

## SERIES: PSK-60 | DESCRIPTION: INTERNAL AC-DC POWER SUPPLY

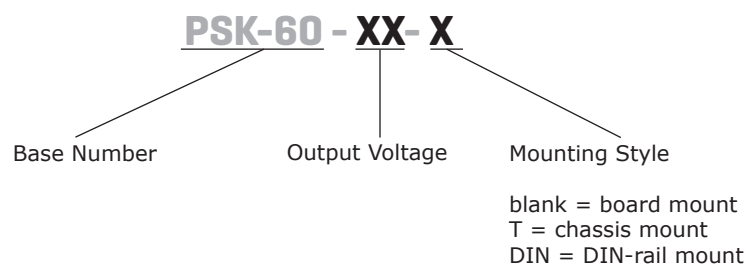
### FEATURES

- universal input voltage range (85~264 VAC)
- IEC/EN/UL 62368 certified
- meets CISPR32/EN 55032 Class B without external components
- 4,000 VAC isolation rating
- short-circuit, over-current, over-voltage protections



| MODEL     | output voltage | output current max | output power max | ripple and noise max | efficiency |
|-----------|----------------|--------------------|------------------|----------------------|------------|
|           | (Vdc)          | (A)                | (W)              | (mVp-p)              | typ (%)    |
| PSK-60-5  | 5              | 10.0               | 50               | 120                  | 84         |
| PSK-60-12 | 12             | 5.0                | 60               | 120                  | 87         |
| PSK-60-15 | 15             | 4.0                | 60               | 120                  | 88         |
| PSK-60-24 | 24             | 2.5                | 60               | 120                  | 89         |
| PSK-60-48 | 48             | 1.25               | 60               | 120                  | 90         |

### PART NUMBER KEY



## INPUT

| parameter                 | conditions/description | min | typ | max | units |
|---------------------------|------------------------|-----|-----|-----|-------|
| voltage                   | ac input               | 85  |     | 264 | Vac   |
|                           | dc input               | 100 |     | 370 | Vdc   |
| frequency                 |                        | 47  |     | 63  | Hz    |
| current                   | at 115 Vac             |     |     | 1.8 | A     |
|                           | at 230 Vac             |     |     | 1.0 |       |
| inrush current            | at 115 Vac             |     | 45  |     | A     |
|                           | at 230 Vac             |     | 90  |     |       |
| no load power consumption | at 230 Vac             |     |     | 0.5 | W     |

## OUTPUT

| parameter                  | conditions/description | min | typ        | max    | units   |
|----------------------------|------------------------|-----|------------|--------|---------|
| capacitive load            | 5 Vdc output           |     |            | 20,000 | $\mu$ F |
|                            | 12 Vdc output          |     |            | 4,000  |         |
|                            | 15 Vdc output          |     |            | 3,000  |         |
|                            | 24 Vdc output          |     |            | 1,800  |         |
|                            | 48 Vdc output          |     |            | 470    |         |
| initial set point accuracy | at full load           |     | $\pm 2$    |        | %       |
| line regulation            | rated load             |     | $\pm 0.5$  |        | %       |
| load regulation            | 0%~100% load           |     | $\pm 1.0$  |        | %       |
| hold-up time               | at 115 Vac             |     | 8          |        | ms      |
|                            | at 230 Vac             |     | 65         |        |         |
| temperature coefficient    |                        |     | $\pm 0.02$ |        | %/°C    |

## PROTECTIONS

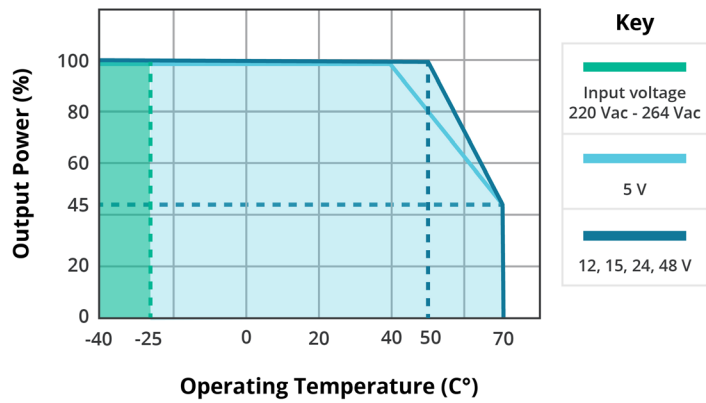
| parameter                | conditions/description            | min | typ | max | units |
|--------------------------|-----------------------------------|-----|-----|-----|-------|
| over voltage protection  | 5 Vdc output, clamp or hiccup     |     |     | 9   | Vdc   |
|                          | 12 Vdc output, clamp or hiccup    |     |     | 16  |       |
|                          | 15 Vdc output, clamp or hiccup    |     |     | 25  |       |
|                          | 24 Vdc output, clamp or hiccup    |     |     | 35  |       |
|                          | 48 Vdc output, clamp or hiccup    |     |     | 60  |       |
| over current protection  | auto recovery                     | 110 |     |     | %     |
| short circuit protection | hiccup, continuous, auto recovery |     |     |     |       |

