameter	Symbol	Limits	Unit
Supply voltage	VCC	7.5 ～ 19.5	V
oscillation frequency	FOUT	30 ～ 90	kHz
BCT oscillation frequency	FBCT	0.05 ～ 1.00	kHz

○Electric Characteristics (Ta=25℃, VCC=12V)

Parameter	Symbol	Limits			Unit	Conditions
		MIN.	TYP.	MAX.		
((WHOLE DEVICE))						
Operating current	Icc1	—	8.0	16	mA	FOUT=60kHz, FB=GND
Stand-by current	Icc2	—	10	30	uA	
((STAND BY CONTROL))						
Stand-by voltage H	VstH	2.0	-	VCC	V	System ON
Stand-by voltage L	VstL	−0.3	-	0.8	V	System OFF
((UVLO BLOCK))						
Operating voltage (VCC)	Vuvlo	6.65	7.00	7.35	V	
Hesteresis width (VCC)	⊿Vuvlo	0.37	0.50	0.63	V	
Operating voltage (UVLO)	Vvlo_u	2.4	2.5	2.6	V	
Hesteresis width (UVLO)	⊿Vvlo_u	0.075	0.100	0.125	V	
((REG BLOCK))						
REG output voltage	VREG	7.35	7.50	7.65	V	VCC＞8.5V
REG source current	IREG	20	—	—	mA	Source current
((SOFT START BLOCK))						
Soft start current	Iss	1.5	2.0	2.5	uA	
SS_COMP detect voltage	VSS	2.3	2.5	2.7	V	
((OSC BLOCK))						
RT Output Voltage	VRT	1.05	1.50	1.95	V	
STR ON Resistor value	RSRT	-	100	200	Ω	
((BOSC BLOCK))						
BOSC Max voltage	VBCTH	1.94	2.00	2.06	V	fBCT=0.3kHz
BOSC Min voltage	VBCTL	0.40	0.50	0.60	V	fBCT=0.3kHz
BOSC constant current	IBCT	1.35/BRT	1.50/BRT	1.65/BRT	A	
BOSC frequency	FBCT	291	300	309	Hz	(BRT=36.2KΩ, BCT=0.047uF)
((FEED BACK BLOCK))						
IS threshold voltage	Vis	1.225	1.250	1.275	V	
VS threshold voltage	Vvs	1.220	1.250	1.280	V	
IS source current 1	Iis1	—	—	0.9	uA	DUTY=2.0V
IS source current 2	Iis2	40	50	60	uA	DUTY=0V, IS=1.0V
VS source current	Ivs	—	—	0.9	uA	
IS COMP detect voltage	VISCOMP	0.64	0.66	0.68	V	
((OUTPUT BLOCK))						
N output sink resistance	Rsink_N	1.8	3.5	7.0	Ω	
N output source resistance	RsourceN	4.5	9.0	18.0	Ω	
P output sink resistance	Rsink_P	1.8	3.5	7.0	Ω	
P output source resistance	RsourceP	4.5	9.0	18.0	Ω	
Drive output frequency	Fout	57.9	60.0	62.1	kHz	RT=28.5kΩ, FB=0V
MAX DUTY	MAXDUTY	-	48.0	-	%	FOUT=60kHz
OFF period	TOFF	100	200	400	ns	
((CT SYNCHRONOUS BLOCK))						
Input High voltage range	VCT_CLKIN_H	2.5	—	5.0	V	
Input Low voltage range	VCT_CLKIN_L	-0.3	—	0.5	V	
((FAIL BLOCK))						
FAIL High voltage	VFAIL_H	2.95	3.1	3.25	V	
FAIL Low voltage	VFAIL_L	-0.3	-	0.3	V	
((SEL BLOCK))						
Input High voltage range	VSEL_H	5.0	-	15	V	
Input Low voltage range	VSEL_L	-0.3	-	0.3	V	
((TIMER LATCH BLOCK)						
CP timer latch detect voltage	VCP	1.91	2.00	2.09	V	
CP timer latch charge current	ICP	0.85	1.05	1.25	uA	
((COMP BLOCK))						
COMP over voltage detect voltage	VCOMP	3.88	4.00	4.12	V	VSS＞2.4V
Hysteresis width (COMP)	⊿Vcomp	0.138	0.185	0.232	V	

