

## SERIES: PHP1-M | DESCRIPTION: DC-DC CONVERTER

### FEATURES

- up to 1 W isolated output
- surface mount package
- 1:1 input range
- single unregulated output
- 2,000 Vdc isolation voltage
- -40 to 100°C temperature range
- efficiency up to 76%
- UL/cUL certified

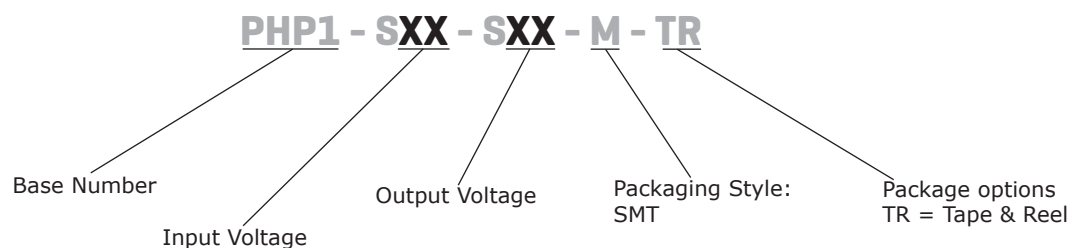


### MODEL

|               | input voltage |                | output voltage | output current<br>max<br>(mA) | output power<br>max<br>(W) | ripple & noise <sup>1</sup><br>max<br>(mVp-p) | efficiency<br>typ<br>(%) |
|---------------|---------------|----------------|----------------|-------------------------------|----------------------------|-----------------------------------------------|--------------------------|
|               | typ<br>(Vdc)  | range<br>(Vdc) |                |                               |                            |                                               |                          |
| PHP1-S3-S5-M  | 3.3           | 2.97~3.63      | 5              | 200                           | 1                          | 100                                           | 75                       |
| PHP1-S5-S5-M  | 5             | 4.5~5.5        | 5              | 200                           | 1                          | 100                                           | 75                       |
| PHP1-S5-S12-M | 5             | 4.5~5.5        | 12             | 84                            | 1                          | 100                                           | 76                       |
| PHP1-S5-S15-M | 5             | 4.5~5.5        | 15             | 66                            | 1                          | 100                                           | 76                       |
| PHP1-S12-S5-M | 12            | 10.8~13.2      | 5              | 200                           | 1                          | 100                                           | 73                       |
| PHP1-S15-S5-M | 15            | 13.5~16.5      | 5              | 200                           | 1                          | 100                                           | 74                       |

Notes: 1. At full load, nominal input, 20 MHz bandwidth oscilloscope, output terminated with a 0.1  $\mu$ F multilayer low ESR ceramic capacitor.  
2. All specifications measured at Ta=25°C, nominal input voltage, rated output load, and after warm up unless otherwise specified.

### PART NUMBER KEY



INPUT

| parameter               | conditions/description | min  | typ | max  | units |
|-------------------------|------------------------|------|-----|------|-------|
| operating input voltage | 3.3 Vdc input model    | 2.97 | 3.3 | 3.63 | Vdc   |
|                         | 5 Vdc input models     | 4.5  | 5   | 5.5  | Vdc   |
|                         | 12 Vdc input model     | 10.8 | 12  | 13.2 | Vdc   |
|                         | 15 Vdc input model     | 13.5 | 15  | 16.5 | Vdc   |

OUTPUT

| parameter                            | conditions/description                                   | min | typ | max  | units |
|--------------------------------------|----------------------------------------------------------|-----|-----|------|-------|
| maximum capacitive load <sup>1</sup> | 5 Vdc output models                                      |     |     | 1000 | μF    |
|                                      | 12 Vdc output model                                      |     |     | 330  | μF    |
|                                      | 15 Vdc output model                                      |     |     | 220  | μF    |
| voltage accuracy                     | at Vin nominal, full load, see tolerance envelope curves |     |     | ±5   | %     |
| line regulation                      | measured from low to high line, full load                |     | ±1  | ±1.5 | %     |
| load regulation                      | measured from 20~100% load                               |     | ±6  | ±10  | %     |
| switching frequency                  | at Vin nominal                                           | 20  | 60  | 100  | kHz   |

Note: 1. Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage.

SAFETY AND COMPLIANCE

| parameter             | conditions/description                | min       | typ   | max | units |
|-----------------------|---------------------------------------|-----------|-------|-----|-------|
| isolation voltage     | input to output for 1 second          |           | 2,000 |     | Vdc   |
| isolation resistance  | at 500 Vdc                            | 10,000    |       |     | MΩ    |
| isolation capacitance |                                       |           |       | 75  | pF    |
| safety approvals      | UL/cUL (60950-1, 2nd Edition)         |           |       |     |       |
| MTBF                  | as per MIL-HDBK-217F, full load, 25°C | 2,992,000 |       |     | hours |
|                       | as per MIL-HDBK-217F, full load, 85°C | 955,000   |       |     | hours |
| RoHS                  | yes                                   |           |       |     |       |

