

# ARTESYN DA10-050 SERIES

External Power Adapter



## PRODUCT DESCRIPTION

Advanced Energy’s Artesyn new standard 10W charger platform provides small-size, high efficiency & low cost features. It meets new European CoC v5 Tier 2 & US DoE Level VI energy saving requirements.

The integrated primary side regulation chip topology provides simplified & low-cost design. It can meet extremely low standby power (< 75mW) and high average loading efficiency (>79%). The enclosure temperature rise is < 45 °C in full temperature range from -10 to 40 °C operating.

Extra features include over-voltage, over-current, short-circuit and over-temperature protections.

### AT A GLANCE

#### Total Power

10 Watts

#### Input Voltage

90 to 264 Vac

#### # of Outputs

Single



## SPECIAL FEATURES

- Small Size 44 x 39.5 x 25 mm excluding AC pins
- High Average Loading Efficiency 79%
- 2-pin Input Class II
- USB connector output
- -10 °C to +40 °C Operating Temperature Range
- Reinforced Insulation 3000 Vac rms
- Over-voltage Protection
- Over-temperature Protection
- Over-current Protection
- Short circuit Protection
- Elegant Enclosure ID Design

- European CoC v5 Tier 2 & US DoE VI Compliant
- One Year Warranty
- RoHS 6/6 , WEEE and REACH Compliant

## SAFETY

- cUL/UL 60950-1
- IEC/EN 60950-1
- IEC 62368-1
- CCC
- CE
- GS
- Designed to meet: NOM-NYCE, SPRING, IRAM, C-Tick, NSW

## MODEL NUMBERS

Standard	Input Voltage Range	Output Voltage	Minimum Load	Maximum Load
DA10-050US	90-264 Vac	5Vdc	0A	2A
DA10-050CH	90-264 Vac	5Vdc	0A	2A
DA10-050EU	90-264 Vac	5Vdc	0A	2A
DA10-050UK	90-264 Vac	5Vdc	0A	2A

### Options

AC Plug Configuration for Fixed Plug	
U.S. 2-prong	DA10-050US
China 2-prong	DA10-050CH
Europe 2-prong	DA10-050EU
UK 3-prong	DA10-050UK

## ELECTRICAL SPECIFICATIONS

### Absolute Maximum Ratings

Stress in excess of those listed in the “Absolute Maximum Ratings” may cause permanent damage to the power supply. These are stress ratings only and functional operation of the unit is not implied at these or any other conditions above those given in the operational sections of this TRN. Exposure to any absolute maximum rated condition for extended periods may adversely affect the power supply’s reliability.

Table 1. Absolute Maximum Ratings						
Parameter	Model	Symbol	Min	Typ	Max	Unit
Input Voltage AC continuous operation	All models	$V_{IN,AC}$	90	-	264	Vac
Maximum Output Power	All models	$P_{O,max}$	-	-	10	W
Isolation Voltage Input to output	All models		-	-	3000	Vac
Ambient Operating Temperature	All models	$T_A$	-10	-	+40	°C
Storage Temperature	All models	$T_{STG}$	-40	-	+85	°C
Humidity(non-condensing)	All models		5	-	95	%

## ELECTRICAL SPECIFICATIONS

### Input Specifications

Table 2. Input Specifications						
Parameter	Condition	Symbol	Min	Typ	Max	Unit
Operating Input Voltage, AC	All	$V_{IN,AC}$	90	-	264	Vac
Input AC Frequency	All	$f_{IN}$	47	50/60	63	Hz
Input Surge Voltage	100ms. $V_{IN,AC} = 264Vac$ to $300Vac$ and back to $264Vac$ Max	$V_{IN,surge}$	-	-	300	Vac
Maximum Input Current ( $I_O = I_{O,max}$ )	$V_{IN,AC} = 115Vac$	$I_{IN,max}$	-	-	300	mA
No Load Input Power ( $V_O = On, I_O = 0A$ )	$V_{IN,AC} = 115Vac / 230Vac$	$P_{IN,standby}$	-	-	75	mW
Efficiency	$V_{IN,AC} = 230Vac$ $I_O = 10\% I_{O,max}$ $I_O = 25\% - 100\% I_{O,max}$	$\eta$	70 79	- -	- -	% %
Leakage Current to earth ground	$V_{IN,AC} = 264Vac$	$I_{Leakage}$	-	-	100	$\mu A$

Note 1 - All parameters defined at 25 °C ambient temperature, unless other specified.

