

Applications

- Telecommunications
- Data communications
- Wireless communications
- Servers, Workstations

Benefits

- High efficiency – no heat sink required
- Higher current capability at 70 °C than most competitors' 40 A half-bricks

Description

The QME48T40 DC-DC Series of converters provide outstanding thermal performance in high temperature environments. This performance is accomplished through the use of patented/patent-pending circuits, packaging, and processing techniques to achieve ultra-high efficiency, excellent thermal management, and a low-body profile.

The low-body profile and the preclusion of heat sinks minimize impedance to system airflow, thus enhancing cooling for both upstream and downstream devices. The use of 100% automation for assembly, coupled with advanced electronic circuits and thermal design, results in a product with extremely high reliability.

Operating from a 36-75 V input, the QME48T40 converters provide any standard output voltage from 3.3 V down to 1.0 V that can be trimmed from –20% to +10% of the nominal output voltage ($\pm 10\%$ for output voltages 1.2 V and 1.0 V), thus providing outstanding design flexibility.

Features

- RoHS lead-free solder and lead-solder-exempted products are available
- Delivers up to 40 A
- Outputs available: 3.3, 2.5, 1.8, 1.5, 1.2 and 1.0 V
- Industry-standard quarter-brick pinout
- On-board input differential LC-filter
- Startup into pre-biased load
- No minimum load required
- Dimensions: 1.45" x 2.30" x 0.425"
(36.83 x 58.42 x 10.80 mm)
- Weight: 1.2 oz [34.2 g]
- Meets Basic Insulation requirements of EN60950
- Withstands 100 V input transient for 100 ms
- Fixed-frequency operation
- Fully protected
- Remote output sense
- Non-Latching / Latching OTP option
- Positive or negative logic ON/OFF option
- Output voltage trim range: +10%/–20% with industry-standard trim equations ($\pm 10\%$ for 1.2 V and 1.0 V)
- High reliability: MTBF = 13.9 million hours, calculated per Telcordia TR-332, Method I Case 1
- UL60950 recognized in US and Canada and DEMKO certified per IEC/EN60950 (pending)
- Designed to meet Class B conducted emissions per FCC and EN55022 when used with external filter
- All materials meet UL94, V-0 flammability rating

Electrical Specifications

Conditions: $T_A = 25\text{ }^\circ\text{C}$, Airflow = 300 LFM (1.5 m/s), $V_{in} = 48\text{ VDC}$, unless otherwise specified.

| Parameter | Notes | Min | Typ | Max | Units |
|--|--|-----|-----|-----|---------------------|
| Absolute Maximum Ratings | | | | | |
| Input Voltage | Continuous | 0 | | 80 | VDC |
| Operating Ambient Temperature | | -40 | | 85 | $^\circ\text{C}$ |
| Storage Temperature | | -55 | | 125 | $^\circ\text{C}$ |
| Input Characteristics | | | | | |
| Operating Input Voltage Range | | 36 | 48 | 75 | VDC |
| Input Under Voltage Lockout | | | | | |
| Turn-on Threshold | | 33 | 34 | 35 | VDC |
| Turn-off Threshold | | 31 | 32 | 33 | VDC |
| Input Voltage Transient | 100 ms | | | 100 | VDC |
| Maximum Input Current | 40 ADC Out @ 36 VDC In | | | | |
| | $V_{OUT} = 3.3\text{ VDC}$ | | | 4.1 | ADC |
| | $V_{OUT} = 2.5\text{ VDC}$ | | | 3.2 | ADC |
| | $V_{OUT} = 1.8\text{ VDC}$ | | | 2.4 | ADC |
| | $V_{OUT} = 1.5\text{ VDC}$ | | | 2.0 | ADC |
| | $V_{OUT} = 1.2\text{ VDC}$ | | | 1.6 | ADC |
| | $V_{OUT} = 1.0\text{ VDC}$ | | | 1.4 | ADC |
| Input Stand-by Current | $V_{in} = 48\text{V}$, converter disabled | | 3 | | mA |
| Input No Load Current (0 load on the output) | $V_{in} = 48\text{V}$, converter enabled | | | | |
| | $V_{OUT} = 3.3\text{ VDC}$ | | 50 | | mA |
| | $V_{OUT} = 2.5\text{ VDC}$ | | 47 | | mA |
| | $V_{OUT} = 1.8\text{ VDC}$ | | 45 | | mA |
| | $V_{OUT} = 1.5\text{ VDC}$ | | 44 | | mA |
| | $V_{OUT} = 1.2\text{ VDC}$ | | 43 | | mA |
| | $V_{OUT} = 1.0\text{ VDC}$ | | 43 | | mA |
| Input Reflected-Ripple Current, i_s | $V_{in} = 48\text{V}$, 25 MHz bandwidth | | | | |
| | $V_{OUT} = 3.3\text{ VDC}$ | | 10 | | mA _{PK-PK} |
| | $V_{OUT} = 2.5\text{ VDC}$ | | 9 | | mA _{PK-PK} |
| | $V_{OUT} = 1.8\text{ VDC}$ | | 9 | | mA _{PK-PK} |
| | $V_{OUT} = 1.5\text{ VDC}$ | | 9 | | mA _{PK-PK} |
| | $V_{OUT} = 1.2\text{ VDC}$ | | 8 | | mA _{PK-PK} |
| | $V_{OUT} = 1.0\text{ VDC}$ | | 8 | | mA _{PK-PK} |
| Input Voltage Ripple Rejection | 120 Hz | | 60 | | dB |

