

# P3LU-xxxxE/Z(Hxx)LF



## PM1-SERIES

Rev.02-2009

- ✓ 0.5 Watt
- ✓ Unregulated
- ✓ **Single** and **Dual** Output
- ✓ **SIP7** Case
- ✓ **3 kV - 6 kV** DC I/O Isolation\*
- ✓ Low Ripple and Noise

The PM1 series P3LU-xxxxE/Z(Hxx)LF is a family of cost effective 0.5 W single & dual output DC-DC converters. These converters are in an ultra miniature SIP7 case. Devices are encapsulated. High performance features: 3000VDC up to 6000VDC 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%)       | $\pm 10\%$ (3.3Vout 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.)              | 3000 VDC (up to 6000 VDC optional)* |
| I/O Isolation Capacity                      | 60 pF, typ.                         |
| I/O Isolation Resistance                    | 1000 MOhm                           |
| 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 °C (ambient)                        |
| Maximum Case Temperature | 100 °C   |
| Storage Temperature      | -40 to +125 °C                                 |
| Cooling                  | Free Air Convection (10 mm distance required)  |
| RoHS Conform             | Soldering 260 °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) |
|----------------------|---------------------|----------------------------|------------------------------|----------------------|-------------------------------|----------------|---------------------|
| <b>SINGLE OUTPUT</b> |                     |                            |                              |                      |                               |                |                     |
| P3LU-053R3ELF        | 5                   | 30                         | 142                          | 3.3                  | 151.5                         | 70             | 220                 |
| P3LU-0505ELF         | 5                   | 30                         | 135                          | 5                    | 100                           | 74             | 220                 |
| P3LU-057R2ELF        | 5                   | 30                         | 135                          | 7.2                  | 69.4                          | 74             | 220                 |
| P3LU-0509ELF         | 5                   | 30                         | 133                          | 9                    | 55.5                          | 75             | 220                 |
| P3LU-0512ELF         | 5                   | 30                         | 131                          | 12                   | 41.6                          | 76             | 220                 |
| P3LU-0515ELF         | 5                   | 30                         | 131                          | 15                   | 33.3                          | 76             | 220                 |
| P3LU-0518ELF         | 5                   | 30                         | 131                          | 18                   | 27.8                          | 76             | 220                 |
| P3LU-0524ELF         | 5                   | 30                         | 128                          | 24                   | 20.8                          | 78             | 220                 |
| P3LU-123R3ELF        | 12                  | 20                         | 59                           | 3.3                  | 151.5                         | 70             | 220                 |
| P3LU-1205ELF         | 12                  | 20                         | 57                           | 5                    | 100                           | 73             | 220                 |
| P3LU-127R2ELF        | 12                  | 20                         | 56                           | 7.2                  | 69.4                          | 74             | 220                 |
| P3LU-1209ELF         | 12                  | 20                         | 55                           | 9                    | 55.5                          | 75             | 220                 |
| P3LU-1212ELF         | 12                  | 20                         | 54                           | 12                   | 41.6                          | 76             | 220                 |
| P3LU-1215ELF         | 12                  | 20                         | 54                           | 15                   | 33.3                          | 76             | 220                 |
| P3LU-1218ELF         | 12                  | 20                         | 54                           | 18                   | 27.8                          | 76             | 220                 |
| P3LU-1224ELF         | 12                  | 20                         | 53                           | 24                   | 20.8                          | 78             | 220                 |
| P3LU-243R3ELF        | 24                  | 10                         | 29                           | 3.3                  | 151.5                         | 70             | 220                 |
| P3LU-2405ELF         | 24                  | 10                         | 28                           | 5                    | 100                           | 73             | 220                 |
| P3LU-247R2ELF        | 24                  | 10                         | 28                           | 7.2                  | 69.4                          | 74             | 220                 |
| P3LU-2409ELF         | 24                  | 10                         | 28                           | 9                    | 55.5                          | 75             | 220                 |
| P3LU-2412ELF         | 24                  | 10                         | 27                           | 12                   | 41.6                          | 76             | 220                 |
| P3LU-2415ELF         | 24                  | 10                         | 26                           | 15                   | 33.3                          | 78             | 220                 |
| P3LU-2418ELF         | 24                  | 10                         | 26                           | 18                   | 27.8                          | 78             | 220                 |
| P3LU-2424ELF         | 24                  | 10                         | 26                           | 24                   | 20.8                          | 78             | 220                 |
| P3LU-483R3ELF        | 48                  | 6                          | 14                           | 3.3                  | 151.5                         | 70             | 220                 |
| P3LU-4805ELF         | 48                  | 6                          | 14                           | 5                    | 100                           | 72             | 220                 |
| P3LU-487R2ELF        | 48                  | 6                          | 14                           | 7.2                  | 69.4                          | 72             | 220                 |
| P3LU-4809ELF         | 48                  | 6                          | 14                           | 9                    | 55.5                          | 74             | 220                 |
| P3LU-4812ELF         | 48                  | 6                          | 14                           | 12                   | 41.6                          | 74             | 220                 |
| P3LU-4815ELF         | 48                  | 6                          | 13                           | 15                   | 33.3                          | 75             | 220                 |
| P3LU-4818ELF         | 48                  | 6                          | 13                           | 18                   | 27.8                          | 75             | 220                 |
| P3LU-4824ELF         | 48                  | 6                          | 13                           | 24                   | 20.8                          | 77             | 220                 |

