

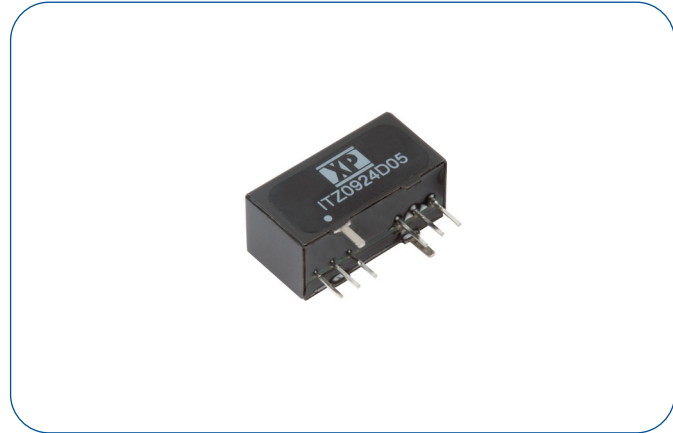


**THE DATASHEET OF
ITZ0924S09**



9 Watts

- Ultra Compact SIP-8 Package
- Smallest Footprint 9 W Converter
- Single & Dual Outputs
- 4:1 Input Range
- Operating Temperature -40 °C to +85 °C
- 1600 VDC Isolation (Functional Insulation)
- Fully Regulated Output
- No Minimum Load Required
- Remote On/Off
- 3 Year Warranty



Dimensions:

ITZ:
0.86 x 0.38 x 0.44" (21.9 x 9.6 x 11.2 mm)

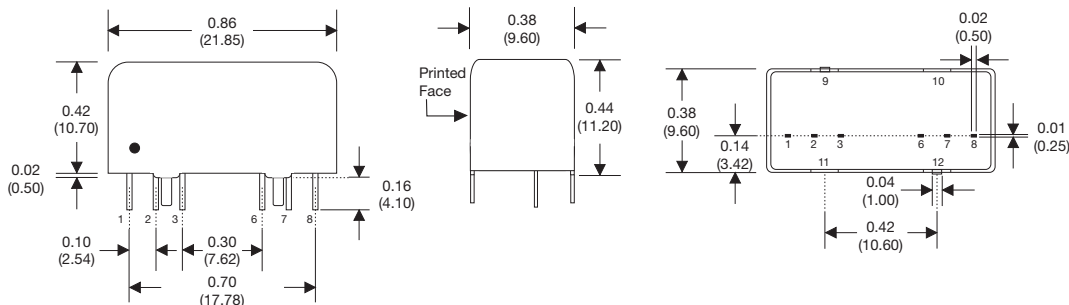
Models & Ratings

| Input Voltage | Output Voltage | Output Current | Input Current ⁽¹⁾ | | Maximum Capacitive Load ⁽²⁾ | Efficiency | Model Number |
|------------------|----------------|----------------|------------------------------|-----------|--|------------|--------------|
| | | | No Load | Full Load | | | |
| 24V (9-36 V) | 3.3 V | 2000 mA | 9 mA | 335 mA | 2600 µF | 82% | ITZ0924S3V3 |
| | 5 V | 1600 mA | 9 mA | 390 mA | 1300 µF | 85% | ITZ0924S05 |
| | 9 V | 1000 mA | 9 mA | 425 mA | 800 µF | 86% | ITZ0924S09 |
| | 12 V | 750 mA | 9 mA | 425 mA | 560 µF | 88% | ITZ0924S12 |
| | 15 V | 600 mA | 9 mA | 420 mA | 560 µF | 89% | ITZ0924S15 |
| | 24 V | 375 mA | 9 mA | 420 mA | 200 µF | 89% | ITZ0924S24 |
| | ±5 V | ±800 mA | 9 mA | 390 mA | ±800 µF | 85% | ITZ0924D05 |
| | ±12 V | ±375 mA | 9 mA | 425 mA | ±390 µF | 88% | ITZ0924D12 |
| 48V (18-75 V) | ±15 V | ±300 mA | 9 mA | 430 mA | ±200 µF | 88% | ITZ0924D15 |
| | 3.3 V | 2000 mA | 5 mA | 170 mA | 2600 µF | 82% | ITZ0948S3V3 |
| | 5 V | 1600 mA | 5 mA | 195 mA | 1300 µF | 85% | ITZ0948S05 |
| | 9 V | 1000 mA | 5 mA | 215 mA | 800 µF | 86% | ITZ0948S09 |
| | 12 V | 750 mA | 5 mA | 212 mA | 560 µF | 89% | ITZ0948S12 |
| | 15 V | 600 mA | 5 mA | 210 mA | 560 µF | 88% | ITZ0948S15 |
| | 24 V | 375 mA | 5 mA | 210 mA | 200 µF | 88% | ITZ0948S24 |
| | ±5 V | ±800 mA | 5 mA | 195 mA | ±800 µF | 85% | ITZ0948D05 |
| ±12 V | ±375 mA | 5 mA | 215 mA | ±390 µF | 87% | ITZ0948D12 | |
| ±15 V | ±300 mA | 5 mA | 215 mA | ±200 µF | 87% | ITZ0948D15 | |

