

RDD05U SERIES

DC - DC CONVERTER
4 ~ 6W SINGLE & DUAL OUTPUT



FEATURES

- 2:1 & 4:1 WIDE INPUT RANGE
- I/O ISOLATION
- INPUT Pi FILTER
- SHORT CIRCUIT PROTECTION
- HIGH PERFORMANCE
- 3 YEARS WARRANTY



MODEL LIST

| MODEL NO. | INPUT VOLTAGE | INPUT CURRENT (typ.) (max.) | | OUTPUT WATTAGE | OUTPUT VOLTAGE | OUTPUT CURRENT | EFF. (min.) | EFF. (typ.) | CAPACITOR LOAD (max.) |
|-----------|---------------|-------------------------------|--|----------------|----------------|----------------|-------------|-------------|-----------------------|
|-----------|---------------|-------------------------------|--|----------------|----------------|----------------|-------------|-------------|-----------------------|

Single Output Models

| | | | | | | | | | |
|---------------|-----------|-------|-------|---------|----------|---------|-----|-----|--------------|
| RDD05 - 03S1U | 9~18 VDC | 0.52A | 0.73A | 5 WATTS | +3.3 VDC | 1500 mA | 77% | 79% | 2200 μ F |
| RDD05 - 05S1U | 9~18 VDC | 0.51A | 0.72A | 5 WATTS | + 5 VDC | 1000 mA | 79% | 81% | 1500 μ F |
| RDD05 - 12S1U | 9~18 VDC | 0.60A | 0.83A | 6 WATTS | + 12 VDC | 500 mA | 82% | 84% | 270 μ F |
| RDD05 - 15S1U | 9~18 VDC | 0.60A | 0.83A | 6 WATTS | + 15 VDC | 400 mA | 83% | 85% | 180 μ F |
| RDD05 - 03S2U | 18~36 VDC | 0.26A | 0.36A | 5 WATTS | +3.3 VDC | 1500 mA | 77% | 79% | 2200 μ F |
| RDD05 - 05S2U | 18~36 VDC | 0.25A | 0.36A | 5 WATTS | + 5 VDC | 1000 mA | 79% | 81% | 1500 μ F |
| RDD05 - 12S2U | 18~36 VDC | 0.30A | 0.42A | 6 WATTS | + 12 VDC | 500 mA | 81% | 83% | 270 μ F |
| RDD05 - 15S2U | 18~36 VDC | 0.30A | 0.42A | 6 WATTS | + 15 VDC | 400 mA | 81% | 83% | 180 μ F |
| RDD05 - 03S3U | 35~75 VDC | 0.13A | 0.19A | 5 WATTS | +3.3 VDC | 1500 mA | 77% | 79% | 2200 μ F |
| RDD05 - 05S3U | 35~75 VDC | 0.13A | 0.18A | 5 WATTS | + 5 VDC | 1000 mA | 79% | 81% | 1500 μ F |
| RDD05 - 12S3U | 35~75 VDC | 0.15A | 0.22A | 6 WATTS | + 12 VDC | 500 mA | 80% | 82% | 270 μ F |
| RDD05 - 15S3U | 35~75 VDC | 0.15A | 0.22A | 6 WATTS | + 15 VDC | 400 mA | 81% | 83% | 180 μ F |
| RDD05 - 03S4U | 9~36 VDC | 0.22A | 0.62A | 4 WATTS | +3.3 VDC | 1200 mA | 75% | 77% | 2200 μ F |
| RDD05 - 05S4U | 9~36 VDC | 0.27A | 0.76A | 5 WATTS | + 5 VDC | 1000 mA | 77% | 79% | 1500 μ F |
| RDD05 - 12S4U | 9~36 VDC | 0.31A | 0.87A | 6 WATTS | + 12 VDC | 500 mA | 80% | 82% | 270 μ F |
| RDD05 - 15S4U | 9~36 VDC | 0.31A | 0.87A | 6 WATTS | + 15 VDC | 400 mA | 80% | 82% | 180 μ F |
| RDD05 - 03S5U | 18~75 VDC | 0.11A | 0.31A | 4 WATTS | +3.3 VDC | 1200 mA | 75% | 77% | 2200 μ F |
| RDD05 - 05S5U | 18~75 VDC | 0.13A | 0.38A | 5 WATTS | + 5 VDC | 1000 mA | 77% | 79% | 1500 μ F |
| RDD05 - 12S5U | 18~75 VDC | 0.15A | 0.43A | 6 WATTS | + 12 VDC | 500 mA | 80% | 82% | 270 μ F |
| RDD05 - 15S5U | 18~75 VDC | 0.15A | 0.43A | 6 WATTS | + 15 VDC | 400 mA | 80% | 82% | 180 μ F |

