# THE DATASHEET OF

# IMB0112S05

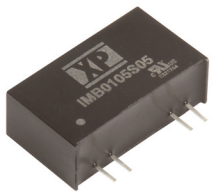
# IMB01 Series

DC-DC Converter

XP Power

## 1 Watt

- Single unregulated output
- ±10% input range
- SIP7 package
- World wide medical approvals
- 4kVAC isolation reinforced
- 2 x MOPP at 300VAC
- 2µA patient leakage current
- -40°C to +105°C operation
- Full load at +85°C ambient
- MTBF 4.3MHrs
- 3 year warranty



**Dimensions:**

**IMB01:**
0.87 x 0.49 x 0.30" (22.0 x 12.5 x 7.5 mm)

Designed for medical applications, the IMB01 series offers a 2 x MOPP and IEC60601-1 compliant solution. Included in the compact SIP7 package is short circuit protection, low leakage current of 2µA and operation to +85°C.

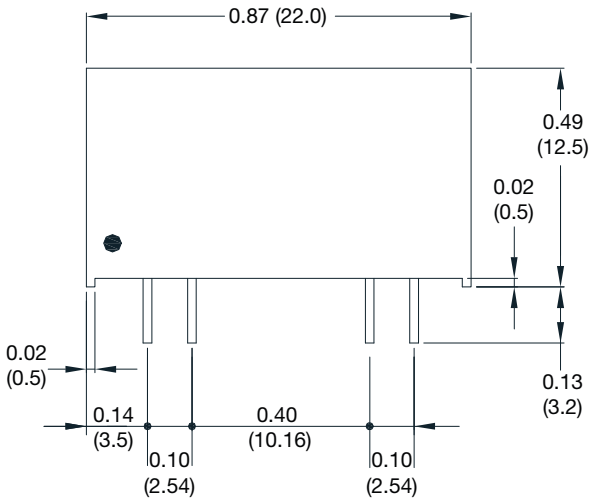
## Models & Ratings

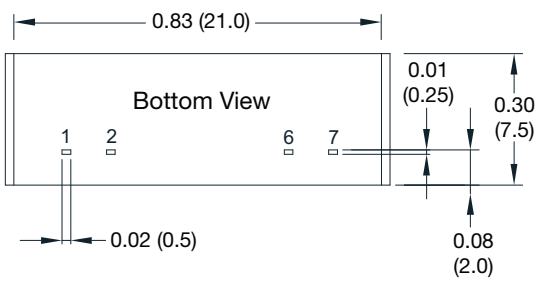
| Input Voltage | Output Voltage | Output Current | Input Current | | Maximum Capacitive Load µF | Efficiency | Model Number |
|---|---|---|---|---|---|---|---|
| | | | No Load | Full Load | | | |
| 5V (4.5-5.5) | 5 V | 200 mA | 50 mA | 253 mA | 220 µF | 79% | IMB0105S05 |
| | 12 V | 84 mA | | 252 mA | | 80% | IMB0105S12 |
| | 15 V | 68 mA | | 252 mA | | 81% | IMB0105S15 |
| 12V (10.8-13.2) | 5 V | 200 mA | 35 mA | 105 mA | 220 µF | 79% | IMB0112S05 |
| | 12 V | 84 mA | | 104 mA | | 81% | IMB0112S12 |
| | 15 V | 68 mA | | 108 mA | | 79% | IMB0112S15 |
| 24V (21.6-26.4) | 5 V | 200 mA | 20 mA | 55 mA | 220 µF | 76% | IMB0124S05 |
| | 12 V | 84 mA | | 53 mA | | 79% | IMB0124S12 |
| | 15 V | 68 mA | | 54 mA | | 79% | IMB0124S15 |

### Notes

*Input currents measured at nominal input voltage.*

## Mechanical Details




| Pin Connections | |
|---|---|
| Pin | Single |
| 1 | +Vin |
| 2 | -Vin |
| 6 | -Vout |
| 7 | +Vout |

### Notes

1. All dimensions are in inches (mm)
2. Weight: 0.009 lbs (4.1 g) approx.
3. Pin diameter: 0.02±0.002 (0.5±0.05)
4. Pin pitch tolerance: ±0.014 (±0.25)
5. Case tolerance: ±0.02 (±0.5)

## Input

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|---|---|---|---|---|---|
| Input Voltage Range | 4.5 | 5 | 5.5 | VDC | 5 V nominal |
| | 10.8 | 12 | 13.2 | | 12 V nominal |
| | 21.6 | 24 | 26.4 | | 24 V nominal |
| Input Surge | -0.7 | | 9 | VDC for 1s | 5 V models |
| | -0.7 | | 18 | VDC for 1s | 12 V nominal |
| | -0.7 | | 30 | VDC for 1s | 24 V nominal |
| Input Filter | Internal Capacitor | | | | |

## Output

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|---|---|---|---|---|---|
| Output Voltage | 5 | | 15 | VDC | See Models and Ratings table |
| Patient Leakage Current | | | 2 | µA | |
| Initial Set Accuracy | | ±1 | ±3 | % | % V nominal |
| Minimum Load | 10 | | | % | Minimum load required for regulation |
| Line Regulation | | ±1.2 | ±1.5 | % | From minimum to maximum input |
| Load Regulation | | | ±10 | % | From 10% to full load |
| Ripple & Noise | | | 75 | mV pk-pk | 20 MHz bandwidth. Measured using 0.1 µF ceramic capacitor |
| Short Circuit Protection | | | | | Continuous, with auto recovery |
| Maximum Capacitive Load | | | | | See Models and Ratings table |
| Temperature Coefficient | | ±0.01 | ±0.02 | %/°C | |

