# 1W-5W

## Modular DC-DC Converters with 500V I/O Isolation

- ✔ Single and Dual Output Models
- ✔ Pi Input Filters—Built-in EMI Suppression
- ✔ 500 VDC Input/Output Isolation
- ✔ Short-Circuit/Over-Voltage Protection
- ✔ Compact Packages
- ✔ 2-Year Warranty
- ✔ 325,000 to 1,140,000-Hour Minimum MTBF


## Characteristics

EMI Suppression.....Pi input filter, standard.
Reflected Ripple Current.....DC1-1, 30 $mA_{pp}$, max.
DC2-1, 35 $mA_{pp}$, max.
DC1-2 and DC2-2, 25 $mA_{pp}$, max.
DC1-5 and DC2-5, 40 $mA_{pp}$, max.
Output Voltage Tolerance.....DC1-1 and DC2-1, ±5%.
DC2-1, ±5%.
DC2-2, ±5%.
DC1-5 and DC2-5, ±5%.
Isolation Voltage.....500 VDC, input to output, for one minute.
Isolation Capacitance.....100 pF, typical.
Output Noise and Ripple.....DC1-1 and DC2-1, 35 $mV_{pp}$, max.
DC1-2 and DC2-2, 30 $mV_{pp}$, max.
DC1-5 and DC2-5, 30 $mV_{pp}$, max.
Efficiency.....DC1-1 and DC2-1, 50%, min.
DC1-2 and DC2-2, 57%,min.
DC1-5 and DC2-5, 63%, min.
Short-Circuit Protection.....DC1-1 and DC2-1, thermal limited.
DC1-2, pulsed overload type.
DC2-2, thermal limited.
DC1-5 and DC2-5, pulsed overload current limit.
Transient Response.....50 µs recovery to within 1% of the regulation band with no more than 5% deviation.
Frequency of Operation.....45-55 kHz.
Temperature Range.....-25°C to +70°C, no de-rating.
Temperature Coefficient.....±0.02%/°C over the entire operating temperature range.
Relative Humidity.....0 to 95%, non-condensing.
Altitude.....0 to 10,000 feet.
Cooling.....Convection cooling is adequate. Moving air is recommended for operation in a confined area.
Storage Temperature.....-40°C to +100°C.
Storage Humidity.....0 to 95%, non-condensing.
Mean Time Between Failures...DC1-1, >1,140,000 hours.
DC2-1, >737,000 hours.
DC1-2 and DC2-2, >800,000 hours.
DC1-5 and DC2-5, >330,000 hours.

| Model | Input Voltage Min. (V) | Nom. (V) | Max. (V) | Input Current No Load (mA) | Full Load (mA) | Output Voltage (V) | Max. Output Current (mA) | Line Reg. | Load Reg. | Cross-Reg. |
|---|---|---|---|---|---|---|---|---|---|---|
| **DC-DC 1W Singles** | | | | | | | | | | |
| DC1-1-5/5 | 4.5 | 5.0 | 5.5 | 50 | 200 | 5.0 | 100 | 0.2% | 0.1% | — |
| DC1-1-12/5 | 10.8 | 12 | 13.2 | 15 | 84 | 5.0 | 100 | 0.2% | 0.2% | — |
| **DC-DC 1W Duals** (Note 5) | | | | | | | | | | |
| DC2-1-5/12A | 4.5 | 5.0 | 5.5 | 35 | 370 | ±12 | 40 | 0.2% | 0.2% | 0.1% |
| DC2-1-5/15A | 4.5 | 5.0 | 5.5 | 55 | 370 | ±15 | 33 | 0.2% | 0.2% | 0.1% |
| **DC-DC 2W Singles** | | | | | | | | | | |
| DC1-2-5/5A | 4.5 | 5.0 | 5.5 | 125 | 700 | 5.0 | 400 | 0.1% | 0.1% | — |
| DC1-2-12/24A | 10.8 | 12 | 13.2 | 68 | 275 | 24 | 83 | 0.1% | 0.1% | — |
| **DC-DC 2W Duals** (Note 5) | | | | | | | | | | |
| DC2-2-5/15* | 4.5 | 5.0 | 5.5 | 115 | 700 | ±15 | 65 | 0.2% | 0.2% | 0.1% |
| DC2-2-24/12* | 21.6 | 24 | 26.4 | 20 | 138 | ±12 | 80 | 0.2% | 0.2% | 0.1% |
| DC2-2-48/15* | 43.2 | 48 | 52.8 | 14 | 70 | ±15 | 65 | 0.2% | 0.2% | 0.1% |

