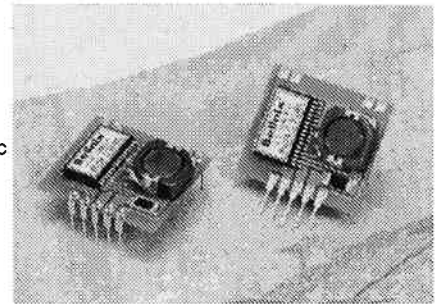


Output Voltage 3.3V-5V Ultra High Efficiency 83~87%
TO-3PL Size, Step-Down Non-Isolated Type DC-DC Converter
Bellnix® **6 Watt BSI24-mini Series**

BSI24-mini Series is an ultra small, TO-3PL packaged type, and non-isolated type step-down DC-DC converter which has achieved ultra high efficiency by the latest synchronous rectification circuit technology. BSI24-mini Series with the size of 25.4×21.5×8.3mm and 6W can be used without heat sink and external capacitor. BSI24-mini Series is the next generation three terminal regulator which has fundamentally changed dropper regulator with big heat.

<Features>

- Synchronous Rectification Control IC equipped.
- TO-3PL Wide type
- High efficiency 87%
- Adjustable output voltage
- Heat Sink not required
- Input voltage range +8V~+36V
- High reliability, high performance
- MTBF 1,000,000 Hrs
- Ultra low profile, Ultra small type
- Remote on/off control
- Over current protection Circuit
- Non-Isolated type
- Wide operating temperature range -10~+70°C
(Derating above +50°C)
- New Development MCM Power-IC loaded



<Model>

Table 1

Model	Rating Input Voltage Vdc	Input Voltage Range Vdc	Rating Output Voltage Vdc	Output Voltage Trim Range Vdc	Output Current A	Ripple & Noise mVpp(typ.)	Efficiency %(typ.)	Package
BSI24-mini Series								
BSI24-3/5S1R2	+24	+8~+36	+3.3	+3.3/+5	0~1.2	40	83/87	SIP
BSI24-3/5S1R2F								DIP

DIP type : Order received product

<Specification>

Table 2

Rating input voltage/range	Refer to Table 1.
Rating output voltage	When 1 pin is open, output voltage will be set at +3.3V. (The accuracy of voltage setting ±5%)
Output Voltage Trim Range	3.3V or 5V
Line regulation	2.0% typ. (3.3V)/2.5% typ. (5V) (For the input voltage range of table 1, at rating load.)
Load regulation	0.4% typ. (At rating input voltage, when load changes 0%~100%)
Temperature coefficient	±0.01%/°C typ. (When operating temperature changes between -10°C~+50°C)
Ripple & Noise	40mVp-p typ. (Rating input / output, room temperature) (20MHz bandwidth)
Efficiency	83% (3.3V)/87% (5V) (Rating input / output, room temperature, refer to table 1)
Over-Current Protection	Operates at more than 105% of rating load current, auto recovery type. Avoid more than 30 second of short-circuit condition.
Over-Voltage Protection	None
No Load Input Current	13mA typ. (At no load)
Standby Input Current	1mA typ. (Off control)
Remote on/off control	Between 1pin(on/off pin) and 3pin(GND); Open=output OFF, short=output ON
MTBF	1,000,000Hr min(EIAJ RCR-9102)
Switching frequency	250kHz typ.
Operating temperature range	-10°C~+70°C (Derating above +50°C)
Storage temperature range	-20°C~+85°C
Humidity range	20%~95%R.H. (non condensing)
Cooling condition	Natural air cooling (Set in a place with good air circulation.)
Vibration	5~10Hz All amplitude 10mm (1 hour in each of 3 orthogonal axes), 10~55Hz acceleration 2G (1 hour in each of 3 orthogonal axes)
Shock	Acceleration 20G (3 times in each of 3 orthogonal axes), Shocking Time 11±5ms
Weight	4g typ.
Outline	Refer to page 2.

* The above specification is provided with rating value, unless specified conditions is described.

