

**SERIES: VYC30W | DESCRIPTION: DC-DC CONVERTER**
**FEATURES**

- up to 30 W output
- industry standard pinout
- 4:1 input range (9~36 V, 18~75 V)
- single, dual, and triple outputs
- 1,500 V isolation
- short circuit, over current, and over voltage protection
- wide temperature operation (-40~85°C)
- efficiency up to 88%



| MODEL           | input voltage range (Vdc) | output voltage (Vdc) | output current max (A) | output power max (W) | ripple and noise <sup>1</sup> max (mVp-p) | efficiency |
|-----------------|---------------------------|----------------------|------------------------|----------------------|---|------------|
|                 |                           |                      |                        |                      |   | typ (%)    |
| VYC30W-Q24-S5   | 9 ~ 36                    | 5                    | 6                      | 30                   | 120                                       | 87         |
| VYC30W-Q24-S12  | 9 ~ 36                    | 12                   | 2.5                    | 30                   | 120                                       | 88         |
| VYC30W-Q24-S15  | 9 ~ 36                    | 15                   | 2                      | 30                   | 120                                       | 87         |
| VYC30W-Q24-D5   | 9 ~ 36                    | ±5                   | 3                      | 30                   | 120                                       | 86         |
| VYC30W-Q24-D12  | 9 ~ 36                    | ±12                  | 1.25                   | 30                   | 120                                       | 88         |
| VYC30W-Q24-D15  | 9 ~ 36                    | ±15                  | 1                      | 30                   | 120                                       | 87         |
| VYC30W-Q24-T312 | 9 ~ 36                    | 3.3<br>±12           | 4<br>±0.625            | 28.2                 | 120                                       | 85         |
| VYC30W-Q24-T315 | 9 ~ 36                    | 3.3<br>±15           | 4<br>±0.5              | 28.2                 | 120                                       | 85         |
| VYC30W-Q24-T512 | 9 ~ 36                    | 5<br>±12             | 3<br>±0.625            | 30                   | 120                                       | 86         |
| VYC30W-Q24-T515 | 9 ~ 36                    | 5<br>±15             | 3<br>±0.5              | 30                   | 120                                       | 86         |
| VYC30W-Q48-S5   | 18 ~ 75                   | 5                    | 6                      | 30                   | 120                                       | 87         |
| VYC30W-Q48-S12  | 18 ~ 75                   | 12                   | 2.5                    | 30                   | 120                                       | 88         |
| VYC30W-Q48-S15  | 18 ~ 75                   | 15                   | 2                      | 30                   | 120                                       | 87         |
| VYC30W-Q48-D5   | 18 ~ 75                   | ±5                   | 3                      | 30                   | 120                                       | 86         |
| VYC30W-Q48-D12  | 18 ~ 75                   | ±12                  | 1.25                   | 30                   | 120                                       | 88         |
| VYC30W-Q48-D15  | 18 ~ 75                   | ±15                  | 1                      | 30                   | 120                                       | 87         |
| VYC30W-Q48-T312 | 18 ~ 75                   | 3.3<br>±12           | 4<br>±0.625            | 28.2                 | 120                                       | 85         |
| VYC30W-Q48-T315 | 18 ~ 75                   | 3.3<br>±15           | 4<br>±0.5              | 28.2                 | 120                                       | 85         |
| VYC30W-Q48-T512 | 18 ~ 75                   | 5<br>±12             | 3<br>±0.625            | 30                   | 120                                       | 86         |
| VYC30W-Q48-T515 | 18 ~ 75                   | 5<br>±15             | 3<br>±0.5              | 30                   | 120                                       | 86         |

Notes: 1. Ripple and noise are measured at 20 MHz BW

## PART NUMBER KEY



## INPUT

| parameter                  | conditions/description      | min  | typ | max  | units |
|----------------------------|-----------------------------|------|-----|------|-------|
| operating input voltage    |                             | 9    | 24  | 36   | Vdc   |
|                            |                             | 18   | 48  | 75   | Vdc   |
| start-up time              |                             |      | 10  |      | ms    |
| under voltage lockout      | power up 24 V input         |      |     | 9.0  | Vdc   |
|                            | power up 48 V input         |      |     | 17.8 | Vdc   |
|                            | power down 24 V input       | 8.0  |     |      | Vdc   |
|                            | power down 48 V input       | 16.0 |     |      | Vdc   |
| Remote on/off <sup>1</sup> | module off                  | 0    |     | 1.2  | Vdc   |
|                            | module on (or open circuit) | 3.5  |     | 12   | Vdc   |
| filter                     | PI type                     |      |     |      |       |

