

RDC Series



- 72 & 110 VDC Input for Railway Applications
- Single and Dual Outputs
- 1500 VAC Basic Isolation
- High Efficiency – Up to 88%
- Remote On/Off
- Complies with EN50155
- EN50121-3-2 EMC for Railway Applications
- 3 Year Warranty

Specification

Input

| | |
|------------------------|---|
| Input Voltage Range | • 72 V (36-140 VDC), 110 V (55-176 VDC) |
| Input Current | • See table |
| Input Reflected Ripple | • 20 mA pk-pk through 12 μ H inductor |
| Input Filter | • Pi network |
| Undervoltage Lockout | • 72 V models: ON 33.5 V, OFF 30.5 V typ. 110 V models: ON 52.5 V, OFF 48.5 V typ. |
| Input Surge | • 72 V models 150 VDC for 100 ms 110 V models 185 VDC for 100 ms |

Output

| | |
|----------------------------|---|
| Output Voltage | • See table |
| Output Voltage Trim | • \pm 10% on single outputs models only |
| Minimum Load | • No minimum load required |
| Line Regulation | • \pm 0.2% max |
| Load Regulation | • Single output models: \pm 0.5% max, Dual output models: \pm 1% max balanced outputs |
| Cross Regulation | • \pm 5% (see note 2) |
| Setpoint Accuracy | • \pm 1% |
| Start Up Time | • 30 ms typical |
| Ripple & Noise | • 100 mV or 1% pk-pk for single output models, 150 mV or 1% pk-pk for dual output model, whichever is greater, 20 MHz bandwidth (see note 3) |
| Transient Response | • 4% max deviation, recovery to within 1% in <500 μ s for a 25% load change |
| Temp. Coefficient | • 0.02%/°C |
| Overvoltage Protection | • 3.3 V models: 3.9 V typical, 5 V models: 6.2 V typical, 12 V models: 15 V typical 15 V models: 18 V typical, \pm 5 V models: \pm 6.2 V typical, \pm 12 V models: \pm 15 V typical \pm 15 V models: \pm 18 V typical |
| Overload Protection | • >150% of full load |
| Short Circuit Protection | • Trip & restart (hiccup mode), auto recovery |
| Overtemperature Protection | • 115 °C typical |
| Remote On/Off | • On = Logic High (>3.0) or Open Off = Logic Low (<1.2 V) or short pin 2 to 3 |
| Maximum Capacitive Load | • See table |

General

| | |
|-----------------------|---|
| Efficiency | • See table |
| Isolation Voltage | • 1500 VAC Input to Output 1600 VDC Input to Case 1600 VDC Output to Case |
| Isolation Capacitance | • 2000 pF |
| Switching Frequency | • 270 kHz typical |
| Power Density | • 25 W/in ³ |
| MTBF | • 400 kHrs min to MIL-HDBK-217F at 25 °C, GB |

Environmental

| | |
|-----------------------|---|
| Operating Temperature | • -40 °C to +85 °C (see derating curve) |
| Case Temperature | • +105 °C max |
| Cooling | • Convection-cooled |
| Operating Humidity | • 5-95% RH, non-condensing |
| Storage Temperature | • -40 °C to +125 °C |

EMC

| | |
|--------------------|--|
| General | • Complies with EN50121-3-2, Railway Applications - Electromagnetic Compatibility for Rolling Stock Apparatus Complies with EN50155 |
| Emissions | • EN55011, 79 dB μ V (0.15-0.5 MHz) 73 dB μ V (0.5-30 MHz) |
| ESD Immunity | • EN61000-4-2, level 3, Perf Criteria A |
| Radiated Immunity | • EN61000-4-3 20 V/m Perf Criteria A* |
| EFT/Burst | • EN61000-4-4 level 3, Perf Criteria A* |
| Surge | • EN61000-4-5 level 2, Perf Criteria A |
| Conducted Immunity | • EN61000-4-6 10 V/rms, Perf Criteria A |
| Magnetic Field | • EN61000-4-8 10 A/m, Perf Criteria A |
| Safety Approvals | • EN62368-1, CE (Meets all applicable directives), UKCA (Meets all applicable legislation) |

