



FEATURES

- RAILWAY APPLICATION
- 4:1 ULTRA WIDE INPUT VOLTAGE RANGE :
9 ~ 36VDC, 18 ~ 75VDC AND 43 ~ 160VDC
- 8 WATTS OUTPUT POWER
- OUTPUT CURRENT UP TO 2.4A
- STANDARD 1.25 X 0.80 X 0.40 INCH AND 24 PIN DIP PACKAGE
- HIGH EFFICIENCY UP TO 88%
- FIVE-SIDED CONTINUOUS SHIELD
- FIXED SWITCHING FREQUENCY (300kHz)
- CE MARK MEETS 2006/95/EC, 2011/95/EC AND 2004/108/EC
- SAFETY MEETS UL60950-1, EN60950-1, IEC60950-1 AND EN50155
- COMPLIANT TO RoHS EU DIRECTIVE 2011/65/EU

APPLICATIONS

Railway System
Wireless Network
Telecom/Datacom
Industry Control System
Measurement Equipment
Semiconductor Equipment

OPTIONS

SMD TYPE

DESCRIPTION

The FKC08W series offer 8 watts of output power from a package in an IC compatible 24pin DIP configuration. FKC08W series have 4:1 ultra wide input voltage of 9-36, 18-75VDC and 43-160VDC. The FKC08W have features 1600VDC of isolation, short circuit protection and as well as five sided shielding.

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

| OUTPUT SPECIFICATIONS | | | |
|---------------------------------------|---------------------------------|--|--|
| Output power | | | 8 Watts, max. |
| Voltage accuracy | | | ± 1% |
| Minimum load | | | 0% |
| Line regulation | LL to HL at Full Load | | ± 0.2% |
| Load regulation | No Load to Full Load | Single (DIP) | ± 0.5% |
| | | Single (SMD) | ± 1% |
| | 10% Load to 90% Load | Dual (SMD,DIP) | ± 1% |
| | | Single (DIP) | ± 0.3% |
| | | Single (SMD) | ± 0.8% |
| | | Dual (SMD,DIP) | ± 0.8% |
| Cross regulation (Dual) | Asymmetrical load 25% / 100% FL | | ± 5% |
| Ripple and noise | 20MHz bandwidth | | See table |
| Temperature coefficient | | | ±0.02% / °C, max. |
| Transient response recovery time | 25% load step change | | 250µs |
| Over voltage protection (only single) | 3.3VDC output | | 3.9VDC |
| | 5.0VDC output | | 6.2VDC |
| | 12VDC output | | 15VDC |
| | 15VDC output | | 18VDC |
| Over load protection | % of FL at nominal input | | 150% |
| Short circuit protection | | | Continuous, automatics recovery |
| GENERAL SPECIFICATIONS | | | |
| Efficiency | | | See table |
| Isolation voltage | Input to Output | 1600VDC, min. 1minute | |
| | Input(Output) to Case | DIP 1600VDC, min. 1minute SMD 1000VDC, min. 1minute | |
| Isolation resistance | 500VDC | | 10 ⁹ ohms, min. |
| Isolation capacitance | | | 1500pF, max. |
| Switching frequency | | | 300kHz±10%. |
| Design meet safety standard | | | IEC60950-1, UL60950-1, EN60950-1, EN50155 |
| Case material | | | Nickel-coated copper |
| Base material | | | Non-conductive black plastic |
| Potting material | | | Epoxy (UL94-V0) |
| Dimensions | | | 1.25 X 0.80 X 0.40 Inch (31.8 X 20.3 X 10.2 mm) |
| Weight | | | 18g (0.62oz) |
| MTBF (Note 1) | MIL-HDBK-217F | | 2.832 x 10 ⁶ hrs |

