

# P5CU-xxxxE/Z LF



## PM1-SERIES

Rev.02-2009

- ✓ 0.75 Watt
- ✓ Unregulated
- ✓ **Single** and **Dual** Output
- ✓ **SIP7** Case
- ✓ **1 kV** DC I/O Isolation
- ✓ Low Ripple and Noise

The PM1 series P5CU-xxxxE/ZLF is a family of cost effective 0.75 W single & dual output DC-DC converters. These converters are in an ultra miniature SIP7 case. Devices are encapsulated. High performance features: 1000VDC input/output isolation, high efficiency operation, output voltage accuracy of  $\pm 3\%$  maximum, input range of  $\pm 10\%$  tolerance and low output ripple and noise.

All specifications typical at  $T_a=25^\circ\text{C}$ , nominal input voltage and full load unless otherwise specified

### Input Specifications

|   |             |
|---|-------------|
| Voltage Range                               | $\pm 10\%$  |
| Input Filter                                | Capacitor   |
| Input Reflected Ripple Current <sup>1</sup> | 20 mA pk-pk |

### Output Specifications

|                                    |   |
|------------------------------------|---|
| Voltage Accuracy                   | $\pm 3\%$                                 |
| Short Circuit Protection           | Short Term                                |
| Line Regulation                    | $\pm 1.2\% / 1\%$ Vin Change              |
| Load Regulation (20% - 100%)       | $\pm 10\%$ (3.3 Vout Models: $\pm 20\%$ ) |
| Ripple and Noise (20Mhz bandwidth) | 75 mV pk-pk                               |
| Temperature Coefficient            | $\pm 0.02\% / ^\circ\text{C}$             |

### General Specifications

|   |                   |
|---|-------------------|
| Efficiency                                  | See Table         |
| I/O Isolation Voltage (3 sec.)              | 1000 VDC          |
| I/O Isolation Capacity                      | 60 pF, typ.       |
| I/O Isolation Resistance                    | 1000 M Ohm        |
| Switching Frequency                         | 80 kHz (Variable) |
| Humidity                                    | 95% rel H         |
| Reliability Calculated MTBF (MIL-HDBK-217F) | > 1.121 Mhrs      |

### Physical Specifications

|                  |  |
|------------------|--|
| Case Material    | Non Conductive Black Plastic (UL94V-0 rated) |
| Potting Material | Epoxy (UL94V-0 rated)                        |
| Weight           | ~ 2.3g, typ.                                 |

### Environment Specifications

|                          |   |
|--------------------------|---|
| Operating Temperature    | -40 to +85 $^\circ\text{C}$ (ambient)                         |
| Maximum Case Temperature | 100 $^\circ\text{C}$  |
| Storage Temperature      | -40 to +125 $^\circ\text{C}$                                  |
| Cooling                  | Free Air Convection (10 mm distance required)                 |
| RoHS Conform             | Soldering 260 $^\circ\text{C}$ , max. (1.5 mm from case 10s.) |