Notes: 1. The on/off pin voltage is referenced to GND

## OUTPUT

| parameter                | conditions/description   | min | typ   | max  | units |
|--------------------------|--|-----|-------|------|-------|
| line regulation          | single and dual output models, measured from low line to high line at full load  |     | ±0.2  | ±0.5 | %     |
|                          | triple output models (main output), measured from low line to high line at full load   |     |       | ±1   | %     |
|                          | triple output models (auxiliary outputs), measured from low line to high line at full load   |     |       | ±5   | %     |
| load regulation          | single and dual output models, measured from 10% to full load at nominal input   |     | ±0.5  | ±1   | %     |
|                          | triple output models (main output), measured 10% to full load at nominal input   |     |       | ±2   | %     |
|                          | triple output models (auxiliary outputs), measured 10% to full load at nominal input   |     |       | ±5   | %     |
| voltage accuracy         | single and dual output models, refer to recommended circuit  |     | ±1    | ±3   | %     |
|                          | triple output models (main output), refer to recommended circuit   |     | ±2    |      | %     |
|                          | triple output models (auxiliary outputs), refer to recommended circuit   |     | ±5    |      | %     |
| transient recovery time  | 25% ~ 50% ~ 25% step load charge   |     | 300   | 500  | µs    |
| transient peak deviation | 25% rated load change  |     | 300   |      | µs    |
| cross regulation         | dual output models, main output 50% load, supplemental output from 10~100% load<br>triple output models, main output and one auxiliary output 50% load, another auxiliary output from 10~100% load |     |       | ±5   | %     |
| adjustability            |  |     | ±10%  |      | Vdc   |
| switching frequency      | 100% load, input voltage range   |     | 400   |      | kHz   |
| temperature coefficient  |  |     | ±0.02 |      | %/°C  |

## PROTECTIONS

| parameter                | conditions/description               | min   | typ | max | units |
|--------------------------|--------------------------------------|-------|-----|-----|-------|
| short circuit protection | hiccup, automatic recovery           |       |     |     |       |
| over current protection  | input voltage range                  |       | 130 |     | %     |
| over voltage protection  | single and dual output models (main) | 5 V   | 6.1 |     | Vdc   |
|                          |                                      | 12 V  | 15  |     | Vdc   |
|                          |                                      | 15 V  | 18  |     | Vdc   |
|                          | triple output models (main)          | 3.3 V | 3.9 |     | Vdc   |
|                          |                                      | 5 V   | 6.2 |     | Vdc   |

## SAFETY AND COMPLIANCE

| parameter             | conditions/description           | min       | typ   | max | units |
|-----------------------|----------------------------------|-----------|-------|-----|-------|
| isolation voltage     | tested for 1 minute at 1 mA max. | 1,500     |       |     | Vdc   |
| isolation resistance  | at 500 Vdc                       | 1,000     |       |     | MΩ    |
| isolation capacitance | 100 kHz / 0.1 V                  |           | 2,000 |     | pF    |
| RoHS compliant        | yes                              |           |       |     |       |
| MTBF                  | M1L-HDBK-217F                    | 1,000,000 |       |     | hours |

## ENVIRONMENTAL

| parameter                  | conditions/description | min | typ | max | units |
|----------------------------|------------------------|-----|-----|-----|-------|
| case operating temperature |                        | -40 |     | 85  | °C    |
| maximum case temperature   | during operation       |     |     | 105 | °C    |
| storage temperature        |                        | -40 |     | 125 | °C    |
| storage humidity           | non-condensing         | 5   |     | 95  | %     |

