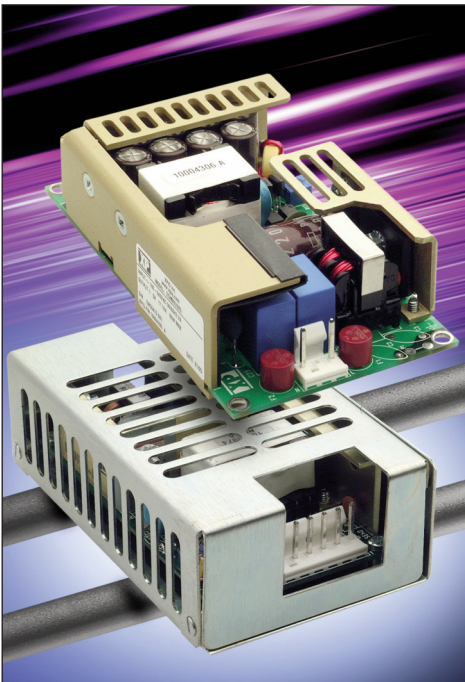


# ECM100 Series



- 100 Watt Models
- Small Size 2.5" x 4.5" x 1.2"
- Low Leakage Current
- Industrial & Medical Approvals
- Convection & Force Cooled Ratings
- Wide Operating Temperature 0 °C to +70 °C
- Level B Conducted Emissions
- EN61000 Compliant
- Universal AC Input 90–264 VAC
- Input Frequency 47–63 & 440 Hz
- Cover Kits Available
- Mating Connector & Cable Harness Kits Available

Approved for Class I and Class II applications, the ECM100 range of single output AC-DC, 100 W power supplies from XP feature the world's smallest footprint for units of these ratings. Size is just 2.5" x 4.5" (63.5 mm x 114.3 mm) and 1.2" (30.48 mm) high. Furthermore, these high-density power supplies meet EN55032 Level B conducted emissions with maximum leakage currents of 125  $\mu$ A at 115 VAC or 210  $\mu$ A at 230 VAC. As a result, these switchers are equally suitable for industrial, IT and medical applications, with no price premium for meeting medical requirements.

The ECM100 series have single output versions from 3.3 V to 48 VDC, adjustable by  $\pm$ 10%. They are dual-fused for compliance with IEC60601-1 and efficiency is 80-85%, depending upon the model, so minimal excess heat is generated.

The power supplies deliver full power between 0 °C and +50 °C and will operate at up to +70 °C with derating and only 5 CFM of cooling. Comprehensive overvoltage, overload and short circuit protection is built in. Covers, cable harnesses and connector kits are available.

## Input Characteristics

| Characteristic            | Minimum  | Typical | Maximum | Units | Notes & Conditions         |
|---------------------------|--|---------|---------|-------|----------------------------|
| Input Voltage - Operating | 90   |         | 264     | VAC   | 120-370 VDC                |
| Input Frequency           | 47   | 50/60   | 63      | Hz    | 400 Hz operation available |
| Power Factor              |  | 0.62    |         |       | 230 VAC                    |
| Input Current - No Load   |  | 40      |         | mA    | 230 VAC                    |
| Input Current - Full Load |  | 0.9     |         | A     | 230 VAC                    |
| Inrush Current            |  |         | 40      | A     | 230 VAC cold start         |
| Earth Leakage Current     |  |         | 125/210 | μA    | 115/230 VAC                |
| Input Protection          | T3.15 A/250 V internal fuse in both line and neutral |         |         |       |                            |

## Output Characteristics

| Characteristic            | Minimum   | Typical | Maximum  | Units  | Notes & Conditions  |
|---------------------------|-----------|---------|--|--------|---|
| Output Voltage            | 3.3       |         | 48.0   | VDC    | See Models and Ratings Table                                    |
| Initial Set Accuracy      |           |         | V <sup>1</sup> : ±1. V <sup>2</sup> , V <sup>3</sup> & V <sup>4</sup> : ±5       | %      |   |
| Output Voltage Adjustment | ±5<br>±10 |         |  | %      | 3.3 & 5 V versions<br>All other versions                        |
| Minimum Load              |           |         |  | A      | See model tables  |
| Start Up Delay            |           |         | 1.5  | s      | 90 VAC  |
| Start Up Rise Time        |           |         | 50   | ms     |   |
| Hold Up Time              | 16        |         | 75   | ms     | 115-230 VAC input   |
| Drift                     |           |         | ±0.2   | %      |   |
| Line Regulation           |           |         | ±0.5   | %      | 90-264 VAC  |
| Load Regulation           |           |         | ±1<br>V <sup>1</sup> & V <sup>2</sup> : ±1. V <sup>3</sup> & V <sup>4</sup> : ±5 | %      | Single output versions<br>Multi output versions                 |
| Transient Response        |           |         | 4  | %      | Recovery to within 1% in less than 500 μs for a 25% load change |
| Ripple & Noise            |           |         | 1  | %pk-pk | 20 MHz bandwidth  |
| Overvoltage Protection    | 115       |         | 135  | %      | V <sup>1</sup> only. Recycle input to reset                     |
| Overload Protection       | 110       |         | 170  | %      | Primary power limit, auto-recovery                              |
| Short Circuit Protection  |           |         |  |        | Trip & restart (Hiccup mode)                                    |
| Temperature Coefficient   |           |         | 0.05   | %/°C   |   |

