

**SERIES:** PSK-20D | **DESCRIPTION:** INTERNAL AC-DC POWER SUPPLY

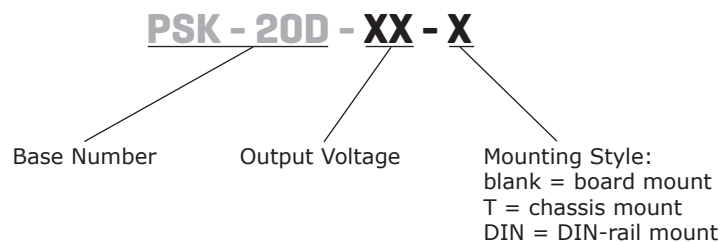
**FEATURES**

- wide input range (85 ~ 305 Vac)
- wide operating temperature range (-40 to +85 C)
- Class B emissions
- certified to 62368, 61558, and 60335 safety standards
- designed to meet 60601 medical safety standard (2xMOPP)
- over voltage, over current, short circuit protections
- input over voltage category III for fixed installations



| MODEL      | output voltage | output current | output power | ripple and noise <sup>1</sup> | efficiency <sup>2</sup> |
|------------|----------------|----------------|--------------|-------------------------------|-------------------------|
|            | (Vdc)          | max (A)        | max (W)      | max (mVp-p)                   | typ (%)                 |
| PSK-20D-3  | 3.3            | 4.5            | 14.85        | 150                           | 81                      |
| PSK-20D-5  | 5              | 4.0            | 20.0         | 150                           | 85                      |
| PSK-20D-9  | 9              | 2.2            | 20.0         | 150                           | 85                      |
| PSK-20D-12 | 12             | 1.67           | 20.0         | 150                           | 86                      |
| PSK-20D-15 | 15             | 1.33           | 20.0         | 150                           | 87                      |
| PSK-20D-24 | 24             | 0.83           | 20.0         | 150                           | 87                      |

Notes: 1. At full load, nominal input, 20 MHz bandwidth oscilloscope, with 1  $\mu$ F ceramic and 10  $\mu$ F electrolytic capacitors on the output.  
 2. At 230 Vac input.  
 3. All specifications are measured at Ta=25°C, humidity <75%, nominal input voltage, and rated output load unless otherwise specified.

**PART NUMBER KEY**


## INPUT

| parameter       | conditions/description | min | typ | max | units |
|-----------------|------------------------|-----|-----|-----|-------|
| voltage         | ac input               | 85  |     | 305 | Vac   |
|                 | dc input               | 100 |     | 430 | Vdc   |
| frequency       |                        | 47  |     | 63  | Hz    |
| current         | 115 Vac                |     |     | 0.5 | A     |
|                 | 230 Vac                |     |     | 0.3 | A     |
| inrush current  | 115 Vac                |     | 25  |     | A     |
|                 | 230 Vac                |     | 45  |     | A     |
| leakage current | 277 Vac/50 Hz          |     |     | 0.1 | mA    |

## OUTPUT

| parameter                 | conditions/description   | min | typ  | max   | units |
|---------------------------|--|-----|------|-------|-------|
| capacitive load           | 3.3 Vdc  |     |      | 8,000 | μF    |
|                           | 5 Vdc  |     |      | 8,000 | μF    |
|                           | 9 Vdc  |     |      | 5,400 | μF    |
|                           | 12 Vdc   |     |      | 4,000 | μF    |
|                           | 15 Vdc   |     |      | 3,000 | μF    |
|                           | 24 Vdc   |     |      | 1,000 | μF    |
| output voltage accuracy   |  |     | ±1.5 |       | %     |
| line regulation           | at full load   |     | ±0.5 |       | %     |
| load regulation           | 0~100% load  |     | ±1.0 |       | %     |
| hold-up time              | 115 Vac  |     | 8    |       | ms    |
|                           | 230 Vac  |     | 50   |       | ms    |
| switching frequency       |  |     | 65   |       | kHz   |
| no load power consumption | 230 Vac  |     | 0.1  |       | W     |
|                           | 3.3 Vdc, 5 Vdc, 9 Vdc, 12 Vdc, 15 Vdc outputs<br>24 Vdc output |     | 0.12 |       | W     |

