

SERIES: PSK-15D | **DESCRIPTION:** INTERNAL AC-DC POWER SUPPLY

FEATURES

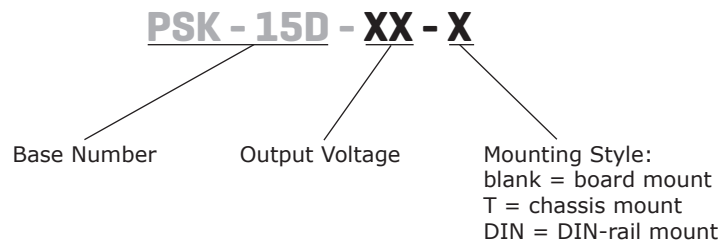
- wide input range (85 ~ 305 Vac)
- wide operating temperature range (-40 to +85 C)
- Class B emissions
- certified to 62368, 61558, and 60335 safety standards
- designed to meet 60601 medical safety standard (2xMOPP)
- over voltage, over current, short circuit protections
- input over voltage category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



| MODEL | output voltage | output current | output power | ripple and noise | efficiency |
|------------|----------------|----------------|--------------|------------------|------------|
| | (Vdc) | max (A) | max (W) | max (mVp-p) | typ (%) |
| PSK-15D-3 | 3.3 | 4.0 | 13.2 | 120 | 82 |
| PSK-15D-5 | 5 | 3.0 | 15.0 | 120 | 85 |
| PSK-15D-9 | 9 | 1.67 | 15.0 | 120 | 84 |
| PSK-15D-12 | 12 | 1.25 | 15.0 | 120 | 85 |
| PSK-15D-15 | 15 | 1.0 | 15.0 | 120 | 85 |
| PSK-15D-24 | 24 | 0.625 | 15.0 | 120 | 86 |

Notes: 1. At full load, nominal input, 20 MHz bandwidth oscilloscope, with output capacitors outlined in Figure/Table 1 below.
 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 | at 115 Vac | | | 0.45 | A |
| | at 230 Vac | | | 0.30 | A |
| inrush current | at 230 Vac | | 60 | | A |
| leakage current | at 277 Vac/50 Hz | | | 0.1 | mA |
| no load power consumption | 3.3, 5, 9, 12, 15 Vdc output models | | | 0.1 | W |
| | 24 Vdc output model | | | 0.12 | W |

OUTPUT

| parameter | conditions/description | min | typ | max | units |
|-------------------------|------------------------|-----|------|-------|-------|
| capacitive load | 3.3 Vdc output model | | | 6,600 | μF |
| | 5 Vdc output model | | | 5,000 | μF |
| | 9 Vdc output model | | | 3,000 | μF |
| | 12 Vdc output model | | | 2,000 | μF |
| | 15 Vdc output model | | | 1,500 | μF |
| | 24 Vdc output model | | | 680 | μF |
| output voltage accuracy | | | ±2 | | % |
| line regulation | at full load | | ±0.5 | | % |
| load regulation | 0~100% load | | ±1.0 | | % |
| hold-up time | at 115 Vac | | 10 | | ms |
| | at 230 Vac | | 55 | | ms |
| switching frequency | | | 65 | | kHz |

PROTECTIONS

| parameter | conditions/description | min | typ | max | units |
|--------------------------|-----------------------------------|-----|-----|-----|-------|
| over voltage protection | clamp or hiccup | | | | |
| | 3.3 & 5 Vdc output models | | | 7.5 | V |
| | 9 Vdc output model | | | 15 | V |
| | 12 & 15 Vdc output models | | | 20 | V |
| | 24 Vdc output model | | | 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 | 4,200 | | | 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/EN 55032 CLASS B CISPR11/EN 55011 CLASS B EN 55014-1 | | | | |
| ESD | IEC/EN 61000-4-2 Contact ±8KV perf. Criteria B IEC/EN 55014-2 perf. Criteria B | | | | |
| radiated immunity | IEC/EN 61000-4-3 10V/m perf. Criteria A IEC/EN 55014-2 perf. Criteria A | | | | |
| EFT/burst | IEC/EN 61000-4-4 ±2KV perf. Criteria B IEC/EN 61000-4-4 ±4KV (See Fig.2 for recommended circuit) perf. Criteria B IEC/EN 55014-2 perf. Criteria B | | | | |

