



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_{ac} to 240V_{ac} 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 V_{ac} and 75% full load at 25°C.

PART NUMBER

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

Part Number Example:

TRE36A120-01G03, 12V_{ac} Output, DC Jack Type, Cable Length 1800mm



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}
					370	V _{dc}
Operating Case 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 T _c =25°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	
		TRE36A480	47.04	48	48.96	
Operating Output Current Range	V _{in} =115V _{ac} and 230V _{ac} , T _c =25°C	TRE36A050			5	A
		TRE36A090			3.3	
		TRE36A120			2.5	
		TRE36A135			2.4	
		TRE36A150			2.4	
		TRE36A180			2	
		TRE36A240			1.5	
		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	
		TRE36A480			±2	
Line Regulation	V _{in} =100V _{ac} to 240V _{ac}	All			±1.0	%



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PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Over Voltage Protection	IC component to clamp (auto recovery)	TRE36A050			7.44	V _{dc}
		TRE36A090			13.6	
		TRE36A120			15.9	
		TRE36A135			16.5	
		TRE36A150			21.5	
		TRE36A180			24.8	
		TRE36A240			31.5	
		TRE36A360			45.2	
		TRE36A480			59.6	
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 2. Oscilloscope is 20MHz band width 3. Ambient temperature=25°C	TRE36A050			100	mV
		TRE36A090			120	
		TRE36A120			120	
		TRE36A135			130	
		TRE36A150			150	
		TRE36A180			180	
		TRE36A240			240	
		TRE36A360			360	
		TRE36A480			480	
Load Capacitance	1. V _{in} =115V _{ac} and 230V _{ac} 2. Output is max. load 3. Ambient temperature=25°C	TRE36A050			5000	uF
		TRE36A090			3300	
		TRE36A120			2500	
		TRE36A135			2400	
		TRE36A150			2400	
		TRE36A180			2000	
		TRE36A240			1500	
		TRE36A360			1000	
		TRE36A480			750	
Efficiency	1. V _{in} =230V _{ac} 2. Output is 75% full load 3. Ambient temperature=25°C	TRE36A050		83		%
		TRE36A090		87		
		TRE36A120		88		
		TRE36A135		89		
		TRE36A150		88		
		TRE36A180		88		
		TRE36A240		88		
		TRE36A360		89		
		TRE36A480		89		

ISOLATION CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Input to Output	1 minute	All			4000	V _{ac}
Isolation Resistance	Input to output	All	100			MΩ

FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	Pout=max. rated power	All		65		kHz



TRE36 Series

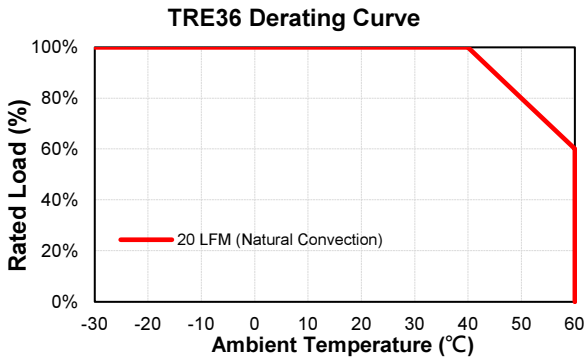
GENERAL SPECIFICATIONS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	$I_0=100\%$; $T_a=25^\circ\text{C}$ 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 (100.00x45.00x22.50 mm)			
Safety	Class II, IEC/EN/UL 62368-1/60950-1					Ed.2.0
EMC Emission	EN 55032:2015 Class B, EN 61000-3-2:2014, EN 6100-3-3:2013, EN 61000-6-3:2007+A1:2011 EN 61000-6-4:2007+A1:2011+AC:2012, CISPR PUB. 22, FCC Part 15 Subpart B					
Conducted Disturbance	EN 55032:2015, EN 61000-6-3:2007+A1:2011, EN 61000-6-4:2007+A1:2011+AC:2012 FCC Part 15 Subpart B					Class B
Radiated Disturbance	EN 55032:2015, EN 61000-6-3:2007+A1:2011, EN 61000-6-4:2007+A1:2011+AC:2012 FCC Part 15 Subpart B					Class B
Power Harmonics	EN 61000-3-2: 2014					
Voltage Fluctuations	EN 61000-3-3: 2013					
EMC Immunity	EN 61000-6-1:2007, EN 61000-6-2:2005+AC:2005, EN 61204-3:2000, EN 55024:2010+A1:2015 IEC 61000-4-2, 3, 4, 5, 6, 8, 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 61000-4-3:2006+A1:2007+A2:2010					Criteria A
Electrical Fast Transient (EFT)	IEC 61000-4-4:2012					Criteria A
Surge	IEC 61000-4-5:2014+A1:2017					Criteria A
Conducted disturbances, induced by RF fields	IEC 61000-4-6:2013					Criteria A
Voltage dips	IEC 61000-4-11:2004+A1:2017, Dips: 30% Reduction, Dips: >95% Reduction					Criteria B
Voltage interruptions	IEC 61000-4-11:2004+A1:2017, >95% reduction					Criteria B
Application Note Link	TRE36 Series App Notes					

