



APPLICATIONS

Communication System
Industry Control System
Factory Automatic Equipment
Semiconductor Equipment

FEATURES

- DIN RAIL DC/DC CONVERTERS
- 60 WATTS MAXIMUM OUTPUT POWER
- OFFER SINGLE AND DUAL OUTPUT
- OVERLOAD AND SHORT CIRCUIT PROTECTION
- OVER VOLTAGE PROTECTION
- RELIABLE SNAP-ON FOR DIN RAIL TS-35/7.5 OR TS-35/15
- I/O-ISOLATION 1600 VDC
- CASE PROTECTION MEET IP20(IEC60529)
- INTERNAL INPUT FUSE PROTECTION
- INTERNAL INPUT REVERSAL POLARITY PROTECTION
- INTERNAL INPUT IN-RUSH CURRENT LIMIT CIRCUIT
- INTERNAL OUTPUT DC-OK INDICATOR
- MEET EN55022 CLASS B
- COMPLIANT TO RoHS EU DIRECTIVE 2011/65/EU

DESCRIPTION

The DFEC60 series was designed to easy application of din rail DC-DC converters. Easy installation is provided with snap-on mounting on the DIN-rail. Internal protection circuits such as input reversal and in-rush current limit protection, as well as output short-circuit and over-voltage protection. A green LED at the front displays the status of the output(s).

TECHNICAL SPECIFICATION

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

OUTPUT SPECIFICATIONS			
Output power		60 Watts, max.	
Voltage accuracy		3.3Vout	± 1.5%
		Others	± 1%
Minimum load		0%	
Voltage adjustability (Note 6)		24Vout	+ 20% -10%
		Others	±10%
Line regulation	LL to HL at Full load		± 0.5%
Load regulation	No load to Full load	3.3Vout	± 2.5%
		Others	± 1.5%
Ripple and noise	20MHz bandwidth		See table
Temperature coefficient		±0.02% / °C, max.	
Transient response recovery time 25% load step change		250µs	
Over voltage protection	3.3VDC output	3.7VDC~5.4VDC	
	5VDC output	5.6VDC~7.0VDC	
Zener diode clamp	12VDC output	13.8VDC~17.5VDC	
	15VDC output	16.8VDC~20.5VDC	
Output indicator		Green LED	
Over load protection	% of FL at nominal input		150%, max.
Short circuit protection		Continuous, automatics recovery	
GENERAL SPECIFICATIONS			
Efficiency		See table	
Isolation voltage	Input to Output	1600 VDC, min. 1minute	
	Input(Output) to Chassis	1600 VDC, min. 1minute	
Isolation resistance	500VDC		10 ⁹ ohms, min.
Isolation capacitance		4000pF, max.	
Switching frequency		300kHz±10%	
Design meets safety standard		IEC60950-1, UL60950-1, EN60950-1	
Chassis material		Aluminum	
Dimensions		4.92 X2.27 X 0.97 Inch (125.0 X 57.6 X 24.5 mm)	
Weight		182g (6.40oz)	
MTBF (Note 1)	MIL-HDBK-217F		5.296 x 10 ⁵ hrs

