

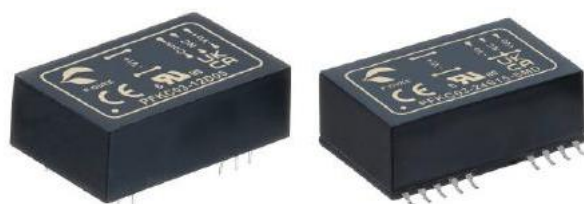


3

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

PFKC03 -	48	S	05	H	-	SMD
Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Isolation Options (VDC)		Package Options
	05:4.5~6 12:9~18 24:18~36 48:36~75	S:Single D:Dual	33:3.3 05:5 12:12 15:15 05:±5 12:±12 15:±15	□: 1600 H: 3000		□: DIP type SMD: SMD type

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
PFKC03-05S33	4.5 ~ 6	3.3	60	600	20	66	2200
PFKC03-05S05	4.5 ~ 6	5	60	600	20	70	1000
PFKC03-05S12	4.5 ~ 6	12	25	250	35	76	170
PFKC03-05S15	4.5 ~ 6	15	20	200	35	75	110
PFKC03-05D05	4.5 ~ 6	±5	±30	± 300	20	74	± 500
PFKC03-05D12	4.5 ~ 6	±12	±12	± 125	25	75	± 96
PFKC03-05D15	4.5 ~ 6	±15	±10	± 100	55	73	± 47
PFKC03-12S33	9 ~ 18	3.3	60	600	10	70	2200
PFKC03-12S05	9 ~ 18	5	60	600	10	75	1000
PFKC03-12S12	9 ~ 18	12	25	250	15	79	170
PFKC03-12S15	9 ~ 18	15	20	200	15	77	110
PFKC03-12D05	9 ~ 18	±5	±30	± 300	15	76	± 500
PFKC03-12D12	9 ~ 18	±12	±12	± 125	20	78	± 96
PFKC03-12D15	9 ~ 18	±15	±10	± 100	25	79	± 47
PFKC03-24S33	18 ~ 36	3.3	60	600	10	71	2200
PFKC03-24S05	18 ~ 36	5	60	600	10	76	1000
PFKC03-24S12	18 ~ 36	12	25	250	10	80	170
PFKC03-24S15	18 ~ 36	15	20	200	10	80	110
PFKC03-24D05	18 ~ 36	±5	±30	± 300	10	77	± 500
PFKC03-24D12	18 ~ 36	±12	±12	± 125	10	79	± 96
PFKC03-24D15	18 ~ 36	±15	±10	± 100	10	79	± 47
PFKC03-48S33	36 ~ 75	3.3	60	600	5	72	2200
PFKC03-48S05	36 ~ 75	5	60	600	5	75	1000
PFKC03-48S12	36 ~ 75	12	25	250	5	79	170
PFKC03-48S15	36 ~ 75	15	20	200	5	79	110
PFKC03-48D05	36 ~ 75	±5	±30	± 300	5	77	± 500
PFKC03-48D12	36 ~ 75	±12	±12	± 125	5	79	± 96
PFKC03-48D15	36 ~ 75	±15	±10	± 100	5	79	± 47

* 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		5Vin(nom)	4.5	5	6	VDC
		12Vin(nom)	9	12	18	
		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.	5Vin(nom)	18			VDC
		12Vin(nom)	36			
		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	Single	3.3Vout	-0.3		+0.3	%
			Others	-0.2		+0.2	
		Dual	All	-2.0		+2.0	
Cross regulation	Asymmetrical load 25%/100% FL	Dual		-5.0		+5.0	%
Ripple and noise	Measured by 20MHz bandwidth	3.3Vout, 5Vout			75		mVp-p
		12Vout			120		
		15Vout			150		
Temperature coefficient				-0.02		+0.02	%/°C
Transient response recovery time	25% load step change				500		µs
Short circuit protection				Continuous, automatics recovery			

GENERAL SPECIFICATIONS

Parameter	Conditions			Min.	Typ.	Max.	Unit
Isolation voltage	1 minute	Input to Output	Standard Suffix " H "	1600			VDC
				3000			
Isolation resistance	500VDC						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			8.066 x 10 ⁶ hrs			

ENVIRONMENTAL SPECIFICATIONS

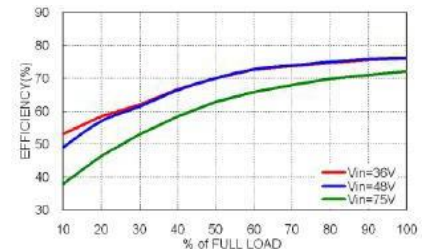
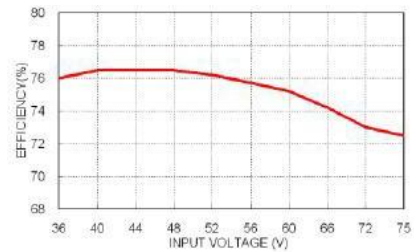
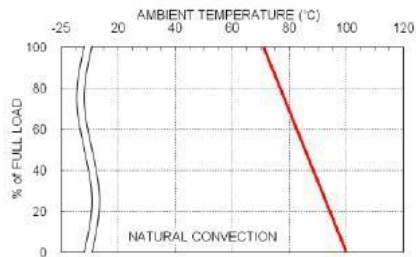
Parameter	Conditions			Min.	Typ.	Max.	Unit
Operating ambient temperature	Without derating			-25		+71	°C
Maximum case temperature						100	°C
Storage temperature range				-55		+125	°C
Thermal shock				MIL-STD-810F			
Vibration				MIL-STD-810F			
Relative humidity				5% to 95% RH			

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	Perf. Criteria B
		With an external input filter capacitor (Nippon chemi-con KY series, 220µF/100V)	
Surge	EN61000-4-5	± 1kV	Perf. Criteria B
		With an external input filter capacitor (Nippon chemi-con KY series, 220µF/100V)	
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



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.

