POWER MATE TECHNOLOGY CO., LTD.

DFEC40 SERIES

CHASSIS-MOUNT DC-DC CONVERTER

2:1 WIDE INPUT RANGE
UP TO 40 Watts

FEATURES

- 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℃ otherwise noted

Model Number	Input Range	Output Voltage	Output Current @Full Load		Input Current @ No Load	Efficiency	Maximum Capacitor Load (2)
	VDC	VDC	Min. Load (1) mA	Full Load mA	mA	%	μF
DFEC40-12S3P3	9.5 ~ 18	3.3	0	8000	179	84	21000
DFEC40-12S05	9.5 ~ 18	5	0	8000	232	84	13600
DFEC40-12S12	9.5 ~ 18	12	0	3333	262	84	2360
DFEC40-12S15	9.5 ~ 18	15	0	2666	320	85	1510
DFEC40-12S24	9.5 ~ 18	24	144	1800	42	83	600
DFEC40-12S28	9.5 ~ 18	28	122	1400	50	83	375
DFEC40-12D12	9.5 ~ 18	±12	±144	±1800	37	83	±1200
DFEC40-12D15	9.5 ~ 18	±15	±112	±1400	45	83	±750
DFEC40-12T3312	9.5 ~ 18	3.3 / ±12	600 / ±40	6000 / ±400	222	82	13000 / ±330
DFEC40-12T3315	9.5 ~ 18	3.3 / ±15	600 / ±30	6000 / ±300	237	82	13000 / ±110
DFEC40-12T0512	9.5 ~ 18	5 / ±12	600 / ±40	6000 / ±400	287	84	6800 / ±330
DFEC40-12T0515	9.5 ~ 18	5 / ±15	600 / ±30	6000 / ±300	287	84	6800 / ±110
DFEC40-24S3P3	18 ~ 36	3.3	0	8000	67	85	21000
DFEC40-24S05	18 ~ 36	5	0	8000	82	87	13600
DFEC40-24S12	18 ~ 36	12	0	3333	87	86	2360
DFEC40-24S15	18 ~ 36	15	0	2666	92	87	1510
DFEC40-24S24	18 ~ 36	24	144	1800	32	86	600
DFEC40-24S28	18 ~ 36	28	122	1400	32	86	375
DFEC40-24D12	18 ~ 36	±12	±144	±1800	27	85	±1200
DFEC40-24D15	18 ~ 36	±15	±112	±1400	27	85	±750
DFEC40-24T3312	18 ~ 36	3.3 / ±12	600 / ±40	6000 / ±400	67	83	13000 / ±330
DFEC40-24T3315	18 ~ 36	3.3 / ±15	600 / ±30	6000 / ±300	67	83	13000 / ±110
DFEC40-24T0512	18 ~ 36	5 / ±12	600 / ±40	6000 / ±400	67	85	6800 / ±330
DFEC40-24T0515	18 ~ 36	5 / ±15	600 / ±30	6000 / ±300	77	85	6800 / ±110
DFEC40-48S3P3	36 ~ 75	3.3	0	8000	42	86	21000
DFEC40-48S05	36 ~ 75	5	0	8000	44	88	13600
DFEC40-48S12	36 ~ 75	12	0	3333	54	87	2360
DFEC40-48S15	36 ~ 75	15	0	2666	57	87	1510
DFEC40-48S24	36 ~ 75	24	144	1800	23	86	600
DFEC40-48S28	36 ~ 75	28	122	1400	23	86	375
DFEC40-48D12	36 ~ 75	±12	±144	±1800	20	85	±1200
DFEC40-48D15	36 ~ 75	±15	±112	±1400	20	85	±750
DFEC40-48T3312	36 ~ 75	3.3 / ±12	600 / ±40	6000 / ±400	42	84	13000 / ±330
DFEC40-48T3315	36 ~ 75	3.3 / ±15	600 / ±30	6000 / ±300	42	84	13000 / ±110
DFEC40-48T0512	36 ~ 75	5 / ±12	600 / ±40	6000 / ±400	42	86	6800 / ±330
DFEC40-48T0515	36 ~ 75	5 / ±15	600 / ±30	6000 / ±300	47	86	6800 / ±110

