



DFEC60 SERIES

CHASSIS-MOUNT DC-DC CONVERTER

2:1 WIDE INPUT RANGE
UP TO 60 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
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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
DFEC60-24S3P3	18 ~ 36	3.3	14	104	87	36000
DFEC60-24S05	18 ~ 36	5	12	134	88	20400
DFEC60-24S12	18 ~ 36	12	5	59	88	3550
DFEC60-24S15	18 ~ 36	15	4	74	88	2300
DFEC60-24S24	18 ~ 36	24	2.5	76	87	885
DFEC60-48S3P3	36 ~ 75	3.3	14	102	87	36000
DFEC60-48S05	36 ~ 75	5	12	94	89	20400
DFEC60-48S12	36 ~ 75	12	5	37	88	3550
DFEC60-48S15	36 ~ 75	15	4	42	88	2300
DFEC60-48S24	36 ~ 75	24	2.5	45	88	885

PART NUMBER STRUCTURE

DFEC60 -	48	S	05	-	N
Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)		Remote Control Option
	24: 18~36 48: 36~75	S: Single	3P3: 3.3 05: 5 12: 12 15: 15 24: 24		□: Positive logic N: Negative logic

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
Input reflected ripple current	Nominal input and Full load		15		mAp-p
Start up voltage	24Vin(nom)			17.5	VDC
	48Vin(nom)			34.5	
Shutdown voltage	24Vin(nom)		15		VDC
	48Vin(nom)		32		
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 Short or 0 ~ 1.2VDC Short or 0 ~ 1.2VDC Open or 3 ~ 12VDC	mA
		(Standard)	DC-DC OFF		
		Negative logic	DC-DC ON		
		(Option)	DC-DC OFF		
		Input current of Ctrl pin			
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		+2.5	%
		Others		+1.5	
Voltage adjustability	Single output	24Vout		+20	%
		Others		+10	
Ripple and noise	Measured by 20MHz bandwidth	Single	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	Zener diode clamp	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					UL60950-1 EN60950-1 IEC60950-1
Chassis material					Aluminum
Weight				182g (6.40oz)	
MTBF	MIL-HDBK-217F, Full load			5.296 x 10 ⁵	hrs

ENVIRONMENTAL SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	Without derating	-40		+55	°C
	With derating	+55		+99	
Storage temperature range		-40		+105	°C
Thermal shock					MIL-STD-810F
Vibration					MIL-STD-810F
Relative humidity					5% to 95% RH

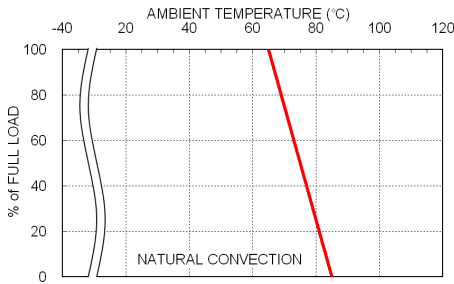
EMC SPECIFICATIONS

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

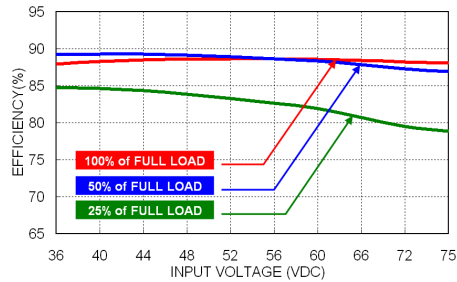
Note:

1. Test by minimum input and constant resistive load.

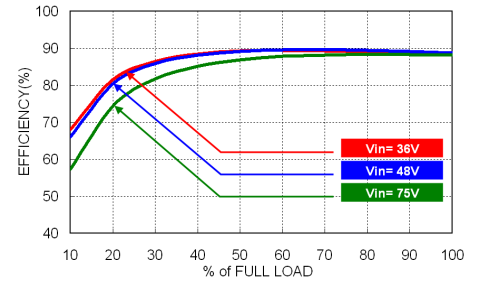
CHARACTERISTIC CURVE



DFEC60-48S05 Derating Curve

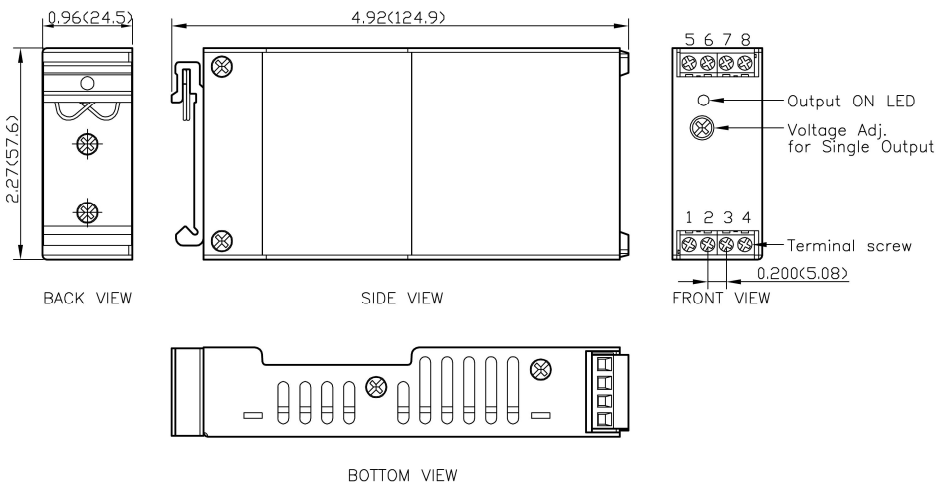


DFEC60-48S05 Efficiency vs. Input Voltage



DFEC60-48S05 Efficiency vs. Output Load

MECHANICAL DRAWING



PIN CONNECTION

PIN	SINGLE
1	Ctrl
2	-Vin
3	-Vin
4	+Vin
5	NC
6	-Vout
7	+Vout
8	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. Terminal screw locked torque : MAX 2.5kgf – cm (0.25N – m)