



Size:
2.28 x 1.45 x 0.50 inches
(57.9 x 36.8 x 12.7 mm)

Applications:

- Automation
- Telecom/Datacom
- Industry Control Systems
- ICP
- Measurement

FEATURES

- Soft Start
- Single Outputs
- Input Under Voltage Protection
- High Efficiency up to 93%
- Remote ON/OFF Control
- 2:1 Wide Input Voltage Ranges
- No Minimum Load Required
- 2250VDC I/O Basic Insulation
- Voltage Adjustability
- Low Stand-by Power Consumption
- Industry Standard Quarter-brick Package
- Up to 108 Watts Maximum Output Power
- Short Circuit, Over Voltage, Over Load, & Over Temp. Protection
- UL60950-1, EN60950-1, and IEC60950-1 Safety Approvals
- CE Marked
- RoHS & REACH Compliant
- Optional Heatsinks Available (Suffix "HS")
- Threaded (Standard) or Thru-Hole (Optional) Inserts Available

DESCRIPTION

The DCQA100 series of DC/DC power converters provides up to 108 Watts of output power in a 2.28" x 1.45" x 0.5" industry standard quarter-brick package. This series has single output models with 2:1 wide input voltage ranges of 8.5-22VDC, 16.5-36VDC, and 33-75VDC. Some features include high efficiency up to 93%, 2250VDC I/O basic insulation, and remote ON/OFF control. These converters are also protected against input under voltage, short circuit, over voltage, over load, and over temperature conditions. All models are RoHS compliant and have UL60950-1, EN60950-1, and IEC60950-1 safety approvals. Several different options are available for this series including negative logic remote ON/OFF, heatsinks, and thru-hole inserts.

MODEL SELECTION TABLE

| Model Number | Input Voltage Range | Output Voltage | Output Current | | Output Ripple & Noise | No Load Input Current | Output Power | Efficiency | Maximum Capacitive Load |
|---------------|---------------------------|----------------|----------------|----------|-----------------------|-----------------------|--------------|------------|-------------------------|
| | | | Min Load | Max Load | | | | | |
| DCQA100-12S33 | 12 VDC (8.5 - 22 VDC) | 3.3 VDC | 0mA | 25A | 75mVp-p | 50mA | 82.5W | 89% | 75,000µF |
| DCQA100-12S05 | | 5 VDC | 0mA | 18A | 75mVp-p | 50mA | 90W | 90% | 36,000µF |
| DCQA100-12S12 | | 12 VDC | 0mA | 7.5A | 100mVp-p | 50mA | 90W | 91% | 6250µF |
| DCQA100-12S15 | | 15 VDC | 0mA | 6A | 100mVp-p | 50mA | 90W | 91% | 4000µF |
| DCQA100-12S24 | | 24 VDC | 0mA | 3.7A | 200mVp-p | 50mA | 88.8W | 90% | 1540µF |
| DCQA100-12S30 | | 30 VDC | 0mA | 3A | 200mVp-p | 50mA | 90W | 90% | 1000µF |
| DCQA100-12S48 | 48 VDC | 0mA | 1.8A | 300mVp-p | 50mA | 86.4W | 89% | 380µF | |
| DCQA100-24S33 | 24 VDC (16.5 - 36 VDC) | 3.3 VDC | 0mA | 25A | 75mVp-p | 25mA | 82.5W | 89% | 75,000µF |
| DCQA100-24S05 | | 5 VDC | 0mA | 18A | 75mVp-p | 25mA | 90W | 90% | 36,000µF |
| DCQA100-24S12 | | 12 VDC | 0mA | 7.5A | 100mVp-p | 25mA | 90W | 91% | 6250µF |
| DCQA100-24S15 | | 15 VDC | 0mA | 6A | 100mVp-p | 25mA | 90W | 91% | 4000µF |
| DCQA100-24S24 | | 24 VDC | 0mA | 3.7A | 200mVp-p | 25mA | 88.8W | 92% | 1540µF |
| DCQA100-24S30 | | 30 VDC | 0mA | 3A | 200mVp-p | 25mA | 90W | 91% | 1000µF |
| DCQA100-24S48 | 48 VDC | 0mA | 1.8A | 300mVp-p | 25mA | 86.4W | 89% | 380µF | |
| DCQA100-48S33 | 48 VDC (33 - 75 VDC) | 3.3 VDC | 0mA | 25A | 75mVp-p | 15mA | 82.5W | 89% | 75,000µF |
| DCQA100-48S05 | | 5 VDC | 0mA | 21A | 75mVp-p | 15mA | 105W | 91% | 42,000µF |
| DCQA100-48S12 | | 12 VDC | 0mA | 9A | 100mVp-p | 15mA | 108W | 90% | 7500µF |
| DCQA100-48S15 | | 15 VDC | 0mA | 7A | 100mVp-p | 15mA | 105W | 91% | 4600µF |
| DCQA100-48S24 | | 24 VDC | 0mA | 4.5A | 200mVp-p | 15mA | 108W | 93% | 1870µF |
| DCQA100-48S30 | | 30 VDC | 0mA | 3.5A | 200mVp-p | 15mA | 105W | 92% | 1160µF |
| DCQA100-48S48 | 48 VDC | 0mA | 2.2A | 300mVp-p | 15mA | 105.6W | 91% | 460µF | |