## General Specifications

| Characteristic                      | Minimum | Typical   | Maximum | Units             | Notes & Conditions    |
|-------------------------------------|---------|-----------|---------|-------------------|-----------------------|
| <b>Reliability and Service Life</b> |         |           |         |                   |                       |
| <b>Isolation</b>                    |         |           |         |                   |                       |
| Input to Output Test Voltage        | 4000    |           |         | VAC               | Test duration: 1 min  |
| Input to Ground Test Voltage        | 1500    |           |         | VAC               | Test duration: 1 min  |
| Output to Ground Test Voltage       | 500     |           |         | VAC               | Test duration: 1 min  |
| <b>Other Specifications</b>         |         |           |         |                   |                       |
| Efficiency                          |         | 80-85     |         | %                 | See Efficiency Graphs |
| Switching Frequency                 |         | 70        |         | kHz               | Fixed                 |
| Weight                              |         | 0.4 (180) |         | lb (g)            |                       |
| Power Density                       |         |           | 7.40    | W/in <sup>3</sup> |                       |
| MTBF                                |         | 600       |         | kHrs              | MIL HDBK 217F         |

## Environmental

| Characteristic        | Minimum | Typical | Maximum | Units  | Notes & Conditions       |
|-----------------------|---------|---------|---------|--------|--------------------------|
| Operating Temperature | 0       |         | +70     | °C     | See derating curves      |
| Storage Temperature   | -40     |         | +85     | °C     |                          |
| Cooling               | 5       |         |         | CFM    | For full power operation |
| Humidity              |         |         | 95      | %RH    | Non-condensing           |
| Operating Altitude    |         |         | 3000    | m      |                          |
| Shock                 |         |         | 30      | G peak | Half sine 6 axis         |
| Vibration             |         |         | 2       | G rms  | 5 Hz to 500 Hz, 3 axis   |

## Electromagnetic Compatibility - Immunity

| Phenomenon             | Standard                  | Test Level | Criteria | Notes & Conditions              |
|------------------------|---------------------------|------------|----------|---------------------------------|
| ESD                    | EN61000-4-2               | 3          | A        |                                 |
| EFT                    | EN61000-4-4               | 3          | A        |                                 |
| Radiated Field         | EN61000-4-3               | 10 V/m     | A        |                                 |
| Surges                 | EN61000-4-5               | 3          | A        |                                 |
| Conducted              | EN61000-4-6               | 10 Vrms    | A        |                                 |
| Dips and Interruptions | EN61000-4-11<br>(Medical) | 70% Ut     | A        | For 500 ms, Medical, 100% load  |
|                        |                           | 40% Ut     | A        | For 100 ms, Medical, 60% load   |
|                        |                           | 0% Ut      | A        | For 10 ms, Medical, 100% load   |
|                        |                           | 0% Ut      | B        | For 5000 ms, Medical, 100% load |
| Dips and Interruptions | EN61000-4-11              | 70% Ut     | A        | For 10 ms, 100% load            |
|                        |                           | 40% Ut     | B        | For 100 ms, 100% load           |
|                        |                           | <5% Ut     | B        | For 5000 ms, 100% load          |

## Electromagnetic Compatibility - Emissions

| Phenomenon        | Standard    | Test Level | Criteria | Notes & Conditions |
|-------------------|-------------|------------|----------|--------------------|
| Conducted         | EN55032/11  | Class B    |          |                    |
| Voltage Flicker   | EN61000-3-3 |            |          |                    |
| Harmonic Currents | EN61000-3-2 | Class A    |          |                    |

## Safety Agency Approvals

| Safety Agency | Safety Standard                           | Category               |
|---------------|---|------------------------|
| CB Report     | IEC60950-1:2005 Ed 2 / IEC62368-1:2014    | Information Technology |
| UL            | UL 62368-1 & CAN/CSA C22.2 No. 62368-1-14 | Information Technology |
| TUV           | EN62368-1:2014/A11:2017                   | Information Technology |
| CE            | LVD                                       |                        |

| Safety Agency | Safety Standard   | Category |
|---------------|---|----------|
| CB Report     | UL, IEC60601-1 Ed 3 Including Risk Management                           | Medical  |
| UL            | UL File # E146893, ANSI/AAMI ES 60601-1:2005 & CSA C22.2 No. 60601-1:08 | Medical  |
| TUV           | EN60601-1:2006  | Medical  |

| Means of Protection                         |   | Category        |
|---|---|-----------------|
| Primary to Secondary<br>(ECM100USxx Models) | 2 x MOPP (Means of Patient Protection)                            | IEC60601-1 Ed 3 |
| Primary to Secondary<br>(ECM100UMxx Models) | 1 x MOPP (Means of Patient Protection) Contact Sales for 2 x MOPP |                 |
| Primary to Earth                            | 1 x MOPP (Means of Patient Protection)                            |                 |

| Equipment Protection Class | Safety Standard                        | Notes & Conditions  |
|----------------------------|--|---|
| Class I & Class II         | IEC60950-1:2005 Ed 2 / IEC62368-1:2014 | See safety agency conditions of acceptability for details |