## ELECTRICAL SPECIFICATIONS

## Output Specifications

Table 3. Output Specifications						
Parameter	Condition	Symbol	Min	Typ	Max	Unit
Output Voltage Regulation	All	$V_O$	4.75	5.00	5.25	Vdc
Output Current	All	$I_O$	-	-	2	A
Output Ripple, pk-pk	Measure with a 0.1uF ceramic capacitor in parallel with a 10uF tantalum capacitor, 0 to 20MHz bandwidth	$V_O$	0	-	100	mV <sub>PK-PK</sub>
$V_O$ Dynamic Response	50% load change, slew rate = 0.5A/uS	$V_O$	4.1	-	6.0	Vdc
Output Rise Time	All	$T_{RISE}$	-	-	100	mSec
Hold-up Time	$V_{IN,AC} = 115Vac$ $I_O = I_{O,max}$	$T_{Hold-up}$	-	10	-	mSec

ELECTRICAL SPECIFICATIONS

DA10-050CH Performance Curves

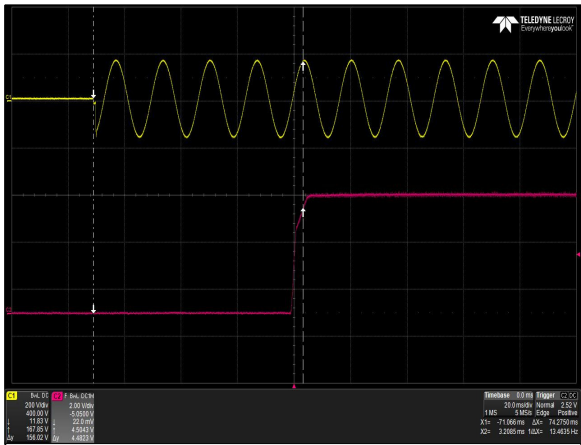


Figure 1: DA10-050CH Turn-on Delay via AC mains  
 Vin = 115Vac Load: Io = 2A  
 Ch 1: VIN Ch 2: Vo

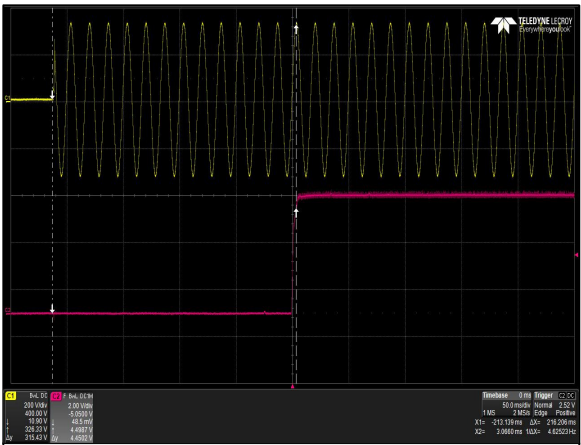


Figure 2: DA10-050CH Turn-on Delay via AC mains  
 Vin = 230Vac Load: Io = 2A  
 Ch 1: VIN Ch 2: Vo

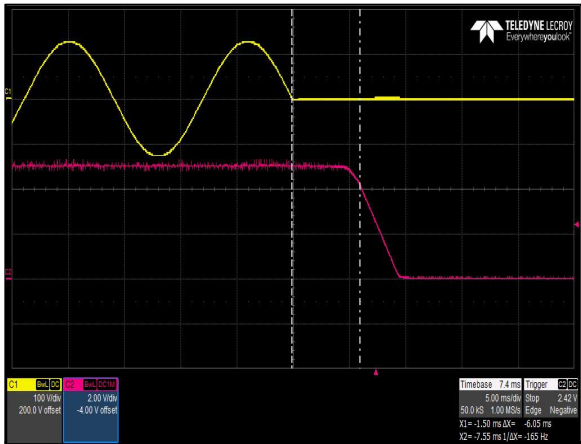


Figure 3: DA10-050CH Hold-up Time  
 Vin = 90Vac/63Hz/0° Load: Io = 2A  
 Ch 1: VIN Ch 2: Vo