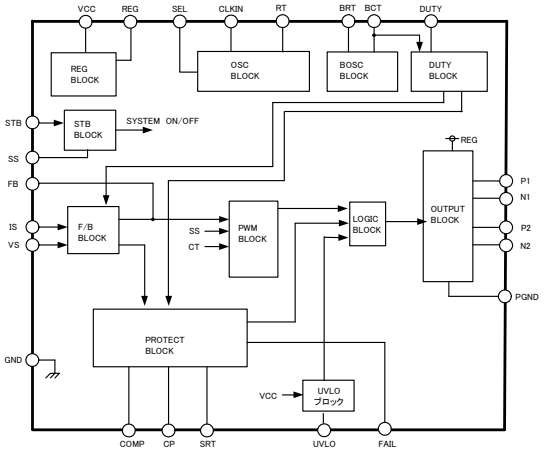
(This product is not designed to be radiation-resistant.)

○Package Dimensions



SOP24(unit:mm)　　SSOP-B24(unit:mm)

○Block Diagram



○Pin Description

PIN No.	PIN NAME	FUNCTION	PIN No.	PIN NAME	FUNCTION
1	PGND	Power Ground for FET drivers	13	CP	External capacitor between CP and GND for timer latch
2	N2	NMOS FET driver (Channel 2 side)	14	FAIL	Error Indication output pin Normal : H, Error : L
3	P2	PMOS FET driver (Channel 2 side)	15	SEL	Selector pin for external syncro-mode frequency REG(Pin 20) : Pull-up fin=Fout(DUTY=50%), Gnd-short : fin=Fout x 2
4	UVLO	Input of Under Voltage Lock Out	16	VS	Error amplifier input 1
5	CLKIN	CT Synchronous signal input	17	IS	Error amplifier input 2
6	RT	External resistor between RT and GND for adjustment frequency of saw tooth wave。	18	FB	Error amplifier output
7	SRT	External resistor between SRT and RT for adjustment frequency of kick-off	19	SS	External capacitor between SS and GND for Soft Start Control and detect the time of Soft Start
8	GND	Ground	20	REG	regulator output
9	BCT	External capacitor between BCT and GND for adjusting the BURST triangle oscillator	21	COMP	Input of over voltage detector
10	BRT	External resistor between BRT and GND for adjustment frequency of Burst dimming	22	VCC	Power supply input with UVLO Protection
11	DUTY	Control Burst-dimming by PWM signal or DC	23	P1	PMOS FET driver (Channel 1 side)
12	STB	Stand-by switch	24	N1	NMOS FET driver (Channel 1 side)

○NOTE FOR USE

1. When designing the external circuit, including adequate margins for variation between external devices and IC. Use adequate margins for steady state and transient characteristics.
2. The circuit functionality is guaranteed within of ambient temperature operation range as long as it is within recommended operating range. The standard electrical characteristic values cannot be guaranteed at other voltages in the operating ranges, however the variation will be small.
3. Mounting failures, such as misdirection or miscounts, may harm the device.
4. A strong electromagnetic field may cause the IC to malfunction.
5. The GND pin should be the location within ±0.3V compared with the PGND pin.
6. If the voltage between VCC and I/O pins or GND and I/O pins is in opposite from the normal potential difference, unusual current flow into pins may occur which can destroy the IC. To avoid such occurrence it is recommended to place protection diodes for prevention against backward current flow.
7. BD9217F/BD9217FV incorporate a built-in thermal shutdown circuit (TSD circuit). The thermal shutdown circuit (TSD circuit) is designed only to shut the IC off to prevent runaway thermal operation. It is not designed to protect the IC or guarantee its operation of the thermal shutdown circuit is assumed.
8. Absolute maximum ratings are those values that, if exceeded, may cause the life of a device to become significantly shortened. Moreover, the exact failure mode caused by short or open is not defined. Physical countermeasures, such as a fuse, need to be considered when using a device beyond its maximum ratings.
9. About the external FET, the parasitic Capacitor may cause the gate voltage to change, when the drain voltage is switching. Make sure to leave adequate margin for this IC variation.
10. By STB voltage, BD9217FV are changed to 2 states. Therefore, do not input STB pin voltage between one state and the other state (0.8～2.0V).
11. The pin connected a connector need to connect to the resistor for electrical surge destruction.
12. This IC is a monolithic IC which (as shown is Fig.1)has P^+ substrate and between the various pins. A P-N junction is formed from this P layer of each pin. For example, the relation between each potential is as follows,

    ○(When GND > PinB and GND > PinA, the P-N junction operates as a parasitic diode.)

