



# DFEC30W SERIES

CHASSIS-MOUNT DC-DC CONVERTER

4:1 ULTRA WIDE INPUT RANGE  
UP TO 30 Watts



## FEATURES

- NO MINIMUM LOAD REQUIRED
- 1600VDC INPUT TO OUTPUT ISOLATION
- SCREW TERMINALS FOR INPUT AND OUTPUT CONNECTIONS
- RELIABLE SNAP-ON FOR DIN RAIL TS-35/7.5 OR TS-35/15
- CASE PROTECTION MEET IP20(IEC60529)
- INTERNAL OUTPUT DC-OK INDICATOR
- MEET EN55022 CLASS B
- SAFETY MEETS UL60950-1, EN60950-1, & IEC60950-1
- CE MARKED
- COMPLIANT TO RoHS II & REACH

## APPLICATIONS

- COMMUNICATION SYSTEM
- INDUSTRY CONTROL SYSTEM
- FACTORY AUTOMATIC EQUIPMENT
- SEMICONDUCTOR EQUIPMENT

|                   |                |     |     |     |     |               |              |                             |
|-------------------|----------------|-----|-----|-----|-----|---------------|--------------|-----------------------------|
| 1600VDC ISOLATION | REMOTE CONTROL | UVP | OCP | SCP | OVP | FUSE INCLUDED | INRUSH LIMIT | REVERSE POLARITY PROTECTION |
|-------------------|----------------|-----|-----|-----|-----|---------------|--------------|-----------------------------|

## TECHNICAL SPECIFICATION

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

| Model Number   | Input Range | Output Voltage | Output Current @Full Load | Input Current @ No Load | Efficiency | Maximum Capacitor Load (1) |
|----------------|-------------|----------------|---------------------------|-------------------------|------------|----------------------------|
|                | VDC         | VDC            | A                         | mA                      | %          | μF                         |
| DFEC30-24S3P3W | 10 ~ 40     | 3.3            | 6                         | 52                      | 85         | 19500                      |
| DFEC30-24S05W  | 10 ~ 40     | 5              | 6                         | 67                      | 85         | 10200                      |
| DFEC30-24S12W  | 10 ~ 40     | 12             | 2.5                       | 69                      | 85         | 3300                       |
| DFEC30-24S15W  | 10 ~ 40     | 15             | 2                         | 75                      | 86         | 1100                       |
| DFEC30-24S24W  | 10 ~ 40     | 24             | 1.25                      | 39                      | 82         | 500                        |
| DFEC30-24S28W  | 10 ~ 40     | 28             | 1                         | 45                      | 83         | 340                        |
| DFEC30-24D12W  | 10 ~ 40     | ±12            | ±1.25                     | 34                      | 82         | ±1000                      |
| DFEC30-24D15W  | 10 ~ 40     | ±15            | ±1                        | 40                      | 83         | ±680                       |
| DFEC30-48S3P3W | 18 ~ 75     | 3.3            | 6                         | 32                      | 85         | 19500                      |
| DFEC30-48S05W  | 18 ~ 75     | 5              | 6                         | 32                      | 86         | 10200                      |
| DFEC30-48S12W  | 18 ~ 75     | 12             | 2.5                       | 38                      | 85         | 3300                       |
| DFEC30-48S15W  | 18 ~ 75     | 15             | 2                         | 48                      | 86         | 1100                       |
| DFEC30-48S24W  | 18 ~ 75     | 24             | 1.25                      | 30                      | 83         | 500                        |
| DFEC30-48S28W  | 18 ~ 75     | 28             | 1                         | 30                      | 84         | 340                        |
| DFEC30-48D12W  | 18 ~ 75     | ±12            | ±1.25                     | 28                      | 83         | ±1000                      |
| DFEC30-48D15W  | 18 ~ 75     | ±15            | ±1                        | 28                      | 84         | ±680                       |

## PART NUMBER STRUCTURE

|             |   |                              |   |                    |   |
|-------------|---|------------------------------|---|--------------------|---|
| DFEC30 -    | <b>48</b>                                     | <b>S</b>                     | <b>05</b>   | <b>W</b> -         | <b>N</b>  |
| Series Name | Input Voltage (VDC)<br>24: 10~40<br>48: 18~75 | Output Quantity<br>S: Single | Output Voltage (VDC)<br>3P3: 3.3<br>05: 5<br>12: 12<br>15: 15<br>24: 24<br>28: 28 | Input Range<br>4:1 | Remote Control Option<br>□: Positive logic<br>N: Negative logic |
|             |   | D: Dual                      | 12: ±12<br>15: ±15  |                    |   |

