POWER MATE TECHNOLOGY CO.,LTD.

FKC12 SERIES

FEATURES

- 12 WATTS OUTPUT POWER
- OUTPUT CURRENT UP TO 3.5A
- STANDARD 1.25 X 0.80 X 0.40 INCH
- HIGH EFFICIENCY UP TO 88%
- 2:1 WIDE INPUT VOLTAGE RANGE
- FIVE-SIDED CONTINUOUS SHIELD
- FIXED SWITCHING FREQUENCY (400KHz)
- STANDARD 24 PIN DIP PACKAGE
- I/O ISOLATION 1600 VDC
- CE MARK MEETS 2006/95/EC, 93/68/EEC AND 2004/108/EC
- UL60950-1, EN60950-1 AND IEC60950-1 LICENSED
- ISO9001 CERTIFIED MANUFACTURING FACILITIES
- COMPLIANT TO RoHS EU DIRECTIVE 2002/95/EC

APPLICATIONS

Wireless Network
Telecom/Datacom
Industry Control System
Measurement Equipment
Semiconductor Equipment

OPTIONS

SMD TYPE

DESCRIPTION

The FKC12 series offer 12 watts of output power from a package in an IC compatible 24pin DIP configuration. FKC12 series have 2:1 wide input voltage of 9-18, 18-36 and 36-75VDC. The FKC12 have features 1600VDC of isolation, short circuit protection and as well as five sided shielding.

TECHNICAL SPECIFICATION

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

OUTPUT SPECIFICATIONS

Output power			12 Watts, max.
Voltage accuracy			±1.2%
Minimum load			0%
Line regulation	LL to HL at Full Load	Single Dual	± 0.2% ± 0.5%
Load regulation	No Load to Full Load	Single (DIP) Single (SMD) Dual (SMD,DIP) (2.5Vo only)	± 0.5% ± 1% ± 1% ± 1%
Cross regulation (Dual)	Asymmetrical load 25% / 100% FL		± 5%
Ripple and noise	20MHz bandwidth		See table
Temperature coefficient			±0.02% / ºC, max.
Transient response recovery time	25% load step change		250µS
Over voltage protection Zener diode clamp (only single)	2.5VDC output 3.3VDC output 5.1VDC output 12VDC output 15VDC output		3.9VDC 3.9VDC 6.2VDC 15VDC 18VDC
Over load protection	% of FL at nominal input		150%
Short circuit protection		Continuous, automatics recovery	

GENERAL SPECIFICATIONS

Efficiency			See table
Isolation voltage	Input to Output		1600VDC, min. 1minute
	Input(Output) to Case	DIP	1600VDC, min. 1minute
		SMD	1600VDC, min. 1minute
Isolation resistance			10^9ohms, min.
Isolation capacitance			1200pF, max.
Switching frequency			400KHz±10%
Approvals and standard			IEC60950-1, UL60950-1, EN60950-1
Case material			Nickel-coated copper
Base material			Non-conductive black plastic
Potting material			Epoxy (UL94-V0)
Dimensions			1.25 X 0.80 X 0.40 Inch (31.8 X 20.3 X 10.2 mm)
Weight			18g (0.62oz)
MTBF (Note 1)	BELLCORE TR-NWT-000332		2.750 x 10^6 hrs
	MIL-HDBK-217F		7.575 x 10^5 hrs

INPUT SPECIFICATIONS

Input voltage range	12VDC nominal input	9 ~ 18VDC
	24VDC nominal input	18 ~ 36VDC
	48VDC nominal input	36 ~ 75VDC
Input filter		Pi type
Input surge voltage	12VDC input	36VDC 100mS, max.
	24VDC input	50VDC 100mS, max.
	48VDC input	100VDC 100mS, max.
Input reflected ripple current		20mAp-p
Start up time	Nominal input and constant resistive load, Power up	450mS
Start-up voltage	12VDC input	9VDC
	24VDC input	18VDC
	48VDC input	36VDC
Shutdown voltage	12VDC input	8VDC
	24VDC input	16VDC
	48VDC input	33VDC
Remote ON/OFF (Note 5) (Positive logic)	DC-DC ON	Open or 3.0V < Vr < 12V
	DC-DC OFF	Short or 0V < Vr < 1.2V
Input current of remote control pin	Nominal input	-0.5mA ~ 0.5mA
Remote off state input current	Nominal input	2.5mA

