



# EC3A-E SERIES

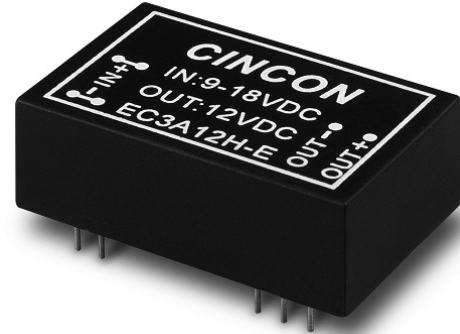
## 3 WATT 2:1 INPUT RANGE

## DC-DC CONVERTERS



### FEATURES

- \* 3W Isolated Output
- \* 24-Pin DIP Package
- \* Efficiency to 87%
- \* 2:1 Input Range
- \* Regulated Outputs
- \* Pi Input Filter
- \* Continuous Short Circuit Protection
- \* Meet EMI EN55022 class A
- \* No Tantalum Capacitor inside
- \* Wide Operating Temperature Range
- \* UL60950-1 Approval



| MODEL NUMBER <sup>(1)</sup> | INPUT VOLTAGE <sup>(2)</sup> | OUTPUT VOLTAGE | OUTPUT CURRENT | INPUT CURRENT |           | % EFF. <sup>(3)</sup> | CAPACITOR LOAD MAX. |
|-----------------------------|------------------------------|----------------|----------------|---------------|-----------|-----------------------|---------------------|
|                             |                              |                |                | NO LOAD       | FULL LOAD |                       |                     |
| EC3A01□-E                   | 4.5-9 VDC                    | 5 VDC          | 600 mA         | 15 mA         | 779 mA    | 77                    | 2200uF              |
| EC3A02□-E                   | 4.5-9 VDC                    | 12 VDC         | 250 mA         | 15 mA         | 750 mA    | 80                    | 2200uF              |
| EC3A03□-E                   | 4.5-9 VDC                    | 15 VDC         | 200 mA         | 15 mA         | 750 mA    | 80                    | 2200uF              |
| EC3A04□-E                   | 4.5-9 VDC                    | ±5 VDC         | ±300 mA        | 25 mA         | 779 mA    | 77                    | 1000uF              |
| EC3A05□-E                   | 4.5-9 VDC                    | ±12 VDC        | ±125 mA        | 25 mA         | 750 mA    | 80                    | 1000uF              |
| EC3A06□-E                   | 4.5-9 VDC                    | ±15 VDC        | ±100 mA        | 25 mA         | 750 mA    | 80                    | 1000uF              |
| EC3A07□-E                   | 4.5-9 VDC                    | 3.3 VDC        | 600 mA         | 15 mA         | 550 mA    | 72                    | 2200uF              |
| EC3A11□-E                   | 9-18 VDC                     | 5 VDC          | 600 mA         | 7.5 mA        | 309 mA    | 81                    | 2200uF              |
| EC3A12□-E                   | 9-18 VDC                     | 12 VDC         | 250 mA         | 10 mA         | 298 mA    | 84                    | 2200uF              |
| EC3A13□-E                   | 9-18 VDC                     | 15 VDC         | 200 mA         | 10 mA         | 294 mA    | 85                    | 2200uF              |
| EC3A14□-E                   | 9-18 VDC                     | ±5 VDC         | ±300 mA        | 15 mA         | 305 mA    | 82                    | 1000uF              |
| EC3A15□-E                   | 9-18 VDC                     | ±12 VDC        | ±125 mA        | 12 mA         | 298 mA    | 84                    | 1000uF              |
| EC3A16□-E                   | 9-18 VDC                     | ±15 VDC        | ±100 mA        | 15 mA         | 294 mA    | 85                    | 1000uF              |
| EC3A17□-E                   | 9-18 VDC                     | 3.3 VDC        | 600 mA         | 7.5 mA        | 212 mA    | 78                    | 2200uF              |
| EC3A21□-E                   | 18-36 VDC                    | 5 VDC          | 600 mA         | 7.5 mA        | 152 mA    | 82                    | 2200uF              |
| EC3A22□-E                   | 18-36 VDC                    | 12 VDC         | 250 mA         | 7.5 mA        | 145 mA    | 86                    | 2200uF              |
| EC3A23□-E                   | 18-36 VDC                    | 15 VDC         | 200 mA         | 7.5 mA        | 145 mA    | 86                    | 2200uF              |
| EC3A24□-E                   | 18-36 VDC                    | ±5 VDC         | ±300 mA        | 7.5 mA        | 152 mA    | 82                    | 1000uF              |
| EC3A25□-E                   | 18-36 VDC                    | ±12 VDC        | ±125 mA        | 10 mA         | 147 mA    | 85                    | 1000uF              |
| EC3A26□-E                   | 18-36 VDC                    | ±15 VDC        | ±100 mA        | 10 mA         | 145 mA    | 86                    | 1000uF              |
| EC3A27□-E                   | 18-36 VDC                    | 3.3 VDC        | 600 mA         | 5 mA          | 106 mA    | 78                    | 2200uF              |
| EC3A31□-E                   | 36-72 VDC                    | 5 VDC          | 600 mA         | 3 mA          | 74 mA     | 84                    | 2200uF              |
| EC3A32□-E                   | 36-72 VDC                    | 12 VDC         | 250 mA         | 3 mA          | 73 mA     | 86                    | 2200uF              |
| EC3A33□-E                   | 36-72 VDC                    | 15 VDC         | 200 mA         | 5 mA          | 73 mA     | 86                    | 2200uF              |
| EC3A34□-E                   | 36-72 VDC                    | ±5 VDC         | ±300 mA        | 5 mA          | 74 mA     | 85                    | 1000uF              |
| EC3A35□-E                   | 36-72 VDC                    | ±12 VDC        | ±125 mA        | 5 mA          | 72 mA     | 87                    | 1000uF              |
| EC3A36□-E                   | 36-72 VDC                    | ±15 VDC        | ±100 mA        | 5 mA          | 72 mA     | 87                    | 1000uF              |
| EC3A37□-E                   | 36-72 VDC                    | 3.3 VDC        | 600 mA         | 3 mA          | 52 mA     | 79                    | 2200uF              |