NOTES

1. Input Source Impedance: The power modules will operate to specifications without external components, assuming that the source voltage has very low impedance and reasonable input voltage regulation. Highly inductive source impedances can affect the stability of the power module. Since real-world voltage sources have finite impedance, performance is improved by adding an external filter capacitor. We recommend using Nippon Chemi-con KY series, 100µF/100V.
2. Maximum output deviation is +10% inclusive of remote sense and trim. If remote sense is not being used, sense pins should connect to the output pins with the same polarity.
3. The DCQA100 series can only meet EMI Class A or Class B with external components added. Please contact factory for more information.
4. An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. We recommend connecting two pieces of aluminum electrolytic capacitors (Nippon chemi-con KY series, 220µF/100V).
5. Both positive logic and negative logic remote ON/OFF control is available. Positive logic remote ON/OFF comes standard; for negative logic remote ON/OFF add the suffix "R" to the model number (Ex: DCQA100-48S24R).
6. Optional heatsinks available. See page 5 for ordering details.
7. M3 x 0.5 threaded-thru inserts come standard. For Ø.126 thru-hole inserts add the suffix "TH" to the model number (Ex: DCQA100-48S24TH). Models with thru-hole inserts cannot be equipped with a heatsink.
8. BASE-PLATE GROUNDING: EMI can be reduced when two screw bolts connected to shield plane.

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

SPECIFICATIONS: DCQA100 SERIES

All specifications are based on 25°C, Nominal Input Voltage, and Full Load unless otherwise noted.
 We reserve the right to change specifications based on technological advances.

