

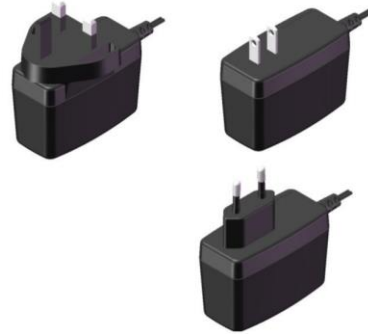


electronic powersolutions

# TRE25 SERIES 25 WATT I.T.E SWITCH ADAPTER

## Features

- Universal Input Range 90~264Vac
- High Efficiency up to 88%
- Class II
- No Load Input Power Consumption < 75mW
- Approval IEC/EN/UL 62368-1
- Approval EN55032 and CISPR/FCC Class B
- Operating Altitude 3000m
- Continuous Short Circuit Protection
- Over Voltage Protection
- Meets CoC Tier 2 and DOE Level VI



MODEL NUMBER	OUTPUT VOLTAGE	OUTPUT CURRENT	RIPPLE & NOISE NOTE1	VOLTAGE ACCURACY NOTE2	LINE REGULATION NOTE3	LOAD REGULATION NOTE4	%EFF. (Typ.) NOTE5
TRE25050	5 V	4.0 A	50 mV	±2%	±1%	±6%	80%
TRE25090	9 V	2.5 A	90 mV	±2%	±1%	±5%	87%
TRE25120	12 V	2.1 A	120 mV	±2%	±1%	±5%	87%
TRE25150	15 V	1.67 A	150 mV	±2%	±1%	±3%	88%
TRE25180	18 V	1.4 A	180 mV	±2%	±1%	±2%	88%
TRE25240	24 V	1.05 A	240 mV	±2%	±1%	±2%	88%

Note:

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

## PART NUMBER

Series	Output Voltage	DC Plug Type	Cable Type	Cable Length
TRE25	XXX	-XX	X	XX
25W I.T.E Adapter	050 : 5V 090 : 9V 120 : 12V 150 : 15V 180 : 18V 240 : 24V	See Page 6	G : UL1571 with OVP	5V : 1220mm with DC Jack 9V : 1800mm with DC Jack 12V : 1800mm with DC Jack 15V : 1800mm with DC Jack 18V : 1800mm with DC Jack 24V : 1800mm with DC Jack

Part Number Example:

**TRE25120-01E02**, 25W, 12V<sub>dc</sub> Output, 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>
			120		370	V <sub>dc</sub>
Operating Temperature	See Derating Curve	All	-20		60	°C
Storage Temperature		All	-20		85	°C
Input/Output Isolation Voltage	1 minute	All			3000	V <sub>ac</sub>
Operating Altitude		All			3000	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% Load, V <sub>in</sub> =100V <sub>ac</sub>	All			0.7	A
Leakage Current		All			250	uA
Under Voltage Protection		All	60	68	75	V <sub>ac</sub>
Inrush Current	V <sub>in</sub> =240V <sub>ac</sub> , Cold start at 25°C	All			60	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	TRE25050	4.9	5	5.1	V <sub>dc</sub>
		TRE25090	8.82	9	9.18	
		TRE25120	11.76	12	12.24	
		TRE25150	14.7	15	15.3	
		TRE25180	17.64	18	18.36	
		TRE25240	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	TRE25050	0		4	A
		TRE25090	0		2.5	
		TRE25120	0		2.1	
		TRE25150	0		1.67	
		TRE25180	0		1.4	
		TRE25240	0		1.05	
Holdup Time	V <sub>in</sub> =115V <sub>ac</sub>	All		10		ms
Output Voltage Regulation						
Load Regulation	60%±40% Full load change	TRE25050			±6.0	%
		TRE25090			±5.0	
		TRE25120			±5.0	
		TRE25150			±3.0	
		TRE25180			±2.0	
		TRE25240			±2.0	
Line Regulation	V <sub>in</sub> =High line to low line, full load	All			±1.0	%
Over Voltage Protection	IC Component to clamp (auto recovery)	TRE25050		7.44		V <sub>dc</sub>
		TRE25090		13.6		
		TRE25120		16.2		
		TRE25150		18.9		
		TRE25180		23.5		
		TRE25240		28.8		
Over Current Protection	Auto recovery	All	110		140	%
Short Circuit Protection	Auto recovery	All				



