POWER MATE TECHNOLOGY CO., LTD.

# HEC50 SERIES

**50 WATTS DC-DC CONVERTER**

## FEATURES

- **50 WATTS MAXIMUM OUTPUT POWER**
- **SINGLE OUTPUT UP TO 15A**
- **COMPACT 2.40 X 2.28 X 0.50 INCH PACKAGE**
- **HIGH EFFICIENCY UP TO 91%**
- **INPUT RANGE FROM 18VDC TO 36VDC AND 36VDC TO 75VDC**
- **FIXED SWITCHING FREQUENCY(300kHz)**
- **HALT TESTED**
- **INDUSTRY STANDARD FOOTPRINT**
- **ADJUSTABLE OUTPUT VOLTAGE**
- **NO MINIMUM LOAD REQUIRED**
- **UNDER-VOLTAGE LOCKOUT**
- **INPUT TO OUTPUT BASIC INSULATION:1600 VDC**
- **UL60950-1, EN60950-1, & IEC60950-1 SAFETY APPROVALS**
- **CE MARKED**
- **COMPLIANT TO RoHS II & REACH**

## OPTIONS

Positive logic remote on/off, pin length

## APPLICATIONS

Wireless Network
Telecom/Datacom
Industry Control System
Distributed Power Architectures
Semiconductor Equipment

## DESCRIPTION

HEC50 single output DC/DC converters provide up to 50 watts of output power in an industry standard half-brick package and footprint. These units are specifically designed to meet the power needs of low-voltage silicone. All models feature a wide input range, adjustable output voltage and a 15A current rating.

## TECHNICAL SPECIFICATION

All specifications are typical at nominal input, full load and 25ºC otherwise noted

| OUTPUT SPECIFICATIONS | | |
|---|---|---|
| Output power | | 50 Watts, max. |
| Voltage accuracy | | ± 1.5% |
| Minimum load | | 0% |
| Voltage adjustability (Note 5) | | + 10% , -20% |
| Line regulation | LL to HL at Full Load | See table |
| Load regulation | No load to Full load | See table |
| Remote sense (Note 5) | | 10% of Vout(nom) |
| Ripple and noise (Note 6) | 20MHz bandwidth | 100mVp-p |
| Temperature coefficient | | ±0.02% / ºC, max. |
| Transient response recovery time | 25% load step change | 200µs |
| Over voltage protection threshold (Hiccup) | | 115% ~ 130% of Vout(nom) |
| Over current protection threshold | | 110% ~ 140% of Iout Rated |
| Short circuit protection | | Continuous, automatics recovery |

| GENERAL SPECIFICATIONS | | |
|---|---|---|
| Efficiency | | See table |
| Isolation voltage | Input to Output<br>Input(Output) to Case | 1600 VDC, min. 1minute<br>1000 VDC, min. 1minute |
| Isolation resistance | 500VDC | $10^7$ ohms, min. |
| Isolation capacitance | | 2500pF, max. |
| Switching frequency | | 300kHz±10% |
| Safety approvals | | IEC60950-1, UL60950-1, & EN60950-1 |
| Case material | | Open with Aluminum base-plate |
| Weight | | 50g (1.76oz) |
| MTBF (Note 1) | MIL-HDBK-217F | 8.987 x $10^5$ hrs |

| INPUT SPECIFICATIONS | | | |
|---|---|---|---|
| Input voltage range | 24VDC nominal input<br>48VDC nominal input | | 18 ~ 36VDC<br>36 ~ 75VDC |
| Input filter | | | L-C type |
| Input surge voltage | 24VDC input<br>48VDC input | | 50VDC 100ms, max.<br>100VDC 100ms, max. |
| Start up time | Nominal input and constant resistive load | Power up<br>Remote ON/OFF | 25ms<br>25ms |
| Input reflected ripple current | 24VDC input<br>48VDCinput | | 50mAp-p<br>20mAp-p |
| Start-up voltage | 24VDC input<br>48VDC input | | 17VDC<br>34VDC |
| Shutdown voltage | 24VDC input<br>48VDC input | | 15VDC<br>32VDC |
| Remote ON/OFF (Note 7) | | | |
| (Negative logic) | ON=Short or 0V < Vr < 1.2V,<br>OFF=Open or 3V < Vr < 15V, | | $I_{IN}$=1mA max.<br>$I_{IN}$=50µA max. |
| (Positive logic) | ON=Open or 3V < Vr < 15V,<br>OFF=Short or 0V < Vr < 1.2V, | | $I_{IN}$=50µA max.<br>$I_{IN}$=1mA max. |
| Input current of remote control pin | Nominal input | | -0.5mA ~ 0.5mA |
| Remote off state input current | Nominal input | | 20mA |

| ENVIRONMENTAL SPECIFICATIONS | |
|---|---|
| Operating base-plate temperature range (Note 8) | -40ºC ~ +100ºC |
| Over temperature protection | 110ºC |
| Humidity max, Non-condensing | 95% |
| Storage temperature range | -55ºC ~ +125ºC |
| Thermal shock | MIL-STD-810F |
| Vibration | MIL-STD-810F |

