

2S7BE_6U Series

2W - Single/Dual Output DC-DC Converter - Fixed Input - Isolated & Unregulated

DC-DC Converter

2 Watt

- ⊕ High efficiency up to 86%
- ⊕ 6000VDC isolation
- ⊕ SIP package
- ⊕ Low ripple and noise
- ⊕ Operating temperature: -40°C to +85°C
- ⊕ International standard pinout
- ⊕ EMI complies with EN55032 Class B

The 2S7BE_6U series meet reinforced insulation requirements. They are specially designed for applications where require compact size, high isolation, low isolation capacitor and low leakage current power. They are widely used in electricity, IGBT drivers and so on.

These products apply to:

- 1) Where the voltage of the input power supply is fixed (voltage variation $\leq \pm 10\%$)
- 2) Where isolation is necessary between input and output (isolation voltage 6000VDC)
- 3) Where do not has high requirement of line regulation and the ripple & noise of the output voltage;

Such as: Collection and isolation, High voltage collection circuit, IGBT-driven circuits, etc.



Common specifications

| | |
|------------------------------|---------------------------------------|
| Short circuit protection: | 1 sec. MAX |
| Cooling: | Nature convection |
| Operation temperature range: | -40°C – +85°C |
| Storage temperature range: | -40°C – +125°C |
| Case temperature: | 100°C MAX |
| Lead temperature: | 260°C MAX, 1.5mm from case for 10 sec |
| Storage humidity range: | < 95% |
| MTBF (MIL-HDBK-217F@25°C): | >1,121 Mhours |
| Safety standard: | designed to meet IEC 60950-1 |
| Case material: | Plastic [UL94-V0] |
| Weight: | 2.3g |
| Dimensions: | 19.3x6.1x9.9mm |

Input specifications

| Item | Test condition | Min | Typ | Max | Units |
|----------------------------------|--|-----|-----|--------------------------------|--|
| Input voltage range | | | | ± 10 | % |
| Input surge voltage (1sec. max.) | <ul style="list-style-type: none"> • 3.3V input • 5VDC input • 12VDC input • 15VDC input • 24VDC input • 48VDC input | | | 6 7 15 18 28 54 | VDC VDC VDC VDC VDC VDC |
| Reflected Ripple Current* | | | 20 | | mApk-pk |
| Input filter | Capacitor | | | | |

* Reflected ripple current measured with a simulated source inductance of 12 μ H and a source capacitor Cin(47 μ F, ESR<1.0 Ω at 100KHz).

Isolation specifications

| Item | Test condition | Min | Typ | Max | Units |
|-----------------------|---------------------|------|-----|-----|------------|
| Isolation voltage | Tested for 1 minute | 6000 | | | VDC |
| Isolation resistance | Test at 500VDC | 1000 | | | M Ω |
| Isolation capacitance | | | 60 | | pF |

Output specifications

| Item | Test condition | Min | Typ | Max | Units |
|-------------------------|---|-----|------------|-----------|--------|
| Output voltage accuracy | | | | ± 3 | % |
| Line regulation | For Vin change of $\pm 1\%$ | | | ± 1.2 | % |
| Load regulation | 20% to 100% load • 3.3V output • Others | | | 20 10 | % % |
| Temperature coefficient | 100% full load | | ± 0.02 | | %/°C |
| Ripple & Noise | 20MHz Bandwidth | | | 75 | mVp-p |
| Switching frequency | Full load, nominal input | | 80 | | KHz |

EMC specifications

| EMI | CE* | EN55032 | CLASS B |
|-----|---------|-----------------|------------------|
| EMI | RE | EN55032 | CLASS B |
| EMS | ESD | IEC/EN61000-4-2 | perf. Criteria A |
| EMS | RS | IEC/EN61000-4-3 | perf. Criteria A |
| EMS | EFT** | IEC/EN61000-4-4 | perf. Criteria A |
| EMS | Surge** | IEC/EN61000-4-5 | perf. Criteria A |
| EMS | CS | IEC/EN61000-4-6 | perf. Criteria A |
| EMS | PfMF | IEC/EN61000-4-8 | perf. Criteria A |

* Input filter components are required to help meet conducted emissions Class B, also see section EMI filter on page 4.

** An external filter capacitor is required if the module has to meet IEC61000-4-4/IEC61000-4-5, also see section EFT/Surge filter on page 4.