Dual Output Models

| | | | | | | | | | |
|---------------|-----------|-------|-------|---------|--------------|--------------|-----|-----|-------------------|
| RDD05 - 05D1U | 9~18 VDC | 0.51A | 0.72A | 5 WATTS | \pm 5 VDC | \pm 500 mA | 80% | 82% | \pm 680 μ F |
| RDD05 - 12D1U | 9~18 VDC | 0.60A | 0.83A | 6 WATTS | \pm 12 VDC | \pm 250 mA | 82% | 84% | \pm 150 μ F |
| RDD05 - 15D1U | 9~18 VDC | 0.59A | 0.83A | 6 WATTS | \pm 15 VDC | \pm 200 mA | 83% | 85% | \pm 68 μ F |
| RDD05 - 05D2U | 18~36 VDC | 0.26A | 0.36A | 5 WATTS | \pm 5 VDC | \pm 500 mA | 79% | 81% | \pm 680 μ F |

MODEL LIST

| MODEL NO. | INPUT VOLTAGE | INPUT CURRENT | | OUTPUT WATTAGE | OUTPUT VOLTAGE | OUTPUT CURRENT | EFF. (min.) | EFF. (typ.) | CAPACITOR LOAD (max.) |
|-----------|---------------|---------------|--------|----------------|----------------|----------------|-------------|-------------|-----------------------|
| | | (typ.) | (max.) | | | | | | |

Dual Output Models

| | | | | | | | | | |
|---------------|-----------|-------|-------|---------|----------|----------|-----|-----|----------|
| RDD05 - 12D2U | 18~36 VDC | 0.30A | 0.42A | 6 WATTS | ± 12 VDC | ± 250 mA | 81% | 83% | ± 150 μF |
| RDD05 - 15D2U | 18~36 VDC | 0.31A | 0.42A | 6 WATTS | ± 15 VDC | ± 200 mA | 80% | 82% | ± 68 μF |
| RDD05 - 05D3U | 35~75 VDC | 0.13A | 0.19A | 5 WATTS | ± 5 VDC | ± 500 mA | 79% | 81% | ± 680 μF |
| RDD05 - 12D3U | 35~75 VDC | 0.15A | 0.22A | 6 WATTS | ± 12 VDC | ± 250 mA | 81% | 83% | ± 150 μF |
| RDD05 - 15D3U | 35~75 VDC | 0.15A | 0.22A | 6 WATTS | ± 15 VDC | ± 200 mA | 80% | 82% | ± 68 μF |
| RDD05 - 05D4U | 9~36 VDC | 0.27A | 0.76A | 5 WATTS | ± 5 VDC | ± 500 mA | 77% | 79% | ± 680 μF |
| RDD05 - 12D4U | 9~36 VDC | 0.31A | 0.87A | 6 WATTS | ± 12 VDC | ± 250 mA | 80% | 82% | ± 150 μF |
| RDD05 - 15D4U | 9~36 VDC | 0.31A | 0.87A | 6 WATTS | ± 15 VDC | ± 200 mA | 80% | 82% | ± 68 μF |
| RDD05 - 05D5U | 18~75 VDC | 0.13A | 0.38A | 5 WATTS | ± 5 VDC | ± 500 mA | 77% | 79% | ± 680 μF |
| RDD05 - 12D5U | 18~75 VDC | 0.15A | 0.43A | 6 WATTS | ± 12 VDC | ± 250 mA | 80% | 82% | ± 150 μF |
| RDD05 - 15D5U | 18~75 VDC | 0.15A | 0.43A | 6 WATTS | ± 15 VDC | ± 200 mA | 80% | 82% | ± 68 μF |

SPECIFICATION

All Specifications Typical At Nominal Line, Full Load, 25°C Unless Otherwise Noticed