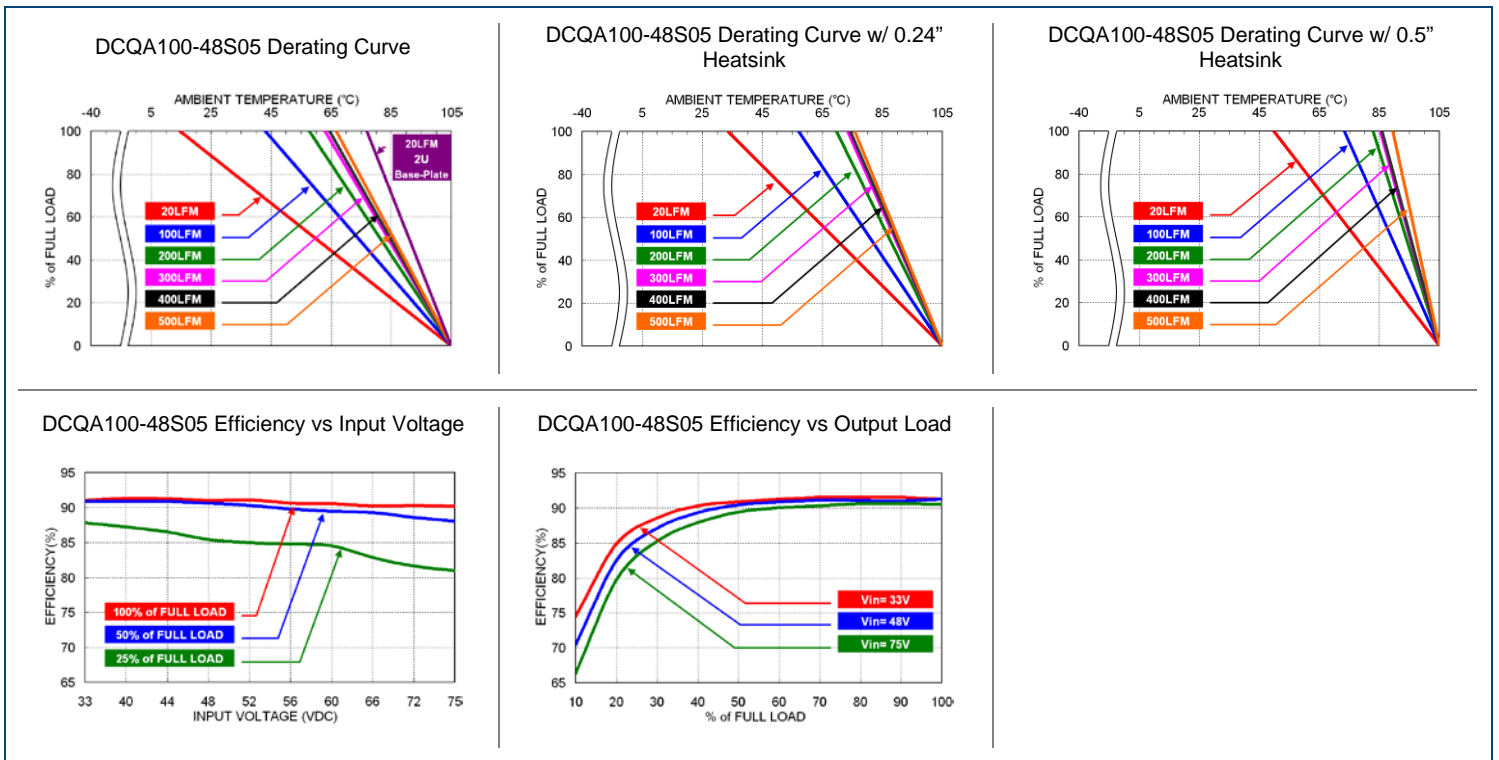
| SPECIFICATION | TEST CONDITIONS | | Min | Typ | Max | Unit |
|-------------------------------------|---|-------------------------------------|--------------------------------|------|-------|-------|
| INPUT SPECIFICATIONS | | | | | | |
| Input Voltage Range | 12VDC nominal input models | | 8.5 | 12 | 22 | VDC |
| | 24VDC nominal input models | | 16.5 | 24 | 36 | |
| | 48VDC nominal input models | | 33 | 48 | 75 | |
| Start-Up Voltage | 12VDC nominal input models | | | | 9 | VDC |
| | 24VDC nominal input models | | | | 18 | |
| | 48VDC nominal input models | | | | 36 | |
| Shutdown Voltage | 12VDC nominal input models | | 7.3 | 7.7 | 8.1 | VDC |
| | 24VDC nominal input models | | 15.5 | 15.9 | 16.3 | |
| | 48VDC nominal input models | | 31.6 | 32 | 32.5 | |
| Input Surge Voltage (1sec, max.) | 12VDC nominal input models | | | | 30 | VDC |
| | 24VDC nominal input models | | | | 50 | |
| | 48VDC nominal input models | | | | 100 | |
| Input Current | No Load | | See Table | | | |
| Input Filter (See Note 1) | | | Pi type | | | |
| OUTPUT SPECIFICATIONS | | | | | | |
| Output Voltage | | | See Table | | | |
| Voltage Accuracy | | | -1.0 | | +1.0 | % |
| Line Regulation | Low line to high line at full load | | -0.1 | | +0.1 | % |
| Load Regulation | No load to full load | 3.3V & 5V Output Models | -0.2 | | +0.2 | % |
| | | Others | -0.1 | | +0.1 | |
| Voltage Adjustability | Maximum output deviation is inclusive of remote sense | | -20 | | +10 | % |
| Remote Sense (See Note 2) | % of Vo (nom) | | | | 10 | % |
| Output Power | | | See Table | | | |
| Output Current | | | See Table | | | |
| Minimum Load | | | 0 | | | % |
| Maximum Capacitive Load | Minimum input and constant resistive load | | See Table | | | |