Electrical Specifications (continued)

Conditions: $T_A = 25\text{ }^\circ\text{C}$, Airflow = 300 LFM (1.5 m/s), $V_{in} = 48\text{ VDC}$, unless otherwise specified.

| Parameter | Notes | Min | Typ | Max | Units |
|--|---|-------|------------------|---------|---------------------|
| Output Characteristics | | | | | |
| External Load Capacitance | Plus full load (resistive) | | | 40,000 | μF |
| Output Current Range | | 0 | | 40 | ADC |
| Current Limit Inception | Non-latching | 42 | 47 | 52 | ADC |
| Peak Short-Circuit Current | Non-latching, Short = 10 m Ω | | 50 | 60 | A |
| RMS Short-Circuit Current | Non-latching | | 9 | | Arms |
| Output Voltage Set Point (no load) | $V_{OUT} = 3.3\text{ VDC}$ | 3.267 | 3.300 | 3.333 | VDC |
| | $V_{OUT} = 2.5\text{ VDC}$ | 2.475 | 2.500 | 2.525 | VDC |
| | $V_{OUT} = 1.8\text{ VDC}$ | 1.782 | 1.800 | 1.818 | VDC |
| | $V_{OUT} = 1.5\text{ VDC}$ | 1.485 | 1.500 | 1.515 | VDC |
| | $V_{OUT} = 1.2\text{ VDC}$ | 1.188 | 1.200 | 1.212 | VDC |
| | $V_{OUT} = 1.0\text{ VDC}$ | 0.990 | 1.000 | 1.010 | VDC |
| Output Regulation Over Line | | | ± 2 | ± 5 | mV |
| Output Regulation Over Load | | | ± 2 | ± 5 | mV |
| Output Voltage Range | Over line, load and temperature ¹ | -1.5 | | +1.5 | %Vout |
| Output Ripple and Noise – 25 MHz bandwidth | $V_{OUT} = 3.3\text{ VDC}$ Full load + 10 μF tantalum + 1 μF ceramic | | 55 | 110 | mV _{PK-PK} |
| | $V_{OUT} = 1.0\text{ VDC}$ Full load + 10 μF tantalum + 1 μF ceramic | | 35 | 70 | mV _{PK-PK} |
| Dynamic Response | | | | | |
| Load Change 50%-75%-50% of Iout Max, di/dt = 0.1 A/ μs | $C_o = 1\text{ }\mu\text{F}$ ceramic (Fig. 3.3V.9) | | 50 ² | | mV |
| | $C_o = 470\text{ }\mu\text{F}$ POS + 1 μF ceramic | | 130 ² | | mV |
| Settling Time to 1% of Vout | | | 15 ² | | μs |
| Efficiency | | | | | |
| 100% Load | $V_{OUT} = 3.3\text{ VDC}$ | | 91.0 | | % |
| | $V_{OUT} = 2.5\text{ VDC}$ | | 89.0 | | % |
| | $V_{OUT} = 1.8\text{ VDC}$ | | 86.5 | | % |
| | $V_{OUT} = 1.5\text{ VDC}$ | | 84.5 | | % |
| | $V_{OUT} = 1.2\text{ VDC}$ | | 82.0 | | % |
| | $V_{OUT} = 1.0\text{ VDC}$ | | 80.0 | | % |
| 50% Load | $V_{OUT} = 3.3\text{ VDC}$ | | 92.0 | | % |
| | $V_{OUT} = 2.5\text{ VDC}$ | | 91.0 | | % |
| | $V_{OUT} = 1.8\text{ VDC}$ | | 88.5 | | % |
| | $V_{OUT} = 1.5\text{ VDC}$ | | 87.0 | | % |
| | $V_{OUT} = 1.2\text{ VDC}$ | | 85.0 | | % |
| | $V_{OUT} = 1.0\text{ VDC}$ | | 83.0 | | % |