#### NOTE:

1. □ can be none, M, H, HM, S, MS, HS or HMS.
2. Nominal input voltage is 5, 12, 24 or 48VDC.
3. Typical value at nominal input voltage and full load.

# SPECIFICATIONS

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

## INPUT SPECIFICATIONS:

|                                  |                |             |
|----------------------------------|----------------|-------------|
| Input Voltage Range              | 5V             | 4.5-9V      |
|                                  | 12V            | 9-18V       |
|                                  | 24V            | 18-36V      |
|                                  | 48V            | 36-72V      |
| Input Surge Voltage (100ms max.) | 5V             | 10Vdc max.  |
|                                  | 12V            | 25Vdc max.  |
|                                  | 24V            | 50Vdc max.  |
|                                  | 48V            | 100Vdc max. |
| Under Voltage Lockout            | 5V Power Up    | 4.4Vdc      |
|                                  | 5V Power Down  | 4.2Vdc      |
|                                  | 12V Power Up   | 8.8Vdc      |
|                                  | 12V Power Down | 8Vdc        |
|                                  | 24V Power Up   | 17Vdc       |
|                                  | 24V Power Down | 16Vdc       |
|                                  | 48V Power Up   | 34Vdc       |
|                                  | 48V Power Down | 31Vdc       |
| Input Filter                     | Pi Type        |             |

## OUTPUT SPECIFICATIONS:

|                                   |                     |                   |
|-----------------------------------|---------------------|-------------------|
| Voltage Accuracy                  | ±1.5% max.          |                   |
| Voltage Balance (Dual)            | ±1.0% max.          |                   |
| Temperature Coefficient           | ±0.05%/°C           |                   |
| Ripple & Noise, 20MHz BW (note 5) | 3.3V/5V             | 100mV pk-pk, max. |
|                                   | 12V/15V             | 1% pk-pk max.     |
| Short Circuit Protection          | Continuous          |                   |
| Line Regulation                   | Single/Dual (note1) | ±0.5% max.        |
| Load Regulation                   | Single (note2)      | ±0.5% max.        |
|                                   | Dual (note3)        | ±1.0% max.        |
| Start up time                     | 10 ms max.          |                   |

## GENERAL SPECIFICATIONS:

|                                     |                                     |                                                       |
|-------------------------------------|-------------------------------------|-------------------------------------------------------|
| Efficiency                          | See Table                           |                                                       |
| Isolation Voltage:                  | 500 VDC min.                        | Standard Models                                       |
|                                     | 3K VDC min.                         | (Non-Conductive Black Plastic Only) Suffix "H" Models |
|                                     | 1.5K VDC min.                       | Suffix "HM" Models                                    |
| Isolation Resistance                | 10 <sup>9</sup> ohm min.            |                                                       |
| Isolation Capacitance               | 250pF Typ.                          |                                                       |
| Switching Frequency                 | 100KHz min.                         |                                                       |
| Operating Ambient Temperature Range | -40°C to +85°C                      |                                                       |
| De-rating, Above 85°C               | Linearly to Zero Power at 100°C     |                                                       |
| Case Temperature (note4)            | 100°C max.                          |                                                       |
| Cooling                             | Natural Convection                  |                                                       |
| Storage Temperature Range           | -40°C to +100°C                     |                                                       |
| EMI                                 | Conductive EMI Meet EN55022 Class A |                                                       |
| Humidity                            | 95% RH max. Non condensing          |                                                       |
| MTBF                                | MIL-STD-217F                        | 2500Khrs typ.                                         |
| Dimensions                          | DIP                                 | 1.25×0.80×0.40 inches(31.8×20.3×10.2 mm)              |
|                                     | MS/HMS Models                       | 1.25×0.80×0.45 inches(31.8×20.3×11.4 mm)              |
|                                     | S/HS Models                         | 1.25×0.80×0.41 inches(31.8×20.3×10.4 mm)              |