## PROTECTIONS

| parameter                | conditions/description            | min | typ | max | units |
|--------------------------|-----------------------------------|-----|-----|-----|-------|
| over voltage protection  | clamp or hiccup                   |     |     |     |       |
|                          | 3.3 & 5 Vdc output                |     |     | 7.5 | V     |
|                          | 9 Vdc output                      |     |     | 15  | V     |
|                          | 12 & 15 Vdc output                |     |     | 20  | V     |
|                          | 24 Vdc output                     |     |     | 30  | V     |
| over current protection  | auto recovery                     | 110 |     |     | %     |
| short circuit protection | continuous, auto recovery, hiccup |     |     |     |       |

## SAFETY & COMPLIANCE

| parameter         | conditions/description  | min    | typ             | max | units |
|-------------------|---|--------|-----------------|-----|-------|
| isolation voltage | input to output, 1 min., <5mA   | 4,000  |                 |     | Vac   |
| safety approvals  | certified to  | 62368: | IEC, EN, UL/cUL |     |       |
|                   | certified to  | 60335: | EN              |     |       |
|                   | certified to  | 61558: | EN              |     |       |
|                   | designed to meet  | 60601: | IEC, EN, UL/cUL |     |       |
| safety class      | Class II  |        |                 |     |       |
| EMI/EMC           | CISPR32/EN55032 CLASS B<br>CISPR11/EN55011 CLASS B<br>EN55014-1                             |        |                 |     |       |
| ESD               | IEC/EN 61000-4-2 Contact ±6KV / Air ±8KV perf. Criteria A<br>IEC/EN55014-2 perf. Criteria A |        |                 |     |       |
| radiated immunity | IEC/EN61000-4-3 10V/m perf. Criteria A<br>IEC/EN55014-2 perf. Criteria A                    |        |                 |     |       |

## SAFETY & COMPLIANCE

|                               |  |           |  |       |
|-------------------------------|--|-----------|--|-------|
| EFT/burst                     | IEC/EN61000-4-4 ±2KV perf. Criteria A<br>IEC/EN61000-4-4 ±4KV (See Fig.2 for recommended circuit) perf. Criteria A<br>IEC/EN55014-2 perf. Criteria A                           |           |  |       |
| surge                         | IEC/EN61000-4-5 line to line ±1KV perf. Criteria A<br>IEC/EN61000-4-5 line to line ±2KV (See Fig.2 for recommended circuit) perf. Criteria A<br>IEC/EN55014-2 perf. Criteria A |           |  |       |
| conducted immunity            | IEC/EN61000-4-6 10Vr.m.s perf. Criteria A<br>IEC/EN55014-2 perf. Criteria A  |           |  |       |
| voltage dips and interruption | IEC/EN61000-4-11 0%, 70% perf. Criteria B<br>IEC/EN55014-2 perf. Criteria B  |           |  |       |
| MTBF                          | MIL-HDBK-217F at 25°C  | 1,500,000 |  | hours |
| RoHS                          | yes  |           |  |       |

## ENVIRONMENTAL

| parameter             | conditions/description | min | typ | max | units |
|-----------------------|------------------------|-----|-----|-----|-------|
| operating temperature |                        | -40 |     | 85  | °C    |
| storage temperature   |                        | -40 |     | 85  | °C    |
| storage humidity      |                        | 0   |     | 95  | %     |

## SOLDERABILITY

| parameter      | conditions/description | min | typ | max | units |
|----------------|------------------------|-----|-----|-----|-------|
| wave soldering | 5~10 seconds max       | 255 | 260 | 265 | °C    |
| hand soldering | 3~5 seconds max        | 350 | 360 | 370 | °C    |