SAFETY & COMPLIANCE

| | | | |
|-------------------------------|---|-----------|-------|
| surge | IEC/EN 61000-4-5 line to line ± 1 KV perf. Criteria B IEC/EN 61000-4-5 line to line ± 2 KV (See Fig.2 for recommended circuit) perf. Criteria B IEC/EN 55014-2 perf. Criteria B | | |
| conducted immunity | IEC/EN 61000-4-6 10Vr.m.s perf. Criteria A IEC/EN 55014-2 perf. Criteria A | | |
| voltage dips and interruption | IEC/EN 61000-4-11 0%, 70% perf. Criteria B IEC/EN 55014-2 perf. Criteria B | | |
| MTBF | MIL-HDBK-217F at 25°C | 3,200,000 | 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 |

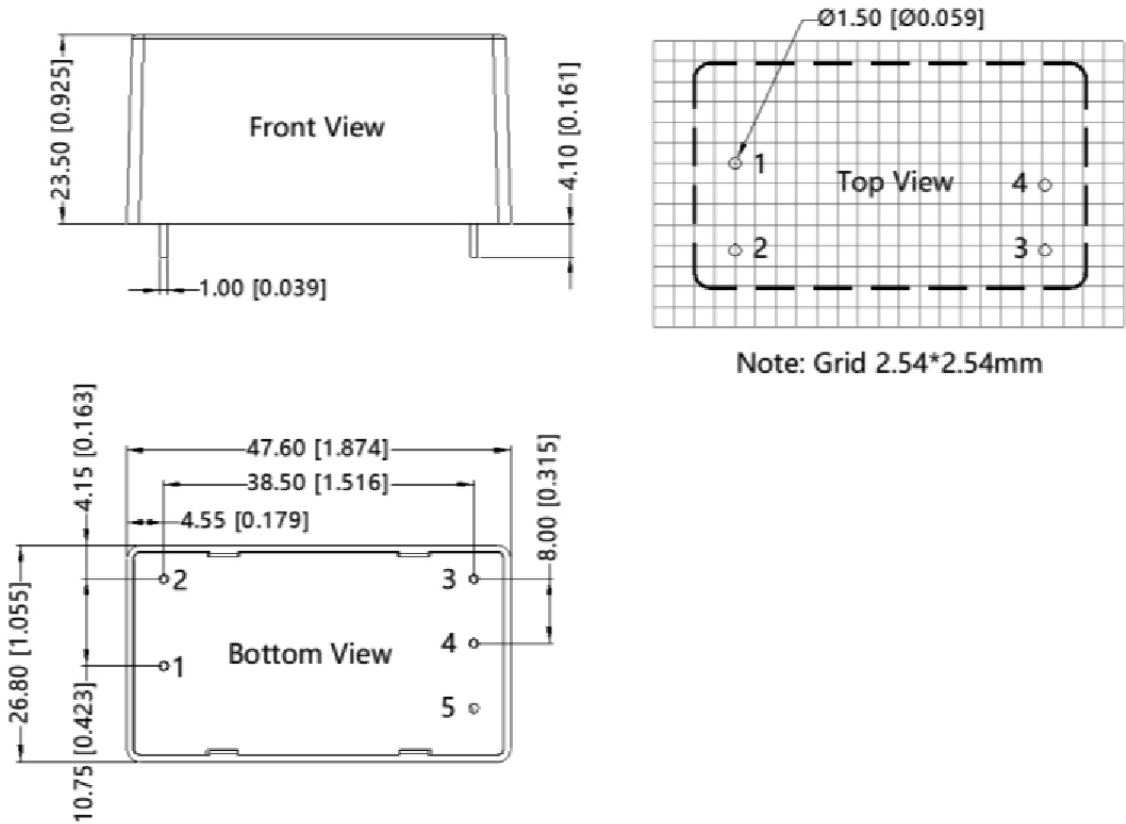
MECHANICAL

| parameter | conditions/description | min | typ | max | units |
|---------------|---|-----|----------------|-----|----------------|
| dimensions | DIP: 47.60 x 26.80 x 23.50 chassis mount: 76.00 x 31.50 x 32.30 DIN-rail: 76.00 x 31.50 x 36.90 | | | | mm mm mm |
| weight | DIP chassis mount DIN-rail | | 48 68 88 | | g g g |
| case material | lack plastic, flame-retardant and heat-resistant (UL94V-0) | | | | |