## Models and Ratings

### Single Output Models

| Output Voltage | Output Current Minimum | Output Current Maximum |        | Ripple & Noise | Model Number |
|----------------|------------------------|------------------------|--------|----------------|--------------|
|                |                        | Convection cooled      | 5 CFM  |                |              |
| 3.3 V          | 0.0 A                  | 15.0 A                 | 20.0 A | 50 mV          | ECM100US03   |
| 5.0 V          | 0.0 A                  | 15.0 A                 | 20.0 A | 50 mV          | ECM100US05   |
| 7.0 V          | 0.0 A                  | 11.4 A                 | 14.3 A | 70 mV          | ECM100US07   |
| 9.0 V          | 0.0 A                  | 8.8 A                  | 11.1 A | 90 mV          | ECM100US09   |
| 12.0 V         | 0.0 A                  | 7.5 A                  | 8.3 A  | 120 mV         | ECM100US12   |
| 15.0 V         | 0.0 A                  | 6.0 A                  | 6.6 A  | 150 mV         | ECM100US15   |
| 18.0 V         | 0.0 A                  | 5.0 A                  | 5.5 A  | 180 mV         | ECM100US18   |
| 24.0 V         | 0.0 A                  | 4.1 A                  | 4.1 A  | 240 mV         | ECM100US24   |
| 28.0 V         | 0.0 A                  | 3.6 A                  | 3.6 A  | 280 mV         | ECM100US28   |
| 33.0 V         | 0.0 A                  | 3.0 A                  | 3.0 A  | 330 mV         | ECM100US33   |
| 48.0 V         | 0.0 A                  | 2.1 A                  | 2.1 A  | 480 mV         | ECM100US48   |

### Multi Output Models

| Power Max Convection | Power Max 5 CFM | Output 1 | Imin/Imax  | Output 2 | Imin/Imax      | Output 3 | Imin/Imax     | Output 4 | Imin/Imax     | Model Number |
|----------------------|-----------------|----------|------------|----------|----------------|----------|---------------|----------|---------------|--------------|
| 80 W                 | 100 W           | +5.0V    | 0.0 A/12 A | +12.0V   | 0.00 A / 3.0 A |          |               |          |               | ECM100UD21   |
| 80 W                 | 100 W           | +5.0V    | 0.0 A/12 A | +15.0V   | 0.00 A / 3.0 A |          |               |          |               | ECM100UD22   |
| 75 W                 | 100 W           | +5.0V    | 0.5 A/10 A | +12.0V   | 0.00 A / 3.0 A | -12.0V   | 0.0 A / 0.8 A |          |               | ECM100UT31   |
| 80 W                 | 100 W           | +5.0V    | 0.5 A/10 A | +24.0V   | 0.00 A / 2.0 A | -12.0V   | 0.0 A / 0.8 A |          |               | ECM100UT32   |
| 80 W                 | 100 W           | +5.0V    | 0.5 A/10 A | +15.0V   | 0.00 A / 3.0 A | -15.0V   | 0.0 A / 0.8 A |          |               | ECM100UT33   |
| 65 W                 | 100 W           | +3.3V    | 0.5 A/10 A | +5.0V    | 0.00 A / 5.0 A | +12.0V   | 0.0 A / 0.8 A |          |               | ECM100UT34   |
| 70 W                 | 100 W           | +5.0V    | 0.5 A/10 A | +3.3V    | 0.00 A / 5.0 A | +12.0V   | 0.0 A / 0.8 A |          |               | ECM100UT35   |
| 80 W                 | 100 W           | +5.0V    | 0.5 A/10 A | +12.0V   | 0.00 A / 3.0 A | -5.0V    | 0.0 A / 0.8 A |          |               | ECM100UT36   |
| 70 W                 | 100 W           | +5.0V    | 0.5 A/10 A | +15.0V   | 0.00 A / 3.0 A | -5.0V    | 0.0 A / 0.8 A |          |               | ECM100UT37   |
| 65 W                 | 100 W           | +5.0V    | 0.5 A/10 A | +3.3V    | 0.10 A / 5.0 A | +12.0V   | 0.0 A / 0.8 A | -12.0V   | 0.0 A / 0.5 A | ECM100UQ41   |
| 60 W                 | 100 W           | +3.3V    | 0.5 A/10 A | +5.0V    | 0.10 A / 5.0 A | +12.0V   | 0.0 A / 0.8 A | -12.0V   | 0.0 A / 0.5 A | ECM100UQ42   |
| 80 W                 | 100 W           | +5.0V    | 0.5 A/10 A | +24.0V   | 0.10 A / 2.0 A | +12.0V   | 0.0 A / 0.8 A | -12.0V   | 0.0 A / 0.5 A | ECM100UQ43   |
| 80 W                 | 100 W           | +5.0V    | 0.5 A/10 A | +24.0V   | 0.10 A / 2.0 A | +15.0V   | 0.0 A / 0.8 A | -15.0V   | 0.0 A / 0.5 A | ECM100UQ44   |
| 80 W                 | 100 W           | +5.0V    | 0.5 A/10 A | +12.0V   | 0.10 A / 3.0 A | -12.0V   | 0.0 A / 0.8 A | -5.0V    | 0.0 A / 0.5 A | ECM100UQ45   |
| 80 W                 | 100 W           | +5.0V    | 0.5 A/10 A | +15.0V   | 0.10 A / 3.0 A | -15.0V   | 0.0 A / 0.8 A | -5.0V    | 0.0 A / 0.5 A | ECM100UQ46   |

