



**P-DUKE**  
**POWER**

**UFEC60** Series

Chassis-Mount DC-DC Converter  
Up to 60 Watts

**3**  
YEARS  
WARRANTY

**ROHS**  
COMPLIANT

**REACH**  
COMPLIANT



Automation



Datacom



IPC



Industry



Measurement



Telecom



Automobile



Boat



Charger



Medical



PV



Railway

CE UK CA

**1600**  
VDC  
Isolation  
Voltage

**2 : 1**  
Input  
Range

**FUSE**  
Installed

**INRUSH**  
**CURRENT**  
**LIMIT**

Internal  
EN55032  
Class  
Filter **B**

**NO**  
Min. Load  
Required

**REMOTE**  
**ON**  
**OFF**

**REVERSE**  
**POLARITY**  
**PROTECTION**

**OCP**

**OVP**

**SCP**

**UVP**

**PART NUMBER STRUCTURE**

| UFEC60 -    | 48                   | S               | 05   | - | N  | R   | EC   |
|-------------|----------------------|-----------------|--|---|--|---|--|
| Series Name | Input Voltage (VDC)  | Output Quantity | Output Voltage (VDC)                       |   | Remote Control Options                                       | Conformal Coating Options                               | Assembly Options   |
|             | 24:18~36<br>48:36~75 | S:Single        | 3P3:3.3<br>05:5<br>12:12<br>15:15<br>24:24 |   | <input type="checkbox"/> :Positive logic<br>N:Negative logic | <input type="checkbox"/> : None<br>R: Conformal Coating | <input type="checkbox"/> : None<br>EC: Enclosed Mounting Type<br>DR: Din Rail Mounting Type<br>ED: Enclosed & Din Rail Mounting Type |

**TECHNICAL SPECIFICATION** All specifications are typical at nominal input, full load and 25°C unless otherwise noted

| Model Number  | Input Range | Output Voltage | Output Current @Full Load | Input Current @No Load | Efficiency | Maximum Capacitor Load |
|---------------|-------------|----------------|---------------------------|------------------------|------------|------------------------|
|               | VDC         | VDC            | A                         | mA                     | %          | μF                     |
| UFEC60-24S3P3 | 18 ~ 36     | 3.3            | 14                        | 102                    | 87         | 36000                  |
| UFEC60-24S05  | 18 ~ 36     | 5              | 12                        | 132                    | 88         | 20400                  |
| UFEC60-24S12  | 18 ~ 36     | 12             | 5                         | 57                     | 89         | 3550                   |
| UFEC60-24S15  | 18 ~ 36     | 15             | 4                         | 72                     | 89         | 2300                   |
| UFEC60-24S24  | 18 ~ 36     | 24             | 2.5                       | 74                     | 88         | 885                    |
| UFEC60-48S3P3 | 36 ~ 75     | 3.3            | 14                        | 100                    | 87         | 36000                  |
| UFEC60-48S05  | 36 ~ 75     | 5              | 12                        | 92                     | 89         | 20400                  |
| UFEC60-48S12  | 36 ~ 75     | 12             | 5                         | 35                     | 89         | 3550                   |
| UFEC60-48S15  | 36 ~ 75     | 15             | 4                         | 40                     | 89         | 2300                   |
| UFEC60-48S24  | 36 ~ 75     | 24             | 2.5                       | 43                     | 89         | 885                    |

| INPUT SPECIFICATIONS          |                         |                           |                     |      |      |      |
|-------------------------------|-------------------------|---------------------------|---------------------|------|------|------|
| Parameter                     | Conditions              |                           | Min.                | Typ. | Max. | Unit |
| Operating input voltage range | 24Vin(nom)              |                           | 18                  | 24   | 36   | VDC  |
|                               | 48Vin(nom)              |                           | 36                  | 48   | 75   |      |
| Input fuse                    | slow blow               | 24Vin(nom)                | 8                   |      |      | A    |
|                               |                         | 48Vin(nom)                | 4                   |      |      |      |
| In-rush current               |                         |                           | 15                  |      |      | A    |
| Start up voltage              | 24Vin(nom)              |                           | 18                  |      |      | VDC  |
|                               | 48Vin(nom)              |                           | 36                  |      |      |      |
| Shutdown voltage              | 24Vin(nom)              |                           | 14.5                | 15.5 | 17.5 | VDC  |
|                               | 48Vin(nom)              |                           | 31                  | 32   | 35.5 |      |
| Start up time                 | Constant resistive load | Power up                  | 100                 |      |      | ms   |
|                               |                         | Remote ON/OFF             | 20                  |      |      |      |
| Input surge voltage           | 100ms, max.             | 24Vin(nom)                | 50                  |      |      | VDC  |
|                               |                         | 48Vin(nom)                | 100                 |      |      |      |
| Remote ON/OFF                 | Referred to -Vin pin    | Positive logic DC-DC ON   | Open or 3 ~ 12VDC   |      |      | mA   |
|                               |                         | (Standard) DC-DC OFF      | Short or 0 ~ 1.2VDC |      |      |      |
|                               |                         | Negative logic DC-DC ON   | Short or 0 ~ 1.2VDC |      |      |      |
|                               |                         | (Option) DC-DC OFF        | Open or 3 ~ 12VDC   |      |      |      |
|                               |                         | Input current of Ctrl pin | -0.5                | 1    |      |      |
| Remote off input current      |                         | 4                         |                     |      | mA   |      |

