

120 Watts

MQP Series



- 9.5 VDC to 40 VDC Input
- MIL-STD-461E Compliance
- Isolated Output
- Regulated Output
- Continuous Short Circuit Protection
- Five-Sided Metal Case
- Rugged Construction

Specification

Input

Input Voltage Range	• 9.5-40 VDC
Input Current	• See models & ratings table
Input Transient	• MIL-STD-1275A-D, MIL-STD-704A when used in conjunction with DSF200/DSF500 filter module (see application notes)
Undervoltage Lockout Protection	• 9.0-9.1 VDC

Output

Output Voltage	• See models & ratings table
Output Voltage Adjustment	• 70-110%
Minimum Load	• No minimum load required
Line Regulation	• $\pm 0.6\%$
Load Regulation	• $\pm 0.6\%$, 10-100% load
Turn-on Time	• Typically 100 ms
Ripple & Noise	• 3%, 20 MHz BW
Overvoltage Protection	• 120% typical
Overcurrent Protection	• 108-115% (see application notes)
Short Circuit Protection	• Continuous
Overtemperature Protection	• $+101^{\circ}\text{C}$ to $+107^{\circ}\text{C}$ case temperature
Current Share	• Max 4 modules, derate total output current to 90% (see application notes)

General

Efficiency	• See model & ratings table
Isolation Voltage	• 3000 VAC Input to Output 1500 VAC Input to Case 1500 VAC Output to Case
Switching Frequency	• Typically 300 kHz
Power Density	• Up to 26.7 W/In ³
Package Style	• Baseplate cooled
MTBF	• 1 Mhrs $+25^{\circ}\text{C}$

Environmental

Operating Temperature	• -40°C to $+85^{\circ}\text{C}$
Storage Temperature	• -50°C to $+125^{\circ}\text{C}$
Case Temperature	• $+100^{\circ}\text{C}$ max, thermal resistance case to ambient (θ_{CA}) 5.5 $^{\circ}\text{C}/\text{W}$
Shock	• EN61373 Category 1, Class B
Vibration	• EN61373 Category 1, Class B

EMC & Safety

Conducted Emissions	• MIL-STD-461E with external components (see application notes)
Conducted Susceptibility	• MIL-STD-461E CS101, CS114, CS115, CS116 with DSF200LV filter (see application notes)
Immunity	• MIL-STD-1275A-D with DSF200LV filter (see application notes)

Models and Ratings

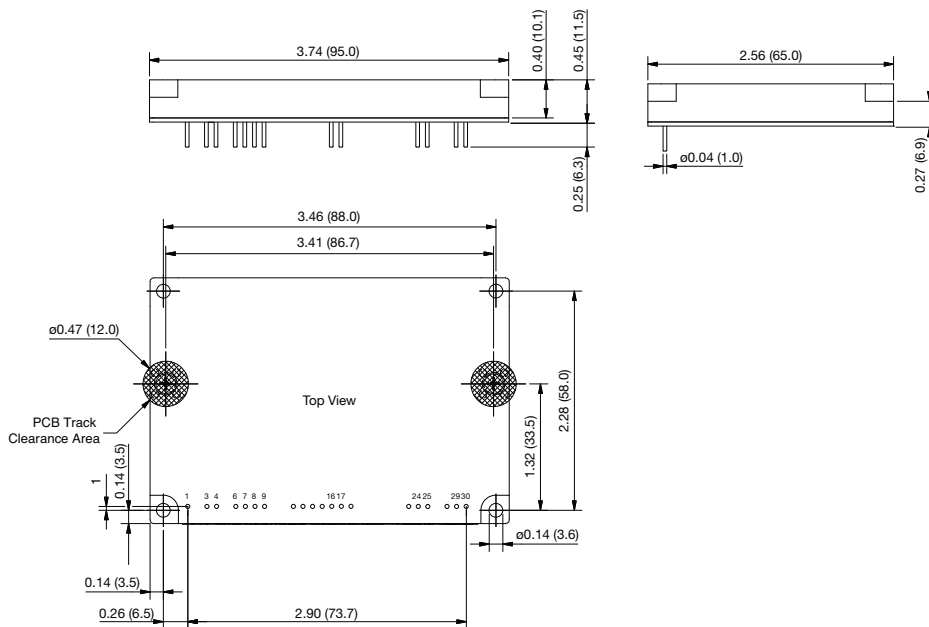
Output Voltage	Output Current	Typical Input Current ⁽²⁾	Efficiency	Max Output Power	Model Number ⁽¹⁾
3.3 VDC	18.2 A	2.8 A	76%	60 W	MQP12028S3V3
5.0 VDC	16.0 A	3.6 A	78%	80 W	MQP12028S05
12.0 VDC	7.9 A	4.3 A	79%	95 W	MQP12028S12
15.0 VDC	7.0 A	4.7 A	79%	105 W	MQP12028S15
24.0 VDC	4.8 A	5.1 A	80%	115 W	MQP12028S24