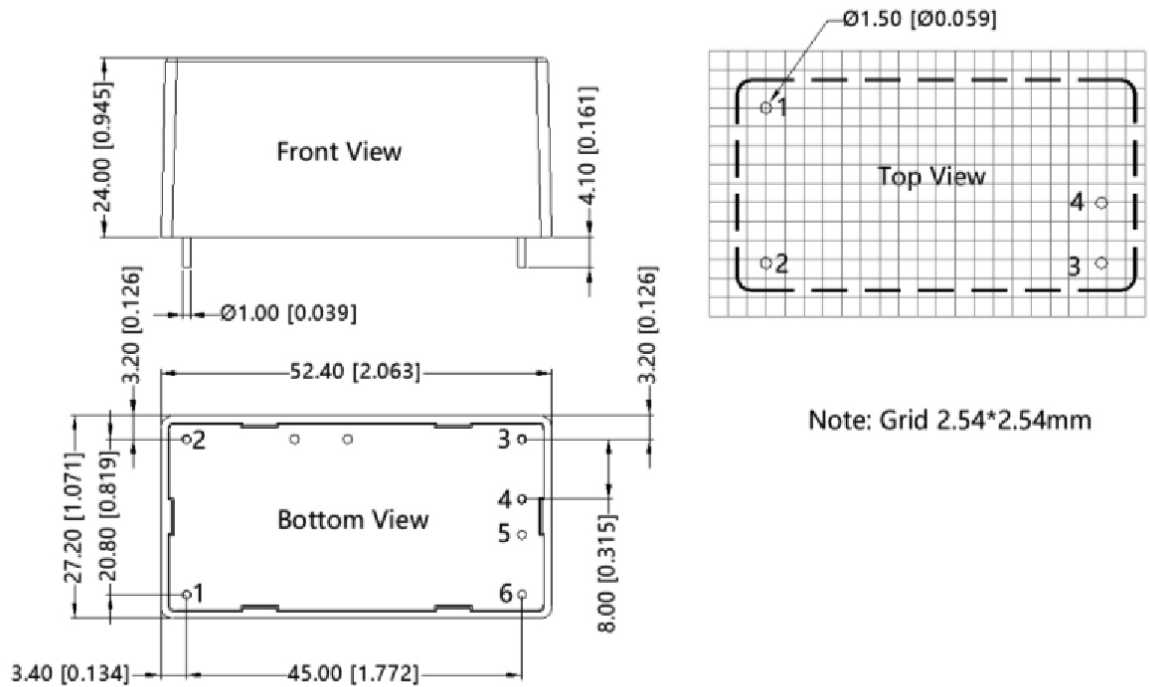
## MECHANICAL

| parameter     | conditions/description  | min | typ            | max | units          |
|---------------|---|-----|----------------|-----|----------------|
| dimensions    | DIP: 52.40 x 27.20 x 24.00<br>chassis mount: 76.00 x 31.50 x 32.80<br>DIN-rail: 76.00 x 31.50 x 37.40 |     |                |     | mm<br>mm<br>mm |
| weight        | DIP<br>chassis mount<br>DIN-rail  |     | 55<br>75<br>95 |     | g<br>g<br>g    |
| case material | Black plastic, flame-retardant and heat-resistant (UL94V-0)   |     |                |     |                |

## MECHANICAL DRAWING

units: mm [inch]  
 pin diameter tolerance:  $\pm 0.10$  [ $\pm 0.004$ ]  
 tolerance:  $\pm 0.50$  [ $\pm 0.020$ ]

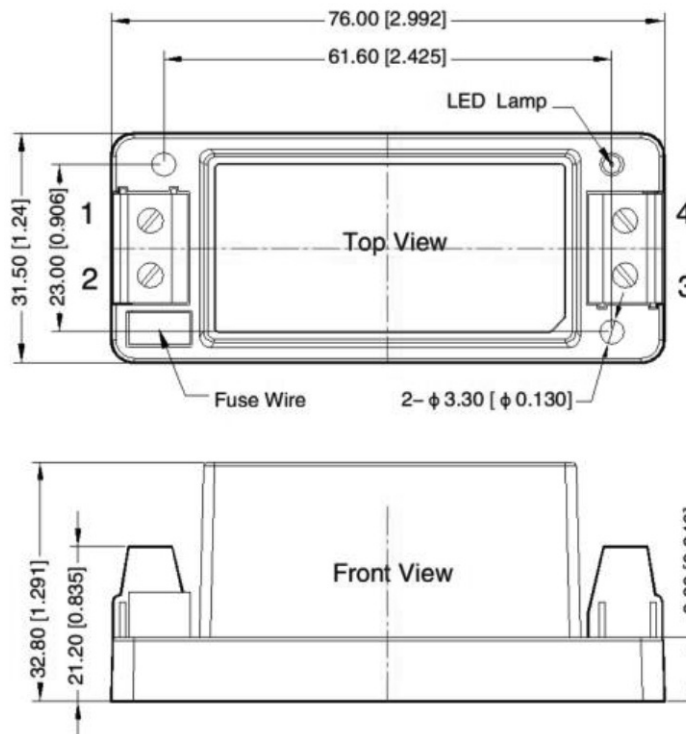
| PIN CONNECTIONS |          |
|-----------------|----------|
| PIN             | Function |
| 1               | AC(L)    |
| 2               | AC(N)    |
| 3               | -Vo      |
| 4               | +Vo      |
| 5               | no pin   |
| 6               | no pin   |