Example:

2S7BE_0505D6U
 2= 2Watt; S7= SIP7; B= Pinning; E= Cost effective; 5Vin; 5Vout;
 D= Dual Output; 6= 6kVDC; U= Unregulated Output

2S7BE_6U Series

2W - Single/Dual Output DC-DC Converter - Fixed Input - Isolated & Unregulated

Single Output

| Part Number | Input Voltage [V] | Output Voltage [VDC] | Input current [mA] | | Output current [mA] | Capacitive load [μ F, max] | Efficiency [%, typ] |
|---------------|-------------------|----------------------|--------------------|-----------|---------------------|---------------------------------|---------------------|
| | | | No load | Full load | | | |
| 2S7BE_0303S6U | 3.3 | 3.3 | 26 | 797 | 400 | 470 | 76 |
| 2S7BE_0305S6U | 3.3 | 5 | 30 | 797 | 400 | 470 | 76 |
| 2S7BE_0309S6U | 3.3 | 9 | 30 | 758 | 222.2 | 470 | 80 |
| 2S7BE_0312S6U | 3.3 | 12 | 35 | 748 | 166.7 | 470 | 81 |
| 2S7BE_0315S6U | 3.3 | 15 | 40 | 777 | 133.3 | 470 | 78 |
| 2S7BE_0324S6U | 3.3 | 24 | 35 | 767 | 83.3 | 470 | 79 |
| 2S7BE_0503S6U | 5 | 3.3 | 30 | 367 | 400 | 470 | 72 |
| 2S7BE_0505S6U | 5 | 5 | 30 | 512 | 400 | 470 | 78 |
| 2S7BE_0509S6U | 5 | 9 | 30 | 500 | 222.2 | 470 | 80 |
| 2S7BE_0512S6U | 5 | 12 | 30 | 487 | 166.7 | 470 | 82 |
| 2S7BE_0515S6U | 5 | 15 | 30 | 487 | 133.3 | 470 | 82 |
| 2S7BE_0524S6U | 5 | 24 | 30 | 487 | 83.3 | 470 | 82 |
| 2S7BE_1203S6U | 12 | 3.3 | 36 | 169 | 400 | 470 | 65 |
| 2S7BE_1205S6U | 12 | 5 | 20 | 216 | 400 | 470 | 77 |
| 2S7BE_1209S6U | 12 | 9 | 20 | 208 | 222.2 | 470 | 80 |
| 2S7BE_1212S6U | 12 | 12 | 20 | 203 | 166.7 | 470 | 82 |
| 2S7BE_1215S6U | 12 | 15 | 20 | 203 | 133.3 | 470 | 82 |
| 2S7BE_1224S6U | 12 | 24 | 20 | 208 | 83.3 | 470 | 80 |
| 2S7BE_2403S6U | 24 | 3.3 | 10 | 76 | 400 | 470 | 72 |
| 2S7BE_2405S6U | 24 | 5 | 10 | 105 | 400 | 470 | 79 |
| 2S7BE_2409S6U | 24 | 9 | 10 | 104 | 222.2 | 470 | 80 |
| 2S7BE_2412S6U | 24 | 12 | 10 | 102 | 166.7 | 470 | 80 |
| 2S7BE_2415S6U | 24 | 15 | 10 | 101 | 133.3 | 470 | 82 |
| 2S7BE_2424S6U | 24 | 24 | 10 | 104 | 83.3 | 470 | 80 |
| 2S7BE_4803S6U | 48 | 3.3 | 6 | 45 | 400 | 470 | 60 |
| 2S7BE_4805S6U | 48 | 5 | 6 | 54 | 400 | 470 | 77 |
| 2S7BE_4809S6U | 48 | 9 | 6 | 54 | 222.2 | 470 | 77 |
| 2S7BE_4812S6U | 48 | 12 | 6 | 53 | 166.7 | 470 | 78 |
| 2S7BE_4815S6U | 48 | 15 | 6 | 53 | 133.3 | 470 | 78 |
| 2S7BE_4824S6U | 48 | 24 | 6 | 55 | 83.3 | 470 | 75 |

