



Power Mate Technology, Inc PFKC05 Series

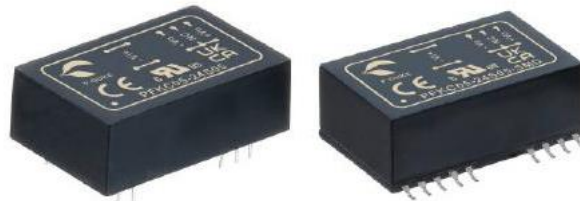
DC-DC Converter
Up to 5 Watts

3

YEARS
WARRANTY

ROHS
COMPLIANT

REACH
COMPLIANT



Automation



Datacom



IPC



Industry



Measurement



Telecom



Automobile



Boat



Charger



Medical



PV



Railway



3000
VDC
Isolation
Voltage

1600
VDC
Isolation
Voltage

2 : 1
Input
Range

SCP

PART NUMBER STRUCTURE

PFKC05 - 48 S 05 H - SMD

Series Name

Input
Voltage
(VDC)

Output
Quantity

Output
Voltage
(VDC)

Isolation
Options
(VDC)

Package
Options

12:9~18
24:18~36
48:36~75

S:Single

33:3.3
05:5
12:12
15:15

□: 1600
H: 3000

□: DIP type
SMD: SMD type

D: Dual

05:±5
12:±12
15:±15

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

Model Number	Input Range	Output Voltage	Output Current @ Full Load		Input Current @ No Load	Efficiency	Maximum Capacitor Load
			Min. Load	Full Load			
	VDC	VDC	mA	mA	mA	%	μF
PFKC05-12S33	9 ~ 18	3.3	100	1000	25	72	2200
PFKC05-12S05	9 ~ 18	5	100	1000	10	76	1000
PFKC05-12S12	9 ~ 18	12	47	470	30	80	220
PFKC05-12S15	9 ~ 18	15	40	400	20	80	150
PFKC05-12D05	9 ~ 18	±5	±50	± 500	20	77	± 680
PFKC05-12D12	9 ~ 18	±12	±20	± 230	50	80	± 100
PFKC05-12D15	9 ~ 18	±15	±19	± 190	30	80	± 68
PFKC05-24S33	18 ~ 36	3.3	100	1000	15	72	2200
PFKC05-24S05	18 ~ 36	5	100	1000	10	79	1000
PFKC05-24S12	18 ~ 36	12	47	470	10	81	220
PFKC05-24S15	18 ~ 36	15	40	400	10	81	150
PFKC05-24D05	18 ~ 36	±5	±50	± 500	10	78	± 680
PFKC05-24D12	18 ~ 36	±12	±23	± 230	40	81	± 100
PFKC05-24D15	18 ~ 36	±15	±19	± 190	10	81	± 68
PFKC05-48S33	36 ~ 75	3.3	100	1000	5	73	2200
PFKC05-48S05	36 ~ 75	5	100	1000	5	78	1000
PFKC05-48S12	36 ~ 75	12	47	470	5	81	220
PFKC05-48S15	36 ~ 75	15	40	400	5	81	150
PFKC05-48D05	36 ~ 75	±5	±50	± 500	10	77	± 680
PFKC05-48D12	36 ~ 75	±12	±23	± 230	10	81	± 100
PFKC05-48D15	36 ~ 75	±15	±19	± 190	10	81	± 68

* 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.

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 time	Constant resistive load	Power up	30			ms
Input surge voltage	100 ms, max.	12Vin(nom)	36			VDC
		24Vin(nom)	50			
		48Vin(nom)	100			
Input filter			Pi type			

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	Min. Load to Full Load	-0.5		+0.5	%
	Single	-2.0		+2.0	%
	Dual				
Cross regulation	Asymmetrical load 25%/100% FL	-5.0		+5.0	%
Ripple and noise	Measured by 20MHz bandwidth		75 120 150		mVp-p
	3.3Vout, 5Vout 12Vout 15Vout				
Temperature coefficient		-0.02		+0.02	%/°C
Transient response recovery time	25% load step change		500		µs
Short circuit protection		Continuous, automatic recovery			

GENERAL SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Isolation voltage	1 minute Input to Output Standard Suffix " H "	1600 3000			VDC
Isolation resistance	500VDC	1			GΩ
Isolation capacitance				300	pF
Switching frequency		100			kHz
Safety approvals	IEC /EN /UL 62368-1			UL:E193009 CB:UL(Demko)	
Case material				Non-conductive black plastic	
Base material				Non-conductive black plastic	
Potting material				Epoxy (UL94 V-0)	
Weight	DIP Type SMD Type			14g (0.48oz) 15g (0.52oz)	
MTBF	MIL-HDBK-217F, Full load			5.953 x 10 ⁶ hrs	

