

# FKC12 SERIES

DC-DC CONVERTER

2:1 WIDE INPUT RANGE  
UP TO 12 Watts



## FEATURES

- NO MINIMUM LOAD REQUIRED
- 1600VDC INPUT TO OUTPUT ISOLATION
- STANDARD 1.25 X 0.80 X 0.40 INCH 24 PIN DIP AND SMD PACKAGE
- UL60950-1, EN60950-1, & IEC60950-1 SAFETY APPROVALS
- CE MARKED
- COMPLIANT TO RoHS II & REACH

## APPLICATIONS

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

<b>1600VDC ISOLATION</b>	<b>REMOTE CONTROL</b>	<b>UVP</b>	<b>OCP</b>	<b>SCP</b>
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## TECHNICAL SPECIFICATION

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

Model Number	Input Range VDC	Output Voltage VDC	Output Current @Full Load mA	Input Current @ No Load mA	Efficiency %	Maximum Capacitor Load µF
FKC12-12S2P5	9 ~ 18	2.5	3500	50	82	2000
FKC12-12S3P3	9 ~ 18	3.3	3500	60	84	2000
FKC12-12S05	9 ~ 18	5.1	2400	53	86	2000
FKC12-12S12	9 ~ 18	12	1000	15	86	430
FKC12-12S15	9 ~ 18	15	800	17	86	300
FKC12-12D05	9 ~ 18	±5	±1200	24	82	±1250
FKC12-12D12	9 ~ 18	±12	±500	19	87	±200
FKC12-12D15	9 ~ 18	±15	±400	24	87	±120
FKC12-24S2P5	18 ~ 36	2.5	3500	36	83	2000
FKC12-24S3P3	18 ~ 36	3.3	3500	36	85	2000
FKC12-24S05	18 ~ 36	5.1	2400	35	87	2000
FKC12-24S12	18 ~ 36	12	1000	16	87	430
FKC12-24S15	18 ~ 36	15	800	17	87	300
FKC12-24D05	18 ~ 36	±5	±1200	15	83	±1250
FKC12-24D12	18 ~ 36	±12	±500	15	88	±200
FKC12-24D15	18 ~ 36	±15	±400	18	88	±120
FKC12-48S2P5	36 ~ 75	2.5	3500	10	83	2000
FKC12-48S3P3	36 ~ 75	3.3	3500	14	85	2000
FKC12-48S05	36 ~ 75	5.1	2400	23	87	2000
FKC12-48S12	36 ~ 75	12	1000	11	87	430
FKC12-48S15	36 ~ 75	15	800	5	87	300
FKC12-48D05	36 ~ 75	±5	±1200	6	83	±1250
FKC12-48D12	36 ~ 75	±12	±500	6	88	±200
FKC12-48D15	36 ~ 75	±15	±400	6	88	±120

## PART NUMBER STRUCTURE

<b>FKC12</b> -	<b>48</b>	<b>S</b>	<b>05</b>	-	<b>SMD</b>
Series Name	Input Voltage (VDC)	Output Voltage	Output Voltage (VDC)	Mounting Type	Option
	12: 9~18 24: 18~36 48: 36~75	S: Single	2P5: 2.5 3P3: 3.3 05: 5.1 12: 12 15: 15	□: DIP type SMD: SMD type	
		D: Dual	05: ±5 12: ±12 15: ±15		

**INPUT SPECIFICATIONS**

Parameter	Conditions			Min.	Typ.	Max.	Unit
Operating input voltage range	12Vin(nom)			9	12	18	VDC
	24Vin(nom)			18	24	36	
	48Vin(nom)			36	48	75	
Start up voltage	12Vin(nom)					9	VDC
	24Vin(nom)					18	
	48Vin(nom)					36	
Shutdown voltage	12Vin(nom)				8		VDC
	24Vin(nom)				16		
	48Vin(nom)				33		
Start up time	Constant resistive load	Power up		450			ms
Input surge voltage	100 ms, max.	Remote ON/OFF			5		
		12Vin(nom)				36	VDC
		24Vin(nom)				50	
48Vin(nom)				100			
Input reflected ripple current					20		mAp-p
Input filter					Pi type		
Remote ON/OFF	Referred to -Vin pin	Positive logic	DC-DC ON		Open or 3.0 ~ 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				-1.2		+1.2	%			
Line regulation	Low Line to High Line at Full Load	Single		-0.2		+0.2	%			
			Dual		-0.5			+0.5		
Load regulation	No Load to Full Load	DIP type	Single 2.5Vout	-1.0		+1.0	%			
			Single others	-0.5		+0.5				
			Dual	-1.0		+1.0				
		SMD type	Single 2.5Vout	-1.0		+1.0				
			Single others	-1.0		+1.0				
			Dual	-1.0		+1.0				
Cross regulation	Asymmetrical load 25%/100% FL	Dual		-5.0		+5.0	%			
Ripple and noise	20MHz bandwidth				85		mVp-p			
Temperature coefficient				-0.02		+0.02	%/°C			
Transient response recovery time	25% load step change				250		µs			
Over voltage protection	Single Output	2.5Vout			3.9		VDC			
			3.3Vout			3.9				
				5.1Vout				6.2		
					12Vout				15	
						15Vout				18
Over load protection	% of lout rated						150		%	
Short circuit protection							Continuous, automatic recovery			

