



# TRE36 SERIES

## 36 WATT AC-DC I.T.E SWITCHING ADAPTER

### Features

- Universal Input Range 90~264Vac
- High Efficiency up to 89%
- Class II
- No Load Power Consumption < 75mW
- Approved IEC/EN/UL 62368-1
- Meets EN55032 Class B and CISPR/FCC Class B
- Operating Altitude 5000m
- Over Voltage Protection
- Continuous Short Circuit Protection
- Meets CoC Tier 2 & DoE Level VI



| MODEL NUMBER | OUTPUT VOLTAGE | OUTPUT CURRENT | VOLTAGE ACCURACY NOTE1 | RIPPLE & NOISE NOTE2 | LINE REGULATION NOTE3 | LOAD REGULATION NOTE4 | %EFF. (Typ.) NOTE5 |
|--------------|----------------|----------------|------------------------|----------------------|-----------------------|-----------------------|--------------------|
| TRE36A050    | 5 V            | 5 A            | ±2%                    | 100 mV               | ±1%                   | ±6%                   | 83%                |
| TRE36A090    | 9 V            | 3.3 A          | ±2%                    | 120 mV               | ±1%                   | ±4%                   | 87%                |
| TRE36A120    | 12 V           | 2.5 A          | ±2%                    | 120 mV               | ±1%                   | ±2%                   | 88%                |
| TRE36A135    | 13.5 V         | 2.4 A          | ±2%                    | 130 mV               | ±1%                   | ±2%                   | 89%                |
| TRE36A150    | 15 V           | 2.4 A          | ±2%                    | 150 mV               | ±1%                   | ±2%                   | 88%                |
| TRE36A180    | 18 V           | 2 A            | ±2%                    | 180 mV               | ±1%                   | ±2%                   | 88%                |
| TRE36A240    | 24 V           | 1.5 A          | ±2%                    | 240 mV               | ±1%                   | ±2%                   | 88%                |
| TRE36A360    | 36 V           | 1 A            | ±2%                    | 360 mV               | ±1%                   | ±2%                   | 89%                |
| TRE36A480    | 48 V           | 0.75 A         | ±2%                    | 480 mV               | ±1%                   | ±2%                   | 89%                |

Note:

1. Voltage accuracy is set at 60% full load.
2. Add a 0.1uF ceramic capacitor and a 10uF E.L. capacitor to output for ripple & noise measuring @20MHz BW.
3. Line regulation is measured from 100V<sub>ac</sub> to 240V<sub>ac</sub> with 100% full load.
4. Load regulation is measured from 60% to 100% full load and from 60% to 20% full load (60%±40% full load).
5. Typical efficiency at 230 Vac and 75% full load at 25°C.
6. Providing specific model number for customer requirement of CCC safety approval.

### PART NUMBER

| Series                  | Output Voltage                                                                                                    | DC Plug Type | Cable Type                                 | Cable Length                                                                                                                                                                  | Optional              |
|-------------------------|-------------------------------------------------------------------------------------------------------------------|--------------|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| TRE36A                  | XXX                                                                                                               | -XX          | X                                          | XX                                                                                                                                                                            | +CCC                  |
| 36W<br>I.T.E<br>Adapter | 050 : 5V<br>090 : 9V<br>120 : 12V<br>135 : 13.5V<br>150 : 15V<br>180 : 18V<br>240 : 24V<br>360 : 36V<br>480 : 48V | See Page 7   | G : UL1571 with OVP<br>E : UL1185 with OVP | 01 : 720mm<br>02 : 1220mm<br>03 : 1800mm<br>11 : 720mm with Ferrite Core<br>12 : 1220mm with Ferrite Core<br>13 : 1800mm with Ferrite Core<br><br>See page 7 for restrictions | Bank or<br>CCC Safety |

Part Number Example:

**TRE36A120-01G03**, 12V<sub>dc</sub> Output, DC Jack Type, Cable Length 1800mm

**TRE36A120-01G03+CCC**, 12V<sub>dc</sub> Output, DC Jack Type, Cable Length 1800mm, CCC Safety



# TRE36 Series

## TECHNICAL SPECIFICATIONS

(All specifications are typical at nominal input, full load at 25°C unless otherwise noted.)