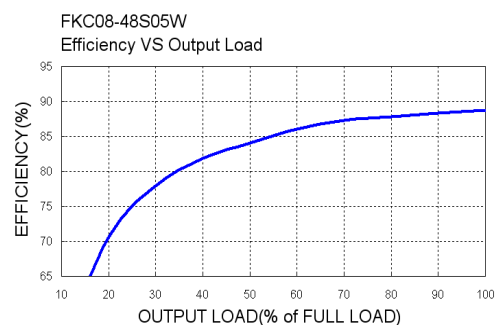
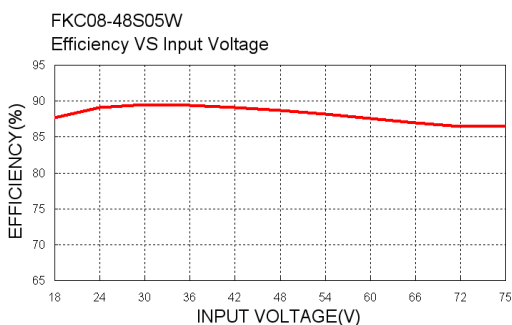
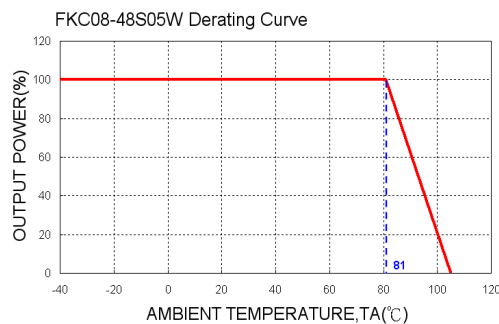
| INPUT SPECIFICATIONS | | | |
|--|---|-------------------------|----------------------------------|
| Input voltage range | 24VDC nominal input | | 9 ~ 36VDC |
| | 48VDC nominal input | | 18 ~ 75VDC |
| | 110VDC nominal input | | 43 ~ 160VDC |
| Input filter | | | Pi type |
| Input surge voltage | 24VDC input | | 50VDC 100ms, max. |
| | 48VDC input | | 100VDC 100ms, max. |
| | 110VDC input | | 170VDC 100ms, max. |
| Input reflected ripple current | | | 20mA _{p-p} |
| Start up time | Nominal input and constant resistive load | Power up | 450ms |
| | | | |
| Start-up voltage | 24VDC input | | 9VDC |
| | 48VDC input | | 18VDC |
| | 110VDC input | | 43VDC |
| Shutdown voltage | 24VDC input | | 8VDC |
| | 48VDC input | | 16VDC |
| | 110VDC input | | 42VDC |
| Remote ON/OFF (Note 5) | | | |
| | DC-DC ON | Open or 3.0V < Vr < 12V | |
| | DC-DC OFF | Short or 0V < Vr < 1.2V | |
| Input current of Remote control pin | Nominal input | | -0.5mA ~ 0.5mA |
| Remote off state input current | Nominal input | | 2.5mA |
| ENVIRONMENTAL SPECIFICATIONS | | | |
| Operating ambient temperature (Note 6) | Vo:5V,12V,15V | | -40°C ~ +78°C (without derating) |
| | ±12V,±15V | | +78°C ~ +105°C (with derating) |
| | Vo:3.3V;±5V | | -40°C ~ +70°C (without derating) |
| | | | +70°C ~ +105°C (with derating) |
| Maximum case temperature | | | +105°C |
| Storage temperature range | | | -55°C ~ +125°C |
| Thermal impedance | Nature convection | | 20°C/Watt |
| Thermal shock | | | EN61373, MIL-STD-810F |
| Vibration | | | EN61373, MIL-STD-810F |
| Relative humidity | | | 5% to 95% RH |
| EMC CHARACTERISTICS | | | |
| EMI (Note 7) | EN55022, EN55011 | | Class A, Class B |
| ESD | EN61000-4-2 | Air | ± 8kV |
| | | Contact | ± 6kV |
| Radiated immunity | EN61000-4-3 | | 20 V/m Perf. Criteria A |
| Fast transient (Note 8) | EN61000-4-4 | | ± 2kV Perf. Criteria A |
| Surge (Note 8) | EN61000-4-5 | | ± 2kV Perf. Criteria A |
| Conducted immunity | EN61000-4-6 | | 10 Vr.m.s Perf. Criteria A |