### Case Material:

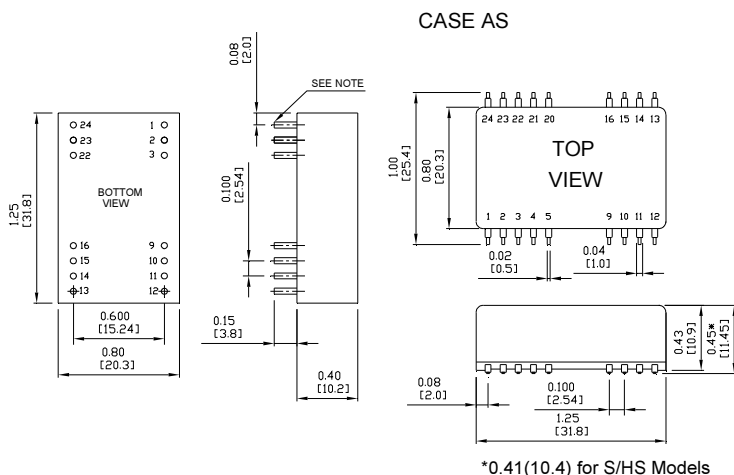
|                   |                                              |
|-------------------|----------------------------------------------|
| Standard Models   | Non-Conductive Black Plastic                 |
| Suffix "M" Models | Black Coated Copper with Non-conductive Base |
| Suffix "S" Models | SMD package                                  |
| Weight            | 12.5g                                        |

## NOTE:

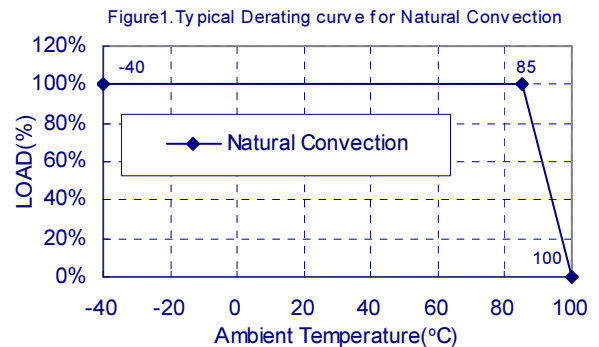
1. Measured from high line to low line.
2. Measured from full load to 10% load.
3. Measured from full load to 1/4 load.
4. Maximum case temperature under any operating condition should not exceed 100°C.
5. The output noise is measured with 0.1uF MLCC across for SMD package.

## Case A Dimensions:

NOTE: Pin Size is 0.02 ±0.002 Inch (0.5±0.05 mm) DIA  
All Dimensions In Inches (mm)  
Tolerances Inches: X.XX= ±0.02, X.XXX= ±0.010  
Millimeters: X.X= ±0.5, X.XX= ±0.25



\*0.41(10.4) for S/HS Models



| PIN CONNECTION |               |     |  |             |               |       |               |     |             |     |
|----------------|---------------|-----|--|-------------|---------------|-------|---------------|-----|-------------|-----|
| 500 VDC        |               |     |  |             | 1.5K & 3K VDC |       |               |     |             |     |
| Pin            | Single Output |     |  | Dual Output |               | Pin   | Single Output |     | Dual Output |     |
|                | DIP           | SMD |  | DIP         | SMD           |       | DIP           | SMD | DIP         | SMD |
| 1,24           | +V Input      |     |  | +V Input    |               | 1,24  | NP            | NC  | NP          | NC  |
| 2,23           | NC            |     |  | -V Output   |               | 2,3   | -V Input      |     | -V Input    |     |
| 3,22           | NC            |     |  | Common      |               | 4,5   | NP            | NC  | NP          | NC  |
| 4              | NP            | NC  |  | NP          | NC            | 9     | NC            |     | Common      |     |
| 5              | NP            | NC  |  | NP          | NC            | 10,15 | NC            |     | NC          |     |
| 9              | NP            | NC  |  | NP          | NC            | 11    | NC            |     | -V Output   |     |
| 10,15          | -V Output     |     |  | Common      |               | 12,13 | NP            | NC  | NP          | NC  |
| 11,14          | +V Output     |     |  | +V Output   |               | 14    | +V Output     |     | +V Output   |     |
| 12,13          | -V Input      |     |  | -V Input    |               | 16    | -V Output     |     | Common      |     |
| 16             | NP            | NC  |  | NP          | NC            | 20,21 | NP            | NC  | NP          | NC  |
| 20,21          | NP            | NC  |  | NP          | NC            | 22,23 | +V Input      |     | +V Input    |     |

\* NP-NO PIN

\* NC-NO CONNECTION WITH PIN

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