



electronic powersolutions

# TRE15 SERIES 15 WATT AC-DC I.T.E SWITCHING ADAPTER

## Features

- Universal Input Range 90~264Vac
- High Efficiency up to 86%
- 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
TRE15050	5 V	2 A	±2%	50 mV	±1%	±4%	79%
TRE15090	9 V	1.4 A	±2%	90 mV	±1%	±2%	84%
TRE15120	12 V	1 A	±2%	100 mV	±1%	±2%	83%
TRE15150	15 V	1 A	±2%	100 mV	±1%	±2%	85%
TRE15240	24 V	0.63 A	±2%	100 mV	±1%	±2%	86%

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 V<sub>ac</sub> and 75% full load at 25°C.

## PART NUMBER

Series	Output Voltage	AC Plug Type	DC Plug Type	Cable Type	Cable Length
TRE15	XXX	-X	-XX	X	XX
15W I.T.E Adapter	050 : 5V 090 : 9V 120 : 12V 150 : 15V 240 : 24V	A: USA 2 Pin E: Europe 2 Pin U: British 3 Pin	See Page 5	G : UL1571 with OVP	01 : 720mm 02 : 1220mm 03 : 1800mm 11 : 720mm with Ferrite Core 12 : 1220mm with Ferrite Core 13 : 1800mm with Ferrite Core

Part Number Example:

**TRE15120-A-01G03**, 12V<sub>dc</sub> Output, AC Plug Type, DC Jack Type, Cable Length 1800mm



## 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		All	90		264	V <sub>ac</sub>
Operating Case Temperature	See Derating Curve	All	-20		60	°C
Storage Temperature		All	-20		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 <sub>ac</sub>
Input Frequency Range		All	47		63	Hz
Maximum Input Current	100% Full load, V <sub>in</sub> =100V <sub>ac</sub>	All			0.5	A
Leakage Current		All			250	uA
Inrush Current	V <sub>in</sub> =240V <sub>ac</sub> , Cold start at 25°C	All			50	A

### OUTPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Output Voltage Set Point	V <sub>in</sub> =115V <sub>ac</sub> and 230V <sub>ac</sub> , I <sub>o</sub> =60% Full load T <sub>c</sub> =25°C	TRE15050	4.9	5	5.1	V <sub>dc</sub>
		TRE15090	8.82	9	9.18	
		TRE15120	11.76	12	12.24	
		TRE15150	14.7	15	15.30	
		TRE15240	23.52	24	24.48	
Operating Output Current Range	V <sub>in</sub> =115V <sub>ac</sub> and 230V <sub>ac</sub> , T <sub>c</sub> =25°C	TRE15050			2	A
		TRE15090			1.4	
		TRE15120			1	
		TRE15150			1	
		TRE15240			0.63	
Holdup Time	V <sub>in</sub> =115V <sub>ac</sub>	All		10		ms
Output Voltage Regulation						
Load Regulation	60%±40% Full load change	TRE15050			±4.0	%
		TRE15090			±2.0	
		TRE15120			±2.0	
		TRE15150			±2.0	
		TRE15240			±2.0	
Line Regulation	V <sub>in</sub> =100V <sub>ac</sub> to 240V <sub>ac</sub>	All			±1.0	%
Over Voltage Protection	IC component to clamp (auto recovery)	TRE15050			7.14	V <sub>dc</sub>
		TRE15090			12.1	
		TRE15120			15.8	
		TRE15150			19.5	
		TRE15240			28.4	
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	TRE15050			50	mV
		TRE15090			90	
		TRE15120			100	
		TRE15150			100	
		TRE15240			100	



# TRE15 Series

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Load Capacitance	1. $V_{in}=115V_{ac}$ and $230V_{ac}$ 2. Output is max. load 3. Ambient temperature= $25^{\circ}C$	TRE15050			2000	uF
		TRE15090			1500	
		TRE15120			1000	
		TRE15150			1000	
		TRE15240			660	
Efficiency	1. $V_{in}=230V_{ac}$ 2. Output is 75% full load 3. Ambient temperature= $25^{\circ}C$	TRE15050		79		%
		TRE15090		84		
		TRE15120		83		
		TRE15150		85		
		TRE15240		86		

## ISOLATION CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Input to Output	1 minute	All			3000	$V_{ac}$
Isolation Resistance	Input to output	All	100			MΩ

## FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	$V_{in}=115V_{ac}$ , $I_o=100\%$	All		85		kHz
	$V_{in}=230V_{ac}$ , $I_o=100\%$			65		

