

STRUCTURE Silicon Monolithic Integrated Circuit

NAME OF PRODUCT DC-AC Inverter Control IC

TYPE **BD9275F**

FUNCTION

- Using 20V process / 1ch control with Push-Pull
- Accuracy of drive output frequency : 3.5% (IC Only/Built-in CT Capacitor)
- High accuracy timer latch current(±15%)
- Built-in FAIL function
- Adjustable latch timing
- Adjustable slow start time
- Lamp current and voltage sense feedback control
- Mode-selectable the operating or stand-by mode by STB pin (Typ.=0uA )

○Absolute Maximum Ratings (Ta = 25°C)

| Parameter                    | Symbol | Limits     | Unit |
|------------------------------|--------|------------|------|
| Supply Voltage               | Vcc    | 20         | V    |
| OUTPUT PIN Voltage           | N1, N2 | 20         | V    |
| Operating Temperature Range  | Topr   | -40~+85    | °C   |
| Storage Temperature Range    | Tstg   | -55~+150   | °C   |
| Maximum Junction Temperature | Tjmax  | +150       | °C   |
| Power Dissipation            | Pd     | SOP18:562* | mW   |

\*1Pd derate at -4.5mW/°C for temperature above Ta = 25°C (When mounted on a PCB 70.0mm×70.0mm×1.6mm)

○動作範囲

| 項目                               | 記号       | 範囲         | 単位  |
|----------------------------------|----------|------------|-----|
| Supply voltage                   | VCC      | 8.0 ~ 18.0 | V   |
| Input Frequency Ratio PWM_IN PIN | F_PWM_IN | 0.060~0.5  | kHz |
| DRIVER frequency                 | F_OUT    | 20 ~ 90    | kHz |

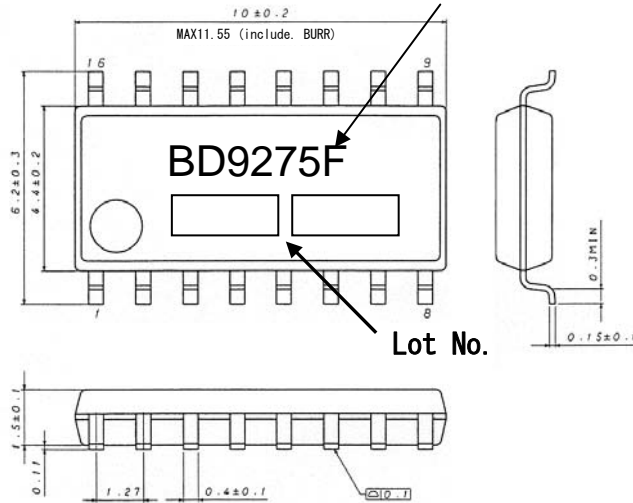
OElectric Characteristics (Ta=25°C, VCC=12V, STB=3.0V)

| Item                                | SYMBOL    | LIMIT |       |       | UNIT | CONDITION                 |
|-------------------------------------|-----------|-------|-------|-------|------|---------------------------|
|                                     |           | MIN.  | TYP.  | MAX.  |      |                           |
| <b>(( WHOLE DEVICE ))</b>           |           |       |       |       |      |                           |
| Operating current                   | Icc1      | —     | 2.0   | 4.0   | mA   | RT=100kΩ, FB=GND, IS=1.5V |
| Stand-by current                    | Icc2      | —     | 0     | 20    | μA   | VSTB=0V                   |
| <b>(( STAND BY CONTROL ))</b>       |           |       |       |       |      |                           |
| Stand-by voltage H                  | VSTBH     | 2     | —     | VCC   | V    | System ON                 |
| Stand-by voltage L                  | VSTBL     | -0.3  | —     | 0.8   | V    | System OFF                |
| STB PIN pull down resistor          | RSTB      | 180   | 375   | 750   | kΩ   | VSTB=2V                   |
| <b>(( VCC UVLO BLOCK ))</b>         |           |       |       |       |      |                           |
| Operating voltage                   | VCC_UVLO  | 7.2   | 7.5   | 7.8   | V    | VCC=6V→8V sweep           |
| Hysteresis width                    | ΔUVLO_HYS | 0.3   | 0.5   | 0.7   | V    | VCC=8V→6V sweep           |
| <b>(( OSC BLOCK ))</b>              |           |       |       |       |      |                           |
| RT pin Voltage                      | VRT       | 1.300 | 1.500 | 1.700 | V    | RT=100kΩ                  |
| SRT ON resistance                   | RSRT      | —     | 75    | 150   | Ω    | VSRT=0.1V                 |
| <b>(( PWM Dimming Block ))</b>      |           |       |       |       |      |                           |
| PWM_IN PIN voltage H                | VPWM_IN_H | 2.4   | —     | 5     | V    | VPWM_IN=0V⇒3.0V           |
| PWM_IN PIN voltage L                | VPWM_IN_L | -0.3  | —     | 0.8   | V    | VPWM_IN=3.0V⇒0V           |
| PWM_IN PIN pull down resistor       | R_PWMIN   | 1000  | 2000  | 4000  | kΩ   | VPWM_IN=5V                |
| <b>(( FEED BACK BLOCK ))</b>        |           |       |       |       |      |                           |
| IS threshold voltage                | VIS       | 1.225 | 1.250 | 1.275 | V    |                           |
| VS threshold voltage                | VVS       | 1.200 | 1.250 | 1.300 | V    |                           |
| IS source current                   | IIS       | 16    | 20    | 24    | μA   | IS=1.0V                   |
| IS COMP detect voltage              | VISCOMP   | 0.565 | 0.625 | 0.685 | V    | IS=1.3V→0.5V              |
| <b>(( SLOW START BLOCK ))</b>       |           |       |       |       |      |                           |
| SS term END Voltage                 | VSS       | 2.400 | 2.500 | 2.600 | V    | VSS=0V⇒3V                 |
| Soft start current                  | ISS       | 1.7   | 2.0   | 2.3   | μA   | VSS=1.0V IS=1.5V          |
| <b>(( COMP BLOCK ))</b>             |           |       |       |       |      |                           |
| COMP over voltage detect voltage    | VCOMPH    | 1.900 | 2.000 | 2.100 | V    | VSS>2.5V VCOMP=1.5V→2.5V  |
| Hysteresis width (COMP)             | ΔVCOMPH   | 0.100 | 0.200 | 0.300 | V    | VSS<2.0V VCOMP=2.5V→1.5V  |
| COMP PIN pull down resistor         | RCOMP     | 1000  | 2000  | 4000  | kΩ   | COMP=5V                   |
| FAIL ON resistance                  | RFAIL     | —     | 75    | 150   | Ω    | VFAIL=0.1V                |
| <b>(( OUTPUT BLOCK ))</b>           |           |       |       |       |      |                           |
| N1, N2 PIN output sink resistance   | RsinkN    | 1.5   | 3.0   | 6.0   | Ω    | IIN=100mA                 |
| N1, N2 PIN output source resistance | RsourceN  | 4.5   | 9     | 18    | Ω    | IIN=-100mA                |
| MAX DUTY                            | MAX DUTY  | 45    | 47.0  | 49.5  | %    | FOUT=50kHz                |
| Drive output frequency              | FOUT      | 48.25 | 50    | 51.75 | kHz  | RT=100kΩ                  |
| <b>(( TIMER BLOCK ))</b>            |           |       |       |       |      |                           |
| Timer Latch setting voltage         | VCP       | 2.900 | 3.000 | 3.100 | V    | VCP=0V⇒3.2V               |
| Timer Latch setting current         | ICP       | 1.7   | 2.0   | 2.3   | μA   | CP=1.0V IS=1.5V COMP=3.0V |