Additional Notes:

¹ Operating ambient temperature range of -40 $^\circ\text{C}$ to 85 $^\circ\text{C}$ for converter.

² See waveforms for dynamic response and settling time for different output voltages.

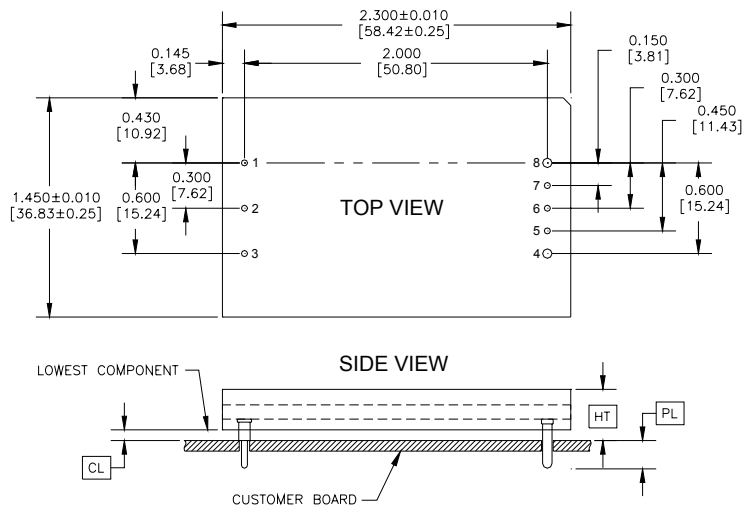
³ Vout can be increased up to 10% via the sense leads or 10% via the trim function. However, the total output voltage trim from all sources should not exceed 10% of $V_{OUT(NOM)}$, in order to ensure specified operation of overvoltage protection circuitry

Electrical Specifications (continued)

Conditions: $T_A = 25\text{ }^\circ\text{C}$, Airflow = 300 LFM (1.5 m/s), $V_{in} = 48\text{ VDC}$, unless otherwise specified.

| Parameter | Notes | Min | Typ | Max | Units |
|--|------------------------------------|------|-----|-----|-------|
| Isolation Characteristics | | | | | |
| I/O Isolation | | 2000 | | | VDC |
| Isolation Capacitance | | | 2 | | nF |
| Isolation Resistance | | 10 | | | MΩ |
| Feature Characteristics | | | | | |
| Switching Frequency | | | 460 | | kHz |
| Output Voltage Trim Range ³ | Non-latching (3.3 - 1.5 V) | -20 | | +10 | % |
| | Non-latching (1.2 V and 1.0 V) | -10 | | +10 | % |
| Remote Sense Compensation ³ | Percent of $V_{OUT(NOM)}$ | | | +10 | % |
| Output Overvoltage Protection | Non-latching | 117 | 128 | 140 | % |
| Auto-Restart Period | Applies to all protection features | | 200 | | ms |
| Turn-On Time | | | 4 | | ms |
| ON/OFF Control (Positive Logic) | | | | | |
| Converter Off (logic low) | | -20 | | 0.8 | VDC |
| Converter On (logic high) | | 2.4 | | 20 | VDC |
| ON/OFF Control (Negative Logic) | | | | | |
| Converter Off (logic high) | | 2.4 | | 20 | VDC |
| Converter On (logic low) | | -20 | | 0.8 | VDC |

Physical Information



QME48T Pinout (Through-hole)