*Units supplied with L-case pin configuration; 2W units with model numbers ending with the suffix "A" are furnished with M-case pin configuration.

# 1W-5W

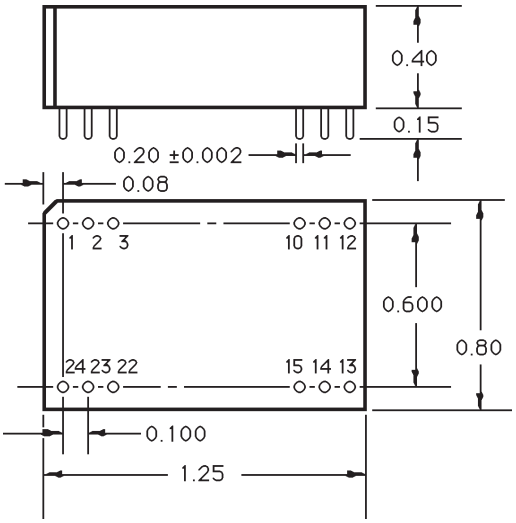
## Modular DC-DC Converters with 500V I/O Isolation

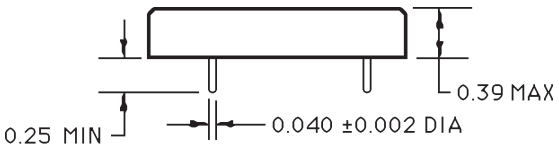
### DC1-1 and DC2-1 Series

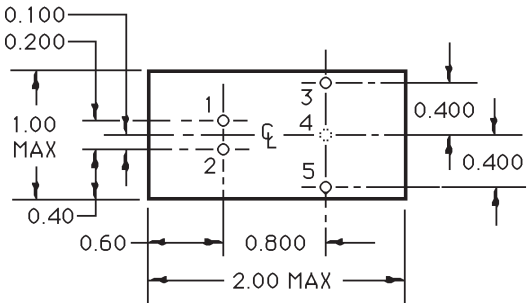
A. Dimensions shown are in inches.
B. Tolerances = 0.00 ±0.02 inch.
0.000 ±0.005 inch.
C. Module weight = 0.5 oz. (14.2g).
D. All DC1-1 and DC2-1 models have a phenolic, UL94V-rated case and are encapsulated with a flame-retardant potting material
E. Dual output ±12V or ±15V models can be used as single output 24V or 30V supplies.

### Pin-Out—1W Models

| Pin | DC1-1 | DC2-1 No Suffix | DC2-1 With Suffix 'A' |
|---|---|---|---|
| 1 | +VIN | +VIN | +VIN |
| 2 | N/C | - V2OUT | +VIN |
| 3 | N/C | +V2OUT | +VIN |
| 10 | - VOUT | - V1OUT | Common |
| 11 | +VOUT | +V1OUT | Common |
| 12 | - VIN | - VIN | N/C |
| 13 | - VIN | - VIN | - VOUT |
| 14 | +VOUT | +V1OUT | N/C |
| 15 | - VOUT | - V1OUT | +VOUT |
| 22 | N/C | +V2OUT | - VIN |
| 23 | N/C | - V2OUT | - VIN |
| 24 | +VIN | +VIN | - VIN |

