

20 Watts

- 4:1 Input range
- 2 x 1" Package
- Single and dual outputs
- Up to 91% efficiency
- -40 to 85°C Operation
- Remote on/off control
- 3 Year warranty



The HTE20 series of wide input DC-DC converters comes in both single and dual outputs. Inputs are available in 24 & 48V versions with 4:1 range and outputs from 3.3 to 15V single and dual. The units operate from -40 to +85°C. All models have a FiDUS 3 year warranty.

Dimensions:

2.00 x 1.00 x 0.40" (50.80 x 25.40 x 10.16mm)

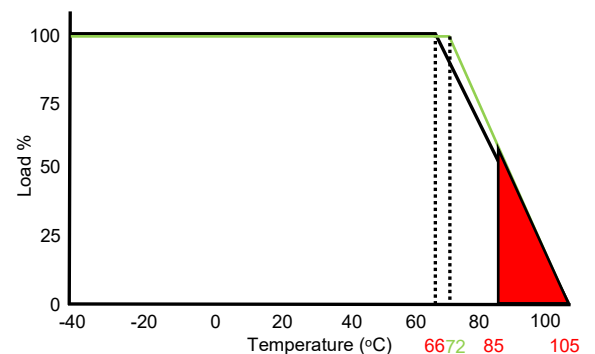
Models & Ratings

| Model Number | Input Voltage | Output Voltage | Output Current | Input Current [1] | | Maximum Capacitive Load | Efficiency |
|--------------|---------------|----------------|----------------|-------------------|---------------|-------------------------|------------|
| | | | | No Load | Full Load [2] | | |
| HTE202403 | 9-36V | 3.3V | 5500mA | 50mA | 879mA | 10000uF | 89% |
| HTE202405 | | 5V | 4000mA | 50mA | 957mA | 6800uF | 91% |
| HTE202412 | | 12V | 1670mA | 22mA | 980mA | 1000uF | 89% |
| HTE202415 | | 15V | 1330mA | 22mA | 968mA | 680uF | 89% |
| HTE202405D | | ±5V | ±2000mA | 65mA | 969mA | ±2200uF | 89% |
| HTE202412D | | ±12V | ±835mA | 25mA | 980mA | ±470uF | 88% |
| HTE202415D | | ±15V | ±665mA | 25mA | 980mA | ±330uF | 89% |
| HTE204803 | 18-75V | 3.3V | 5500mA | 30mA | 440mA | 10000uF | 89% |
| HTE204805 | | 5V | 4000mA | 30mA | 473mA | 6800uF | 91% |
| HTE204812 | | 12V | 1670mA | 15mA | 484mA | 1000uF | 89% |
| HTE204815 | | 15V | 1330mA | 15mA | 484mA | 680uF | 89% |
| HTE204805D | | ±5V | ±2000mA | 40mA | 484mA | ±2200uF | 89% |
| HTE204812D | | ±12V | ±835mA | 15mA | 490mA | ±470uF | 88% |
| HTE204815D | | ±15V | ±665mA | 15mA | 490mA | ±330uF | 89% |

Notes

1. Input current specified at nominal 24 or 48V
2. For heatsink option with better thermal performance please contact sales
3. Do not operate continuously in the red area of the derating curve

Derating curve



| Input | |
|--------------------------------|---|
| Parameter | Rating |
| Input voltage range | See table |
| Input reflected ripple current | 20mA pk-pk through 12uH inductor |
| Input surge (100mS max) | 24V Models 50V DC Max. 48V Models 100VDC Max. |
| Input filter | Pi type |