Notes

1. For integrated heatsink models add suffix '-H' to model number.
2. 28 V input at full load.

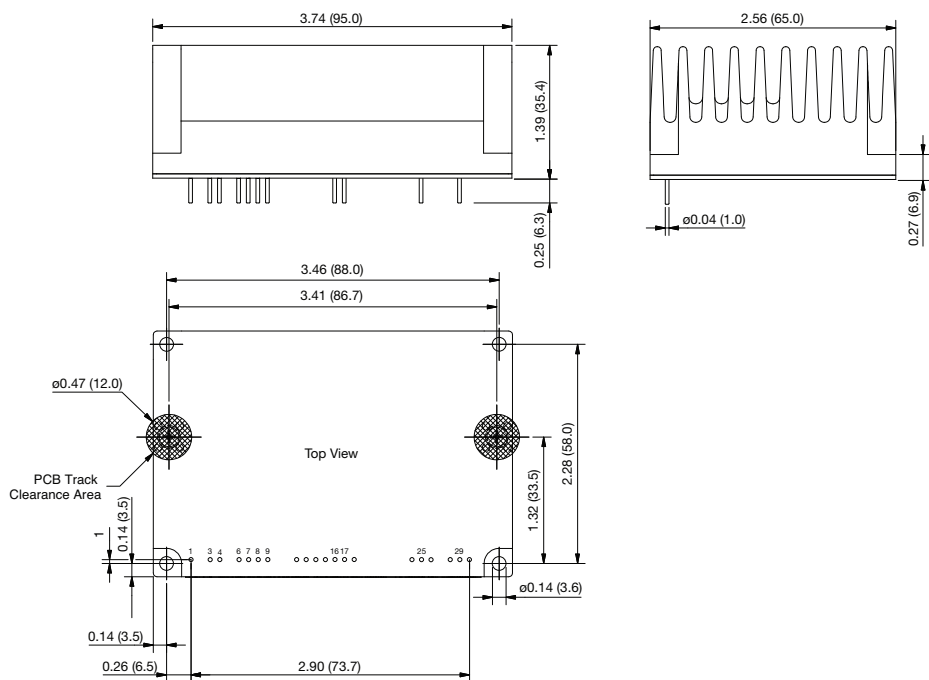
Mechanical Details

MQP120



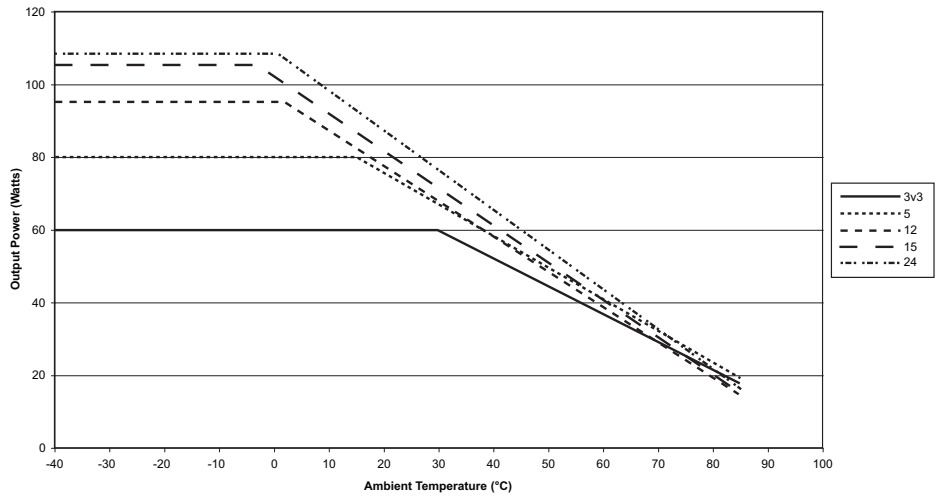
PIN CONNECTIONS	
Pin	Function
1	Case
3	+Vin
4	+Vin
6	-Vin
7	-Vin
8	En
9	St
16	Ot
17	Tr
24	-Vout
25	-Vout
29	+Vout
30	+Vout