### ABSOLUTE MAXIMUM RATINGS

| PARAMETER             | NOTES and CONDITIONS | Device | Min. | Typ. | Max. | Units    |
|-----------------------|----------------------|--------|------|------|------|----------|
| Input Voltage         | See Derating Curve   | All    | 90   |      | 264  | $V_{ac}$ |
|                       |                      |        | 120  |      | 370  | $V_{dc}$ |
| Operating Temperature | See Derating Curve   | All    | -30  |      | 60   | °C       |
| Storage Temperature   |                      | All    | -30  |      | 85   | °C       |
| Operating Altitude    |                      | All    |      |      | 5000 | m        |

### INPUT CHARACTERISTICS

| PARAMETER               | NOTES and CONDITIONS                    | Device | Min. | Typ. | Max. | Units    |
|-------------------------|-----------------------------------------|--------|------|------|------|----------|
| Operating Voltage Range |                                         | All    | 100  |      | 240  | $V_{ac}$ |
| Input Frequency Range   |                                         | All    | 47   |      | 63   | Hz       |
| Maximum Input Current   | 100% Full load, $V_{in}=100V_{ac}$      | All    |      |      | 0.9  | A        |
| Leakage Current         |                                         | All    |      |      | 250  | uA       |
| Inrush Current          | $V_{in}=240V_{ac}$ , Cold start at 25°C | All    |      |      | 100  | A        |

### OUTPUT CHARACTERISTICS

| PARAMETER                      | NOTES and CONDITIONS                                                          | Device    | Min.  | Typ. | Max.  | Units    |
|--------------------------------|-------------------------------------------------------------------------------|-----------|-------|------|-------|----------|
| Output Voltage Set Point       | $V_{in}=115V_{ac}$ and $230V_{ac}$ , $I_o=60\%$ Full load<br>$T_c=25^\circ C$ | TRE36A050 | 4.9   | 5    | 5.1   | $V_{dc}$ |
|                                |                                                                               | TRE36A090 | 8.82  | 9    | 9.18  |          |
|                                |                                                                               | TRE36A120 | 11.76 | 12   | 12.24 |          |
|                                |                                                                               | TRE36A135 | 13.23 | 13.5 | 13.77 |          |
|                                |                                                                               | TRE36A150 | 14.7  | 15   | 15.3  |          |
|                                |                                                                               | TRE36A180 | 17.64 | 18   | 18.36 |          |
|                                |                                                                               | TRE36A240 | 23.52 | 24   | 24.48 |          |
|                                |                                                                               | TRE36A360 | 35.28 | 36   | 36.72 |          |
|                                |                                                                               | TRE36A480 | 47.04 | 48   | 48.96 |          |
| Operating Output Current Range | $V_{in}=115V_{ac}$ and $230V_{ac}$ , $T_c=25^\circ C$                         | TRE36A050 |       |      | 5     | A        |
|                                |                                                                               | TRE36A090 |       |      | 3.3   |          |
|                                |                                                                               | TRE36A120 |       |      | 2.5   |          |
|                                |                                                                               | TRE36A135 |       |      | 2.4   |          |
|                                |                                                                               | TRE36A150 |       |      | 2.4   |          |
|                                |                                                                               | TRE36A180 |       |      | 2     |          |
|                                |                                                                               | TRE36A240 |       |      | 1.5   |          |
|                                |                                                                               | TRE36A360 |       |      | 1     |          |
|                                |                                                                               | TRE36A480 |       |      | 0.75  |          |
| Holdup Time                    | $V_{in}=115V_{ac}$                                                            | All       |       | 10   |       | ms       |
| Output Voltage Regulation      |                                                                               |           |       |      |       |          |
| Load Regulation                | 60%±40% Full load change                                                      | TRE36A050 |       |      | ±6    | %        |
|                                |                                                                               | TRE36A090 |       |      | ±4    |          |
|                                |                                                                               | TRE36A120 |       |      | ±2    |          |
|                                |                                                                               | TRE36A135 |       |      | ±2    |          |
|                                |                                                                               | TRE36A150 |       |      | ±2    |          |
|                                |                                                                               | TRE36A180 |       |      | ±2    |          |
|                                |                                                                               | TRE36A240 |       |      | ±2    |          |
|                                |                                                                               | TRE36A360 |       |      | ±2    |          |
|                                |                                                                               | TRE36A480 |       |      | ±2    |          |
| Line Regulation                | $V_{in}=100V_{ac}$ to $240V_{ac}$                                             | All       |       |      | ±1.0  | %        |