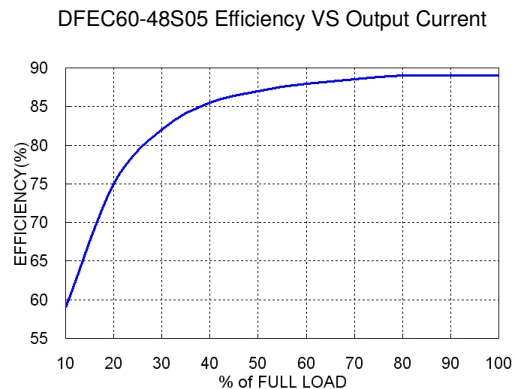
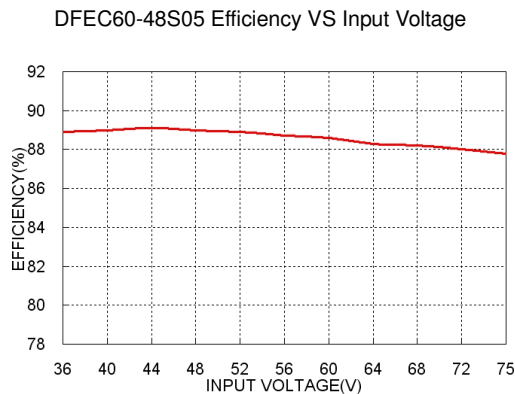
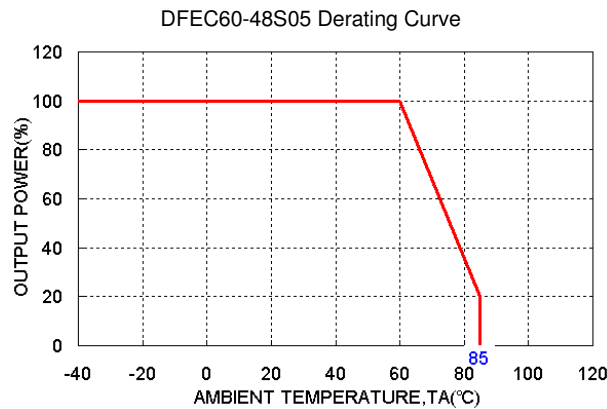
INPUT SPECIFICATIONS			
Input voltage range	24VDC nominal input	18 ~ 36VDC	
	48VDC nominal input	36 ~ 75VDC	
Input surge voltage	24VDC input	50VDC 100ms, max.	
	48VDC input	100VDC 100ms, max.	
Input fuse (slow blow)	24VDC input	8A	
	48VDC input	4A	
In-rush current	15A		
Input reflected ripple current	15mA _{p-p}		
Start up time	Nominal input and constant resistive load	Power up	100ms
		Remote ON/OFF	20ms
Start-up voltage	24VDC input	17.5VDC	
	48VDC input	34.5VDC	
Shutdown voltage	24VDC input	15VDC	
	48VDC input	32VDC	
Remote ON/OFF (Note 7)			
(Positive logic) (Standard)	DC-DC ON	Open or 3 V < Vr < 12V	
	DC-DC OFF	Short or 0V < Vr < 1.2V	
(Negative logic) (Option)	DC-DC ON	Short or 0V < Vr < 1.2V	
	DC-DC OFF	Open or 3 V < Vr < 12V	
Input current of Remote control pin	Nominal input	-0.5mA ~ + 1.0mA	
Remote off state input current	Nominal input	4mA	
ENVIRONMENTAL SPECIFICATIONS			
Operating ambient temperature	-40°C ~ +55°C (without derating)		
	+55°C ~ +85°C (with derating)		
Storage temperature range	-40°C ~ +105°C		
Thermal shock	MIL-STD-810F		
Vibration	MIL-STD-810F		
Relative humidity	5% to 95% RH		
EMC CHARACTERISTICS			
EMI	EN55022	Class B	
ESD	EN61000-4-2	Air Contact	± 8kV
			± 6kV
Radiated immunity	EN61000-4-3	10 V/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	10 Vr.m.s	Perf. Criteria A