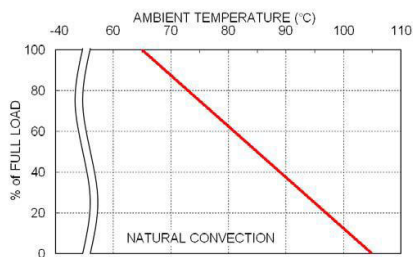
| OUTPUT SPECIFICATIONS            |                                    |                 |                                |       |       |
|----------------------------------|------------------------------------|-----------------|--------------------------------|-------|-------|
| Parameter                        | Conditions                         | Min.            | Typ.                           | Max.  | Unit  |
| Voltage accuracy                 | 3.3Vout                            | -1.5            |                                | +1.5  | %     |
|                                  | Others                             | -1.0            |                                | +1.0  |       |
| Line regulation                  | Low Line to High Line at Full Load | -0.5            |                                | +0.5  | %     |
| Load regulation                  | No Load to Full Load               | 3.3Vout         |                                | +2.0  | %     |
|                                  |                                    | Others          |                                | +1.5  |       |
| Voltage adjustability            |                                    | 24Vout          |                                | +20   | %     |
|                                  |                                    | Others          |                                | +10   |       |
| Ripple and noise                 | Measured by 20MHz bandwidth        | 3.3Vout, 5Vout, | 75                             |       | mVp-p |
|                                  |                                    | 12Vout, 15Vout  | 100                            |       |       |
|                                  |                                    | 24Vout          | 130                            |       |       |
| Temperature coefficient          |                                    | -0.02           |                                | +0.02 | %/°C  |
| Transient response recovery time | 25% load step change               |                 | 250                            |       | µs    |
| Over voltage protection          |                                    | 3.3Vout         | 3.7                            | 5.4   | VDC   |
|                                  |                                    | 5Vout           | 5.6                            | 7.0   |       |
|                                  |                                    | 12Vout          | 13.8                           | 17.5  |       |
|                                  |                                    | 15Vout          | 16.8                           | 20.5  |       |
|                                  |                                    | 24Vout          | 30.0                           | 33.0  |       |
| Output indicator                 |                                    |                 | Green LED                      |       |       |
| Over load protection             | % of Iout rated; Hiccup mode       |                 |                                | 150   | %     |
| Short circuit protection         |                                    |                 | Continuous, automatic recovery |       |       |

| GENERAL SPECIFICATIONS |                          |                           |      |                             |      |
|------------------------|--------------------------|---------------------------|------|-----------------------------|------|
| Parameter              | Conditions               | Min.                      | Typ. | Max.                        | Unit |
| Isolation voltage      | 1 minute                 | Input to Output           | 1600 |                             | VDC  |
|                        |                          | Input (Output) to Chassis | 1600 |                             |      |
| Isolation resistance   | 500VDC                   | 1                         |      |                             | GΩ   |
| Isolation capacitance  |                          |                           |      | 4000                        | pF   |
| Switching frequency    |                          | 270                       | 300  | 330                         | kHz  |
| Safety meets           |                          |                           |      | IEC/ EN/ UL62368-1          |      |
| Chassis material       |                          |                           |      | Aluminum                    |      |
| Conformal coating      |                          |                           |      | Impregnating varnish        |      |
| Weight                 |                          |                           |      | 122g (4.29oz)               |      |
| MTBF                   | MIL-HDBK-217F, Full load |                           |      | 3.307 x 10 <sup>5</sup> hrs |      |