## MECHANICAL DRAWING

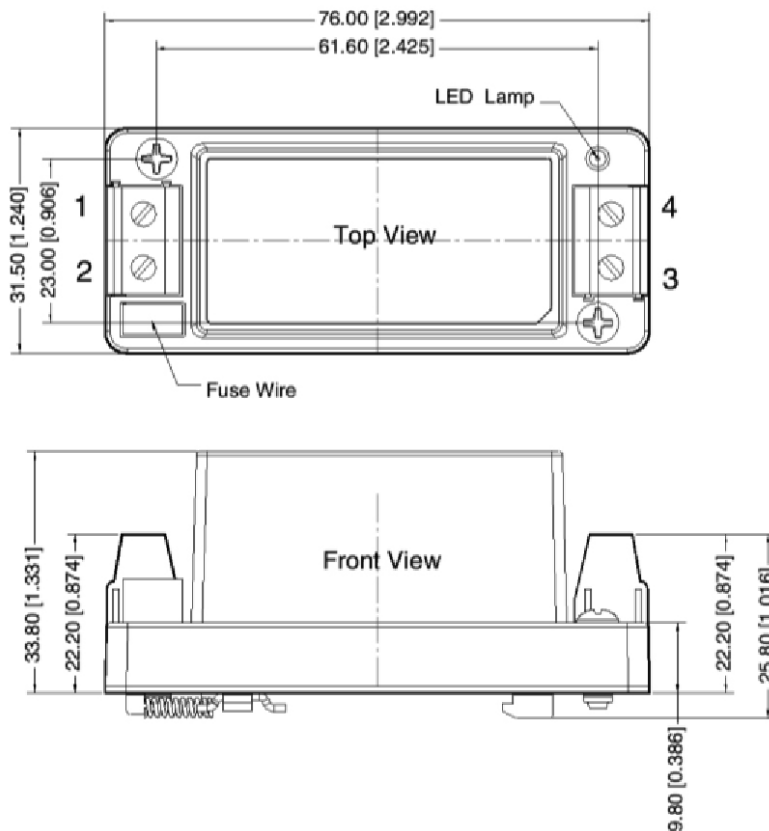
units: mm [inch]  
 wire range: 24~12 AWG  
 tightening torque: Max 0.4 N·m  
 tolerance: ±1.0 [±0.039]

| PIN CONNECTIONS |          |
|-----------------|----------|
| PIN             | Function |
| 1               | AC(N)    |
| 2               | AC(L)    |
| 3               | -Vo      |
| 4               | +Vo      |



units: mm [inch]  
 wire range: 24~12 AWG  
 tightening torque: Max 0.4 N·m  
 mounting rail: TS35, must be connected to safety ground  
 tolerance: ±1.0 [±0.039]

| PIN CONNECTIONS |          |
|-----------------|----------|
| PIN             | Function |
| 1               | AC(N)    |
| 2               | AC(L)    |
| 3               | -Vo      |
| 4               | +Vo      |



## APPLICATION DESIGN REFERENCE

Output Filtering Components:

C1 should be a ceramic capacitor and the TVS will help protect downstream electronics in the unlikely event of converter failure.