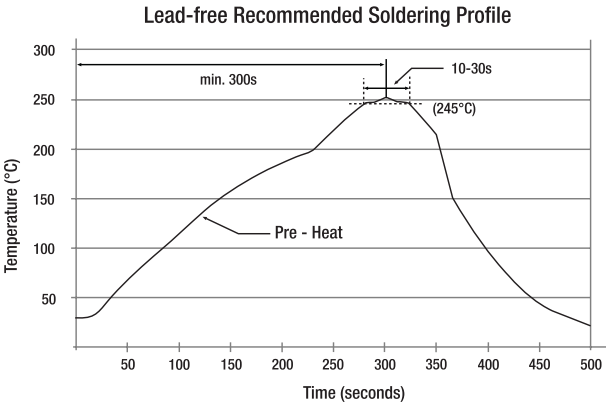
ENVIRONMENTAL

| parameter             | conditions/description | min | typ | max | units |
|-----------------------|------------------------|-----|-----|-----|-------|
| operating temperature |                        | -40 |     | 100 | °C    |
| storage temperature   |                        | -55 |     | 125 | °C    |
| operating humidity    | non-condensing         |     |     | 95  | %     |

SOLDERABILITY

| parameter                     | conditions/description    | min | typ | max | units |
|-------------------------------|---------------------------|-----|-----|-----|-------|
| reflow soldering <sup>2</sup> | see reflow solder profile |     |     | 245 | °C    |

Note: 2. In accordance with JEDEC STD-020C.



MECHANICAL

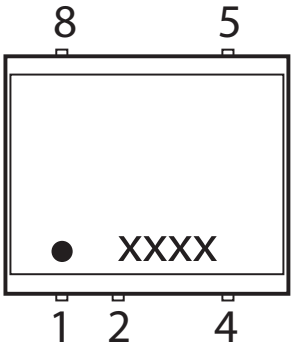
| parameter     | conditions/description                 | min | typ | max | units |
|---------------|----------------------------------------|-----|-----|-----|-------|
| dimensions    | 12.75 x 10.7 x 7.0                     |     |     |     | mm    |
| case material | non-conductive black plastic (UL94V-0) |     |     |     |       |
| weight        |                                        |     | 1.0 |     | g     |

MECHANICAL DRAWING

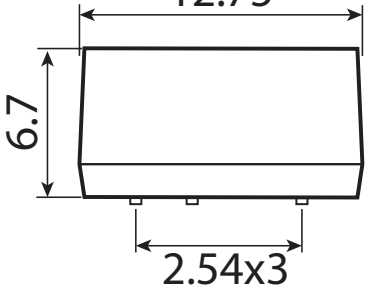
units: mm  
tolerance: XX.X = ±0.5 mm  
              XX.XX = ±0.25 mm

| PIN CONNECTIONS |          |
|-----------------|----------|
| PIN             | Function |
| 1               | -Vin     |
| 2               | +Vin     |
| 4               | -Vout    |
| 5               | +Vout    |
| 8               | NC       |