# TRE25 Series

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
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	TRE25050			50	mV
		TRE25090			90	
		TRE25120			120	
		TRE25150			150	
		TRE25180			180	
		TRE25240			240	
Load Capacitance	1. $V_{in}=115V_{ac}$ and $230V_{ac}$ 2. Output is max. load 3. Ambient temperature=25°C	TRE25050			4000	uF
		TRE25090			2500	
		TRE25120			2100	
		TRE25150			1670	
		TRE25180			1400	
		TRE25240			1050	
Efficiency	1. $V_{in}=230V_{ac}$ 2. Output is 75% full load 3. Ambient temperature=25°C	TRE25050		80		%
		TRE25090		87		
		TRE25120		87		
		TRE25150		88		
		TRE25180		88		
		TRE25240		88		

## ISOLATION CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Input to Output	1 minute (without dielectric breakdown)	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		All		65		kHz

## 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	300			k hours
Humidity	Non-condensing	All			93	% RH
Shock	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	MIL-STD-810F Table 514.5C-VIII, 15~2000Hz, X · Y · Z axis, 1 hour(each axis),. total 3 hours.	All		4		g
Weight		All		140		grams
Dimension		All	2.795x1.906x1.299 inches (71.00x48.40x33.00 mm)			
<b>Safety</b>	Class II, IEC 62368-1:2014, EN 62368-1:2014/A11:2017 UL 62368-1, 2nd Edition					Ed. 2.0
<b>EMC Emission</b>	EN55032:2015+AC:2016, EN61000-3-2:2014, EN6100-3-3:2013, FCC CFR 47 Part 15					
Conducted Disturbance	EN55032:2015+AC:2016					Class B
Radiated Disturbance	EN55032:2015+AC:2016					Class B
Harmonic Current Emissions	EN 61000-3-2: 2014					Class A
Voltage Fluctuations & Flicker	EN 61000-3-3: 2013					Criterion A
<b>EMC Immunity</b>	EN 55024:2010+A1:2015, EN 61204-3, EN 61000-6-1,3, EN 61000-3-2:2014 EN 61000-3-3:2013					
Electrostatic Discharge (ESD)	IEC 61000-4-2:2008, Air Discharge: $\pm 8kV$ Contact Discharge: $\pm 4kV$					Criterion A
Radio-Frequency, Continuous Radiated Disturbance	IEC 61000-4-3:2006+A1:2007+A2:2010					Criterion A



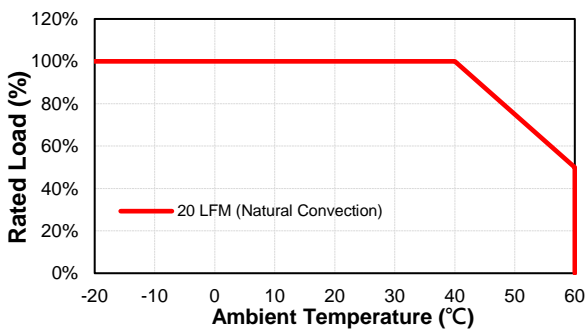
## GENERAL SPECIFICATIONS

Electrical Fast Transient (EFT)	IEC 61000-4-4:2012, $\pm 1\text{kV}$	Criterion A
Surge	IEC 61000-4-5 2014+A1:2017, L-N $\pm 0.5\text{kV}$ , $\pm 1\text{kV}$	Criterion A
Conducted Disturbances, Induced by RF Fields	IEC 61000-4-6:2013	Criterion A
Power Frequency Magnetic Field	IEC 61000-4-8:2009	Criterion A
Voltage Dips	IEC 61000-4-11:2004+A1:2017, Dips:30% reduction, Dips: >95% Reduction	Criterion A
Voltage Interruptions	IEC 61000-4-11:2004+A1:2017, >95% Reduction	Criterion B
Application Note Link	<a href="#">TRE25 Series App Notes</a>	