## General

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|---|---|---|---|---|---|
| Efficiency | | 80 | | % | |
| Isolation: Input to Output | 4000 | | | VAC | 60s reinforced, 300 Vrms 2 x MOPP |
| Switching Frequency | | 60 | | kHz | May enter burst mode frequency of 12-28 kHz at light load |
| Isolation Resistance | $10^9$ | | | Ω | 500 VDC |
| Isolation Capacitance | | 20 | | pF | 100 kHz, 1V |
| Power Density | | | 7.80 | W/in$^3$ | |
| Mean Time Between Failure | 4.3 | | | MHrs | MIL-HDBK-217F, +25 °C GB |
| Weight | | 0.009 (4.1) | | lb (g) | |
| Case Material | Non conductive black plastic, UL94V-0 rated | | | | |
| Pin Material | Tinned Copper | | | | |

## Environmental

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|---|---|---|---|---|---|
| Operating Altitude | | | 5000 | m | |
| Transport Altitude | | | 10,000 | m | |
| Operating Temperature | -40 | | +105 | °C | Derate linearly from 100% load at +85 °C to 0% at +105 °C |
| Storage Temperature | -50 | | +125 | °C | |
| Case Temperature | | | +105 | °C | |
| Humidity | | | 95 | %RH | Non-condensing |
| Cooling | | | | | Natural convection |

## EMC: Emissions

| Phenomenon | Standard | Test Level | Notes & Conditions |
|---|---|---|---|
| Conducted | EN55011 | Class A | See Application Note |
| Radiated | EN55011 | Class A | |

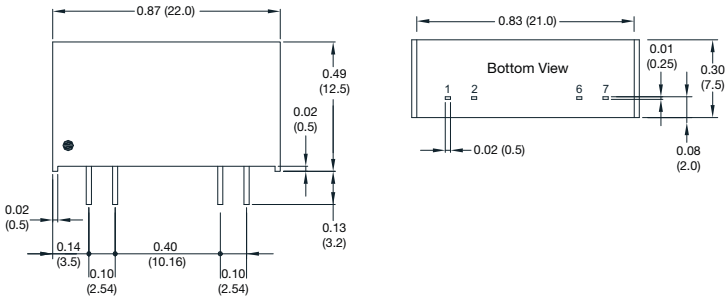
## EMC: Immunity

| Phenomenon | Standard | Test Level | Criteria | Notes & Conditions |
|---|---|---|---|---|
| Medical Device EMC | IEC60601-1-2 | Ed 4.0:2014 | As below | |
| ESD Immunity | EN61000-4-2 | Air ±15 kV/Contact ±8 kV | A | Air Discharge |
| Radiated Immunity | EN61000-4-3 | 10 V/m | A | 80% mod, 80 MHz - 2.7 GHz plus discrete communcation proximity field frequencies |
| EFT/Burst | EN61000-4-4 | 2 kV | A | External input filter required, see application note |
| Surge | EN61000-4-5 | 2 kV | A | External input filter required, see application note |
| Conducted Immunity | EN61000-4-6 | 10 V rms | A | |
| Magnetic Fields | EN61000-4-8 | 30 A/m | A | |

## Safety Approvals

| Safety Agency | Safety Standard | Notes & Conditions |
|---|---|---|
| UL | ANSI/AMMI ES60601-1 | 2 x MOPP |
| CSA | CAN/CSA-C22.2 No.60601-1 | |
| CE | Meets all applicable directives | |
| UKCA | Meets all applicable legislation | |

## Mechanical Details




| Pin Connections | |
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| Pin | Single |
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### Notes

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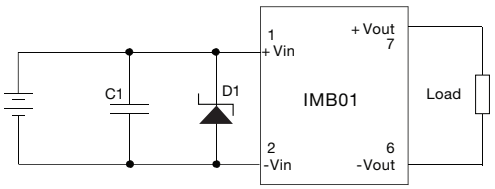
2. Weight: 0.009 lbs (4.1 g) approx.
3. Pin diameter: 0.02±0.002 (0.5±0.05)
4. Pin pitch tolerance: ±0.014 (±0.25)
5. Case tolerance: ±0.02 (±0.5)

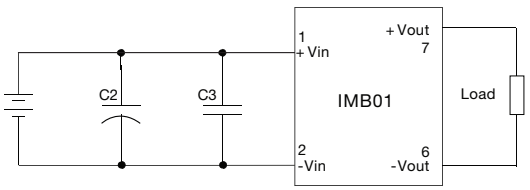
## Application Note

### External Filter for Surge and EFT



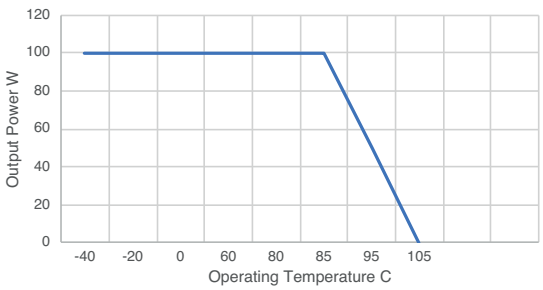

| Part Number | C1 | ZD1 |
|---|---|---|
| IMB0105 | 330 µF/25 V, CHEMI-CON KY Series | 1.5KE7.5CA (TVS Diode) |
| IMB0112 | 1800 µF/25 V, CHEMI-CON KY Series | |
| IMB0124 | 470 µF/50 V, CHEMI-CON KY Series | |

### EMI Filter Conducted Emissions




| Part Number | C2 | C3 |
|---|---|---|
| IMB0105 | 47 µF/16V, 1210 X5R | |
| IMB0112 | 47 µF/25 V, 1210 X5R | |
| IMB0124 | 10 µF/50 V, 1210 X7R | 10 µF/ 50 V, 1210 XZR |

### Operating Temperature



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