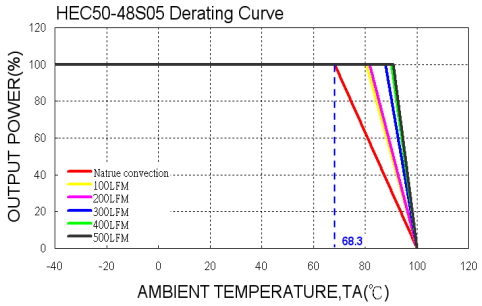
| EMC CHARACTERISTICS | | | |
|---|---|---|---|
| EMI (Note 9) | EN55022 | | Class A, Class B |
| Radiated immunity | EN61000-4-3 | 10 V/m | Perf. Criteria A |
| Fast transient (Note 10) | EN61000-4-4 | ± 2kV | Perf. Criteria B |
| Surge (Note 10) | EN61000-4-5 | ± 1kV | Perf. Criteria B |
| Conducted immunity | EN61000-4-6 | 10 Vr.m.s | Perf. Criteria A |

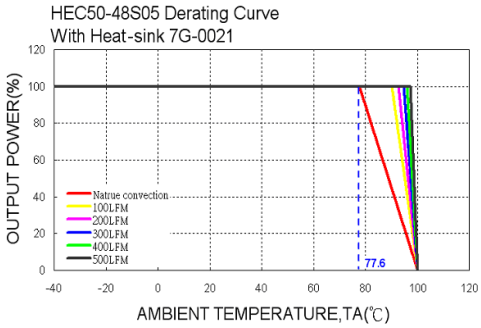
| Model Number | Input Range | Output Voltage | Output Current | | Line regulation | Load regulation | No load[3] Input Current | Eff [4] (%) |
|---|---|---|---|---|---|---|---|---|
| | | | Min. load | Full load | | | | |
| HEC50-24S1P8 | 18 ~ 36 VDC | 1.8 VDC | 0mA | 15 A | 4 mV | 6 mV | 120mA | 86 |
| HEC50-24S2P5 | 18 ~ 36 VDC | 2.5 VDC | 0mA | 15 A | 5 mV | 8 mV | 100mA | 87 |
| HEC50-24S3P3 | 18 ~ 36 VDC | 3.3 VDC | 0mA | 15 A | 7 mV | 10 mV | 120mA | 89 |
| HEC50-24S05 | 18 ~ 36 VDC | 5 VDC | 0mA | 10 A | 10 mV | 15 mV | 120mA | 90 |
| HEC50-24S15 | 18 ~ 36 VDC | 15 VDC | 0mA | 3.3 A | 30 mV | 45 mV | 190mA | 89 |
| HEC50-48S1P8 | 36 ~ 75 VDC | 1.8 VDC | 0mA | 15 A | 4 mV | 6 mV | 80mA | 87 |
| HEC50-48S2P5 | 36 ~ 75 VDC | 2.5 VDC | 0mA | 15 A | 5 mV | 8 mV | 80mA | 88 |
| HEC50-48S3P3 | 36 ~ 75 VDC | 3.3 VDC | 0mA | 15 A | 7 mV | 10 mV | 110mA | 90 |
| HEC50-48S05 | 36 ~ 75 VDC | 5 VDC | 0mA | 10 A | 10 mV | 15 mV | 90mA | 91 |
| HEC50-48S15 | 36 ~ 75 VDC | 15 VDC | 0mA | 3.3 A | 30 mV | 45 mV | 130mA | 90 |