## SAFETY & COMPLIANCE

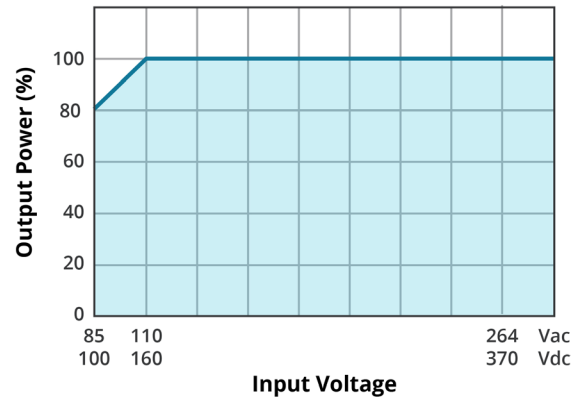
| parameter                     | conditions/description                                                                                             | min     | typ | max | units |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------|---------|-----|-----|-------|
| isolation voltage             | input to output                                                                                                    | 4,000   |     |     | Vac   |
| safety approvals              | UL/cUL, EN, IEC 62368                                                                                              |         |     |     |       |
| safety class                  | Class II                                                                                                           |         |     |     |       |
| EMI/EMC                       | CISPR 32/EN 55032 Class B                                                                                          |         |     |     |       |
| ESD                           | IEC/EN 61000-4-2 Contact $\pm 6$ KV/Air $\pm 8$ KV, perf. Criteria B                                               |         |     |     |       |
| radiated immunity             | IEC/EN 61000-4-3 10 V/m, perf. Criteria A                                                                          |         |     |     |       |
| EFT/burst                     | IEC/EN 61000-4-4 $\pm 4$ KV, perf. Criteria B                                                                      |         |     |     |       |
| surge                         | IEC/EN 61000-4-5 line to line $\pm 2$ KV/line to ground $\pm 4$ KV, perf. Criteria B (see recommended EMC circuit) |         |     |     |       |
|                               | IEC/EN 61000-4-5 $\pm 1$ KV line to line, perf. Criteria B                                                         |         |     |     |       |
| conducted immunity            | IEC/EN 61000-4-6 10 Vr.m.s, perf. Criteria A                                                                       |         |     |     |       |
| voltage dips and interruption | IEC/EN 61000-4-11 0%, 70%, perf. Criterial B                                                                       |         |     |     |       |
| MTBF                          | per MIL-HDBK-217F at 25 °C                                                                                         | 300,000 |     |     | hours |
| RoHS                          | yes                                                                                                                |         |     |     |       |