PART NUMBER STRUCTURE

DFEC40 - 48 S 05

Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)
	12: 9.5~18	**S:** Single	**3P3:** 3.3
	24: 18~36		**05:** 5
	48: 36~75		**12:** 12
			15: 15
			24: 24
			28: 28
		D: Dual	**12:** ±12
			15: ±15
		T: Triple	**3312:** 3.3 / ±12
			3315: 3.3 / ±15
			0512: 5 / ±12
			0515: 5 / ±15

INPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating input voltage range		12Vin(nom)	9.5	12	18	VDC
		24Vin(nom)	18	24	36	
		48Vin(nom)	36	48	75	
Input fuse (slow blow)		12Vin(nom)		8		A
		24Vin(nom)		8		
		48Vin(nom)		4		
In-rush current				15		A
Input reflected ripple current	Nominal input and Full load			15		mAp-p
Start up voltage		12Vin(nom)			9.5	VDC
		24Vin(nom)			18	
		48Vin(nom)			36	
Shutdown voltage		12Vin(nom)		8		VDC
		24Vin(nom)		16		
		48Vin(nom)		33		
Start up time	Nominal input and	Power up		100		ms
	Constant resistive load	Remote ON/OFF		25		
Input surge voltage	100ms, max.	12Vin(nom)			36	VDC
		24Vin(nom)			50	
		48Vin(nom)			100	
Remote ON/OFF	Referred to –Vin pin	Positive logic DC-DC ON	Open or 3.5 ~ 12VDC			
		DC-DC OFF	Short or 0 ~ 1.2VDC			
		Input current of Ctrl pin	-0.5		0.5	mA
		Remote off input current		2.5		mA

OUTPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Voltage accuracy		3.3Vout Single / Dual Triple: 3.3Vout, 5Vout Triple: 12Vout, 15Vout	-2.0 -1.5 -2.0 -5.0		+2.0 +1.5 +2.0 +5.0	%
Line regulation	Low Line to High Line at Full Load	Single / Dual Triple: 3.3Vout, 5Vout Triple: 12Vout, 15Vout	-0.5 -1.0 -5.0		+0.5 +1.0 +5.0	%
Load regulation	Min. Load to Full Load Triple: Main output: :(3.3Vout, 5Vout) 10% to 100% with 10% to 100% balanced onauxiliaries. Auxiliary outputs 10% to 100% balanced on all outputs.	3.3Vout Single / Dual Triple: 3.3Vout, 5Vout Triple: 12Vout, 15Vout	-2.0 -1.5 -2.5 -5.0		+2.0 +1.5 +2.5 +5.0	%
Cross regulation	Dual: Asymmetrical load 25%/100% FL Triple: Main output:(3.3Vout, 5Vout) 100% load, auxiliary 100%, other auxiliary 25% to 100% load or main output:(3.3Vout, 5Vout) 25%, auxiliary 25%, other auxiliary 25% to 100%.	Dual Triple: 3.3Vout, 5Vout Triple: 12Vout, 15Vout	-5.0 -2.5 -5.0		+5.0 +2.5 +5.0	%
Voltage adjustability	Single output	28Vout Others	-3 -10		+17 +10	%
Ripple and noise	Measured by 20MHz bandwidth Single / Triple: Main Single / Triple: Auxiliary Single Dual	3.3Vout, 5Vout 12Vout, 15Vout 24Vout, 28Vout 12Vout 15Vou		50 75 350 120 150		mVp-p
Temperature coefficient			-0.02		+0.02	%/℃
Transient response recovery time	25% load step change			250		µs
Over voltage protection	Zener diode clamp	3.3Vout 5Vout 12Vout 15Vout 24Vout 28Vout		3.9 6.2 15 18 30 36		VDC
Output indicator				Green LED		
Over load protection	% of Iout rated; Hiccup mode				150	%
Short circuit protection				Continuous, automatics recovery		