MQP120-H

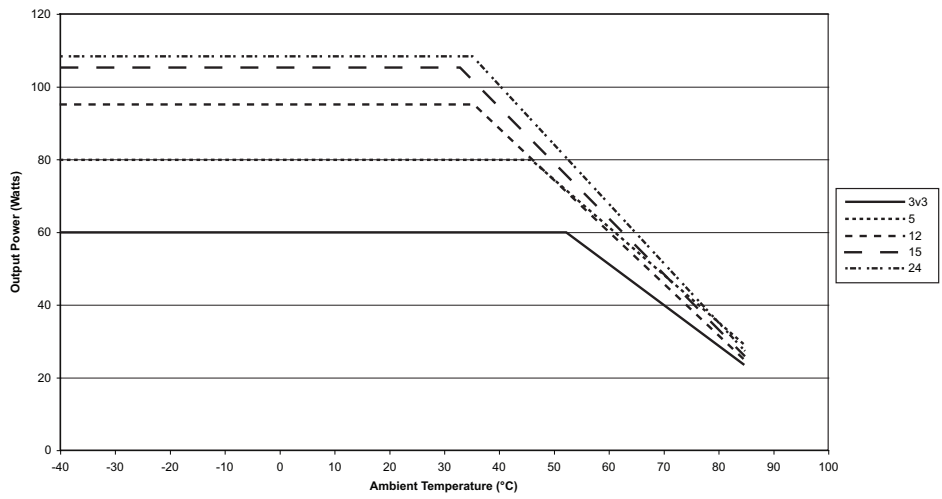


Derating Curves

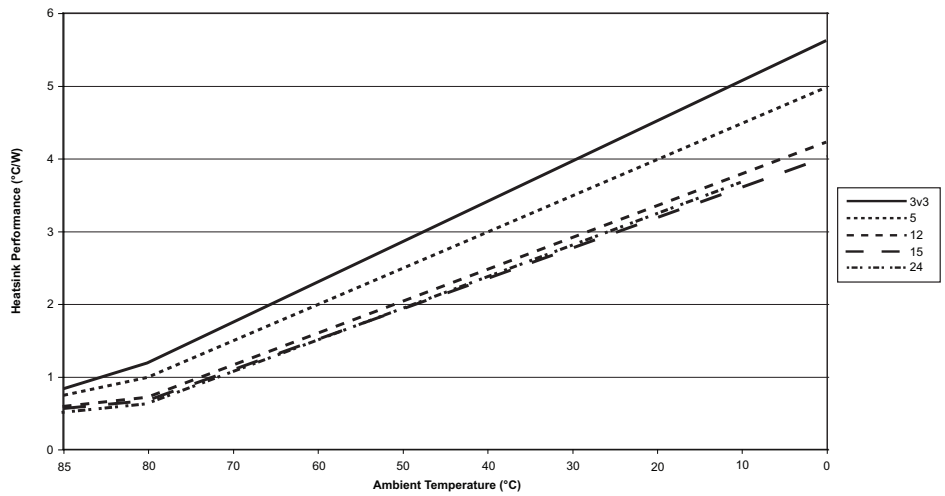
MQP120 vs ambient temperature (module only)

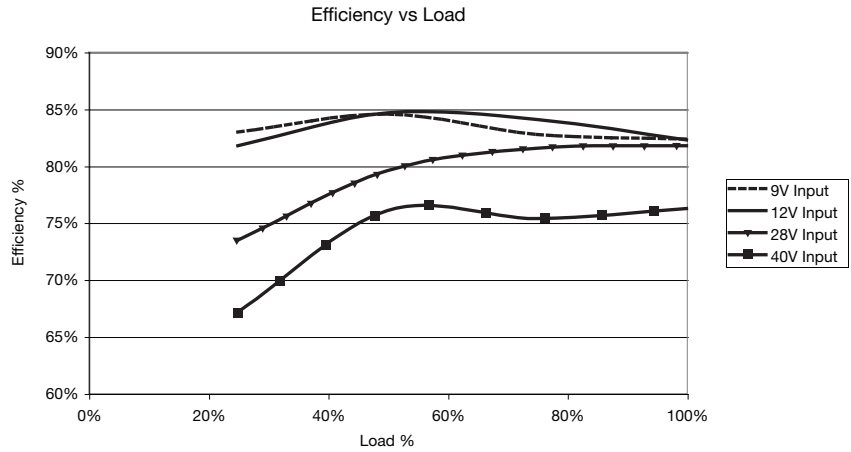


MQP120-H vs ambient temperature (integrated heatsink)

