65/100/130 Watts
ECS Series

• IT & Medical Safety Approvals
• 65/80/100 W – Convection-cooled Ratings
• Class I & Class II Construction
• Industry Standard 2” x 4” Package
• <0.5 W No Load Input Power
• Low Leakage Current
• 3 Year Warranty

Specification

Input

- 80-264 VAC (275 VAC ECS65)
- 120-370 VDC, derate output power <90 VAC, see derating curves
- 47-400 Hz
- 65 W: 1.0/0.6 A typical at 115/230 VAC
- 100 W: 1.5/0.9 A typical at 115/230 VAC
- 130 W: 1.9/1.1 A typical at 115/230 VAC full load
- Inrush Current: 40 A max at 230 VAC, cold start at 25 °C
- Power Factor: EN61000-3-2, class A
- No Load Input Power: <0.5 W
- Earth Leakage Current: 65/130 W: 260 µA at 264 VAC/60 Hz max
- Input Protection: Internal T3.15/T5A/250 V fuse inline and neutral
- Output Voltage: 12-48 VDC (see tables)
- Output Voltage Trim: ±10%
- Initial Set Accuracy: ±1%
- Minimum Load: No minimum load required
- Start Up Delay: 1 s typical
- Start Up Rise Time: 50 ms
- Hold Up Time: 16 ms min at 115 VAC
- Drift: ±0.2% after 20 min warm up
- Line Regulation: ±0.5% max
- Load Regulation: ±1%
- Over/Undershoot: 5% typical
- Transient Response: 4% max. deviation, recovery to within 1% in 500 µs for a 50-75-50% load change
- Ripple & Noise: 1% pk-pk, 20 MHz bandwidth
- Overvoltage Protection: 115-140% Vnom, recycle input to reset
- Overload Protection: 110-160%
- Short Circuit Protection: Continuous trip and restart (hiccup mode)
- Temperature Coefficient: 0.05%/°C

General

- Efficiency: Up to 90% model dependent
- Isolation: 4000 VAC Input to Output, 2 x MOPP, 1500 VAC Input to Ground, 1 x MOPP, 500 VDC Output to Ground, 1 x MOPP
- Switching Frequency: 65 KHz typical
- Power Density: 65 W: 7.7 W/in³, 100 W: 10 W/in³,
- MTBF: 130 W: 13 W/in³
- Operating Temperature: -20 °C (~-40 °C, ECS130) to +70 °C derate linearly from +50 °C at 2.5%/°C to 50% load at +70 °C.
- Cooling: Convection & fan cooled ratings (see tables)
- Operating Humidity: 95% RH, non-condensing
- Storage Temperature: -40 °C to +85 °C
- Shock: 30 g pk, half sine, 6 axes
- Vibration: 2 g rms, 5 Hz to 500 Hz, 3 axes
- EMC & Safety: Low Voltage PSU EMC
- Emissions: EN61204-3, high severity level
- EN55011/22 level B conducted
- EN55011/22 level A radiated, level B Suffix '-B' models
- Harmonic Currents: EN61000-3-2, class A
- Voltage Flicker: EN61000-3-3
- Radiated Immunity: EN61000-4-3, level 3 Perf Criteria A
- EFT/Burst: EN61000-4-4, level 3 Perf Criteria A
- Surge: EN61000-4-5, installation class 3 Perf Criteria A
- Conducted Immunity: EN61000-4-6, level 3 Perf Criteria A
- Dips & Interruptions: EN61000-4-11, 30% 10 ms, 60% 100 ms, 100% 5000 ms, Perf Criteria A, B, B, EN60601-1-2, 30% 500 ms, 60% 100 ms, 100% 10 ms, 100% 5000 ms, Perf Criteria A, A, A, B - 230 VAC. Consult longform datasheet for 115 V operation.
- Safety Approvals: IEC60950-1 CB report, CSA 22.2 No. 60950-1, UL60950-1, TUV EN60950-1, IEC60601-1 CB report, CSA 22.2 No. 60601-1, ANSI/AMMI ES60601-1, TUV 60601-1, including risk management Class I & II (ECS65 Non '-B' models, Class I only)

Equipment Protection

- Class: Class I & II (ECS65 Non '-B' models, Class I only)

Notes

1. Safety approvals cover frequency 47-63 Hz.
Models and Ratings

| Output Power | Output Voltage | Output Current | Model Number
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>65 W</td>
<td>12.0 VDC</td>
<td>5.4 A</td>
<td>ECS65US12</td>
</tr>
<tr>
<td>65 W</td>
<td>15.0 VDC</td>
<td>4.3 A</td>
<td>ECS65US15</td>
</tr>
<tr>
<td>65 W</td>
<td>18.5 VDC</td>
<td>3.4 A</td>
<td>ECS65US18</td>
</tr>
<tr>
<td>65 W</td>
<td>24.0 VDC</td>
<td>2.7 A</td>
<td>ECS65US24</td>
</tr>
<tr>
<td>65 W</td>
<td>28.0 VDC</td>
<td>2.3 A</td>
<td>ECS65US28</td>
</tr>
<tr>
<td>65 W</td>
<td>48.0 VDC</td>
<td>1.4 A</td>
<td>ECS65US48</td>
</tr>
</tbody>
</table>

Notes
1. For Class B radiated emissions models, add suffix -B to model number. For covered versions, add suffix ‘-C’ to model number or order part no. ECM40/60 COVER KIT for standalone cover. Derate output power by 20% with cover. The cover is not suitable for Class II installations.