MECHANICAL DRAWING

units: mm [inch]
 pin diameter tolerance: ± 0.10 [± 0.004]
 tolerance: ± 0.50 [± 0.020]

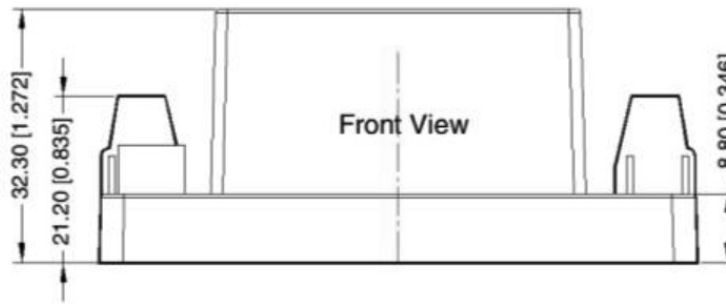
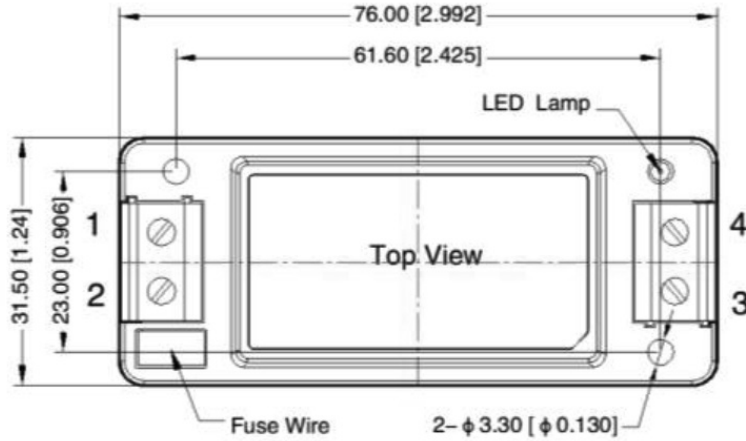
| PIN CONNECTIONS | |
|-----------------|----------|
| PIN | Function |
| 1 | AC(L) |
| 2 | AC(N) |
| 3 | -Vo |
| 4 | +Vo |
| 5 | no pin |



MECHANICAL DRAWING

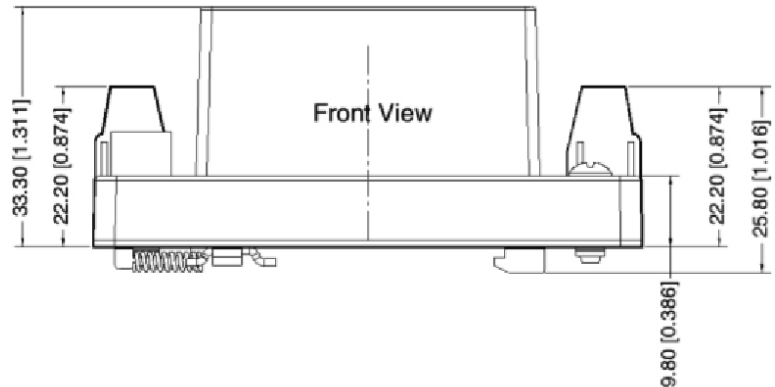
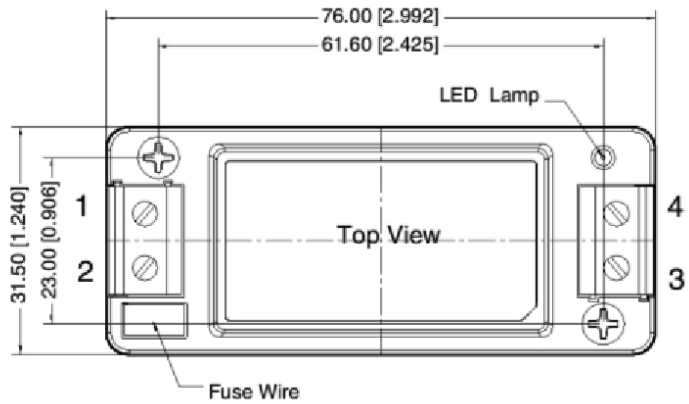
units: mm [inch]
 wire range: 24~12 AWG
 tightening torque: Max 0.4 N·m
 tolerance: ±1.0 [±0.039]