GENERAL

| Characteristics | Conditions | min. | typ. | max. | unit |
|-------------------------|-----------------------------|-----------------------|-----------|--------|--------|
| Switching frequency | Vi nom, Io nom | | 280 | | KHz |
| Isolation voltage | Input / Output | 1,500 | | | VDC |
| Isolation resistance | Input / Output, @ 500VDC | 100 | | | MΩ |
| Isolation capacitance | 100KHz / 1V | | 1,000 | | PF |
| Ambient temperature | Operating at Vi nom, Io nom | -40 | | + 71 | °C |
| Case temperature | Operating at Vi nom, Io nom | | | + 100 | °C |
| Derating | Vi nom | See derating curve | | | |
| Storage temperature | Non operational | -40 | | + 100 | °C |
| Relative humidity | Vi nom, Io nom | 20 | | 95 | % RH |
| Temperature coefficient | Vi nom, Io min | | | ± 0.02 | % / °C |
| Dimension | | L31.8 x W20.3 x H10.2 | | | mm |
| MTBF | Bellcore issue 6@40°C, GB | | 1,120,000 | | Hours |
| Cooling | Free air convection | | | | |

INPUT SPECIFICATIONS

| Characteristics | Conditions | min. | typ. | max. | unit | |
|--------------------------|---------------------------|------|------|------|------|-----|
| Input voltage range | Ta min ... Ta max, Io nom | 2:1 | 9 | 12 | 18 | VDC |
| | | | 18 | 24 | 36 | VDC |
| | | | 35 | 48 | 75 | VDC |
| | | 4:1 | 9 | 24 | 36 | VDC |
| | | | 18 | 48 | 75 | VDC |
| | | | | | | |
| No load input current | Vi nom, Io = 0 | 12V | | 30 | mA | |
| | | 24V | | 30 | mA | |
| | | 48V | | 20 | mA | |
| Input voltage w/o damage | Io nom | 12V | | 20 | VDC | |
| | | 24V | | 40 | VDC | |
| | | 48V | | 80 | VDC | |
| Startup voltage | Io nom | 12V | 8.7 | | VDC | |
| | | 24V | 17.4 | | VDC | |
| | | 48V | 31.5 | | VDC | |
| Input filter | Pi type | | | | | |

SPECIFICATION

All Specifications Typical At Nominal Line, Full Load, 25°C Unless Otherwise Noticed

OUTPUT SPECIFICATIONS

| Characteristics | Conditions | min. | typ. | max. | unit |
|-------------------------------|--|--|------|-------|------|
| Output voltage accuracy | Vi nom, Io nom | | | ± 2 | % |
| Minimum load | Vi nom, single output models | 0 | | | % |
| | Vi nom, dual output models (each output) | 10 | | | % |
| Line regulation | Io nom, Vi min ...Vi max | | | ± 0.5 | % |
| Load regulation | Vi nom, Io 0 ...Io nom, single output models | | | ± 0.5 | % |
| | Vi nom, Io min ...Io nom, dual output models | | | ± 1 | % |
| Cross regulation (Dual model) | Aymmetrical load 10% - 100% FL | | | ± 5 | % |
| Startup time | Vi nom, Io nom | | | 700 | ms |
| Transient recovery time | Vi nom, I~0.5 Io nom | | | 1 | ms |
| Ripple & noise | Vi nom, Io nom, BW = 20MHz | | | 50 | mV |
| Efficiency | Vi nom, Io nom, Po / Pi | Up to 85%, See model list and efficiency curve | | | |

CONTROL AND PROTECTION

| | |
|----------------------------|--|
| Input reversed | Shunt diode built in, external fuse recommended 1A |
| Output short circuit | Current limited (Auto-recovery) |
| Rated over load protection | 110%min....165%max |

APPROVALS AND STANDARD

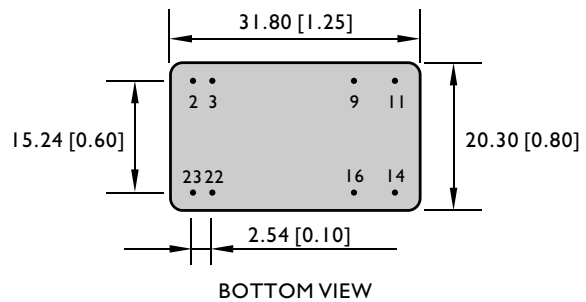
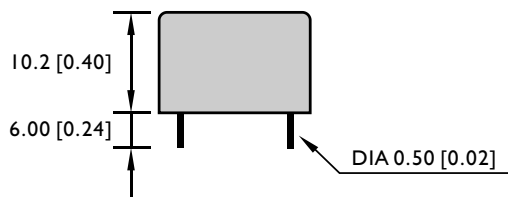
| | |
|-----------|--|
| UL/cUL | UL 60950-1 Recognized |
| cTUVus | UL 62368-1 |
| TUV | EN 62368-1 |
| CE | EN 61204-3, EN 55032, Class A, EN 61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-6 |
| Vibration | meet IEC 60068-2-6 (10-500 Hz, 2G, along X, Y, Z each Axis, 60 min for each Axis) |

