

# 5-30 Watts

## ECL Series



GREEN•POWER

- Ultra Compact Size
- Single, Dual & Triple Outputs
- Open Frame PCB & Chassis Mount
- Encapsulated PCB & Chassis Mount
- <0.3 W No Load Input Power
- Peak Load Capability
- 3 Year Warranty

### Specification

#### Input

|                       |                                                                                                           |
|-----------------------|-----------------------------------------------------------------------------------------------------------|
| Input Voltage         | • 85-264 VAC (120-370 VDC)                                                                                |
| Input Frequency       | • 47-63 Hz                                                                                                |
| Input Current         | • ECL05: 0.1 A rms, ECL10: 0.2 A rms<br>ECL15: 0.3 A rms, ECL25: 0.4 A rms<br>ECL30: 0.8 A rms at 230 VAC |
| Inrush Current        | • 20 A at 115 VAC, 40 A at 230 VAC, cold start at 25 °C                                                   |
| Earth Leakage Current | • Class II construction no earth                                                                          |
| Power Factor          | • EN61000-3-2, class A                                                                                    |
| No Load Input Power   | • <0.3 W                                                                                                  |
| Input Protection      | • ECL05/10: Internal T1 A/250 VAC fuse<br>ECL15/25/30: Internal T2 A/250 VAC fuse                         |

#### Output

|                          |                                                                                                                                                                                                         |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output Voltage           | • See tables                                                                                                                                                                                            |
| Output Voltage Trim      | • $\pm 5\%$ on output 1 only, on multiple output versions, V2 & V3 will track by same percentage, (not '-E' or '-S' versions)                                                                           |
| Initial Set Accuracy     | • $\pm 1\%$ for output 1,<br>$\pm 1\%$ for output 2 of UD01 & UD02 versions,<br>$\pm 5\%$ for output 2 & output 3 of other versions                                                                     |
| Minimum Load             | • Single output versions: none,<br>Multi output versions:<br>UD01 & UD02: 10% V1 & V2<br>UD03: 10% V1, 20% V2<br>UT02 & UT03: 10% V1, 20% V2 & V3 to meet regulation specifications                     |
| Start Up Delay           | • 3 s max                                                                                                                                                                                               |
| Start Up Rise Time       | • 14 ms max                                                                                                                                                                                             |
| Hold Up Time             | • 16 ms typical for single output versions,<br>12 ms typical for multiple output versions, at full load & 115 VAC                                                                                       |
| Line Regulation          | • $\pm 0.5\%$ max for single output versions and output 1 of multiple output versions,<br>$\pm 0.9\%$ max for output 2 & output 3 of multiple output versions                                           |
| Load Regulation          | • 1% max for single output versions, for multiple output versions (see note 5)                                                                                                                          |
| Cross Regulation         | • Multi output versions only (see note 5)                                                                                                                                                               |
| Transient Response       | • 4% max deviation, recovery to within 1% in 500 $\mu$ s for a 25% load change                                                                                                                          |
| Ripple & Noise           | • Single output versions:<br>3.3-5 V versions: 50 mV pk-pk,<br>12-15 V versions: 120 mV pk-pk,<br>24-48 V versions: 200 mV pk-pk,<br>Multiple output versions: 1% pk-pk on any output, 20 MHz bandwidth |
| Overvoltage Protection   | • 115-140% Vnom, recycle input to reset                                                                                                                                                                 |
| Overload Protection      | • Single output versions: ECL05/10/15: 120-150%, ECL25: 120-170% of total power<br>Multiple output versions: 140-200% of total power                                                                    |
| Short Circuit Protection | • Trip and restart (hiccup mode)                                                                                                                                                                        |
| Temperature Coefficient  | • 0.05%/°C                                                                                                                                                                                              |

#### General

|                     |                                                                                                                                                                                                                                                                         |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Efficiency          | • See tables                                                                                                                                                                                                                                                            |
| Isolation           | • 3000 VAC Input to Output                                                                                                                                                                                                                                              |
| Switching Frequency | • 70 kHz typical                                                                                                                                                                                                                                                        |
| Power Density       | • ECL05: 2.25 W/In <sup>3</sup> (PCB Mount version)<br>ECL10: 5.50 W/In <sup>3</sup> (PCB Mount version)<br>ECL15: 5.30 W/In <sup>3</sup> (PCB Mount version)<br>ECL25: 5.90 W/In <sup>3</sup> (PCB Mount version)<br>ECL30: 7.10 W/In <sup>3</sup> (PCB Mount version) |
| MTBF                | • ECL05/10: >450 kHrs,<br>ECL15/25/30: >400 kHrs,<br>to MIL-HDBK-217F at 25 °C, GB                                                                                                                                                                                      |

#### Environmental

|                       |                                                                          |
|-----------------------|--------------------------------------------------------------------------|
| Operating Temperature | • -20 °C to +70 °C, derate linearly from 100% at +50 °C to 50% at +70 °C |
| Cooling               | • Convection-cooled                                                      |
| Operating Humidity    | • 95% RH, non-condensing                                                 |
| Storage Temperature   | • -40 °C to +85 °C                                                       |
| Operating Altitude    | • 3000 m                                                                 |
| Vibration             | • 2 g, 10 Hz to 500 Hz, 10 mins/cycle, 60 mins each cycle                |

