

# 15 Watt

# 2x2 Inch Package H 4:1 Input Range



- o Wide Input Range
- o Pi Input Filter
- o Efficiency up to 84%
- o Single, Dual & Triple Output
- o Remote On/Off Control



| MODEL NUMBER   | INPUT VOLTAGE | OUTPUT VOLTAGE | OUTPUT CURRENT |              | INPUT CURRENT |           | %EFF   |
|----------------|---------------|----------------|----------------|--------------|---------------|-----------|--------|
|                |               |                | MIN.           | MAX.         | NO LOAD       | FULL LOAD |        |
| 15HRS24X3.3LC  | 9-36 VDC      | 3.3 VDC        | 0 mA           | 3000 mA      | 15 mA         | 530 mA    | 78     |
| 15HRS24X5LC    |               | 5 VDC          |                | 3000 mA      |               | 770 mA    | 81     |
| 15HRS24X12LC   |               | 12 VDC         |                | 1250 mA      |               | 745 mA    | 84     |
| 15HRS24X15LC   |               | 15 VDC         |                | 1000 mA      |               | 760 mA    | 82     |
| 15HRD24X5LC    |               | ±5 VDC         | ±1500 mA       | 20 mA        | 770 mA        | 81        |        |
| 15HRD24X12LC   |               | ±12 VDC        | ±625 mA        |              | 760 mA        | 82        |        |
| 15HRD24X15LC   |               | ±15 VDC        | ±500 mA        |              | 750 mA        | 83        |        |
| 15HRT24X5/12LC |               | 5/±12 VDC      | 250/±100 mA    | 1500/±310 mA | 780 mA        | 80        |        |
| 15HRT24X5/15LC |               | 5/±15 VDC      | 250/±100 mA    | 1500/±250 mA |               |           |        |
| 15HRS48X3.3LC  |               | 18-72 VDC      | 3.3 VDC        |              | 3000 mA       | 10 mA     | 270 mA |
| 15HRS48X5LC    | 5 VDC         |                | 3000 mA        |              | 385 mA        |           | 81     |
| 15HRS48X12LC   | 12 VDC        |                | 1250 mA        |              | 375 mA        |           | 83     |
| 15HRS48X15LC   | 15 VDC        |                | 1000 mA        |              | 380 mA        |           | 82     |
| 15HRD48X5LC    | ±5 VDC        |                | ±1500 mA       | 15 mA        | 385 mA        | 81        |        |
| 15HRD48X12LC   | ±12 VDC       |                | ±625 mA        |              | 375 mA        | 83        |        |
| 15HRD48X15LC   | ±15 VDC       |                | ±500 mA        |              | 385 mA        | 81        |        |
| 15HRT48X5/12LC | 5/±12 VDC     |                | 250/±100 mA    | 1500/±310 mA | 390 mA        | 80        |        |
| 15HRT48X5/15LC | 5/±15 VDC     |                | 250/±100 mA    | 1500/±250 mA |               |           |        |

**SPECIFICATIONS**

All Specifications Typical At Nominal Line, Full Load, and 25°C Unless Otherwise Noted

**INPUT SPECIFICATIONS**

|                                   |                  |                             |
|-----------------------------------|------------------|-----------------------------|
| Input Voltage Range               |                  | 4:1                         |
| Input Surge Voltage (100 ms max.) | 24 VDC<br>48 VDC | 50 VDC max.<br>100 VDC max. |
| Input Filter                      |                  | Pi Type                     |

**OUTPUT SPECIFICATIONS**

|   |                       |                                  |
|---|-----------------------|----------------------------------|
| Voltage Accuracy                            | Single & Dual +Output | ±1% max.                         |
|   | Dual -Output          | ±3% max.                         |
|   | Triple 5V Output      | ±2% max.                         |
|   | Triple 12V/15V Output | ±3% max.                         |
| Voltage Balance, Dual Output at Full Load   |                       | ±1% max.                         |
| Transient Response                          |                       |                                  |
| Single, 25% Step Load Change                |                       | <500 µsec.                       |
| Dual, Full Load to Half Load ±1% Error Band |                       |                                  |
| External Trim Adj. Range                    |                       | ±10%                             |
| Ripple and Noise, 20MHz BW                  |                       | 10 mV RMS max.<br>75 mV p-p max. |
| Temperature Coefficient                     |                       | ±0.02%/°C                        |
| Short Circuit Protection                    |                       | Continuous                       |
| Line Regulation <sup>1)</sup>               | Single & Dual Output  | ±0.2% max.                       |
|   | Triple Output         | ±1.0% max.                       |
| Load Regulation <sup>2)</sup>               | Single & Dual Output  | ±1.0% max.                       |
|   | Triple Output         | ±5.0% max.                       |
| Start Up Time                               |                       | 300 ms                           |

