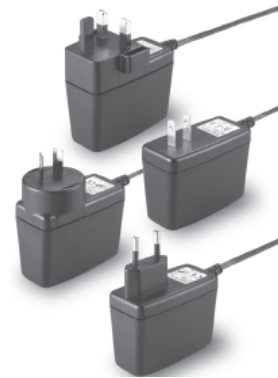




# TRG15 SERIES 15 WATT AC-DC I.T.E SWITCHING ADAPTER

## 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
TRG1505	5 V	2 A	±2%	50 mV	±1%	±4%	80%
TRG1506	6 V	1.5 A	±2%	60 mV	±1%	±3%	82%
TRG1507	7.5 V	1.6 A	±2%	75 mV	±1%	±3%	83%
TRG1509	9 V	1.4 A	±2%	90 mV	±1%	±2%	84%
TRG1512	12 V	1 A	±2%	100 mV	±1%	±2%	85%
TRG1512-01	13.6 V	1 A	±2%	100 mV	±1%	±2%	85%
TRG1515	15 V	1 A	±2%	100 mV	±1%	±2%	86%
TRG1518	18 V	0.83 A	±2%	100 mV	±1%	±2%	86%
TRG1524	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
TRG15	XX or XX-XX	-X	-XX	X	XX
15W I.T.E Adapter	05 : 5V 06 : 6V 07 : 7.5V 09 : 9V 12 : 12V 12-01 : 13.6V 15 : 15V 18 : 18V 24 : 24V	A: USA 2 Pin E: Europe 2 Pin U: British 3 Pin S: Australia 2 Pin	See Page 7	E : UL1185 with OVP	5V : 1800mm with DC Jack 6V : 1220mm with DC Jack 7.5V : 1800mm with DC Jack 9V : 1800mm with DC Jack 12V : 1800mm with DC Jack 13.6V : 1800mm with DC Jack 15V : 1800mm with DC Jack 18V : 1800mm with DC Jack 24V : 1800mm with DC Jack

Part Number Example:

**TRG1512-A-01E03**, 12V<sub>dc</sub> Output, AC Plug Type, DC Jack Type, Cable Length 1800mm



# TRG15 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		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	TRG1505	4.9	5	5.1	V <sub>dc</sub>
		TRG1506	5.88	6	6.12	
		TRG1507	7.35	7.5	7.65	
		TRG1509	8.82	9	9.18	
		TRG1512	11.76	12	12.24	
		TRG1512-01	13.32	13.6	13.87	
		TRG1515	14.7	15	15.3	
		TRG1518	17.64	18	18.36	
Operating Output Current Range	V <sub>in</sub> =115V <sub>ac</sub> and 230V <sub>ac</sub> , T <sub>c</sub> =25°C	TRG1505			2	A
		TRG1506			1.5	
		TRG1507			1.6	
		TRG1509			1.4	
		TRG1512			1	
		TRG1512-01			1	
		TRG1515			1	
		TRG1518			0.83	
TRG1524			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	TRG1505			±4.0	%
		TRG1506			±3.0	
		TRG1507			±3.0	
		TRG1509			±2.0	
		TRG1512			±2.0	
		TRG1512-01			±2.0	
		TRG1515			±2.0	
		TRG1518			±2.0	
TRG1524			±2.0			
Line Regulation	V <sub>in</sub> =100V <sub>ac</sub> to 240V <sub>ac</sub>	All			±1.0	%



# TRG15 Series

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Over Voltage Protection	IC component to clamp (auto recovery)	TRG1505			7.14	V <sub>dc</sub>
		TRG1506			7.88	
		TRG1507			10.05	
		TRG1509			12.1	
		TRG1512			15.8	
		TRG1512-01			16.5	
		TRG1515			19.5	
		TRG1518			23.1	
TRG1524			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	TRG1505			50	mV
		TRG1506			60	
		TRG1507			75	
		TRG1509			90	
		TRG1512			100	
		TRG1512-01			100	
		TRG1515			100	
		TRG1518			100	
TRG1524			100			
Load Capacitance	1. V <sub>in</sub> =115V <sub>ac</sub> and 230V <sub>ac</sub> 2. Output is max. load 3. Ambient temperature=25°C	TRG1505			2000	uF
		TRG1506			1500	
		TRG1507			1680	
		TRG1509			1470	
		TRG1512			1000	
		TRG1512-01			1000	
		TRG1515			1000	
		TRG1518			830	
TRG1524			630			
Efficiency	1. V <sub>in</sub> =230V <sub>ac</sub> 2. Output is 75% full load 3. Ambient temperature=25°C	TRG1505		80%		%
		TRG1506		82%		
		TRG1507		83%		
		TRG1509		84%		
		TRG1512		85%		
		TRG1512-01		85%		
		TRG1515		86%		
		TRG1518		86%		
TRG1524		86%				

