P-DUKE POWER

FKC12W Series

DC-DC Converter
Up to 12 Watts

3 YEARS WARRANTY

RoHS COMPLIANT

REACH COMPLIANT

Automation | Datacom | IPC

Industry | Measurement | Telecom

Automobile | Boat | Charger

Medical | PV | Railway

1600 VDC Isolation Voltage | 4 : 1 Wide Input Range | NO Min. Load Required | REMOTE ON OFF | OCP | SCP | UVP

PART NUMBER STRUCTURE

FKC12 - 48 S 05 W - SMD

Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Input Range	Mounting Type Options
	24:9~36 **48:**18~75	**S:**Single	**3P3:**3.3 **05:**5.1 **12:**12 **15:**15	4 : 1	**□:** 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℃ unless otherwise noted

Model Number	Input Range	Output Voltage	Output Current @Full Load	Input Current @No Load	Efficiency	Maximum Capacitor Load
	VDC	VDC	mA	mA	%	μF
FKC12-24S3P3W	9 ~ 36	3.3	3500	55	84	2000
FKC12-24S05W	9 ~ 36	5.1	2400	55	87	2000
FKC12-24S12W	9 ~ 36	12	1000	13	87	430
FKC12-24S15W	9 ~ 36	15	800	11	87	300
FKC12-24D05W	9 ~ 36	±5	±1200	15	84	±1250
FKC12-24D12W	9 ~ 36	±12	±500	12	87	±200
FKC12-24D15W	9 ~ 36	±15	±400	20	87	±120
FKC12-48S3P3W	18 ~ 75	3.3	3500	17	84	2000
FKC12-48S05W	18 ~ 75	5.1	2400	20	87	2000
FKC12-48S12W	18 ~ 75	12	1000	6	87	430
FKC12-48S15W	18 ~ 75	15	800	6	88	300
FKC12-48D05W	18 ~ 75	±5	±1200	7	85	±1250
FKC12-48D12W	18 ~ 75	±12	±500	7	87	±200
FKC12-48D15W	18 ~ 75	±15	±400	7	87	±120

INPUT SPECIFICATIONS

Parameter	Conditions			Min.	Typ.	Max.	Unit
Operating input voltage range		24Vin(nom) 48Vin(nom)		9 18	24 48	36 75	VDC
Start up voltage		24Vin(nom) 48Vin(nom)				9 18	VDC
Shutdown voltage		24Vin(nom) 48Vin(nom)		7 15	8 16	8.8 17.5	VDC
Start up time	Constant resistive load	Power up Remote ON/OFF			450 5		ms
Input surge voltage	100 ms, max.	24Vin(nom) 48Vin(nom)				50 100	VDC
Input filter					Pi type		
Remote ON/OFF	Referred to –Vin pin	Positive logic	DC-DC ON DC-DC OFF		Open or 3.0 ~ 12VDC 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			-0.2		+0.2	%
Load regulation	No Load to Full Load	DIP type	Single Dual	-0.5 -1.0		+0.5 +1.0	%
		SMD type	Single Dual	-1.0 -1.0		+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	%/℃
Transient response recovery time	25% load step change				250		μs
Over voltage protection			3.3Vout 5.1Vout 12Vout 15Vout		3.9 6.2 15 18		VDC
Over load protection	% of Iout rated				150		%
Short circuit protection					Continuous, automatics 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						1500	pF
Switching frequency				360	400	440	kHz
Safety approvals	IEC/ EN/ UL62368-1						UL:E193009 CB:UL(Demko)
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						2.087 x 10^6 hrs

ENVIRONMENTAL SPECIFICATIONS

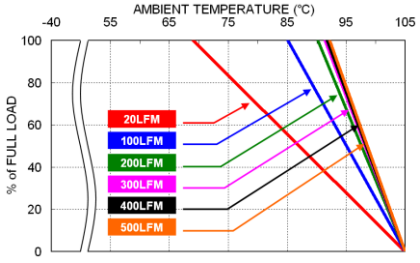
Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating ambient temperature		With derating	-40		+105	℃
Maximum case temperature					105	℃
Storage temperature range			-55		+125	℃
Thermal impedance				20		℃/W
Thermal shock						MIL-STD-810F
Vibration						MIL-STD-810F
Relative humidity						5% to 95% RH
Lead-free reflow solder process	Only for SMD type					The time above 217℃ 30~60sec. Peak temperature 245℃ max. Time above 240℃ 10sec. max.