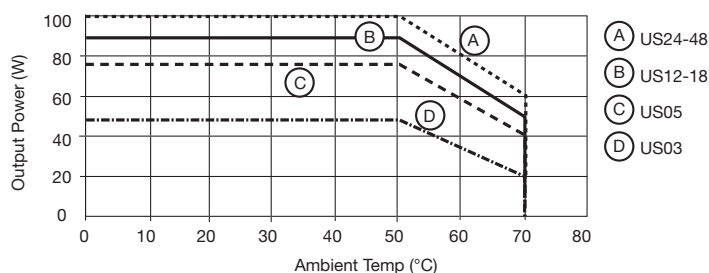
### Notes

1. To receive unit with cover fitted, add suffix '-C' to model number.

2. Output 3 available with opposite polarity for OEM quantities.

## Derating Curves

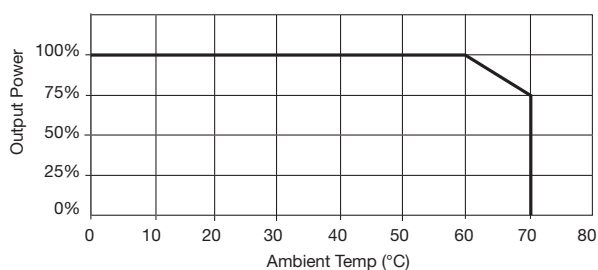
All ECM100 single output models convection cooled



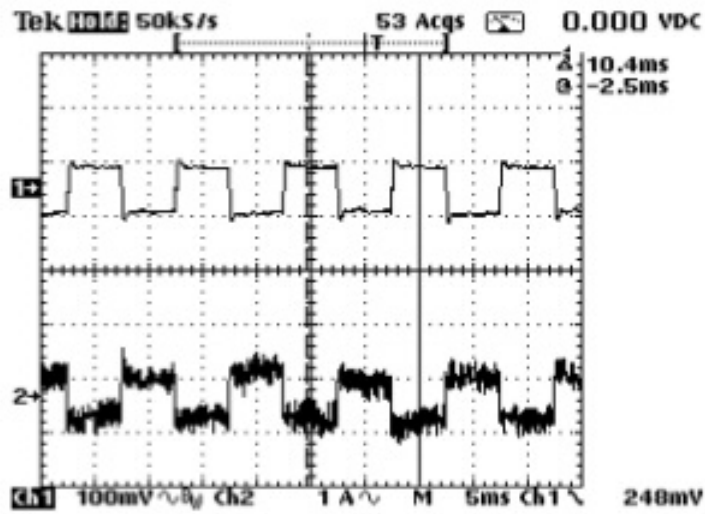
### Note:

1. Derate by 10% if cover is fitted.
2. For multi output convection-cooled operation above 50 °C derate linearly to 50% at 70 °C.