**INPUT SPECIFICATIONS**

| Parameter                      | Conditions                                | Min.                      | Typ.      | Max.   | Unit  |
|--------------------------------|---|---------------------------|-----------|--|-------|
| Operating input voltage range  | 24Vin(nom)                                | 10                        | 24        | 40   | VDC   |
|                                | 48Vin(nom)                                | 18                        | 48        | 75   |       |
| Input fuse (slow blow)         | 24Vin(nom)                                |                           | 6         |  | A     |
|                                | 48Vin(nom)                                |                           | 4         |  |       |
| In-rush current                |   |                           | 15        |  | A     |
| Input reflected ripple current | Nominal input and Full load               |                           | 15        |  | mAp-p |
| Start up voltage               | 24Vin(nom)                                |                           |           | 10   | VDC   |
|                                | 48Vin(nom)                                |                           |           | 18   |       |
| Shutdown voltage               | 24Vin(nom)                                |                           | 8         |  | VDC   |
|                                | 48Vin(nom)                                |                           | 16        |  |       |
| Start up time                  | Nominal input and 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<br>Short or 0 ~ 1.2VDC<br>Short or 0 ~ 1.2VDC<br>Open or 3 ~ 12VDC |       |
|                                |   | (Standard)                | DC-DC OFF |  |       |
|                                |   | Negative logic            | DC-DC ON  |  |       |
|                                |   | (Option)                  | DC-DC OFF |  |       |
|                                |   | Input current of Ctrl pin |           |  |       |
| Remote off input current       |   |                           | 3         |  | 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        |                 | +1.5  | %                              |
|                                  |                                    | Others         |                 | +1.0  |                                |
| Cross regulation                 | Asymmetrical load 25%/100% FL      | -5.0           |                 | +5.0  | %                              |
| Voltage adjustability            | Single output                      | 28Vout         |                 | +17   | %                              |
|                                  |                                    | Others         |                 | +10   |                                |
| Ripple and noise                 | Measured by 20MHz bandwidth        | Singl          | 3.3Vout, 5Vout, | 50    | mVp-p                          |
|                                  |                                    |                | 12Vout, 15Vout  | 75    |                                |
|                                  |                                    | 24Vout, 28Vout | 130             |       |                                |
|                                  | Dual                               | All            | 100             |       |                                |
| Temperature coefficient          |                                    | -0.02          |                 | +0.02 | %/°C                           |
| Transient response recovery time | 25% load step change               |                | 250             |       | µs                             |
| Over voltage protection          | Zener diode clamp                  | 3.3Vout        |                 | 3.9   | VDC                            |
|                                  |                                    | 5Vout          |                 | 6.2   |                                |
|                                  |                                    | 12Vout         |                 | 15    |                                |
|                                  |                                    | 15Vout         |                 | 18    |                                |
|                                  |                                    | 24Vout         |                 | 30    |                                |
|                                  |                                    | 28Vout         |                 | 36    |                                |
| 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          |                          |                           |      |      | UL60950-1<br>EN60950-1<br>IEC60950-1 |
| Chassis material      |                          |                           |      |      | Aluminum                             |
| Weight                |                          |                           |      |      | 170g (5.98oz)                        |
| MTBF                  | MIL-HDBK-217F, Full load |                           |      |      | 8.412 x 10 <sup>5</sup> hrs          |

**ENVIRONMENTAL SPECIFICATIONS**

| Parameter                     | Conditions       | Min. | Typ. | Max. | Unit         |
|-------------------------------|------------------|------|------|------|--------------|
| Operating ambient temperature | Without derating | -40  |      | +65  | °C           |
|                               | With derating    | +65  |      | +93  |              |
| Storage temperature range     |                  | -40  |      | +105 | °C           |
| Thermal shock                 |                  |      |      |      | MIL-STD-810F |
| Vibration                     |                  |      |      |      | MIL-STD-810F |
| Relative humidity             |                  |      |      |      | 5% to 95% RH |