| Output | | | | | |
|--------------------------|---|---------|---------|----------|---|
| Parameter | Minimum | Typical | Maximum | Units | Notes & Conditions |
| Output voltage | 3.3 | | 15 | VDC | See Model & Ratings table |
| Set point accuracy | | | ±1 | % | |
| Line regulation | | | ±0.5 | % | Low line to High line |
| Load regulation | | | ±0.5 | % | 0 to 100%. Single output |
| | | | ±1 | | 0 to 100%. Dual output |
| Cross regulation | | | ±5 | % | On dual output models when one load is varied by 25 to 100% and the other is 100% load. |
| Ripple & Noise | | | 75 | mV pk-pk | All models measured with 1uF ceramic capacitor. 20 MHz bandwidth |
| Short circuit protection | | | | | Trip & restart (hiccup mode) auto recovery |
| Maximum capacitive load | | | | | See Model and Ratings table |
| Remote on/off | Module on 3.0 to 12.0 Vdc or open circuit. Module off short circuit pin 2 and 6 or 0 to 1.2 Vdc. Off input current 5mA typ. | | | | |

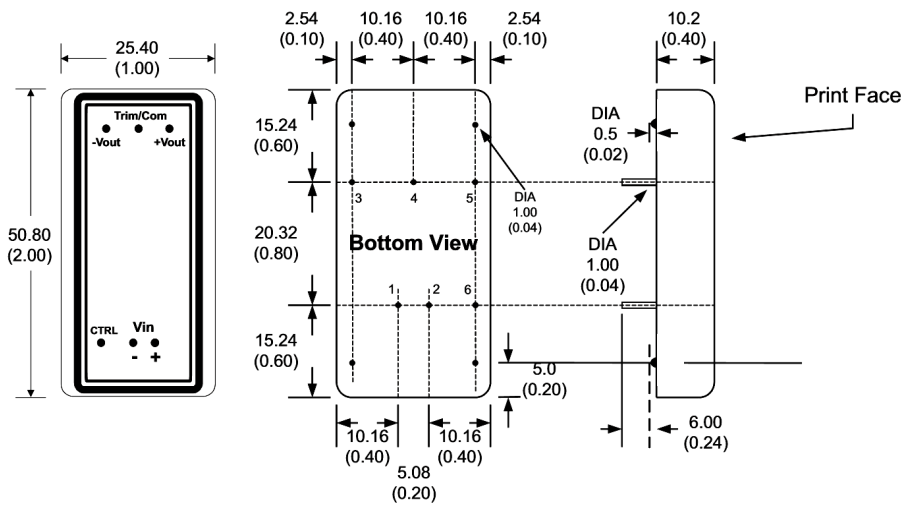
| General | | | | | |
|-----------------------|---------|---------|---------|-------------------|-------------------------------|
| Parameter | Minimum | Typical | Maximum | Units | Notes & Conditions |
| Efficiency | 88 | | 91 | % | See Model & Ratings table |
| Isolation | | | 1600 | VDC | Input to output |
| Isolation resistance | 1000 | | | M Ohm | |
| Isolation capacitance | | 1200 | | pF | |
| Switching frequency | | 330 | | KHz | |
| Power density | | | 25 | W/in ³ | |
| MTBF | | >560 | | KHrs | As per MIL-HDBK-217F, 25°C GB |

| Environmental | | | | | |
|-------------------------|---------|---------|---------|-------|---|
| Parameter | Minimum | Typical | Maximum | Units | Notes & Conditions |
| Operating temperature | -40 | | 85 | °C | See derating graph PG1 |
| Storage temperature | -55 | | 125 | °C | |
| Case temperature | | | 105 | °C | |
| Cooling | | | | | Convection cooled |
| Humidity | | | 95 | % RH | Non-condensing |
| Thermal impedance | | 12 | | °C/W | 10°C/W with heatsink option (Contact sales) |
| Temperature coefficient | | | ±0.02 | %/°C | |

| EMC: Emissions | | | |
|----------------|----------|------------|---------------------------|
| | Standard | Test level | Notes & Conditions |
| Conducted | EN55022 | Class A | See application notes PG3 |
| Radiated | EN55022 | Class A | |

