

## 20W Single and Dual Output DC-DC converters



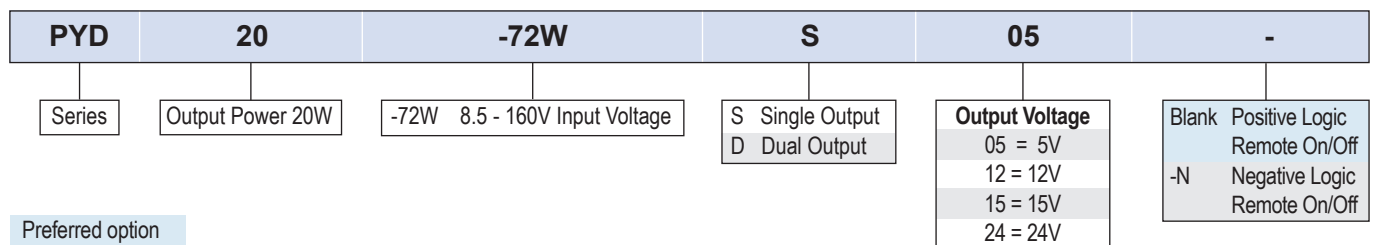
The 20W 2 x 1" footprint PYD series of isolated DC-DC converters operate from an ultra wide range input of 8.5 to 160Vdc (18:1) with single and dual output voltages from 5V to 48V<sup>(1)</sup>. Single output models can be adjusted -20% to +15% by using the trim terminal. The PYD20 models have efficiencies of up to 90% and can operate in ambient temperature of -40 to 105°C. The input to output isolation is 3,000Vac and the units are potted to provide a high resistance to shock and vibration. The converters are certified according to the 62368-1 safety standards and with additional circuits, the PYD20 series is also tested according to the EN 50155 railroad standard for electronic equipment in railroad vehicles.

Features	Benefits
• 2" x 1" Footprint	• Industry Standard Package Size
• 8.5 - 160Vdc Wide Input Range (18:1)	• Supports the Majority of Rail DC Input Voltages
• Certified to IEC 62368-1, Tested According to EN 50155	• Easier System Compliance
• Potted Plastic Case	• High Resistance to Shock and Vibration
• 3000Vac Input to Output Isolation	• Suitable For Railway and Industrial Applications

Model Selector							
Model	Input Voltage (V)	Output Voltage (V)	Maximum Current (A)	Maximum Power (W)	No Load Input Current (mA)	Efficiency (%) at 72 / 110Vdc	Maximum Load Capacitance (uF)
<b>Single Outputs</b>							
PYD20-72WS05	8.5 - 160	5	4	20	5	86 / 85	6800
PYD20-72WS12	8.5 - 160	12	1.67	20	8	89 / 88	3300
PYD20-72WS15	8.5 - 160	15	1.33	20	8	89 / 88	2200
<b>Dual Outputs</b>							
PYD20-72WD12 <sup>(1)</sup>	8.5 - 160	±12	±0,833	20	8	89 / 88	820
PYD20-72WD15 <sup>(1)</sup>	8.5 - 160	±15	±0,667	20	8	89 / 88	680
PYD20-72WD24 <sup>(1)</sup>	8.5 - 160	±24	±0,417	20	8	90 / 89	330

### Notes

(1) ±12V dual output models can provide a 24V single output by utilizing just the +Vout and -Vout pins, leaving the COM unconnected. Similarly ±15V models can be used as a 30V single output and ±24V models a single 48V output.



Related Products		
Type	Part Number	Description
DC-DC Converter	PYQ50	30-50W, Input 14-160V, quarter brick
DC-DC Converter	PYH200	200W, Input 14-160V, half brick
DC-DC Converter	CN-B	200-300W, Input 60-160V, half brick

Specifications		
Model		PYD20
<b>Input</b>		
Input Voltage Range	Vdc	8.5 - 160. Derate output power linearly to 70% load from 12V to 8.5 input
Input Surge Voltage	Vdc	200 (100ms maximum)
Input Shutdown Voltage	Vdc	7.5 Typ.
Start-up Time (typ)	ms	10 (15 for 5V output)
No Load Power Consumption	-	See model selector table. Typically 3mA when remote on/off is activated
Efficiency	-	See model selector table
Conducted & Radiated EMI	-	EN55032. See installation manual for external circuitry
Immunity	-	See immunity section
Safety Certification and Markings	-	IEC/UL/CSA/EN62368-1, CE Mark and UKCA Mark. Designed to meet EN45545-2

Immunity				
Test	Standard	Test Level	Criteria	Notes (See installation manuals for external circuitry)
ESD	EN61000-4-2	Air $\pm$ 8kV and Contact $\pm$ 6kV	A	-
Radiated Susceptibility	EN61000-4-3	20V/m	A	-
Electrical Fast Transient Burst	EN61000-4-4	$\pm$ 2kV	A	With an input filter of two 100uF capacitors and a 180V suppressor diode (SMCJ180A)
Surge	EN61000-4-5	$\pm$ 2kV	A	
Conducted Susceptibility	EN61000-4-6	10 Vrms	A	-