Figure 1

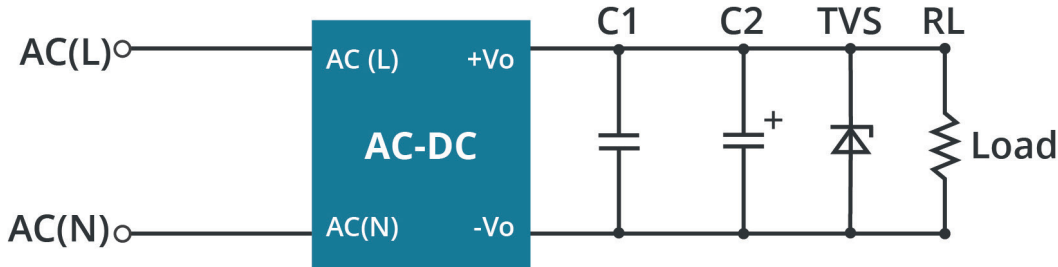


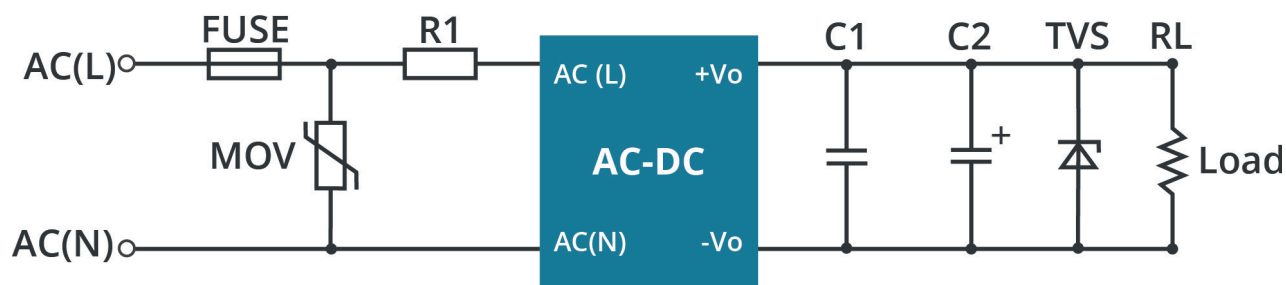
Table 1

| Part No.   | C1(μF)  | C2(μF)   | TVS      |
|------------|---------|----------|----------|
| PSK-20D-3  | 1μF/50V | 10μF/16V | SMBJ7.0A |
| PSK-20D-5  |         | 10μF/16V | SMBJ7.0A |
| PSK-20D-9  |         | 10μF/25V | SMBJ12A  |
| PSK-20D-12 |         | 10μF/25V | SMBJ20A  |
| PSK-20D-15 |         | 10μF/25V | SMBJ20A  |
| PSK-20D-24 |         | 10μF/35V | SMBJ30A  |