ENVIRONMENTAL SPECIFICATIONS

Operating ambient temperature		-40ºC ~ +85ºC (with derating)
Maximum case temperature		100ºC
Storage temperature range		-55ºC ~ +105ºC
Thermal impedance	Nature convection	20ºC/Watt
Thermal shock		MIL-STD-810F
Vibration		MIL-STD-810F
Relative humidity		5% to 95% RH

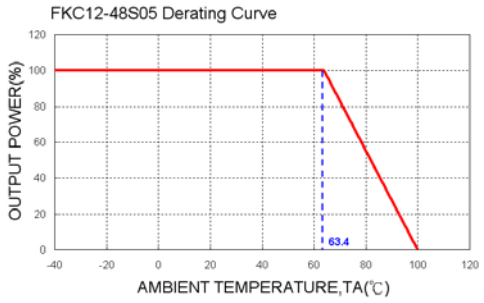
EMC CHARACTERISTICS

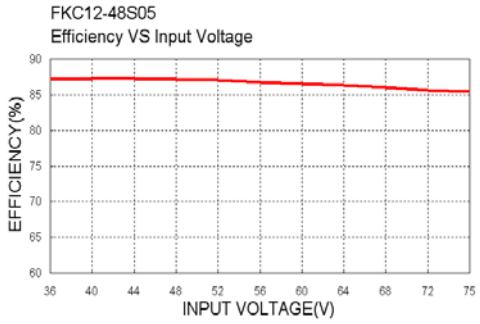
EMI (Note 6)	EN55022		Class A
ESD	EN61000-4-2	Air ± 8KV Contact ± 6KV	Perf. Criteria A
Radiated immunity	EN61000-4-3	10 V/m	Perf. Criteria A
Fast transient (Note 7)	EN61000-4-4	± 2KV	Perf. Criteria A
Surge (Note 7)	EN61000-4-5	± 1KV	Perf. Criteria A
Conducted immunity	EN61000-4-6	10 Vr.m.s	Perf. Criteria A