# Selection Guide

## Single Output

| Order #              | Input Voltage (VDC) | Input Current No Load (mA) | Input Current Full Load (mA) | Output Voltage (VDC) | Output Current Full Load (mA) | Efficiency (%) | Capacitor Load (µF) <sup>2</sup> |
|----------------------|---------------------|----------------------------|------------------------------|----------------------|-------------------------------|----------------|----------------------------------|
| <b>SINGLE OUTPUT</b> |                     |                            |                              |                      |                               |                |                                  |
| P5CU-053R3ELF        | 5                   | 30                         | 205                          | 3.3                  | 227.3                         | 73             | 220                              |
| P5CU-0505ELF         | 5                   | 30                         | 200                          | 5                    | 150                           | 75             | 220                              |
| P5CU-057R2ELF        | 5                   | 30                         | 202                          | 7.2                  | 104.2                         | 74             | 220                              |
| P5CU-0509ELF         | 5                   | 30                         | 200                          | 9                    | 83.3                          | 75             | 220                              |
| P5CU-0512ELF         | 5                   | 30                         | 197                          | 12                   | 62.5                          | 76             | 220                              |
| P5CU-0515ELF         | 5                   | 30                         | 197                          | 15                   | 50                            | 76             | 220                              |
| P5CU-0518ELF         | 5                   | 30                         | 197                          | 18                   | 41.7                          | 76             | 220                              |
| P5CU-0524ELF         | 5                   | 30                         | 194                          | 24                   | 31.2                          | 77             | 220                              |
| P5CU-123R3ELF        | 12                  | 20                         | 85                           | 3.3                  | 227.3                         | 73             | 220                              |
| P5CU-1205ELF         | 12                  | 20                         | 84                           | 5                    | 150                           | 74             | 220                              |
| P5CU-127R2ELF        | 12                  | 20                         | 84                           | 7.2                  | 104.2                         | 74             | 220                              |
| P5CU-1209ELF         | 12                  | 20                         | 83                           | 9                    | 83.3                          | 75             | 220                              |
| P5CU-1212ELF         | 12                  | 20                         | 81                           | 12                   | 62.5                          | 77             | 220                              |
| P5CU-1215ELF         | 12                  | 20                         | 80                           | 15                   | 50                            | 78             | 220                              |
| P5CU-1218ELF         | 12                  | 20                         | 80                           | 18                   | 41.7                          | 78             | 220                              |
| P5CU-1224ELF         | 12                  | 20                         | 80                           | 24                   | 31.2                          | 78             | 220                              |
| P5CU-243R3ELF        | 24                  | 10                         | 42                           | 3.3                  | 227.3                         | 74             | 220                              |
| P5CU-2405ELF         | 24                  | 10                         | 42                           | 5                    | 150                           | 74             | 220                              |
| P5CU-247R2ELF        | 24                  | 10                         | 41                           | 7.2                  | 104.2                         | 75             | 220                              |
| P5CU-2409ELF         | 24                  | 10                         | 41                           | 9                    | 83.3                          | 75             | 220                              |
| P5CU-2412ELF         | 24                  | 10                         | 40                           | 12                   | 62.5                          | 78             | 220                              |
| P5CU-2415ELF         | 24                  | 10                         | 40                           | 15                   | 50                            | 78             | 220                              |
| P5CU-2418ELF         | 24                  | 10                         | 40                           | 18                   | 41.7                          | 78             | 220                              |
| P5CU-2424ELF         | 24                  | 10                         | 39                           | 24                   | 31.2                          | 80             | 220                              |
| P5CU-483R3ELF        | 48                  | 6                          | 21                           | 3.3                  | 227.3                         | 72             | 220                              |
| P5CU-4805ELF         | 48                  | 6                          | 21                           | 5                    | 150                           | 72             | 220                              |
| P5CU-487R2ELF        | 48                  | 6                          | 21                           | 7.2                  | 104.2                         | 72             | 220                              |
| P5CU-4809ELF         | 48                  | 6                          | 21                           | 9                    | 83.3                          | 74             | 220                              |
| P5CU-4812ELF         | 48                  | 6                          | 21                           | 12                   | 62.5                          | 74             | 220                              |
| P5CU-4815ELF         | 48                  | 6                          | 20                           | 15                   | 50                            | 75             | 220                              |
| P5CU-4818ELF         | 48                  | 6                          | 20                           | 18                   | 41.7                          | 75             | 220                              |
| P5CU-4824ELF         | 48                  | 6                          | 21                           | 24                   | 31.2                          | 73             | 220                              |

If you need other specifications, please enquire.