#### EMC & Safety

|                      |                                                                                       |
|----------------------|---------------------------------------------------------------------------------------|
| Emissions            | • EN55022, level B conducted & radiated                                               |
| Harmonic Currents    | • EN61000-3-2, class A                                                                |
| Voltage Flicker      | • EN61000-3-3                                                                         |
| ESD Immunity         | • EN61000-4-2, level 3 Perf Criteria A                                                |
| Radiated Immunity    | • EN61000-4-3, 10 V/m 80% mod 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, 10 Vrms Perf Criteria A                                                |
| Magnetic Fields      | • EN61000-4-8, 10 A/m, Perf Criteria A                                                |
| Dips & Interruptions | • EN61000-4-11, 30% for 10 ms, 60% for 100 ms, 100% for 5000 ms Perf Criteria A, B, B |
| Safety Approvals     | • IEC60950-1, EN60950-1, UL60950-1, CSA22.2 No. 234 per cUL                           |

## Models and Ratings

ECL05/10 XP

| Output Power | Output Voltage | Output Current |                     | Efficiency | Model Number <sup>(2)</sup> |
|--------------|----------------|----------------|---------------------|------------|-----------------------------|
|              |                | Nominal        | Peak <sup>(1)</sup> |            |                             |
| 4.3 W        | 3.3 VDC        | 1.30 A         | 1.69 A              | 72%        | ECL05US03†^                 |
| 5.0 W        | 5.0 VDC        | 1.00 A         | 1.30 A              | 75%        | ECL05US05†^                 |
| 5.0 W        | 9.0 VDC        | 0.55 A         | 0.71 A              | 78%        | ECL05US09†^                 |
| 5.0 W        | 12.0 VDC       | 0.41 A         | 0.54 A              | 78%        | ECL05US12†^                 |
| 5.0 W        | 15.0 VDC       | 0.33 A         | 0.44 A              | 80%        | ECL05US15†^                 |
| 5.0 W        | 24.0 VDC       | 0.21 A         | 0.27 A              | 82%        | ECL05US24†^                 |
| 5.0 W        | 48.0 VDC       | 0.10 A         | 0.13 A              | 82%        | ECL05US48†^                 |
| 8.6 W        | 3.3 VDC        | 2.60 A         | 3.38 A              | 72%        | ECL10US03†^                 |
| 10.0 W       | 5.0 VDC        | 2.00 A         | 2.60 A              | 75%        | ECL10US05†^                 |
| 10.0 W       | 9.0 VDC        | 1.10 A         | 1.43 A              | 78%        | ECL10US09†^                 |
| 10.0 W       | 12.0 VDC       | 0.83 A         | 1.08 A              | 78%        | ECL10US12†^                 |
| 10.0 W       | 15.0 VDC       | 0.67 A         | 0.87 A              | 80%        | ECL10US15†^                 |
| 10.0 W       | 24.0 VDC       | 0.42 A         | 0.55 A              | 82%        | ECL10US24†^                 |
| 10.0 W       | 48.0 VDC       | 0.21 A         | 0.27 A              | 82%        | ECL10US48†^                 |

## Notes

1. Peak load lasting <30 s with a maximum duty cycle of 10%, average output power not to exceed nominal.

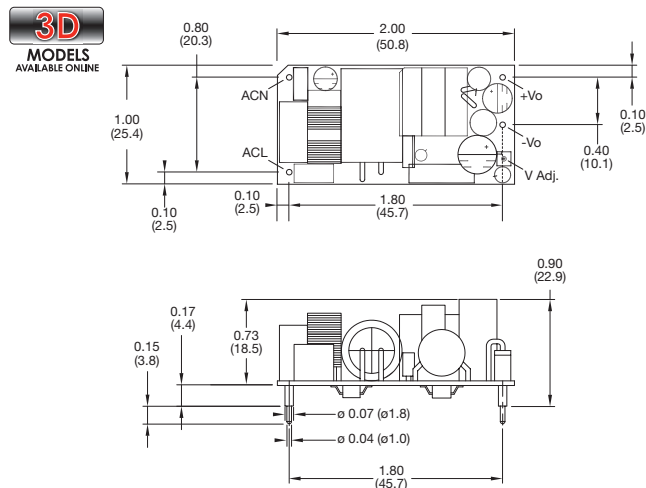
2. Add suffix to model number to define type: add '-P' for PCB mount, add '-T' for chassis mount, add '-E' for encapsulated.

† Available from Farnell & element14. See pages 284-290.

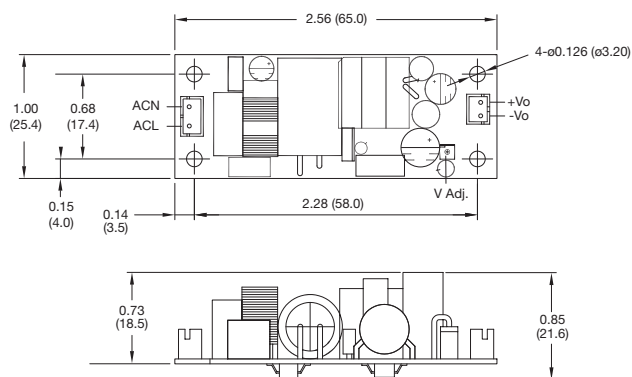
^ Available from Newark. See pages 291-296.