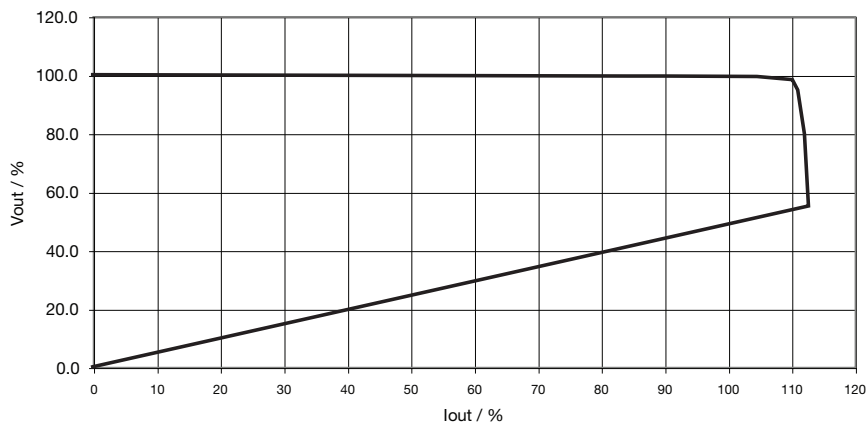


Heatsink requirements for maximum output power °C/W



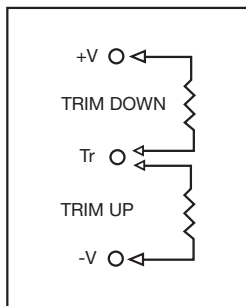


Typical Overcurrent Protection



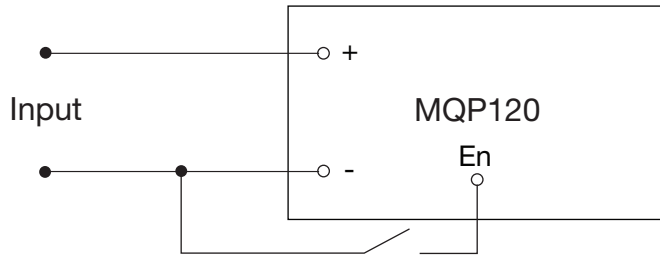
Application Notes

Output Adjustment (Tr)



OUTPUT ADJUSTMENT RANGE				
Model	Minimum	Maximum	Trim Down	Trim Up
MQP12028S3V3	3.3 V	3.6 V	0.0 Ω	1.0 kΩ
MQP12028S05	4.3 V	5.5 V	85.0 Ω	2.4 kΩ
MQP12028S12	8.4 V	13.2 V	2.0 Ω	1.0 kΩ
MQP12028S15	10.5 V	16.5 V	1.3 kΩ	1.3 kΩ
MQP12028S24	16.8 V	26.4 V	5.4 kΩ	1.6 kΩ

Enable (En)

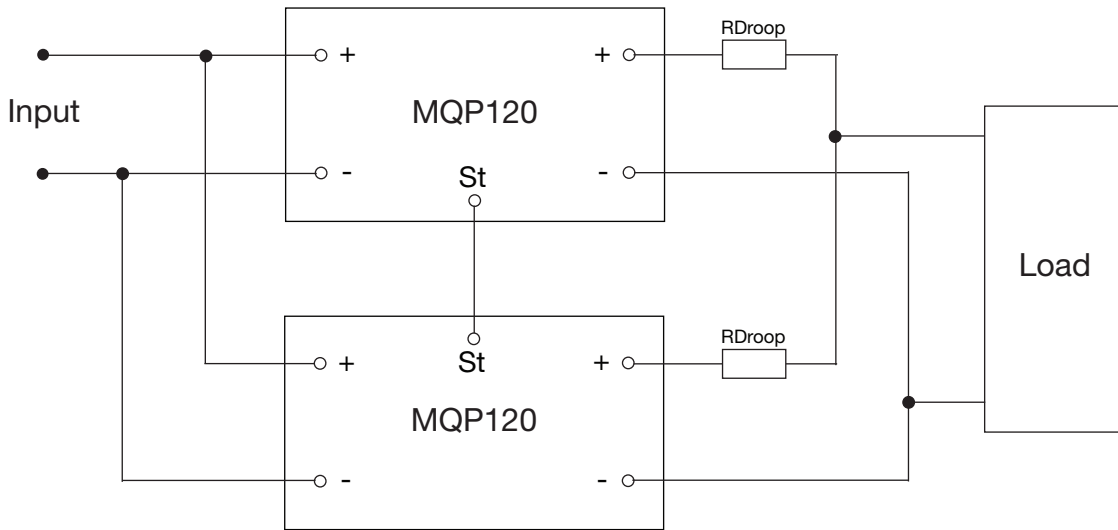


En floating = Output on
 En connected -Vin = Output off

Input current typically 10 mA with output inhibited.