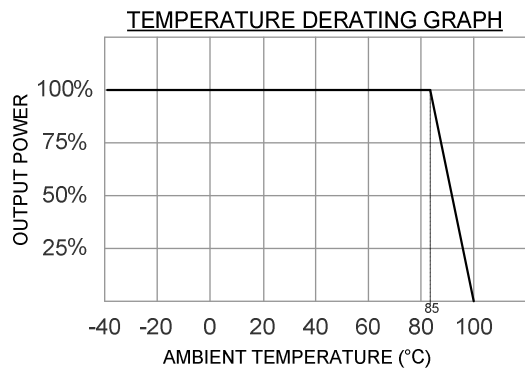
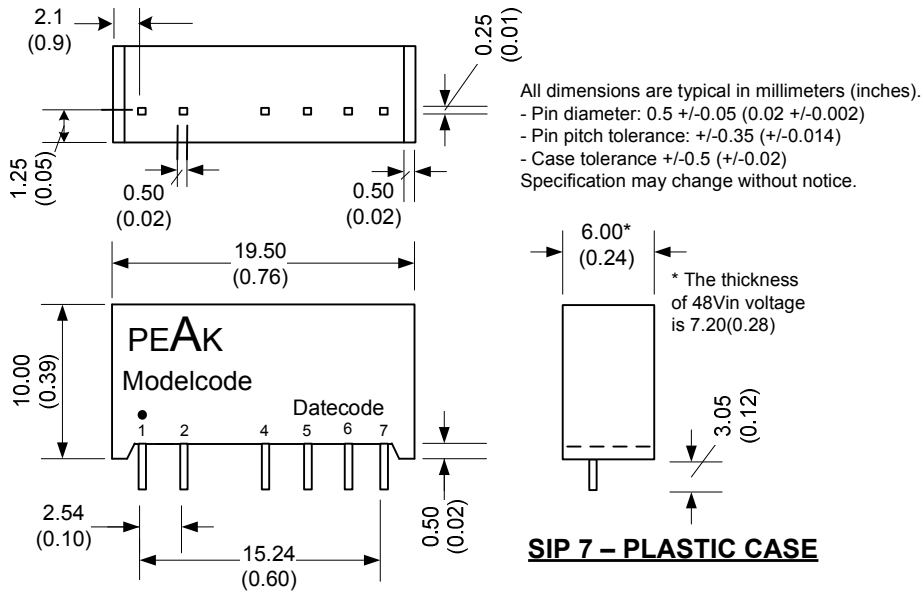
# Selection Guide