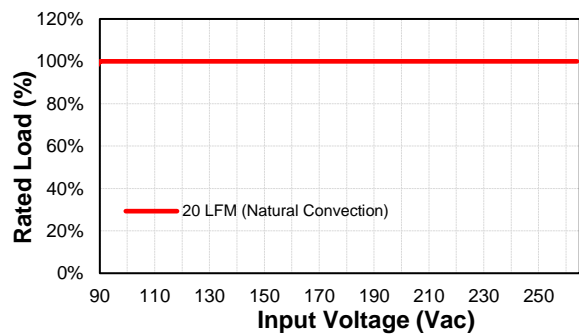
## CHARACTERISTIC CURVE

### Power Derating Curve

TRE25 Derating Curve

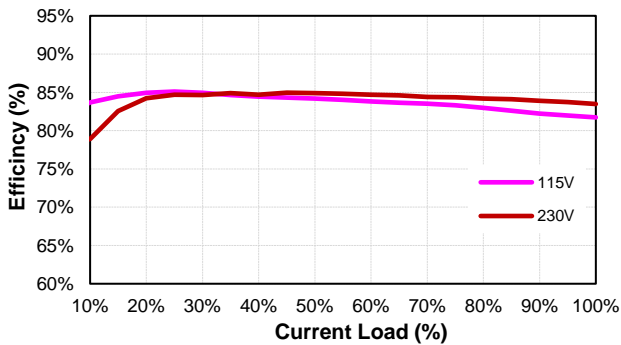


TRE25 Input Voltage Derating Curve

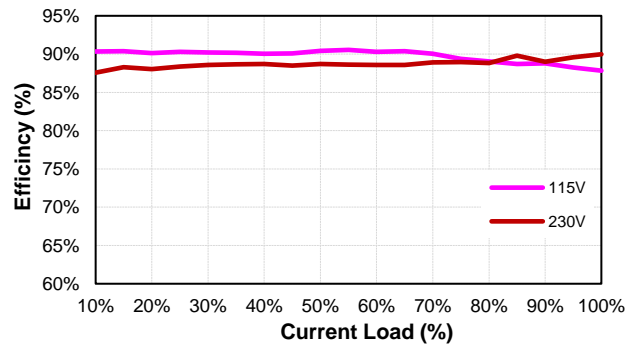


### Performance Data

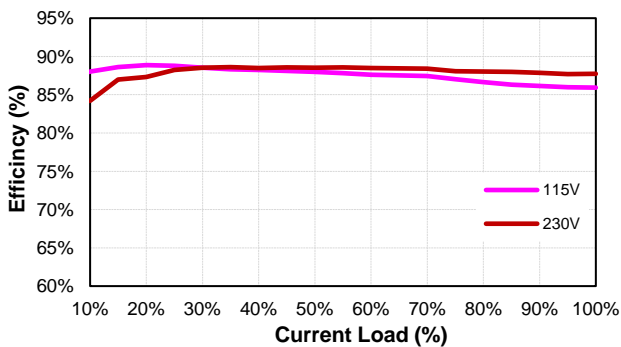
TRE25050 (Eff Vs Io)



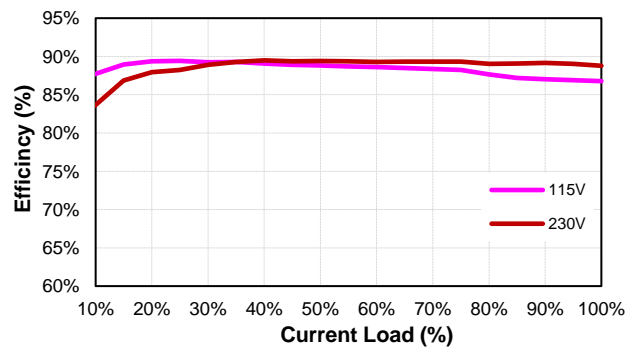
TRE25090 (Eff Vs Io)



TRE25120 (Eff Vs Io)