All ECM100 models with 5 CFM

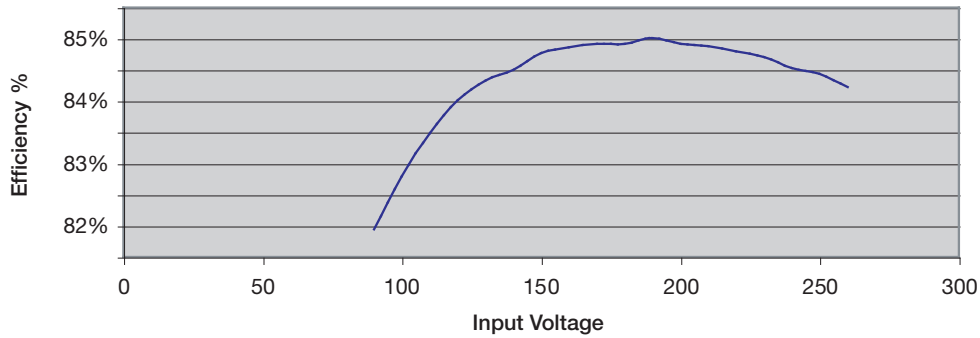


## Transient Response



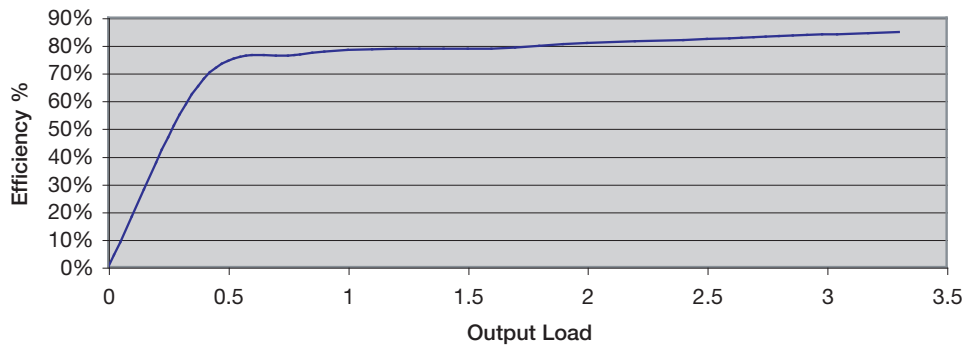
ECM100US24 25% load change

## Efficiency Versus Input Voltage



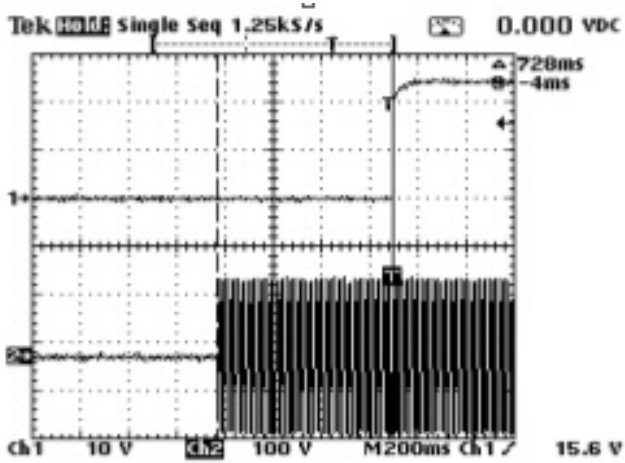
Efficiency shown for ECM100US24

## Efficiency Versus Output Load

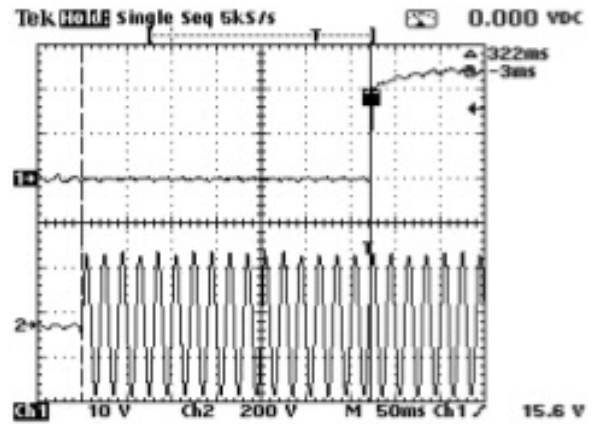


Efficiency shown for ECM100US24

### Start Up Delay

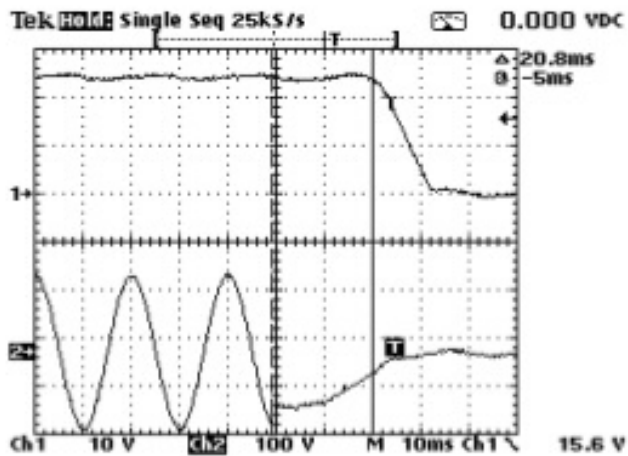