Notes

1. Input currents measured at nominal input voltage.
2. Maximum capacitive load is per output.

Mechanical Details



| Pin Connections | | |
|-----------------|---------------|---------------|
| Pin | Single | Dual |
| 1 | -Vin | -Vin |
| 2 | +Vin | +Vin |
| 3 | Remote On/Off | Remote On/Off |
| 6 | +Vout | +Vout |
| 7 | -Vout | Common |
| 8 | No Connection | -Vout |
| 9 | Case | Case |
| 10 | Stand Off | Stand Off |
| 11 | Stand Off | Stand Off |
| 12 | Case | Case |

Notes

1. All dimensions are in inches (mm)
2. Weight: 0.257 lbs (7.3 g) approx.
3. Pin diameter: 0.02±0.002 (0.5±0.05)
4. Pin pitch tolerance: ±0.014 (±0.35)
5. Case tolerance: ±0.02 (±0.5)

Input

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|------------------------|-----------|---------|---------|----------------|---|
| Input Voltage Range | 9 | | 36 | VDC | 24 V nominal |
| | 18 | | 75 | VDC | 48 V nominal |
| Input Filter | Capacitor | | | | |
| Input Reflected Ripple | | | 20/40 | mA pk-pk | 24/48 V input. Through 12 μ H inductor and 47 μ F capacitor |
| Input Surge | | | 50 | VDC for 100 ms | 24 V models |
| | | | 100 | VDC for 100 ms | 48 V models |

Output

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|--------------------------|--|---------|---------------|-------------|--|
| Output Voltage | 3.3 | | 30 | VDC | See Models and Ratings table |
| Initial Set Accuracy | | | ± 1 | % | At full load |
| Minimum Load | 0 | | | A | No minimum load required |
| Line Regulation | | | ± 0.2 | % | |
| Load Regulation | | | ± 0.5 | % | Single output from 0 to full load |
| | | | ± 1 | % | Dual output and single 3V3 output from 0 to full load |
| Cross Regulation | | | ± 5 | % | On dual output models when one load is varied between 25% and 100% and other is fixed at 100% |
| Transient Response | | | $\pm 5/\pm 3$ | % deviation | For 3V3 & 5V output models / all other models. Recovery within 2% in less than 2ms for a 25% load change |
| Ripple & Noise | | | 75 | mV pk-pk | 20 MHz bandwidth. Measured using 0.1 μ F ceramic capacitor |
| Short Circuit Protection | | | | | Continuous, with auto recovery |
| Over Voltage Protection | | 130 | | % | |
| Over Load Protection | | 180 | | % | |
| Maximum Capacitive Load | | | | | See Models and Ratings table |
| Temperature Coefficient | | | 0.02 | %/°C | |
| Remote On/Off | Output is on if remote on/off (pin 3) is open circuit. Output is off if 2-4 mA current is applied to remote on/off (pin 3) via 1 k Ω resistor. Maximum pin voltage is 5 V and maximum current into pin 3 is 4 mA. Note: Output may be affected with current into the pin as low as 10 μ A. | | | | |