# TRE36 Series

| PARAMETER                | NOTES and CONDITIONS                                                                                                                                        | Device                                                                                                            | Min. | Typ.                                               | Max.                                                                 | Units           |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|------|----------------------------------------------------|----------------------------------------------------------------------|-----------------|
| Over Voltage Protection  | IC component to clamp (auto recovery)                                                                                                                       | TRE36A050<br>TRE36A090<br>TRE36A120<br>TRE36A135<br>TRE36A150<br>TRE36A180<br>TRE36A240<br>TRE36A360<br>TRE36A480 |      |                                                    | 7.44<br>13.6<br>15.9<br>16.5<br>21.5<br>24.8<br>31.5<br>45.2<br>59.6 | V <sub>dc</sub> |
| Over Current Protection  | Auto recovery                                                                                                                                               | All                                                                                                               | 110  |                                                    | 160                                                                  | %               |
| Short Circuit Protection | Auto recovery                                                                                                                                               | All                                                                                                               |      |                                                    |                                                                      |                 |
| Output Ripple and Noise  | 1. Add a 0.1uF ceramic capacitor and a 10uF aluminum electrolytic capacitor to output<br>2. Oscilloscope is 20MHz band width<br>3. Ambient temperature=25°C | TRE36A050<br>TRE36A090<br>TRE36A120<br>TRE36A135<br>TRE36A150<br>TRE36A180<br>TRE36A240<br>TRE36A360<br>TRE36A480 |      |                                                    | 100<br>120<br>120<br>130<br>150<br>180<br>240<br>360<br>480          | mV              |
| Load Capacitance         | 1. V <sub>in</sub> =115V <sub>ac</sub> and 230V <sub>ac</sub><br>2. Output is max. load<br>3. Ambient temperature=25°C                                      | TRE36A050<br>TRE36A090<br>TRE36A120<br>TRE36A135<br>TRE36A150<br>TRE36A180<br>TRE36A240<br>TRE36A360<br>TRE36A480 |      |                                                    | 5000<br>3300<br>2500<br>2400<br>2400<br>2000<br>1500<br>1000<br>750  | uF              |
| Efficiency               | 1. V <sub>in</sub> =230V <sub>ac</sub><br>2. Output is 75% full load<br>3. Ambient temperature=25°C                                                         | TRE36A050<br>TRE36A090<br>TRE36A120<br>TRE36A135<br>TRE36A150<br>TRE36A180<br>TRE36A240<br>TRE36A360<br>TRE36A480 |      | 83<br>87<br>88<br>89<br>88<br>88<br>88<br>89<br>89 |                                                                      | %               |

## ISOLATION CHARACTERISTICS

| PARAMETER            | NOTES and CONDITIONS | Device | Min. | Typ. | Max. | Units           |
|----------------------|----------------------|--------|------|------|------|-----------------|
| Input to Output      | 1 minute             | All    |      |      | 4000 | V <sub>ac</sub> |
| Isolation Resistance | Input to output      | All    | 100  |      |      | MΩ              |