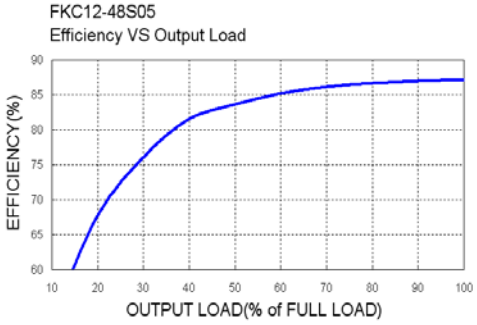
Model Number	Input Range	Output Voltage	Output Current		Output Ripple & Noise	No load [2] Input Current	Eff [3] (%)	Capacitor[4] Load max
			Min. load	Full load				
FKC12-12S2P5	9 ~ 18 VDC	2.5 VDC	0mA	3500mA	85mVp-p	50mA	82	2000μF
FKC12-12S3P3	9 ~ 18 VDC	3.3 VDC	0mA	3500mA	85mVp-p	60mA	84	2000μF
FKC12-12S05	9 ~ 18 VDC	5.1 VDC	0mA	2400mA	85mVp-p	53mA	86	2000μF
FKC12-12S12	9 ~ 18 VDC	12 VDC	0mA	1000mA	85mVp-p	15mA	86	430μF
FKC12-12S15	9 ~ 18 VDC	15 VDC	0mA	800mA	85mVp-p	17mA	86	300μF
FKC12-12D05	9 ~ 18 VDC	± 5 VDC	0mA	± 1200mA	85mVp-p	24mA	82	± 1250μF
FKC12-12D12	9 ~ 18 VDC	± 12 VDC	0mA	± 500mA	85mVp-p	19mA	87	± 200μF
FKC12-12D15	9 ~ 18 VDC	± 15 VDC	0mA	± 400mA	85mVp-p	24mA	87	± 120μF
FKC12-24S2P5	18 ~ 36 VDC	2.5 VDC	0mA	3500mA	85mVp-p	36mA	83	2000μF
FKC12-24S3P3	18 ~ 36 VDC	3.3 VDC	0mA	3500mA	85mVp-p	36mA	85	2000μF
FKC12-24S05	18 ~ 36 VDC	5.1 VDC	0mA	2400mA	85mVp-p	35mA	87	2000μF
FKC12-24S12	18 ~ 36 VDC	12 VDC	0mA	1000mA	85mVp-p	16mA	87	430μF
FKC12-24S15	18 ~ 36 VDC	15 VDC	0mA	800mA	85mVp-p	17mA	87	300μF
FKC12-24D05	18 ~ 36 VDC	± 5 VDC	0mA	± 1200mA	85mVp-p	15mA	83	± 1250μF
FKC12-24D12	18 ~ 36 VDC	± 12 VDC	0mA	± 500mA	85mVp-p	15mA	88	± 200μF
FKC12-24D15	18 ~ 36 VDC	± 15 VDC	0mA	± 400mA	85mVp-p	18mA	88	± 120μF
FKC12-48S2P5	36 ~ 75 VDC	2.5 VDC	0mA	3500mA	85mVp-p	10mA	83	2000μF
FKC12-48S3P3	36 ~ 75 VDC	3.3 VDC	0mA	3500mA	85mVp-p	14mA	85	2000μF
FKC12-48S05	36 ~ 75 VDC	5.1 VDC	0mA	2400mA	85mVp-p	23mA	87	2000μF
FKC12-48S12	36 ~ 75 VDC	12 VDC	0mA	1000mA	85mVp-p	11mA	87	430μF
FKC12-48S15	36 ~ 75 VDC	15 VDC	0mA	800mA	85mVp-p	5mA	87	300μF
FKC12-48D05	36 ~ 75 VDC	± 5 VDC	0mA	± 1200mA	85mVp-p	6mA	83	± 1250μF
FKC12-48D12	36 ~ 75 VDC	± 12 VDC	0mA	± 500mA	85mVp-p	6mA	88	± 200μF
FKC12-48D15	36 ~ 75 VDC	± 15 VDC	0mA	± 400mA	85mVp-p	6mA	88	± 120μF

NOTE:
1. BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40ºC.
   MIL-HDBK-217F Notice2 @Ta=25 ºC, Full load(Ground, Benign, controlled environment).
2. Typical value at nominal input voltage and no load.
3. Typical value at nominal input voltage and full load.
4. Test by minimum input and constant resistive load.
5. The ON/OFF control pin voltage is referenced to –INPUT.
6. The FKC12 series can meet EN55022 Class A with parallel an external capacitor to the input pins.
   Recommend: 12Vin: 6.8μF/50V 1812 MLCC. 24Vin: 4.7μF/50V 1812 MLCC. 48Vin: 2.2μF/100V 1812 MLCC.
7. An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5.
   The filter capacitor Power Mate suggest: Nippon chemi-con KY series, 220μF /100V, ESR 48mΩ.

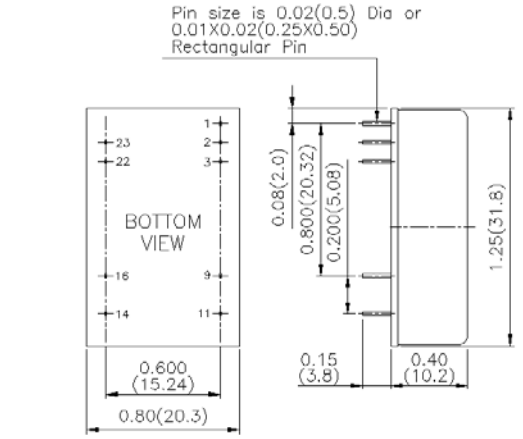
CAUTION: This power module is not internally fused. An input line fuse must always be used.