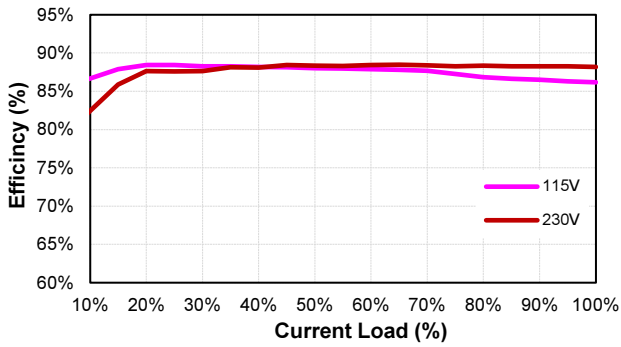
TRE25150 (Eff Vs Io)



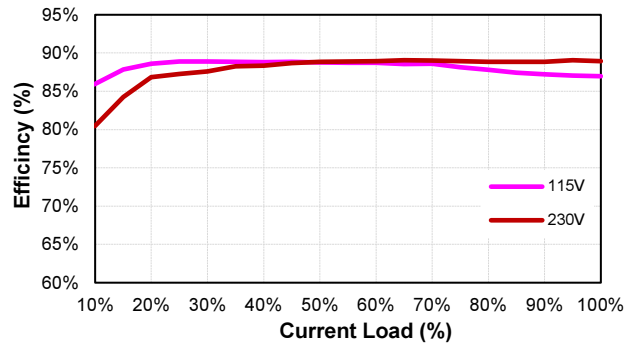


# TRE25 Series

### TRE25180 (Eff Vs Io)

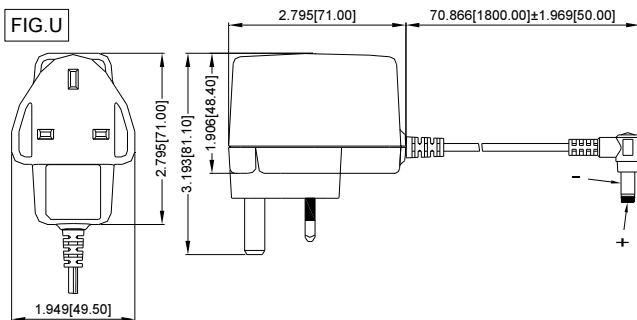
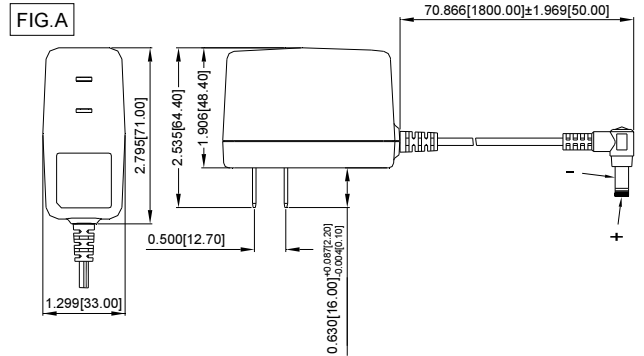
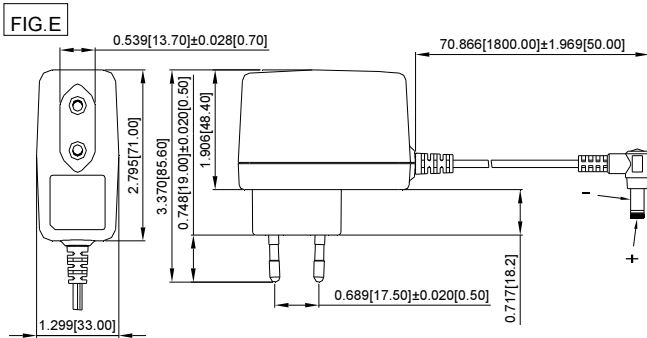


### TRE25240 (Eff Vs Io)



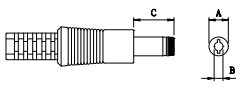
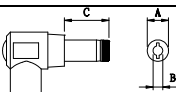
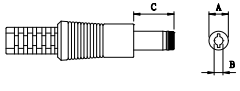
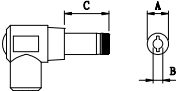
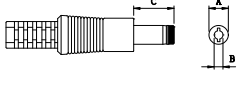
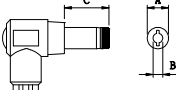
## MECHANICAL SPECIFICATION

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





## STANDARD OUTPUT DC PLUG

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