GENERAL SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Isolation voltage	1 minute	Input to Output Input (Output) to Chassis	1600 1600			VDC
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					8.080 x 10^5 hrs

ENVIRONMENTAL SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating ambient temperature		Without derating With derating	-40 +58		+58 +86	℃
Storage temperature range			-40		+105	℃
Thermal shock						MIL-STD-810F
Vibration						MIL-STD-810F
Relative humidity						5% to 95% RH

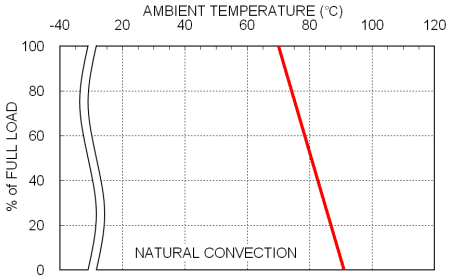
EMC SPECIFICATIONS

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

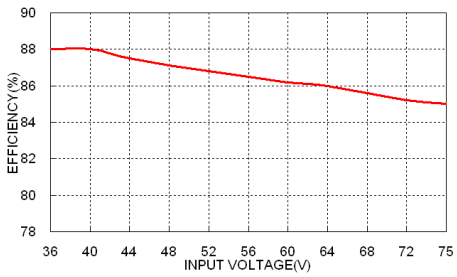
Note:

1. The output requires a minimum loading on the output to maintain specified regulation. Operation under no-load condition will not damage these devices, however they may not meet all listed specification.
2. Test by minimum input and constant resistive load.

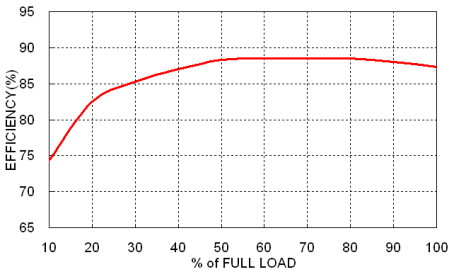
CHARACTERISTIC CURVE



DFEC40-48S05 Derating Curve

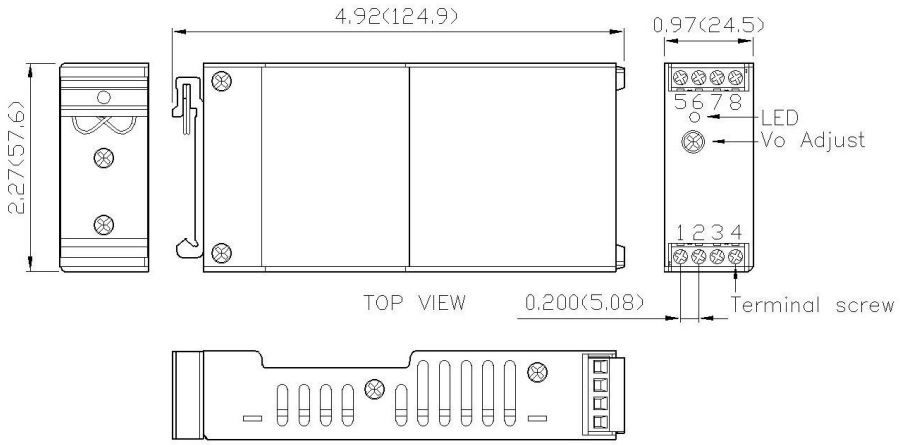


DFEC40-48S05 Efficiency vs. Input Voltage



DFEC40-48S05 Efficiency vs. Output Load

MECHANICAL DRAWING



PIN CONNECTION

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