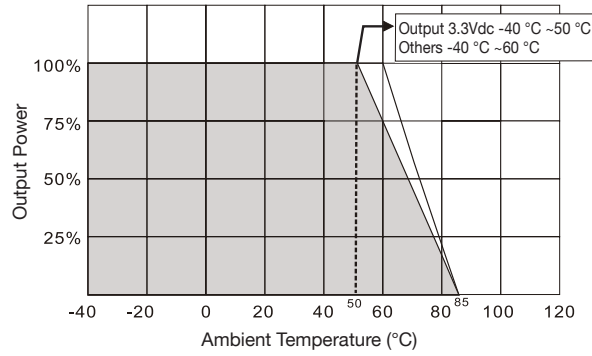
General

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|---|---------|-------------|---------|------------------|--|
| Efficiency | | 88 | | % | See Models and Ratings table |
| Isolation: Input to Output | 1600 | | | VDC | For 60 seconds. Insulation: Functional |
| Isolation: Input/Output to Case | 1000 | | | VDC | For 60 seconds. Insulation: Functional |
| Continuous Working Voltage: Input to Output | | | 500 | VDC | 200V r.m.s. |
| Switching Frequency | | 400/500 | | kHz | 24 V input/48 V input |
| Isolation Resistance | 10^9 | | | Ω | |
| Isolation Capacitance | | 50 | | pF | |
| Power Density | | | 65 | Win ³ | |
| Mean Time Between Failure | 900 | | | KHrs | MIL-HDBK-217F, +25 °C GB |
| Case Material | | | | | Copper |
| Potting Material | | | | | Epoxy UL94V-0 rated |
| Pin Material | | | | | Solder coated phosphur bronze C519R-H |
| Solder Profile | | | | | 260 °C max, 1.5mm from case 10s max |
| Weight | | 0.257 (7.3) | | lb (g) | |

Environmental

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|-----------------------|---------|---------|---------|-------|---|
| Operating Temperature | -40 | | +85 | °C | Derate from 100% load at +60 °C to no load at +85 °C, and 100% load at 50 °C to no load at 85 °C for 3V3 models |
| Storage Temperature | -55 | | +125 | °C | |
| Case Temperature | | | +100 | °C | |
| Humidity | | | 95 | %RH | Non-condensing |
| Cooling | | | | | Natural convection |

Derating Curve



EMC: Emissions

| Phenomenon | Standard | Test Level | Notes & Conditions |
|------------|----------|------------|----------------------|
| Conducted | EN55032 | Class A | See application note |
| Radiated | EN55032 | Class A | See application note |

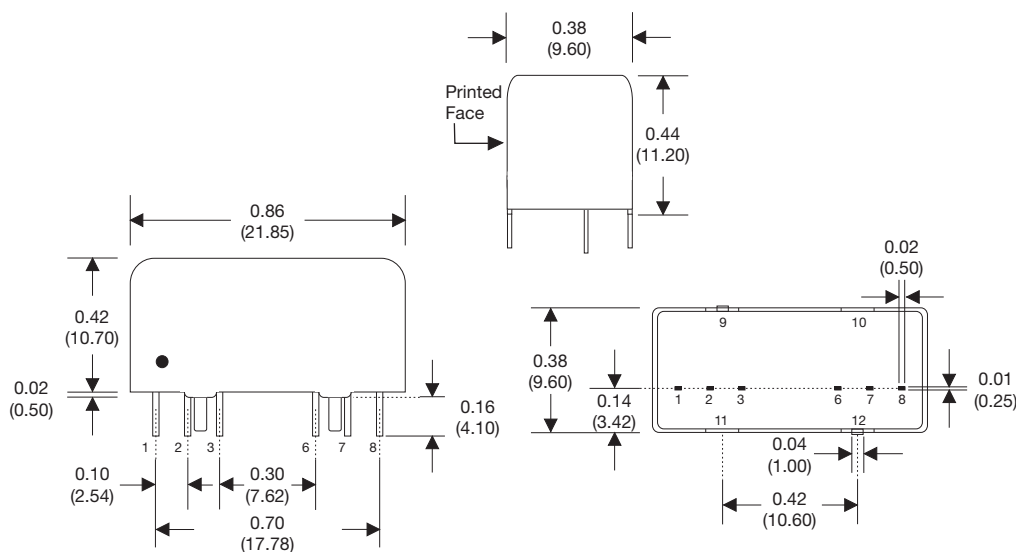
EMC: Immunity

| Phenomenon | Standard | Test Level | Criteria | Notes & Conditions |
|--------------------|-------------|-------------|----------|-----------------------|
| ESD Immunity | EN61000-4-2 | ±6 kV/±8 kV | A | Contact/Air Discharge |
| Radiated Immunity | EN61000-4-3 | 20 Vrms | A | |
| EFT/Burst | EN61000-4-4 | ±2 kV | A | See application note |
| Surges | EN61000-4-5 | ±2 kV | A | See application note |
| Conducted Immunity | EN61000-4-6 | 10 V rms | A | |
| Magnetic Fields | EN61000-4-8 | 100 A/m | A | |

Safety Approvals

| Agency | Standard | Notes & Conditions |
|--------|----------------------------------|--------------------|
| UL | UL/cUL 60950-1, 62368-1 | ITE |
| CE | Meets all applicable directives | |
| UKCA | Meets all applicable legislation | |