**GENERAL SPECIFICATIONS**

Parameter	Conditions			Min.	Typ.	Max.	Unit
Isolation voltage	1 minute	DIP type	Input to Output	1600			VDC
			Input (Output) to Case	1600			
		SMD type	Input to Output	1600			
			Input (Output) to Case	1000			
Isolation resistance	500VDC			1			GΩ
Isolation capacitance						1200	pF
Switching frequency				360	400	440	kHz
Safety approvals							UL60950-1 EN60950-1 IEC60950-1
Case material							Nickel-coated copper
Base material							Non-conductive black plastic
Potting material							Epoxy (UL94 V-0)
Weight							18g (0.62oz)
MTBF	MIL-HDBK-217F						2.064 x 10 <sup>6</sup> hrs

**ENVIRONMENTAL SPECIFICATIONS**

Parameter	Conditions	Min.	Typ.	Max.	Unit	
Operating ambient temperature	2.5Vout, 3.3Vout, $\pm 5V_{out}$	Without derating		+61	°C	
		With derating		+100		
	Others	Without derating		+66		
		With derating		+100		
Maximum case temperature				100	°C	
Storage temperature range				-55	+125	°C
Thermal impedance	Natural convection		20		°C/W	
Thermal shock					MIL-STD-810F	
Vibration					MIL-STD-810F	
Relative humidity					5% to 95% RH	

**EMC SPECIFICATIONS**

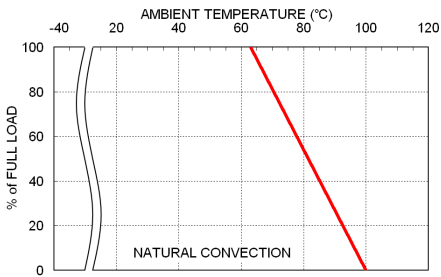
Parameter	Conditions	Level
EMI <sup>(1)</sup>	EN55022	Class A · Class B
ESD	EN61000-4-2	Air $\pm 8kV$ and Contact $\pm 6kV$
Radiated immunity	EN61000-4-3	10 V/m
Fast transient <sup>(2)</sup>	EN61000-4-4	$\pm 2kV$
Surge <sup>(2)</sup>	EN61000-4-5	$\pm 1kV$
Conducted immunity	EN61000-4-6	10 Vr.m.s

**Note:**

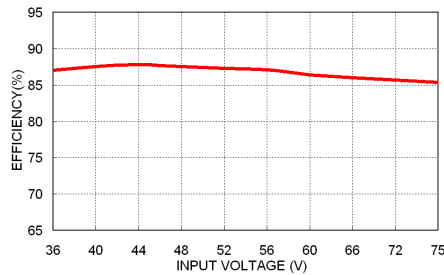
- The standard modules meet EMI Class A or Class B with external components. For further information, please contact with P-DUKE.
- An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5.  
The filter Power Mate suggests: Nippon chemi-con KY series, 220 $\mu$ F/100V.

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

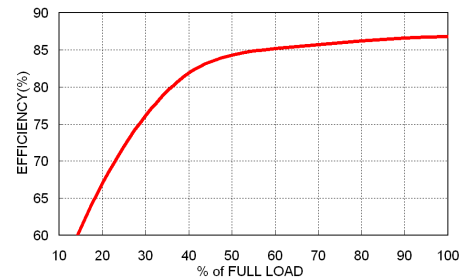
**CHARACTERISTIC CURVE**



FKC12-48S05 Derating Curve



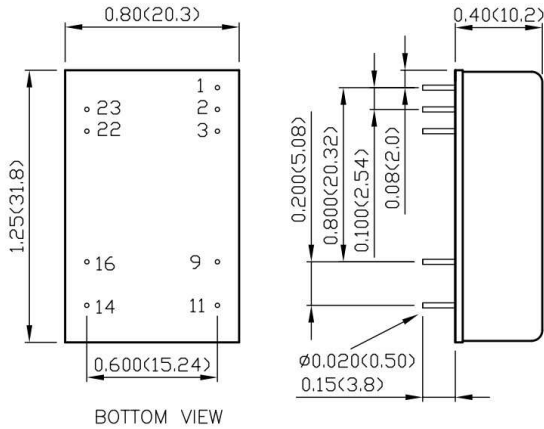
FKC12-48S05 Efficiency vs. Input Voltage



FKC12-48S05 Efficiency vs. Output Load

**MECHANICAL DRAWING**

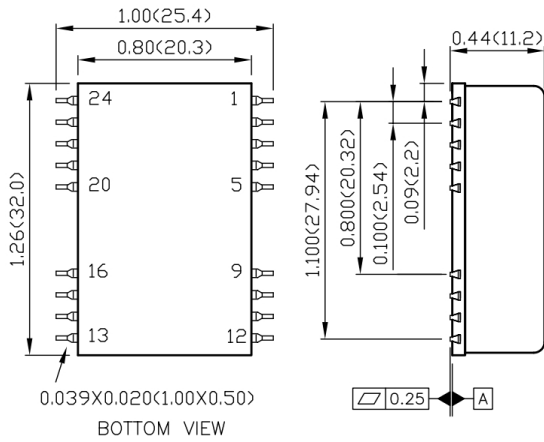
**DIP type**



**PIN CONNECTION**

PIN	SINGLE	DUAL	PIN	SINGLE	DUAL
1	Ctrl	Ctrl			
2	-Vin	-Vin	23	+Vin	+Vin
3	-Vin	-Vin	22	+Vin	+Vin
9	NC	Common	16	-Vout	Common
11	NC	-Vout	14	+Vout	+Vout

**SMD type**



**PIN CONNECTION**

PIN	SINGLE	DUAL	PIN	SINGLE	DUAL
1	Ctrl	Ctrl			
2	-Vin	-Vin	23	+Vin	+Vin
3	-Vin	-Vin	22	+Vin	+Vin
9	NC	Common	16	-Vout	Common
11	NC	-Vout	14	+Vout	+Vout
Others	NC	NC			

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)