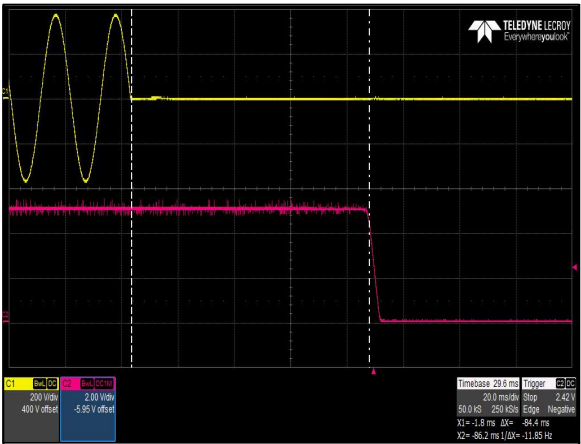


Figure 4: DA10-050CH Hold-up Time  
 Vin = 264Vac/47Hz/0° Load: Io = 2A  
 Ch 1: VIN Ch 2: Vo

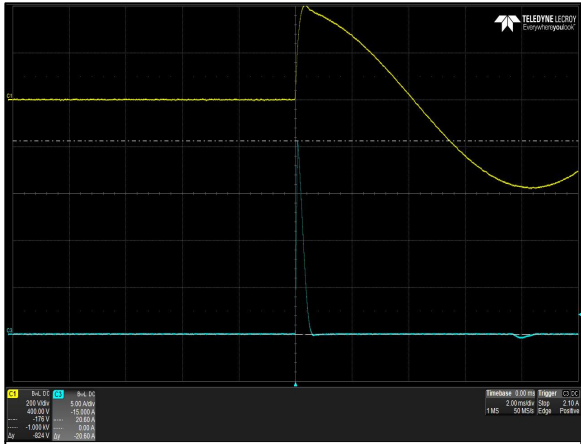


Figure 5: DA10-050CH Start up Inrush Current  
 Vin = 264Vac Load: Io = 0A, Turn on at 90 deg  
 Ch 1: VIN Ch 3: IIN

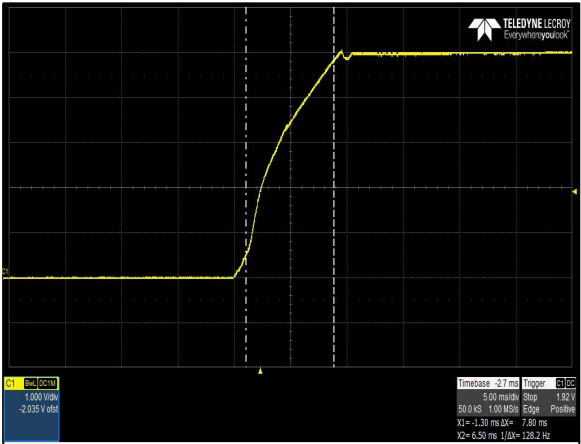


Figure 6: DA10-050CH Output Voltage Startup  
 Vin = 90Vac Load: Io = 2A  
 Ch 1: Vo

# ELECTRICAL SPECIFICATIONS

## DA10-050CH Performance Curves

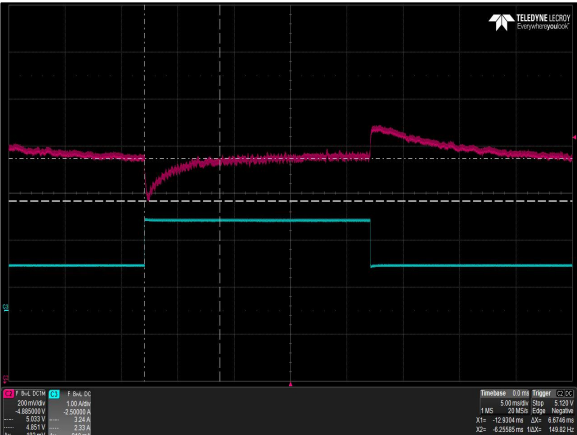


Figure 7: DA10-050CH Transient Response – Vo Deviation  
 Vin = 115Vac Load: Io = 50% to 100%, 1A/us slew rate  
 Ch 2: Vo Ch 3: Io