## Dual Output

| Order #            | Input Voltage (VDC) | Input Current No Load (mA) | Input Current Full Load (mA) | Output Voltage (VDC) | Output Current Full Load (mA) | Efficiency (%) | Capacitor Load (µF) <sup>2</sup> |
|--------------------|---------------------|----------------------------|------------------------------|----------------------|-------------------------------|----------------|----------------------------------|
| <b>DUAL OUTPUT</b> |                     |                            |                              |                      |                               |                |                                  |
| P5CU-053R3ZLF      | 5                   | 30                         | 230                          | ± 3.3                | ± 113.6                       | 65             | ± 100                            |
| P5CU-0505ZLF       | 5                   | 30                         | 211                          | ± 5                  | ± 75                          | 71             | ± 100                            |
| P5CU-057R2ZLF      | 5                   | 30                         | 202                          | ± 7.2                | ± 52                          | 74             | ± 100                            |
| P5CU-0509ZLF       | 5                   | 30                         | 202                          | ± 9                  | ± 41.6                        | 74             | ± 100                            |
| P5CU-0512ZLF       | 5                   | 30                         | 197                          | ± 12                 | ± 31.2                        | 76             | ± 100                            |
| P5CU-0515ZLF       | 5                   | 30                         | 197                          | ± 15                 | ± 25                          | 76             | ± 100                            |
| P5CU-0518ZLF       | 5                   | 30                         | 189                          | ± 18                 | ± 20.8                        | 79             | ± 100                            |
| P5CU-0524ZLF       | 5                   | 30                         | 189                          | ± 24                 | ± 15.6                        | 79             | ± 100                            |
| P5CU-123R3ZLF      | 12                  | 20                         | 126                          | ± 3.3                | ± 113.6                       | 65             | ± 100                            |
| P5CU-1205ZLF       | 12                  | 20                         | 85                           | ± 5                  | ± 75                          | 73             | ± 100                            |
| P5CU-127R2ZLF      | 12                  | 20                         | 84                           | ± 7.2                | ± 52                          | 74             | ± 100                            |
| P5CU-1209ZLF       | 12                  | 20                         | 84                           | ± 9                  | ± 41.6                        | 74             | ± 100                            |
| P5CU-1212ZLF       | 12                  | 20                         | 80                           | ± 12                 | ± 31.2                        | 78             | ± 100                            |
| P5CU-1215ZLF       | 12                  | 20                         | 78                           | ± 15                 | ± 25                          | 80             | ± 100                            |
| P5CU-1218ZLF       | 12                  | 20                         | 78                           | ± 18                 | ± 20.8                        | 80             | ± 100                            |
| P5CU-1224ZLF       | 12                  | 20                         | 80                           | ± 24                 | ± 15.6                        | 78             | ± 100                            |
| P5CU-243R3ZLF      | 24                  | 10                         | 46                           | ± 3.3                | ± 113.6                       | 67             | ± 100                            |
| P5CU-2405ZLF       | 24                  | 10                         | 42                           | ± 5                  | ± 75                          | 74             | ± 100                            |
| P5CU-247R2ZLF      | 24                  | 10                         | 41                           | ± 7.2                | ± 52                          | 76             | ± 100                            |
| P5CU-2409ZLF       | 24                  | 10                         | 41                           | ± 9                  | ± 41.6                        | 76             | ± 100                            |
| P5CU-2412ZLF       | 24                  | 10                         | 40                           | ± 12                 | ± 31.2                        | 78             | ± 100                            |
| P5CU-2415ZLF       | 24                  | 10                         | 40                           | ± 15                 | ± 25                          | 78             | ± 100                            |
| P5CU-2418ZLF       | 24                  | 10                         | 40                           | ± 18                 | ± 20.8                        | 78             | ± 100                            |
| P5CU-2424ZLF       | 24                  | 10                         | 40                           | ± 24                 | ± 15.6                        | 78             | ± 100                            |
| P5CU-483R3ZLF      | 48                  | 6                          | 25                           | ± 3.3                | ± 113.6                       | 62             | ± 100                            |
| P5CU-4805ZLF       | 48                  | 6                          | 24                           | ± 5                  | ± 75                          | 65             | ± 100                            |
| P5CU-487R2ZLF      | 48                  | 6                          | 22                           | ± 7.2                | ± 52                          | 70             | ± 100                            |
| P5CU-4809ZLF       | 48                  | 6                          | 21                           | ± 9                  | ± 41.6                        | 72             | ± 100                            |
| P5CU-4812ZLF       | 48                  | 6                          | 21                           | ± 12                 | ± 31.2                        | 74             | ± 100                            |
| P5CU-4815ZLF       | 48                  | 6                          | 21                           | ± 15                 | ± 25                          | 74             | ± 100                            |
| P5CU-4818ZLF       | 48                  | 6                          | 21                           | ± 18                 | ± 20.8                        | 72             | ± 100                            |
| P5CU-4824ZLF       | 48                  | 6                          | 22                           | ± 24                 | ± 15.6                        | 70             | ± 100                            |

If you need other specifications, please enquire.

# Package / Pinning / Derating



| PIN CONNECTIONS |         |         |
|-----------------|---------|---------|
| #               | SINGLE  | DUAL    |
| 1               | +Vin    | +Vin    |
| 2               | - Vin   | - Vin   |
| 4               | - Vout  | - Vout  |
| 5               | Omitted | Common  |
| 6               | +Vout   | +Vout   |
| 7               | Omitted | Omitted |

## App Notes:

<sup>1</sup> = Measured Input reflected ripple current with a simulated source inductance of 12uH.

<sup>2</sup> = Tested by minimal Vin and constant resistive load.

- Operation under no-load conditions will not damage these devices, but they will not observe the listed specifications.