

# 2-channel synchronous rectifier DC/DC converter

## BD9751FV

BD9751FV is a high-efficient 2-channel synchronous rectifier step-down DC/DC converter controller. External high side N-channel FET can be driven directly by the built-in charge-pump driver.

This IC also incorporates each protection circuit to protect supply circuit more safety.

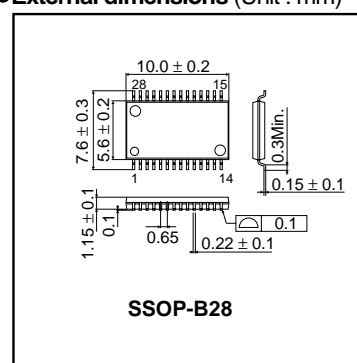
### ●Applications

Game machine, Liquid crystal display, Note PC

### ●Features

- 1) Built-in 2channel synchronous rectifier control circuit.
- 2) Built-in timer latch type short protection circuit.
- 3) Built-in output over voltage protection circuit.
- 4) Built-in over current protection circuit.
- 5) Built-in error operating at low  $V_{CC}$  protection circuit.

### ●External dimensions (Unit : mm)



### ●Absolute Maximum Rating (Ta=25°C)

| Parameter                   | Symbol | Limits                                | Unit |
|-----------------------------|--------|---------------------------------------|------|
| Supply voltage1             | VCC    | 14                                    | V    |
| Supply voltage2             | PVCC   | 19                                    | V    |
| Power dissipation           | Pd     | 640 <sup>*1</sup> / 850 <sup>*2</sup> | mW   |
| Operating temperature range | Topr   | -20 to +90 <sup>*3</sup>              | °C   |
| Storage temperature range   | Tstg   | -55 to +125                           | °C   |

<sup>\*1</sup> Derating : 6.4mW/°C for operation above Ta=25°C (IC only).

<sup>\*2</sup> Derating : 8.5mW/°C for operation above Ta=25°C (70mm × 70mm, t=1.6mm, glass epoxy mounting).

<sup>\*3</sup> Do not exceed junction temperature (Tjmax=125°C) even operating temperature range.

### ●Recommended Operating Conditions (Ta=25°C)

| Parameter                           | Symbol | Min. | Typ. | Max.    | Unit |
|-------------------------------------|--------|------|------|---------|------|
| Supply voltage                      | VCC    | 8.0  | 12.0 | 13.5    | V    |
| Timing capacity                     | CT     | 75   | 100  | 1000    | pF   |
| Timing resistance                   | RT     | 12   | 30   | 50      | kΩ   |
| Oscillating frequency               | fosc   | 100  | 320  | 400     | kHz  |
| Error amplifier input voltage range | VINV   | GND  | –    | 1.6     | V    |
| CS+, CS–pin input voltage range *   | VCS    | GND  | –    | Vcc–3.0 | V    |

