POWER MATE TECHNOLOGY CO., LTD.

FED60W SERIES

DC-DC CONVERTER

4:1 ULTRA WIDE INPUT RANGE
UP TO 60Watts

RoHS Compliant

FEATURES

- NO MINIMUM LOAD REQUIRED
- LOW STANDBY POWER CONSUMPTION
- 1600VDC INPUT TO OUTPUT ISOLATION
- SIX-SIDED CONTINUOUS SHIELD
- STANDARD 2.00 X 1.00 X 0.40 INCH
- SAFETY MEETS UL60950-1, EN60950-1 AND IEC60950-1
- CE MARK MEETS 2006/95/EC, 2011/95/EC and 2004/108/EC
- COMPLIANT TO RoHS EU DIRECTIVE 2011/65/EU

APPLICATIONS

WIRELESS NETWORK
TELECOM/DATACOM
INDUSTRY CONTROL SYSTEM
DISTRIBUTED POWER ARCHITECTURES
SEMICONDUCTOR EQUIPMENT

1600VDC ISOLATION	REMOTE CONTROL	UVP	OCP	SCP	OVP	OTP	LOW STANDBY POWER

TECHNICAL SPECIFICATION

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

Model Number	Input Range VDC	Output Voltage VDC	Output Current @Full Load A	Input Current @ No Load mA	Efficiency %	Maximum Capacitor Load μF
FED60-24S3P3W	9 ~ 36	3.3	12	10	90	32000
FED60-24S05W	9 ~ 36	5	12	10	92	30000
FED60-24S12W	9 ~ 36	12	5	10	92	5850
FED60-24S15W	9 ~ 36	15	4	10	92	3900
FED60-24S24W	9 ~ 36	24	2.5	10	92	2000
FED60-24D12W	9 ~ 36	±12	±2.5	10	91	±3900
FED60-24D15W	9 ~ 36	±15	±2	10	91	±2400
FED60-24D24W	9 ~ 36	±24	±1.25	10	91	±1000
FED60-48S3P3W	18 ~ 75	3.3	12	10	90	32000
FED60-48S05W	18 ~ 75	5	12	10	92	30000
FED60-48S12W	18 ~ 75	12	5	10	92	5850
FED60-48S15W	18 ~ 75	15	4	10	92	3900
FED60-48S24W	18 ~ 75	24	2.5	10	91	2000
FED60-48D12W	18 ~ 75	±12	±2.5	10	91	±3900
FED60-48D15W	18 ~ 75	±15	±2	10	91	±2400
FED60-48D24W	18 ~ 75	±24	±1.25	10	91	±1000

PART NUMBER STRUCTURE

FED60 - 48 S 05 W - N HS

Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Input Range	Remote Control options	Heat-sink
	24: 9~36 **48:** 18~75	**S:** Single	**3P3:** 3.3 **05:** 5 **12:** 12 **15:** 15 **24:** 24	4:1	□: Positive logic **N:** Negative logig	□: No Heat-sink **HS** Heat-sink **HC** Heat-sink with Clamp
		D: Dual	**12:** ±12 **15:** ±15 **24:** ±24			

INPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating input voltage range		24Vin(nom) 48Vin(nom)	9 18	24 48	36 75	VDC
Start-up voltage		24Vin(nom) 48Vin(nom)			9 18	VDC
Shutdown voltage		24Vin(nom) 48Vin(nom)		8 16		VDC
Start up time	Constant resistive load	Power up Remote ON/OFF		60 60		ms
Input surge voltage	1 second, max.	24Vin(nom) 48Vin(nom)			50 100	VDC
Input filter				Pi type		
Remote ON/OFF	Referenced to –INPUT pin	Positive logic (Standard) DC-DC ON DC-DC OFF Negative logic (Option) DC-DC ON DC-DC OFF Input current of CTRL pin Remote off input current		Open or 3 ~ 12VDC Short or 0 ~ 1.2VDC Short or 0 ~ 1.2VDC Open or 3 ~ 12VDC 3		 mA mA

OUTPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Voltage accuracy			-1.0		+1.0	%
Line regulation	Low Line to High Line at Full Load		-0.2		+0.2	%
Load regulation	No Load to Full Load	Single Dual	-0.5 -1.0		+0.5 +1.0	%
Cross regulation	Asymmetrical load 25%/100% FL	Dual	-5.0		+5.0	%
Voltage adjustability	Single output	3.3Vout, 5Vout, 12Vout 15Vout, 24Vout	-10 -10		+10 +20	%
Ripple and noise	Measured by 20MHz bandwidth With a 10μF/25V X7R MLCC With a 10μF/25V X7R MLCC With a 4.7μF/50V X7R MLCC	 3.3Vout, 5Vout 12Vout, 15Vout 24Vout		 75 100 150	 100 125 200	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		3.9 6.2 15 20 30		VDC
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 Case	1600 1600			VDC
Isolation resistance	500VDC		1			GΩ
Isolation capacitance					2200	pF
Switching frequency			225	250	275	kHz
Design meet safety standard			IEC60950-1, UL60950-1, EN60950-1			
Case material						Copper
Base material						FR4 PCB
Potting material						Silicone (UL94-V0)
Dimensions						2.00 X 1.00 X 0.40 Inch (50.8×25.4×10.2 mm)
Weight						33g (1.16oz)
MTBF	MIL-HDBK-217F Tc=70℃, Full load.					8.582 x 10^5 hrs

ENVIRONMENTAL SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature		-40		+85	℃
Maximum case temperature				+105	℃
Over temperature protection			+115		℃

Storage temperature range			-55	+125	℃
Thermal impedance (1)	Natural convection (20LFM)	Without Heat-sink With Heat-sink	10.8 10.3		℃/W
Thermal shock				MIL-STD-810F	
Vibration				MIL-STD-810F	
Relative humidity				5% to 95% RH	

EMC SPECIFICATIONS

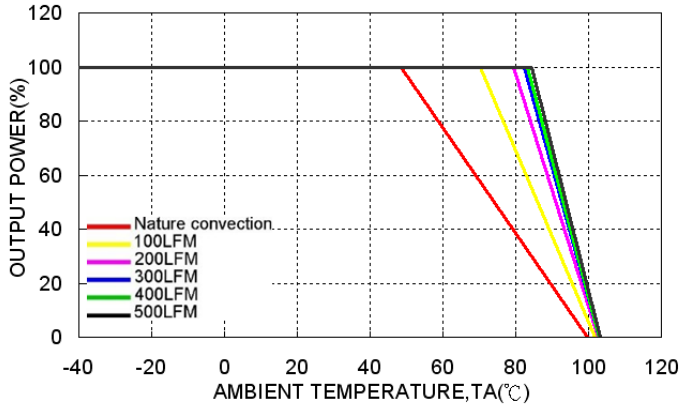
Parameter	Conditions		Level
EMI (2)	EN55022		Class A
ESD	EN61000-4-2	Air ± 8kV Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3	20 V/m	Perf. Criteria A
Fast transient (3)	EN61000-4-4	± 2kV	Perf. Criteria A
Surge (3)	EN61000-4-5	± 2kV	Perf. Criteria A
Conducted immunity	EN61000-4-6	10 Vr.m.s	Perf. Criteria A

Note:

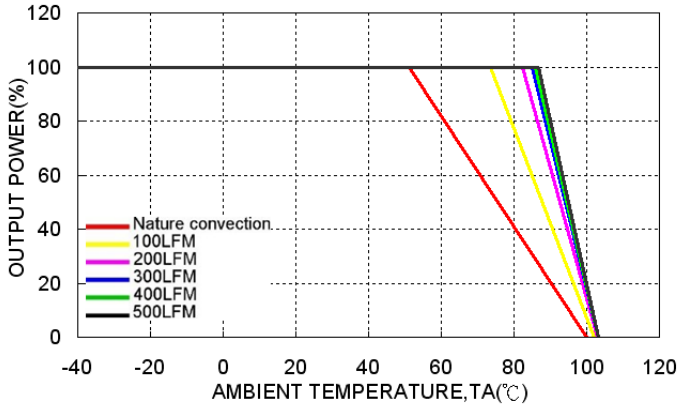
1. The heat-sink is optional and P/N: 7G-0020C-F.
2. The FED60 series standard module meets EMI Class A or Class B with external components. For more detail information, please contact with P-DUKE.
3. An external filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5.
   The FED60-24□□□W recommended an aluminum electrolytic capacitor (Nippon chemi-con KY series, 220μF/100V) and a TVS (SMDJ58A, 58V, 3000Watt peak pulse power) to connect in parallel.
   The FED60-48□□□W recommended an aluminum electrolytic capacitor (Nippon chemi-con KY series, 220μF/100V) and a TVS (SMDJ120A, 120V, 3000Watt peak pulse power) to connect in parallel.