| Model Number | Input Range | Output Voltage | Output Current | | Output ⁽⁴⁾ Ripple & Noise | No load ⁽²⁾ Input Current | Eff ⁽³⁾ (%) | Capacitor ⁽⁴⁾ Load max |
|----------------|--------------|----------------|----------------|-----------|---|---|---------------------------|--------------------------------------|
| | | | Min. Load | Max. Load | | | | |
| FKC08-24S3P3W | 9 ~ 36 VDC | 3.3 VDC | 0mA | 2400mA | 50mVp-p | 40mA | 85 | 1330μF |
| FKC08-24S05W | 9 ~ 36 VDC | 5 VDC | 0mA | 1600mA | 50mVp-p | 40mA | 87 | 1330μF |
| FKC08-24S12W | 9 ~ 36 VDC | 12 VDC | 0mA | 666mA | 50mVp-p | 25mA | 86 | 288μF |
| FKC08-24S15W | 9 ~ 36 VDC | 15 VDC | 0mA | 533mA | 50mVp-p | 25mA | 86 | 200μF |
| FKC08-24D05W | 9 ~ 36 VDC | ± 5 VDC | 0mA | ± 800mA | 50mVp-p | 20mA | 84 | ± 900μF |
| FKC08-24D12W | 9 ~ 36 VDC | ± 12 VDC | 0mA | ± 333mA | 50mVp-p | 25mA | 86 | ± 133μF |
| FKC08-24D15W | 9 ~ 36 VDC | ± 15 VDC | 0mA | ± 267mA | 50mVp-p | 25mA | 86 | ± 90μF |
| FKC08-48S3P3W | 18 ~ 75 VDC | 3.3 VDC | 0mA | 2400mA | 50mVp-p | 20mA | 85 | 1330μF |
| FKC08-48S05W | 18 ~ 75 VDC | 5 VDC | 0mA | 1600mA | 50mVp-p | 20mA | 87 | 1330μF |
| FKC08-48S12W | 18 ~ 75 VDC | 12 VDC | 0mA | 666mA | 50mVp-p | 13mA | 87 | 288μF |
| FKC08-48S15W | 18 ~ 75 VDC | 15 VDC | 0mA | 533mA | 50mVp-p | 13mA | 88 | 200μF |
| FKC08-48D05W | 18 ~ 75 VDC | ± 5 VDC | 0mA | ± 800mA | 50mVp-p | 10mA | 84 | ± 900μF |
| FKC08-48D12W | 18 ~ 75 VDC | ± 12 VDC | 0mA | ± 333mA | 50mVp-p | 13mA | 87 | ± 133μF |
| FKC08-48D15W | 18 ~ 75 VDC | ± 15 VDC | 0mA | ± 267mA | 50mVp-p | 13mA | 87 | ± 90μF |
| FKC08-110S3P3W | 43 ~ 160 VDC | 3.3 VDC | 0mA | 2400mA | 75mVp-p | 8mA | 84 | 1330μF |
| FKC08-110S05W | 43 ~ 160 VDC | 5 VDC | 0mA | 1600mA | 75mVp-p | 8mA | 85 | 1330μF |
| FKC08-110S12W | 43 ~ 160 VDC | 12 VDC | 0mA | 666mA | 75mVp-p | 4mA | 86 | 288μF |
| FKC08-110S15W | 43 ~ 160 VDC | 15 VDC | 0mA | 533mA | 75mVp-p | 4mA | 86 | 200μF |
| FKC08-110D05W | 43 ~ 160 VDC | ± 5 VDC | 0mA | ± 800mA | 75mVp-p | 5mA | 82 | ± 900μF |
| FKC08-110D12W | 43 ~ 160 VDC | ± 12 VDC | 0mA | ± 333mA | 75mVp-p | 5mA | 85 | ± 133μF |
| FKC08-110D15W | 43 ~ 160 VDC | ± 15 VDC | 0mA | ± 267mA | 75mVp-p | 5mA | 85 | ± 90μF |