| Ripple & Noise (20MHz BW) | | Measured with a 22µF/25V X7R MLCC | 3.3V & 5V Output Models | | 75 | mVp-p |
| | | Measured with a 22µF/25V X7R MLCC | 12V & 15V Output Models | | 100 | |
| | | Measured with a 4.7µF/50V X7R MLCC | 24V & 30V Output Models | | 200 | |
| | | Measured with a 2.2µF/100V X7R MLCC | 48V Output Models | | 300 | |
| Transient Response Recovery Time | 25% load step change | | | 250 | | µs |
| Start-Up Time | Constant resistive load | Power Up | | 75 | 100 | ms |
| | | Remote On/Off | | 75 | 100 | |
| Temperature Coefficient | | | -0.02 | | +0.02 | %/°C |
| PROTECTION | | | | | | |
| Short Circuit Protection | | | Continuous, automatic recovery | | | |
| Over Load Protection | % of rated Iout; hiccup mode | | 110 | | 140 | % |
| Over Voltage Protection | % of Vo (nom); hiccup mode | | 115 | | 130 | % |
| Over Temperature Protection | | | | +110 | | °C |
| GENERAL SPECIFICATIONS | | | | | | |
| Efficiency | Nominal input voltage and full load | | See Table | | | |
| Switching Frequency | | | 270 | 300 | 330 | kHz |
| Isolation Voltage | 1 minute (basic insulation) | Input to Output | 2250 | | | VDC |
| | | Input/Output to Base-plate | 2250 | | | VDC |
| Isolation Resistance | 500VDC | | 1 | | | GΩ |
| Isolation Capacitance | | | | | 1500 | pF |
| REMOTE ON/OFF (See Note 5) | | | | | | |
| Positive Logic (standard) | Referenced to -Input pin | DC/DC ON | Open or 3~12 VDC | | VDC | |
| | | DC/DC OFF | Short or 0~1.2VDC | | | |
| Negative Logic (optional) | Referenced to -Input pin | DC/DC ON | Short or 0~1.2 VDC | | VDC | |
| | | DC/DC OFF | Open or 3~12VDC | | | |
| Input Current of Remote Control Pin | Nominal Vin | | -0.5 | | 1 | mA |
| Remote OFF State Input Current | Nominal Vin | | | 3 | | mA |