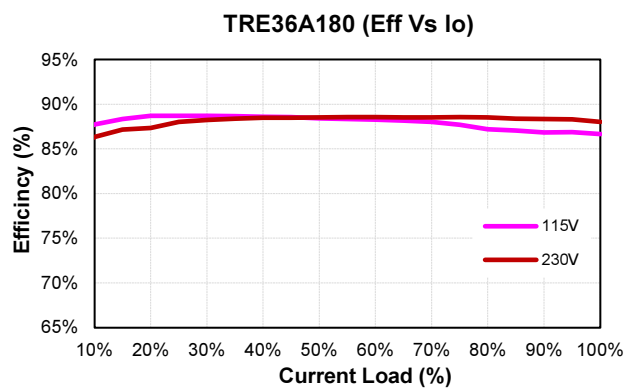
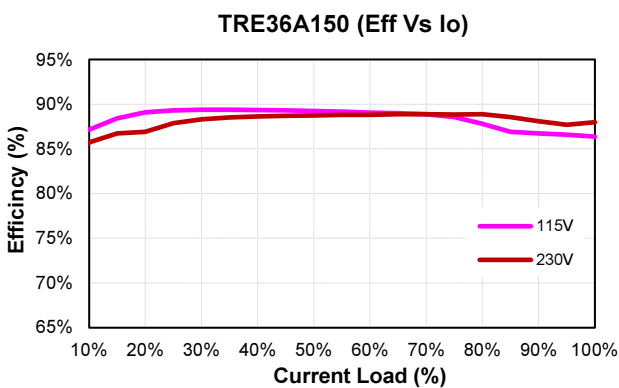
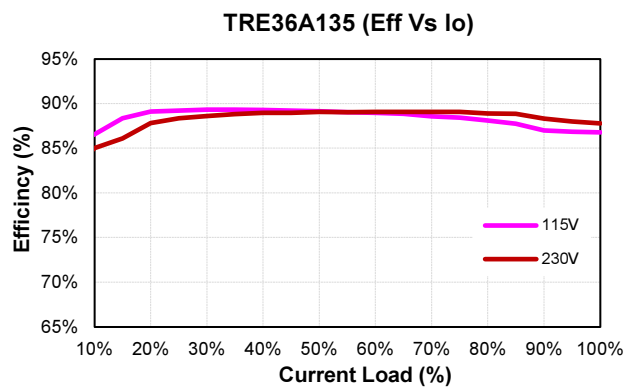
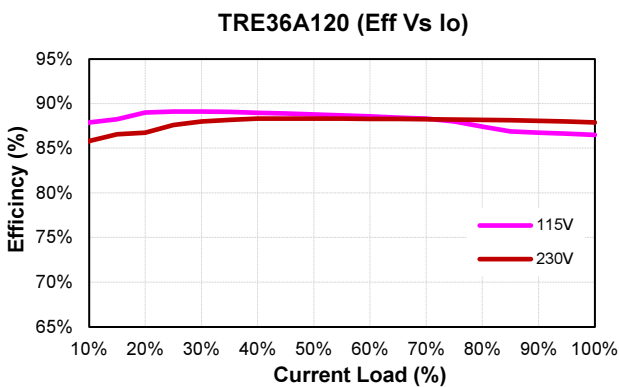
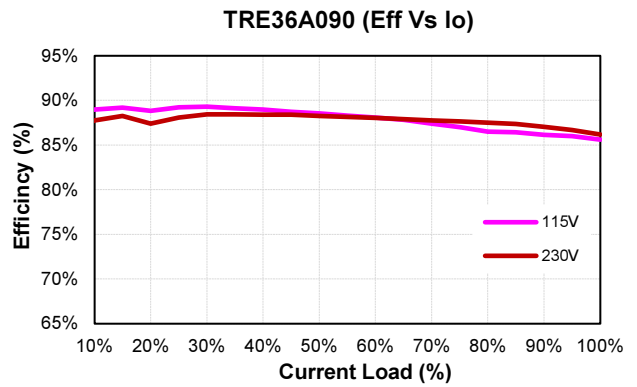
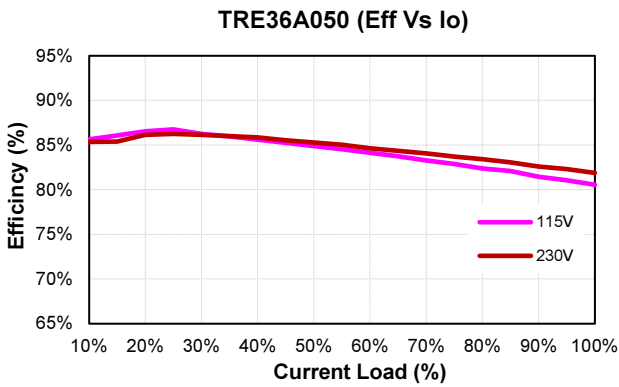