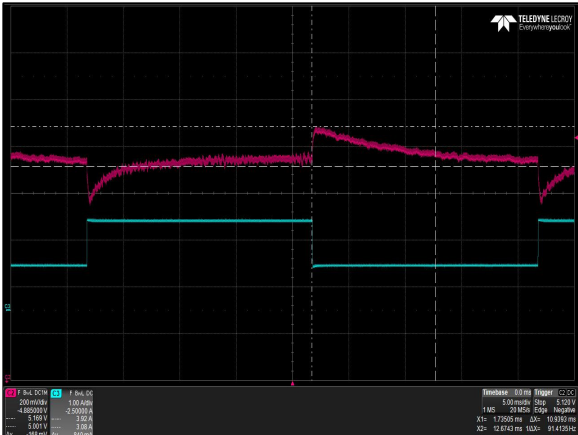


Figure 8: DA10-050CH Transient Response – Vo Deviation  
 Vin = 115Vac Load: Io = 100% to 50%, 1A/us slew rate  
 Ch 2: Vo Ch 3: Io

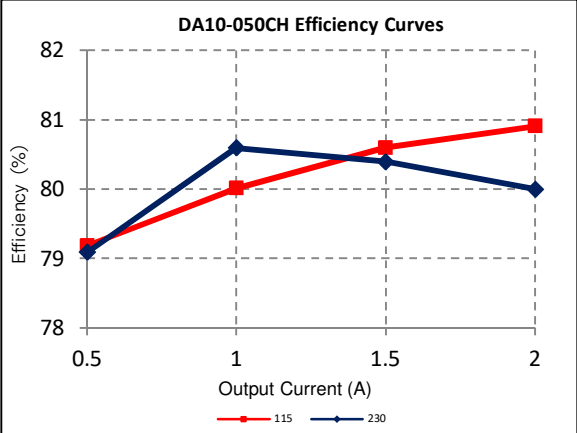


Figure 9: DA10-050CH Efficiency Curves @ 25 degC  
 Vin = 115 / 230Vac Load: Io = 25% increment to 2A

## ELECTRICAL SPECIFICATIONS

### Protection Function Specifications

#### Over Voltage Protection (OVP)

Over Voltage Protection is triggered when the PSU has an internal fault which results in the output rising over the regulation limit. The power supply will bounce during overvoltage and recover to normal once removing the fault condition.

Parameter	Min	Typ	Max	Unit
V <sub>O</sub> Output Overvoltage	/	/	6.5	Vdc

#### Over Current Protection (OCP)

Current Limitation at >100% output current, Hiccup mode. The DA10 series includes internal current limit circuitry to prevent damage in the event of overload or short circuit. Recovery is automatic when the overload is removed.

Parameter	Min	Typ	Max	Unit
V <sub>O</sub> Output Overcurrent	2	-	-	A

#### Short Circuit Protection (SCP)

The DA10 series will withstand a continuous short circuit with no permanent damage, applied to its output during start-up or while running. The output will recover to normal after the short-circuit is removed.