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Bellnix®

6 Watt BSI24-mini Series

<Outline>

[SIP type]
BSI24-3/5S1R2

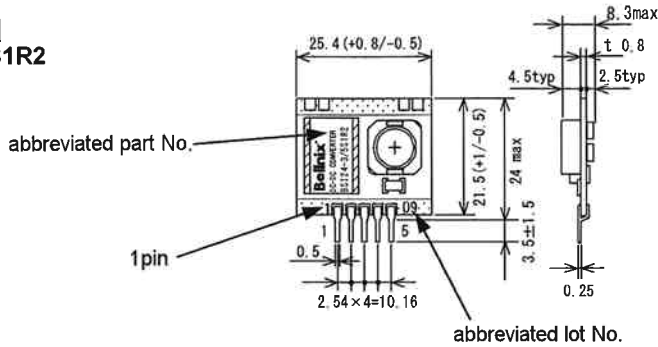


Figure1

pin	Function
1	ON/OFF CONT
2	+Vin
3	GND
4	+Vout
5	Vout.sel

Dimensions: mm
Tolerance when nothing specified ±0.5

[DIP type]
BSI24-3/5S1R2F

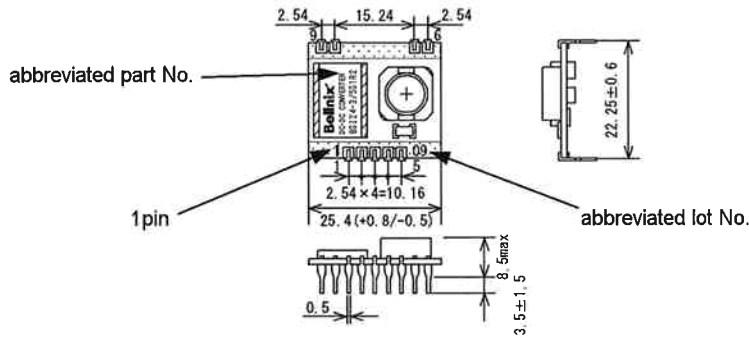


Figure2

pin	Function
1	ON/OFF CONT
2	+Vin
3	GND
4	+Vout
5	Vout.sel
6	NC
7	NC
8	NC
9	NC

Dimensions: mm
Tolerance when nothing specified ±0.5

<Block Diagram>

- Use this model according to a usual three terminal regulator.
- Output Voltage
5pin Open=+3.3V (rating output voltage)

Recommended additional capacitor

- C1 : 120µF50VV ZL series(Rubycon)
- C2 : 220µF10VV SH typeOScon(SANYO)
- C3 : 0.1µF

- In case that the wiring is long to the load, output noise may be further reduced with the 2.2µF~4.7µF added.
- Refer to figure 5~7 about :
adjustment output voltage, on/off control.
- Refer to page 6 about :
over-voltage protection, soldering conditions, and cleaning conditions.

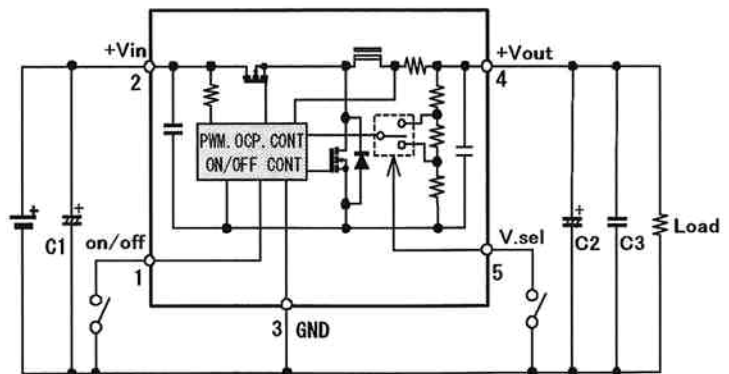


Figure3

Output Voltage 3.3V-5V Ultra High Efficiency 83~87%
TO-3PL Size, Step-Down Non-Isolated Type DC-DC Converter

Bellnix®

6 Watt BSI24-mini Series

<Technical Notes>

(A) Standard Connection

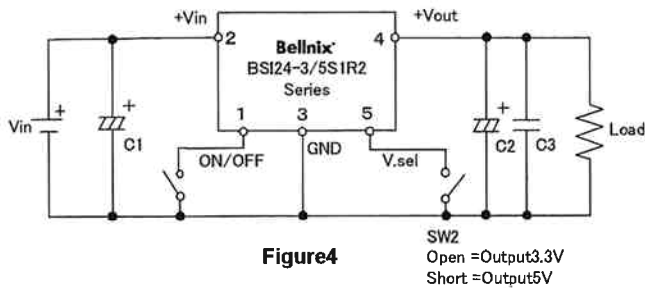


Figure4

Choice of external capacitors
C1=120µF50WV ZL series (Rubycon)
C2=220µF10WV SH type OS-CON (SANYO)
C3=0.1µF

C2: In case that the wiring is long to the load, output noise may be further reduced with the 2.2µF~4.7µF added.

(B) ON/OFF Control connection

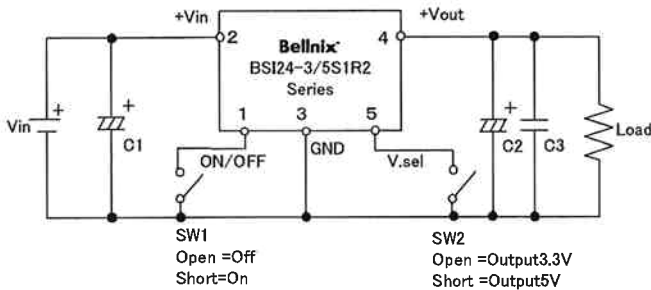


Figure5

ON/OFF can be controlled by opening or shortening 1 pin and 3 pin. Transistor(open collector) is recommended for the open and short control parts.