## ISOLATION CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Input to Output	1 minute	All			3000	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	V <sub>in</sub> =115Vac, I <sub>o</sub> =100%	All		85		kHz
	V <sub>in</sub> =230Vac, I <sub>o</sub> =100%			65		



# TRG15 Series

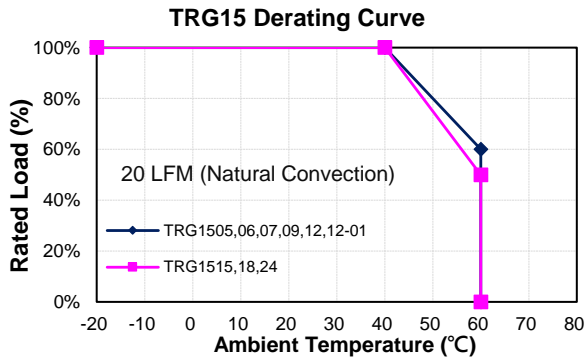
## GENERAL SPECIFICATIONS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	$I_o=100\%$ ; $T_a=25^{\circ}\text{C}$ per MIL-HDBK-217F	All	200			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		140		g
Dimensions		All	2.835x2.047x1.378 inches (72.00x52.00x35.00 mm)			
<b>Safety</b>	Class II, IEC/EN/UL 62368-1/60950-1					Ed.2.0
<b>EMC Emission</b>	EN 55032: 2015 Class B, EN 61000-3-2:2014 EN 61000-3-3:2013, FCC CFR Title 47 Part 15 Subpart B: 2007 Class B					
Conducted Disturbance	EN 55032, EN61000-6-3, EN 61204-3					Class B
Radiated Disturbance	EN 55032, EN61000-6-3, EN 61204-3					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, 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: $\pm 8\text{kV}$ , Contact Discharge: $\pm 4\text{kV}$					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, $\pm 1\text{kV}$					Criteria A
Surge	IEC 61000-4-5 Ed. 3.0: 2014, L-N: $\pm 1\text{kV}$					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 B
Voltage interruptions	IEC 61000-4-11 Ed. 2.0: 2004, >95% reduction					Criteria B
Application Note Link	<a href="#">TRG15 Series App Notes</a>					

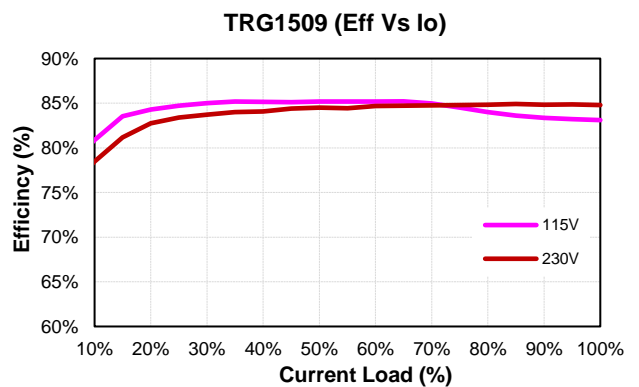
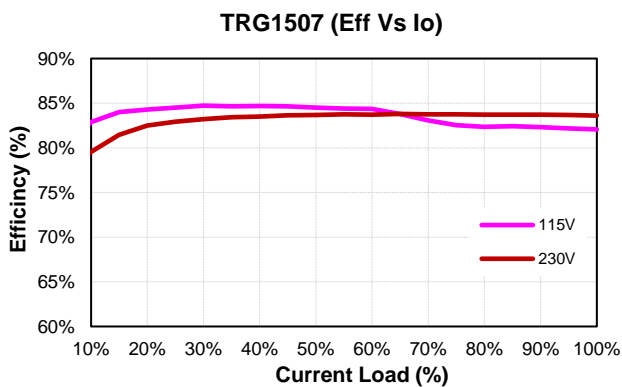
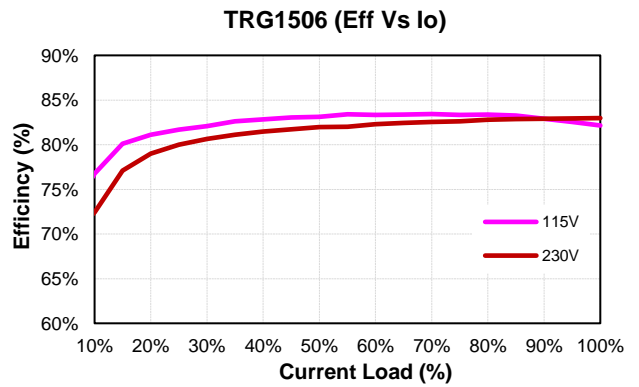
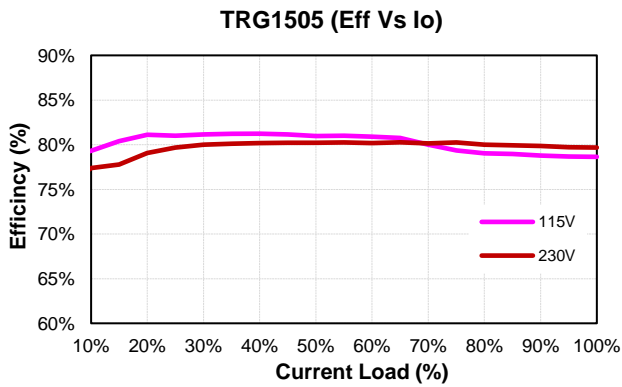