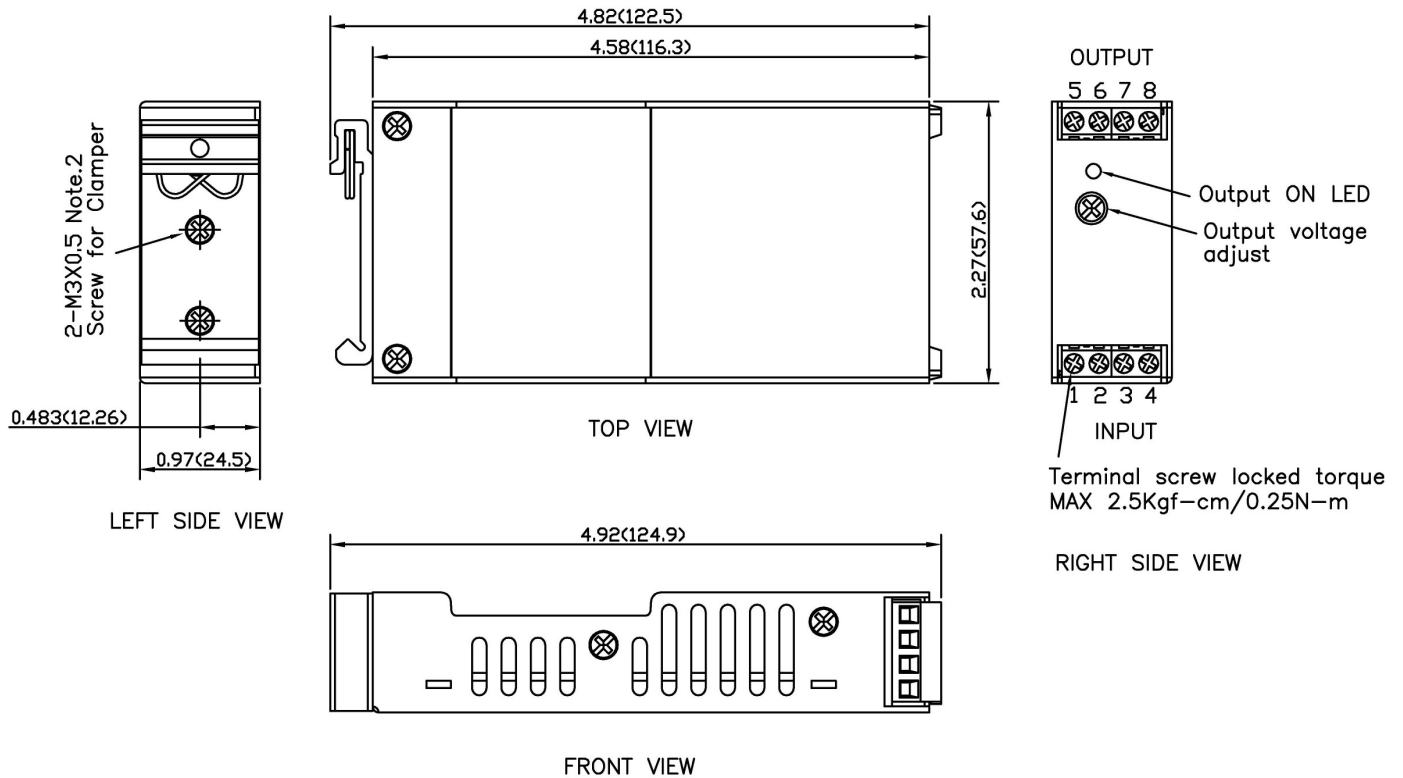
Model Number	Input Range	Output Voltage	Output Current		Output ⁽²⁾ Ripple & Noise	No load ⁽³⁾ Input Current	Eff ⁽⁴⁾ (%)	Capacitor ⁽⁵⁾ Load max
			Min. load	Full load				
DFEC60-24S3P3	18 ~ 36 VDC	3.3 VDC	0mA	14A	75mVp-p	104mA	87	36000μF
DFEC60-24S05	18 ~ 36 VDC	5 VDC	0mA	12A	75mVp-p	134mA	88	20400μF
DFEC60-24S12	18 ~ 36 VDC	12 VDC	0mA	5A	100mVp-p	59mA	88	3550μF
DFEC60-24S15	18 ~ 36 VDC	15 VDC	0mA	4A	100mVp-p	74mA	88	2300μF
DFEC60-24S24	18 ~ 36 VDC	24 VDC	0mA	2.5A	130mVp-p	76mA	87	885μF
DFEC60-48S3P3	36 ~ 75 VDC	3.3 VDC	0mA	14A	75mVp-p	102mA	87	36000μF
DFEC60-48S05	36 ~ 75 VDC	5 VDC	0mA	12A	75mVp-p	94mA	88	20400μF
DFEC60-48S12	36 ~ 75 VDC	12 VDC	0mA	5A	100mVp-p	37mA	88	3550μF
DFEC60-48S15	36 ~ 75 VDC	15 VDC	0mA	4A	100mVp-p	42mA	88	2300μF
DFEC60-48S24	36 ~ 75 VDC	24 VDC	0mA	2.5A	130mVp-p	45mA	87	885μF

Note

1. MIL-HDBK-217F @Ta=25 °C, Full load.
2. Typical value at nominal input and full load. (20MHz BW.)
3. Typical value at nominal input and no load.
4. Typical value at nominal input and full load.
5. Test by minimum input and constant resistive load.
6. The output installs a potentiometer to adjust the output voltage.
7. The ON/OFF pin voltage is referenced to -INPUT
To order negative logic ON/OFF control add the suffix-N (Ex:DFEC60-48S05-N).



MECHANICAL DRAWING :



Note: 1.All dimensions in inch(mm)
Tolerance : x.xx±0.02(x.x±0.5)
x.xxx±0.01(x.xx±0.25)
2.The screw locked torque: MAX 5.0kgf-cm/0.49N-m

PIN CONNECTION		
PIN	SINGLE	DUAL
1	CTRL	CTRL
2	-INPUT	-INPUT
3	-INPUT	-INPUT
4	+INPUT	+INPUT
5	NC	NC
6	-OUTPUT	-OUTPUT
7	+OUTPUT	COMMON
8	NC	+OUTPUT

※ NC : No Connection

※ Screw terminals – wire range from 14 to 18 AWG

PRODUCT OPTIONS TABLE	
Option	Suffix
Negative logic Remote ON/OFF	-N