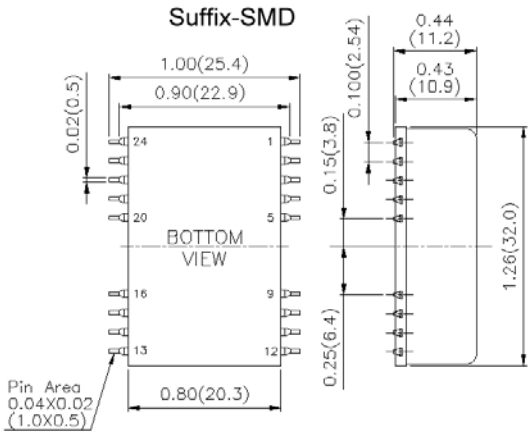






Mechanical Drawing:



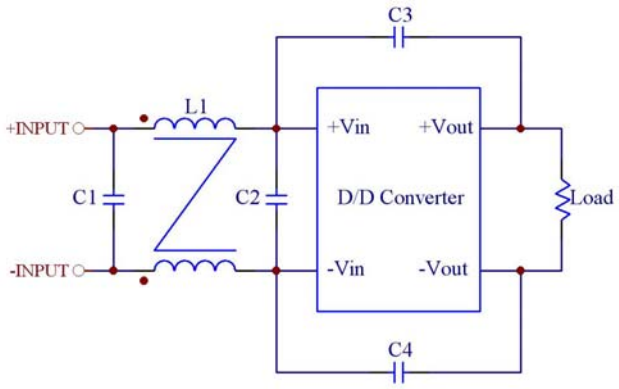


1. All dimensions in Inch (mm)
   Tolerance: X.XX±0.02 (X.X±0.5)
   X.XXX±0.01 (X.XX±0.25)
2. Pin pitch tolerance ±0.01(0.25)
3. Pin dimension tolerance ±0.004 (0.1)

DIP PIN CONNECTION					
PIN	SINGLE	DUAL	PIN	SINGLE	DUAL
1	CTRL	CTRL			
2	- INPUT	- INPUT	23	+ INPUT	+ INPUT
3	- INPUT	- INPUT	22	+ INPUT	+ INPUT
9	NC	COMMON	16	- OUTPUT	COMMON
11	NC	- OUTPUT	14	+ OUTPUT	+ OUTPUT

SMD PIN CONNECTION					
PIN	SINGLE	DUAL	PIN	SINGLE	DUAL
1	CTRL	CTRL			
2	- INPUT	- INPUT	23	+ INPUT	+ INPUT
3	- INPUT	- INPUT	22	+ INPUT	+ INPUT
9	NC	COMMON	16	- OUTPUT	COMMON
11	NC	- OUTPUT	14	+ OUTPUT	+ OUTPUT
Others	NC	NC	Others	NC	NC

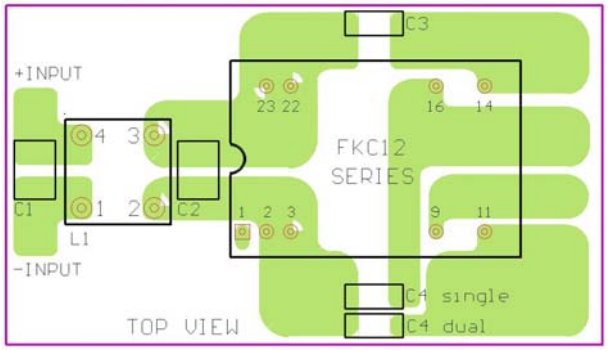
Recommended EMI Filter:



Recommended Filter for EN55022 Class B Compliance

The components used in the above figure, together with the manufacturers' part numbers for these components, are as follows:

	C1	C2	C3	C4	L1
FKC12-12xxx	3.3μF/50V 1812 MLCC	N/A	1000pF/2KV MLCC	1000pF/2KV MLCC	325μH Common Choke PMT-050
FKC12-24xxx	4.7μF/50V 1812 MLCC	N/A	1000pF/2KV MLCC	1000pF/2KV MLCC	325μH Common Choke PMT-050
FKC12-48xxx	2.2μF/100V 1812 MLCC	2.2μF/100V 1812 MLCC	1000pF/2KV MLCC	1000pF/2KV MLCC	325μH Common Choke PMT-050



Recommended EN55022 Class B Filter Circuit Layout