Output ON mode
Between 1 pin and 3 pin : short
Off state voltage 0~0.5Vdc (1mA max.)
Output OFF mode
Between 1 pin and 3 pin : open
2.5~5.3

(C) Output Voltage Adjustment Connection

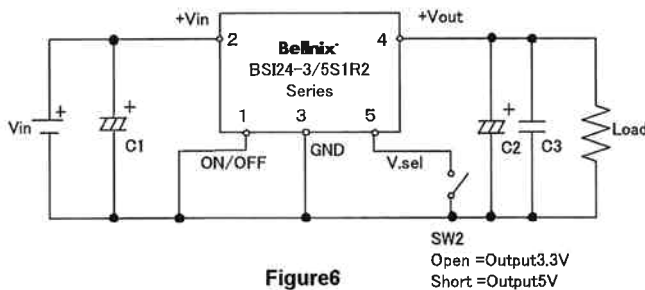


Figure6

5pin(V.ADJ)-3pin(GND)
open : 3.3V
short : 5V

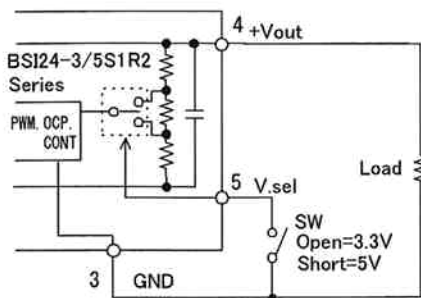


Figure7

Internal circuit diagram

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These test data do not represent all product.

<Turn on transient>

BSI24-3/5S1R2

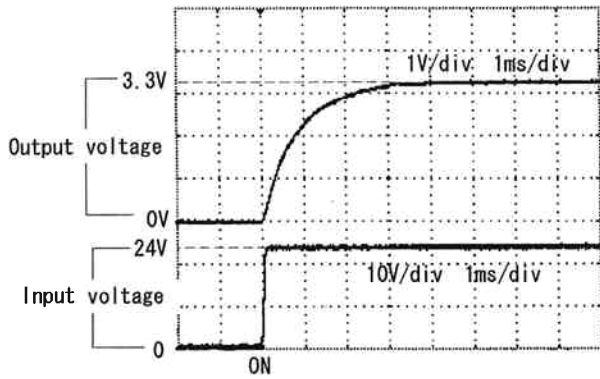


Figure8

Test condition : Rating Input/Rating Load/ Room temperature

BSI24-3/5S1R2

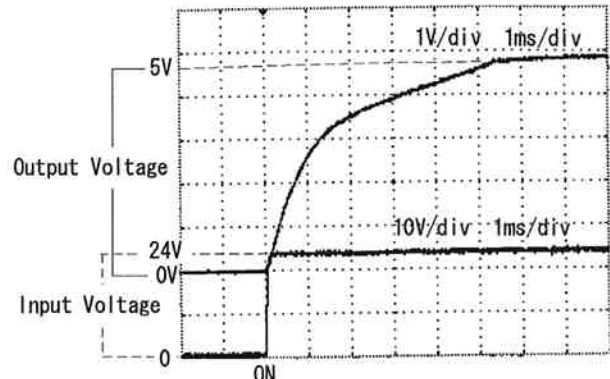


Figure9

<Output Ripple & Noise>

Test Condition
 Vin=24V
 Vout=3.3V
 Io=1.2A
 Ta=25°C
 Bw=20MHz

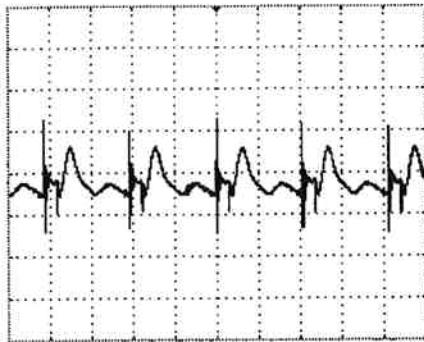


Figure10

Test Condition
 Vin=24V
 Vout=5V
 Io=1.2A
 Ta=25°C
 Bw=20MHz

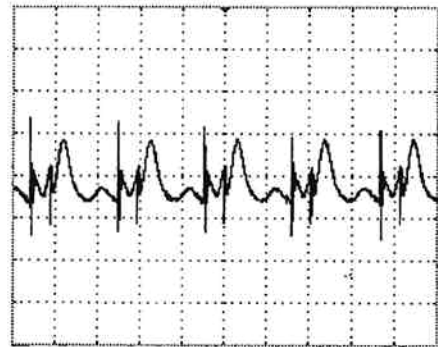


Figure11

Test condition : Rating Input/Rating Load/ Room temperature
 Test circuit is indicated in figure 15.