



# EC5SAW SERIES

## 10 WATT WIDE INPUT

## DC-DC CONVERTERS



### FEATURE

- \* 4:1 Input Range
- \* Regulated Outputs
- \* 3000VDC/2000VAC Isolation
- \* Efficiency Up to 89.5%
- \* Compact SIP8 Package
- \* Remote On/Off Control
- \* 6.6-10W Isolated Output
- \* Fixed Switching Frequency
- \* No Tantalum Capacitor Inside
- \* Input Under-Voltage Protection
- \* Low No Load Power Consumption
- \* Continuous Short Circuit Protection



| MODEL<br>NUMBER | INPUT<br>VOLTAGE(4) | OUTPUT<br>VOLTAGE | OUTPUT CURRENT |          | INPUT CURRENT |           | %EFF. |      | CAPACITOR<br>LOAD MAX. |
|-----------------|---------------------|-------------------|----------------|----------|---------------|-----------|-------|------|------------------------|
|                 |                     |                   | MIN.           | MAX.     | NO LOAD       | FULL LOAD | (3)   | (2)  |                        |
| EC5SAW-24S33N   | 9-36 VDC            | 3.3 VDC           | 0 mA           | 2000 mA  | 6 mA          | 336 mA    | 81    | 81.5 | 2000uF                 |
| EC5SAW-24S05N   | 9-36 VDC            | 5 VDC             | 0 mA           | 2000 mA  | 6 mA          | 490 mA    | 83.5  | 85   | 2000uF                 |
| EC5SAW-24S12N   | 9-36 VDC            | 12 VDC            | 0 mA           | 833 mA   | 6 mA          | 473 mA    | 87    | 89   | 833uF                  |
| EC5SAW-24S15N   | 9-36 VDC            | 15 VDC            | 0 mA           | 666 mA   | 6 mA          | 468 mA    | 88.5  | 89.5 | 666uF                  |
| EC5SAW-24D05N   | 9-36 VDC            | ±5 VDC            | 0 mA           | ±1000 mA | 6 mA          | 490 mA    | 84    | 85   | 1000uF                 |
| EC5SAW-24D12N   | 9-36 VDC            | ±12 VDC           | 0 mA           | ±417 mA  | 7 mA          | 468 mA    | 88.5  | 89   | 417uF                  |
| EC5SAW-24D15N   | 9-36 VDC            | ±15 VDC           | 0 mA           | ±333 mA  | 7 mA          | 468 mA    | 88.5  | 89   | 333uF                  |
| EC5SAW-48S33N   | 18-75 VDC           | 3.3 VDC           | 0 mA           | 2000 mA  | 6 mA          | 168 mA    | 81    | 81   | 2000uF                 |
| EC5SAW-48S05N   | 18-75 VDC           | 5 VDC             | 0 mA           | 2000 mA  | 6 mA          | 245 mA    | 84    | 85   | 2000uF                 |
| EC5SAW-48S12N   | 18-75 VDC           | 12 VDC            | 0 mA           | 833 mA   | 6 mA          | 237 mA    | 87.5  | 88   | 833uF                  |
| EC5SAW-48S15N   | 18-75 VDC           | 15 VDC            | 0 mA           | 666 mA   | 6 mA          | 234 mA    | 87.5  | 88   | 666uF                  |
| EC5SAW-48D05N   | 18-75 VDC           | ±5 VDC            | 0 mA           | ±1000 mA | 6 mA          | 245 mA    | 84    | 85   | 1000uF                 |
| EC5SAW-48D12N   | 18-75 VDC           | ±12 VDC           | 0 mA           | ±417 mA  | 6 mA          | 234 mA    | 88    | 88   | 417uF                  |
| EC5SAW-48D15N   | 18-75 VDC           | ±15 VDC           | 0 mA           | ±333 mA  | 6 mA          | 234 mA    | 87.5  | 88   | 333uF                  |

### NOTE:

1. Nominal Input Voltage 24 or 48 VDC
2. Measured at Nominal Input Voltage
3. Measured at 12VDC for 24Vin, 24VDC for 48Vin
4. For 3.3Vo, 5Vo & ±5Vo has Derating by Input is Required Show Fig.1

# SPECIFICATIONS

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

## INPUT SPECIFICATIONS:

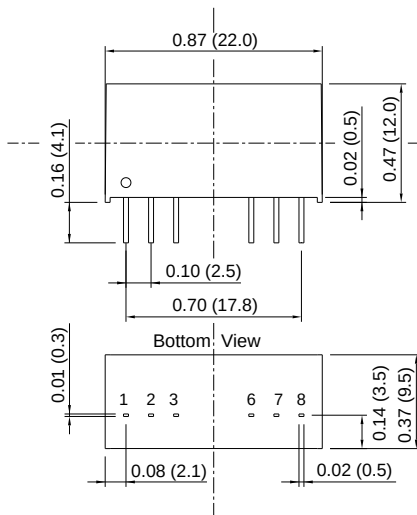
|                                   |                        |             |
|-----------------------------------|------------------------|-------------|
| Input Voltage Range               | 24V                    | 9-36V       |
|                                   | 48V                    | 18-75V      |
| Input Surge Voltage (100 ms max.) | 24V                    | 50VDC max.  |
|                                   | 48V                    | 100VDC max. |
| Input Filter                      | Capacitive             |             |
| Remote On/Off Control:            |                        |             |
| Module On                         | Open or High Impedance |             |
| Module Off                        | 2mA to 4mA             |             |
| Module Off (Input Idle Current)   | 2.5mA max.             |             |