## DERATING CURVES

### TEMPERATURE DERATING CURVE

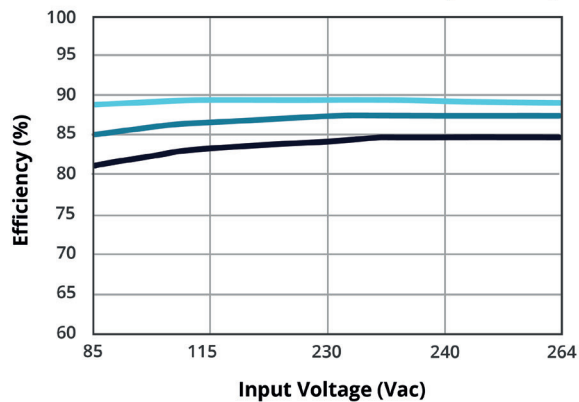


### INPUT VOLTAGE DERATING CURVE (25 °C)

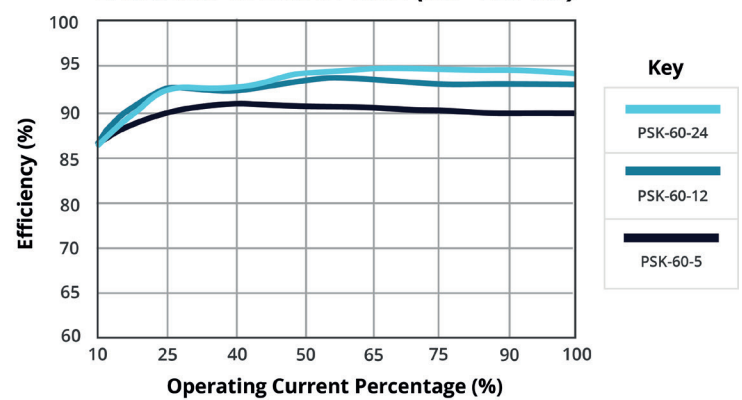


## EFFICIENCY CURVES

### EFFICIENCY VS INPUT VOLTAGE (Full load)



### EFFICIENCY VS OUTPUT LOAD (Vin = 230 Vac)



## ENVIRONMENTAL

| parameter             | conditions/description | min | typ | max | units |
|-----------------------|------------------------|-----|-----|-----|-------|
| operating temperature |                        | -40 |     | 70  | °C    |
| storage temperature   |                        | -40 |     | 85  | °C    |
| storage humidity      |                        | 0   |     | 95  | %     |

## SOLDERABILITY

| parameter      | conditions/description     | min | typ | max | units |
|----------------|----------------------------|-----|-----|-----|-------|
| wave soldering | 5~10 seconds ( $\pm 5$ °C) |     |     | 260 | °C    |
| manual welding | 3~5 seconds ( $\pm 10$ °C) |     |     | 360 | °C    |

## MECHANICAL

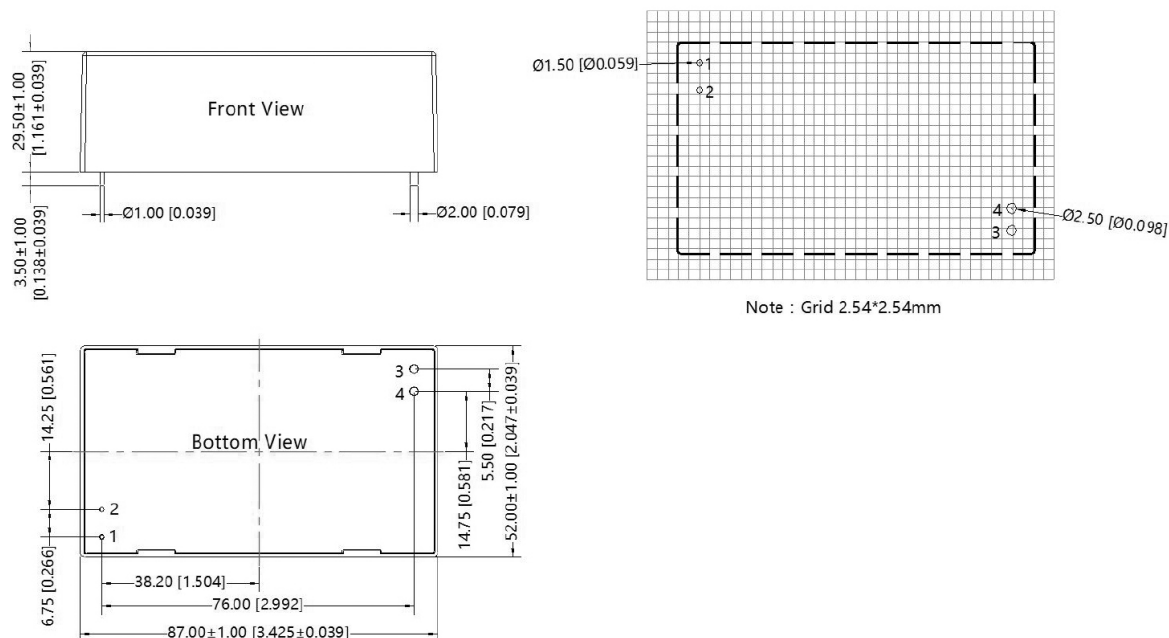
| parameter     | conditions/description                                      | min | typ | max | units |
|---------------|-------------------------------------------------------------|-----|-----|-----|-------|
| dimensions    | 87.00 x 52.00 x 29.50 (board mount)                         |     |     |     | mm    |
|               | 135.00 x 70.00 x 37.90 (chassis mount)                      |     |     |     | mm    |
|               | 137.00 x 70.00 x 42.40 (DIN-rail)                           |     |     |     | mm    |
| weight        | board mount                                                 |     | 210 |     | g     |
|               | chassis mount                                               |     | 290 |     | g     |
|               | DIN-rail                                                    |     | 360 |     | g     |
| cooling       | free air convection                                         |     |     |     |       |
| case material | black plastic, flame-retardant and heat-resistant (UL94V-0) |     |     |     |       |