## CHARACTERISTIC CURVE

### Power Derating Curve



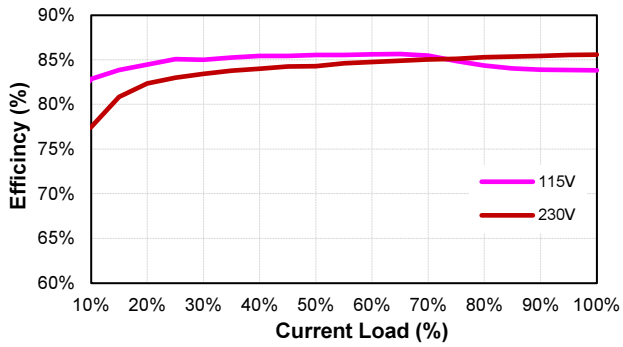
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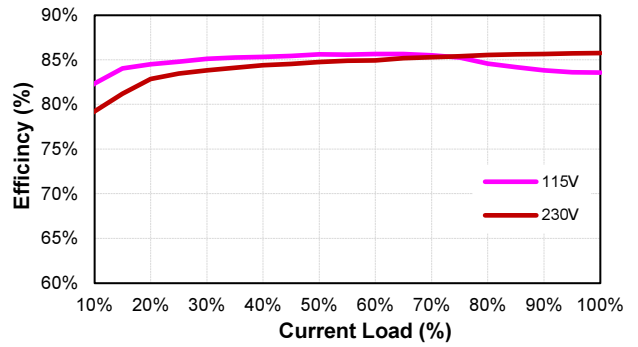


# TRG15 Series

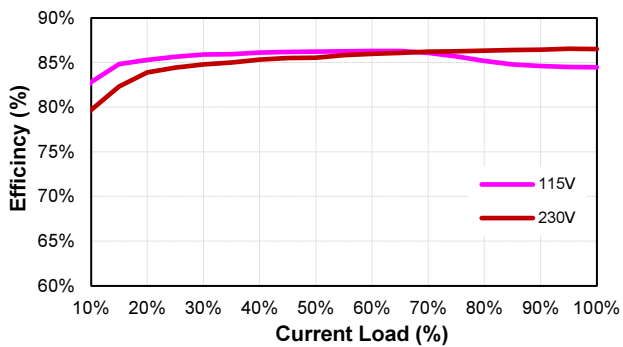
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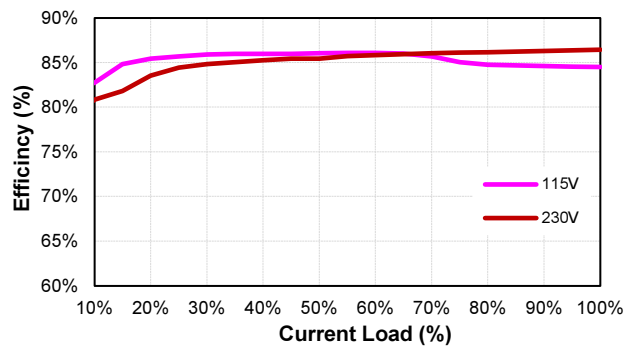
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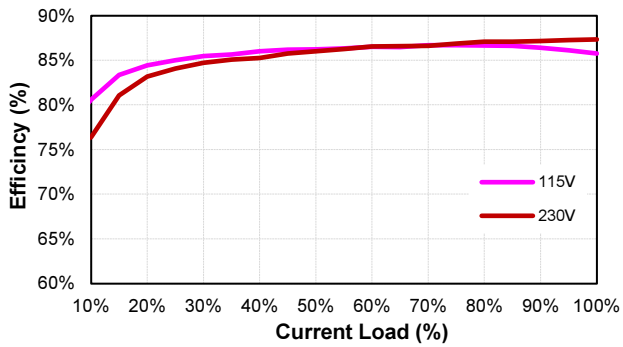
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### TRG1518 (Eff Vs Io)



