

RED20W SERIES

Rail DC / DC Converter, Single & Dual Output: 20 Watts



Fig 2: Optional Case



Features

- 4:1 wide Input range 9~36V, 18~75V & 43~160V
- Rail EN50155 compliance
- Single and Dual output options
- Industry Standard footprint: 2 x 1in
- High efficiency up to 88%
- Regulated output & Short circuit protection
- 1600VDC isolation
- Six sided continuous shield
- Remote ON / OFF, Negative or Positive Logic
- High operating base plate temperature : -40°to +100°C
- Zero load operation
- External Output voltage trim Singles: ±10%

Specifications

Input Voltage	24VDC (9 ~ 36), 48VDC (18 ~ 75) 110VDC (43~160)
Input Filter	24V & 48V Common Choke 110V Pi filter
Start-up Voltage	24V input: 9V typ, 48V input: 18V typ. 110V input: 43V
Shutdown Voltage	24V input: 8V, 48V input: 16V 110V input: 40V
Input Surge Voltage.	24V: 50VDC. 48V: 100VDC (1 sec) 110V: 170VDC (1 sec)
Input Reverse Voltage Protection	External input fuse required
Start Up time	Typically 30ms at nominal input voltage
Remote ON/OFF note 6 Negative Logic- Standard	DC-DC ON Short or $0V < V_r < 1.2V$ DC-DC OFF Open or $3.0V < V_r < 12V$
(Positive Logic -P)	DC-DC ON Open or $3.0V < V_r < 12V$ DC-DC OFF Short or $0V < V_r < 1.2V$
	Input current of remote control pin: 0.5~1mA. Remote off state input current: 2.5mA
Output power	20 watts
Voltage Accuracy	±1.0%
Voltage Trim	±10% External voltage trim-Singles
Minim Load	Zero
Line Regulation	Single ±0.2%. Dual ±0.5%
Load Regulation	Single ±0.2%. Dual ±1.0%
Remote Sense	N/A
Ripple & noise	See table. 20MHZ bandwidth
Temp. Coefficient	±0.02% / °C
Transient Response	250uS (25% load step change)
Over Voltage Protection	Set at 110 ~130% of Voltage output Hiccup.
Overload Protection	Set at 120 ~ 150% of output load
Short Circuit protection	Continuous hiccup mode, auto recovery.

Efficiency	Model dependant 85 ~ 89%
Isolation	Input – Output: 1600VDC Input / Output – Case: 1000VDC
Isolation Cap.	3000pF
Switching Freq.	330KHz
Safety	EN60950-1, UL60950-1, EN50155
Case Material	Nickel-coated copper
Base Material	FR4 PCB
Potting	Epoxy UL94-V0
Dimensions	50.8 x 25.4 x 10.2mm
Weight	30g
MTBF	4.950 x 10Hrs (MIL-HDBK-217F)
Operating Temperature	-40°C to +100°C with derating (see note 7) Maximum case temperature 105°C
Case Temperature	Maximum 105°C
Thermal Impedance	12°C / watt without heatsink 10°C / watt with optional heatsink (note 8)
Thermal shock	MIL-STD-810F & EN61373
Vibration	MIL-STD-810F & EN61373
Humidity	5-95% RH
EMC	EN55011, EN55022 Class A (see note 9)
ESD	EN61000-4-2 ±8KV Air ±6KV Contact
Radiated Immunity	EN61000-4-3
Fast Transients	EN61000-4-4
Surge	EN61000-4-5 (note 10)
Conducted Immunity	EN61000-4-6