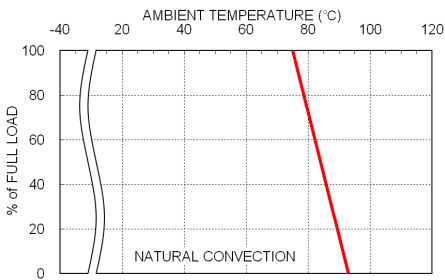
**EMC SPECIFICATIONS**

| Parameter                      | Conditions                                      | Level            |
|--------------------------------|---|------------------|
| EMI                            | EN55022   | Class B          |
| ESD                            | EN61000-4-2 Air ± 8kV and Contact ± 6kV         | Perf. Criteria A |
| Radiated immunity              | EN61000-4-3 10V/m                               | Perf. Criteria A |
| Fast transient                 | EN61000-4-4 ± 2kV                               | Perf. Criteria A |
| Surge                          | EN61000-4-5 ± 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 |

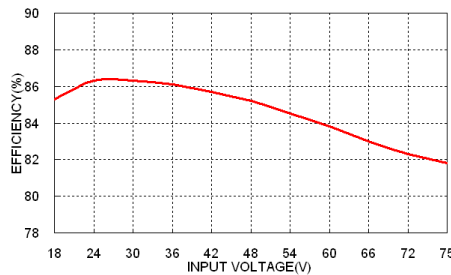
**Note:**

1. Test by minimum input and constant resistive load.

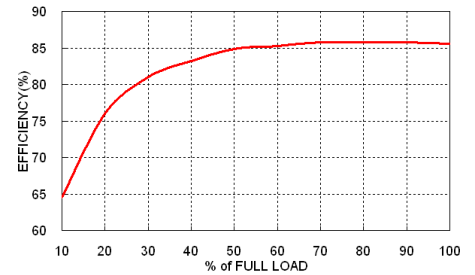
**CHARACTERISTIC CURVE**



DFEC30-48S05W Derating Curve

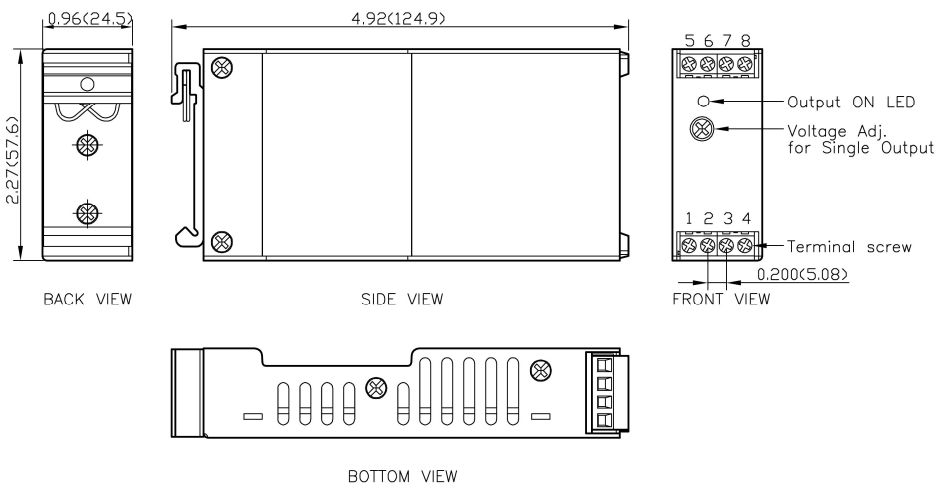


DFEC30-48S05W Efficiency vs. Input Voltage



DFEC30-48S05W Efficiency vs. Output Load

**MECHANICAL DRAWING**



**PIN CONNECTION**

| PIN | SINGLE | DUAL   |
|-----|--------|--------|
| 1   | Ctrl   | Ctrl   |
| 2   | -Vin   | -Vin   |
| 3   | -Vin   | -Vin   |
| 4   | +Vin   | +Vin   |
| 5   | NC     | NC     |
| 6   | -Vout  | -Vout  |
| 7   | +Vout  | Common |
| 8   | NC     | +Vout  |

\* 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. Terminal screw locked torque : MAX 2.5kgf – cm (0.25N – m)