

### 3 Watts

- Ultra Compact SIL Package
- Single Outputs from 3.3 to 48VDC
- PCB Mount
- Encapsulated & Open Frame
- 85 to 305VAC Input
- ITE & Household Appliance Approvals
- Class II
- <0.3 W No Load Input Power
- Low Cost
- 3 Year Warranty



#### Dimensions:

**VCE03:**  
1.60 x 0.75 x 0.75" (40.6 x 19.10 x 19.10 mm)  
**VCE03-P:**  
1.50 x 0.65 x 0.65" (38.1 x 16.5 x 16.5 mm)

The VCE03 is a series of open frame and encapsulated AC-DC single output power supplies designed for low cost ITE industrial and domestic applications. The series provides two mechanical options including open frame and encapsulated PCB mount. With approvals to world-wide safety standards including ITE and household, compliance with class B for conducted and radiated emissions, these class II isolation parts benefit system designers with easy integration into a wide range of applications.

### Models & Ratings

| Output Power | Output Voltage | Output Current | Model Number <sup>(1)</sup> |
|--------------|----------------|----------------|-----------------------------|
| 3 W          | 3.3VDC         | 910 mA         | VCE03US03                   |
| 3 W          | 5.0VDC         | 600 mA         | VCE03US05                   |
| 3 W          | 9.0VDC         | 333 mA         | VCE03US09                   |
| 3 W          | 12.0VDC        | 250 mA         | VCE03US12                   |
| 3 W          | 15.0VDC        | 200 mA         | VCE03US15                   |
| 3 W          | 24.0VDC        | 125 mA         | VCE03US24                   |
| 3 W          | 48.0VDC        | 63 mA          | VCE03US48                   |

### Notes

1. For Open Frame version add suffix -P to model number, e.g. VCE03US12-P.

### Summary

| Characteristic        | Minimum  | Typical | Maximum | Units | Notes & Conditions                                   |
|-----------------------|--|---------|---------|-------|--|
| Input Voltage Range   | 85   |         | 305     | VAC   | Derate from 100% at 90 VAC to 90% at 85 VAC          |
| No Load Input Power   |  |         | 0.3     | W     |  |
| Efficiency            |  | 80      |         | %     | Model dependant                                      |
| Operating Temperature | -25  |         | +70     | °C    | Derate linearly from 100% at +50 °C to 50% at +70 °C |
| EMC                   | EN55032 Level B Conducted & Radiated, EN601000-3-2, EN61000-3-3, EN55024 |         |         |       |  |
| Safety Approvals      | IEC62368-1, IEC60335-1, IEC60950-1, EN62368-1, EN60335-1, UL62368-1      |         |         |       |  |

### Input

| Characteristic            | Minimum                                       | Typical        | Maximum | Units | Notes & Conditions  |
|---------------------------|---|----------------|---------|-------|---|
| Input Voltage Range       | 85  |                | 305     | VAC   | Covers all standard voltages in range from 100 VAC to 277 VAC |
| Input Frequency           | 47  |                | 63      | Hz    |   |
| Input Current - Full Load |   | 0.10/0.06/0.04 |         | A rms | At 115/230/277 VAC  |
| No Load Input Power       |   |                | 0.3     | W     |   |
| Inrush Current            |   |                | 40/44.2 | A     | At 230/277 VAC, cold start 25 °C                              |
| Earth Leakage Current     |   |                |         |       | Class II construction no earth                                |
| Input Protection          | External T1.0 A/300 VAC fuse required in line |                |         |       |   |