ECM100US24 start up 115 VAC at 100% load



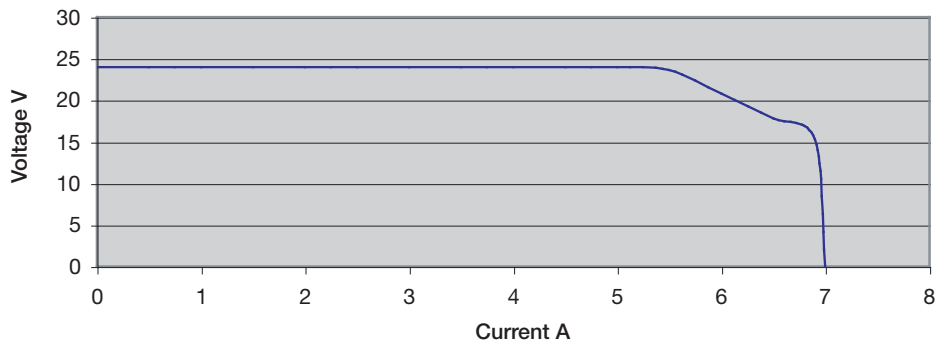
ECM100US24 start up 230 VAC at 100% load

### Hold Up Time



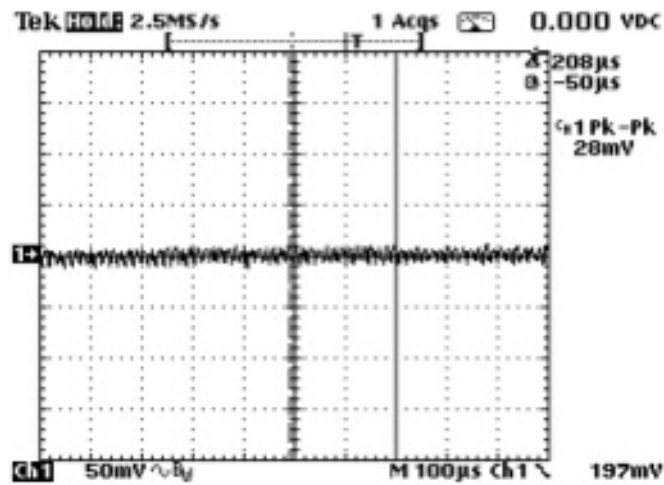
ECM100US24 hold up 115 VAC at 100% load  
Hold up time is 20.8 ms

### Overload Characteristics



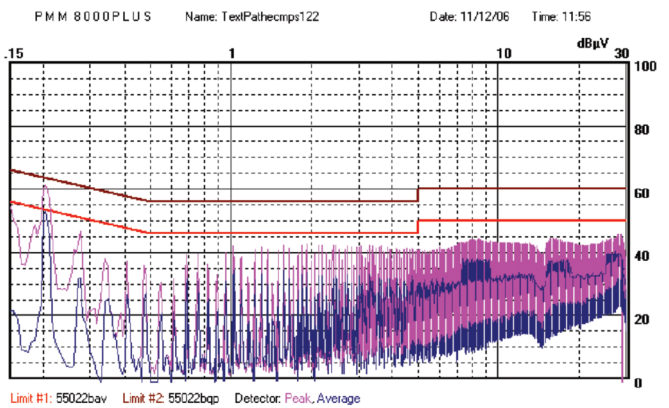
ECM100US24. When current reaches 6.9 A, output goes into trip & restart (Hiccup mode)