## FEATURE CHARACTERISTICS

| PARAMETER           | NOTES and CONDITIONS               | Device | Min. | Typ. | Max. | Units |
|---------------------|------------------------------------|--------|------|------|------|-------|
| Switching Frequency | P <sub>out</sub> =max. rated power | All    |      | 65   |      | kHz   |



# TRE36 Series

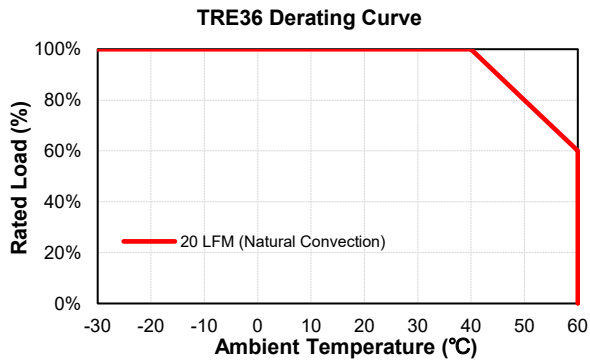
## GENERAL SPECIFICATIONS

| PARAMETER                                        | NOTES and CONDITIONS                                                                                                                                                            | Device | Min.                                                | Typ. | Max. | Units      |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------------------------------------------------|------|------|------------|
| MTBF                                             | $I_o=100\%$ ; $T_a=25^{\circ}\text{C}$ per MIL-HDBK-217F                                                                                                                        | All    | 400                                                 |      |      | k hours    |
| Humidity                                         | Non-condensing                                                                                                                                                                  | All    |                                                     |      | 93   | % RH       |
| Shock                                            | Meet MIL-STD-810F Table 516.5, Table 516.5-I 10ms, each axis 3 times( $\pm X$ 、 $\pm Y$ 、 $\pm Z$ axis)                                                                         | All    |                                                     | 75   |      | g          |
| Vibration                                        | Meet MIL-STD-810F Table 514.5C-VIII, 15~2000Hz, X、Y、Z axis, 1 hour (each axis),. Total 3 hrs.                                                                                   | All    |                                                     | 4    |      | g          |
| Weight                                           |                                                                                                                                                                                 | All    |                                                     | 150  |      | g          |
| Dimensions                                       |                                                                                                                                                                                 | All    | 3.937x1.771x0.886 inches<br>(100.00x45.00x22.50 mm) |      |      |            |
| <b>Safety</b>                                    | Class II, IEC/EN/UL 62368-1                                                                                                                                                     |        |                                                     |      |      | Ed.3.0     |
| <b>EMC Emission</b>                              | EN 55032:2015+A1:2020, EN 55032:2015+A11:2020, CISPR PUB. 22, FCC Part 15 Subpart B, EN 61000-6-3:2021, EN 61000-6-4:2019, EN 61000-3-2:2019+A1:2021, EN 61000-3-3:2013+A2:2021 |        |                                                     |      |      | Class B    |
| Conducted Disturbance                            | EN 55032:2015+A1:2020, EN 55032:2015+A11:2020, CISPR PUB. 22, FCC Part 15 Subpart B, EN 61000-6-3:2021, EN 61000-6-4:2019                                                       |        |                                                     |      |      | Class B    |
| Radiated Disturbance                             | EN 55032:2015+A1:2020, EN 55032:2015+A11:2020, CISPR PUB. 22, FCC Part 15 Subpart B, EN 61000-6-3:2021, EN 61000-6-4:2019                                                       |        |                                                     |      |      | Class B    |
| Harmonic Current Emissions                       | EN 61000-3-2:2019+A1:2021                                                                                                                                                       |        |                                                     |      |      |            |
| Voltage Fluctuations & Flicker                   | EN 61000-3-3:2013+A2:2021                                                                                                                                                       |        |                                                     |      |      |            |
| <b>EMC Immunity</b>                              | EN 55035:2017+A11:2020, EN 61000-6-1:2019, EN 61000-6-2:2019、IEC 61000-4-2, 3, 4, 5, 6, 11                                                                                      |        |                                                     |      |      |            |
| Electrostatic Discharge (ESD)                    | IEC 61000-4-2:2008、Air Discharge: $\pm 8\text{kV}$ , Contact Discharge: $\pm 4\text{kV}$                                                                                        |        |                                                     |      |      | Criteria A |
| Radio-Frequency, Continuous Radiated Disturbance | IEC 61000-4-3:2020                                                                                                                                                              |        |                                                     |      |      | Criteria A |
| Electrical Fast Transient (EFT)                  | IEC 61000-4-4:2012, $\pm 1\text{kV}$ , $\pm 2\text{kV}$                                                                                                                         |        |                                                     |      |      | Criteria A |
| Surge                                            | IEC 61000-4-5:2014+A1:2017, L-N: $\pm 0.5\text{kV}$ , $\pm 1\text{kV}$                                                                                                          |        |                                                     |      |      | Criteria A |
| Conducted Disturbances, Induced by RF Fields     | IEC 61000-4-6:2013+COR1:2015                                                                                                                                                    |        |                                                     |      |      | Criteria A |
| Voltage Dips                                     | IEC 61000-4-11:2020, Dip: 30% Reduction, Dip >95% Reduction                                                                                                                     |        |                                                     |      |      | Criteria A |
| Voltage Interruptions                            | IEC 61000-4-11:2020, >95% Reduction                                                                                                                                             |        |                                                     |      |      | Criteria B |
| Application Note Link                            |                                                                                                                                                                                 |        | <a href="#">TRE36 Series App Notes</a>              |      |      |            |

