

HR78 SERIES

1 A

KEY FEATURES

- Package Type:SIP 3 Industrial Standard
- Operating Temperature: -40°C~+85°C
- No Load Input Current as Low as 0.2mA
- Short Circuit Protection



ELECTRICAL SPECIFICATIONS

All specifications valid at normal input voltage, full load and +25°C after warm-up time unless otherwise stated

Model No.		HR78-3.3S /1000	HR78-5S /1000	HR78-6.5S /1000	HR78-9S /1000	HR78-12S /1000	HR78-15S /1000
Max Output Wattage		3.3W	5W	6.5W	9W	12W	15W
Input Voltage (V.DC)		24V (6-36V)	24V (8-36V)	24V (10-36V)	24V (13-36V)	24V(16-36V)	24V(18-36V)
Input Current (mA)	Max.	917	1042	1083	1154	1250	1389
Output Voltage (V.DC)		3.3	5	6.5	9	12	15
Efficiency (%)	Max.	89	93	94	94	96	96
	Min.	82	85	89	89	94	93
Capacitor Load (μF)	Max.	680	680	680	680	680	680

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Model No.		HR78-3.3S /1000	HR78-5S /1000	HR78-6.5S /1000	HR78-9S /1000	HR78-12S /1000	HR78-15S /1000
Max Output Wattage		3.3W	5W	6.5W	9W	12W	15W
Input	Input Voltage (V.DC) (Note 1)	6-36	8-36	10-36	13-36	16-36	18-36
	Nominal Input Voltage	24VDC					
	Current (mA) (Max.)	917	1042	1083	1154	1250	1389
	No Load Input Current	Typ.: 1mA / Max.: 4mA					
	Filter	Capacitor type					
Output	Voltage (V.DC)	3.3	5	6.5	9	12	15
	Voltage Accuracy (Max.)	±4%	±3%				
	Current (mA) (Max.)	1000					
	Quiescent Current (Typ.)	0.2 mA (Vin=Min. to Max. @ 0% Load)					
	Line Regulation (LL-HL) (Max.)	±0.4%					
	Load Regulation (10-100%) (Max.)	±0.8%					
	Capacitor Load	680μF					
	Ripple & Noise (0-100%) (Max.)	100mVp-p	100mVp-p	124 mVp-p	180 mVp-p	240 mVp-p	300 mVp-p
	Switching Frequency	500KHz					
	Short Circuit Protection (Typ.)	Continuous, Auto-recovery					

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Model No.		HR78-3.3S	HR78-5S	HR78-6S	HR78-9S	HR78-12S	HR78-15S
		/1000	/1000	/1000	/1000	/1000	/1000
Environment	Operating Temperature	-40°C...+85°C (with derating)					
	Storage Temperature	-55°C...+125°C					
	Max Case Temperature	+100°C					
	Relative Humidity	Min.: 5% RH / Max.: 95% RH					
	MTBF (Min.)	2000K Hrs @ 25°C (MIL-HDBK-217F)					
	Temperature Drift Coefficient (Full Load)	±0.03% / °C					
Physical	Dimensions (L x W x H)	0.457 x 0.297 x 0.4 Inches					
	Tolerance ±0.5 mm	11.6 x 7.55 x 10.16 mm					
	Case Material	Black Flame-Retardant Heat-Resistant Plastic (UL94 V-0)					
	Weight (Typ.)	1.8 g					

NOTE

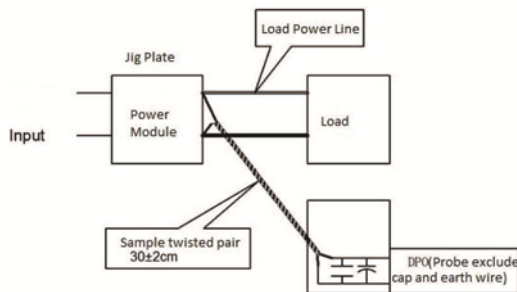
- When input voltage exceeds 30Vdc, the input terminal needs to be connected to an external 22μF/50V electrolytic capacitor to prevent module damage caused by voltage spikes.
- When the ambient temperature is between -40°C and -25°C, an external 22μF/50V electrolytic capacitor is required at the input.
- This product cannot be used in parallel, and do not support hot-plugging.
- If the product works below the minimum required load, it cannot be guaranteed that the product performance meets all the performance indicators in this manual.
- If the product works beyond the product load range, it cannot be guaranteed that the product performance meets all the performance indicators in this manual.
- The products should be used according to the specifications in this manual, otherwise it could be permanently damaged.
- Please check the derating curve for more details.
- All values or indicators in this manual had been tested based on ARCH test specifications.
- The specifications are specially for the parts listed in this manual, any other non-standard model performances could be out of the specifications. Please contact our technician for specific requirements.
- Product specifications are subject to change without prior notice. Please pay attention to the latest manual published on our official website.
- ARCH can provide customization service.