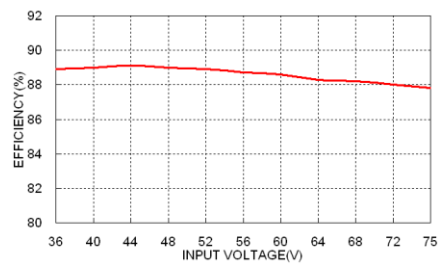
| ENVIRONMENTAL SPECIFICATIONS  |                      |      |      |                       |      |
|-------------------------------|----------------------|------|------|-----------------------|------|
| Parameter                     | Conditions           | Min. | Typ. | Max.                  | Unit |
| Operating ambient temperature | With derating        | -40  |      | +105                  | °C   |
| Over temperature protection   | Case of DC/DC module |      | 120  |                       | °C   |
| Storage temperature range     |                      | -40  |      | +105                  | °C   |
| Thermal shock                 |                      |      |      | MIL-STD-810F          |      |
| Vibration                     | □□S□□-□              |      |      | EN61373, MIL-STD-810F |      |
|                               | □□S□□-□IEC           |      |      | EN61373, MIL-STD-810F |      |
|                               | □□S□□-□DR            |      |      | EN61373, IEC60068-2-6 |      |
|                               | □□S□□-□ED            |      |      | EN61373, IEC60068-2-6 |      |
| Relative humidity             |                      |      |      | 5% to 95% RH          |      |

**EMC SPECIFICATIONS**

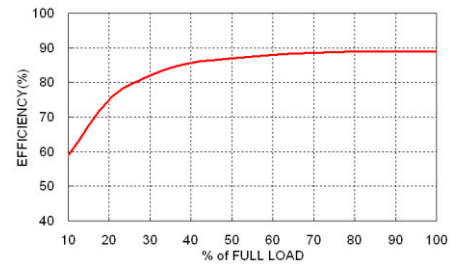
| Parameter                      | Conditions  |                                     | Level            |
|--------------------------------|-------------|-------------------------------------|------------------|
| EMI                            | EN55032     |                                     | Class B          |
| EMS                            | EN55035     |                                     |                  |
| ESD                            | EN61000-4-2 | Air $\pm$ 8kV and Contact $\pm$ 6kV | Perf. Criteria A |
| Radiated immunity              | EN61000-4-3 | 10V/m                               | Perf. Criteria A |
| Fast transient                 | EN61000-4-4 | $\pm$ 2kV                           | Perf. Criteria A |
| Surge                          | EN61000-4-5 | $\pm$ 1kV                           | Perf. Criteria A |
| Conducted immunity             | EN61000-4-6 | 10Vr.m.s                            | Perf. Criteria A |
| Power frequency magnetic field | EN61000-4-8 | 100A/m continuous; 1000A/m 1 second | Perf. Criteria A |

**CHARACTERISTIC CURVE**


UFEC60-48S05 Derating Curve



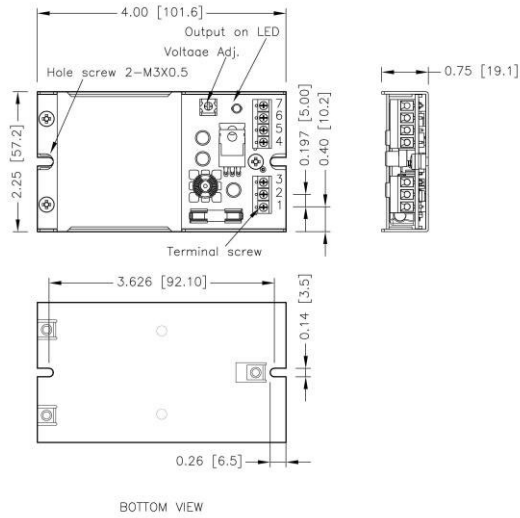
UFEC60-48S05 Efficiency vs. Input Voltage



UFEC60-48S05 Efficiency vs. Output Load

**MECHANICAL DRAWING**

**CHASSIS MOUNTING TYPE**



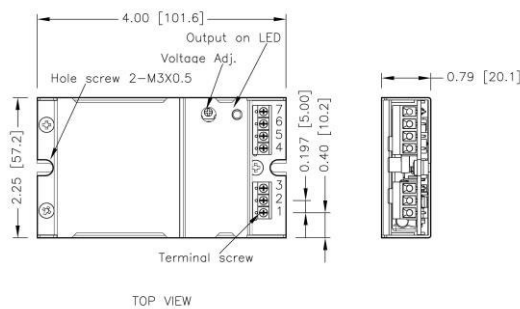
**TERMINAL CONNECTION**

| NO. | SINGLE |
|-----|--------|
| 1   | +Vin   |
| 2   | -Vin   |
| 3   | Ctrl   |
| 4   | NC     |
| 5   | -Vout  |
| 6   | +Vout  |
| 7   | NC     |

- ※ NC : No Connection
- ※ Screw terminals – wire range from 14 to 18 AWG

1. All dimensions in Inch [mm]
2. Tolerance : X.XX±0.02 [X.X±0.5]  
X.XXX±0.01 [X.XX±0.25]
3. Hole screw locked torque :  
MAX 5.0kgf – cm/0.49N – m
4. Terminal screw locked torque :  
MAX 2.5kgf – cm/0.25N – m

**ENCLOSED MOUNTING TYPE**



**DIN RAIL MOUNTING TYPE**

