P-DUKE POWER

FKC08W Series

DC-DC Converter
Up to 8 Watts

3 YEARS WARRANTY

RoHS COMPLIANT

REACH COMPLIANT



Railway | Automation | Datacom

IPC | Industry | Measurement

Telecom | Automobile | Boat

Charger | Medical | PV

c UL us | CB | CE | UKCA

1600 VDC Isolation Voltage | 4 : 1 Wide Input Range | NO Min. Load Required | Operating Altitude 5000 meter | REMOTE ON OFF | OCP | SCP | UVP

PART NUMBER STRUCTURE

FKC08 - 48 S 05 W - M3 SMD

Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Input Range	Operating Temp. Options	Mounting Type Options
	24:9~36 **48:**18~75 **110:**43~160	**S:**Single	**3P3:**3.3 **05:**5 **12:**12 **15:**15	4 : 1	**□:** Standard -40~+105℃ With derating **M3:** M3 Version -55~+105℃ With derating	**□:** DIP type **SMD:** SMD type
		D:Dual	**05:**±5 **12:**±12 **15:**±15			

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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
FKC08-24S3P3W	9 ~ 36	3.3	2400	40	85	1330
FKC08-24S05W	9 ~ 36	5	1600	40	87	1330
FKC08-24S12W	9 ~ 36	12	666	25	86	288
FKC08-24S15W	9 ~ 36	15	533	25	86	200
FKC08-24D05W	9 ~ 36	±5	±800	20	84	±900
FKC08-24D12W	9 ~ 36	±12	±333	25	86	±133
FKC08-24D15W	9 ~ 36	±15	±267	25	86	±90
FKC08-48S3P3W	18 ~ 75	3.3	2400	20	85	1330
FKC08-48S05W	18 ~ 75	5	1600	20	87	1330
FKC08-48S12W	18 ~ 75	12	666	13	87	288
FKC08-48S15W	18 ~ 75	15	533	13	88	200
FKC08-48D05W	18 ~ 75	±5	±800	10	84	±900
FKC08-48D12W	18 ~ 75	±12	±333	13	87	±133
FKC08-48D15W	18 ~ 75	±15	±267	13	87	±90
FKC08-110S3P3W	43 ~ 160	3.3	2400	8	84	1330
FKC08-110S05W	43 ~ 160	5	1600	8	85	1330
FKC08-110S12W	43 ~ 160	12	666	4	86	288
FKC08-110S15W	43 ~ 160	15	533	4	86	200
FKC08-110D05W	43 ~ 160	±5	±800	5	82	±900
FKC08-110D12W	43 ~ 160	±12	±333	5	85	±133
FKC08-110D15W	43 ~ 160	±15	±267	5	85	±90

INPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating input voltage range		24Vin(nom)	9	24	36	VDC
		48Vin(nom)	18	48	75	
		110Vin(nom)	43	110	160	
Start up voltage		24Vin(nom)			9	VDC
		48Vin(nom)			18	
		110Vin(nom)			43	
Shutdown voltage		24Vin(nom)	7	8	8.8	VDC
		48Vin(nom)	15	16	17.5	
		110Vin(nom)	37	40	42	
Start up time	Constant resistive load	Power up		450		ms
		Remote ON/OFF		5		
Input surge voltage	100 ms, max.	24Vin(nom)			50	VDC
		48Vin(nom)			100	
		110Vin(nom)			170	
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

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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	No Load to Full Load	DIP type	Single	-0.5		+0.5	%
			Dual	-1.0		+1.0	
		SMD type	Single	-1.0		+1.0	
			Dual	-1.0		+1.0	
	10% Load to 90% Load	DIP type	Single	-0.3		+0.3	
			Dual	-0.8		+0.8	
		SMD type	Single	-0.8		+0.8	
			Dual	-0.8		+0.8	
Cross regulation	Asymmetrical load 25%/100% FL		Dual	-5.0		+5.0	%
Ripple and noise	20MHz bandwidth		24Vin(nom)		50		mVp-p
			48Vin(nom)		50		
			110Vin(nom)		75		
Temperature coefficient				-0.02		+0.02	%/℃
Transient response recovery time	25% load step change				250		μs
Over voltage protection	Single Output		3.3Vout		3.9		VDC
			5Vout		6.2		
			12Vout		15		
			15Vout		18		
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				270	300	330	kHz
Safety approvals	IEC/ EN/ UL62368-1					UL:E193009 CB:UL(Demko)	
Standard approvals	EN50155 EN45545-2						
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					2.832 x 10^6 hrs	

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ENVIRONMENTAL SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	Standard With derating M3 Version With derating *Converter can meet the railway T2 and TX temperature requirement. T2: -40℃~+70℃ as all models; TX: -40℃~+85℃ as power derating to 55% output power.	-40 -55		+105 +105	℃
Maximum case temperature				105	℃
Storage temperature range		-55		+125	℃
Operating altitude				5000	m
Thermal impedance	Natural convection		20		℃/W
Thermal shock					MIL-STD-810F
Shock					EN61373, MIL-STD-810F
Vibration					EN61373, 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.