2S7BE_6U Series

2W - Single/Dual Output DC-DC Converter - Fixed Input - Isolated & Unregulated

Dual Output

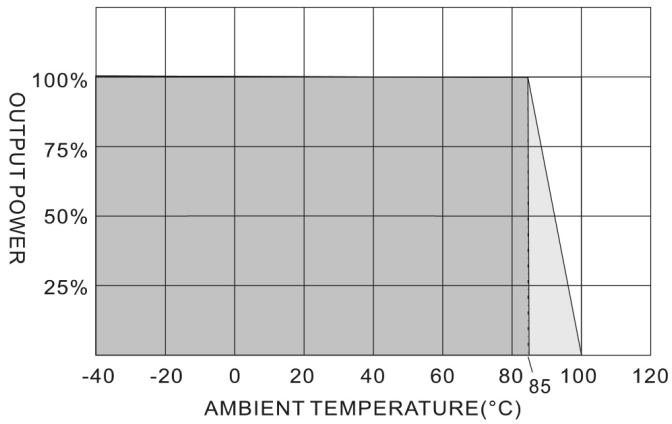
| Part Number | Input Voltage [V] | Output Voltage [VDC] | Input current | | Output current [mA] | Capacitive load [μ F, max] | Efficiency [%, typ] |
|---------------|-------------------|----------------------|-------------------|---------------------|---------------------|---------------------------------|---------------------|
| | | | No load [mA, max] | Full load [mA, typ] | | | |
| 2S7BE_0303D6U | 3.3 | \pm 3.3 | 25 | 797 | \pm 200 | \pm 220 | 76 |
| 2S7BE_0305D6U | 3.3 | \pm 5 | 40 | 777 | \pm 200 | \pm 220 | 78 |
| 2S7BE_0309D6U | 3.3 | \pm 9 | 40 | 797 | \pm 111.1 | \pm 220 | 76 |
| 2S7BE_0312D6U | 3.3 | \pm 12 | 45 | 777 | \pm 83.3 | \pm 220 | 78 |
| 2S7BE_0315D6U | 3.3 | \pm 15 | 45 | 777 | \pm 66.67 | \pm 220 | 78 |
| 2S7BE_0324D6U | 3.3 | \pm 24 | 45 | 767 | \pm 41.67 | \pm 220 | 79 |
| 2S7BE_0503D6U | 5 | \pm 3.3 | 30 | 406 | \pm 200 | \pm 220 | 65 |
| 2S7BE_0505D6U | 5 | \pm 5 | 30 | 555 | \pm 200 | \pm 220 | 72 |
| 2S7BE_0509D6U | 5 | \pm 9 | 30 | 519 | \pm 111.1 | \pm 220 | 77 |
| 2S7BE_0512D6U | 5 | \pm 12 | 30 | 512 | \pm 83.3 | \pm 220 | 78 |
| 2S7BE_0515D6U | 5 | \pm 15 | 30 | 500 | \pm 66.67 | \pm 220 | 80 |
| 2S7BE_0524D6U | 5 | \pm 24 | 30 | 500 | \pm 41.67 | \pm 220 | 80 |
| 2S7BE_1203D6U | 12 | \pm 3.3 | 20 | 164 | \pm 200 | \pm 220 | 67 |
| 2S7BE_1205D6U | 12 | \pm 5 | 20 | 222 | \pm 200 | \pm 220 | 75 |
| 2S7BE_1209D6U | 12 | \pm 9 | 20 | 216 | \pm 111.1 | \pm 220 | 77 |
| 2S7BE_1212D6U | 12 | \pm 12 | 20 | 203 | \pm 83.3 | \pm 220 | 82 |
| 2S7BE_1215D6U | 12 | \pm 15 | 20 | 203 | \pm 66.67 | \pm 220 | 82 |
| 2S7BE_1224D6U | 12 | \pm 24 | 20 | 203 | \pm 41.67 | \pm 220 | 82 |
| 2S7BE_2403D6U | 24 | \pm 3.3 | 10 | 80 | \pm 200 | \pm 220 | 68 |
| 2S7BE_2405D6U | 24 | \pm 5 | 10 | 111 | \pm 200 | \pm 220 | 75 |
| 2S7BE_2409D6U | 24 | \pm 9 | 10 | 104 | \pm 111.1 | \pm 220 | 80 |
| 2S7BE_2412D6U | 24 | \pm 12 | 10 | 101 | \pm 83.3 | \pm 220 | 82 |
| 2S7BE_2415D6U | 24 | \pm 15 | 10 | 101 | \pm 66.67 | \pm 220 | 82 |
| 2S7BE_2424D6U | 24 | \pm 24 | 10 | 101 | \pm 41.67 | \pm 220 | 82 |
| 2S7BE_4803D6U | 48 | \pm 3.3 | 6 | 45 | \pm 200 | \pm 220 | 60 |
| 2S7BE_4805D6U | 48 | \pm 5 | 6 | 57 | \pm 200 | \pm 220 | 73 |
| 2S7BE_4809D6U | 48 | \pm 9 | 6 | 54 | \pm 111.1 | \pm 220 | 77 |
| 2S7BE_4812D6U | 48 | \pm 12 | 6 | 52 | \pm 83.3 | \pm 220 | 80 |
| 2S7BE_4815D6U | 48 | \pm 15 | 6 | 52 | \pm 66.67 | \pm 220 | 80 |
| 2S7BE_4824D6U | 48 | \pm 24 | 6 | 52 | \pm 41.67 | \pm 220 | 80 |