Note: 3.15A / 300V, slow-blow fuse integrated into unit

## EMC RECOMMENDED CIRCUIT

Figure 2

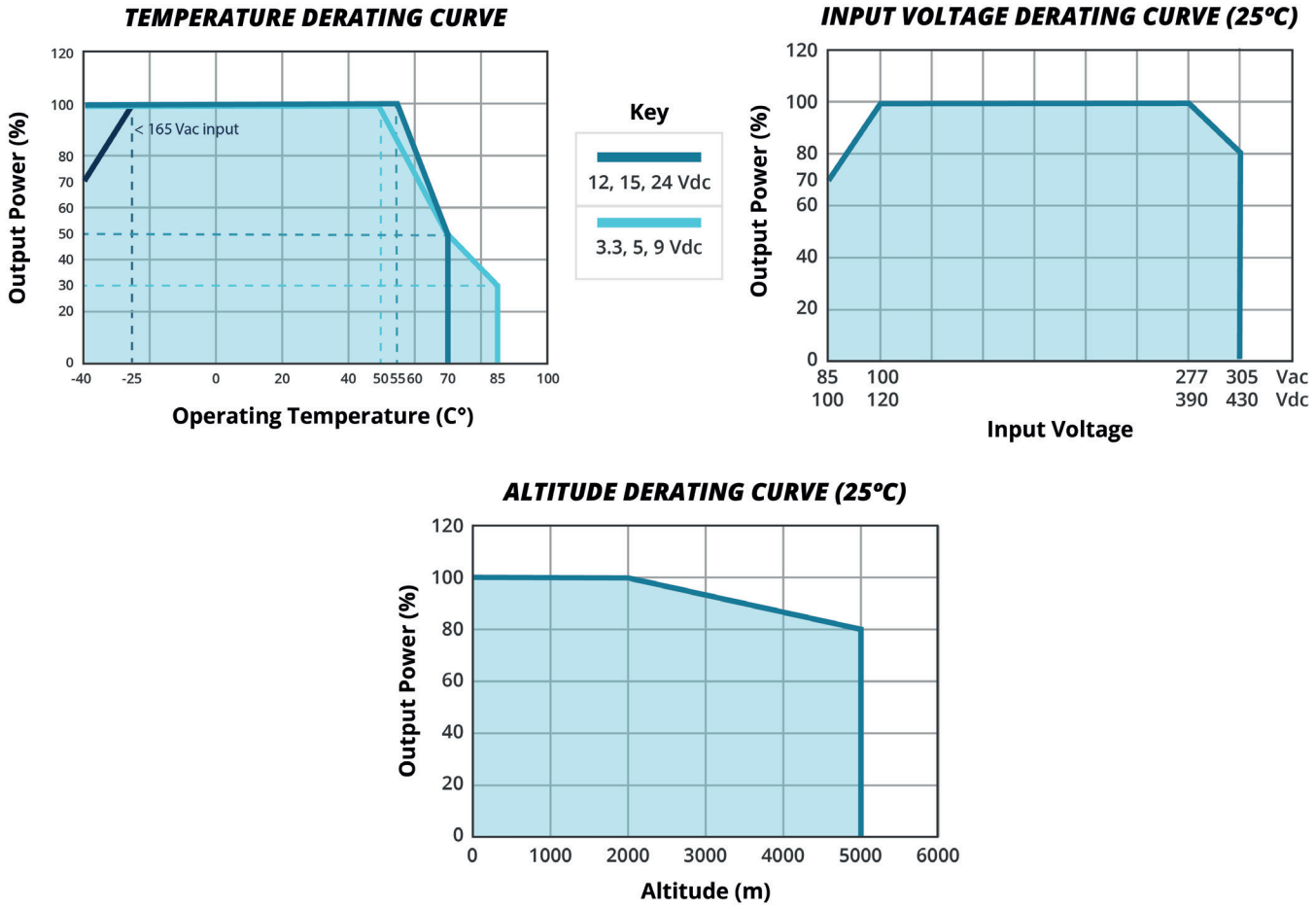


Note: EMC application circuit with higher requirements.

Table 2

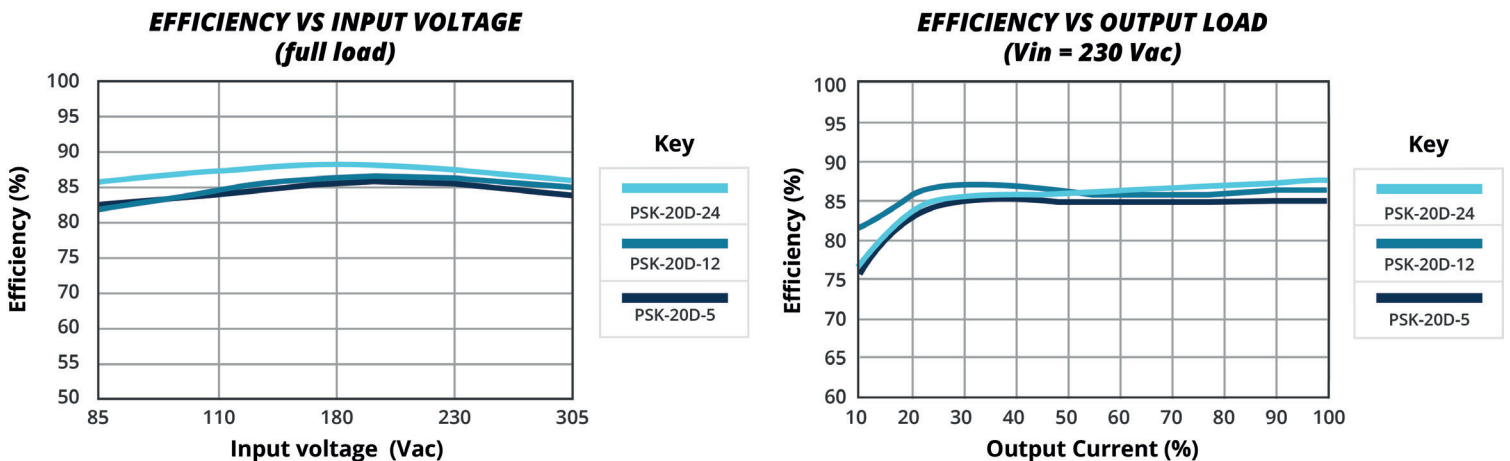
| Components | Recommended Value               |
|------------|---------------------------------|
| FUSE       | 3.15A/300V, slow-blow, required |
| MOV        | S14K350                         |
| R1         | 3Ω/3W                           |

## DERATING CURVE



Note: 1. With an AC input between 85~100V/277~305Vac and a DC input between 100~120V/390~430Vdc, the output power must be derated as per temperature derating curves.  
 2. This product is suitable for applications using natural air cooling; for applications in closed environment please consult with CUI.

## EFFICIENCY CURVES



## REVISION HISTORY

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| rev. | description                             | date       |
|------|---|------------|
| 1.0  | initial release                         | 01/27/2021 |
| 1.01 | over voltage category added to features | 04/06/2021 |
| 1.02 | derating and efficiency curves updated  | 01/27/2022 |
| 1.03 | UKCA mark added                         | 06/13/2022 |
| 1.04 | safeties updated                        | 01/16/2023 |
| 1.05 | medical icon added                      | 05/04/2023 |

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



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