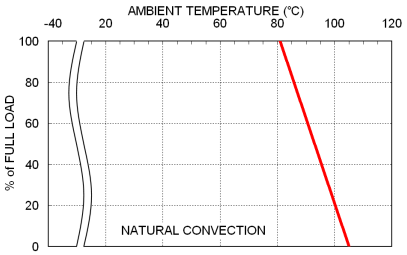
EMC SPECIFICATIONS

Parameter	Conditions		Level
EMI	EN55032, EN50121-3-2	With external components	Class A, Class B
EMS	EN55035, EN50121-3-2		
ESD	EN61000-4-2	Air ± 8kV and Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3	20 V/m	Perf. Criteria A
Fast transient	EN61000-4-4	± 2kV	Perf. Criteria A
	24Vin, 48Vin	With an external input filter capacitor (Nippon chemi-con KY series, 220μF/100V)	
	110 Vin	With an external input filter capacitor (Nippon chemi-con KXJ series, 150μF/200V)	
Surge	EN61000-4-5	±2kV	Perf. Criteria A
	24Vin, 48Vin	With an external input filter capacitor (Nippon chemi-con KY series, 220μF/100V)	
	110 Vin	With an external input filter capacitor (Nippon chemi-con KXJ series, 150μF/200V)	
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

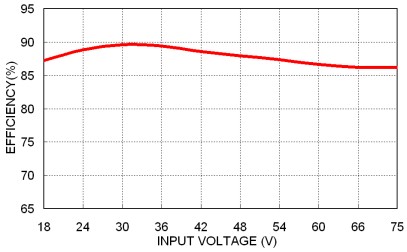
CAUTION: This power module is not internally fused. An input line fuse must always be used

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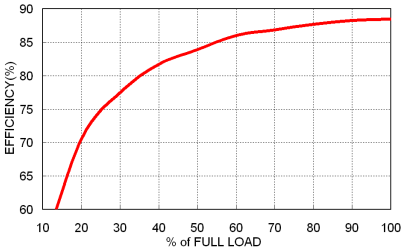
CHARACTERISTIC CURVE



FKC08-48S05W Derating Curve



FKC08-48S05W Efficiency vs. Input Voltage



FKC08-48S05W 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：

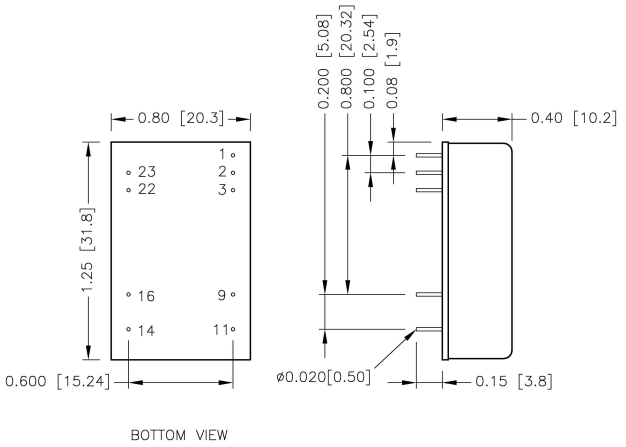
Model	Fuse Rating (A)	Fuse Type
FKC08-24S□□W、FKC08-24D□□W	2	Slow-Blow
FKC08-48S□□W、FKC08-48D□□W	1	Slow-Blow
FKC08-110S□□W、FKC08-110D□□W	0.5	Slow-Blow