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

○Package Dimensions

Device Name



SOP-16 (Unit:mm)

○PIN No. ・ PIN NAME ・ FUNCTION

| BD9275F |     |  |     |        |  |
|---------|-----|--|-----|--------|--|
| No.     | PIN | Function   | No. | PIN    | Function   |
| 1       | VCC | Supply voltage input   | 16  | N1     | NMOS FET driver  |
| 2       | STB | Stand-by switch  | 15  | N2     | NMOS FET driver  |
| 3       | SRT | External resistor from SRT to RT for adjusting the triangle oscillator | 14  | PGND   | Ground for FET drivers                                   |
| 4       | RT  | External resistor from SRT to RT for adjusting the triangle oscillator | 13  | PWM_IN | Dimming pulse signal input pin                           |
| 5       | GND | GROUND   | 12  | SS     | External capacitor from SS to GND for Soft Start Control |
| 6       | FB  | Error amplifier output   | 11  | CP     | External capacitor from CP to GND for Timer Latch        |
| 7       | IS  | Error amplifier input  | 10  | FAIL   | Error signal output pin                                  |
| 8       | VS  | Error amplifier input  | 9   | COMP   | Over voltage detect pin                                  |

ONOTE FOR USE

1. This product is produced with strict quality control, but might be destroyed if used beyond its absolute maximum ratings. Once IC is destroyed, failure mode will be difficult to determine, like short mode or open mode. Therefore, physical protection countermeasure, like fuse is recommended in case operating conditions go beyond the expected absolute maximum ratings.
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  $\pm 0.3V$  compared with the PGND pin. ALL voltage should be under VCC voltage +0.3V
6. BD9275F 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.
7. When modifying the external circuit components, make sure to leave an adequate margin for external components actual value and tolerance as well as dispersion of the IC.
8. 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.
9. Under operating CP charge (under error mode) analog dimming and burst dimming are not operate.
10. Under operating Slow Start Control (SS is less than 2.5V), It does not operate Timer Latch.
11. By STB voltage is changed to 2 states. Therefore, do not input STB pin voltage between one state and the other state (0.8~2.0V).
12. The pin connected a connector need to connect to the resistor for electrical surge destruction.
13. This IC is a monolithic IC which (as shown is Fig-1) has P<sup>+</sup> 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.

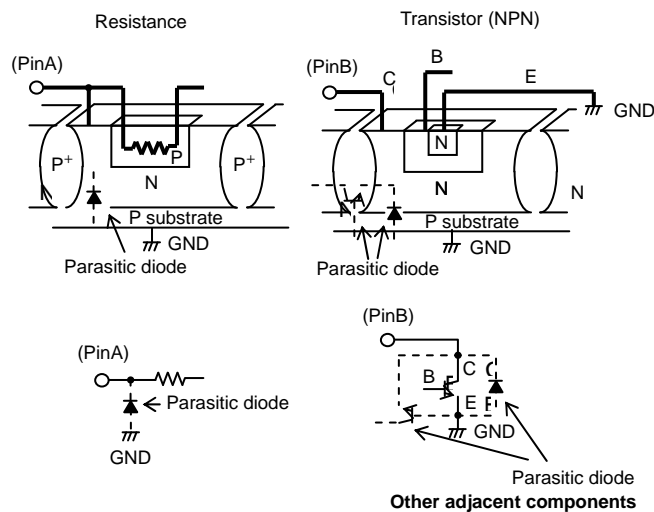


Fig-1 Simplified structure of a Bipolar IC

## Notes

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