SPECIFICATIONS: DCQA100 SERIES

All specifications are based on 25°C, Nominal Input Voltage, and Full Load unless otherwise noted.
We reserve the right to change specifications based on technological advances.

| SPECIFICATION | TEST CONDITIONS | Min | Typ | Max | Unit |
|---|--|--|------------------|------|------|
| ENVIRONMENTAL SPECIFICATIONS | | | | | |
| Operating Base-Plate Temperature | | -40 | | +105 | °C |
| Storage Temperature Range | | -55 | | +125 | °C |
| Thermal Impedance (See Note 6) | Vertical direction by natural convection (20LFM) | Without Heatsink | 9 | | °C/W |
| | | With 0.24" Height Heatsink | 7.1 | | |
| | | With 0.5" Height Heatsink | 5.5 | | |
| | | Mounted on 2U iron base-plate | 2.8 | | |
| Relative Humidity | | 5 | | 95 | % RH |
| Thermal Shock | | MIL-STD-810F | | | |
| Vibration | | MIL-STD-810F | | | |
| MTBF | MIL-HDBK-217F, full load | 387,300 Hours | | | |
| PHYSICAL SPECIFICATIONS | | | | | |
| Weight | | 2.26oz (64g) | | | |
| Dimensions (L x W x H) | | 2.28x1.45x0.50 inch (57.9x36.8x12.7 mm) | | | |
| Case Material | | Aluminum base-plate with plastic case | | | |
| Potting Material | | Silicon (UL94-V0) | | | |
| SAFETY & EMC CHARACTERISTICS | | | | | |
| Safety Approvals | | IEC60950-1, UL60950-1, EN60950-1 | | | |
| EMI (See Note 3) | EN55032 | Class A, Class B | | | |
| ESD | EN61000-4-2 | Air ±8kV Contact ±6kV | Perf. Criteria A | | |
| Radiated Immunity | EN61000-4-3 | 20 V/m | Perf. Criteria A | | |
| Fast Transient (See Note 4) | EN61000-4-4 | ±2kV | Perf. Criteria A | | |
| Surge (See Note 4) | EN61000-4-5 | EN55024: ±2kV | Perf. Criteria A | | |
| Conducted Immunity | EN61000-4-6 | 10 Vrms | Perf. Criteria A | | |
| Power Frequency Magnetic Field | EN61000-4-8 | 100A/m continuous; 1000A/m 1 sec | Perf. Criteria A | | |

CHARACTERISTIC CURVES



OUTPUT VOLTAGE ADJUSTMENT

Output is adjustable for 10% trim up or -20% trim down of nominal output voltage by connecting an external resistor between the TRIM pin and either the +SENSE or -SENSE pins.

With an external resistor between the TRIM and -SENSE pin, the output voltage set decreases.

With an external resistor between the TRIM and +SENSE pin, the output voltage set point increases.

Maximum output deviation is +10% inclusive of remote sense. The external trim resistor needs to be at least 1/8 of rated power. The value of the external resistor can be obtained by the equations below.

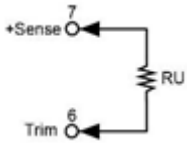
Trim Up Equation

$$R_U = \left(\frac{5.11V_{OUT}(100 + \Delta\%)}{1.225\Delta\%} - \frac{(511 + 10.22\Delta\%)}{\Delta\%} \right) k\Omega$$

Trim Down Equation

$$R_D = \left(\frac{511}{\Delta\%} - 10.22 \right) k\Omega$$

TRIM UP



3.3V Output Models

| ΔV (%) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------------------|---------|---------|--------|---------|--------|---------|---------|---------|-------|--------|
| Vout (V) | 3.333 | 3.366 | 3.399 | 3.432 | 3.465 | 3.498 | 3.531 | 3.564 | 3.597 | 3.630 |
| RU (k Ω) | 869.117 | 436.331 | 292.07 | 219.939 | 176.66 | 147.808 | 127.198 | 111.742 | 99.72 | 90.103 |

