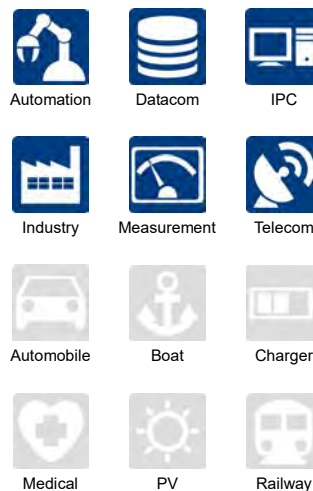


**Chassis-Mount DC-DC converter  
up to 60 Watts**

**3**  
YEARS  
WARRANTY

**ROHS**  
COMPLIANT

**REACH**  
COMPLIANT



CE UK  
CA

|                                     |                         |                   |                            |                                                    |                             |                     |                                   |     |     |     |     |
|-------------------------------------|-------------------------|-------------------|----------------------------|----------------------------------------------------|-----------------------------|---------------------|-----------------------------------|-----|-----|-----|-----|
| 1600<br>VDC<br>Isolation<br>Voltage | 2 : 1<br>Input<br>Range | FUSE<br>Installed | INRUSH<br>CURRENT<br>LIMIT | Internal<br>EN55032<br>Class<br>Filter<br><b>B</b> | NO<br>Min. Load<br>Required | REMOTE<br>ON<br>OFF | REVERSE<br>POLARITY<br>PROTECTION | OCP | OVP | SCP | UVP |
|-------------------------------------|-------------------------|-------------------|----------------------------|----------------------------------------------------|-----------------------------|---------------------|-----------------------------------|-----|-----|-----|-----|

**PART NUMBER STRUCTURE**

| VPEC60      | - | 48                        | S                  | 05                                         | - | N                                    | R                               | EC                                                                                                           |
|-------------|---|---------------------------|--------------------|--------------------------------------------|---|--------------------------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------|
| Series Name |   | Input<br>Voltage<br>(VDC) | Output<br>Quantity | Output<br>Voltage<br>(VDC)                 |   | Remote Control<br>Options            | Conformal Coating<br>Options    | Assembly<br>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 |   | □:Positive logic<br>N:Negative logic | □: None<br>R: Conformal Coating | □: 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                     |
| VPEFC60-24S3P3 | 18 ~ 36     | 3.3            | 14                        | 102                    | 87         | 36000                  |
| VPEFC60-24S05  | 18 ~ 36     | 5              | 12                        | 132                    | 88         | 20400                  |
| VPEFC60-24S12  | 18 ~ 36     | 12             | 5                         | 57                     | 89         | 3550                   |
| VPEFC60-24S15  | 18 ~ 36     | 15             | 4                         | 72                     | 89         | 2300                   |
| VPEFC60-24S24  | 18 ~ 36     | 24             | 2.5                       | 74                     | 88         | 885                    |
| VPEFC60-48S3P3 | 36 ~ 75     | 3.3            | 14                        | 100                    | 87         | 36000                  |
| VPEFC60-48S05  | 36 ~ 75     | 5              | 12                        | 92                     | 89         | 20400                  |
| VPEFC60-48S12  | 36 ~ 75     | 12             | 5                         | 35                     | 89         | 3550                   |
| VPEFC60-48S15  | 36 ~ 75     | 15             | 4                         | 40                     | 89         | 2300                   |
| VPEFC60-48S24  | 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 |                     |      |      |      |
|                               |                         | Negative logic            | DC-DC ON  | Short or 0 ~ 1.2VDC |      |      |      |
|                               |                         | (Option)                  | DC-DC OFF |                     |      |      |      |
|                               |                         | Input current of Ctrl pin |           | -0.5                | 1    |      |      |
|                               |                         | Remote off input current  |           |                     | 4    |      |      |

## OUTPUT SPECIFICATIONS

| Parameter                        | Conditions                                     | Min.                               | Typ.             | Max.                               | Unit  |
|----------------------------------|------------------------------------------------|------------------------------------|------------------|------------------------------------|-------|
| Voltage accuracy                 | 3.3Vout<br>Others                              | -1.5<br>-1.0                       |                  | +1.5<br>+1.0                       | %     |
| Line regulation                  | Low Line to High Line at Full Load             | -0.5                               |                  | +0.5                               | %     |
| Load regulation                  | No Load to Full Load                           | -2.0<br>-1.5                       |                  | +2.0<br>+1.5                       | %     |
| Voltage adjustability            | 24Vout<br>Others                               | -10<br>-10                         |                  | +20<br>+10                         | %     |
| Ripple and noise                 | Measured by 20MHz bandwidth                    |                                    | 75<br>100<br>130 |                                    | mVp-p |
| Temperature coefficient          |                                                | -0.02                              |                  | +0.02                              | %/°C  |
| Transient response recovery time | 25% load step change                           |                                    | 250              |                                    | µs    |
| Over voltage protection          | 3.3Vout<br>5Vout<br>12Vout<br>15Vout<br>24Vout | 3.7<br>5.6<br>13.8<br>16.8<br>30.0 |                  | 5.4<br>7.0<br>17.5<br>20.5<br>33.0 | VDC   |
| 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                 | 1600<br>1600 |      |                             | VDC  |
| 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 |      |