## Mechanical Details

## Open Frame - PCB Mount (-P)



## Open Frame - Chassis Mount (-T)



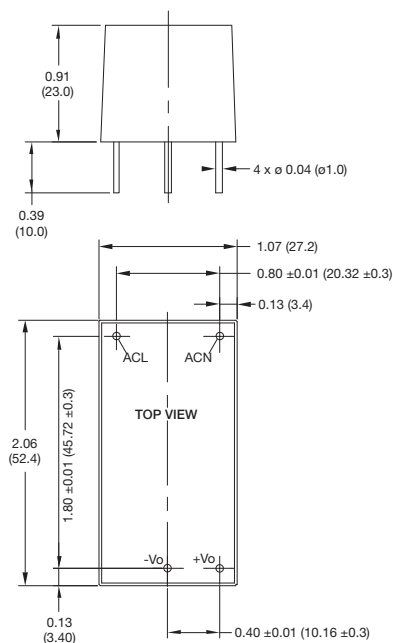
## Notes

1. All dimensions in inches (mm).

2. Weight: ECL05/10 P Version: 0.057 lbs (26 g)  
ECL05/10 T Version: 0.057 lbs (26 g)  
ECL05/10 E Version: 0.13 lbs (60 g)

3. Tolerances: x.xx = ± 0.02 (x.x = ± 0.5)  
x.xxx = ± 0.01 (x.xx = ± 0.25)

## Encapsulated (-E)



## Mating Connectors (-T version only)

Input Connector: JST PHR-3

Output Connector: JST PHR-2

Crimps: SPH-002T-P0.5S

Cable harness with 300 mm wire available, order part no. ECL10 LOOM KIT

## Models and Ratings

| Output Power | Output Voltage | Output Current |                     | Efficiency | Model Number <sup>(2,3)</sup> |
|--------------|----------------|----------------|---------------------|------------|-------------------------------|
|              |                | Nominal        | Peak <sup>(1)</sup> |            |                               |
| 10 W         | 3.3 VDC        | 3.00 A         | 3.90 A              | 75%        | ECL15US03†^                   |
| 15 W         | 5.0 VDC        | 3.00 A         | 3.90 A              | 78%        | ECL15US05†^                   |
| 15 W         | 9.0 VDC        | 1.67 A         | 2.17 A              | 80%        | ECL15US09†^                   |
| 15 W         | 12.0 VDC       | 1.25 A         | 1.62 A              | 80%        | ECL15US12†^                   |
| 15 W         | 15.0 VDC       | 1.00 A         | 1.30 A              | 80%        | ECL15US15†^                   |
| 15 W         | 24.0 VDC       | 0.63 A         | 0.82 A              | 82%        | ECL15US24†^                   |
| 15 W         | 48.0 VDC       | 0.32 A         | 0.41 A              | 82%        | ECL15US48†^                   |

## Notes

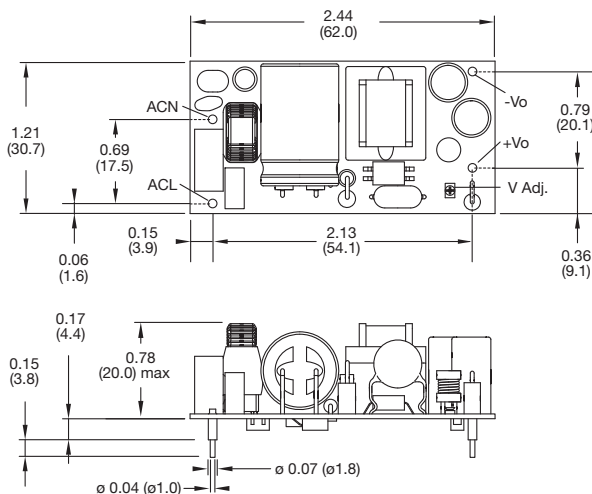
1. Peak load lasting <30 s with a maximum duty cycle of 10%, average output power not to exceed nominal.
2. Add suffix to model number to define type: add '-P' for PCB mount, add '-T' for chassis mount, add '-E' for encapsulated, add '-S' for screw terminals.
3. A screw terminal version (-S) is available with DIN clip attached, add suffix 'D', e.g. ECL15US24-SD, DIN rail mounting kit is available as a separate item, order code ECL15 DIN CLIP.
4. For medically-approved 15 W power supplies contact sales or see [www.xppower.com](http://www.xppower.com) for details of CU15-M series and VCP15 series.

† Available from Farnell &amp; element14. See pages 284-290.

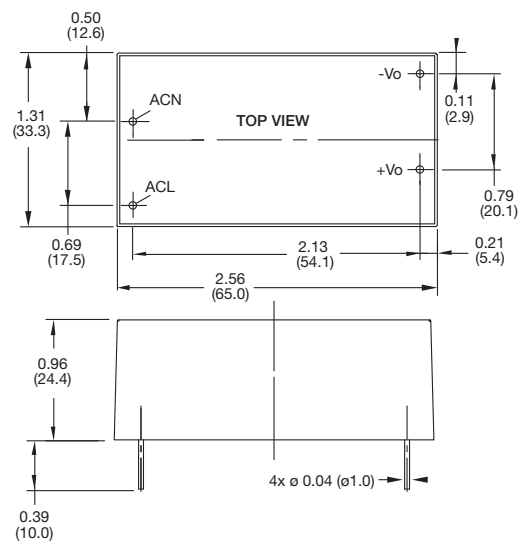
^ Available from Newark. See pages 291-296.