| 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

Figure 1

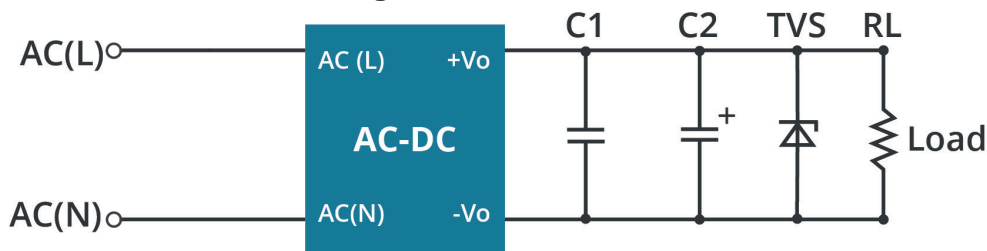


Table 1

| Part No. | C1(μF) | C2(μF) | TVS |
|------------|---------|-----------|----------|
| PSK-15D-3 | 1μF/50V | 220μF/16V | SMBJ7.0A |
| PSK-15D-5 | | 220μF/16V | SMBJ7.0A |
| PSK-15D-9 | | 100μF/25V | SMBJ12A |
| PSK-15D-12 | | 100μF/25V | SMBJ20A |
| PSK-15D-15 | | 100μF/25V | SMBJ20A |
| PSK-15D-24 | | 100uF/35V | SMBJ30A |

Note: 2A / 300V, slow-blow fuse integrated into unit.

Output Filtering Components:

An electrolytic capacitor with high frequency operation, low ESR, and at least 20% margin on rated output voltage is recommended for C2. C1 should be a ceramic capacitor and the TVS will help protect downstream electronics in the unlikely event of converter failure.

EMC RECOMMENDED CIRCUIT

Figure 2

EMC APPLICATION CIRCUIT WITH HIGHER REQUIREMENTS

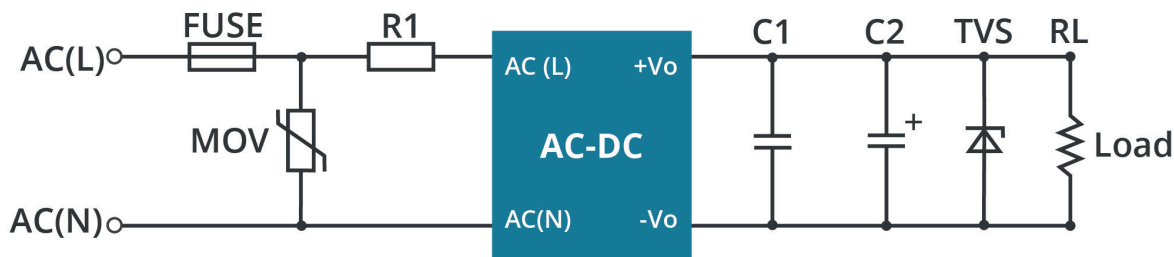
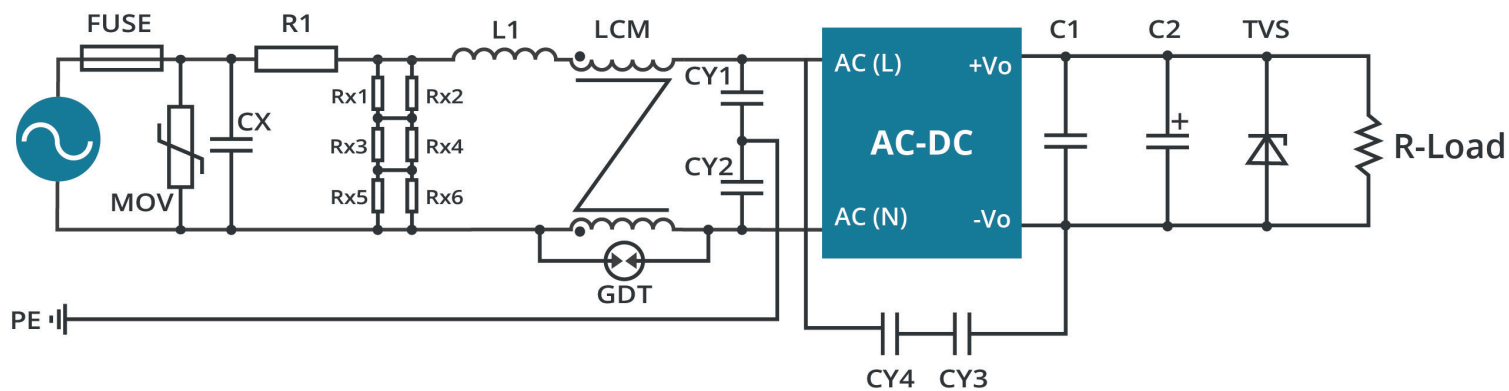