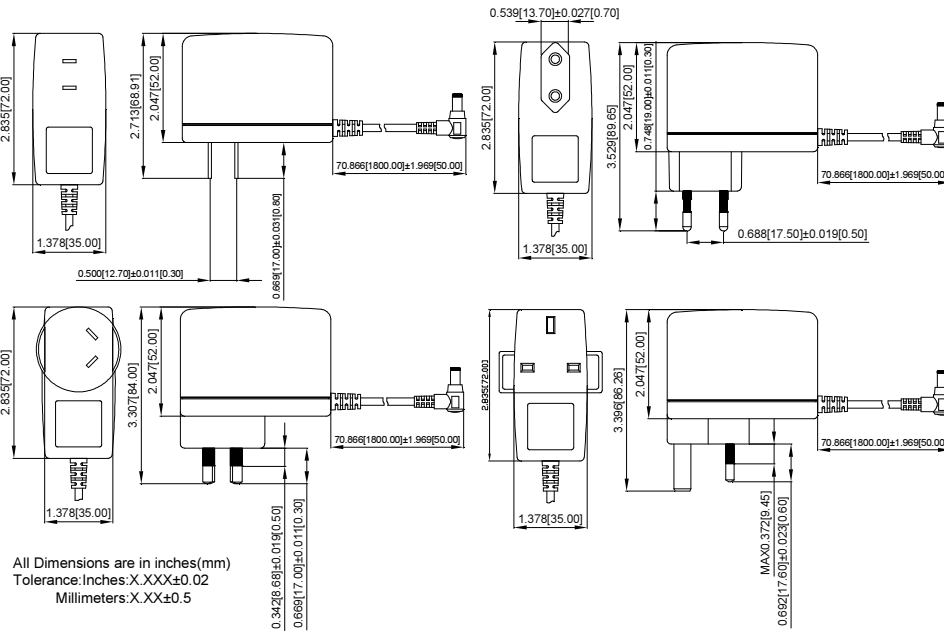
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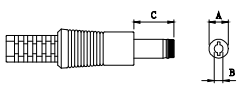
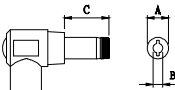
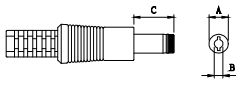
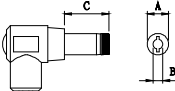


# TRG15 Series

## MECHANICAL SPECIFICATION



## 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- + ● - -	11E03	Φ5.5	Φ2.1	12	UL1185	1800mm without Core	18AWG for Vo: 5V, 7.5V, 9V 20AWG for Vo: 12V, 13.6V, 15V, 18V, 24V
	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			
 Straight/Inner+Outer- + ● - -	11E02	Φ5.5	Φ2.1	12	UL1185	1220mm without Core	16AWG for Vo: 6V
	12E02	Φ5.5	Φ2.5	12			
	23E02	Φ5.5	Φ2.1	9.5			
	26E02	Φ5.5	Φ2.5	9.5			
 Right Angle/Inner+Outer- + ● ) - -	01E02	Φ5.5	Φ2.1	12			
	02E02	Φ5.5	Φ2.5	12			
	21E02	Φ5.5	Φ2.5	9.5			
	24E02	Φ5.5	Φ2.1	9.5			

※Other DC Plug Type please refer to the link: <https://www.cincon.com/productdownload/TRG15-cable-DC-Plug.pdf>

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