If you need other specifications, please enquire.

**\*OPTIONS:**

**H40 = 4000 VDC ISOLATION**  
**H52 = 5200 VDC ISOLATION**  
**H60 = 6000 VDC ISOLATION**

For other I/O Isolation please see table on the left hand side and add "Hxx" before LF (P3LU-2412EH60LF for 6KV)

# 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> |                     |                            |                              |                      |                               |                |                                  |
| P3LU-053R3ZLF      | 5                   | 30                         | 166                          | ± 3.3                | ± 75.7                        | 60             | ± 100                            |
| P3LU-0505ZLF       | 5                   | 30                         | 135                          | ± 5                  | ± 50                          | 74             | ± 100                            |
| P3LU-057R2ZLF      | 5                   | 30                         | 129                          | ± 7.2                | ± 34.7                        | 77             | ± 100                            |
| P3LU-0509ZLF       | 5                   | 30                         | 128                          | ± 9                  | ± 27.7                        | 78             | ± 100                            |
| P3LU-0512ZLF       | 5                   | 30                         | 128                          | ± 12                 | ± 20.8                        | 78             | ± 100                            |
| P3LU-0515ZLF       | 5                   | 30                         | 128                          | ± 15                 | ± 16.7                        | 78             | ± 100                            |
| P3LU-0518ZLF       | 5                   | 30                         | 126                          | ± 18                 | ± 13.9                        | 79             | ± 100                            |
| P3LU-0524ZLF       | 5                   | 30                         | 126                          | ± 24                 | ± 10.4                        | 79             | ± 100                            |
| P3LU-123R3ZLF      | 12                  | 20                         | 69                           | ± 3.3                | ± 75.7                        | 60             | ± 100                            |
| P3LU-1205ZLF       | 12                  | 20                         | 56                           | ± 5                  | ± 50                          | 74             | ± 100                            |
| P3LU-127R2ZLF      | 12                  | 20                         | 54                           | ± 7.2                | ± 34.7                        | 77             | ± 100                            |
| P3LU-1209ZLF       | 12                  | 20                         | 53                           | ± 9                  | ± 27.7                        | 78             | ± 100                            |
| P3LU-1212ZLF       | 12                  | 20                         | 53                           | ± 12                 | ± 20.8                        | 78             | ± 100                            |
| P3LU-1215ZLF       | 12                  | 20                         | 53                           | ± 15                 | ± 16.7                        | 78             | ± 100                            |
| P3LU-1218ZLF       | 12                  | 20                         | 52                           | ± 18                 | ± 13.9                        | 80             | ± 100                            |
| P3LU-1224ZLF       | 12                  | 20                         | 52                           | ± 24                 | ± 10.4                        | 80             | ± 100                            |
| P3LU-243R3ZLF      | 24                  | 10                         | 35                           | ± 3.3                | ± 75.7                        | 60             | ± 100                            |
| P3LU-2405ZLF       | 24                  | 10                         | 28                           | ± 5                  | ± 50                          | 74             | ± 100                            |
| P3LU-247R2ZLF      | 24                  | 10                         | 27                           | ± 7.2                | ± 34.7                        | 76             | ± 100                            |
| P3LU-2409ZLF       | 24                  | 10                         | 27                           | ± 9                  | ± 27.7                        | 76             | ± 100                            |
| P3LU-2412ZLF       | 24                  | 10                         | 26                           | ± 12                 | ± 20.8                        | 78             | ± 100                            |
| P3LU-2415ZLF       | 24                  | 10                         | 26                           | ± 15                 | ± 16.7                        | 78             | ± 100                            |
| P3LU-2418ZLF       | 24                  | 10                         | 26                           | ± 18                 | ± 13.9                        | 78             | ± 100                            |
| P3LU-2424ZLF       | 24                  | 10                         | 26                           | ± 24                 | ± 10.4                        | 80             | ± 100                            |
| P3LU-483R3ZLF      | 48                  | 6                          | 17                           | ± 3.3                | ± 75.7                        | 60             | ± 100                            |
| P3LU-4805ZLF       | 48                  | 6                          | 14                           | ± 5                  | ± 50                          | 74             | ± 100                            |
| P3LU-487R2ZLF      | 48                  | 6                          | 13                           | ± 7.2                | ± 34.7                        | 76             | ± 100                            |
| P3LU-4809ZLF       | 48                  | 6                          | 13                           | ± 9                  | ± 27.7                        | 76             | ± 100                            |
| P3LU-4812ZLF       | 48                  | 6                          | 13                           | ± 12                 | ± 20.8                        | 76             | ± 100                            |
| P3LU-4815ZLF       | 48                  | 6                          | 13                           | ± 15                 | ± 16.7                        | 77             | ± 100                            |
| P3LU-4818ZLF       | 48                  | 6                          | 13                           | ± 18                 | ± 13.9                        | 77             | ± 100                            |
| P3LU-4824ZLF       | 48                  | 6                          | 13                           | ± 24                 | ± 10.4                        | 79             | ± 100                            |