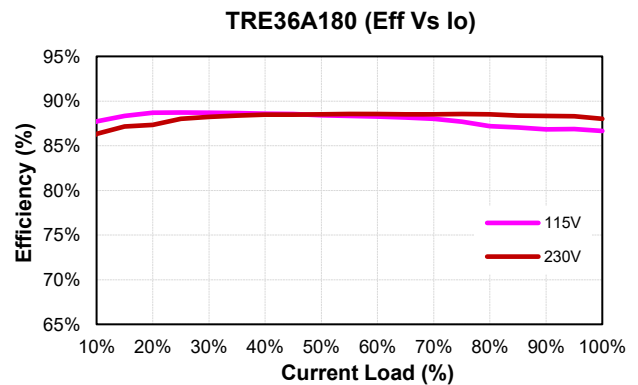
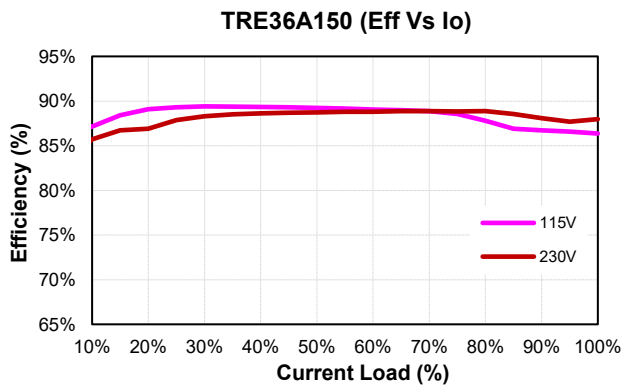
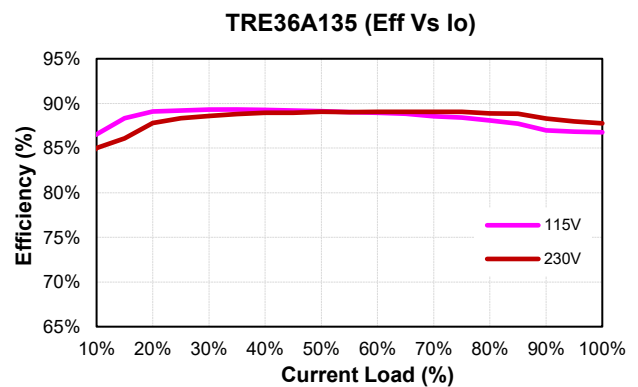
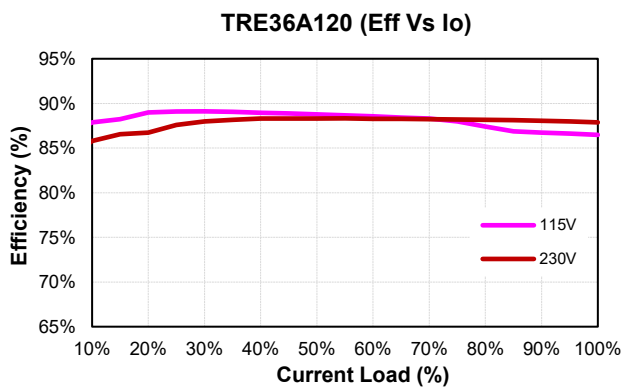
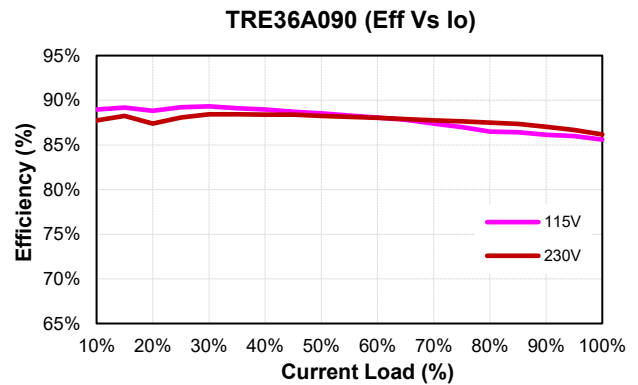
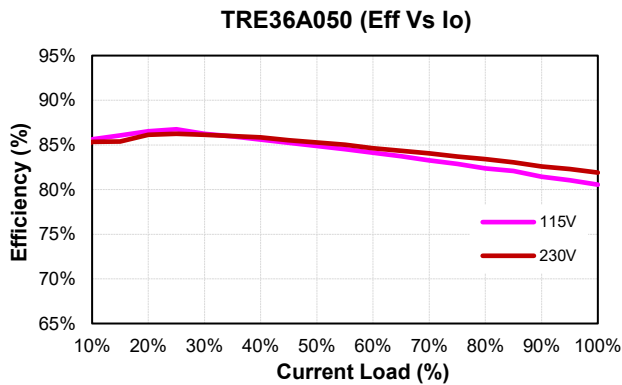