ENVIRONMENTAL SPECIFICATIONS

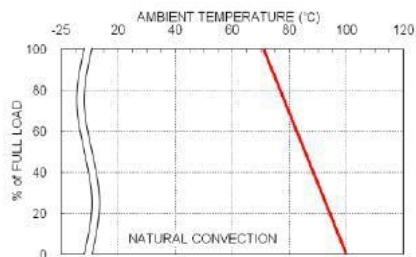
Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	Without derating	-25		+71	°C
Maximum case temperature				100	°C
Storage temperature range		-55		+125	°C
Thermal shock				MIL-STD-810F	
Vibration				MIL-STD-810F	
Relative humidity				5% to 95% RH	

EMC SPECIFICATIONS

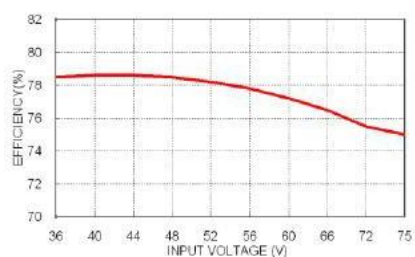
Parameter	Conditions	Level
EMI	EN55032	Class A
EMS	EN55024	
ESD	EN61000-4-2 Air ± 8kV and Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3 10 V/m	Perf. Criteria A
Fast transient	EN61000-4-4 ± 2kV With an external input filter capacitor (Nippon chemi-con KY series, 220µF/100V)	Perf. Criteria B
Surge	EN61000-4-5 ± 1kV With an external input filter capacitor (Nippon chemi-con KY series, 220µF/100V)	Perf. Criteria B
Conducted immunity	EN61000-4-6 10 Vr.m.s	Perf. Criteria A
Power frequency magnetic field	EN61000-4-8 100A/m continuous; 1000A/m 1 second	Perf. Criteria A

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

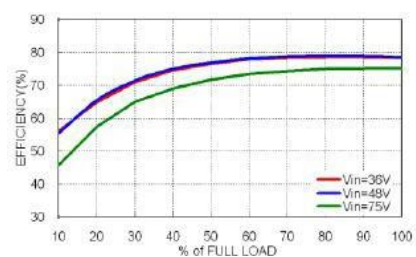
CHARACTERISTIC CURVE



PFKC05-48S05 Derating Curve



PFKC05-48S05 Efficiency vs. Input Voltage



PFKC05-48S05 Efficiency vs. Output Load

FUSE CONSIDERATION

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

This encapsulated power module can be used in a wide variety of applications, ranging from simple stand-alone operation to an integrated part of sophisticated power architecture.

To maximum flexibility, internal fusing is not included; however, to achieve maximum safety and system protection, always use an input line fuse.

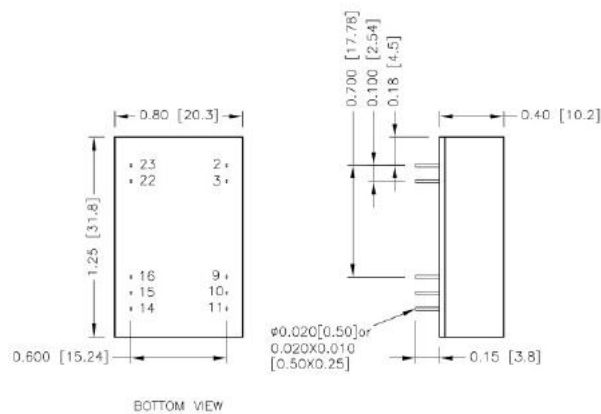
The input line fuse suggest as below :

Model	Fuse Rating (A)	Fuse Type
PFKC05-12□□□	1.25	Slow-Blow
PFKC05-24□□□	0.63	Slow-Blow
PFKC05-48□□□	0.315	Slow-Blow

The table based on the information provided in this data sheet on inrush energy and maximum DC input current at low Vin.

MECHANICAL DRAWING

DIP type



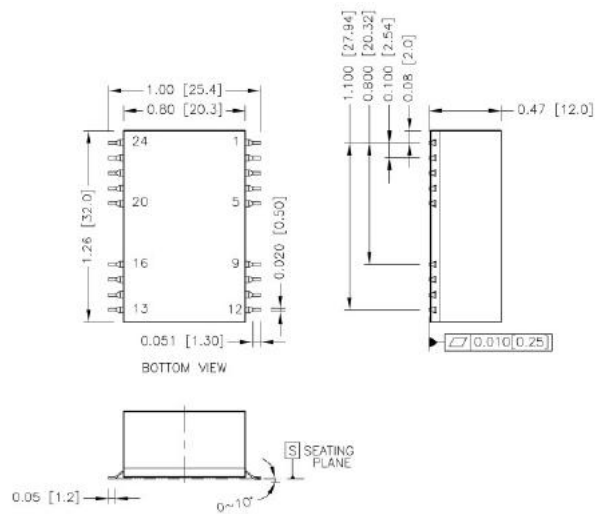
PIN CONNECTION

PIN	SINGLE	DUAL	PIN	SINGLE	DUAL
2	-Vin	-Vin	23	+Vin	+Vin
3	-Vin	-Vin	22	+Vin	+Vin
9	NC	Common	16	-Vout	Common
10	NC	NC	15	NC	NC
11	NC	-Vout	14	+Vout	+Vout