CHARACTERISTIC CURVE

Power Derating Curve



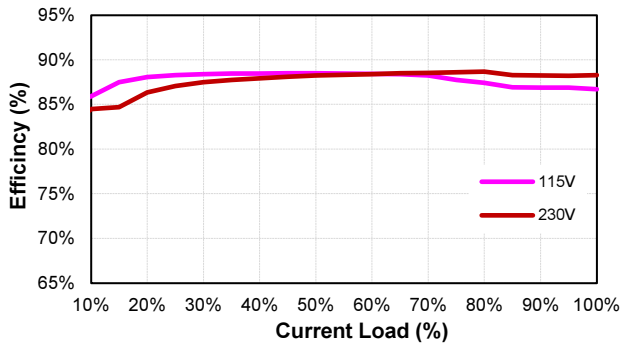
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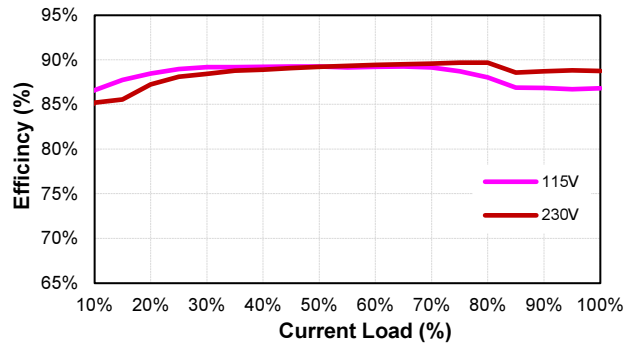


