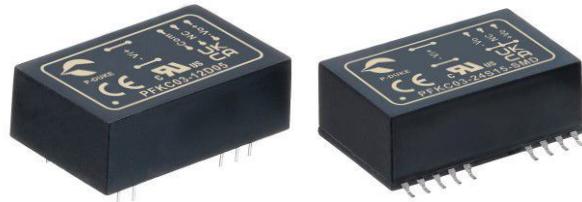




3
YEARS
WARRANTY

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

Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Isolation Options (VDC)	Package Options
PFKC03 -	48	S	05	H	- SMD
	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 VDC	Output Voltage VDC	Output Current @ Full Load		Input Current @ No Load mA	Efficiency %	Maximum Capacitor Load µF
			Min. Load mA	Full Load mA			
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 %
		Dual	Others All	-0.2		+0.2 %
Cross regulation	Asymmetrical load 25%/100% FL	Dual		-2.0		+2.0 %
Ripple and noise	Measured by 20MHz bandwidth	3.3Vout, 5Vout			75	
		12Vout			120	mVp-p
		15Vout			150	
Temperature coefficient				-0.02		+0.02 %/°C
Transient response recovery time	25% load step change			500		µs
Short circuit protection				Continuous, automatic recovery		

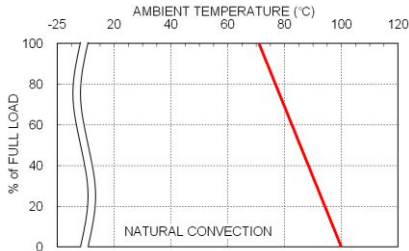
GENERAL SPECIFICATIONS						
Parameter	Conditions			Min.	Typ.	Max. Unit
Isolation voltage	1 minute	Input to Output	Standard Suffix " H "	1600		3000 VDC
Isolation resistance	500VDC			1		GΩ
Isolation capacitance						300 pF
Switching frequency				100		kHz
Safety approvals	IEC /EN /UL 62368-1			UL:E193009 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			8.066 x 10 ⁵ 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		
Lead-free reflow solder process	Only for SMD type			The time above 217°C 30~60sec. Peak temperature 245°C max. Time above 240°C 10sec. max.		

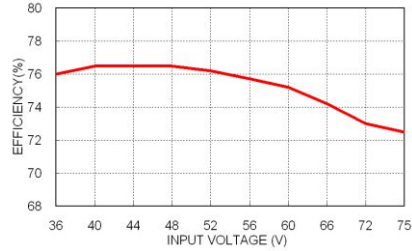
EMC SPECIFICATIONS			
Parameter	Conditions		Level
EMI	EN55032		Class A
EMS	EN55035		
ESD	EN61000-4-2	Air ± 8kV and Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3	10 V/m	Perf. Criteria A
Fast transient	EN61000-4-4	± 2kV	Perf. Criteria B
		With an external input filter capacitor (Nippon chemi-con 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.

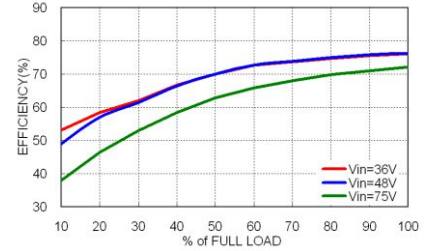
CHARACTERISTIC CURVE



PFKC03-48S05 Derating Curve



PFKC03-48S05 Efficiency vs. Input Voltage



PFKC03-48S05 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.

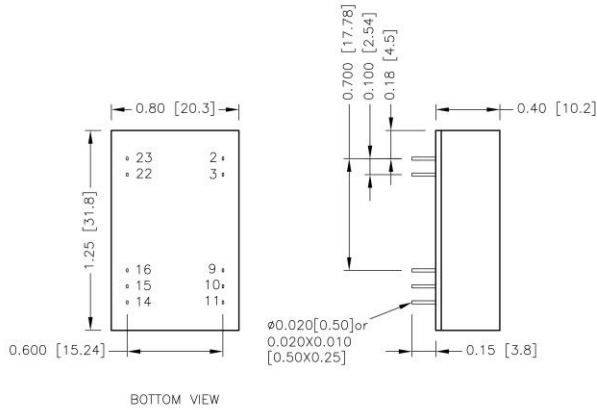
The input line fuse suggest as below :

Model	Fuse Rating (A)	Fuse Type
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