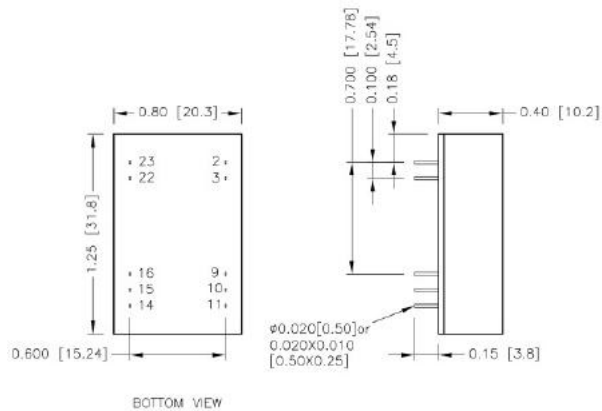
The input line fuse suggest as below :

Model	Fuse Rating (A)	Fuse Type
PFKC03-05□□□	1.6	Slow-Blow
PFKC03-12□□□	0.8	Slow-Blow
PFKC03-24□□□	0.5	Slow-Blow
PFKC03-48□□□	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



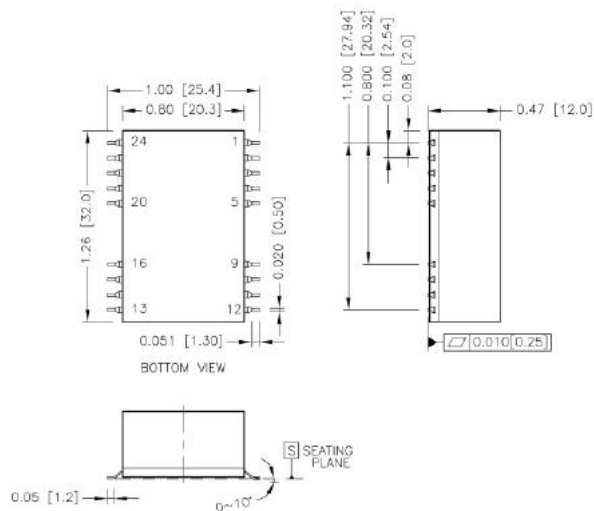
PIN CONNECTION

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

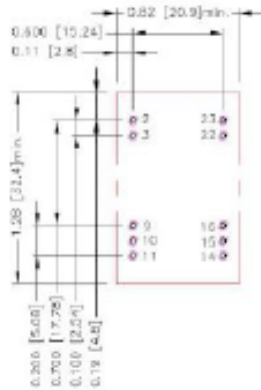
PIN	SINGLE	DUAL	PIN	SINGLE	DUAL
2	-Vin	-Vin	23	+Vin	+Vin
3	-Vin	-Vin	22	+Vin	+Vin
9	NC	Common	16	-Vout	Common
10	NC	NC	15	NC	NC
11	NC	-Vout	14	+Vout	+Vout
Others	NC	NC			

*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]

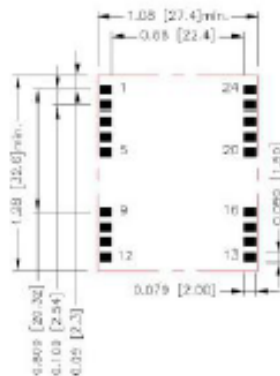
RECOMMENDED PAD LAYOUT

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: $0.079 \times 0.059[2.00 \times 1.50]$

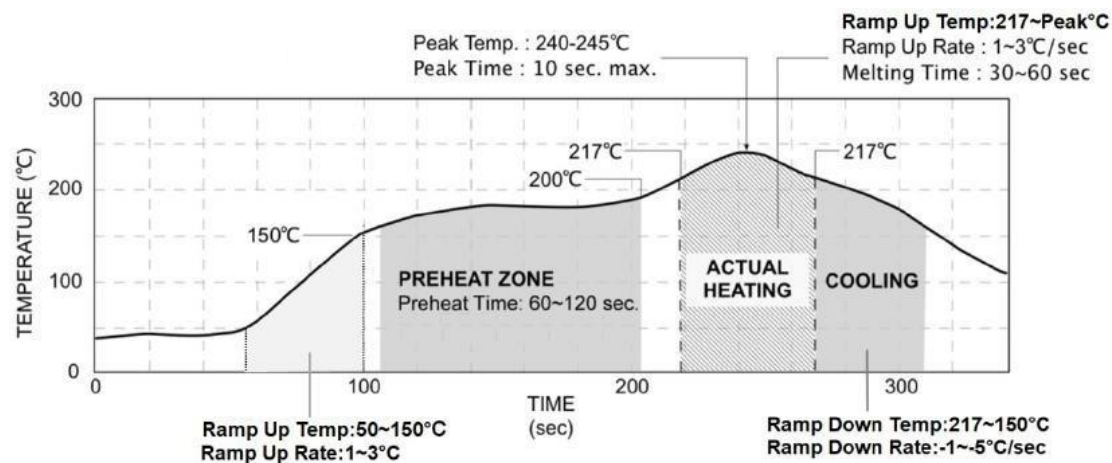
THERMAL CONSIDERATIONS

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.