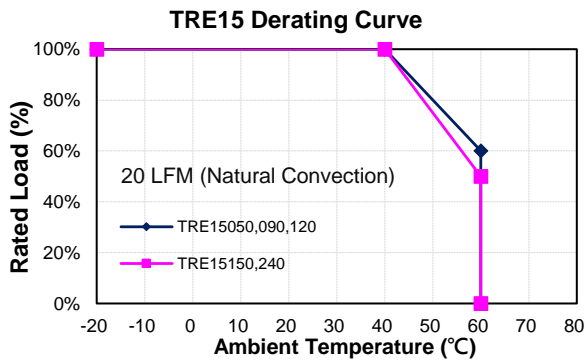
## GENERAL SPECIFICATIONS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	$I_o=100\%$ ; $T_a=25^{\circ}C$ per MIL-HDBK-217F	All	330			k hours
Humidity	Non-condensing	All			93	% RH
Shock	Meet MIL-STD-810F Table 516.5, Table 516.5-1 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		100		g
Dimensions		All	2.795x2.220x1.299 inches (71.00x56.40x33.00 mm)			
<b>Safety</b>	Class II, IEC/EN/UL 62368-1/60950-1					Ed.2.0
<b>EMC Emission</b>	EN 55032: 2015/AC: 2016, EN 61000-3-2:2014 EN 61000-3-3:2013, FCC CFR Title 47 Part 15 Subpart B: 2016 Class B					
Conducted Disturbance	EN 55032:2015/AC:2016, EN 61000-6-3, EN 61204-3 FCC CFR Title 47 Part 15 Subpart B: 2016 Class B					Class B
Radiated Disturbance	EN 55032:2015/AC:2016, EN 61000-6-3, EN 61204-3 FCC CFR Title 47 Part 15 Subpart B: 2016 Class B					Class B
Power Harmonics	EN 61000-3-2: 2014					
Voltage Fluctuations	EN 61000-3-3: 2013					
<b>EMC Immunity</b>	EN 61204-3: 2000, EN 55024:2010+A1:2015, EN 61000-6-1, 3, IEC 61000-4-2, 3, 4, 5, 6, 8, 11					
Electrostatic Discharge (ESD)	IEC 61000-4-2 Ed. 2.0: 2008, Air Discharge: $\pm 8kV$ , Contact Discharge: $\pm 4kV$					Criteria A
Radio-Frequency, Continuous Radiated Disturbance	IEC 61000-4-3 Ed. 3.2: 2010					Criteria A
Electrical Fast Transient (EFT)	IEC 61000-4-4 Ed. 3.0: 2012, $\pm 1kV$					Criteria A
Surge	IEC 61000-4-5 Ed. 3.0: 2014, L-N: $\pm 1kV$					Criteria A
Conducted disturbances, induced by RF fields	IEC 61000-4-6 Ed. 4.0: 2013					Criteria A
Power frequency magnetic field	IEC 61000-4-8 Ed. 2.0: 2009					Criteria A
Voltage dips	IEC 61000-4-11 Ed. 2.0: 2004, Dips: 30% Reduction, Dips: >95% Reduction					Criteria A
Voltage interruptions	IEC 61000-4-11 Ed. 2.0: 2004, >95% reduction					Criteria B
Application Note Link						<a href="#">TRE15 Series App Notes</a>

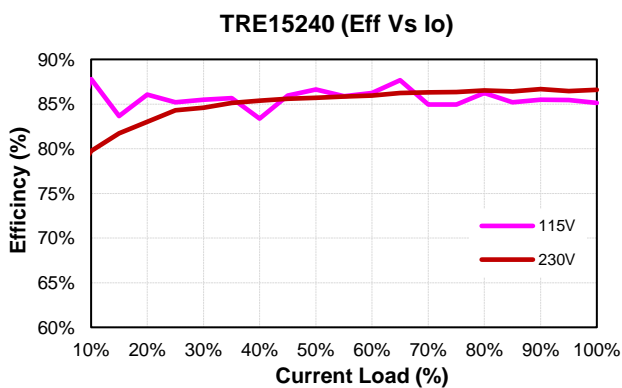
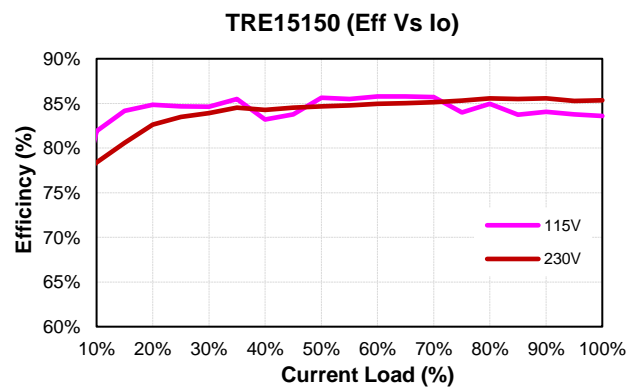
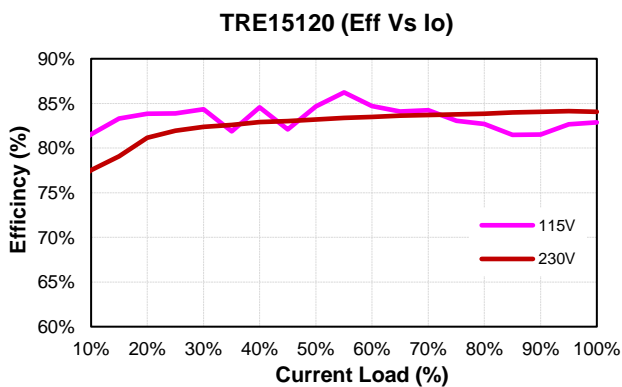
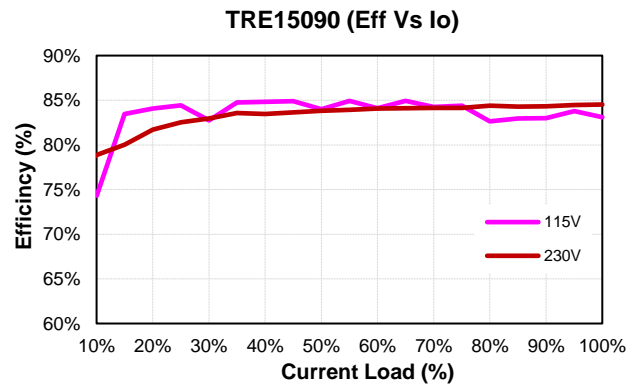
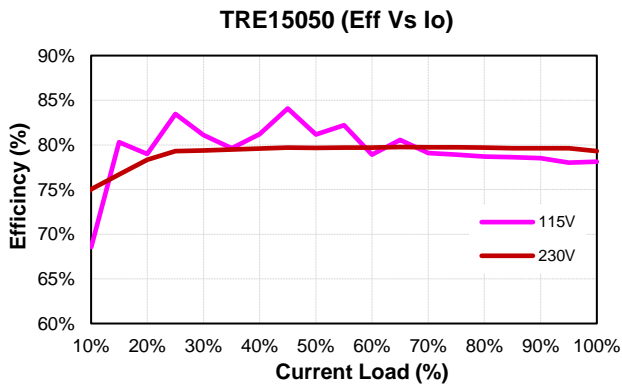