1. Line Regulation measured from High Line to Low Line.

2. Load Regulation measured from Full Load to 1/4 Load.

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| <b>GENERAL SPECIFICATION</b>                       |  |
|--|--|
| Efficiency   | see table                                      |
| Case Grounding                                     | Connected to Output Common                     |
| Isolation Voltage                                  | 500 VDC min.                                   |
| Isolation Resistance                               | 1000 Mohms min.                                |
| Isolation Capacitance                              | 1000 pF  |
| Switching Frequency                                | 300 kHz  |
| Operating Temperature Range                        | -25°C to +71°C                                 |
| Case Temperature <sup>1)</sup>                     | +100°C max.                                    |
| Storage Temperature Range                          | -55°C to +105°C                                |
| Cooling  | Natural Convection                             |
| Humidity   | 95% RH max. Non Condensing                     |
| Derating >+71°C                                    | Linearly to Zero power at +100°C               |
| Recommended Reflow Soldering Pb-free <sup>2)</sup> | see diagram                                    |
| EMI/RFI  | Six-Sided Continuous Shield                    |
| Case Material                                      | Black Coated Copper with Non-Conductive Base   |
| MTBF (MIL-STD-217F, GB, 25°C, Full Load)           | 1300 khrs                                      |
| Dimensions   | 2.0 x 2.0 x 0.4 Inches (50.8 x 50.8 x 10.2 mm) |
| Weight   | 59 g   |

## NOTE

1. Maximum case temperature under any operating condition should not be exceeded +100°C.
2. We do not recommend vapor phase soldering!

| <b>TRIPLE OUTPUT LOADING <sup>1)</sup></b> |                |                          |             |
|--|----------------|--------------------------|-------------|
| <b>OUTPUT<br/>(PIN NO.)</b>                | <b>VOLTAGE</b> | <b>AMPERES</b>           |             |
|  |                | <b>MIN.<sup>2)</sup></b> | <b>NOM.</b> |
| 7  | +5 VDC         | 0.25 A                   | 1.5 A       |
| 8 & 5                                      | ±12 VDC        | 0.10 A                   | 0.31 A      |
| 8 & 5                                      | ±15 VDC        | 0.10 A                   | 0.25 A      |

## NOTE:

- 1) Maximum total power from all outputs is limited to 15 watts but no output should be allowed to exceed its maximum current.
- 2) Minimum current on each output is required to maintain specified regulation.

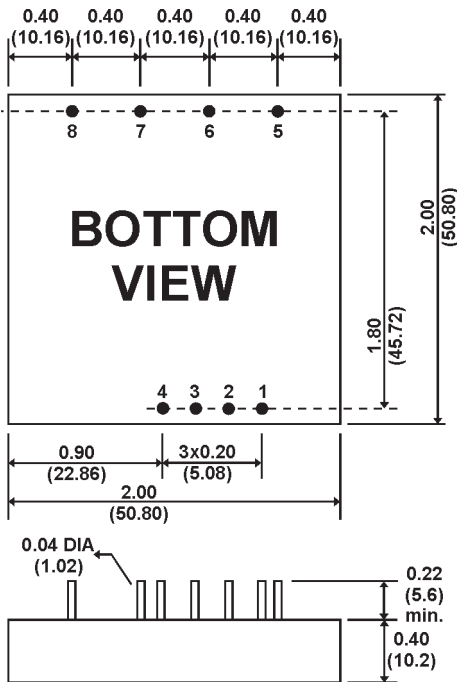
| <b>REMOTE ON/OFF CONTROL</b> |                                    |
|------------------------------|------------------------------------|
| Logic Compatibility          | CMOS or Open Collector TTL         |
| Ec-ON                        | >+5.5VDC to 75 VDC or Open Circuit |
| Ec-OFF                       | <1.8VDC                            |
| Shutdown Idle Current        | 10mA                               |
| Control Common               | Referenced to Input Minus          |

## SPECIFICATIONS

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### MECHANICAL SPECIFICATIONS

CASE "H"



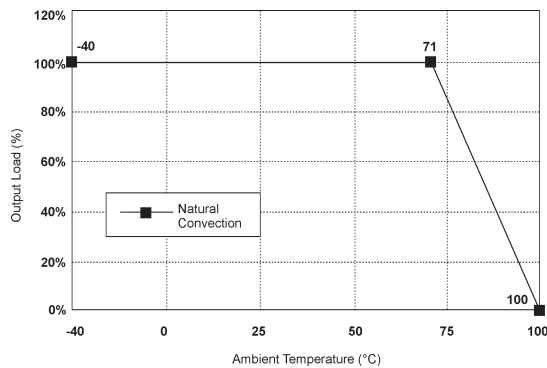
All Dimensions in Inches (mm)  
Tolerances: x.xx = 0.04 Inches (x.xxx = 0.010 mm)

#### PIN CONNECTIONS

| PIN | SINGLE                | DUAL    | TRIPLE    |
|-----|-----------------------|---------|-----------|
| 1   | REMOTE ON/OFF CONTROL |         |           |
| 2   | NO PIN                | NO PIN  | NO PIN    |
| 3   | -INPUT                | -INPUT  | -INPUT    |
| 4   | +INPUT                | +INPUT  | +INPUT    |
| 5   | TRIM                  | TRIM    | -AUX. OUT |
| 6   | -OUTPUT               | -OUTPUT | COMMON    |
| 7   | +OUTPUT               | COMMON  | +5V OUT   |
| 8   | NO PIN                | +OUTPUT | +AUX. OUT |

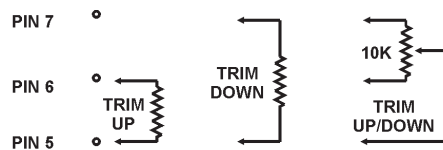
### APPLICATION NOTES & DIAGRAMS

#### Derating Diagram



#### External Output Trimming

Output may optionally be externally trimmed ( $\pm 10\%$ ) with a fixed resistor or an external trimpot as shown.



**NOTICE:**

The information in this document has been carefully checked. However, no responsibility is assumed for inaccuracies! Specifications can be changed without notice. The latest and most complete information can be found on our website.