## DERATING CURVES

### output power vs. ambient temperature



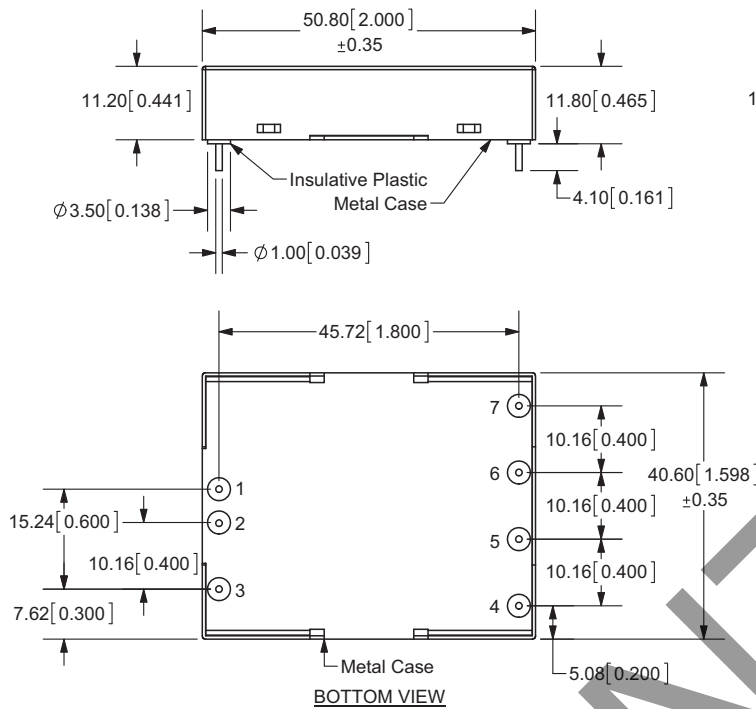
- ① without heat sink  
 ② with heatsink  
 (Natural Convection)

## MECHANICAL

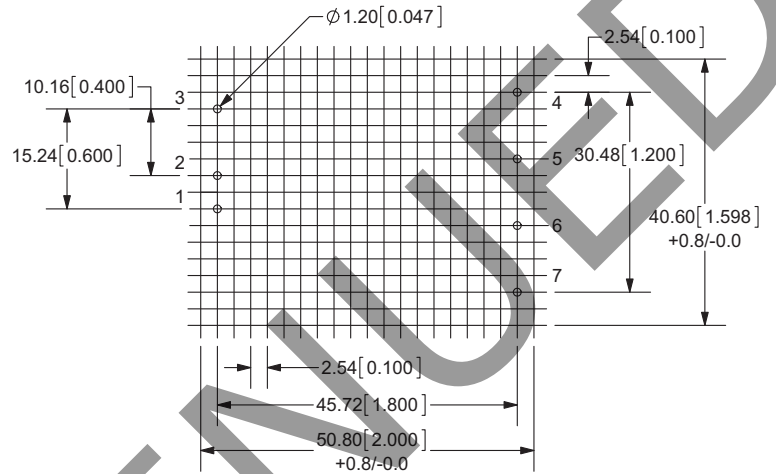
| parameter     | conditions/description                       | min | typ | max | units |
|---------------|--|-----|-----|-----|-------|
| dimensions    | 2.0 x 1.6 x 0.44 inch (50.8 x 40.6 x 11.2mm) |     |     |     |       |
| case material | nickel-coated copper (six-sided)             |     |     |     |       |
| weight        | with heat sink                               |     | 50  |     | g     |
|               |  |     | 70  |     | g     |

## MECHANICAL DRAWING

unit: mm [inch]  
 General tolerances:  $\pm 0.25\text{mm}$  [ $\pm 0.010$  inch]  
 Pin section tolerances:  $\pm 0.10\text{mm}$  [ $\pm 0.004$  inch]