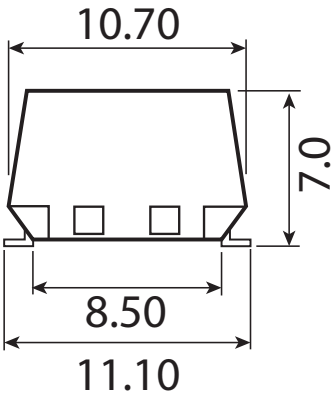
NC = no connection



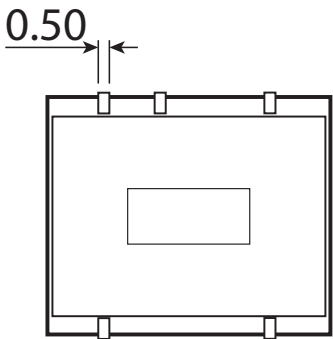
Top View



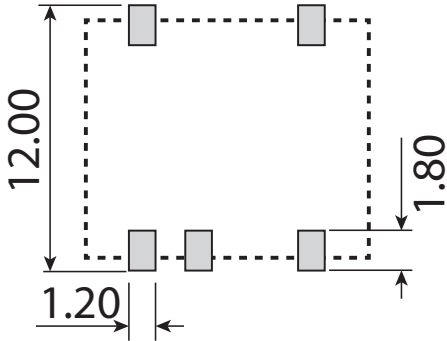
Side View



End View

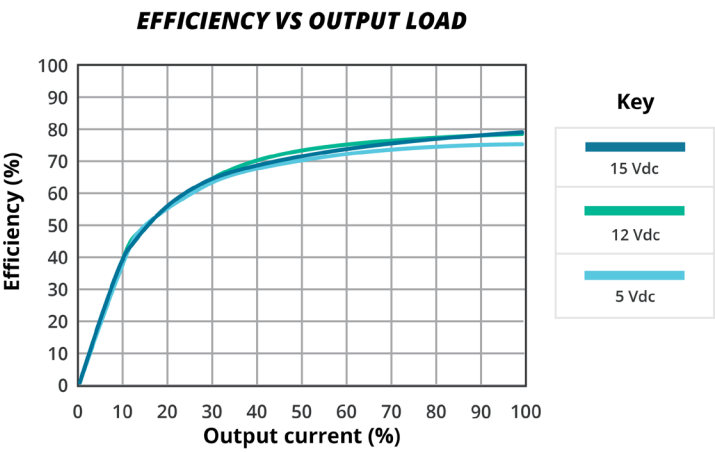
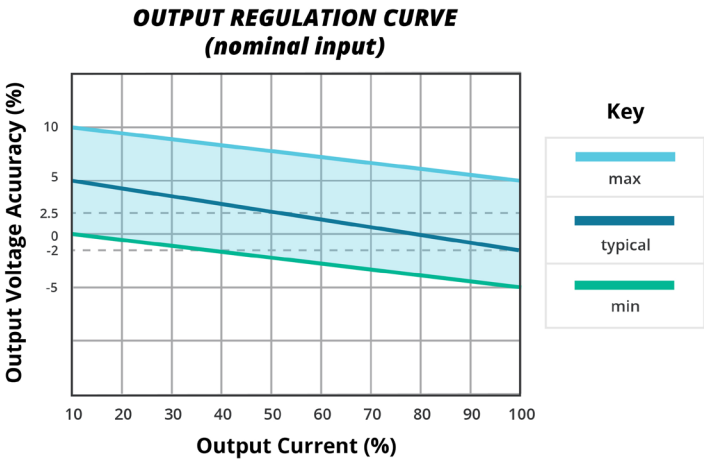


Bottom View



Recommended PCB Layout Top View

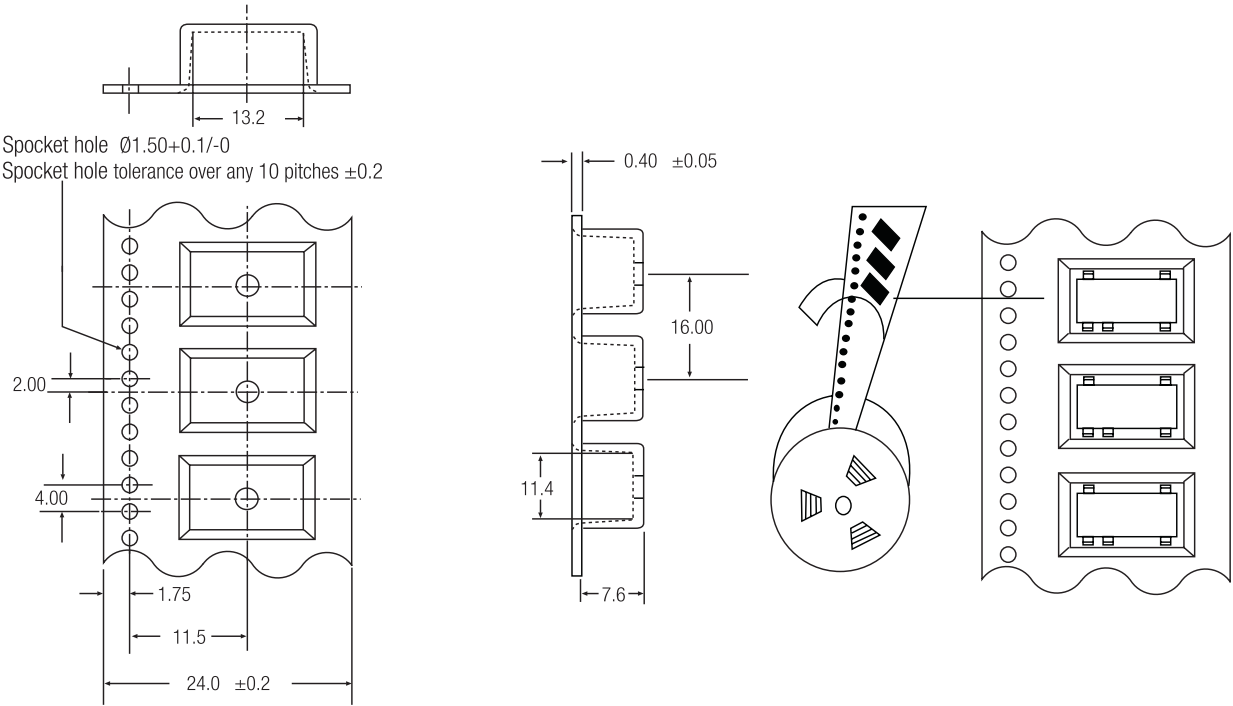
PERFORMANCE CURVES



PACKAGING

units: mm

Tape & Reel: Conforms to EIA-481-2  
Reel Size: Ø13"  
QTY: 500 pcs per reel



REVISION HISTORY

| rev. | description                | date       |
|------|----------------------------|------------|
| 1.0  | initial release            | 07/25/2016 |
| 1.01 | company logo updated       | 03/30/2021 |
| 1.02 | performance curves updated | 07/06/2021 |
| 1.03 | packaging updated          | 06/13/2024 |
| 1.04 | company address updated    | 11/05/2024 |
| 1.05 | datasheet updated          | 04/24/2025 |

The revision history provided is for informational purposes only and is believed to be accurate.



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