Mechanical Details



| Pin Connections | | |
|-----------------|---------------|---------------|
| Pin | Single | Dual |
| 1 | -Vin | -Vin |
| 2 | +Vin | +Vin |
| 3 | Remote On/Off | Remote On/Off |
| 6 | +Vout | +Vout |
| 7 | -Vout | Common |
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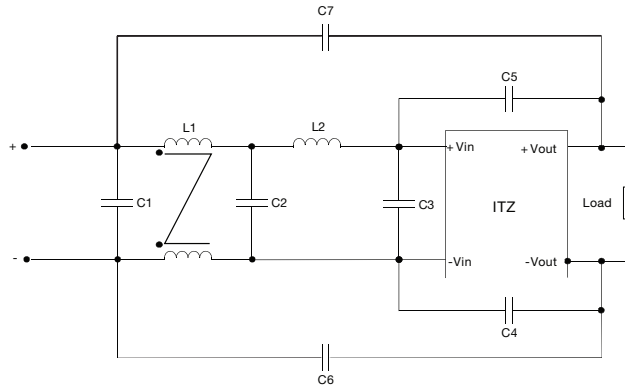
Notes

- All dimensions are in inches (mm)
- Weight: 0.013 lbs (5.9 g) approx.
- Pin diameter: 0.02±0.002 (0.5±0.05)
- Pin pitch tolerance: ±0.014 (±0.35)
- Case tolerance: ±0.02 (±0.5)

Application Notes

EMI Filter

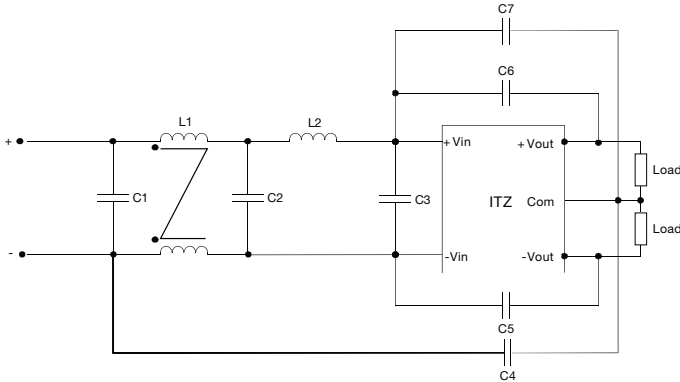
Single Output Models



| Models | C1,C2,C3 | C4, C5, C6, C7 | L1 | L2 |
|--------|-------------------------|-------------------|-------------|------------|
| 24 Vin | 1210, 10 μ F/35 V | 1808, 220pF/3 kV | 20 μ H | 20 μ H |
| 48 Vin | 1210, 4.7 μ F/100 V | 1808, 1000pF/3 kV | 133 μ H | 10 μ H |

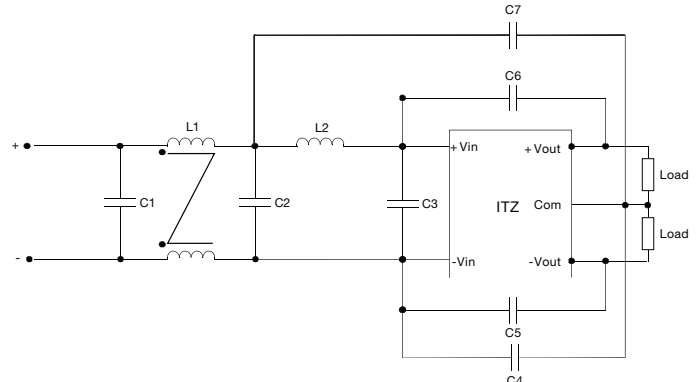
Dual Output Models

24 V Version



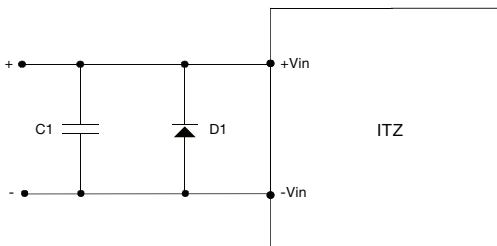
| Models | C1,C2,C3 | C4, C5, C6 | C7 | L1 | L2 |
|--------|-----------------------|------------------|-------------------|------------|------------|
| 24 Vin | 1210, 10 μ F/35 V | 1808, 220pF/3 kV | 1808, 1000pF/3 kV | 20 μ H | 20 μ H |

48 V Version



| Models | C1,C2,C3 | C5, C6 | C4, C7 | L1 | L2 |
|--------|-------------------------|-------------------|------------------|-------------|------------|
| 48 Vin | 1210, 4.7 μ F/100 V | 1808, 1000pF/3 kV | 1808, 220pF/3 kV | 133 μ H | 10 μ H |

EFT/Surge Filter



| Models | C1 | D1 |
|--------|--------------------|------------------|
| 24 Vin | 330 μ F, 100 V | TVS, 3 kW, 70 V |
| 48 Vin | 330 μ F, 100 V | TVS, 3 kW, 120 V |

C1 suggested series Nippon Chemicon KY







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