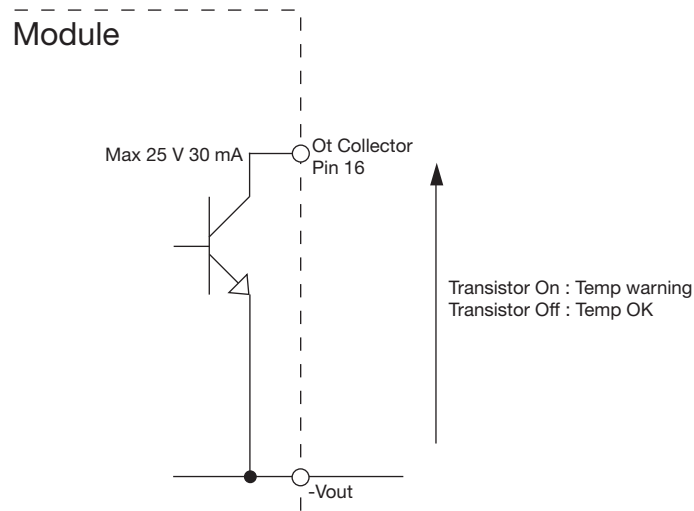
Parallel Operation Start-up (St)

If the MQP120 modules are to be used in parallel a droop share methodology must be used to ensure that each converter shares the load equally. The 'St' pins should be connected together to ensure reliable start-up.



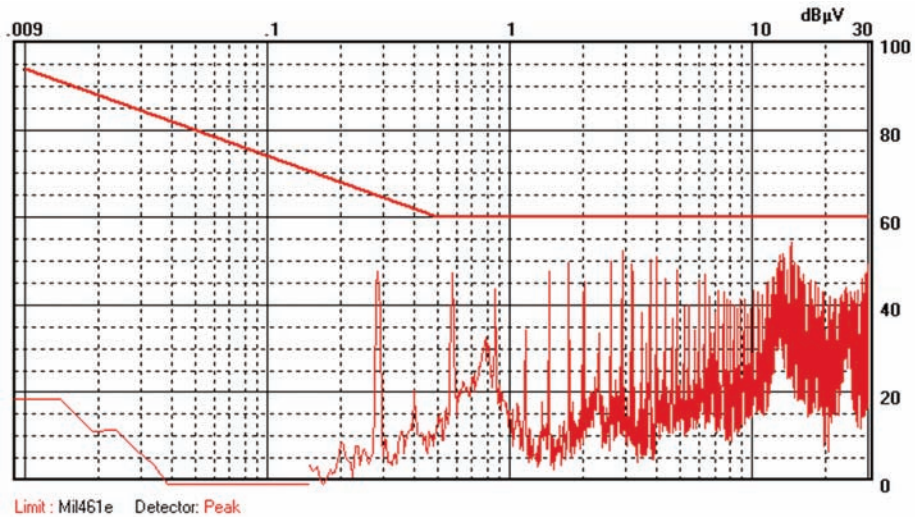
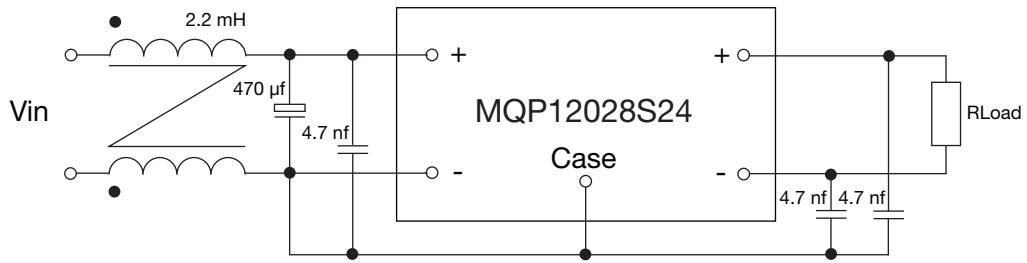
Overtemperature Warning (Ot)

Open collector transistor gives +5 °C warning of thermal shutdown. Transistor is referenced to -Vout.



Transistor On : Temp warning
 Transistor Off : Temp OK

Conducted EMI
MQP12028S24, Limit MIL-STD-461E



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MQP12028S24, Limit MIL-STD-461E

