

PPMxx-X-xxZSLF



PPM-SERIES

Rev.10-2013

- ✓ **5 - 20 Watt**
- ✓ **Univ. 85-264VAC and 50/60Hz**
- ✓ **Dual Separate Output**
- ✓ **Overload Protection**
- ✓ **3 kV AC I/O Isolation**
- ✓ **Low Ripple and Noise**
- ✓ **High Efficiency**

The PPM-Series are high efficiency modules with various packaging provided by Peak. The features of this series are: wide input voltage, DC and AC all in one, high efficiency, high reliability, low loss, safety isolation etc. They are widely used in industrial, office and civil equipments. EMC and safety standards meet international standards IEC61000 UL60950 and IEC60950, and Multi-certificate is in processing.

All specifications typical at Ta=25°C, nominal input voltage and full load unless otherwise specified

Input Specifications

Input Voltage Range	85 – 264 VAC or 120 – 370 VDC universal	
Input Frequency	47 – 63 Hz	
Input (Inrush) Current	<u>115 VAC</u>	<u>230 VAC</u>
PPM05 models	125mA (10A), max.	80mA (20A), max.
PPM10 models	260mA (10A), max.	160mA (20A), max.
PPM15 models	370mA (10A), max.	220mA (20A), max.
PPM20 models	600mA (16A), max.	340mA (30A), max.

External Input Fuse (recommended)

PPM05 models	1A / 250V slow blow
PPM10 / 15 models	2A / 250V slow blow
PPM20 models	3.15A / 250V slow blow

Output Specifications

Voltage Accuracy	±2% (main output)
Line Regulation	±0.5% (main output) ±1.5% (supplement output)
Load Regulation (10-100% balanced load)	Vo1: ±3% Vo2: ±5%
Minimum load	10%
Ripple and Noise (20Mhz bandwidth)	≤ 100mV pk-pk (main output)
Short Circuit Protection	Continuous, auto recovery
Over Current Protection	≥ 110% Io
Over output voltage protection	5VDC models ≤7.5VDC 12 / 15VDC models ≤20VDC 24VDC models ≤30VDC

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Common Specifications

Temperature range	-40 °C to +70 °C
Power derating	3.75% / °C (above 55°C)
Case temperature	+90 °C, max
Storage	-40 °C to +105 °C
Hold up Time	80mS, typ. (230VAC)
Humidity (non condensing)	95%, max.
Temperature Coefficient	0.02%/°C (main output) 0.15%/°C (supplement output)
Switching Frequency	65kHz
I/O Isolation Voltage	3000VAC / 1min.
Safety Standards	IEC60950, EN60950, UL60950
Safety Class	CLASS 1
Hot Swap	Forbid
Case Material	UL94V-0 rated
Cooling	Free air convection
Reliability Calculated MTBF (MIL-HDBK-217F)	> 300,000 hrs
Weight	50g (PPM05) 80g (PPM10) 85g (PPM15) 120g (PPM20)

EMC Specifications

EMI / CE, RE	CISPR22 / EN55022, Class B		
EMC compliance			
ESD	IEC/EN 61000-4-2	±6KV/±8KV	perf Criteria B
RS	IEC/EN 61000-4-3	10V/m	perf Criteria A
EFT	IEC/EN 61000-4-4	±2KV (without external circuit)	perf Criteria B
	IEC/EN 61000-4-4	±4KV (recommended circuit)	perf Criteria B
Surge	IEC/EN 61000-4-5	±1KV / ±2KV (without external Circuit)	perf Criteria B
	IEC/EN 61000-4-5	±2KV / ±4KV (recommended circuit)	perf Criteria B
CS	IEC/EN 61000-4-6	10 Vr.m.s	perf Criteria A
PFM	IEC/EN 61000-4-6	10 A/m	perf Criteria A
Voltage dips, short and interruption immunity			
	IEC/EN 61000-4-11	0%-70%	perf Criteria B

Notes:

Selection Guide

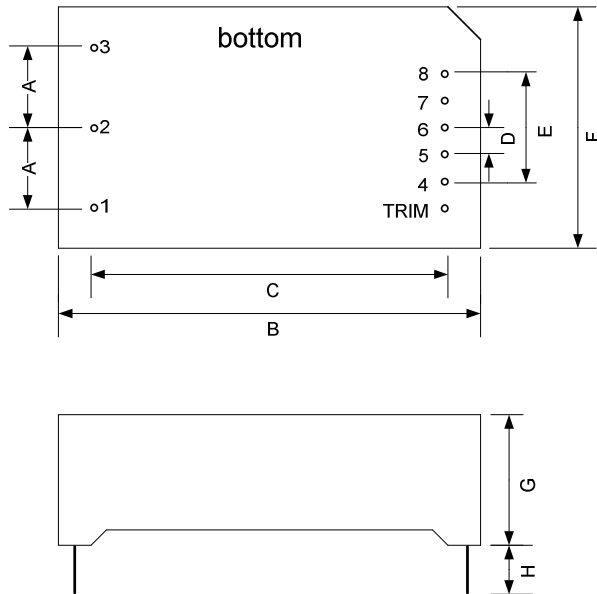
Dual Separate Output

Order #	Power (W)	Out1 / Out2 Voltage (VDC)	Out1 / Out2 Current Full Load (mA)	Vo1 / Vo2 Capacitor Load (uF), max	Efficiency (%)
DUAL SEPARATE OUTPUT					
PPM05-A-0505ZSLF	5	5 / 5	900 / 100	3360 / 370	71
PPM05-A-0512ZSLF	5	5 / 12	750 / 100	2400 / 170	73
PPM05-A-0515ZSLF	5	5 / 15	700 / 100	2160 / 170	73
PPM05-A-0524ZSLF	5	5 / 24	600 / 100	4560 / 370	75
PPM10-B-0505ZSLF	10	5 / 5	1800 / 200	8000 / 540	75
PPM10-B-0512ZSLF	10	5 / 12	1500 / 200	4400 / 260	79
PPM10-B-0515ZSLF	10	5 / 15	1400 / 200	4400 / 170	79
PPM10-B-0524ZSLF	10	5 / 24	1000 / 200	4000 / 170	81
PPM15-C-0505ZSLF	15	5 / 5	2200 / 800	10800 / 2960	76
PPM15-C-0512ZSLF	15	5 / 12	2000 / 400	8640 / 1200	80
PPM15-C-0515ZSLF	15	5 / 15	2000 / 300	6480 / 800	80
PPM15-C-0524ZSLF	15	5 / 24	2000 / 200	12900 / 800	81
PPM20-D-0512ZSLF	20	5 / 12	2500 / 600	32400 / 3250	75
PPM20-D-0515ZSLF	20	5 / 15	12 / 600	28000 / 1980	76
PPM20-D-0524ZSLF	20	5 / 24	2500 / 300	28000 / 720	77

If you need other specifications, please enquire.

Notes:

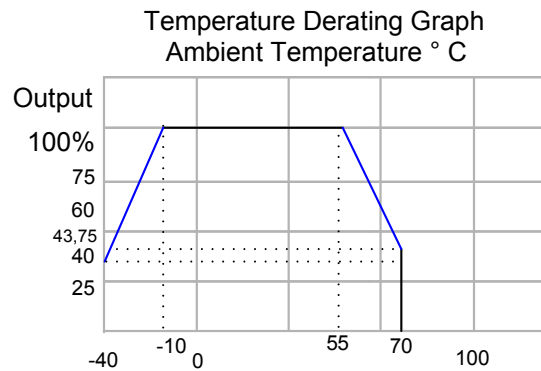
Package / Pinning / Derating



No.	PPM05-A	No.	PPM10-B
A	12.5	A	17.5
B	48.5	B	55.0
C	40.5	C	47.0
D	4.0	D	5.0
E	16.0	E	20.0
F	36.0	F	45.0
G	20.5	G	20.5
H	min. 6.0	H	min. 6.0