2S7BE_6U Series

2W - Single/Dual Output DC-DC Converter - Fixed Input - Isolated & Unregulated

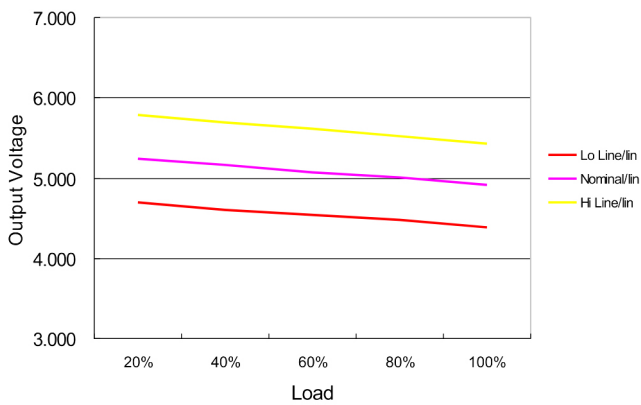
Typical characteristics

Derating Curve



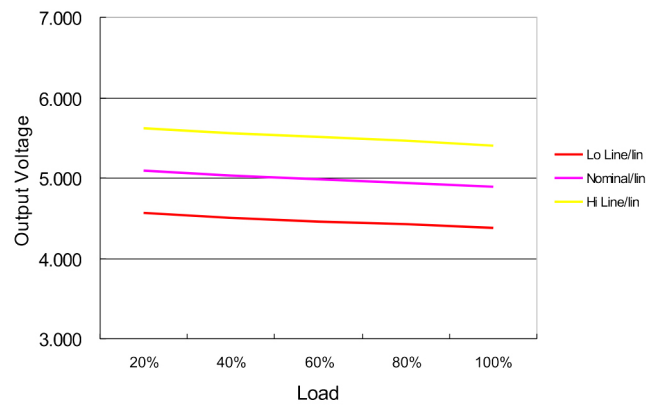
Loading vs. output

LOADING VS OUTPUT VOLTAGE



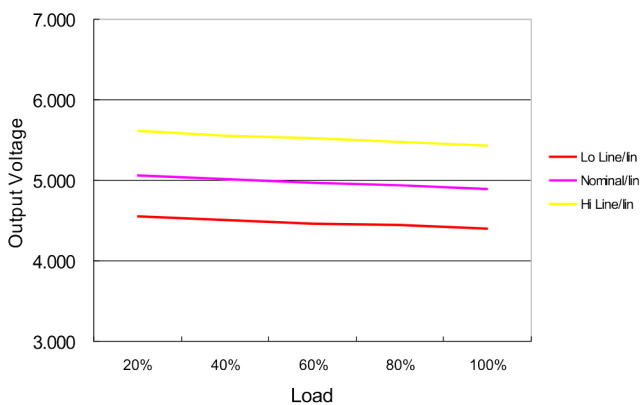
2S7BE_05yy type

LOADING VS OUTPUT VOLTAGE



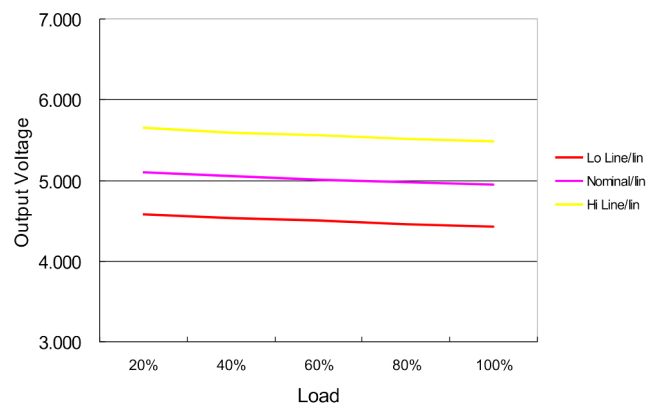
2S7BE_12yy type

LOADING VS OUTPUT VOLTAGE



2S7BE_24yy type

LOADING VS OUTPUT VOLTAGE

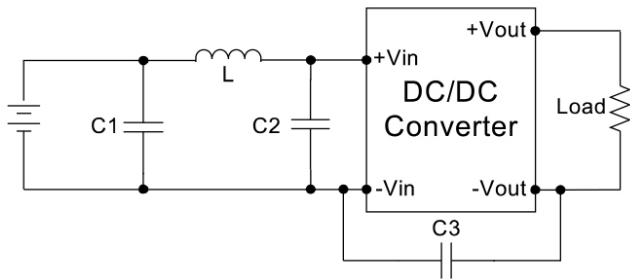


2S7BE_48yy type

2S7BE_6U Series

2W - Single/Dual Output DC-DC Converter - Fixed Input - Isolated & Unregulated

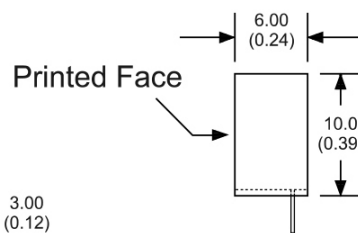
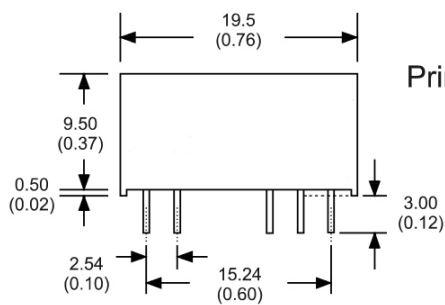
EMI filter



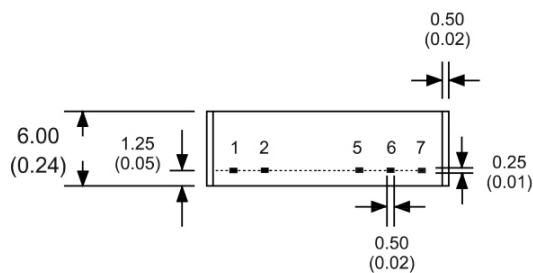
| Model | C1 | L | C2 | C3 |
|--------------|-----------------------------------|------|------------------|-----------------|