5V Output Models

| ΔV (%) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------------------|---------|---------|---------|---------|--------|--------|---------|---------|---------|---------|
| Vout (V) | 5.05 | 5.10 | 5.15 | 5.20 | 5.25 | 5.30 | 5.35 | 5.40 | 5.45 | 5.50 |
| RU (k Ω) | 1585.35 | 797.994 | 535.542 | 404.316 | 325.58 | 273.09 | 235.596 | 207.479 | 185.605 | 168.109 |

12V Output Models

| ΔV (%) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------------------|---------|---------|---------|---------|--------|---------|---------|---------|--------|---------|
| Vout (V) | 12.12 | 12.24 | 12.36 | 12.48 | 12.60 | 12.72 | 12.84 | 12.96 | 13.08 | 13.20 |
| RU (k Ω) | 4534.55 | 2287.19 | 1538.08 | 1163.52 | 938.78 | 788.956 | 681.939 | 601.676 | 539.25 | 489.309 |

15V Output Models

| ΔV (%) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Vout (V) | 15.15 | 15.30 | 15.45 | 15.60 | 15.75 | 15.90 | 16.05 | 16.20 | 16.35 | 16.50 |
| RU (k Ω) | 5798.49 | 2925.42 | 1967.73 | 1488.89 | 1201.58 | 1010.04 | 873.229 | 770.619 | 690.812 | 626.966 |

24V Output Models

| ΔV (%) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------------------|---------|---------|--------|-------|---------|--------|--------|---------|--------|---------|
| Vout (V) | 24.24 | 24.48 | 24.72 | 24.96 | 25.20 | 25.44 | 25.68 | 25.92 | 26.16 | 26.40 |
| RU (k Ω) | 9590.32 | 4840.11 | 3256.7 | 2465 | 1989.98 | 1673.3 | 1447.1 | 1277.45 | 1145.5 | 1039.94 |

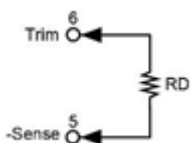
30V Output Models

| ΔV (%) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Vout (V) | 30.3 | 30.6 | 30.9 | 31.2 | 31.5 | 31.8 | 32.1 | 32.4 | 32.7 | 33 |
| RU (k Ω) | 12118.2 | 6116.57 | 4116.02 | 3115.74 | 2515.58 | 2115.47 | 1829.68 | 1615.33 | 1448.62 | 1315.25 |

48V Output Models

| ΔV (%) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Vout (V) | 48.48 | 48.96 | 49.44 | 49.92 | 50.40 | 50.88 | 51.36 | 51.84 | 52.32 | 52.80 |
| RU (k Ω) | 19701.9 | 9945.94 | 6693.96 | 5067.97 | 4092.38 | 3441.99 | 2977.42 | 2628.99 | 2357.99 | 2141.19 |