Specifications		
Model		PYD20
<b>Output</b>		
Output Voltage Tolerance	%	$\pm$ 1
Output Voltage Adjustment	%	-20/+15 (single output models only)
Switching Frequency	kHz	180 - 220
Line Regulation	%	$\pm$ 0.2
Load Regulation	%	Single output: $\pm$ 0.2, Dual output: $\pm$ 1
Cross Regulation	%	Dual output: $\pm$ 5 (Asymmetrical 25% to 100% load change)
External Load Capacitance	-	See model selector table
Ripple & Noise <sup>(2)</sup>	mVp-p	5V: 75; all other outputs: 100
Temperature Coefficient	%/°C	$\pm$ 0.02
Minimum Load	-	No minimum load required
Transient Loading	-	250us recovery time for a 25% load change
Overcurrent Protection (typ)	%	150 hiccup mode)
Overvoltage Protection (typ)	V	Zener clamp method. 5V: 6.2, 12V: 15, 15V: 18, 24V: 30
Overtemperature Protection	°C	110, automatic recovery when temperature falls below 92
Remote Sense	-	No remote sense
Remote On/Off	-	Positive Logic (Blank): ON: Open or 4-160V, OFF Short or 0-1.2V Negative Logic (-N): ON: Short or 0-1.2V, OFF: Open or 4-160V

Specifications		
Model	PYD20	
<b>Environmental</b>		
Operating Temperature(3)	°C	-40 to +105 (see derating section and confirm case temperatures in end system)
Maximum Case Temperature	°C	105
Storage Temperature	°C	-55 to +125
Humidity (non condensing)	%RH	95 (maximum, for operation & storage)
Cooling	-	Convection or forced air
Altitude	m	5,000 (operating)
Withstand Voltage (For 1 minute)	-	Input to output 3000Vac or 4200Vdc
Isolation Capacitance	pF	20 (input to output)
Vibration (Operating)	-	MIL-STD-810F, EN61373
Thermal Shock	-	MIL-STD-810F
<b>Other</b>		
Weight (Typ)	g	28.5
Size (LxWxH)	mm	50.8 x 25.4 x 10.2
Size (LxWxH)	Inches	2 x 1 x 0.4
Case Material	-	Plastic
MTBF - MIL-HDBK-217F, Full Load	Hours	1,242,000 - 1,631,000 depending on model
Warranty	yrs	3

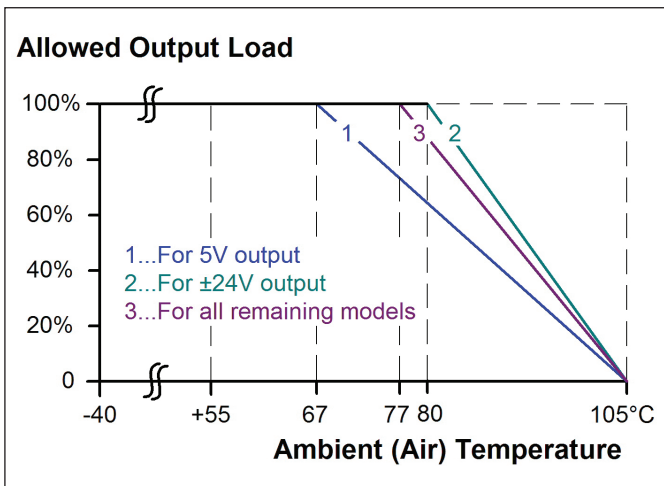
**Notes**

See website for detailed specifications, test methods and installation manual

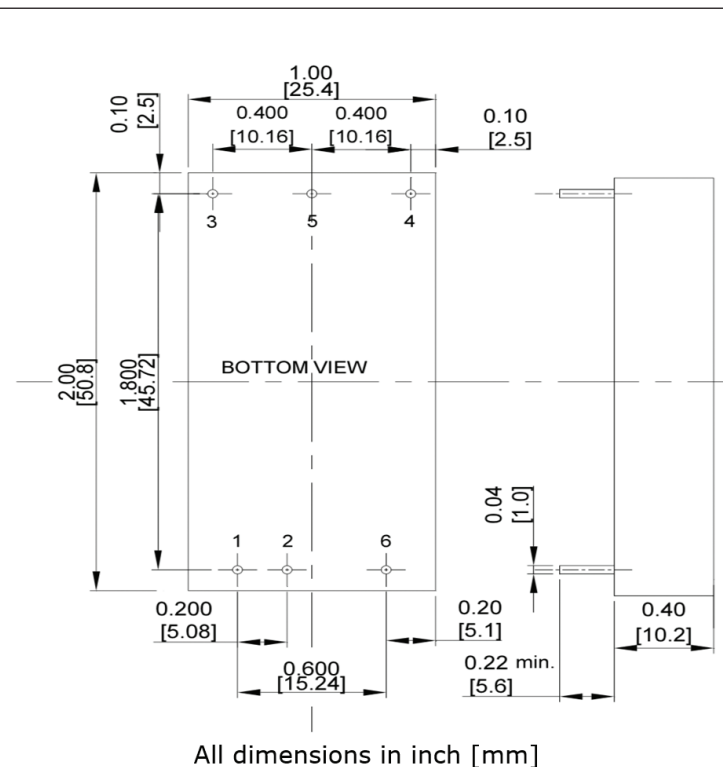
(2): Measured with a 20MHz bandwidth oscilloscope across a 1uF/100V X7R MLCC

(3): The case temperature must be confirmed in the end application. The product rating may be affected by airflow direction and physical obstructions near the module.

**Derating Curve - Vertical Mount, Natural Convection**



**Outline Drawing and Pinout**



**Inch tolerances:**

x.xx±0.02, x.xxx±0.01

Pin diameter ±0.004

**Millimeter tolerances:**

x.x±0.5, x.xx±0.25

Pin diameter ±0.10

**Pad size recommendations** (all pads)

Through hole:  $\Phi$  0.051 [1.30]

Top view pad:  $\Phi$  0.064 [1.63]

Bottom view pad:  $\Phi$  0.102 [2.60]

**Pin assignment**

Pin	Single output	Dual outputs
1	+V Input	+V Input
2	-V Input	-V Input
3	+V Output	+V Output
4	TRIM	-V Output
5	-V Output	COM
6	R/C	R/C



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