## Mechanical Details

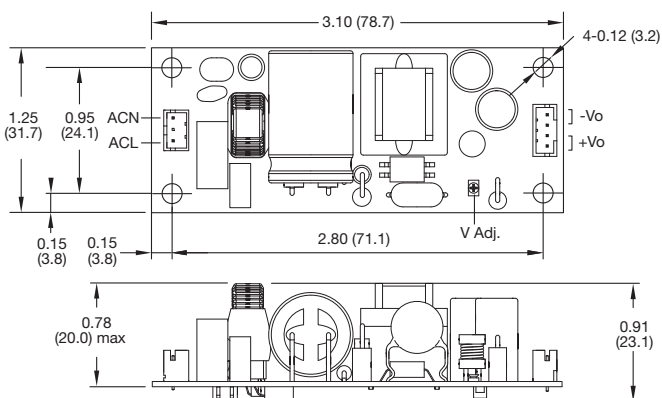
## Open Frame - PCB Mount (-P)



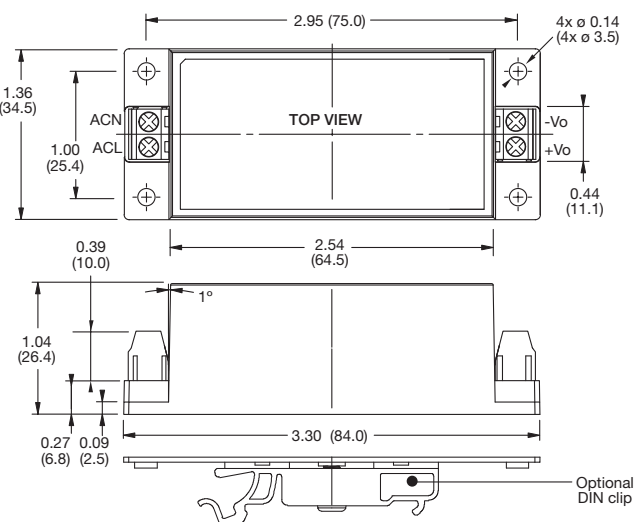
## Encapsulated (-E)



## Open Frame - Chassis Mount (-T)



## Screw Terminal (-S)



## Notes

1. All dimensions in inches (mm).
2. Weight: ECL15 P Version: 0.07 lbs (35 g)  
T Version: 0.07 lbs (35 g)  
E Version: 0.20 lbs (90 g)  
S Version: 0.24 lbs (110 g)
3. Tolerances: x.xx = ± 0.02 (x.x = ± 0.5)  
x.xxx = ± 0.01 (x.xx = ± 0.25)

## Mating Connectors (-T version only)

Input Connector: JST PHR-3

Output Connector: JST PHR-4

Crimps: SPH-002T-P0.5S

Cable harness with 300 mm wire available, order part no. ECL15 LOOM KIT

## Models and Ratings

ECL15UD/UT **XP**

| Output Power | Output 1             |                        | Output 2              |                        | Output 3 |                        | Model Number <sup>(3,4)</sup> |
|--------------|----------------------|------------------------|-----------------------|------------------------|----------|------------------------|-------------------------------|
|              | Voltage              | Current <sup>(2)</sup> | Voltage               | Current <sup>(2)</sup> | Voltage  | Current <sup>(2)</sup> |                               |
| 15 W         | +12.0 V              | 0.65 A                 | -12.0 V               | 0.650 A                |          |                        | ECL15UD01†^                   |
| 15 W         | +15.0 V              | 0.50 A                 | -15.0 V               | 0.500 A                |          |                        | ECL15UD02†^                   |
| 15 W         | 5.0 V <sup>(1)</sup> | 1.50 A                 | 12.0 V <sup>(1)</sup> | 0.625 A                |          |                        | ECL15UD03†                    |
| 15 W         | 5.0 V <sup>(1)</sup> | 2.00 A                 | +12.0 V               | 0.200 A                | -12.0 V  | 0.20 A                 | ECL15UT02†^                   |
| 15 W         | 5.0 V <sup>(1)</sup> | 2.00 A                 | +15.0 V               | 0.150 A                | -15.0 V  | 0.15 A                 | ECL15UT03†^                   |

## Notes

1. Isolated output
2. Peak load of 130% lasting <30 s with a maximum duty cycle of 10%, average output power not to exceed nominal.
3. Add suffix to model number to define type: add '-P' for PCB mount, add '-T' for chassis mount, add '-E' for encapsulated, add '-S' for screw terminals.
4. A screw terminal version (-S) is available with DIN clip attached, add suffix 'D' e.g. ECL15UT02-SD, DIN rail mounting kit is available as a separate item, order code ECL15 DIN CLIP.