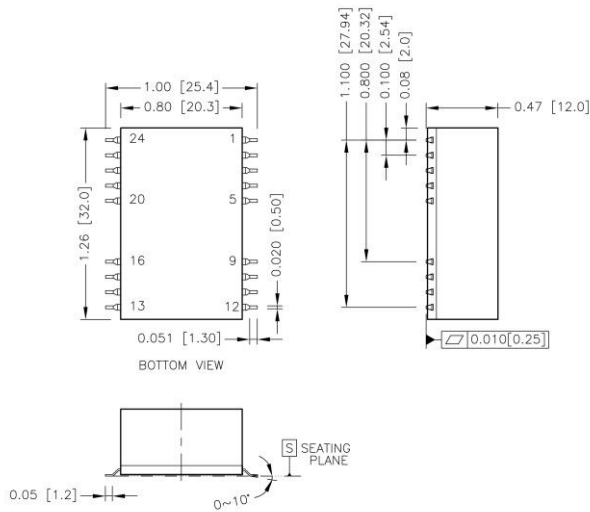
PIN CONNECTION

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 : $x.xx \pm 0.02$ [$x.x \pm 0.5$]
 $x.xxx \pm 0.010$ [$x.xx \pm 0.25$]
3. Pin dimension tolerance $\pm 0.004 [0.10]$

SMD type



PIN CONNECTION

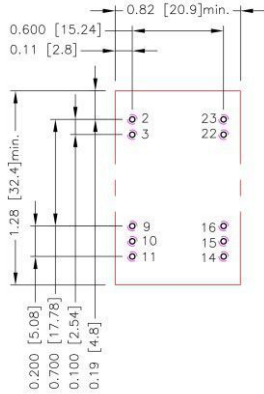
PIN	SINGLE	DUAL	PIN	SINGLE	DUAL
2	-Vin	-Vin	23	+Vin	+Vin
3	-Vin	-Vin	22	+Vin	+Vin
9	NC	Common	16	-Vout	Common
10	NC	NC	15	NC	NC
11	NC	-Vout	14	+Vout	+Vout
Others	NC	NC			

*NC:No Connection

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

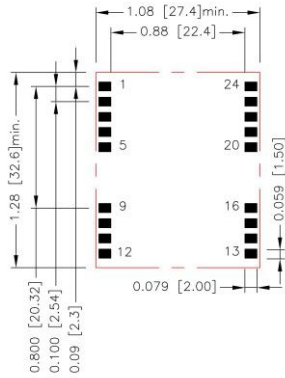
RECOMMENDED PAD LAYOUT

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

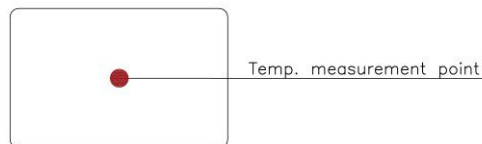


All dimensions in inch[mm]
 Pad size(lead free recommended)
 Top view pad: $0.079 \times 0.059[2.00 \times 1.50]$

THERMAL CONSIDERATIONS

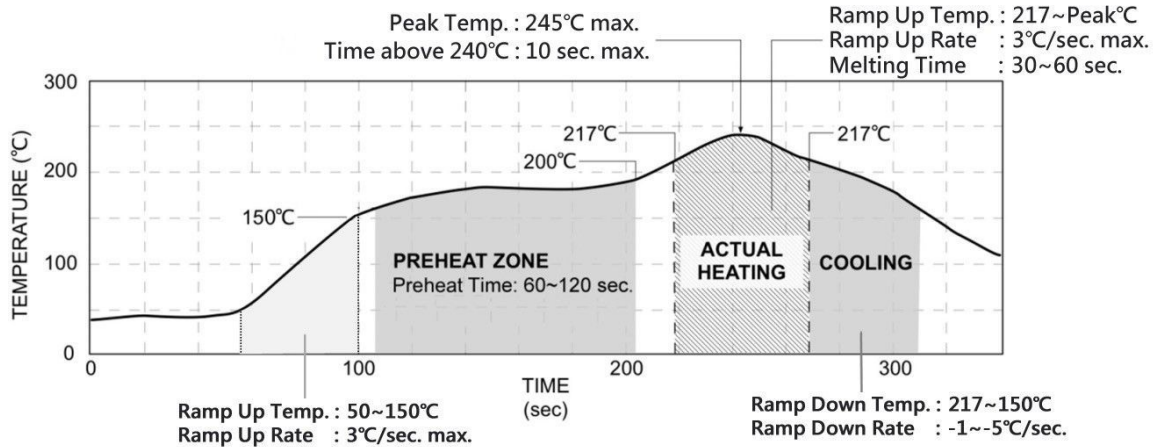
The power module operates in a variety of thermal environments. However, sufficient cooling should be provided to help ensure reliable operation of the unit. Heat is removed by conduction, convection, and radiation to the surrounding environment. Proper cooling can be verified by measuring the point 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).



TOP VIEW

LEAD FREE REFLOW PROFILE For SMD Type



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