### Output

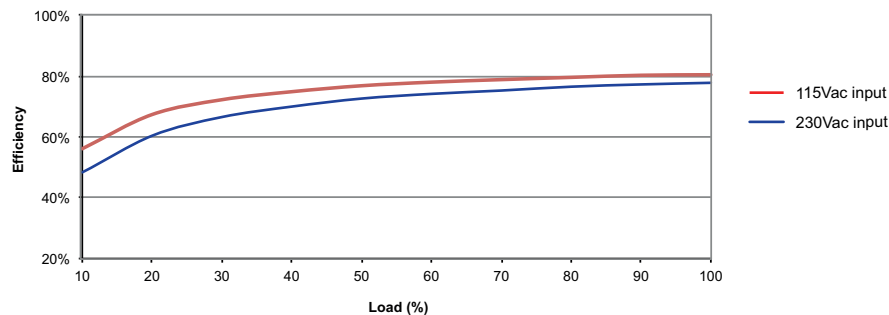
| Characteristic           | Minimum | Typical | Maximum | Units    | Notes & Conditions  |
|--------------------------|---------|---------|---------|----------|---|
| Output Voltage           | 3.3     |         | 48      | VDC      |   |
| Initial Set Accuracy     |         |         | 2/1     | %        | At 50% load for 3.3 & 5 V models/Other models   |
| Minimum Load             | 0       |         |         | A        | No minimum load required  |
| Total Regulation         |         |         | 5/3     | %        | For 3.3 & 5 V models/Other models: from 10% to 100% load. Includes initial set accuracy, line and load regulation. Total regulation is 7% max from 0% to 100% load. |
| Start Up Delay           |         |         | 2       | s        |   |
| Start Up Rise Time       |         |         | 30      | ms       |   |
| Hold Up Time             | 16      | 20      |         | ms       | at full load and 115 VAC  |
| Transient Response       |         |         | 4       | %        | Deviation, recovery within 1% in less than 500 $\mu$ s for a 25% load change  |
| Ripple & Noise           |         |         | 180/120 | mV pk-pk | 3.3 & 5V/9 V models, 20 MHz bandwidth   |
|                          |         |         | 1       | % pk-pk  | 12 V to 48 V models, 20 MHz bandwidth   |
| Overvoltage Protection   | 115     |         | 140     | % Vnom   | 210% typical for 3.3 V models, auto recovery  |
| Overload Protection      | 110     |         | 180     | %        |   |
| Short Circuit Protection |         |         |         |          | Trip & Restart (hiccup mode)  |
| Temperature Coefficient  |         |         | 0.02    | %/°C     |   |

### General

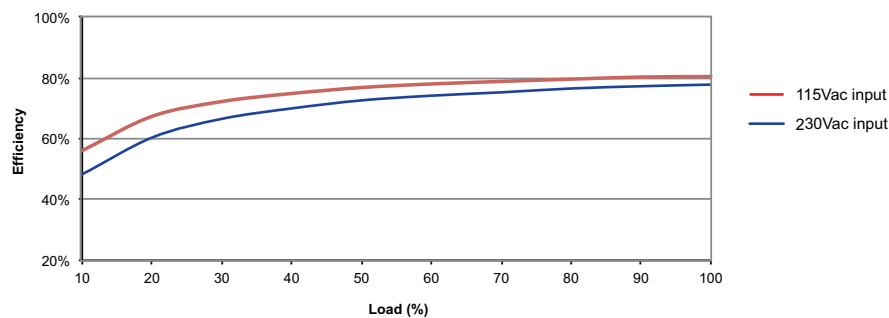
| Characteristic             | Minimum | Typical    | Maximum | Units             | Notes & Conditions          |
|----------------------------|---------|------------|---------|-------------------|-----------------------------|
| Efficiency                 |         | 80         |         | %                 | At 115 VAC, Model Dependant |
| Isolation: Input to Output | 3000    |            |         | VAC               |                             |
| Switching Frequency        | 5       |            | 52      | kHz               | Varies with load            |
| Power Density              |         |            | 4.7     | W/in <sup>3</sup> | For '-P' version            |
| Mean Time Between Failure  | 400     |            |         | kHrs              | MIL-HDBK-217F, +25 °C GB    |
| Weight                     |         | 0.025 (11) |         | lb (g)            | Open frame versions (-P)    |
|                            |         | 0.067 (30) |         | lb (g)            | Encapsulated version        |

### Efficiency Graphs

#### VCE03US12-P



#### VCE03US24-P



### Environmental

| Characteristic        | Minimum   | Typical | Maximum | Units | Notes & Conditions                                   |
|-----------------------|---|---------|---------|-------|--|
| Operating Temperature | -25   |         | +70     | °C    | Derate linearly from 100% at +50 °C to 50% at +70 °C |
| Storage Temperature   | -40   |         | +85     | °C    |  |
| Cooling               |   |         |         |       | Convection-cooled                                    |
| Humidity              |   |         | 95      | %RH   | Non-condensing                                       |
| Operating Altitude    |   |         | 3048    | m     |  |
| Shock                 | IEC68-2-27, 30 g, 11 ms half sine, 3 times in each of 6 axes        |         |         |       |  |
| Vibration             | IEC68-2-6, 2 g, 10 Hz to 500 kHz, 10 mins/cycle, 60 mins each cycle |         |         |       |  |