EMC SPECIFICATIONS

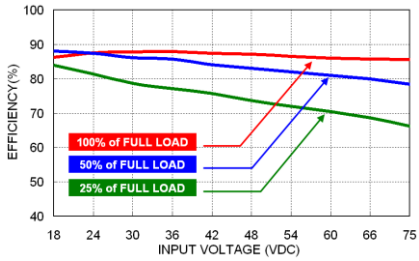
Parameter	Conditions		Level
EMI	EN55032	With external components	Class A, Class B
EMS	EN55035		
ESD	EN61000-4-2	Air ± 8kV and Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3	10 V/m	Perf. Criteria A
Fast transient	EN61000-4-4	± 2kV With an external input filter capacitor (Nippon chemi-con KY series, 220μF/100V.)	Perf. Criteria A
Surge	EN61000-4-5	± 1kV With an external input filter capacitor (Nippon chemi-con KY series, 220μF/100V.)	Perf. Criteria A
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

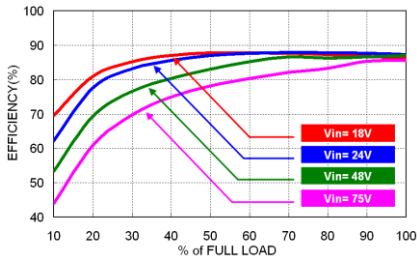
CHARACTERISTIC CURVE



FKC12-48S05W Derating Curve



FKC12-48S05W Efficiency vs. Input Voltage



FKC12-48S05W Efficiency vs. Output Load

FUSE CONSIDERATION

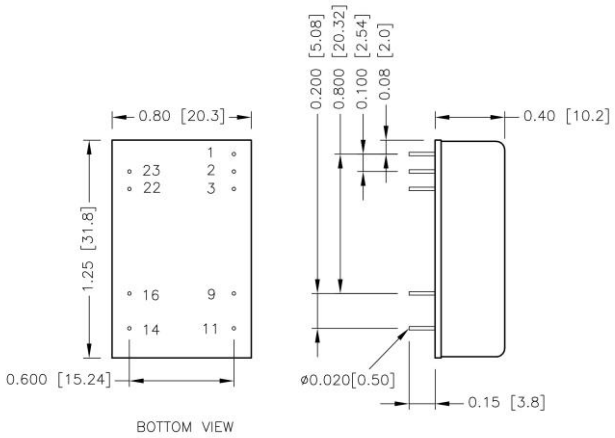
This power module is not internally fused. An input line fuse must always be used.
This encapsulated power module can be used in a wide variety of applications, ranging from simple stand-alone operation to an integrated part of sophisticated power architecture.
To maximum flexibility, internal fusing 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
FKC12-24S□□W、FKC12-24D□□W	2.5	Slow-Blow
FKC12-48S□□W、FKC12-48D□□W	1.25	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

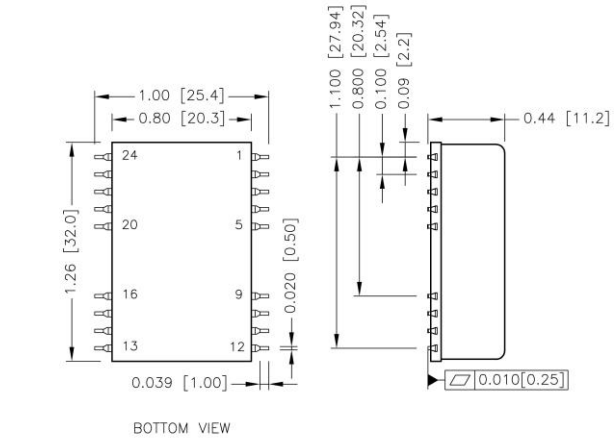
DIP type



PIN CONNECTION

PIN	SINGLE	DUAL	PIN	SINGLE	DUAL
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