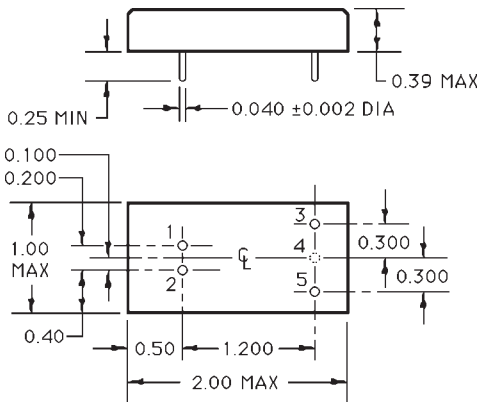



### DC1-2/DC2-2 Series—L Case

A. Dimensions shown are in inches.
B. Tolerances = 0.00 ±0.02 inch.
0.000 ±0.005 inch.
C. Module weight = 0.9 oz. (25.5g).
D. All DC1-2 and DC2-2 models have six-sided copper cases and are encapsulated with a flame retardant potting material.
E. Dual output ±12V or ±15V models can be used as single output 24V or 30V supplies.




### Pin-Out—2W Models

| Pin | DC1-2 No Suffix 'A' (L Case) | DC1-2 With Suffix 'A' (M Case) | DC2-2 (L Case) |
|---|---|---|---|
| 1 | +VIN | - VIN | +VIN |
| 2 | - VIN | +VIN | - VIN |
| 3 | +VOUT | - VOUT | +VOUT |
| 4 | N/A | N/A | Common |
| 5 | - VOUT | +VOUT | - VOUT |

### DC1-2 Series—M Case

A. Dimensions shown are in inches.
B. Tolerances = 0.00 ±0.02 inch.
0.000 ±0.005 inch.
C. Module weight = 0.9 oz. (25.5g).
D. All DC1-2 models have six-sided copper cases and are encapsulated with a flame retardant potting material.

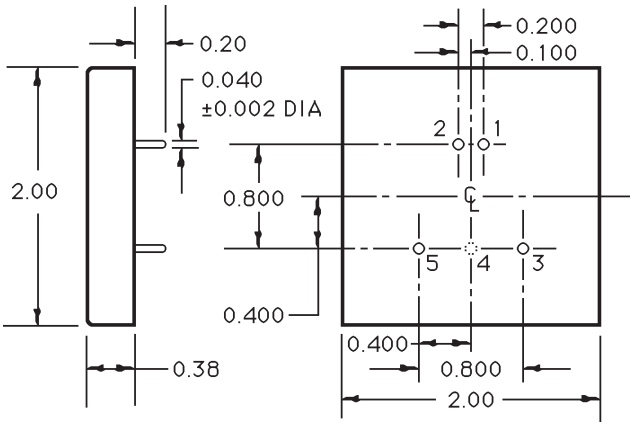
# 1W-5W

## Modular DC-DC Converters with 500V I/O Isolation

| Model | Input Voltage Min. (V) | Nom. (V) | Max. (V) | Input Current No Load (mA) | Full Load (mA) | Output Voltage (V) | Max. Output Current (mA) | Line Reg. | Load Reg. | Cross-Reg. |
|---|---|---|---|---|---|---|---|---|---|---|
| **DC-DC 5W Singles** | | | | | | | | | | |
| DC1-5-5/5 | 4.75 | 5.0 | 5.5 | 175 | 1500 | 5.0 | 1000 | 0.1% | 0.1% | — |
| DC1-5-5/12 | 4.75 | 5.0 | 5.5 | 175 | 1700 | 12 | 500 | 0.1% | 0.1% | — |
| DC1-5-24/5 | 21.6 | 24 | 26.4 | 25 | 315 | 5.0 | 1000 | 0.1% | 0.1% | — |