### EMC: Emissions

| Phenomenon       | Standard    | Test Level | Criteria | Notes & Conditions  |
|------------------|-------------|------------|----------|---|
| Conducted        | EN55032     | Class B    |          | If output is connected to a ground additional external components will be required. Contact sales for details |
| Radiated         | EN55032     | Class B    |          |   |
| Harmonic Current | EN61000-3-2 |            |          | Class A   |
| Voltage Flicker  | EN61000-3-3 |            |          |   |

### EMC: Immunity

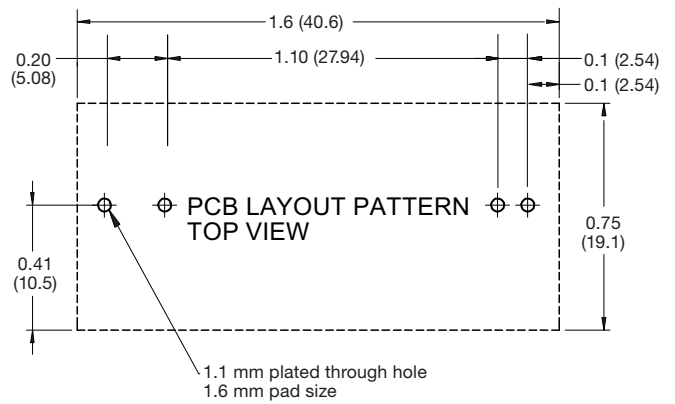
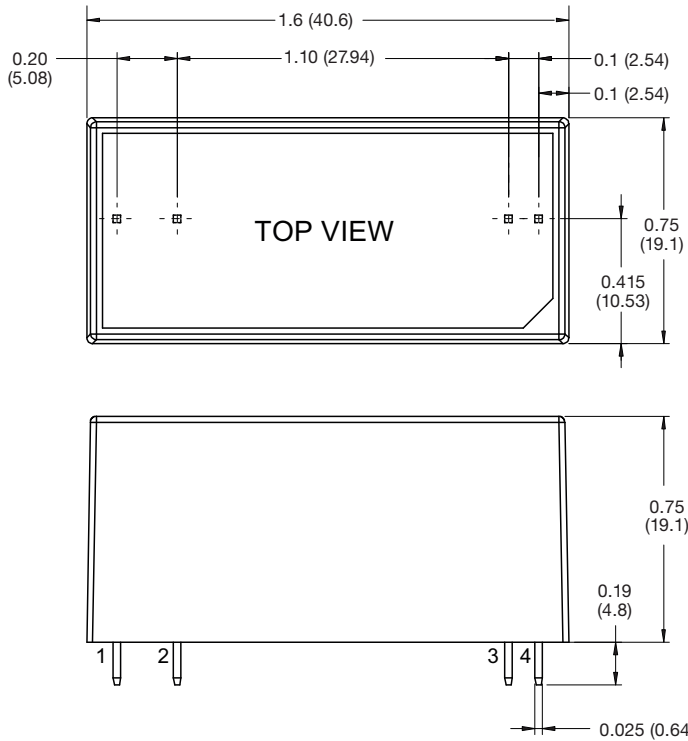
| Phenomenon                           | Standard               | Test Level                               | Criteria | Notes & Conditions            |
|--------------------------------------|------------------------|--|----------|-------------------------------|
| ESD                                  | EN61000-4-2            | ±6kV contact,<br>±8kV air discharge      | A        |                               |
| Radiated                             | EN61000-4-3            | 10 V/m                                   | A        |                               |
| EFT                                  | EN61000-4-4            | 3  | A        |                               |
| Surge                                | EN61000-4-5            | 2  | A        | Line to Line                  |
| Conducted                            | EN61000-4-6            | 10 Vrms                                  | A        |                               |
| Magnetic Fields                      | EN61000-4-8            | 30 A/m                                   | A        |                               |
| Dips and Interruptions               | EN61000-4-11 (115 VAC) | 70% U <sub>r</sub> (80.5 VAC) for 100 ms | A        | A at High Line, B at Low Line |
|                                      |                        | 40% U <sub>r</sub> (46 VAC) for 200 ms   | B        |                               |
|                                      |                        | <5% U <sub>r</sub> (0 VAC) for 10 ms     | A        |                               |
|                                      |                        | <5% U <sub>r</sub> (0 VAC) for 5000 ms   | B        |                               |
|                                      | EN61000-4-11 (230 VAC) | 70% U <sub>r</sub> (161 VAC) for 100 ms  | A        |                               |
|                                      |                        | 40% U <sub>r</sub> (92 VAC) for 200 ms   | A        |                               |
| <5% U <sub>r</sub> (0 VAC) for 10 ms |                        | A  |          |                               |
|                                      |                        | <5% U <sub>r</sub> (0 VAC) for 5000 ms   | B        |                               |