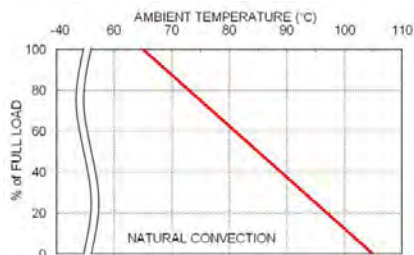
## ENVIRONMENTAL SPECIFICATIONS

| 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□□ -□<br>□□S□□ -□EC<br>□□S□□ -□DR<br>□□S□□ -□ED |      |      | EN61373, MIL-STD-810F<br>EN61373, MIL-STD-810F<br>EN61373, IEC60068-2-6<br>EN61373, IEC60068-2-6 |      |
| Relative humidity             |                                                    |      |      | 5% to 95% RH                                                                                     |      |

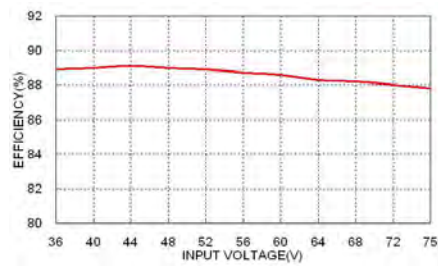
## EMC SPECIFICATIONS

| Parameter                      | Conditions  |                                                   | Level            |
|--------------------------------|-------------|---------------------------------------------------|------------------|
| EMI                            | EN55032     |                                                   | Class B          |
| EMS                            | EN55024     |                                                   |                  |
| ESD                            | EN61000-4-2 | Air $\pm 8\text{kV}$ and Contact $\pm 6\text{kV}$ | Perf. Criteria A |
| Radiated immunity              | EN61000-4-3 | 10V/m                                             | Perf. Criteria A |
| Fast transient                 | EN61000-4-4 | $\pm 2\text{kV}$                                  | Perf. Criteria A |
| Surge                          | EN61000-4-5 | $\pm 1\text{kV}$                                  | 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 |

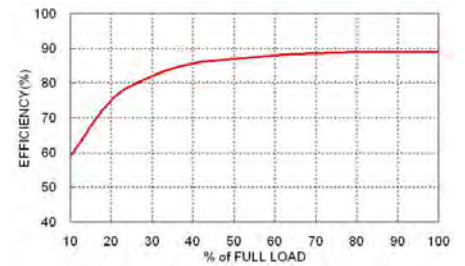
## CHARACTERISTIC CURVE



VPEFC60-48S05 Derating Curve



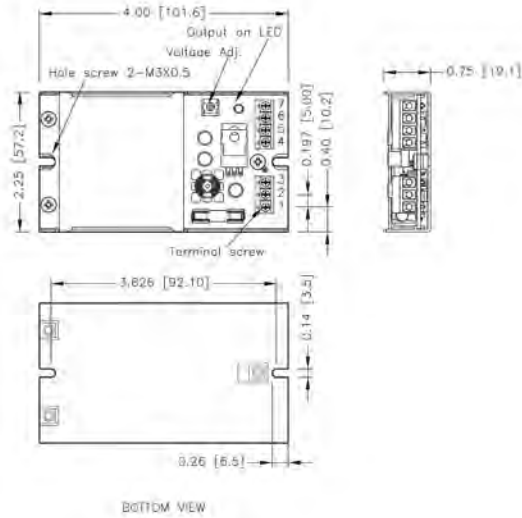
VPEFC60-48S05 Efficiency vs. Input Voltage



VPEFC60-48S05 Efficiency vs. Output Load

## MECHANICAL DRAWING

### CHASSIS MOUNTING TYPE



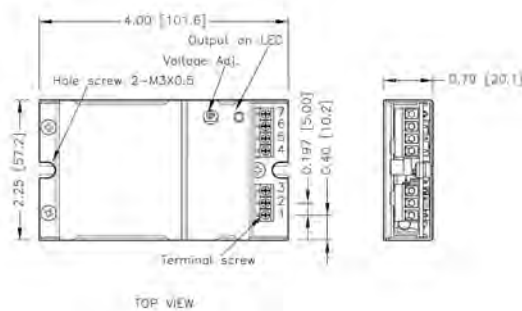
### TERMINAL CONNECTION

| 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

