

40 Watts

- 72 & 110 VDC Input for Railway Applications
- Single and Dual Outputs
- 1500 VAC Basic Isolation
- High Efficiency - Up to 90%
- Remote On/Off
- Complies with EN50155
- EN50121-3-2 EMC for Railway Applications
- 3 Year Warranty



Dimensions:

RDC40:

2.00 x 1.60 x 0.4" (50.8 x 40.6 x 10.16 mm)

The RDC40 series of 40W DC-DC converters are designed for railway applications and comply with EN50121-3-2, the EMC standard for rolling stock apparatus. There are two input voltage ranges. The 72 VDC nominal models accept an input from 36 to 140 VDC and the 110 V nominal versions have a 55 to 176 VDC input. A trim pin allows a +/-10% adjustment for single output models. Using convection cooling the converters have a wide operating temperature range of -40°C to +85°C and a maximum case temperature of 105°C.

Models & Ratings

Input Voltage	Output Voltage	Output Current	Input Current ⁽¹⁾		Maximum Capacitive Load	Efficiency	Model Number ⁽²⁾
			No Load	Full Load			
36-140 VDC	3.3 V	10.00 A	30 mA	526.82 mA	25000 µF	87.0%	RDC4072S3V3
	5.0 V	8.00 A	30 mA	617.28 mA	2000 µF	90.0%	RDC4072S05
	12.0 V	3.35 A	25 mA	641.76 mA	2500 µF	87.0%	RDC4072S12
	15.0 V	2.65 A	25 mA	627.37 mA	2500 µF	88.0%	RDC4072S15
	±12.0 V	±1.65 A	30 mA	632.18 mA	±1600 µF	87.0%	RDC4072D12
	±15.0 V	±1.35 A	30 mA	639.20 mA	±1600 µF	88.0%	RDC4072D15
55-176 VDC	3.3 V	10.00 A	20 mA	344.83 mA	25000 µF	87.0%	RDC40110S3V3
	5.0 V	8.00 A	25 mA	408.58 mA	2000 µF	89.0%	RDC40110S05
	12.0 V	3.35 A	25 mA	420.06 mA	2500 µF	87.0%	RDC40110S12
	15.0 V	2.65 A	25 mA	410.64 mA	2500 µF	88.0%	RDC40110S15
	±12.0 V	±1.65 A	20 mA	413.79 mA	±1600 µF	87.0%	RDC40110D12
	±15.0 V	±1.35 A	20 mA	420.78 mA	±1600 µF	87.5%	RDC40110D15

Notes

1. Input current specified at nominal 72 V or 110 V input.

2. Add suffix '-HK' for optional heatsink.

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage - Operating	36 55		140 176	VDC	72 V nominal 110 V nominal
Input Current					See models and ratings table
Input Reflected Ripple		20		mA	Through 12 µH inductor and 33 µF capacitor
Input Filter					Pi network
Undervoltage Lockout	OFF: 30.5 OFF: 48.5		ON: 33.5 V ON: 52.5 V	V	72 V models 110 V models
Input Surge			150 185	VDC	72 V models (for 100 ms) 110 V models (for 100 ms)

Output

Characteristic	Min.	Typ.	Max.	Units	Notes & Conditions
Output Voltage				VDC	See Models and Ratings table
Output Voltage Trim		±10		%	On single outputs models only
Minimum Load	0			A	
Line Regulation			±0.2	%	
Load Regulation			±0.5 ±1.0	%	Single output models Dual output models (balanced outputs)
Cross Regulation		±5		%	Dual output models, when one load is varied between 25% and 100% and the other is fixed at 100%
Setpoint Accuracy		±1		%	
Start Up Time		30		ms	
Ripple and Noise			100 150	mV pk-pk mV pk-pk	Single output models Dual output model Measured with 20 MHz bandwidth in parallel with 1 µF ceramic capacitor across output rails
Transient Response			4	%	Deviation, recovery to within 1% in <500 µs for a 25% load change
Oversvoltage Protection		3.9 6.2 15.0 18 ±15 ±18		V	3.3 V Models 5.0 V Models 12 V Models 15 V Models ±12 V Models ±15 V Models
Overload Protection		130		%	Of Full Load
Short Circuit Protection					Trip and restart (hiccup mode, auto recovery)
Overtemperature Protection		115		°C	Case temperature
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 Models and Ratings table

General

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency		88		%	See Models and Ratings table
Isolation: Input to Output			1500	VAC	
Input to Case			1600	VDC	
Output to Case			1600	VDC	
Switching Frequency		270		kHz	
Power Density		31		W/in ³	
Mean Time Between Failure	320			kHrs	MIL-HDBK-217F at 25 °C GB
Weight		0.105 (48)		lb (g)	
Pin material	Solder-coated copper				
Solder profile	Wave solder 260°C 1.5mm from case 10s maximum. With iron, 450°C 5s maximum				
Potting material	Epoxy UL94V-0 rated, designed to meet EN45545-2				
Case material	Nickel-coated copper				
Base material	Non conductive black plastic UL94V-0 rated				