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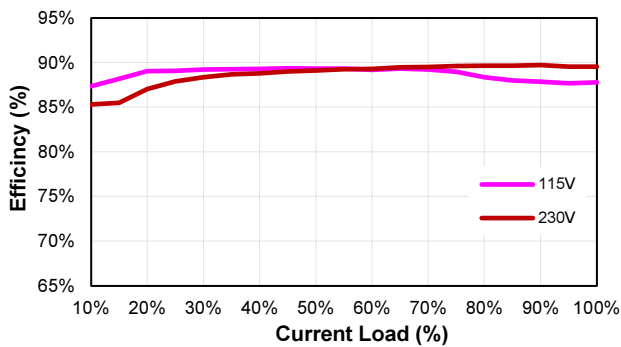
TRE36A240 (Eff Vs Io)



TRE36A360 (Eff Vs Io)

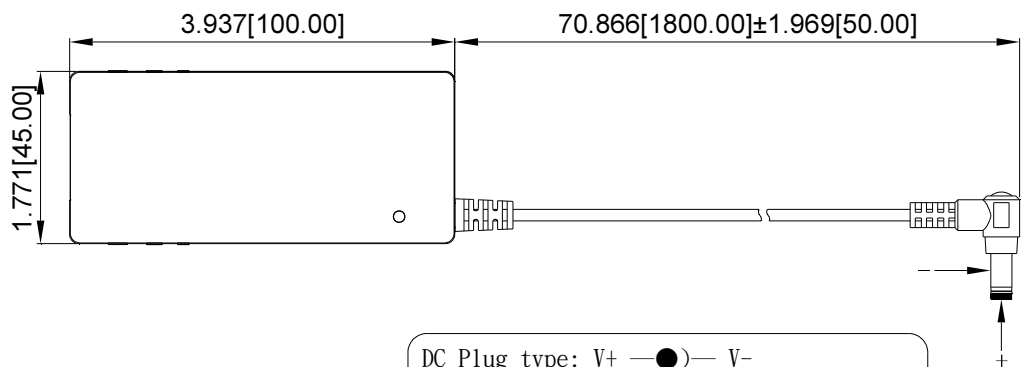


TRE36A480 (Eff Vs Io)

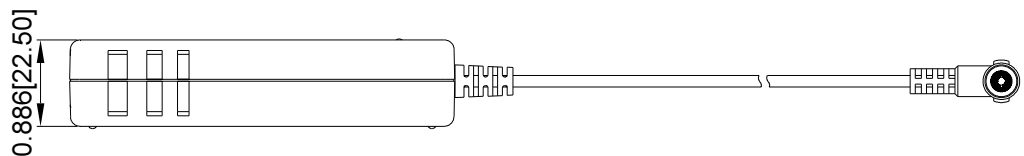
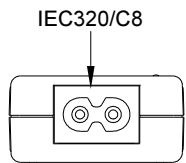


MECHANICAL SPECIFICATION

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



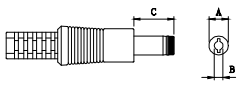
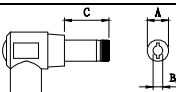
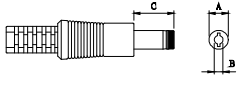
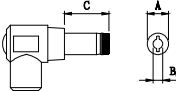
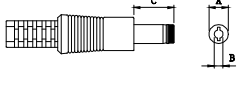
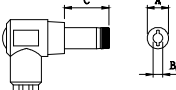
DC Plug type: V+ — ● — V-
 DC Plug :Right Angle(φ 5.5 / φ 2.1)L12mm
 20AWG / 1800mm





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)			
 Straight/Inner+Outer- + ● -	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			
 Right Angle/Inner+Outer- + ● -	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			
 Straight/Inner+Outer- + ● -	11G03	Φ5.5	Φ2.1	12	UL1571	1800mm without Core	18AWG for Vo: 9V, 12V, 13.5V 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			
 Right Angle/Inner+Outer- + ● -	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			
 Straight/Inner+Outer- + ● -	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			
 Right Angle/Inner+Outer- + ● -	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>

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