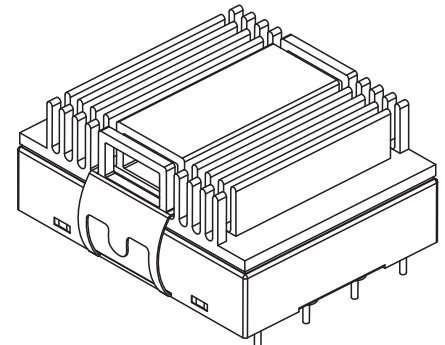
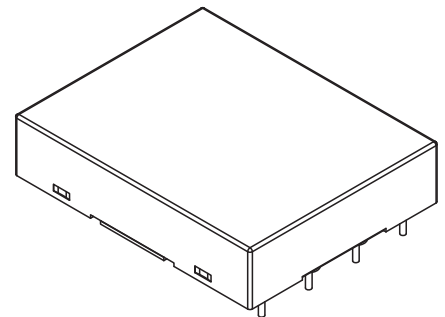
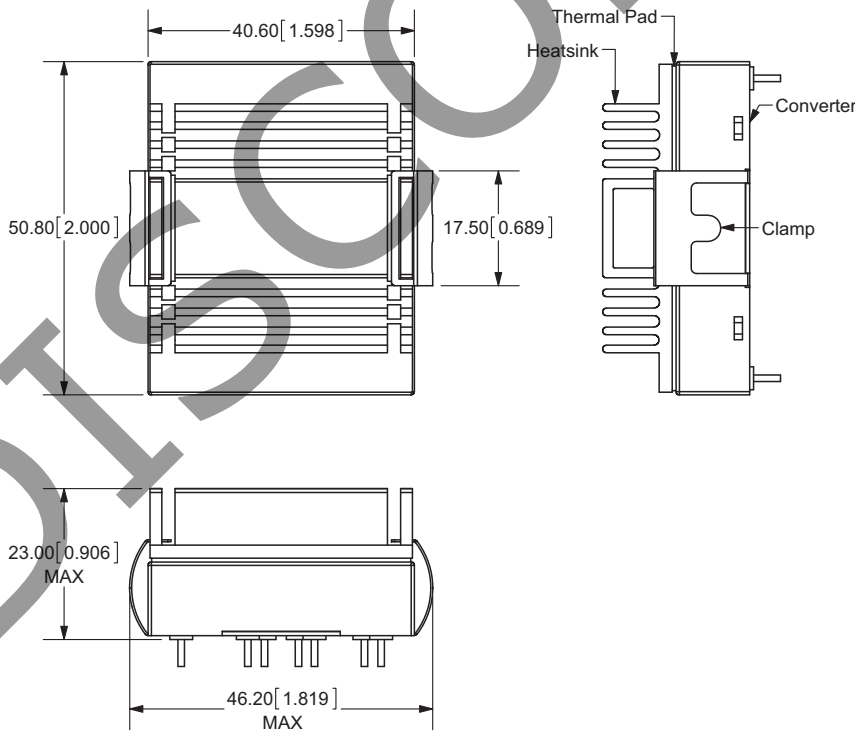


## RECOMMENDED FOOTPRINT (TOP VIEW)



| PIN CONNECTIONS |        |        |        |
|-----------------|--------|--------|--------|
| Pin             | Single | Dual   | Triple |
| 1               | Vin    | Vin    | Vin    |
| 2               | GND    | GND    | GND    |
| 3               | On/Off | On/Off | On/Off |
| 4               | Trim   | Trim   | -Vo2   |
| 5               | 0V     | -Vo    | 0V     |
| 6               | +Vo    | 0V     | +Vo1   |
| 7               | No Pin | +Vo    | +Vo2   |

unit: mm [inch]  
 tolerance:  $\pm 0.5\text{mm}$  [ $\pm 0.020$  inch]



## APPLICATION NOTES

### 1. EMI & EMS recommended external circuit

|     | Single output, 18 ~ 75 Vin                     | Single output, 9 ~ 36 Vin                      | Dual output, 18 ~ 75 Vin                       | Dual output, 9 ~ 36 Vin                        | Triple output, 18 ~ 75 Vin                     | Triple output, 9 ~ 36 Vin                      |
|-----|--|--|--|--|--|--|
| TVS | SMCJ90A,1500W(Bringtking)                      | SMCJ48A,1500W(Bringtking)                      | SMCJ90A,1500W(Bringtking)                      | SMCJ48A,1500W(Bringtking)                      | SMCJ48A,1500W(Bringtking)                      | SMCJ48A,1500W(Bringtking)                      |
| LCM | 232uH(0.1V 100KHz) 15T core: N5 T12*6*4 (Acme) | 232uH(0.1V 100KHz) 15T core: N5 T12*6*4 (Acme) | 232uH(0.1V 100KHz) 15T core: N5 T12*6*4 (Acme) | 232uH(0.1V 100KHz) 15T core: N5 T12*6*4 (Acme) | 232uH(0.1V 100KHz) 15T core: N5 T12*6*4 (Acme) | 232uH(0.1V 100KHz) 15T core: N5 T12*6*4 (Acme) |
| C0  | 680µF/1,000V (CapXon)                          | 1,000µF/50V(CapXon)                            | 680µF/100V (CapXon)                            | 1000µF/50V(CapXon)                             | 680µF/50V(CapXon)                              | 1,000µF/100V (CapXon)                          |
| C1  | 105K/100V 1210(TDK)                            | 105K/100V 1210(TDK)                            | 105K/100V 1210(TDK)                            | 105K/100V 1210(TDK)                            | 105K/100V 1210(TDK)                            | 105K/100V 1210(TDK)                            |
| C2  | 225K/100V 1210(TDK)                            | 225K/100V 1210(TDK)                            | 225K/100V 1210(TDK)                            | 225K/100V 1210(TDK)                            | 225K/100V 1210(TDK)                            | 225K/100V 1210(TDK)                            |
| C3  | No component                                   | No component                                   | 102K/2,000V 1206 (TDK)                         | 102K/2,000V 1200 (TDK)                         | No component                                   | No component                                   |
| C4  | No component                                   | No component                                   | 102K/2,000V 1206 (TDK)                         | 102K/2,000V 1206 (TDK)                         | 102K/2,000V 1206 (TDK)                         | 102K/2,000V 1206 (TDK)                         |