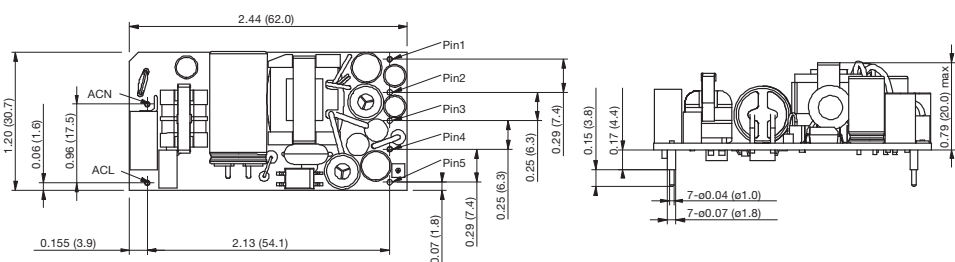
† Available from Farnell & element14. See pages 284-290.

5. UD01/UD02: Load regulation <3%, 10-100% load.  
Cross regulation <3%, one output fixed, the other varied from 10-100% load
- UD03: Load regulation <1% V1, <10% V2  
Cross regulation <10% V2, V1 varied from 10-100% load
- UT02/UT03: Load regulation <1% V1, <10% V2 & V3  
Cross regulation <10% V2 & V3, V2 & V3 at 50% load & V1 varied from 20-100% load

^ Available from Newark. See pages 291-296.

## Mechanical Details

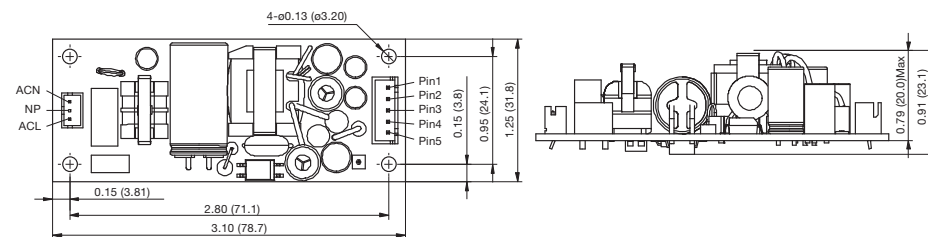
## Open Frame - PCB Mount (-P)



| Pin | UD01/02 | UD03   | UT02/03 |
|-----|---------|--------|---------|
| 1   | V2      | NP     | V3      |
| 2   | NP      | V2 RTN | COM     |
| 3   | COM     | V2     | V2      |
| 4   | V1      | V1     | V1      |
| 5   | NP      | V1 RTN | V1 RTN  |

NP = No pin.

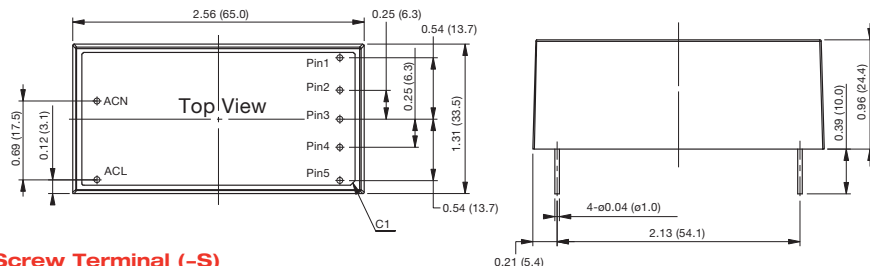
## Open Frame - Chassis Mount (-T)



| Pin | UD01/02 | UD03   | UT02/03 |
|-----|---------|--------|---------|
| 1   | V2      | NC     | V3      |
| 2   | COM     | V2 RTN | COM     |
| 3   | COM     | V2     | V2      |
| 4   | COM     | V1     | V1      |
| 5   | V1      | V1 RTN | V1 RTN  |

NC = No connection.

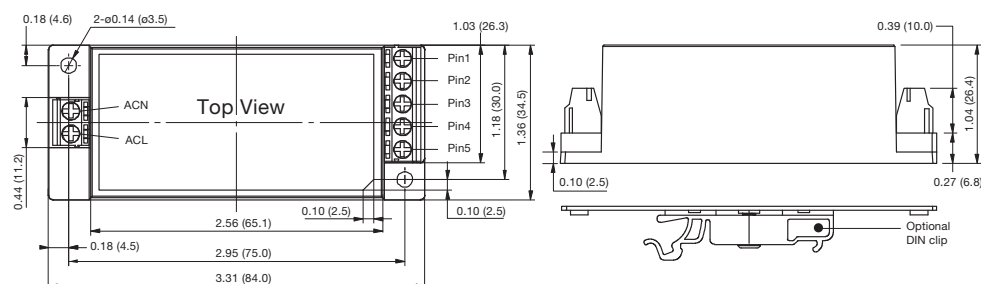
## Encapsulated (-E)



| Pin | UD01/02 | UD03   | UT02/03 |
|-----|---------|--------|---------|
| 1   | V2      | NP     | V3      |
| 2   | NP      | V2 RTN | COM     |
| 3   | COM     | V2     | V2      |
| 4   | V1      | V1     | V1      |
| 5   | NP      | V1 RTN | V1 RTN  |

NP = No pin.