| EMC: Immunity | | | | |
|---------------------------------|-------------|----------------------|----------|---|
| | Standard | Test level | Criteria | Notes & Conditions |
| ESD | EN61000-4-2 | 8KV Air, 6KV contact | A | |
| Radiated | EN61000-4-3 | 10V/m | A | 80~1000 MHz, 80% AM (1kHz) |
| EFT/Burst | EN61000-4-4 | 3 | A | 2KV. A 220uF/100V capacitor required |
| Surges | EN61000-4-5 | Installation class 3 | A | A 220uF/100V capacitor required. Line to line : 1.0kV |
| Conducted | EN61000-4-6 | 10Vrms | A | 0.15 ~ 80 MHz, 80% AM (1kHz) |
| Power frequency magnetic fields | EN61000-4-8 | 1A/m | A | 50Hz |

Mechanical Details



| Pin | Pin Connections | |
|-----|-----------------|---------------|
| | Standard | |
| 1 | +Vin | +Vin |
| 2 | -Vin | -Vin |
| 3 | +Vout | +Vout |
| 4 | Trim | 0V |
| 5 | -Vout | -Vout |
| 6 | Remote On/Off | Remote On/Off |

Notes

1. All dimensions shown in millimetres (inches)
2. Pin diameter 1.00 ± 0.05 (0.04 ± 0.002)
3. Case tolerance ± 0.5 (± 0.002)

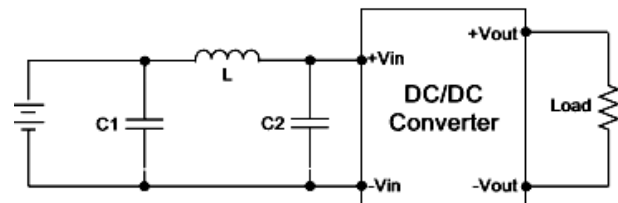
Physical

| Parameter | Rating |
|-----------------------|-------------------------------------|
| Case material | Nickel coated copper |
| Pin material | 1.00mm brass solder coated |
| Potting material | Epoxy (UL94V-0) |
| Weight | 31g |
| Dimensions | 2.00 x 1.00 x 0.40" |
| Soldering temperature | 1.5mm from case, 10s and 260°C max. |

Application notes

EMI Filter

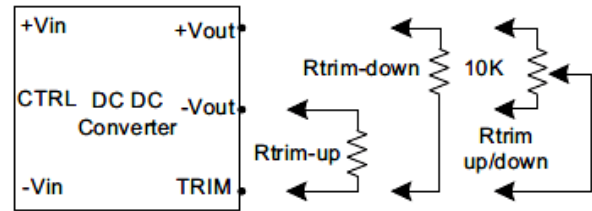
The input filter components C1, L and C2 can be fitted to help meet conducted emission requirements for the system. They should be mounted as close as possible to the module. Lead lengths should be minimized and where possible avoid running input and output tracks under the module as part of good design practice for best EMC performance. If the module is embedded in a system running from a AC/DC converter, this will have its own additional immunity protection and EMI filtering that will impact the overall system EMI performance.



| Model number | C1 | L | C2 |
|--------------|------------------|------|------------------|
| HTE2024XX | 1210, 2.2uF/100V | 12uH | 1210, 2.2uF/100V |
| HTE2048XX | 1210, 2.2uF/100V | 12uH | 1210, 2.2uF/100V |

Trim Tables

Output voltage trim function allows the user to increase or decrease the output voltage set point. The module may be connected with an external resistor (Rtrim) between TRIM pin and either +Vout or -Vout. By adjusting Rtrim, the output voltage can be changed by $\pm 10\%$ of nominal the output voltage.