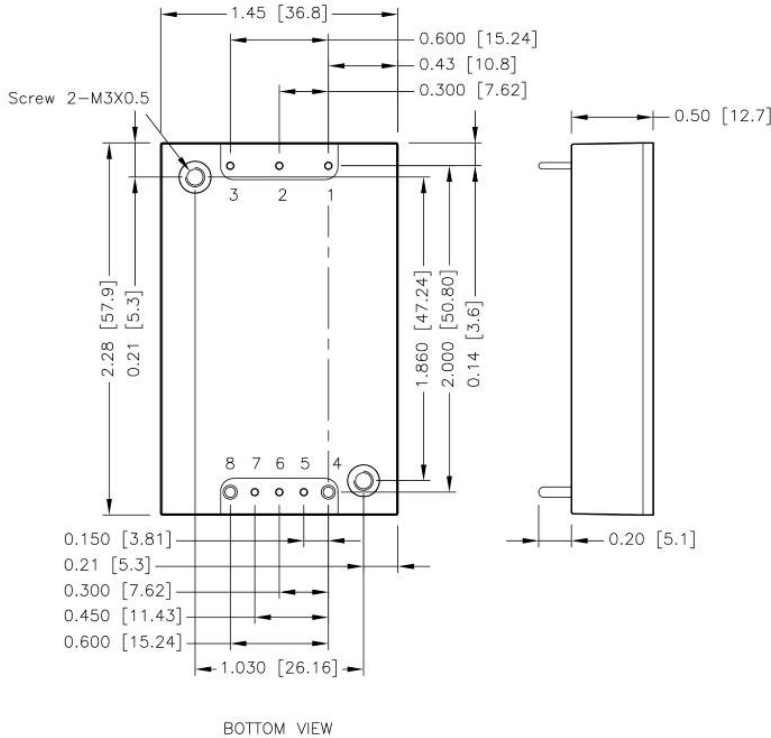
TRIM DOWN



All Outputs

| ΔV (%) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------------------|--------|--------|---------|--------|--------|--------|--------|--------|--------|-------|
| RD (k Ω) | 500.78 | 245.28 | 160.113 | 117.53 | 91.98 | 74.947 | 62.78 | 53.655 | 46.558 | 40.88 |
| ΔV (%) | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| RD (k Ω) | 36.235 | 32.363 | 29.088 | 26.28 | 23.847 | 21.718 | 19.839 | 18.169 | 16.675 | 15.33 |

MECHANICAL DRAWING



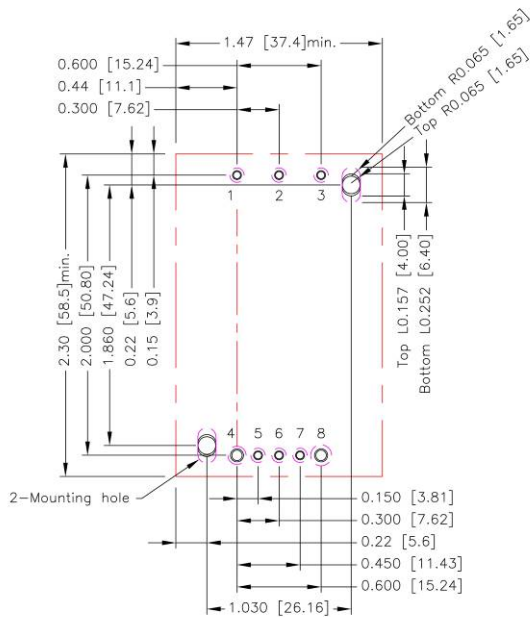
PIN CONNECTION

| PIN | DEFINE | DIAMETER |
|-----|--------|-----------|
| 1 | -Vin | 0.04 Inch |
| 2 | Ctrl | 0.04 Inch |
| 3 | +Vin | 0.04 Inch |
| 4 | -Vout | 0.06 Inch |
| 5 | -Sense | 0.04 Inch |
| 6 | Trim | 0.04 Inch |
| 7 | +Sense | 0.04 Inch |
| 8 | +Vout | 0.06 Inch |

Notes:

1. All dimensions in inch [mm]
2. Tolerance: x.xx±0.02 [x.x±0.5]
x.xxx±0.01 [x.xxx±0.25]
3. Pin pitch tolerance: ±0.01 [0.25]
4. Pin dimension tolerance ±0.004 [0.10]
5. The screw locked torque: MAX 3.5kgf-cm [0.34N-m]

RECOMMENDED PAD LAYOUT



Notes:

- All dimensions in inch [mm]
- Pad size (lead free recommended)
- Through Hole 1.2.3.5.6.7: Ø0.051 [1.30]
- Through Hole 4.8: Ø0.075 [1.90]
- Through Hole of Mounting: Ø0.126 [3.20]
- Top View Pad 1.2.3.5.6.7: Ø0.064 [1.63]
- Top View Pad 4.8: Ø0.094 [2.38]
- Top View Pad of Mounting: Groove R0.065 [1.65] L0.157 [4.00]
- Bottom View Pad 1.2.3.5.6.7: Ø0.102 [2.60]
- Bottom View Pad 8: Ø0.150 [3.80]
- Bottom View Pad 4: Ø0.130 [3.30]
- Bottom View Pad of Mounting: Groove R0.065 [1.65] L0.252 [6.40]