## Screw Terminal (-S)



| Pin | UD01/02 | UD03   | UT02/03 |
|-----|---------|--------|---------|
| 1   | V2      | NC     | V3      |
| 2   | COM     | V2 RTN | COM     |
| 3   | COM     | V2     | V2      |
| 4   | COM     | +V1    | V1      |
| 5   | V1      | V1 RTN | V1 RTN  |

NC = No connection.

## Notes

1. All dimensions in inches (mm).
2. Tolerances: x.xx = ± 0.02 (x.x = ± 0.5)  
x.xxx = ± 0.01 (x.xx = ± 0.25)

3. Weight: ECL15 UD/UT: P Version: 0.09 lbs (40 g)  
T Version: 0.09 lbs (40 g)  
E Version: 0.21 lbs (95 g)  
S Version: 0.26 lbs (120 g)

## Mating Connectors (-T version only)

Input Connector: JST PHR-3  
Output Connector: JST XHP-5

## Models and Ratings

ECL25 **XP**

| Output Power | Output Voltage | Output Current |                     | Efficiency | Model Number <sup>(2,3)</sup> |
|--------------|----------------|----------------|---------------------|------------|-------------------------------|
|              |                | Nominal        | Peak <sup>(1)</sup> |            |                               |
| 20 W         | 3.3 VDC        | 6.00 A         | 7.80 A              | 75%        | ECL25US03†^                   |
| 25 W         | 5.0 VDC        | 5.00 A         | 6.50 A              | 78%        | ECL25US05†^                   |
| 25 W         | 9.0 VDC        | 2.80 A         | 3.64 A              | 80%        | ECL25US09†^                   |
| 25 W         | 12.0 VDC       | 2.10 A         | 2.73 A              | 80%        | ECL25US12†^                   |
| 25 W         | 15.0 VDC       | 1.67 A         | 2.17 A              | 80%        | ECL25US15†^                   |
| 25 W         | 24.0 VDC       | 1.04 A         | 1.35 A              | 82%        | ECL25US24†^                   |
| 25 W         | 48.0 VDC       | 0.52 A         | 0.68 A              | 82%        | ECL25US48†^                   |

## Notes

1. Peak load lasting <30 s with a maximum duty cycle of 10%, average output power not to exceed nominal.
2. Add suffix to model number to define type: add '-P' for PCB mount, add '-T' for chassis mount, add '-E' for encapsulated, add '-S' for screw terminals.

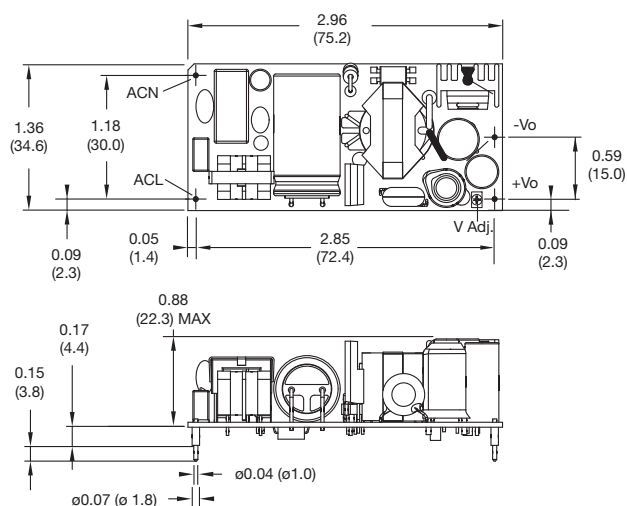
† Available from Farnell & element14. See pages 284-290.

3. A screw terminal version (-S) is available with DIN clip attached, add suffix 'D', e.g. ECL25US24-SD, DIN rail mounting kit is available as a separate item, order code ECL25/30 DIN CLIP.

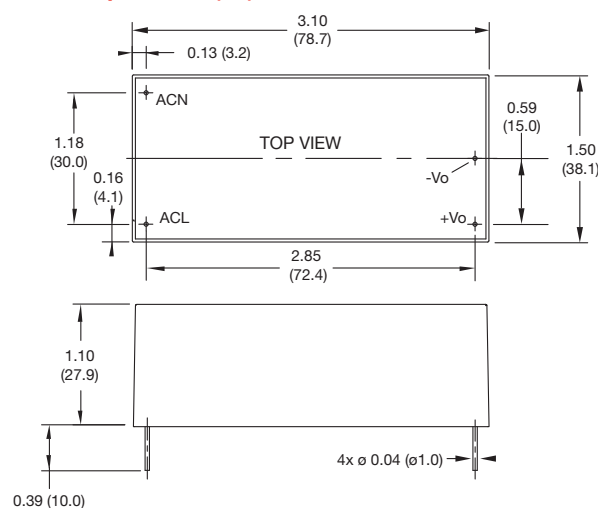
^ Available from Newark. See pages 291-296.