## Output Ripple & Noise

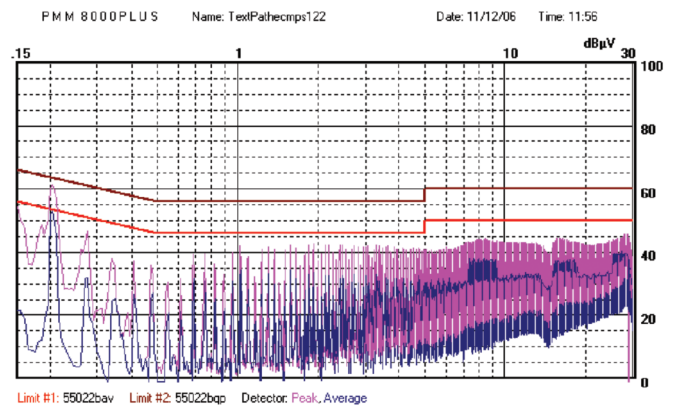


ECM100US24 with 100 W load  
Noise measured is 28 mV

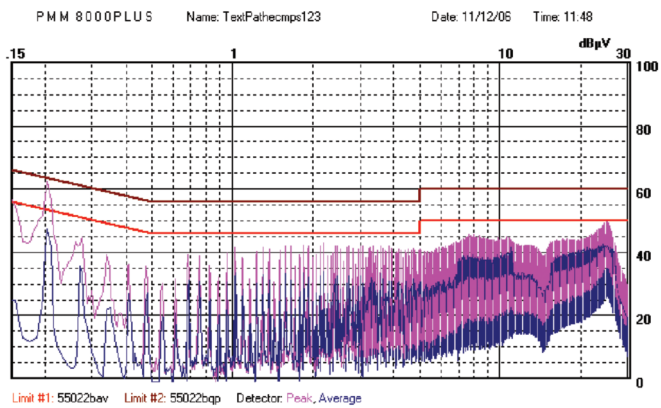
## Conducted Noise



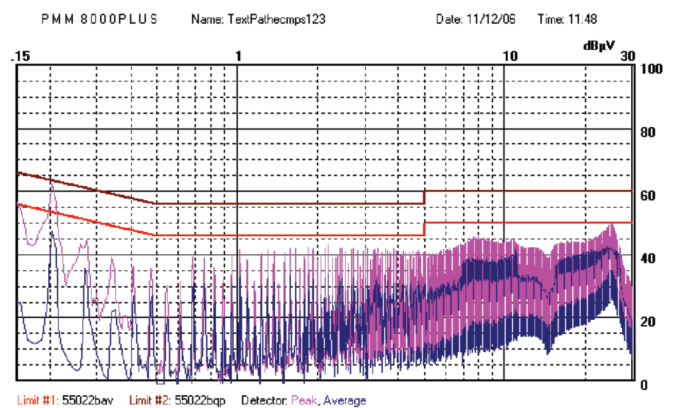
ECM100US12 Class I - Output floating (full load)



ECM100UQ44 Class I - Output floating (full load)



ECM100US12 Class I - Output grounded (full load)

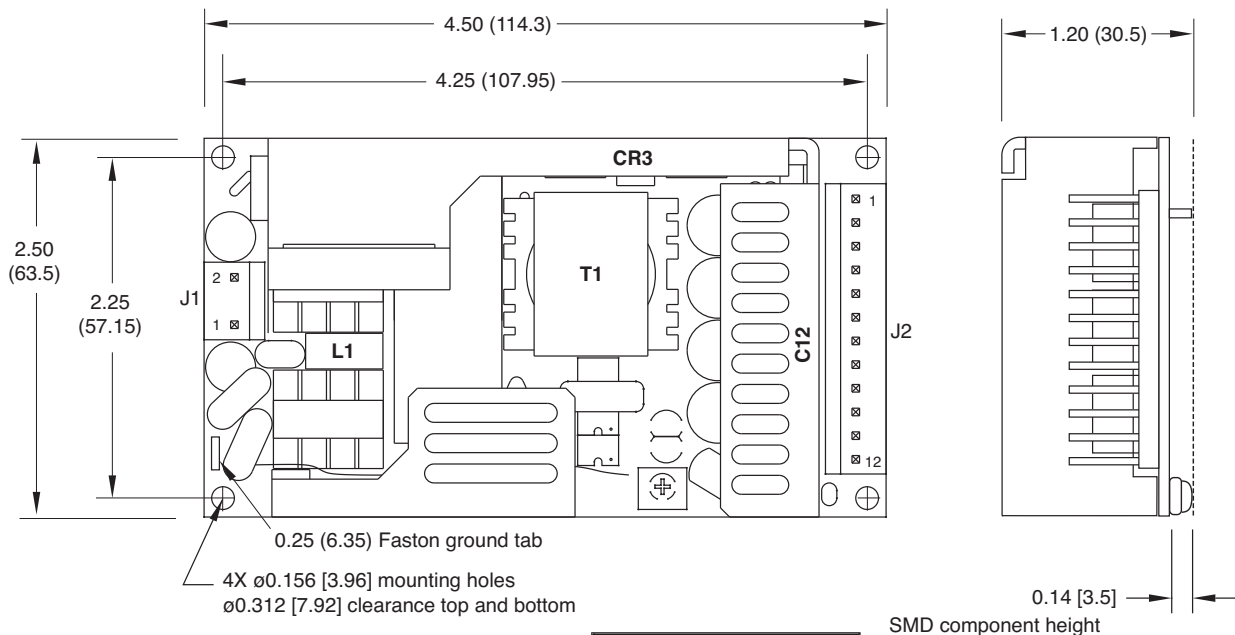


ECM100UQ44 Class I - Output grounded (full load)

## Mechanical Details - Single Output Models

Weight: approx. 0.4 lb (180g)

Cover dimensions are 4.98 x 3.01 x 1.54 (126.5 x 76.4 x 39.0)



| Input Connector J1 |         |
|--------------------|---------|
| Pin 1              | Line    |
| Pin 2              | Neutral |

J1 mates with Molex housing 43061-0003 and Molex series 5194 crimp terminals. Ground (0.25 faston) tab standard.

| Output Connector J2 |          |
|---------------------|----------|
| Pin                 | Single   |
| 1                   | +V1      |
| 2                   | +V1      |
| 3                   | +V1      |
| 4                   | +V1      |
| 5                   | V1 RTN   |
| 6                   | V1 RTN   |
| 7                   | V1 RTN   |
| 8                   | V1 RTN   |
| 9                   | NOT USED |
| 10                  | NOT USED |
| 11                  | NOT USED |
| 12                  | NOT USED |

SMD component height

J2 mates with Molex housing 43061-0012 & Molex series 5194 crimp terminals

### Notes

1. All dimensions in inches (mm). Tolerance .xx = ±0.02 (0.50); .xxx = ±0.01 (0.25)
2. Cable harnesses with 300mm wire available. For single output models, order part number ECM100S LOOM.
3. Mating connector kit available. Order part number ECM100 CONKIT.
4. Covers available. Order part number ECM100 COVER.