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Model Number	Input Range	Output Voltage	Output Current		Output ⁽³⁾ Ripple & Noise	No Load ⁽²⁾ Input Current	Eff ⁽³⁾ (%)	Capacitor ⁽⁴⁾ Load max
			Min. Load	Full Load				
RED20-24S3P3W	9 ~ 36 VDC	3.3 VDC	0mA	4500mA	75mVp-p	6mA	85	7000µF
RED20-24S05W	9 ~ 36 VDC	5 VDC	0mA	4000mA	75mVp-p	6mA	88	5000µF
RED20-24S12W	9 ~ 36 VDC	12 VDC	0mA	1670mA	100mVp-p	6mA	89	850µF
RED20-24S15W	9 ~ 36 VDC	15 VDC	0mA	1330mA	100mVp-p	6mA	88	700µF
RED20-24D12W	9 ~ 36 VDC	± 12 VDC	0mA	± 833mA	100mVp-p	6mA	88	± 500µF
RED20-24D15W	9 ~ 36 VDC	± 15 VDC	0mA	± 667mA	100mVp-p	6mA	89	± 350µF
RED20-48S3P3W	18 ~ 75 VDC	3.3 VDC	0mA	4500mA	75mVp-p	4mA	85	7000µF
RED20-48S05W	18 ~ 75 VDC	5 VDC	0mA	4000mA	75mVp-p	4mA	88	5000µF
RED20-48S12W	18 ~ 75 VDC	12 VDC	0mA	1670mA	100mVp-p	4mA	89	850µF
RED20-48S15W	18 ~ 75 VDC	15 VDC	0mA	1330mA	100mVp-p	4mA	89	700µF
RED20-48D12W	18 ~ 75 VDC	± 12 VDC	0mA	± 833mA	100mVp-p	4mA	88	± 500µF
RED20-48D15W	18 ~ 75 VDC	± 15 VDC	0mA	± 667mA	100mVp-p	4mA	89	± 350µF
RED20-110S3P3W	43 ~ 160 VDC	3.3 VDC	0mA	4500mA	75mVp-p	3mA	85	7000µF
RED20-110S05W	43 ~ 160 VDC	5 VDC	0mA	4000mA	75mVp-p	3mA	87	5000µF
RED20-110S12W	43 ~ 160 VDC	12 VDC	0mA	1670mA	100mVp-p	3mA	88	850µF
RED20-110S15W	43 ~ 160 VDC	15 VDC	0mA	1330mA	100mVp-p	3mA	88	700µF
RED20-110D12W	43 ~ 160 VDC	± 12 VDC	0mA	± 833mA	100mVp-p	3mA	88	± 500µF
RED20-110D15W	43 ~ 160 VDC	± 15 VDC	0mA	± 667mA	100mVp-p	3mA	89	± 350µF

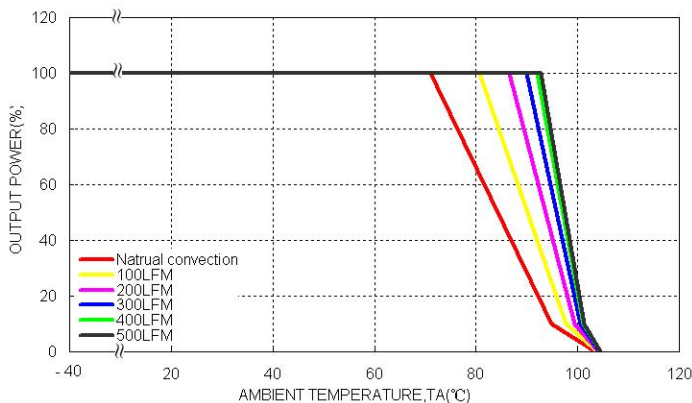
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Note

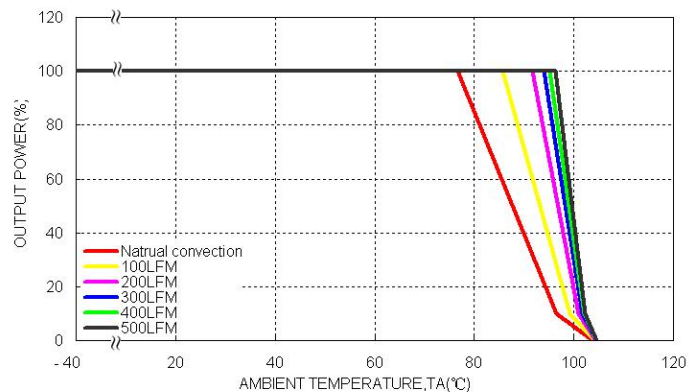
- BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40°C.
MIL-HDBK-217F Notice2 @Ta=25 °C, Full load(Ground, Benign, controlled environment)
- Typical value at nominal input and no load.
- Typical value at nominal input and full load.
- Test by minimum input and constant resistive load.
- Trimming allows the user to increase or decrease the output voltage set point of the module. This is accomplished by connecting an external resistor between the TRIM pin and either the +OUTPUT pin or the -OUTPUT pin.
- The CTRL pin voltage is reference to -INPUT.
The order number please see product standard table.
- Operating ambient temperature:
Converter can meet the railway T2 and TX temperature requirement.
T2: -40°C ~ +70°C as all models , TX: -40°C ~ +85° as power derating to 55% output power.(with Heat-sink as power derating to 70% output power)
Test condition with vertical direction by natural convection (20LFM).
- Heat-sink is optional and **P/N: 7G-0020C-F**
- EN55022 and EN55011: 24VDC & 48VDC input: To meet Class B without external filter.
110VDC input: To meet Class A without external filter.
- An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5.
The filter capacitor Power Mate suggest: 24VDC & 48VDC input: Nippon chemi-con KY series, 220 µF/100V, ESR 48mΩ.
110VDC input: Rubycon BXF series, 100 µF/250V.