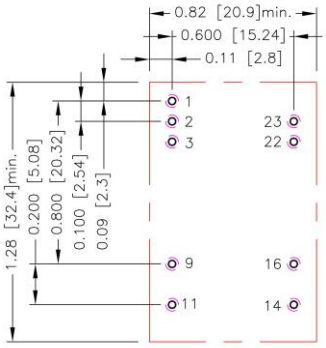
PIN CONNECTION

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 dimension tolerance ±0.004[0.10]

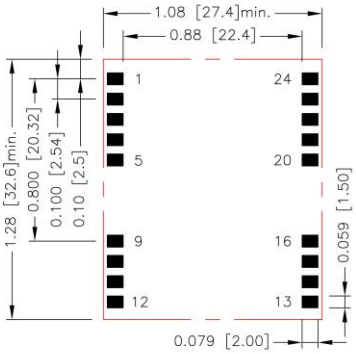
RECOMMENDED PAD LAYOUT

DIP type



All dimensions in inch[mm]
Pad size(lead free recommended)
Through hole 1.2.3.9.11.14.16.22.23: Φ0.031[0.80]
Top view pad 1.2.3.9.11.14.16.22.23: Φ0.039[1.00]
Bottom view pad 1.2.3.9.11.14.16.22.23: Φ0.063[1.60]

SMD type

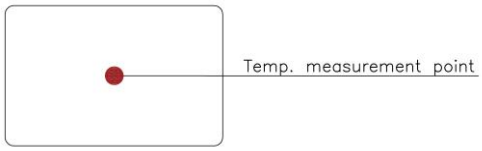


All dimensions in inch[mm]
Pad size(lead free recommended)
Top view pad:0.079x0.059[2.00x1.50]

THERMAL CONSIDERATIONS

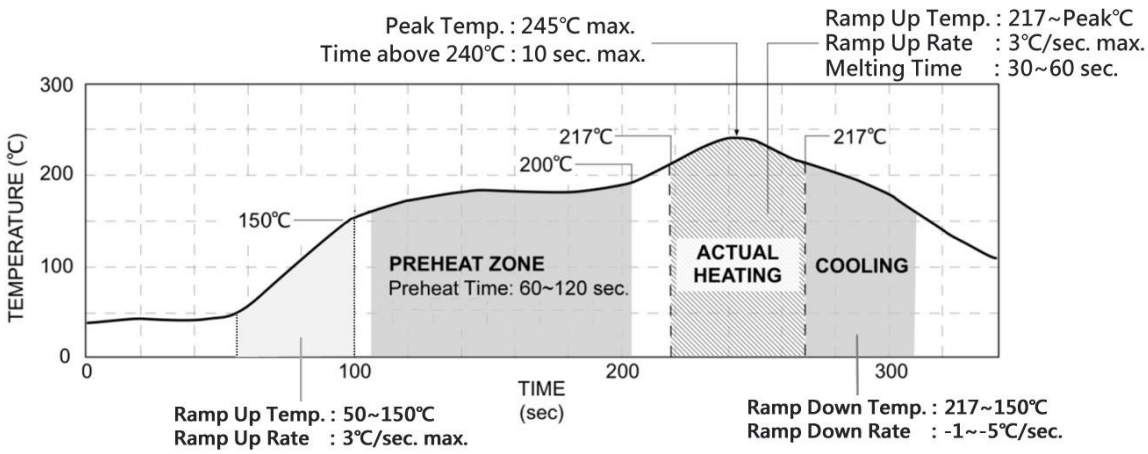
The power module operates in a variety of thermal environments.
However, sufficient cooling should be provided to help ensure reliable operation of the unit.
Heat is removed by conduction, convection, and radiation to the surrounding environment.
Proper cooling can be verified by measuring the point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

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