## MECHANICAL DRAWING (BOARD MOUNT)

units: mm [inch]

pin diameter tolerance:  $\pm 0.1$  [ $\pm 0.004$ ]

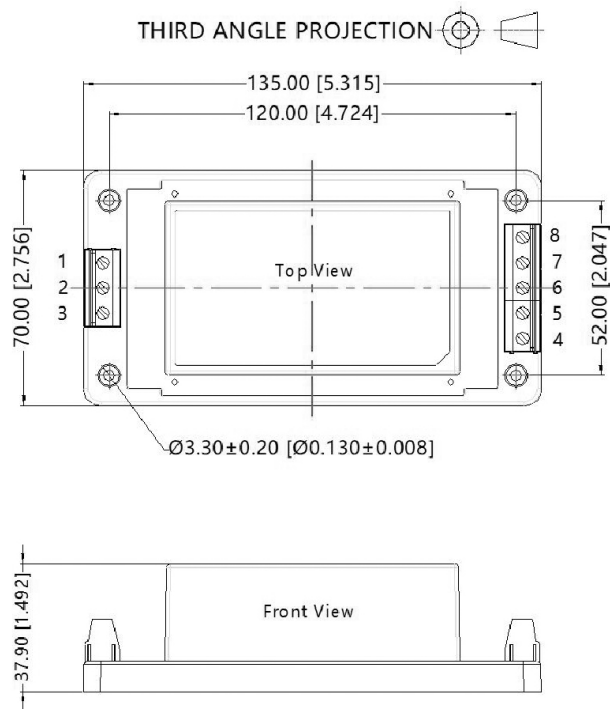
| PIN CONNECTIONS |          |
|-----------------|----------|
| PIN             | Function |
| 1               | AC(L)    |
| 2               | AC(N)    |
| 3               | +Vo      |
| 4               | -Vo      |



## MECHANICAL DRAWING (CHASSIS MOUNT)

units: mm [inch]  
 tolerance:  $\pm 1.00$  [ $\pm 0.040$ ]  
 wire range: 24 - 12 AWG  
 tightening torque: 0.4 N·m

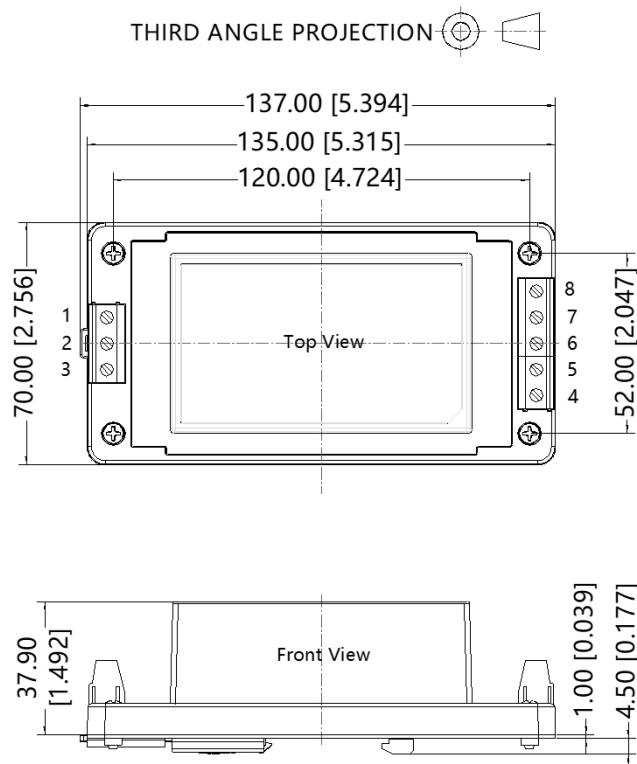
| PIN CONNECTIONS |          |
|-----------------|----------|
| PIN             | Function |
| 1               | AC(L)    |
| 2               | NC       |
| 3               | AC(N)    |
| 4               | +Vo      |
| 5               | -Vo      |
| 6               | NC       |
| 7               | NC       |
| 8               | NC       |



## MECHANICAL DRAWING (DIN-RAIL MOUNT)

units: mm [inch]  
 tolerance:  $\pm 1.00$  [ $\pm 0.040$ ]  
 wire range: 24 - 12 AWG  
 tightening torque: 0.4 N·m  
 installed on DIN-RAIL TS35

| PIN CONNECTIONS |          |
|-----------------|----------|
| PIN             | Function |
| 1               | AC(L)    |
| 2               | NC       |
| 3               | AC(N)    |
| 4               | +Vo      |
| 5               | -Vo      |
| 6               | NC       |
| 7               | NC       |
| 8               | NC       |