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature	-40		+85	°C	See derating curve in Applications Note
Case Temperature			+105	°C	See derating curve in Applications Note
Cooling					Convection-cooled
Operating Humidity			95	%RH	Non-condensing
Storage Temperature	-55		+125	°C	

EMC: Emissions

Phenomenon	Standard	Test Level	Notes & Conditions
General	Complies with EN50155 & EN50121-3-2, Railway Applications - Electromagnetic Compatibility for Rolling Stock Apparatus		
Emissions	EN55011	79 dB μ V / 73 dB μ V	0.15-0.5 MHz / 0.5-30 MHz

EMC: Immunity

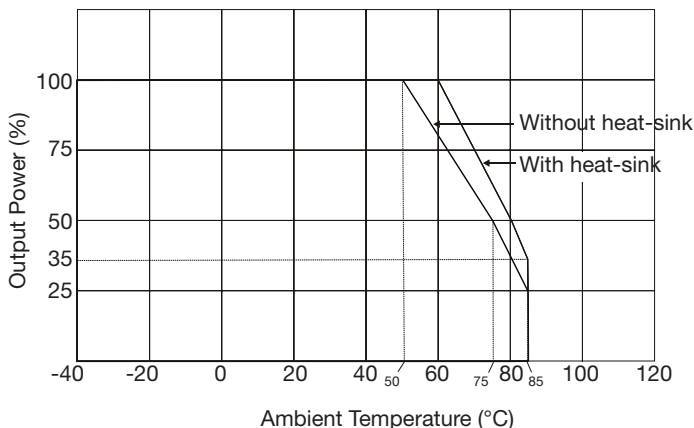
Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
ESD	EN61000-4-2	3	A	
Radiated	EN61000-4-3	20 V/m	A	
EFT	EN61000-4-4	3	A	
Surges	EN61000-4-5	2	A	External Input Capacitor required 220 μ F / 250 V
Conducted	EN61000-4-6	10 Vrms	A	
Magnetic Field	EN61000-4-8	10 A/m	A	

Safety Approvals

Safety Agency	Safety Standard	Notes & Conditions
CE	Meets all applicable directives	
UKCA	Meets all applicable legislation	

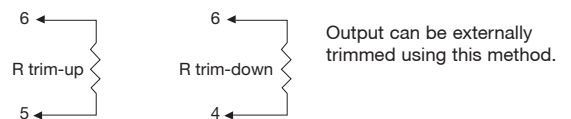
Application Notes

Derating Curve



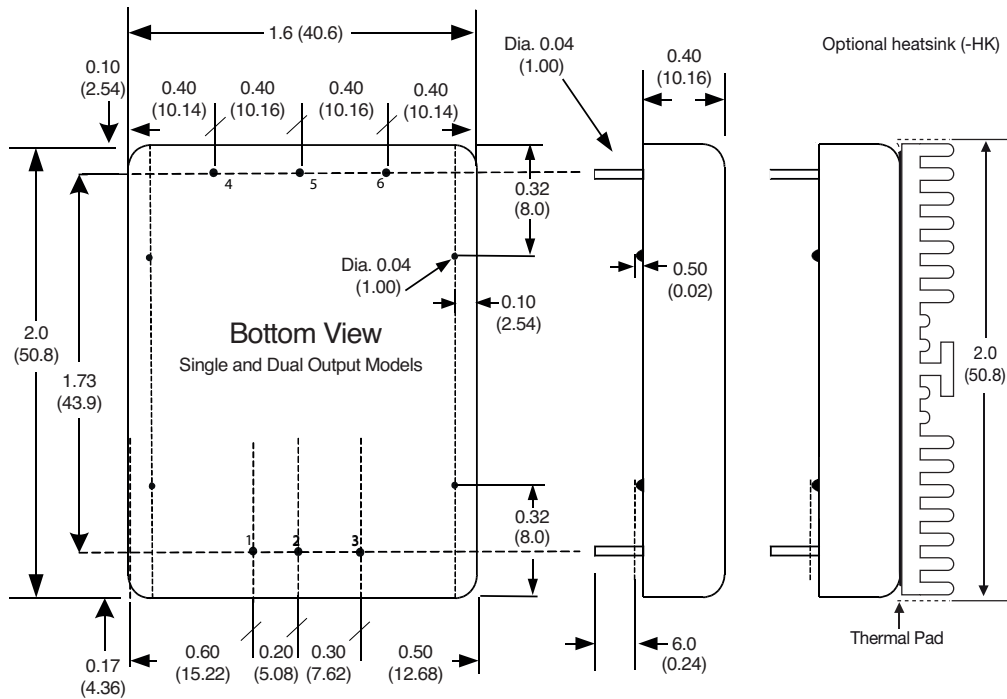
External Output Trim

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

Mechanical Details



Notes

1. Dimensions shown in inches (mm).
2. Weight: 0.105 lbs (48.0 g)
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)

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