## Mechanical Details

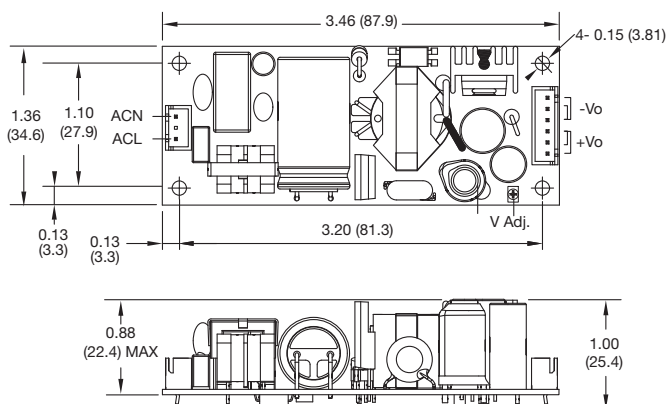
## Open Frame - PCB Mount (-P)



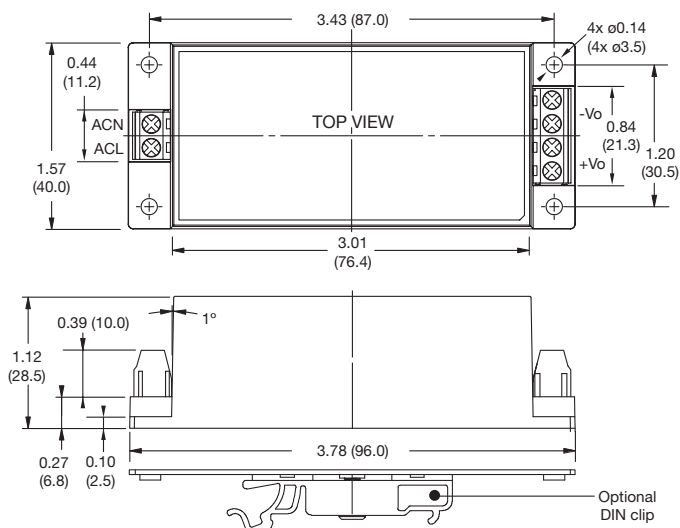
## Encapsulated (-E)



## Open Frame - Chassis Mount (-T)



## Screw Terminal (-S)



## Notes

1. All dimensions in inches (mm).
2. Weight: ECL25: P Version: 0.14 lbs (66 g)  
T Version: 0.14 lbs (66 g)  
E Version: 0.33 lbs (150 g)  
S Version: 0.37 lbs (170 g)
3. Tolerances: x.xx = ± 0.02 (x.x = ± 0.5)  
x.xxx = ± 0.01 (x.xx = ± 0.25)

## Mating Connectors (-T version only)

Input Connector: JST XHP-3  
Output Connector: JST XHP-6  
Crimps: SXH-002T-P0.6  
Cable harness with 300 mm wire available, order part no. ECL25 LOOM KIT

## Models and Ratings

ECL30UD/UT **XP**

| Output Power | Output 1             |                        | Output 2              |                        | Output 3 |                        | Model Number <sup>(3,4)</sup> |
|--------------|----------------------|------------------------|-----------------------|------------------------|----------|------------------------|-------------------------------|
|              | Voltage              | Current <sup>(2)</sup> | Voltage               | Current <sup>(2)</sup> | Voltage  | Current <sup>(2)</sup> |                               |
| 30 W         | +12.0 V              | 1.3 A                  | -12.0 V               | 1.30 A                 |          |                        | ECL30UD01†^                   |
| 30 W         | +15.0 V              | 1.0 A                  | -15.0 V               | 1.00 A                 |          |                        | ECL30UD02†^                   |
| 30 W         | 5.0 V <sup>(1)</sup> | 3.0 A                  | 12.0 V <sup>(1)</sup> | 1.30 A                 |          |                        | ECL30UD03†^                   |
| 30 W         | 5.0 V <sup>(1)</sup> | 3.0 A                  | +12.0 V               | 0.63 A                 | -12.0 V  | 0.63 A                 | ECL30UT02†^                   |
| 30 W         | 5.0 V <sup>(1)</sup> | 3.0 A                  | +15.0 V               | 0.50 A                 | -15.0 V  | 0.50 A                 | ECL30UT03†^                   |

## Notes

1. Isolated output
2. Peak load of 130% lasting <30 s with a maximum duty cycle of 10%, average output power not to exceed nominal.
3. Add suffix to model number to define type: add '-P' for PCB mount, add '-T' for chassis mount, add '-E' for encapsulated, add '-S' for screw terminals.
4. A screw terminal version (-S) is available with DIN clip attached, add suffix 'D' e.g. ECL30UT02-SD, DIN rail mounting kit is available as a separate item, order code ECL25/30 DIN CLIP.

† Available from Farnell &amp; element14. See pages 284-290.

5. UD01/UD02: Load regulation <3%, 10-100% load.

Cross regulation &lt;3%, one output fixed, the other varied from 10-100% load

UD03: Load regulation &lt;1% V1, &lt;10% V2

Cross regulation &lt;10% V2, V1 varied from 10-100% load

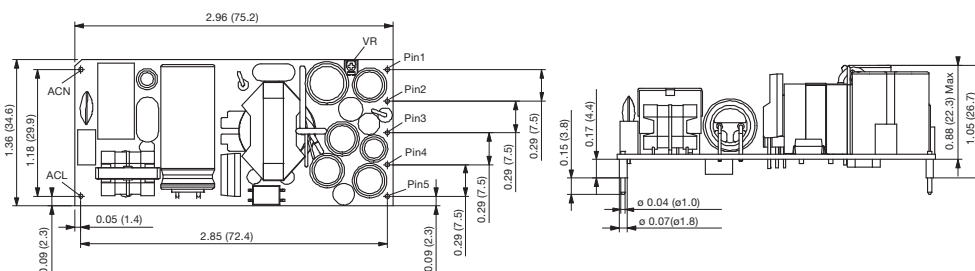
UT02/UT03: Load regulation &lt;1% V1, &lt;10% V2 &amp; V3

Cross regulation &lt;10% V2 &amp; V3, V2 &amp; V3 at 50% load &amp; V1 varied from 20-100% load

^ Available from Newark. See pages 291-296.