\* CS+ ≥ CS–

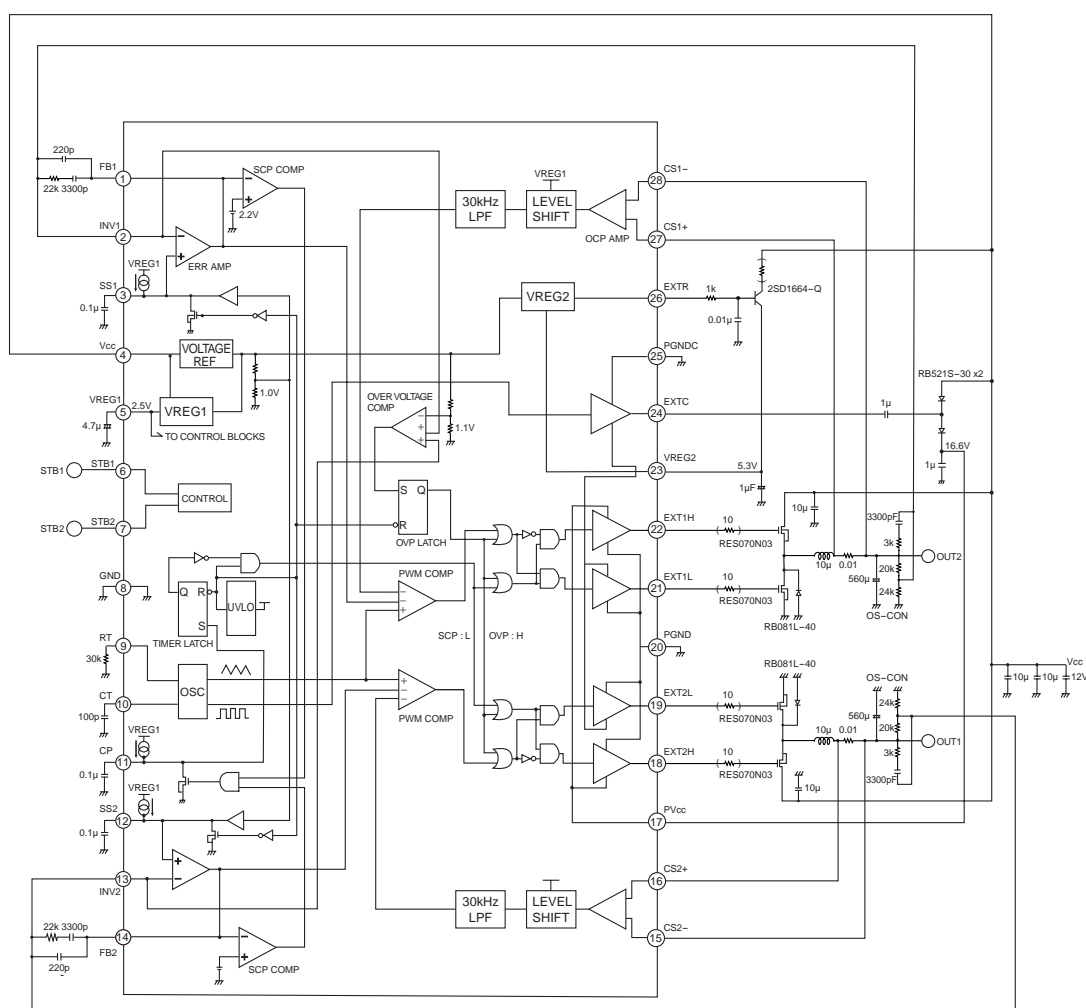
## Regulators

## ●Electrical characteristics

(Unless otherwise noted :  $T_a=25^{\circ}\text{C}$ ,  $V_{\text{CC}}=12.0\text{V}$ ,  $V_{\text{REG2}}=5.3\text{V}$ ,  $PV_{\text{CC}}=16.5\text{V}$ ,  $R_T=300\text{k}\Omega$ ,  $C_T=100\text{pF}$ )

| Parameter  | Symbol                          | Min.  | Typ. | Max.  | Unit     | Conditions   |
|--|---------------------------------|-------|------|-------|----------|--|
| Oscillating frequency                              | fosc                            | 287   | 319  | 351   | kHz      | $C_T=100\text{pF}$ , $R_T=30\text{k}\Omega$                                    |
| MAX DUTY cycle                                     | DMAX                            | 77    | 83   | 89    | %        | $V_{\text{INV}}=0.9\text{V}$   |
| Feedback voltage                                   | V <sub>F</sub>                  | 0.988 | 1.00 | 1.012 | V        | $\text{INV}=\text{FB}$   |
| Output ON resistance                               | R <sub>ON</sub>                 | —     | 5    | 10    | $\Omega$ |  |
| Output transition time                             | T <sub>r</sub> / T <sub>f</sub> | —     | 80   | —     | ns       | $C_{\text{gate}}=2000\text{pF}$ , 10%↔90%                                      |
| Oscillating stop voltage (Over current protection) | V <sub>ST</sub>                 | 61.6  | 70.0 | 78.4  | mV       | $V_{\text{ST}}=(V_{\text{CS}+})-(V_{\text{CS}-})$ , $V_{\text{CS-}}=0\text{V}$ |
| Overvoltage protection threshold voltage           | VOVT                            | 1.10  | 1.16 | 1.22  | V        |  |

## ●Application Circuit



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