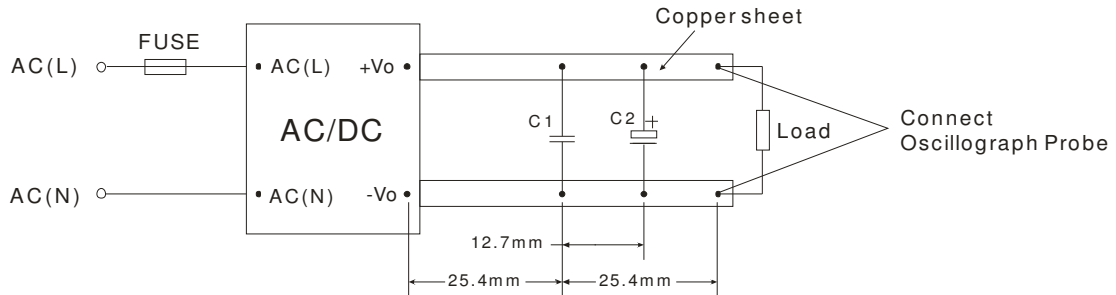
No.	PPM15-C	No.	PPM20-D
A	17.5	A	20.0
B	62.0	B	70.0
C	54.0	C	62.0
D	5.0	D	5.75
E	20.0	E	23.0
F	48.0	F	48.0
G	22.5	G	23.5
H	min. 6.0	H	min. 6.0

PIN CONNECTIONS	
#	DUAL SEP
1	Ground
2	AC (N)
3	AC (L)
4	- Vout 1
5	+Vout 1
6	No Pin
7	- Vout 2
8	+Vout 2
TRIM	No Pin



App Notes

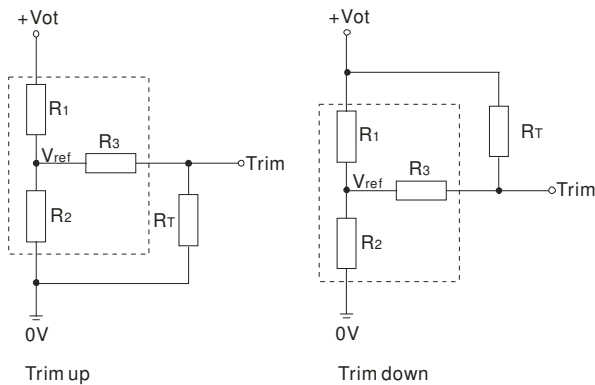
Parallel Lines Measure



Note: C1: 1μF (Ceramic capacitor) C2: 10μF (Electrolytic capacitor)

Trim Application & Trim Calculation

Application Circuit for TRIM



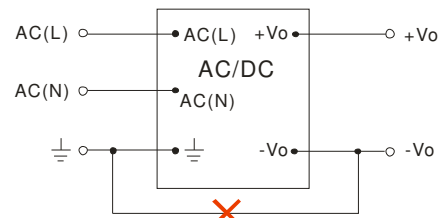
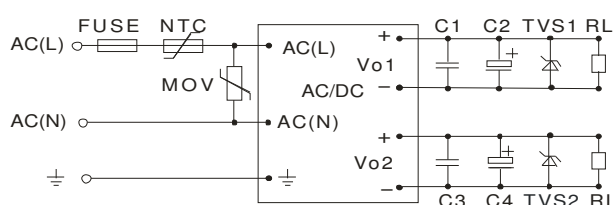
Formula for resistance of Trim

$$\begin{aligned} \text{up: } R_T &= \frac{aR_2}{R_2-a} - R_3 & a &= \frac{V_{ref}}{V_{ot}-V_{ref}} \cdot R_1 \\ \text{down: } R_T &= \frac{aR_1}{R_1-a} - R_3 & a &= \frac{V_{ot}-V_{ref}}{V_{ref}} \cdot R_2 \end{aligned}$$

Note: Value for R1, R2, R3, and Vref refer to the following table.
 R_T : Resistance of Trim
 a: User-defined parameter, no actual meanings.