## Mechanical Details

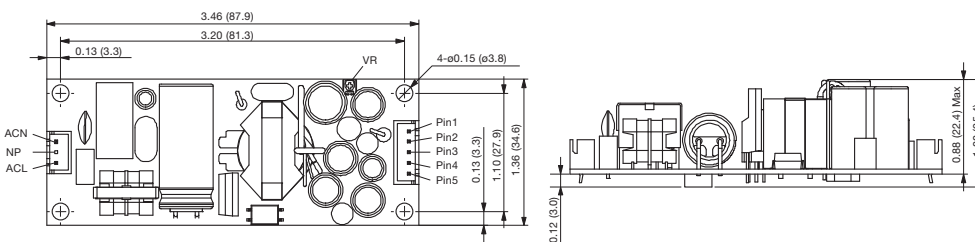
## Open Frame - PCB Mount (-P)



| Pin | UD01/02 | UD03   | UT02/03 |
|-----|---------|--------|---------|
| 1   | NP      | V1 RTN | V1 RTN  |
| 2   | NP      | V1     | V1      |
| 3   | V2      | NP     | V3      |
| 4   | COM     | V2 RTN | COM     |
| 5   | V1      | V2     | V2      |

NP = No pin.

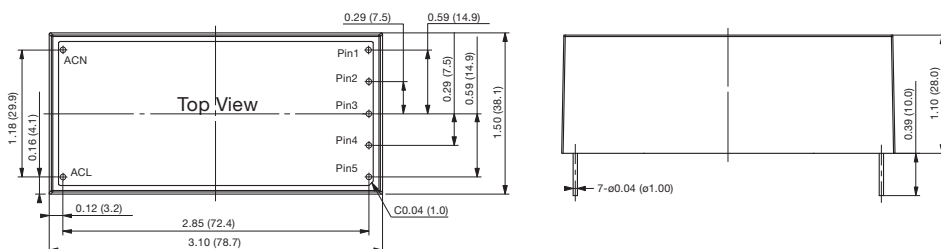
## Open Frame - Chassis Mount (-T)



| Pin | UD01/02 | UD03   | UT02/03 |
|-----|---------|--------|---------|
| 1   | V2      | V1 RTN | V1 RTN  |
| 2   | COM     | V1     | V1      |
| 3   | COM     | NC     | V3      |
| 4   | COM     | V2 RTN | COM     |
| 5   | V1      | V2     | V2      |

NC = No connection.

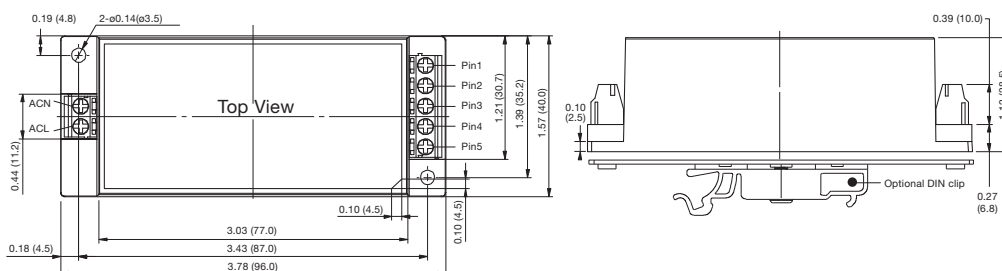
## Encapsulated (-E)



| Pin | UD01/02 | UD03   | UT02/03 |
|-----|---------|--------|---------|
| 1   | NP      | V1 RTN | V1 RTN  |
| 2   | NP      | V1     | V1      |
| 3   | V2      | NP     | V3      |
| 4   | COM     | V2 RTN | COM     |
| 5   | V1      | V2     | V2      |

NP = No pin.

## Screw Terminal (-S)



| Pin | UD01/02 | UD03   | UT02/03 |
|-----|---------|--------|---------|
| 1   | V2      | V1 RTN | V3      |
| 2   | COM     | V1     | COM     |
| 3   | COM     | NC     | V2      |
| 4   | COM     | V2 RTN | V1      |
| 5   | V1      | V2     | V1 RTN  |

NC = No connection.

## Notes

1. All dimensions in inches (mm).
2. Tolerances: x.xx = ± 0.02 (x.x = ± 0.5)  
x.xxx = ± 0.01 (x.xx = ± 0.25)

3. Weight: ECL30 UD/UT: P Version: 0.13 lbs (60 g)  
T Version: 0.13 lbs (60 g)  
E Version: 0.34 lbs (155 g)  
S Version: 0.39 lbs (175 g)

## Mating Connectors (-T version only)

Input Connector: JST XHP-3

Output Connector: JST XHP-5