## Thermal Considerations

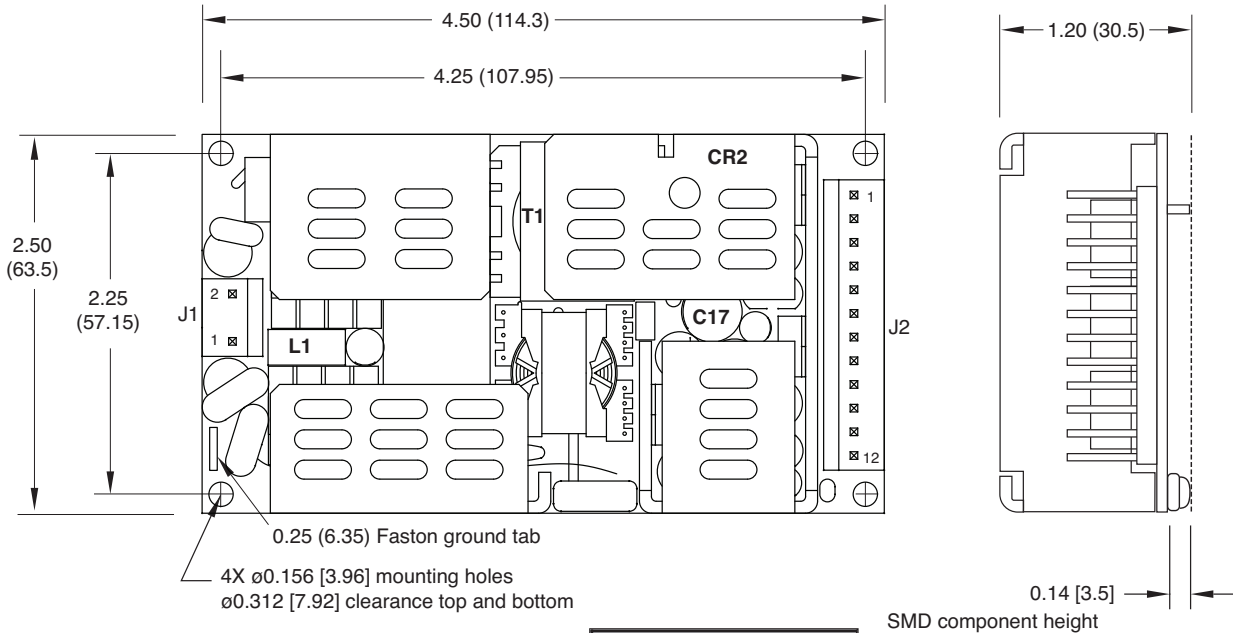
To ensure correct and safe operation of the PSU, the temperature of the components listed in the table below must not be exceeded. See mechanical details for component locations.

| Component | Maximum Temperature |
|-----------|---------------------|
| L1        | 110 °C              |
| T1        | 110 °C              |
| CR3       | 120 °C              |
| C12       | 95 °C               |

## Mechanical Details - Multi Output Models

Weight: approx. 0.4 lb (180g)

Cover dimensions are 4.98 x 3.01 x 1.54 (126.5 x 76.4 x 39.0)



| Input Connector J1 |         |
|--------------------|---------|
| Pin 1              | Line    |
| Pin 2              | Neutral |

J1 mates with Molex housing 43061-0003 and Molex series 5194 crimp terminals. Ground (0.25 faston) tab standard.

| Output Connector J2 |       |
|---------------------|-------|
| Pin                 | Multi |
| 1                   | +V1   |
| 2                   | +V1   |
| 3                   | +V1   |
| 4                   | +V1   |
| 5                   | RTN   |
| 6                   | RTN   |
| 7                   | RTN   |
| 8                   | RTN   |
| 9                   | +V2   |
| 10                  | +V2   |
| 11                  | ±V3   |
| 12                  | -V4   |

J2 mates with Molex Housing 43061-0012 and Molex series 5194 crimp terminals

### Notes

- All dimensions in inches (mm). Tolerance .xx = ±0.02 (0.50); .xxx = ±0.01 (0.25)
- Cable harness with 300mm wire available. For multi output models (dual and triple output only), order part number ECM100DT LOOM.
- Mating connector kit available. Order part number ECM100 CONKIT.
- Covers available. Order part number ECM100 COVER.

## Thermal Considerations

To ensure correct and safe operation of the PSU, the temperature of the components listed in the table below must not be exceeded. See mechanical details for component locations.

| Component | Maximum Temperature |
|-----------|---------------------|
| L1        | 110 °C              |
| T1        | 110 °C              |
| CR2       | 120 °C              |
| C17       | 95 °C               |