Vo(V) Resistance	3.3	5	9	12	15	24	48
R1(KΩ)	3.3	3.3	7.5	3.83	7.5	8.66	68
R2(KΩ)	1.98	3.3	2.87	1	1.5	1	3.73
R3(KΩ)	1	1	1	1	1	1	1
Vref(V)	1.24	2.5	2.5	2.5	2.5	2.5	2.5
Vot(V)	Output voltage of Trim, variation $\leq \pm 10\%$						

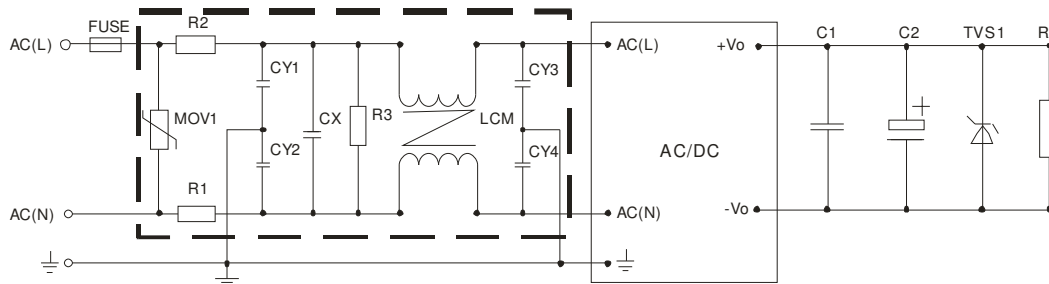
Typical Application



Note: This application is not supported for this series

App Notes

EMC Recommended Circuit



Recommended circuit for applications which require higher EMC standard

External Circuit Parameter

Model	C2 (μF)	C4 (μF)	TVS1	TVS2
PPM05-A-0505ZSLF	220	22	SMBJ7.0A	SMBJ7.0A
PPM05-A-0512ZSLF	220	22		SMBJ20A
PPM05-A-0515ZSLF	120	22		SMBJ20A
PPM05-A-0524ZSLF	120	22		SMBJ30A
PPM10-B-0505ZSLF	220	68		SMBJ7.0A
PPM10-B-0512ZSLF	220	68		SMBJ20A
PPM10-B-0515ZSLF	220	47		SMBJ20A
PPM10-B-0524ZSLF	220	47		SMBJ30A
PPM15-C-0505ZSLF	470	470		SMBJ7.0A
PPM15-C-0512ZSLF	470	220		SMBJ20A
PPM15-C-0515ZSLF	470	120		SMBJ20A
PPM15-C-0524ZSLF	470	47		SMBJ30A
PPM20-D-0512ZSLF	330	220		SMBJ20A
PPM20-D-0515ZSLF	330	220		SMBJ20A
PPM20-D-0524ZSLF	330	120		SMBJ30A

Note

1. Output filtering capacitors C2, C4 and C6 are electrolytic capacitors. It is recommended to use high frequency and low impedance electrolytic capacitors. For capacitance and current of capacitor please refer to manufacture's datasheet. Voltage derating of capacitor should be 80% or above. C1, C3, C5 are used to filter high frequency noise, suggest choose 1μF. TVS is recommended component to protect post-circuits (if converter fails). External input NTC is recommended to use 5D-9.

2. Recommended parameter for higher EMC standard circuit:

MOV:	S14K350
R1, R2:	2Ω/3W
R3:	1Ω/2W
CY1, CY2, CY3, CY4:	1nF/400VAC
CX:	0.22μF/275VAC
FUSE:	
PPM05:	1A/250V
PPM10/PPM15:	2A/250V
PPM20:	3.15A/250V