CAUTION: This power module is not internally fused. An input line fuse must always be used.

RED20-48S05W Derating Curve



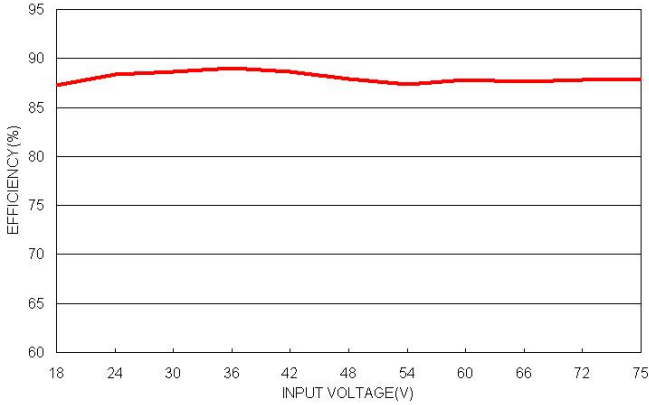
RED20-48S05W Derating Curve With Heat-sink (Note 8)



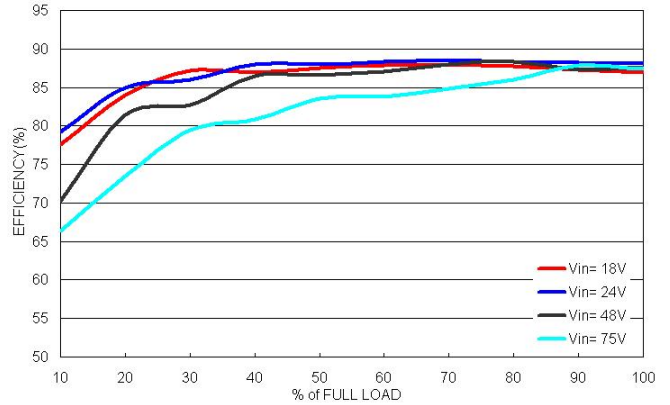
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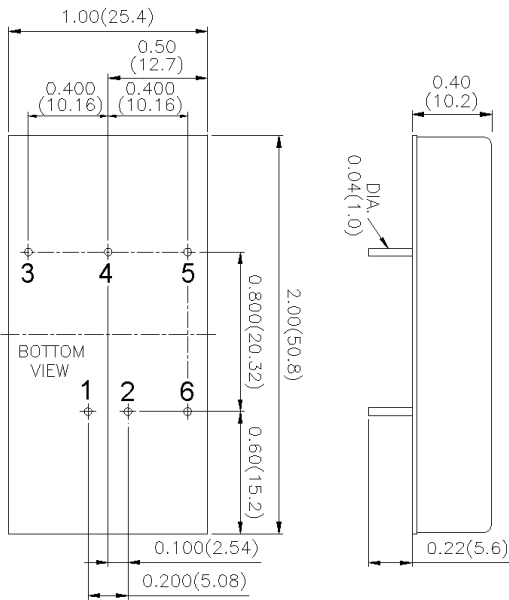
RED20-48S05W Efficiency VS Input Voltage



RED20-48S05W Efficiency VS Output Load



Mechanical Drawing:



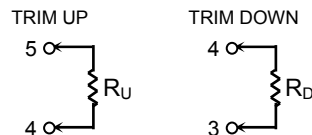
- All dimensions in Inch (mm)
Tolerance: X.XX±0.02 (X.X±0.5)
X.XXX±0.01 (X.XX±0.25)
- Pin pitch tolerance ±0.01(0.25)
- Pin dimension tolerance ±0.004 (0.1)

Pin Connection

PIN	SINGLE	DUAL
1	+ INPUT	+ INPUT
2	- INPUT	- INPUT
3	+ OUTPUT	+ OUTPUT
4	TRIM	COMMON
5	- OUTPUT	- OUTPUT
6	CTRL	CTRL

External Output Trimming

Output can be externally trimmed by using the method shown below.



Options Table

Option	Suffix
Negative logic remote ON/OFF (Standard)	
Positive logic remote ON/OFF	-A
Without ON/OFF logic pin	-B
Negative remote logic ON/OFF without TRIM pin	-C
Without ON/OFF logic & TRIM pin	-D
Positive remote logic ON/OFF without TRIM pin	-E