| Model | Input Voltage Min. (V) | Nom. (V) | Max. (V) | Input Current No Load (mA) | Full Load (mA) | Output Voltage (V) | Max. Output Current (mA) | Line Reg. | Load Reg. | Cross-Reg. |
|---|---|---|---|---|---|---|---|---|---|---|
| **DC-DC 5W Duals** (Note 5) | | | | | | | | | | |
| DC2-5-5/15 | 4.75 | 5.0 | 5.5 | 210 | 1850 | ±15 | 200 | 0.1% | 0.1% | 0.1% |
| DC2-5-12/15 | 10.8 | 12 | 13.2 | 65 | 730 | ±15 | 200 | 0.1% | 0.1% | 0.1% |
| DC2-5-24/12 | 21.6 | 24 | 26.4 | 35 | 355 | ±12 | 250 | 0.1% | 0.1% | 0.1% |
| DC2-5-48/15 | 43.2 | 48 | 52.8 | 18 | 175 | ±15 | 200 | 0.1% | 0.1% | 0.1% |

### 5W Models



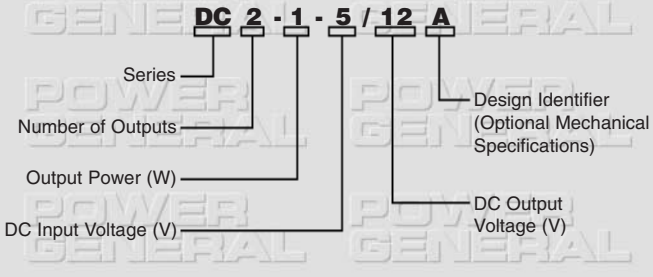

### DC1-5 and DC2-5 Series

A. Dimensions shown are in inches.
B. Tolerances = 0.00 ±0.02 inch.
0.000 ±0.005 inch.
C. DC1-5 and DC2-5 module weight = 1.6 oz. (45.4g).
D. All DC1-5 and DC2-5 models are supplied in a six-sided copper case.
E. Applications-ready G10 sockets are available for DC1-5 and DC2-5 dc-dc converters. For more information, call Power General Applications Engineering.
F. Dual output models with ±12V, ±15V or ±18V outputs can be used as single output 24V, 30V or 36V supplies.

### Pin-Out—5W Models

| Pin | DC1-5 | DC2-5 |
|---|---|---|
| 1 | +VIN | +VIN |
| 2 | - VIN | - VIN |
| 3 | +VOUT | +VOUT |
| 4 | N/A | Common |
| 5 | - VOUT | - VOUT |

### Model Selection Guide




### Notes

1. Use of an external input line fuse is recommended:
   1W series, 5V input models, use a 1.0A/125V fuse.
   2W series, 5V input models, use a 1.5A/125V fuse.
   1W and 2W series, all but 5V input models, use a 0.5A/125V fuse.
   5W series, 5V input models, use a 2.5A/125V fuse.
   5W series, 12V input models, use a 1.5A/125V fuse.
   5W series, 24V input models, use a 1.0A/125V fuse.
   5W series, 48V input models, use a 0.5A/125V fuse.
2. Peak-to-peak and RMS metering equipment must have a 20 MHz frequency response with probes and cables that maintain a frequency response of 20 Hz to 20 MHz. Output ripple and spikes are measured directly at the output terminals of the converter with a 0.1 µF ceramic capacitor
   The probe ground band must make direct contact with the output return or the common terminal of the converter to prevent erroneous noise measurements.
3. DC2-6 short-circuit protection: 30 seconds, max. For all other models, protection period is unlimited.
4. MTBF is calculated using the parts stress method in MIL-HDBK 217F (ground benign, $T_A$ = +25°C).
5. Dual output converters with ±12V or ±15V output can be used as single output 24V or 30V supplies.
6. All measurements are at nominal input, full load, and +25°C unless otherwise specified.