PHYSICAL CHARACTERISTICS

| | |
|------------------|---|
| Case size | 31.8 x 20.3 x 10.2 mm (1.25 x 0.8 x 0.4 inches) |
| Case material | Plastic base / Metal case |
| Weight | 18 g |
| Potting material | Silicone |

MECHANISM & PIN CONFIGURATION

mm [inch]



| GENERAL TOLERANCE | |
|----------------------------|-------------|
| 0.00[0.00] - 30.00[1.18] | ±0.30[0.01] |
| 30.00[1.18] - 120.00[4.72] | ±0.50[0.02] |

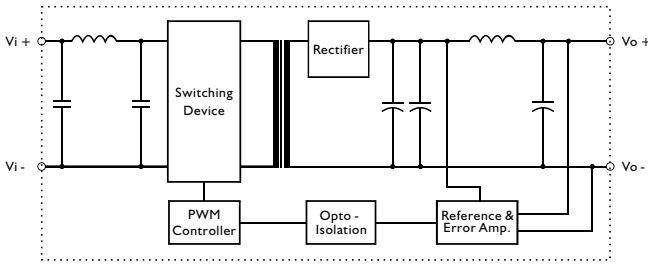
PIN ASSIGNMENT

GENERAL

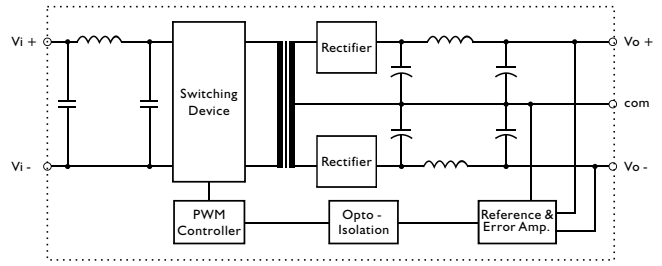
| PIN NO. | 2 & 3 | 9 | 11 | 14 | 16 | 22 & 23 |
|---------|-------|-------|-------|-----|------|---------|
| SINGLE | Vi - | N. C. | N. C. | Vo+ | Vo - | Vi+ |
| DUAL | Vi - | com | Vo - | Vo+ | com | Vi+ |

CIRCUIT SCHEMATIC

• Block diagram for RDD05U series with single output

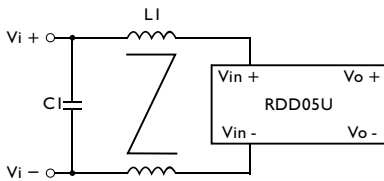


• Block diagram for RDD05U series with dual output

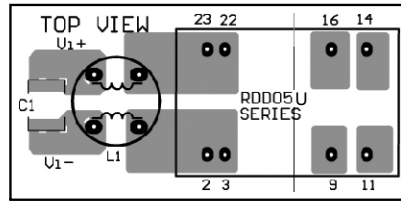


RECOMMENDED CIRCUIT

• Recommended filter for EN 55032 Class B compliance



• Recommended EN 55032 Class B filter circuit layout.



• The components used in the above figure, together with the manufacturer part numbers for these components, are as follows.

| | CI | LI |
|-------------|-------------------------|--------------------|
| RDD05-XXX1U | 2.2 μ F / 50V MLCC | 1.5mH common choke |
| RDD05-XXX2U | 2.2 μ F / 50V MLCC | 1.5mH common choke |
| RDD05-XXX3U | 2.2 μ F / 100V MLCC | 1.5mH common choke |
| RDD05-XXX4U | 2.2 μ F / 50V MLCC | 1.5mH common choke |
| RDD05-XXX5U | 2.2 μ F / 100V MLCC | 1.5mH common choke |

DERATING AND EFFICIENCY CURVE