HEATSINK OPTIONS

| | |
|--|---|
| <p>Horizontal Fin Orientation (Suffix Option: H) 7G-0029B-F</p> | <p>Horizontal Fin Orientation (Suffix Option: H1) 7G-0030B-F</p> |
| <p>Vertical Fin Orientation (Suffix Option: H2) 7G-0031B-F</p> <p>Note: Models with thru-hole inserts cannot be equipped with a heatsink All dimensions in inch [mm] Tolerance: x.xx±0.02 [x.x±0.5]</p> | <p>Vertical Fin Orientation (Suffix Option: H3) 7G-0032B-F</p> |

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 protection, always use an input line fuse. The input line fuse suggestions are below:

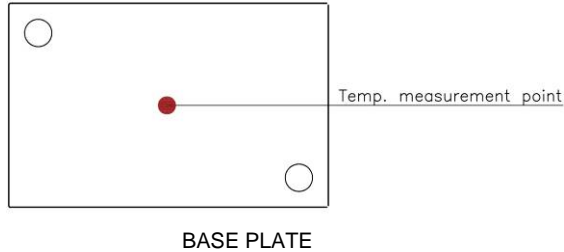
| Model | Fuse Rating | Fuse Type |
|----------------------------|-------------|-------------|
| 12VDC nominal input models | 20A | Fast-Acting |
| 24VDC nominal input models | 10A | Fast-Acting |
| 48VDC nominal input models | 6.3A | Slow-Blow |

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

THERMAL CONSIDERATION

This 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 in the figure below. The temperature at this location should not exceed 105°C. When operating, adequate cooling must be provided to maintain the test point temperature at or below 105°C. Although the maximum point, temperature of the power modules is 105°C, you can limit this temperature to a lower value for extremely high reliability.

- Thermal test condition with vertical direction by natural convection (20LFM)
- The iron base-plate dimension is 19" x 3.5" x 0.063" (the height is EIA standard 2U)
- The heat-sink is optional and P/N: 7G-0029B-F, 7G-0030B-F, 7G-0031B-F, 7G-0032B-F



MODEL NUMBER SETUP

| DCQA | 100 | - | 48 | S | 05 | R | H ⁽¹⁾ |
|-------------|-----------------------|---|---|-------------------------|---|---|---|
| Series Name | Output Power | | Input Voltage | Output Quantity | Output Voltage | Remote ON/OFF | Hole Thread & Heatsink Options |
| | 100: 100 Watts | | 12: 8.5~22 VDC 24: 16.5~36 VDC 48: 33~75 VDC | S: Single Output | 33: 3.3 VDC 05: 5 VDC 12: 12 VDC 15: 15 VDC 24: 24 VDC 30: 30 VDC 48: 48 VDC | None: Positive Logic R: Negative Logic | None: M3x0.5 Threaded-thru Inserts TH: Ø.126 Thru-hole Inserts ⁽¹⁾ H: 0.24" Horizontal Heatsink H1: 0.5" Horizontal Heatsink H2: 0.24" Vertical Heatsink H3: 0.5" Vertical Heatsink |

(1) Models with thru-hole inserts cannot be equipped with a heatsink.

COMPANY INFORMATION

Wall Industries, Inc. has created custom and modified units for over 50 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on-time and on budget. Our ISO9001-2008 certification is just one example of our commitment to producing a high quality, well-documented product for our customers.

Our past projects demonstrate our commitment to you, our customer. Wall Industries, Inc. has a reputation for working closely with its customers to ensure each solution meets or exceeds form, fit and function requirements. We will continue to provide ongoing support for your project above and beyond the design and production phases. Give us a call today to discuss your future projects.

Contact **Wall Industries** for further information:

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