| 2S7BE_03xx6U | 1210, 2.2μF/100V | 18μH | | |
| 2S7BE_05xx6U | 1210, 2.2μF/100V | 18μH | | |
| 2S7BE_12xx6U | 1210, 2.2μF/100V | 18μH | | |
| 2S7BE_15xx6U | 1210, 2.2μF/100V | 18μH | | |
| 2S7BE_24xx6U | 1210, 2.2μF/100V | 18μH | 1210, 2.2μF/100V | 1206, 470pF/2KV |
| 2S7BE_48xx6U | Electrolytic capacitor, 10μF/100V | 18μH | 1210, 2.2μF/100V | 1206, 470pF/2KV |

Input filter components (C1, L, C2, C3) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.

Mechanical dimensions



* The thickness of 48V input voltage model is 7.20(0.28)



| Pin connections | | |
|-----------------|--------|--------|
| Pin | Single | Dual |
| 1 | +Vin | +Vin |
| 2 | -Vin | -Vin |
| 5 | -Vout | -Vout |
| 6 | N.P. | Common |
| 7 | +Vout | +Vout |

All dimensions are typical in mm (inch)
 Pin diameter: 0.5 ±0.05 (0.02 ±0.002)
 Pin pitch and length tolerance: ±0.35 (±0.014)
 Case tolerance: ±0.5 (±0.02)