#### Over Temperature Protection (OTP)

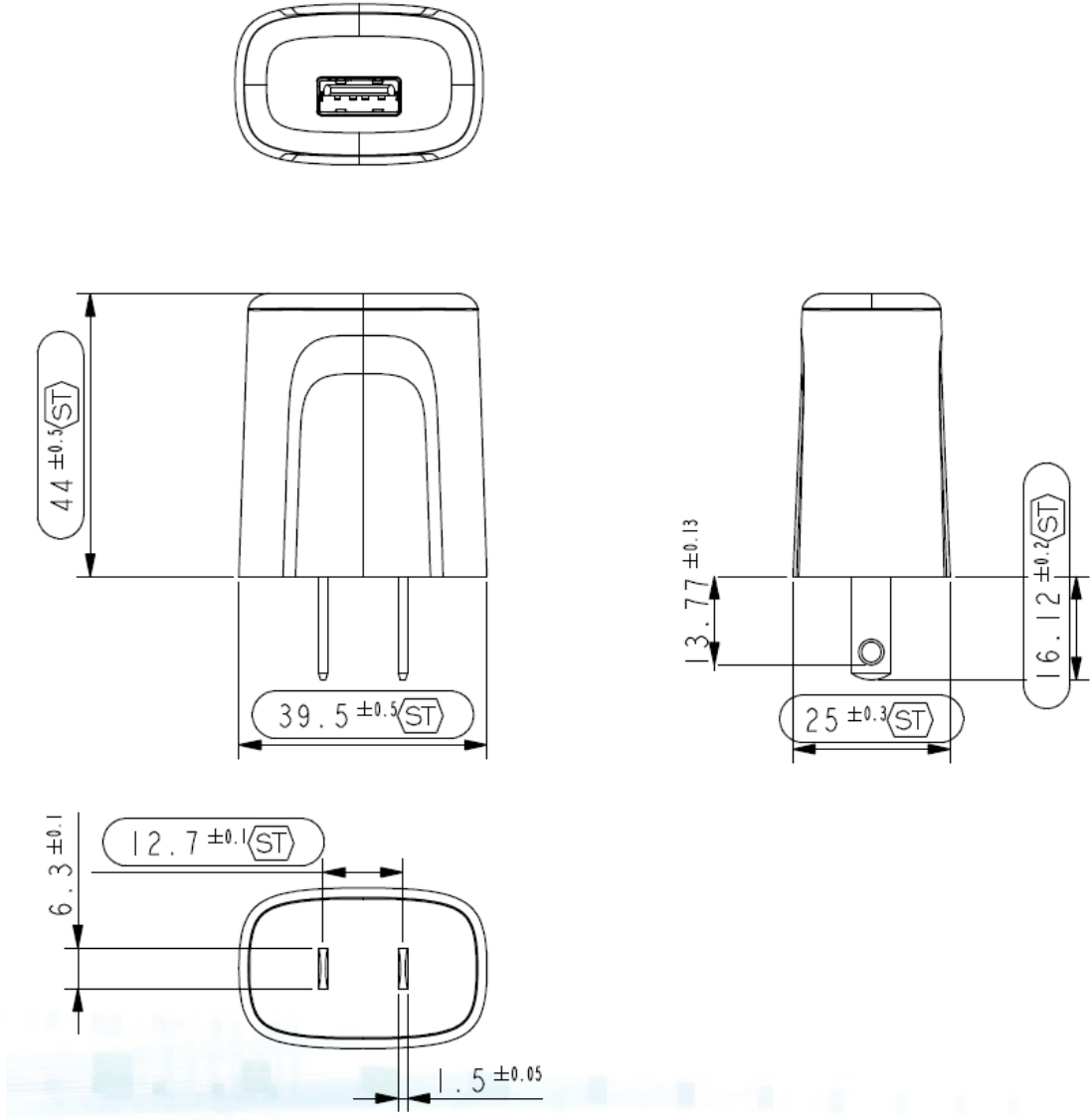
The power supply is internally protected against over temperature conditions. When the OT circuit is activated, the power supply will latch off, requiring AC power recycling to restart the power supply with 5 seconds "off time" at least.