*External input capacitor required 220 μ F/250 V

Models and Ratings

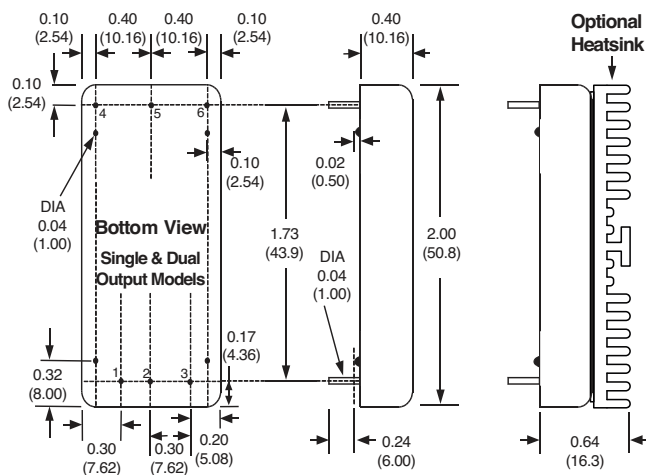
| Input Voltage | Output Voltage | Output Current | Input Current ⁽¹⁾ | | Maximum Capacitive Load | Efficiency | Model Number ⁽⁴⁾ |
|---------------|----------------|----------------|------------------------------|-----------|-------------------------|------------|-----------------------------|
| | | | No Load | Full Load | | | |
| 36-140 VDC | 3.3 V | 6.00 A | 20 mA | 312 mA | 10000 μ F | 88.0% | RDC2072S3V3 |
| | 5.0 V | 4.00 A | 25 mA | 313 mA | 6800 μ F | 88.5% | RDC2072S05 |
| | 12.0 V | 1.65 A | 15 mA | 318 mA | 1000 μ F | 86.5% | RDC2072S12 |
| | 15.0 V | 1.33 A | 20 mA | 318 mA | 700 μ F | 87.0% | RDC2072S15 |
| | \pm 5.0 V | \pm 2.00 A | 35 mA | 319 mA | \pm 1000 μ F | 87.0% | RDC2072D05 |
| | \pm 12.0 V | \pm 0.83 A | 20 mA | 323 mA | \pm 470 μ F | 85.5% | RDC2072D12 |
| 55-176 VDC | 3.3 V | 6.00 A | 15 mA | 208 mA | 10000 μ F | 86.5% | RDC20110S3V3 |
| | 5.0 V | 4.00 A | 20 mA | 209 mA | 6800 μ F | 87.0% | RDC20110S05 |
| | 12.0 V | 1.65 A | 15 mA | 212 mA | 1000 μ F | 85.0% | RDC20110S12 |
| | 15.0 V | 1.33 A | 15 mA | 211 mA | 700 μ F | 86.0% | RDC20110S15 |
| | \pm 5.0 V | \pm 2.00 A | 30 mA | 211 mA | \pm 1000 μ F | 86.0% | RDC20110D05 |
| | \pm 12.0 V | \pm 0.83 A | 15 mA | 215 mA | \pm 470 μ F | 84.0% | RDC20110D12 |
| | \pm 15.0 V | \pm 0.67 A | 15 mA | 215 mA | \pm 330 μ F | 85.0% | RDC20110D15 |

Notes

1. Input current specified at nominal 72 V or 110 V input.
2. Cross regulation for duals is \pm 5% when one output is at 100% and the other is varied between 25% and 100%.

3. Measured with 1 μ F ceramic capacitor in parallel with 10 μ F electrolytic capacitor across output rails.
4. Add suffix '-HK' for optional heatsink.

Mechanical Details



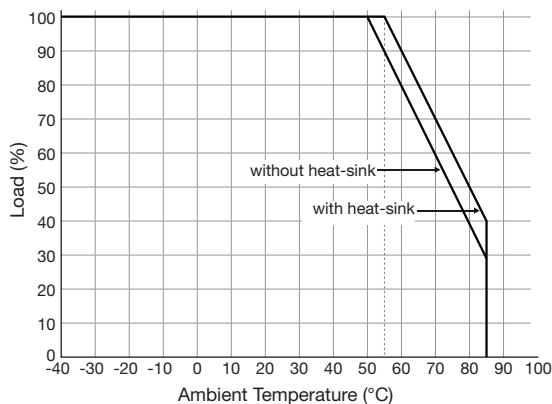
| PIN CONNECTIONS | | |
|-----------------|---------------|---------------|
| Pin | Single | Dual |
| 1 | +Vin | +Vin |
| 2 | -Vin | -Vin |
| 3 | Remote On/Off | Remote On/Off |
| 4 | +Vout | +Vout |
| 5 | -Vout | Com |
| 6 | Trim | -Vout |

Notes

1. All dimensions are in inches (mm).
2. Weight: 0.07 lbs (30 g) approx
3. Pin diameter: 0.04 \pm 0.002 (1.0 \pm 0.05)
4. Pin pitch tolerance: \pm 0.014 (\pm 0.35)
5. Case tolerance: \pm 0.02 (\pm 0.5)

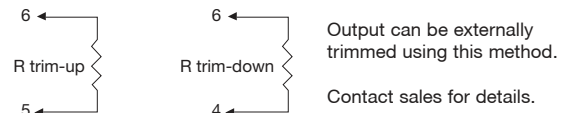
Application Notes

Derating Curve



External Output Trim

On single output versions only.



| Typical Resistor | | | | |
|------------------|-----------------|-----------------|-----------------|-----------------|
| | S3V3 | S05 | S12 | S15 |
| Trim Down 10% | 15.3 k Ω | 5.31 k Ω | 5.3 k Ω | 5.8 k Ω |
| Trim Up 10% | 10.3 k Ω | 10.6 k Ω | 22.1 k Ω | 20.0 k Ω |