CAUTION: This power module is not internally fused. An input line fuse must always be used.

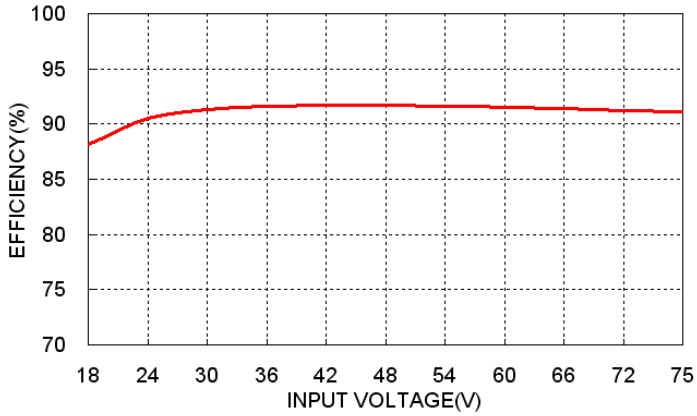
CHARACTERISTIC CURVE



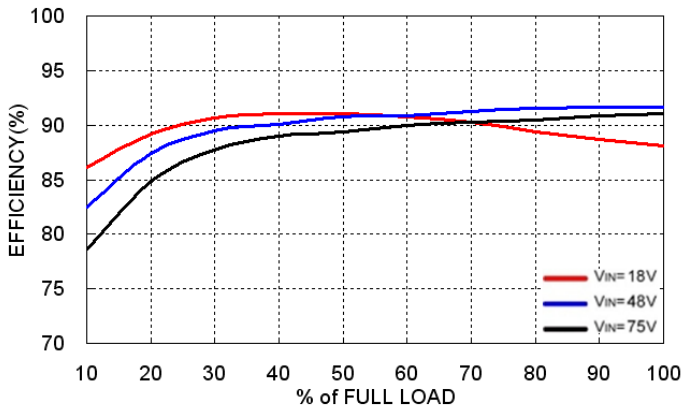
FED60-48S12W Derating Curve



FED60-48S12W Derating Curve with Heat-sink

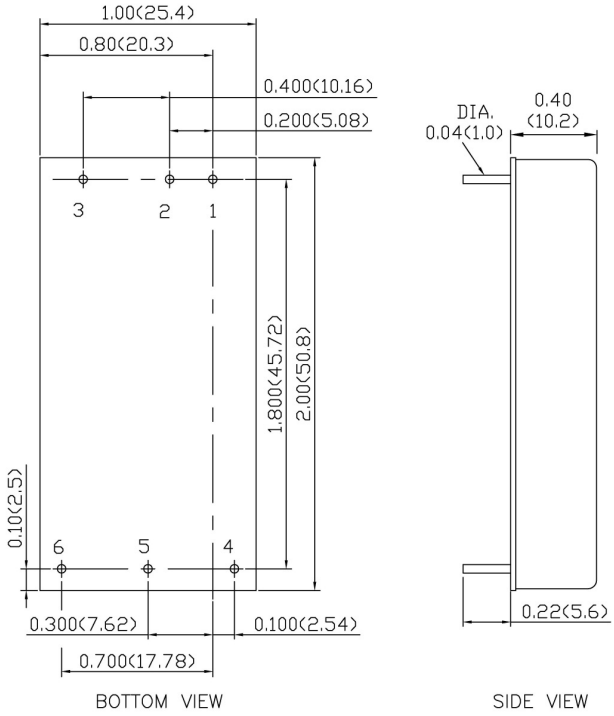


FED60-48S12W Efficiency VS Input Voltage



FED60-48S12W Efficiency VS Output Load

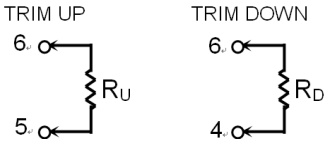
MECHANICAL DRAWING



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

EXTERNAL OUTPUT TRIMMING

Output can be externally trimmed by using the method shown below.



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. Pin pitch tolerance ±0.01 (0.25)
4. Pin dimension tolerance ±0.004(0.1)