

## 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 $\mu$ 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 $< 500 \mu$ 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 <sup>3</sup>
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 $\mu$ V (0.15-0.5 MHz) 73 dB $\mu$ 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  $\mu$ F/250 V

**Models and Ratings**

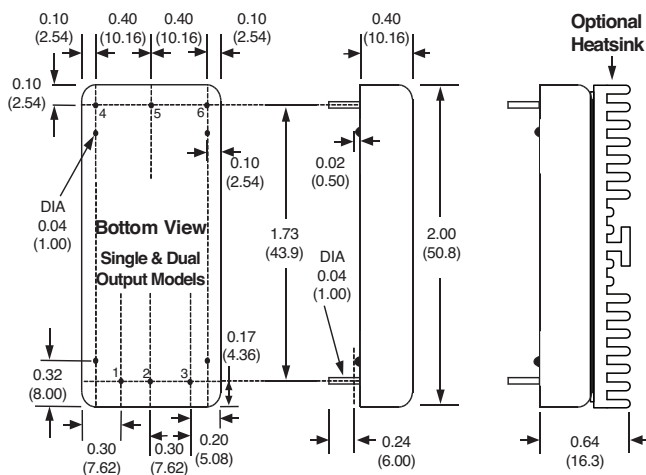
Input Voltage	Output Voltage	Output Current	Input Current <sup>(1)</sup>		Maximum Capacitive Load	Efficiency	Model Number <sup>(4)</sup>
			No Load	Full Load			
36-140 VDC	3.3 V	6.00 A	20 mA	312 mA	10000 µF	88.0%	RDC2072S3V3
	5.0 V	4.00 A	25 mA	313 mA	6800 µF	88.5%	RDC2072S05
	12.0 V	1.65 A	15 mA	318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

**Notes**

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

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

**Mechanical Details**



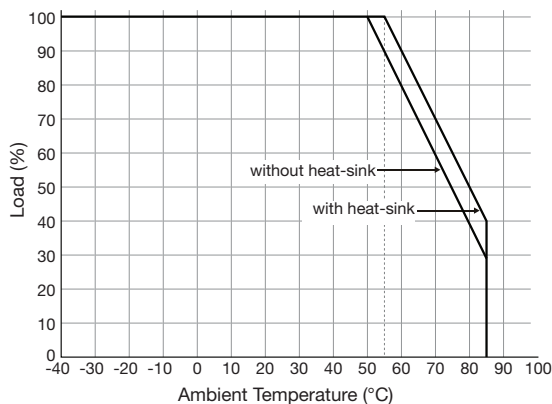
PIN CONNECTIONS		
Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	Remote On/Off	Remote On/Off
4	+Vout	+Vout
5	-Vout	Com
6	Trim	-Vout

**Notes**

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

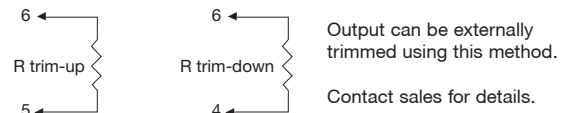
**Application Notes**

**Derating Curve**



**External Output Trim**

On single output versions only.



Typical Resistor				
	S3V3	S05	S12	S15
Trim Down 10%	15.3 kΩ	5.31 kΩ	5.3 kΩ	5.8 kΩ
Trim Up 10%	10.3 kΩ	10.6 kΩ	22.1 kΩ	20.0 kΩ