## CHARACTERISTIC CURVE

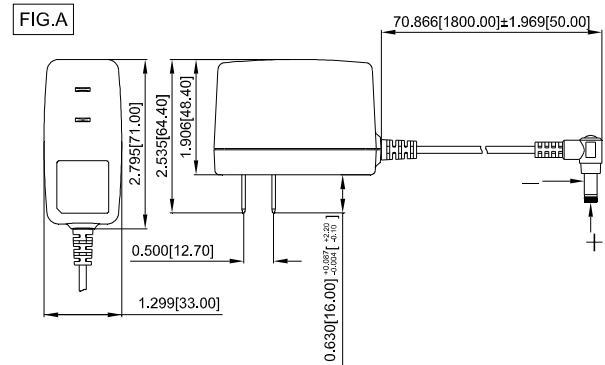
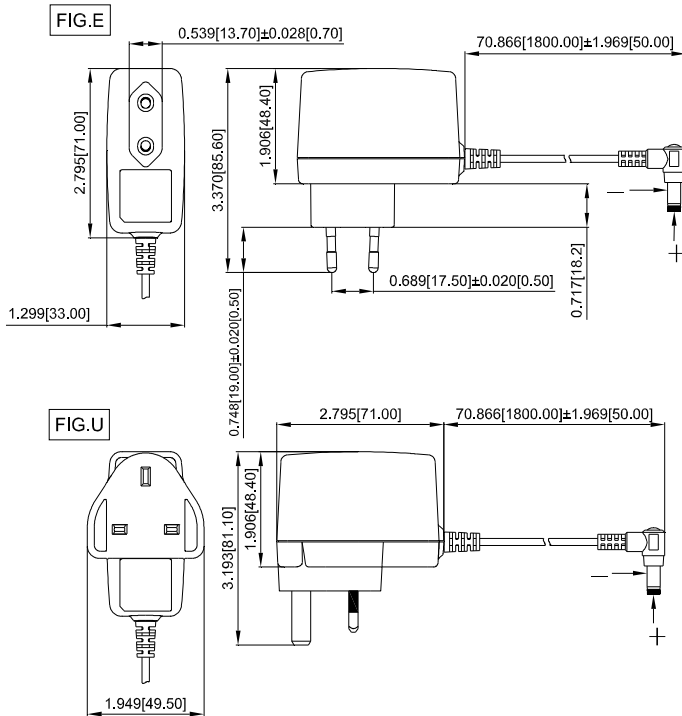
### Power Derating Curve



### Performance Data

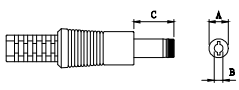
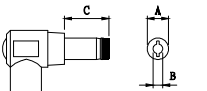


## MECHANICAL SPECIFICATION



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

## 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- + ● -	11G03	Φ5.5	Φ2.1	12	UL1571	1800mm without Core	20AWG for Vo: 5V 18AWG for Vo: 9V 24AWG for Vo: 12V, 15V, 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			