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

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MECHANICAL DRAWING

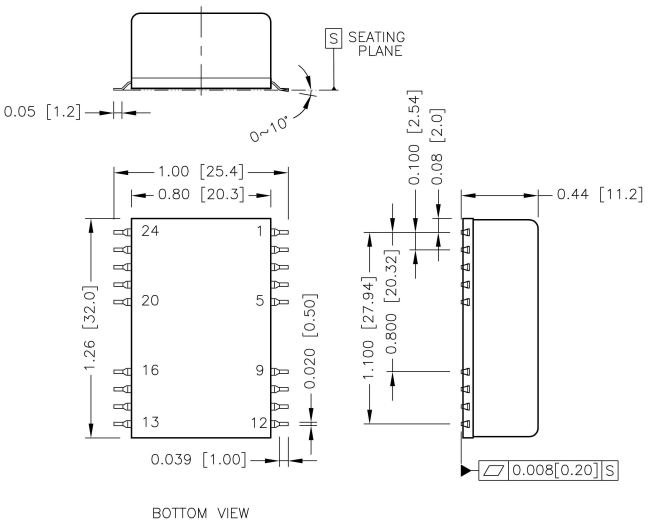
DIP type



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

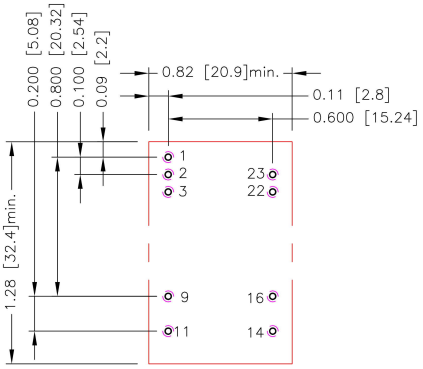
PIN	SINGLE	DUAL	PIN	SINGLE	DUAL
1	Ctrl	Ctrl			
2	-Vin	-Vin	23	+Vin	+Vin
3	-Vin	-Vin	22	+Vin	+Vin
9	NC	Common	16	-Vout	Common
11	NC	-Vout	14	+Vout	+Vout
Others	NC	NC			

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]

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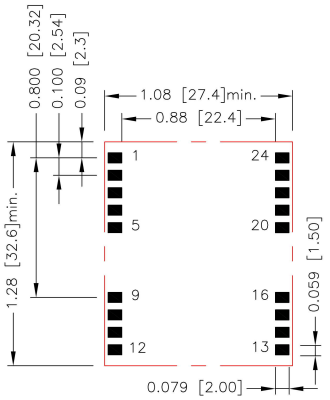
RECOMMENDED PAD LAYOUT

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

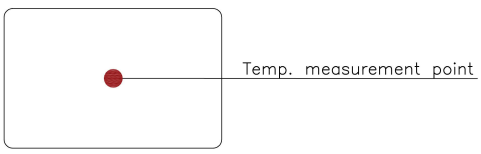


All dimensions in inch[mm]
Pad size(lead free recommended)
Top view pad:0.079x0.059[2.00x1.50]

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.

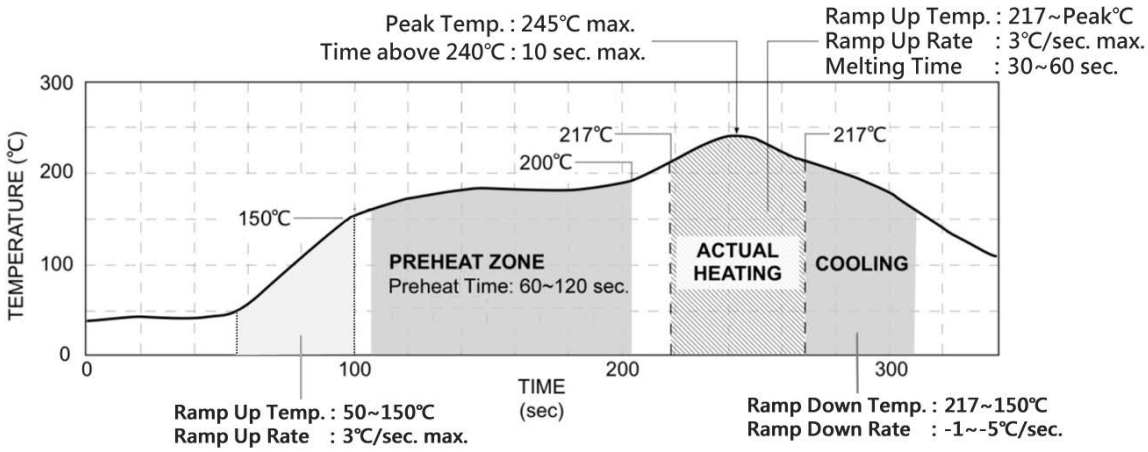
■ Thermal test condition with vertical direction by natural convection (20LFM).



TOP VIEW

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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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