Figure 1 (Single output)

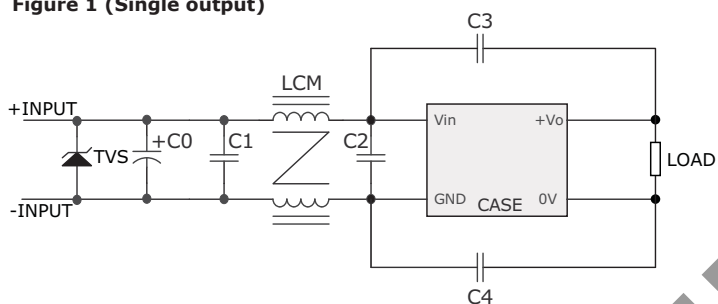


Figure 2 (Dual output)

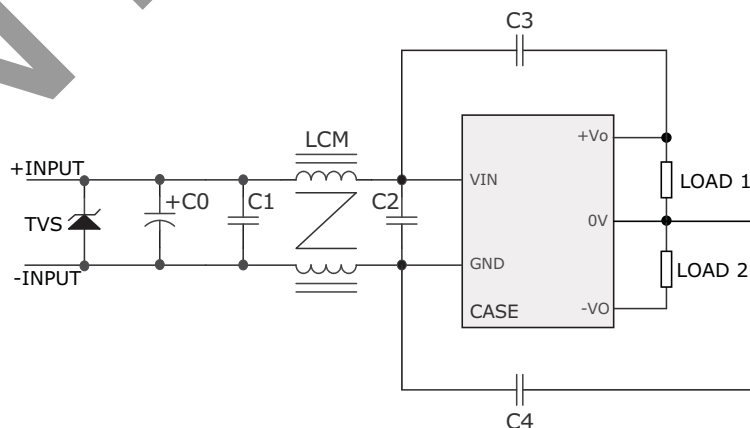
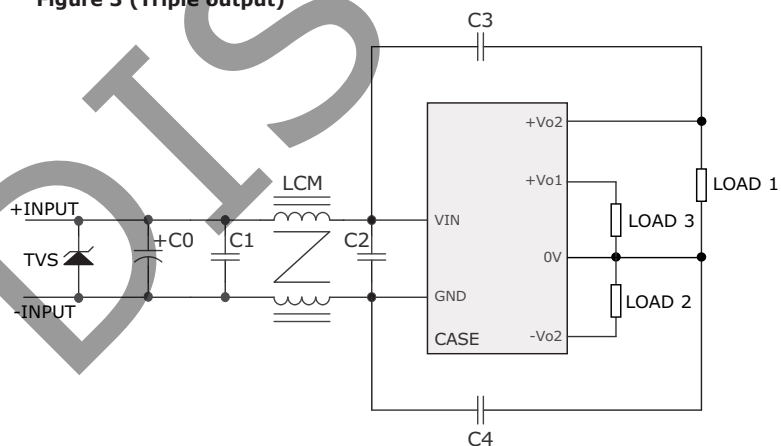


Figure 3 (Triple output)



## REVISION HISTORY

| rev. | description                 | date       |
|------|-----------------------------|------------|
| 1.0  | initial release             | 08/23/2011 |
| 1.01 | updated spec                | 10/07/2011 |
| 1.02 | added two dual 5 V models   | 11/15/2011 |
| 1.03 | V-Infinity branding removed | 09/06/2012 |

The revision history provided is for informational purposes only and is believed to be accurate.



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