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NOTE

12. Ripple & Noise Test (Twisted Pair Method)

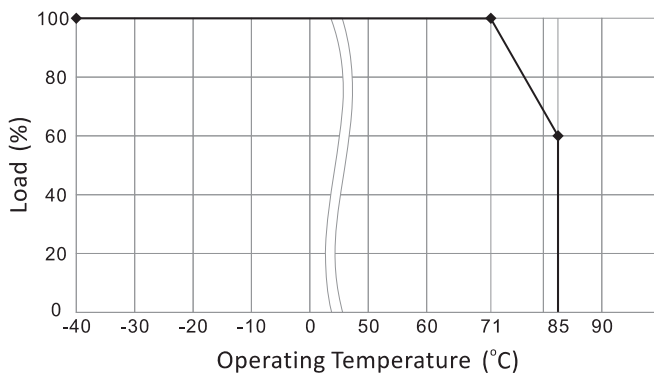


Test Conditions:

- 12# twisted pair to connect, Oscilloscope bandwidth set as 20MHz, 100M bandwidth probe, terminated with 0.1uF polypropylene capacitor and 10uF high frequency low resistance electrolytic capacitor in parallel, oscilloscope set as Sample pattern.
- Input terminal connect to power supply, output terminal connect to electronic load through jig plate, Use 30cm±2 cm sampling line, Power line selected from corresponding diameter wire with insulation according to the flow of output current.

DERATING

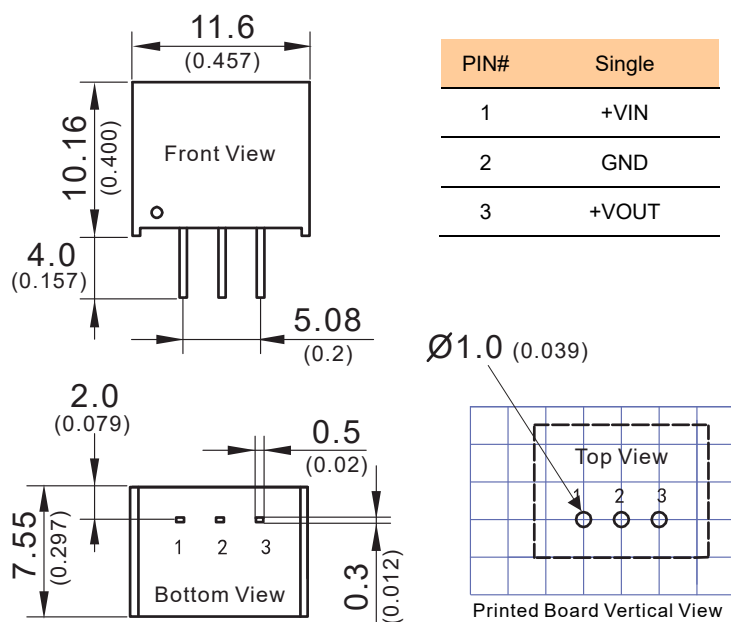
Derating Output Load versus Operating Temperature



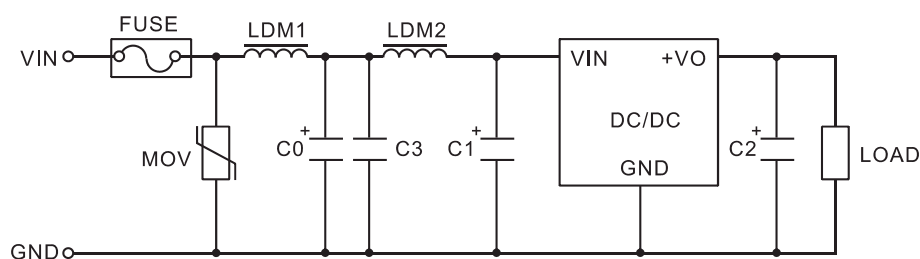
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MECHANICAL DIMENSIONS



EMC RECOMMENDED CIRCUIT



Note:

1. The required C1 and C2 capacitors must be connected as close as possible to the terminals of the module;
2. For certain applications, increased values for C2 and/or tantalum or low ESR electrolytic capacitors may also be used instead;
3. Converter cannot be used for hot swap and with output in parallel.

Component	Parameter
Part No.	Vin=24V
FUSE	Selected fuse value according to actual
MOV	S20K30
LDM1	82uH
C0	680uF/50V
C1	10uF/50V
C2	22uF/10V
C3	4.7uF/50V
LDM1	12 uH

Specifications are subject to change without notice, E&OE. ALL PSU Terms & Conditions apply.

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