Note

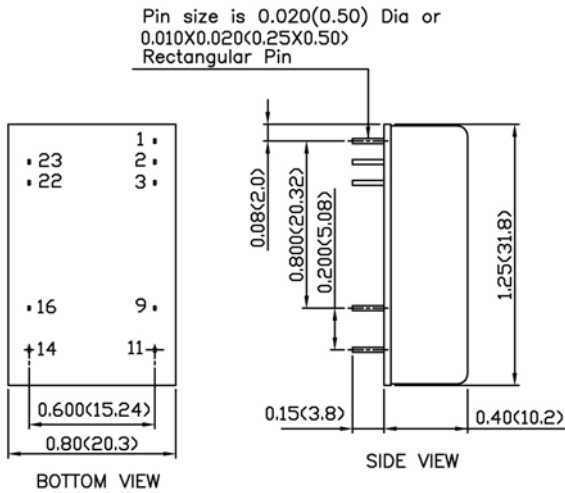
- MIL-HDBK-217F @Ta=25 °C, Full load.
- Typical value at nominal input voltage and no load.
- Typical value at nominal input voltage and full load.
- Test by minimum input and constant resistive load.
- The ON/OFF control pin voltage is referenced to -INPUT.
- Operating ambient temperature:
Converter can meet the railway T2 and TX temperature requirement.
T2 : -40 °C ~ +70 °C as all models, TX : -40 °C ~ +85 °C as power derating to 55% output power.
- The FKC08W series standard module meets EN55022 Class A and Class B with external components.
For more detail information, please contact with P-DUKE.
- An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5.
The filter capacitor Power Mate suggest: : 24Vin/48Vin Nippon chemi-con KY series, 220μF/100V
: 110 Vin Nippon chemi-con KXJ series, 150μF/200V

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

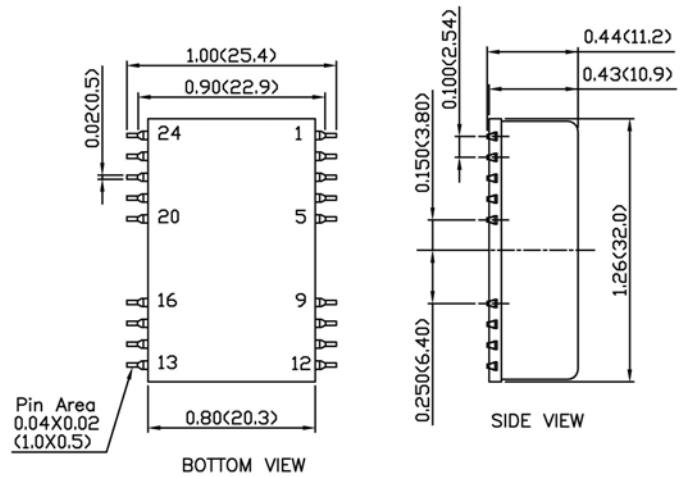


MECHANICAL DRAWING :

DIP TYPE



SMD TYPE



1. All dimensions in Inch (mm)

Tolerance: X.XX±0.02 (X.X±0.5)
 X.XXX±0.01 (X.XX±0.25)

- Pin pitch tolerance ±0.01 (0.25)
- Pin dimension tolerance ±0.004 (0.1)

| DIP PIN CONNECTION | | | | | |
|--------------------|--------|---------|-----|---------|---------|
| PIN | SINGLE | DUAL | PIN | SINGLE | DUAL |
| 1 | CTRL | CTRL | | | |
| 2 | -INPUT | -INPUT | 23 | +INPUT | +INPUT |
| 3 | -INPUT | -INPUT | 22 | +INPUT | +INPUT |
| 9 | NC | COMMON | 16 | -OUTPUT | COMMON |
| 11 | NC | -OUTPUT | 14 | +OUTPUT | +OUTPUT |

| SMD PIN CONNECTION | | | | | |
|--------------------|--------|---------|-----|---------|---------|
| PIN | SINGLE | DUAL | PIN | SINGLE | DUAL |
| 1 | CTRL | CTRL | | | |
| 2 | -INPUT | -INPUT | 23 | +INPUT | +INPUT |
| 3 | -INPUT | -INPUT | 22 | +INPUT | +INPUT |
| 9 | NC | COMMON | 16 | -OUTPUT | COMMON |
| 11 | NC | -OUTPUT | 14 | +OUTPUT | +OUTPUT |
| Others | NC | NC | | | |