HTE20XX03

| Trim down | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | % |
|------------|---------|---------|---------|--------|--------|--------|--------|--------|--------|--------|-------|
| Vout= | 3.267 | 3.234 | 3.201 | 3.168 | 3.135 | 3.102 | 3.069 | 3.036 | 3.003 | 2.970 | Volts |
| Rtrim-down | 315.932 | 172.257 | 112.528 | 79.806 | 59.153 | 44.930 | 34.539 | 26.616 | 20.374 | 15.330 | KOhms |
| Trim up | 1.000 | 2.000 | 3.000 | 4.000 | 5.000 | 6.000 | 7.000 | 8.000 | 9.000 | 10.000 | % |
| Vout= | 3.333 | 3.366 | 3.399 | 3.432 | 3.465 | 3.498 | 3.531 | 3.564 | 3.597 | 3.630 | Volts |
| Rtrim-up | 544.612 | 184.034 | 103.305 | 67.715 | 47.676 | 34.824 | 25.880 | 19.297 | 14.249 | 10.255 | KOhms |

HTE20XX05

| Trim down | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | % |
|------------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| Vout= | 4.950 | 4.900 | 4.850 | 4.800 | 4.750 | 4.700 | 4.650 | 4.600 | 4.550 | 4.500 | Volts |
| Rtrim-down | 230.566 | 106.182 | 64.301 | 43.281 | 30.647 | 22.207 | 16.177 | 11.651 | 8.129 | 5.310 | KOhms |
| Trim up | 1.000 | 2.000 | 3.000 | 4.000 | 5.000 | 6.000 | 7.000 | 8.000 | 9.000 | 10.000 | % |
| Vout= | 5.050 | 5.100 | 5.150 | 5.200 | 5.250 | 5.300 | 5.350 | 5.400 | 5.450 | 5.500 | Volts |
| Rtrim-up | 244.547 | 113.776 | 70.631 | 49.142 | 36.274 | 27.707 | 21.592 | 17.010 | 13.447 | 10.598 | KOhms |

HTE20XX12

| Trim down | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | % |
|------------|---------|---------|---------|--------|--------|--------|--------|--------|--------|--------|-------|
| Vout= | 11.880 | 11.760 | 11.640 | 11.520 | 11.400 | 11.280 | 11.160 | 11.040 | 10.920 | 10.800 | Volts |
| Rtrim-down | 327.351 | 142.100 | 83.928 | 55.470 | 38.591 | 27.418 | 19.477 | 13.542 | 8.939 | 5.264 | KOhms |
| Trim up | 1.000 | 2.000 | 3.000 | 4.000 | 5.000 | 6.000 | 7.000 | 8.000 | 9.000 | 10.000 | % |
| Vout= | 12.120 | 12.240 | 12.360 | 12.480 | 12.600 | 12.720 | 12.840 | 12.960 | 13.080 | 13.200 | Volts |
| Rtrim-up | 371.425 | 183.645 | 117.623 | 83.929 | 63.489 | 49.767 | 39.919 | 32.508 | 26.728 | 22.094 | KOhms |

HTE20XX15

| Trim down | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | % |
|------------|---------|---------|---------|--------|--------|--------|--------|--------|--------|--------|-------|
| Vout= | 14.850 | 14.700 | 14.550 | 14.400 | 14.250 | 14.100 | 13.950 | 13.800 | 13.650 | 13.500 | Volts |
| Rtrim-down | 433.811 | 174.916 | 100.946 | 65.907 | 45.468 | 32.077 | 22.625 | 15.596 | 10.165 | 5.842 | KOhms |
| Trim up | 1.000 | 2.000 | 3.000 | 4.000 | 5.000 | 6.000 | 7.000 | 8.000 | 9.000 | 10.000 | % |
| Vout= | 15.150 | 15.300 | 15.450 | 15.600 | 15.750 | 15.900 | 16.050 | 16.200 | 16.350 | 16.500 | Volts |
| Rtrim-up | 347.293 | 178.523 | 115.235 | 82.084 | 61.683 | 47.863 | 37.882 | 30.336 | 24.430 | 19.682 | KOhms |