### Safety Approvals

| Safety Agency | Safety Standard | Notes & Conditions              |
|---------------|-----------------|---------------------------------|
| CB            | IEC60950-1      | ITE                             |
|               | IEC62368-1      |                                 |
|               | IEC60335-1      | Household, Encapsulated Version |
|               | IEC61558-1      | Power Supply Units              |
| UL            | UL62368-1       | ITE                             |
| TUV           | EN62368-1       |                                 |

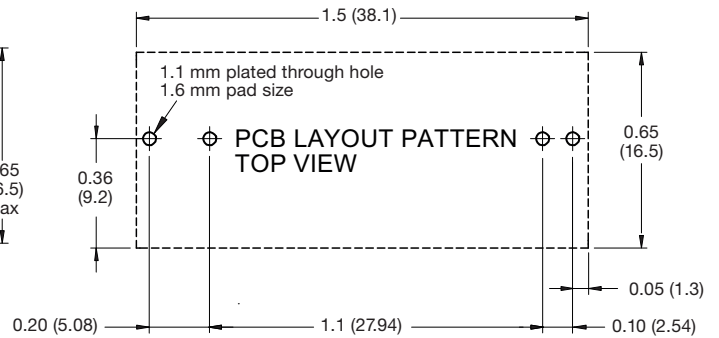
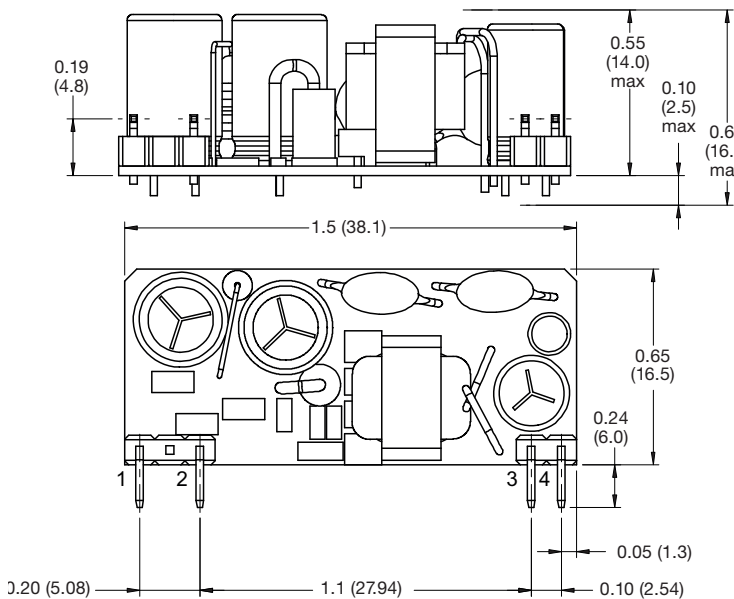
### Mechanical Details

#### Encapsulated



| Pin Connections |        |
|-----------------|--------|
| Pin             | Single |
| 1               | ACL    |
| 2               | ACN    |
| 3               | +Vout  |
| 4               | -Vout  |

#### Open Frame (-P)



#### Notes

- Dimensions in inches (mm).
- Weight: Open frame versions (-P): 0.025 lbs (10 g)  
Encapsulated: 0.067 lbs (30 g)

- Tolerances: x.xx =  $\pm 0.02$  (x.x =  $\pm 0.5$ )  
x.xxx =  $\pm 0.01$  (x.xx =  $\pm 0.25$ )