Table 2

| Components | Recommended Value |
|------------|---------------------------------|
| FUSE | 3.15A/300V, slow-blow, required |
| MOV | S14K350 |
| R1 | 6.8Ω/3W |

EMC RECOMMENDED CIRCUIT (CONTINUED)

Figure 3
RECCOMENDED CIRCUIT FOR CLASS I EQUIPMENT



Recommended when the output terminal of the product needs to be connected to PE or connected to PE through a Y capacitor

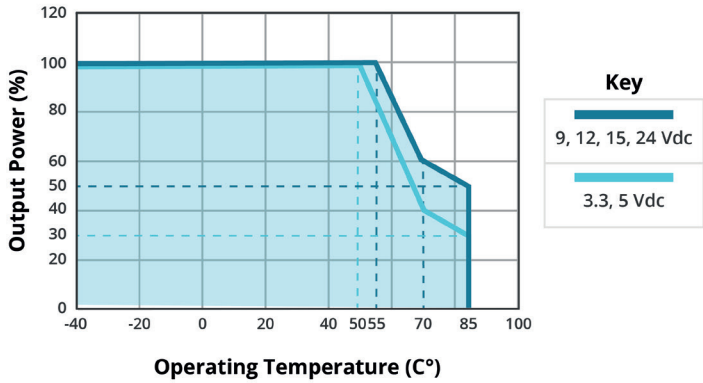
Table 3

| Components | Recommended Value |
|------------|--|
| FUSE | 3.15A/300V, slow-blow, required |
| MOV | S14K350 |
| CX | 334K/305Vac |
| R1 | 12Ω/5W (wire-wound resistor, required) |
| L1 | 1.2mH/0.5A |
| CY1/CY2 | 2.2nF/400Vac |
| CY3/CY4 | 1nF/400Vac |
| GDT | 300V/1KA |
| LCM | 20mH |

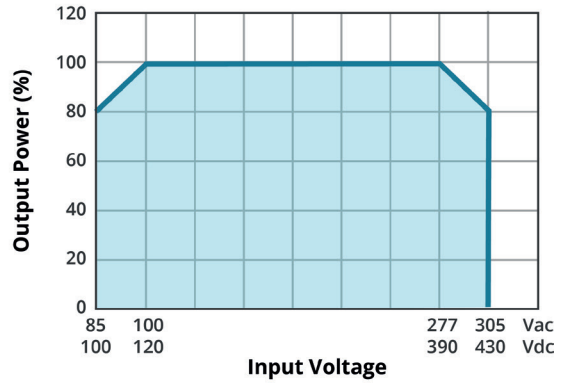
Note: Rx1/Rx2/Rx3/Rx4/Rx5/Rx6 is the bleeder resistance of CX, and the recommended resistance value is 1.5MΩ/150Vdc.