Mechanical Details

Input Connector J1
Molex PN 09-65-2038
- Pin 1: Line
- Pin 2: Neutral
- 0.25" Faston: Earth

Output Connector J2
Molex PN 09-65-2048
- Pin 1: +V1
- Pin 2: +V1
- Pin 3: RTN
- Pin 4: RTN

J1 mates with Molex Housing PN 09-50-1031, J2 mates with Molex Housing PN 09-50-1041 and both with Molex Series 5194 Crimp Terminals

Notes
1. All dimensions in inches (mm).
2. Weight: 0.386 lbs (175 g)

Derating Curve - ECS65 Models

Output Power (%)

Input Voltage (VAC)

Output Power (%)

Ambient Temperature (°C)
Models and Ratings

<table>
<thead>
<tr>
<th>Output Power</th>
<th>Output Voltage</th>
<th>Output Current</th>
<th>Model Number(*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forced Cooled (10 CFM)</td>
<td>Convection-cooled</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 W</td>
<td>60 W</td>
<td>12.0 VDC</td>
<td>8.3 A</td>
</tr>
<tr>
<td>100 W</td>
<td>80 W</td>
<td>15.0 VDC</td>
<td>6.7 A</td>
</tr>
<tr>
<td>100 W</td>
<td>80 W</td>
<td>18.0 VDC</td>
<td>5.5 A</td>
</tr>
<tr>
<td>100 W</td>
<td>80 W</td>
<td>24.0 VDC</td>
<td>4.2 A</td>
</tr>
<tr>
<td>100 W</td>
<td>80 W</td>
<td>28.0 VDC</td>
<td>3.6 A</td>
</tr>
<tr>
<td>100 W</td>
<td>80 W</td>
<td>48.0 VDC</td>
<td>2.1 A</td>
</tr>
</tbody>
</table>

Notes
1. For Class B radiated emissions models, add suffix -B to model number. For covered versions, add suffix '-C' to model number or order part no. ECM40/60 COVER KIT for standalone cover. Derate output power by 20% with cover. The cover is not suitable for Class II installations. '-C' not available for '-B' models.

Mechanical Details

Output Connector J2
Molex PN 09-65-2048
- Pin 1 +V1
- Pin 2 +V1
- Pin 3 RTN
- Pin 4 RTN

Input Connector J1
Molex PN 09-65-2038
- Pin 1 Line
- Pin 2 Neutral
- 0.25" Faston Earth

Notes
1. All dimensions in inches (mm).
2. Weight: 0.386 lbs (175 g)

Derating Curve - ECS100 Models

- Force-cooled >10 CFM
- Convection-cooled
- Convection-cooled with cover
**Models and Ratings**

<table>
<thead>
<tr>
<th>Output Power</th>
<th>Output Voltage</th>
<th>Output Current</th>
<th>Model Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forced Cooled (10 CFM)</td>
<td>Convection-cooled</td>
<td></td>
<td></td>
</tr>
<tr>
<td>130 W</td>
<td>100 W</td>
<td>12.0 VDC</td>
<td>10.9 A</td>
</tr>
<tr>
<td>130 W</td>
<td>100 W</td>
<td>15.0 VDC</td>
<td>8.7 A</td>
</tr>
<tr>
<td>130 W</td>
<td>100 W</td>
<td>18.0 VDC</td>
<td>7.3 A</td>
</tr>
<tr>
<td>130 W</td>
<td>100 W</td>
<td>24.0 VDC</td>
<td>5.4 A</td>
</tr>
<tr>
<td>130 W</td>
<td>100 W</td>
<td>28.0 VDC</td>
<td>4.7 A</td>
</tr>
<tr>
<td>130 W</td>
<td>100 W</td>
<td>48.0 VDC</td>
<td>2.7 A</td>
</tr>
</tbody>
</table>

**Notes**
1. For covered versions, add suffix ‘-C’ to model number or order part no. ECM40/60 COVER KIT for standalone cover, see derating curve. The cover is not suitable for Class II installations. ‘-C’.

**Mechanical Details**

Input Connector J1
Molex PN 09-65-2038

<table>
<thead>
<tr>
<th>Pin 1</th>
<th>Pin 2</th>
<th>0.25” Faston</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line</td>
<td>Neutral</td>
<td>Earth</td>
</tr>
</tbody>
</table>

Output Connector J2
Molex PN 09-65-2048

<table>
<thead>
<tr>
<th>Pin 1</th>
<th>Pin 2</th>
<th>Pin 3</th>
<th>Pin 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>+V1</td>
<td>+V1</td>
<td>R1N</td>
<td>R1N</td>
</tr>
</tbody>
</table>

J1 mates with Molex Housing PN 09-50-1031, J2 mates with Molex Housing PN 09-50-1041 and both with Molex Series 5194 Crimp Terminals.

**Derating Curve - ECS130 Models**

Input Voltage (VAC) vs. Output Power (W)

Ambient Temperature (°C) vs. Output Power (W)
Thermal Considerations - All Models

In order to ensure safe and reliable operation of the PSU in the most adverse conditions permitted in the end-use equipment, the temperature of the components listed in the table below must not be exceeded. See mechanical drawing for component locations. Temperature should be monitored using K type thermocouples placed on the hottest part of the component (out of any direct air flow).

<table>
<thead>
<tr>
<th>Component</th>
<th>Temperature °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>110 °C</td>
</tr>
<tr>
<td>C5</td>
<td>100 °C</td>
</tr>
<tr>
<td>C4</td>
<td>100 °C</td>
</tr>
<tr>
<td>Q1</td>
<td>110 °C</td>
</tr>
</tbody>
</table>

Notes

1. All dimensions in inches (mm).
   Tolerance \( \pm 0.02 \) (0.50); \( \pm 0.01 \) (0.25)

2. Weight: 0.8 lbs (360 g)