## CHARACTERISTIC CURVE

### Power Derating Curve



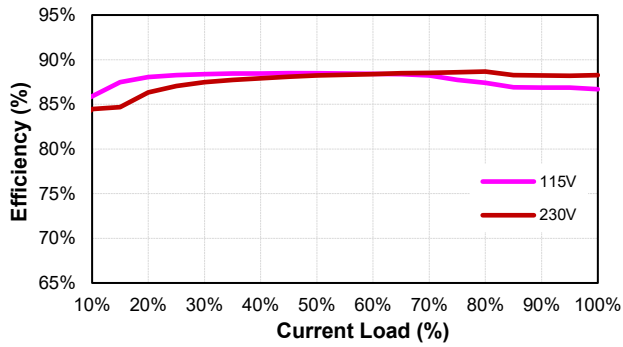
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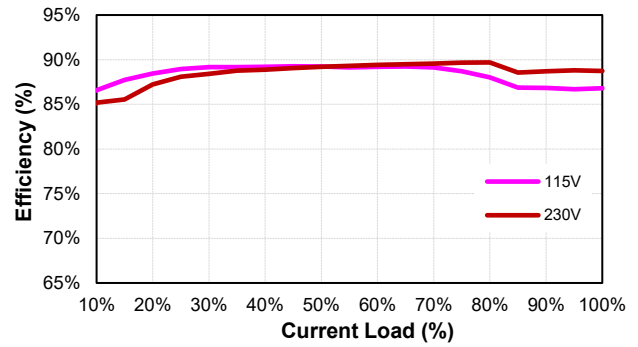