DERATING CURVE

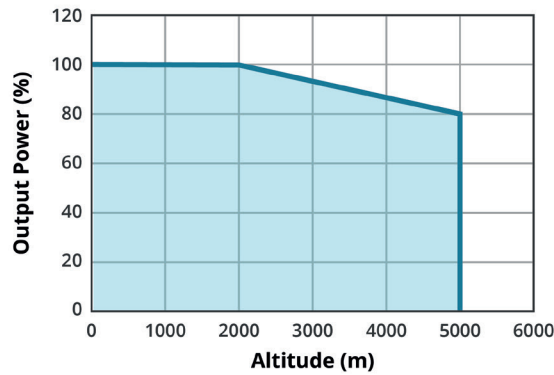
TEMPERATURE DERATING CURVE



INPUT VOLTAGE DERATING CURVE (25°C)



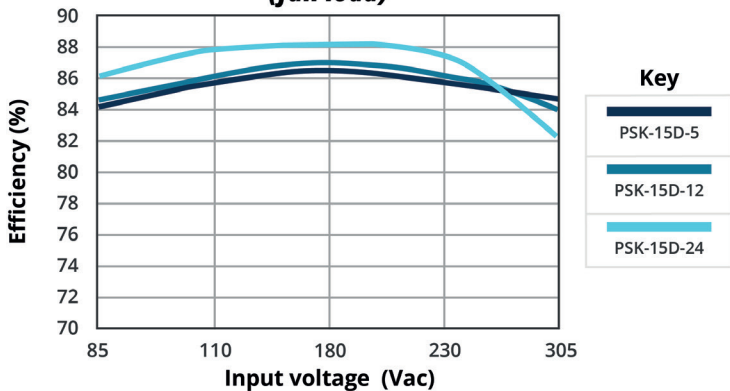
ALTITUDE DERATING CURVE (25°C)



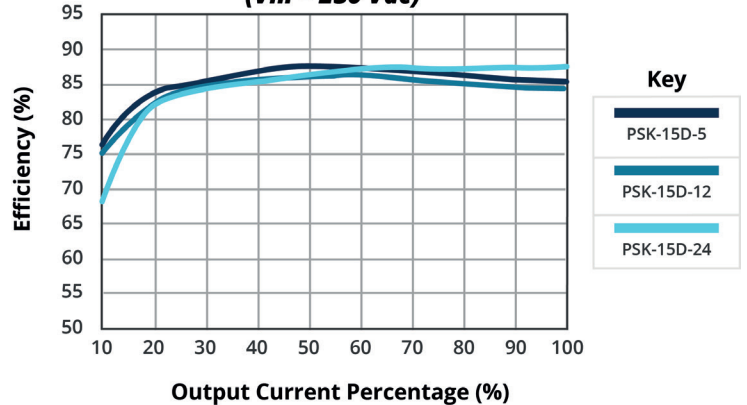
Note: 1. With an AC input between 85~100V/277~305Vac and a DC input between 100~120V/390~430Vdc, the output power must be derated as per temperature derating curves.
 2. This product is suitable for applications using natural air cooling; for applications in closed environment please consult with CUI.

EFFICIENCY CURVES

EFFICIENCY VS INPUT VOLTAGE (full load)



EFFICIENCY VS OUTPUT LOAD (Vin = 230 Vac)



REVISION HISTORY

| rev. | description | date |
|------|---|------------|
| 1.0 | initial release | 02/15/2021 |
| 1.01 | over voltage category added to features | 04/06/2021 |
| 1.02 | per PCN-65631480R-01, the no-load power consumption of the 5 Vdc and 12 Vdc output variants was modified to 0.3 W (max) for all date codes 2148 (YYWW) or later | 12/13/2021 |
| 1.03 | derating and efficiency curves updated | 01/25/2022 |
| 1.04 | no load power consumption updated | 05/03/2022 |
| 1.05 | added UKCA | 05/26/2022 |
| 1.06 | medical icon added | 05/04/2023 |
| 1.07 | isolation voltage updated, EMC circuit for Class I added | 01/10/2024 |
| 1.08 | no load power consumption updated | 03/05/2024 |

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



Headquarters
20050 SW 112th Ave.
Tualatin, OR 97062
800.275.4899

Fax 503.612.2383
cui.com
techsupport@cui.com

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