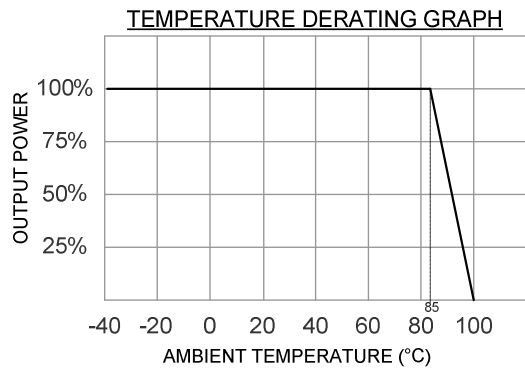
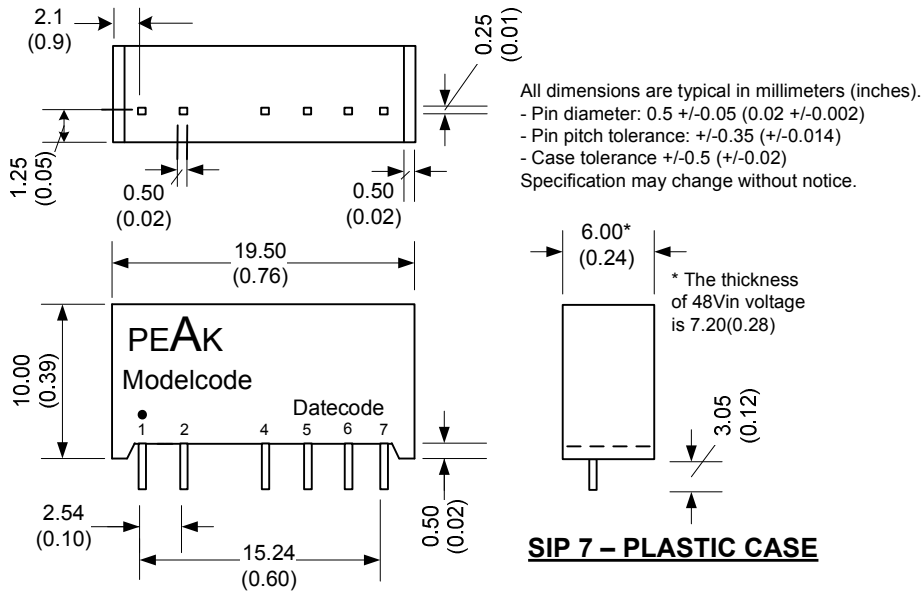
If you need other specifications, please enquire.

**\*OPTIONS:**

**H40 = 4000 VDC ISOLATION**  
**H52 = 5200 VDC ISOLATION**  
**H60 = 6000 VDC ISOLATION**

For other I/O Isolation please see table on the left hand side and add "Hxx" before LF (P3LU-2412ZH40LF for 4KV)

# Package / Pinning / Derating



| PIN CONNECTIONS |             |           |
|-----------------|-------------|-----------|
| #               | SINGLE ≥3KV | DUAL ≥3KV |
| 1               | +Vin        | +Vin      |
| 2               | - Vin       | - Vin     |
| 4               | Omitted     | Omitted   |
| 5               | - Vout      | - Vout    |
| 6               | Omitted     | Common    |
| 7               | +Vout       | +Vout     |

## 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.