# TRE36 Series

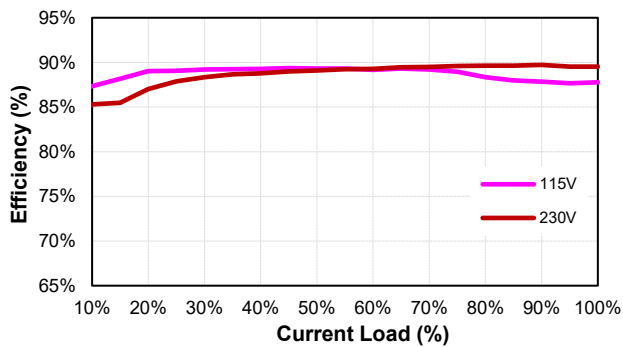
TRE36A240 (Eff Vs Io)



TRE36A360 (Eff Vs Io)

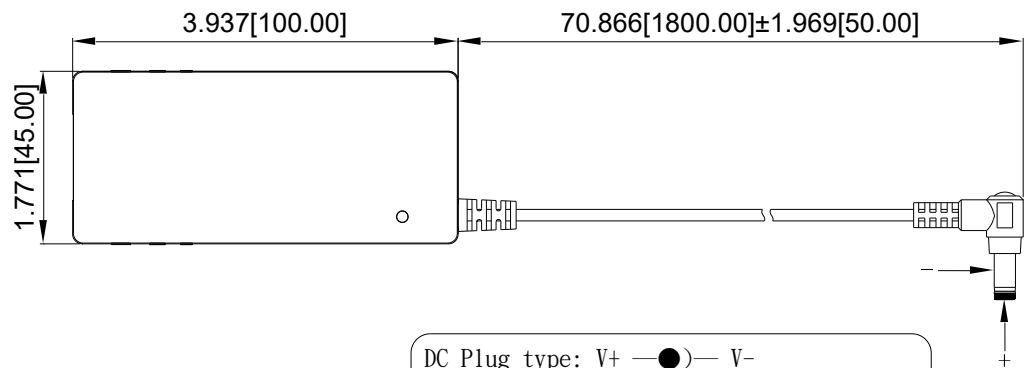


TRE36A480 (Eff Vs Io)

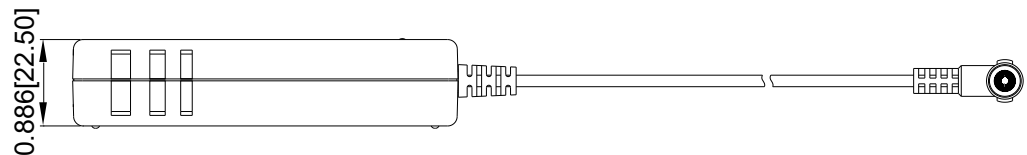
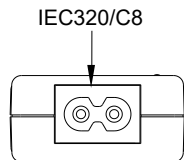


## MECHANICAL SPECIFICATION

All Dimensions are in inches[mm]  
Tolerance: Inches: X.XXX±0.02  
Millimeters: X.XX±0.5



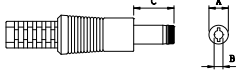
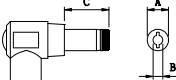
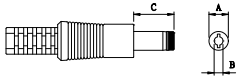
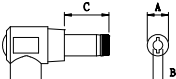
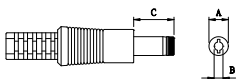
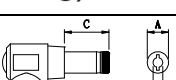
DC Plug type: V+ —●— V-  
DC Plug :Right Angle(  $\phi$  5.5 /  $\phi$  2.1 ) L12mm  
20AWG / 1800mm