## APPLICATION CIRCUIT

Figure 1

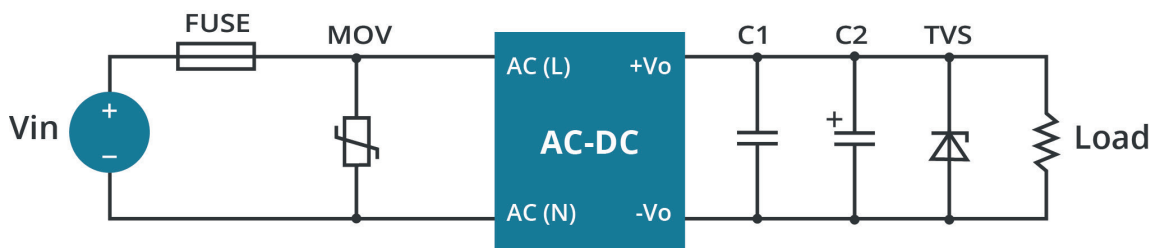


Table 1

| Recommended External Circuit Components |           |             |                          |         |          |
|-----------------------------------------|-----------|-------------|--------------------------|---------|----------|
| Part no.                                | C1        | C2          | FUSE                     | MOV     | TVS      |
| PSK-60-5                                | 1 $\mu$ F | 680 $\mu$ F | 3.15A/250V,<br>slow-blow | S10K300 | SMBJ7.0A |
| PSK-60-12                               |           | 330 $\mu$ F |                          |         | SMBJ20A  |
| PSK-60-15                               |           | 330 $\mu$ F |                          |         | SMBJ20A  |
| PSK-60-24                               |           | 200 $\mu$ F |                          |         | SMBJ30A  |
| PSK-60-48                               |           | 100 $\mu$ F |                          |         | SMBJ64A  |

## EMC RECOMMENDED CIRCUIT

Figure 2

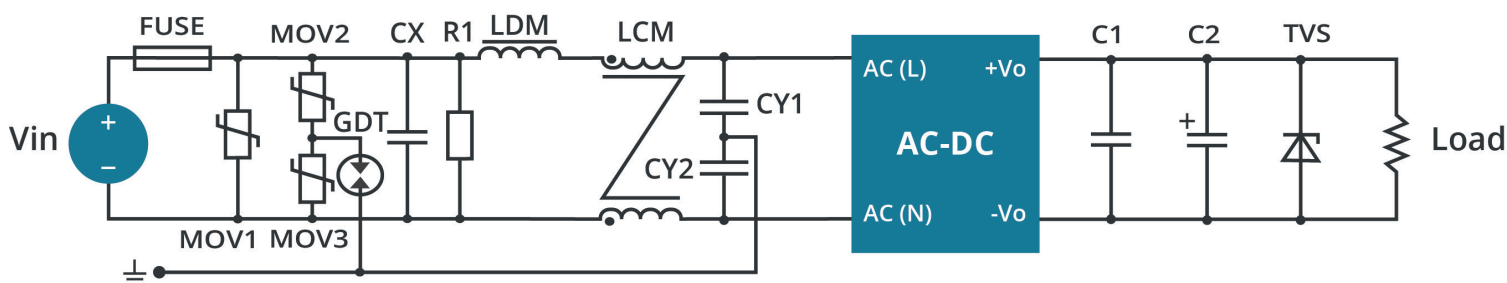


Table 2

| Component | Reccomended value               |
|-----------|---------------------------------|
| FUSE      | 3.15A/250V, slow-blow, required |
| MOV1      | S20K300                         |
| MOV2/MOV3 | S10K300                         |
| GDT       | EM3600XS                        |
| CX        | 0.22 $\mu$ F / 275 Vac          |
| CY1, CY2  | 1 nF / 400 Vac                  |
| R1        | 1 M $\Omega$ / 2 W              |
| LDM       | 4.7 $\mu$ H                     |
| LCM       | 2 mH                            |

## REVISION HISTORY

| rev. | description                         | date       |
|------|-------------------------------------|------------|
| 1.0  | initial release                     | 07/14/2020 |
| 1.01 | din-rail mechanical drawing updated | 03/12/2021 |
| 1.02 | figure and circuit drawings updated | 03/25/2021 |
| 1.03 | UKCA mark added                     | 06/06/2022 |

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



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