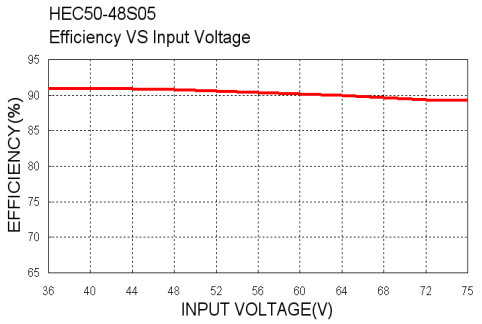
Note

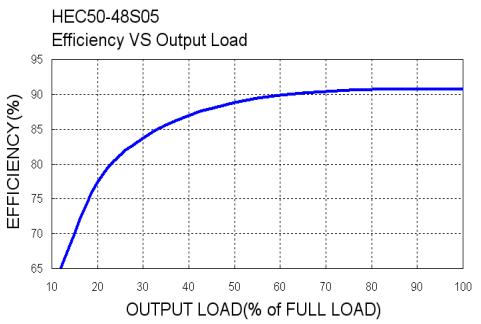
1. MIL-HDBK-217F @Ta=25 ºC, Full load.
2. The converter is provided by basic insulation.
3. Typical value at nominal input voltage and no load.
4. Typical value at nominal input voltage and full load.
5. Maximum output deviation is 10% inclusive of remote sense. If remote sense is not being used, the + SENSE should be connected to its corresponding +OUTPUT and likewise the –SENSE should be connected to its corresponding –OUTPUT.
6. Measured with a 1μF M/C and a 10μF T/C.
7. The negative/ positive logic and pin length are optional (see table). The pin voltage is referenced to –INPUT
8. Heat-sink is optional and P/N: 7G-0021A-F, 7G-0022A-F, 7G-0023A-F, 7G-0024A-F.
9. The HEC50 series standard module meets EN55022 Class A and Class B with external components. For more detail information, please contact with P-DUKE.
10. 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: Nippon chemi-con KY series, 220μF/100V.
11. CASE GROUNDING：When connect the case pin and four screw bolts to shield plane, the EMI could be reduced.

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

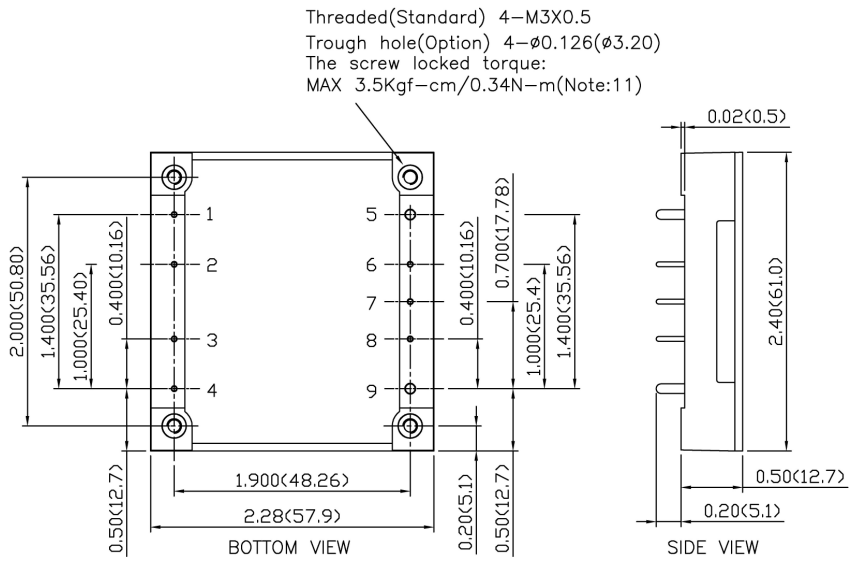


## MECHANICAL DRAWING :

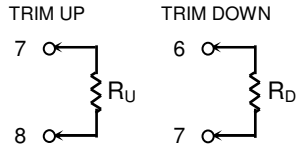



1. All dimensions in Inch (mm)
   Tolerance: X.XX±0.02 (X.X±0.5)
   X.XXX±0.01 (X.XX±0.25)
2. Pin pitch tolerance ±0.01(0.25)
3. Pin dimension tolerance ±0.004 (0.1)

| PIN CONNECTION | | |
|---|---|---|
| PIN | DEFINE | DIAMETER |
| 1 | -INPUT | 0.040 Inch（1.02mm） |
| 2 | CASE | 0.040 Inch（1.02mm） |
| 3 | CTRL | 0.040 Inch（1.02mm） |
| 4 | +INPUT | 0.040 Inch（1.02mm） |
| 5 | -OUTPUT | 0.080 Inch（2.03mm） |
| 6 | -SENSE | 0.040 Inch（1.02mm） |
| 7 | TRIM | 0.040 Inch（1.02mm） |
| 8 | +SENSE | 0.040 Inch（1.02mm） |
| 9 | +OUTPUT | 0.080 Inch（2.03mm） |

### EXTERNAL OUTPUT TRIMMING

Output can be externally trimmed by using the method shown below.




| Remote On/Off and Pin Options | Suffix |
|---|---|
| Negative remote ON/OFF logic, 0.200” pin length (standard) | - |
| Negative remote ON/OFF logic, 0.145” pin length | -L |
| Positive remote ON/OFF logic, 0.200” pin length | -P |
| Positive remote ON/OFF logic, 0.145” pin length | -S |

| Heat-Sink and Mounting Hole Tread Options | Suffix |
|---|---|
| Without heat-sink | - |
| 7G-0021A-F | -HS |
| 7G-0022A-F | -HS1 |
| 7G-0023A-F | -HS2 |
| 7G-0024A-F | -HS3 |
| Through hole (No thread) | -TH |

Example：HEC50-48S3P3-PHS
* The module can’t equip heat-sink with TH option.