## OUTPUT SPECIFICATIONS:

|                                                                 |                                            |  |
|-----------------------------------------------------------------|--------------------------------------------|--|
| Voltage Accuracy                                                | $\pm 1.0\%$ max.                           |  |
| Voltage Balance (Dual)                                          | $\pm 1.0\%$ max                            |  |
| Transient Response: 75%~100% Step Load Change                   |                                            |  |
| Error Band                                                      | $\pm 5\%$ Vout Nominal, Recovery Time      |  |
|                                                                 | < 250 $\mu$ s                              |  |
| Ripple & Noise, 20MHz BW (Note 5)                               | 3.3V & 5V & $\pm 5V$ ... 100mV pk-pk max.  |  |
|                                                                 | 12V/15V/ $\pm 12V/\pm 15V$ ..... 1%Vo max. |  |
| Temperature Coefficient                                         | $\pm 0.02\%/^{\circ}\text{C}$ max.         |  |
| Short Circuit Protection                                        | Continuous                                 |  |
| Line Regulation (note1)                                         | $\pm 0.2\%$ max.                           |  |
| Load Regulation (note2)                                         | $\pm 1.0\%$ max.                           |  |
| Cross Regulation (Dual note3) ... Asymmetrical Load 25%/100% .. | $\pm 5.0\%$ max.                           |  |
| Current Limit                                                   | 180% typ.                                  |  |
| Start up time                                                   | 5ms typ.                                   |  |

## CASE SA DIMENSIONS:

All Dimensions In Inches (mm)  
 Tolerances : Inches Millimeters  
 X.XX= $\pm 0.02$  X.X= $\pm 0.5$   
 Pin  $\pm 0.002$   $\pm 0.05$



| PIN CONNECTION |           |           |
|----------------|-----------|-----------|
| Pin            | Single    | Dual      |
| 1              | -V Input  | -V Input  |
| 2              | +V Input  | +V Input  |
| 3              | On/Off    | On/Off    |
| 6              | +V Output | +V Output |
| 7              | -V Output | Common    |
| 8              | NC        | -V Output |

## GENERAL SPECIFICATIONS:

|                                       |                                                     |               |
|---------------------------------------|-----------------------------------------------------|---------------|
| Efficiency                            | See Table                                           |               |
| Isolation Voltage                     | Input/Output                                        | 3000VDC min.  |
|                                       | Input/Output                                        | 2000VAC min.  |
| Isolation Resistance                  | $10^9$ ohm min.                                     |               |
| Isolation Capacitance                 | 50pF max.                                           |               |
| Switching Frequency                   | 530KHz typ.                                         |               |
| Operating Ambient Temperature         | $-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$      |               |
| De-rating, Above $50^{\circ}\text{C}$ | Linearly to Zero power at $105^{\circ}\text{C}$     |               |
| Case Temperature (note4)              | $105^{\circ}\text{C}$ max.                          |               |
| Cooling                               | Natural Convection                                  |               |
| Storage Temperature                   | $-55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$     |               |
| Humidity                              | 95% RH max. Non condensing                          |               |
| MTBF                                  | MIL-HDBK-217F, GB, $25^{\circ}\text{C}$ , Full Load | 1930Khrs typ. |
| Dimensions                            | 0.87x0.37x0.47 inches (22.0x9.5x12.0mm)             |               |
| Case Material                         | Non-Conductive Black Plastic                        |               |
| Weight                                | 4.9g                                                |               |

## NOTE:

1. Measured from high line to low line.
2. Measured from full load to no load.
3. For asymmetric loading, both channels must be at 25% load or more.
4. Maximum case temperature under any operating condition should not be exceeded  $105^{\circ}\text{C}$ .
5. Output ripple and noise measured with 1 $\mu$ F ceramic capacitor

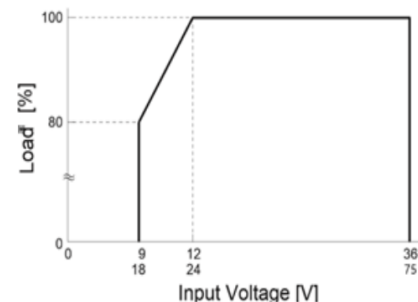


Fig1. Input Voltage Derating Curve  
 Typical Derating curve for Natural Convection

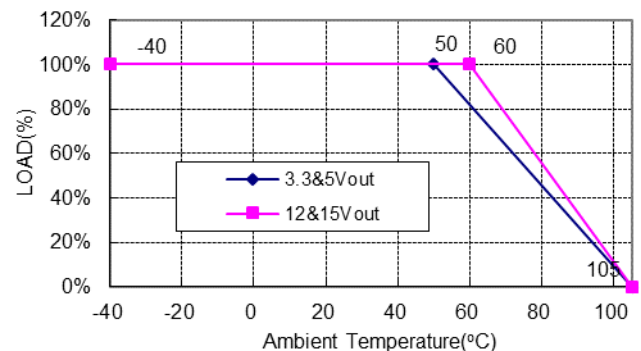


Fig2. Typical Derating Curve for Naturel Convection