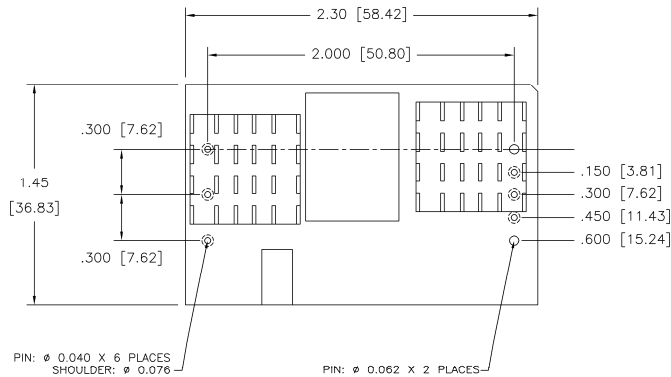
| Pad/Pin Connections | |
|---------------------|----------|
| Pad/Pin # | Function |
| 1 | Vin (+) |
| 2 | ON/OFF |
| 3 | Vin (-) |
| 4 | Vout (-) |
| 5 | SENSE(-) |
| 6 | TRIM |
| 7 | SENSE(+) |
| 8 | Vout (+) |

QME48T Platform Notes

- All dimensions are in inches [mm]
- Pins 1-3 and 5-7 are Ø 0.040" [1.02] with Ø 0.078" [1.98] shoulder
- Pins 4 and 8 are Ø 0.062" [1.57] without shoulder
- Pin Material & Finish: Brass Alloy 360 with Matte Tin over Nickel
- Converter Weight: 1.2 oz [34.2 g] typical

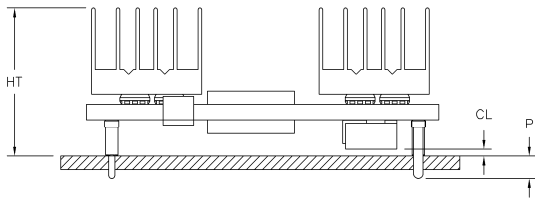
| Height Option | HT (Max. Height) | CL (Min. Clearance) |
|---------------|------------------|---------------------|
| G | 0.425 [10.80] | 0.035 [0.89] |

| Pin Option | PL Pin Length |
|------------|----------------|
| | ±0.005 [±0.13] |
| A | 0.188 [4.78] |
| B | 0.145 [3.68] |



| Heatsink Option | HT (Max. Height) | CL (Min.) |
|-----------------|------------------|--------------|
| S1 | 0.99 [25.1] | 0.039 [1.00] |

| Pin Option | PL Pin Length |
|------------|----------------|
| | ±0.005 [±0.13] |
| B | 0.145 [3.68] |



Converter Part Numbering Ordering Information

| Product Series | Input Voltage | Mounting Scheme | Rated Load Current | Output Voltage | ON/OFF Logic | Max Height [HT] | Pin Length [PL] | Special Features | RoHS | Heatsink |
|----------------------|---------------|------------------|--------------------|--|------------------------------|----------------------------|--|---|---|--|
| QME | 48 | T | 40 | 033 | - | N | G | B | 0 | |
| Quarter-Brick Format | 36-75 V | T ⇒ Through-hole | 40 ADC | 010 ⇒ 1.0V 012 ⇒ 1.2V 015 ⇒ 1.5V 018 ⇒ 1.8V 025 ⇒ 2.5V 033 ⇒ 3.3V | N ⇒ Negative P ⇒ Positive | Through hole G ⇒ 0.425" | Through hole A ⇒ 0.188" B ⇒ 0.145" | 0 ⇒ STD Non-Latching L ⇒ Latching Option | No Suffix ⇒ RoHS lead-solder-exemption compliant G ⇒ RoHS compliant for all six substances | No Suffix ⇒ No heatsink -S1 ⇒ Heatsink as shown |

Example: The example above describes P/N QME48T40033-NGB0: 36-75 V input, through-hole, 40 A @ 3.3 V output, negative ON/OFF logic, a 0.145" solder tail and maximum height of 0.425", standard (non-latching) protection, and Eutectic Tin/Lead solder. Consult factory for the complete list of available options.

Attention: The heatsink option "S1" is only available with the model QME48T40033-NGBOG-S1

Notes:

1. NUCLEAR AND MEDICAL APPLICATIONS - Power-One products are not designed, intended for use in, or authorized for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems without the express written consent of the respective divisional president of Power-One, Inc.
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