    ○(When PinB > GND > PinA, the P-N junction operates as a parasitic transistor.)

    Parasitic diodes can occur inevitably in the structure of the IC. The operation of parasitic diodes can result in mutual interference among circuits as well as operation faults and physical damage. Accordingly you must not use methods by which parasitic diodes operate, such as applying a voltage that is lower than the GND (P substrate) voltage to an input pin.

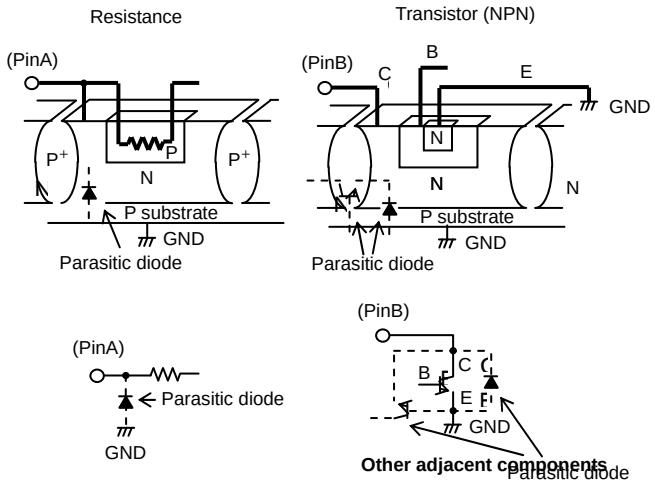


Fig.1 Simplified structure of a Bipolar IC

Notes

No copying or reproduction of this document, in part or in whole, is permitted without the consent of ROHM Co.,Ltd.

The content specified herein is subject to change for improvement without notice.

The content specified herein is for the purpose of introducing ROHM's products (hereinafter "Products"). If you wish to use any such Product, please be sure to refer to the specifications, which can be obtained from ROHM upon request.

Examples of application circuits, circuit constants and any other information contained herein illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.

Great care was taken in ensuring the accuracy of the information specified in this document. However, should you incur any damage arising from any inaccuracy or misprint of such information, ROHM shall bear no responsibility for such damage.

The technical information specified herein is intended only to show the typical functions of and examples of application circuits for the Products. ROHM does not grant you, explicitly or implicitly, any license to use or exercise intellectual property or other rights held by ROHM and other parties. ROHM shall bear no responsibility whatsoever for any dispute arising from the use of such technical information.

The Products specified in this document are intended to be used with general-use electronic equipment or devices (such as audio visual equipment, office-automation equipment, communication devices, electronic appliances and amusement devices).

The Products specified in this document are not designed to be radiation tolerant.

While ROHM always makes efforts to enhance the quality and reliability of its Products, a Product may fail or malfunction for a variety of reasons.

Please be sure to implement in your equipment using the Products safety measures to guard against the possibility of physical injury, fire or any other damage caused in the event of the failure of any Product, such as derating, redundancy, fire control and fail-safe designs. ROHM shall bear no responsibility whatsoever for your use of any Product outside of the prescribed scope or not in accordance with the instruction manual.

The Products are not designed or manufactured to be used with any equipment, device or system which requires an extremely high level of reliability the failure or malfunction of which may result in a direct threat to human life or create a risk of human injury (such as a medical instrument, transportation equipment, aerospace machinery, nuclear-reactor controller, fuel-controller or other safety device). ROHM shall bear no responsibility in any way for use of any of the Products for the above special purposes. If a Product is intended to be used for any such special purpose, please contact a ROHM sales representative before purchasing.

If you intend to export or ship overseas any Product or technology specified herein that may be controlled under the Foreign Exchange and the Foreign Trade Law, you will be required to obtain a license or permit under the Law.

ROHM SEMICONDUCTOR

Thank you for your accessing to ROHM product informations.
More detail product informations and catalogs are available, please contact us.

ROHM Customer Support System

http://www.rohm.com/contact/