*NC:No Connection

1. All dimensions in inch [mm]
2. Tolerance :x.xx±0.02 [x.x±0.5]
x.xxx±0.010 [x.xx±0.25]
3. Pin dimension tolerance ±0.004[0.10]

SMD type



PIN CONNECTION

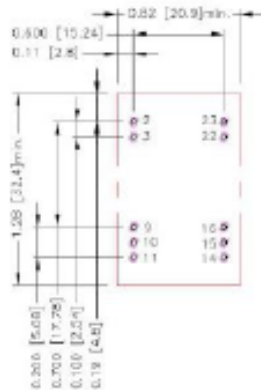
PIN	SINGLE	DUAL	PIN	SINGLE	DUAL
2	-Vin	-Vin	23	+Vin	+Vin
3	-Vin	-Vin	22	+Vin	+Vin
9	NC	Common	16	-Vout	Common
10	NC	NC	15	NC	NC
11	NC	-Vout	14	+Vout	+Vout
Others	NC	NC			

*NC:No Connection

1. All dimensions in inch [mm]
2. Tolerance :x.xx±0.02 [x.x±0.5]
x.xxx±0.010 [x.xx±0.25]
3. Pin dimension tolerance ±0.004[0.10]

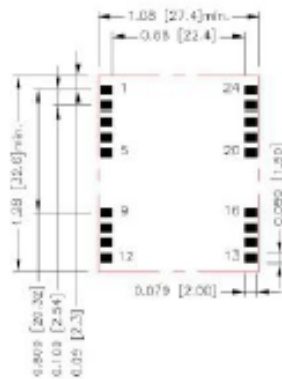
RECOMMENDED PAD LAYOUT

DIP type



All dimensions in Inch[mm]
 Pad size(lead free recommended)
 Through hole 2.3.9.10.11.14.15.16.22.23: $\Phi 0.031$ [0.80]
 Top view pad 2.3.9.10.11.14.15.16.22.23: $\Phi 0.039$ [1.00]
 Bottom view pad 2.3.9.10.11.14.15.16.22.23: $\Phi 0.063$ [1.60]

SMD type



All dimensions in Inch[mm]
 Pad size(lead free recommended)
 Top view pad:0.079x0.059[2.00x1.50]

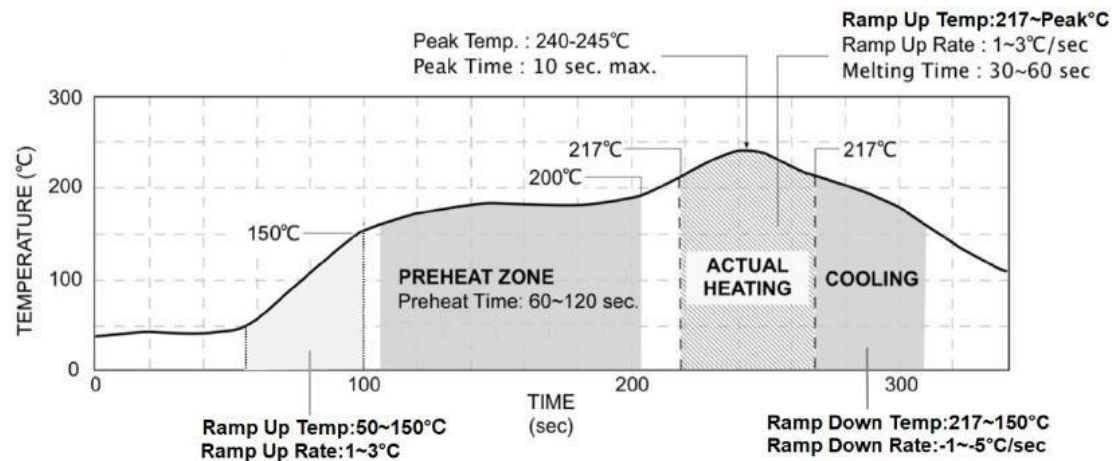
THERMAL CONSIDERATIONS

The power module operates in a variety of thermal environments. However, sufficient cooling should be provided to help ensure reliable operation of the unit. Heat is removed by conduction, convection, and radiation to the surrounding environment. Proper cooling can be verified by measuring the point as the figure below. The case temperature (T_c) should be measured at the position as the figure below. The temperature at this location should not exceed "Maximum case temperature". When operating, adequate cooling must be provided to maintain the test point temperature at or below "Maximum case temperature". You can limit this temperature to a lower value for extremely high reliability.

- Thermal test condition with vertical direction by natural convection (20LFM).



LEAD FREE REFLOW PROFILE For SMD Type



*The curves define the maximum peak reflow temperature permissible measured on pin1 or Vin pin.