# TRE36 Series

## STANDARD OUTPUT PLUG

| DC Plug Type                                                                                                             | Cable Number-XXXXX | A       | B       | C      | Cable Type | Cable Length        | Cable AWG                                                   |
|--------------------------------------------------------------------------------------------------------------------------|--------------------|---------|---------|--------|------------|---------------------|-------------------------------------------------------------|
|                                                                                                                          |                    | OD (mm) | ID (mm) | L (mm) |            |                     |                                                             |
| <br>Straight/Inner+Outer-<br>+ ● -      | 11G02              | Φ5.5    | Φ2.1    | 12     | UL1571     | 1220mm without Core | 16AWG for Vo: 5V                                            |
|                                                                                                                          | 12G02              | Φ5.5    | Φ2.5    | 12     |            |                     |                                                             |
|                                                                                                                          | 23G02              | Φ5.5    | Φ2.1    | 9.5    |            |                     |                                                             |
|                                                                                                                          | 26G02              | Φ5.5    | Φ2.5    | 9.5    |            |                     |                                                             |
| <br>Right Angle/Inner+Outer-<br>+ ● -   | 01G02              | Φ5.5    | Φ2.1    | 12     |            |                     |                                                             |
|                                                                                                                          | 02G02              | Φ5.5    | Φ2.5    | 12     |            |                     |                                                             |
|                                                                                                                          | 21G02              | Φ5.5    | Φ2.5    | 9.5    |            |                     |                                                             |
|                                                                                                                          | 24G02              | Φ5.5    | Φ2.1    | 9.5    |            |                     |                                                             |
| <br>Straight/Inner+Outer-<br>+ ● -      | 11G03              | Φ5.5    | Φ2.1    | 12     | UL1571     | 1800mm without Core | 18AWG for Vo: 9V, 12V, 13.5V<br>20AWG for Vo: 15V, 18V, 24V |
|                                                                                                                          | 12G03              | Φ5.5    | Φ2.5    | 12     |            |                     |                                                             |
|                                                                                                                          | 23G03              | Φ5.5    | Φ2.1    | 9.5    |            |                     |                                                             |
|                                                                                                                          | 26G03              | Φ5.5    | Φ2.5    | 9.5    |            |                     |                                                             |
| <br>Right Angle/Inner+Outer-<br>+ ● -  | 01G03              | Φ5.5    | Φ2.1    | 12     |            |                     |                                                             |
|                                                                                                                          | 02G03              | Φ5.5    | Φ2.5    | 12     |            |                     |                                                             |
|                                                                                                                          | 21G03              | Φ5.5    | Φ2.5    | 9.5    |            |                     |                                                             |
|                                                                                                                          | 24G03              | Φ5.5    | Φ2.1    | 9.5    |            |                     |                                                             |
| <br>Straight/Inner+Outer-<br>+ ● -    | 11E03              | Φ5.5    | Φ2.1    | 12     | UL1185     | 1800mm without Core | 20AWG for Vo: 36V, 48V                                      |
|                                                                                                                          | 12E03              | Φ5.5    | Φ2.5    | 12     |            |                     |                                                             |
|                                                                                                                          | 23E03              | Φ5.5    | Φ2.1    | 9.5    |            |                     |                                                             |
|                                                                                                                          | 26E03              | Φ5.5    | Φ2.5    | 9.5    |            |                     |                                                             |
| <br>Right Angle/Inner+Outer-<br>+ ● - | 01E03              | Φ5.5    | Φ2.1    | 12     |            |                     |                                                             |
|                                                                                                                          | 02E03              | Φ5.5    | Φ2.5    | 12     |            |                     |                                                             |
|                                                                                                                          | 21E03              | Φ5.5    | Φ2.5    | 9.5    |            |                     |                                                             |
|                                                                                                                          | 24E03              | Φ5.5    | Φ2.1    | 9.5    |            |                     |                                                             |

※Other DC Plug Type please refer to the link: <https://www.cincon.com/productdownload/TRE36-cable--DC-Plug.pdf>