# MECHANICAL SPECIFICATIONS

## Mechanical Outlines (Dimensioning)

### DA10-050US Mechanical Outline

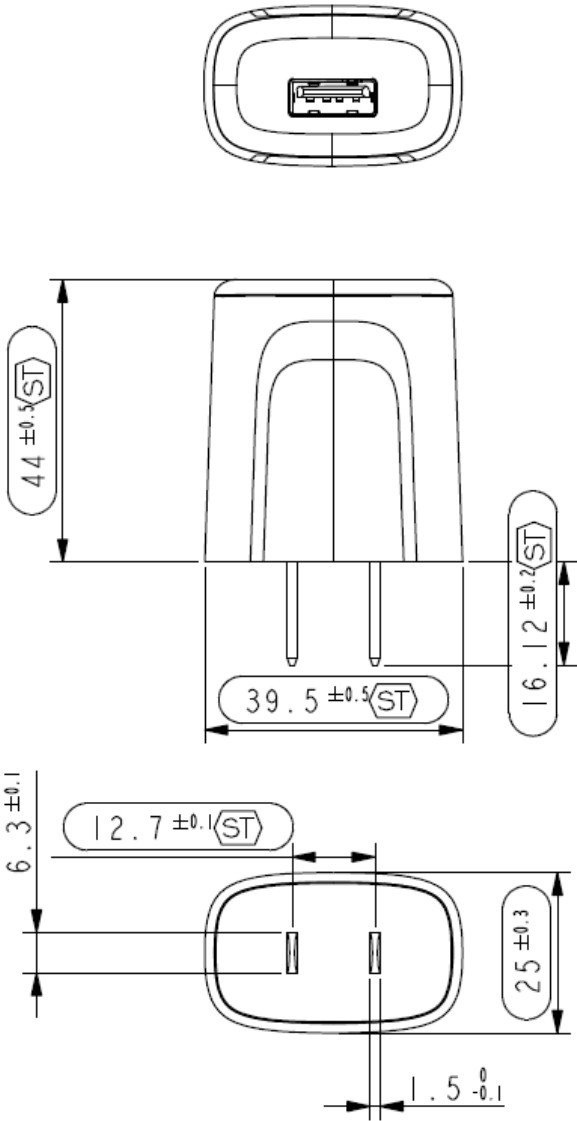


Note: All dimensions in mm.

# MECHANICAL SPECIFICATIONS

## Mechanical Outlines (Dimensioning)

### DA10-050CH Mechanical Outline

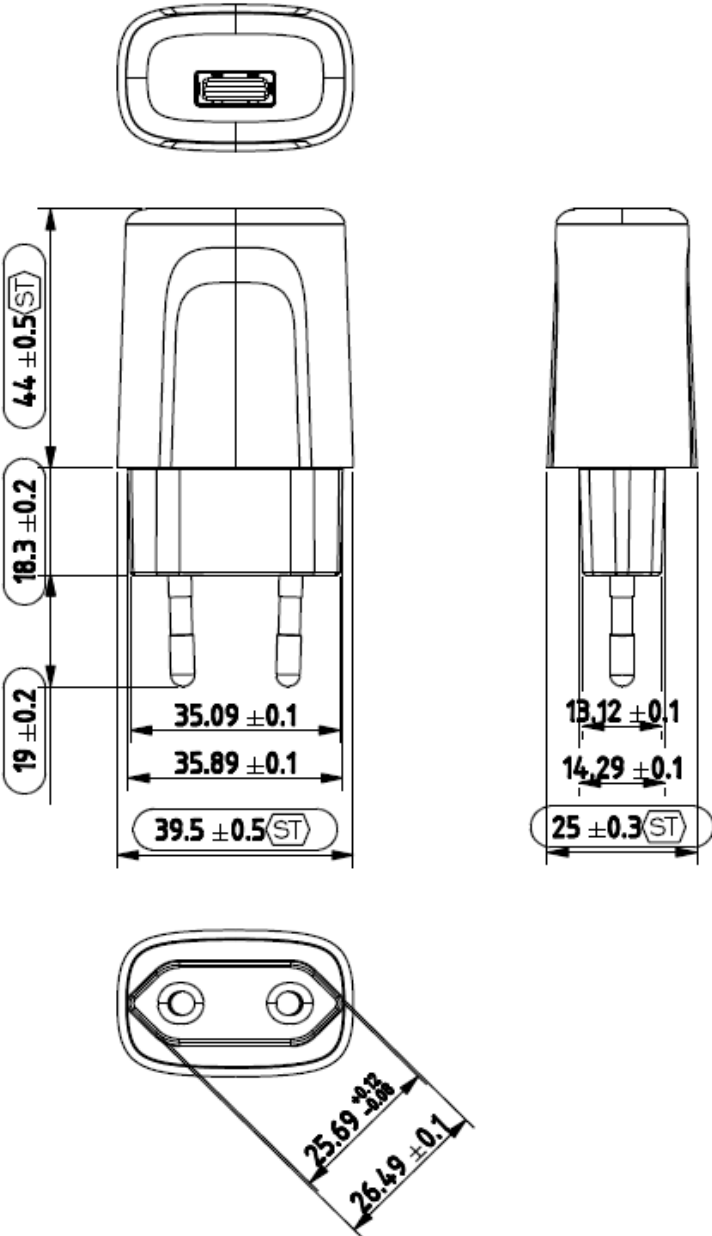


Note: All dimensions in mm.

# MECHANICAL SPECIFICATIONS

## Mechanical Outlines (Dimensioning)

### DA10-050EU Mechanical Outline

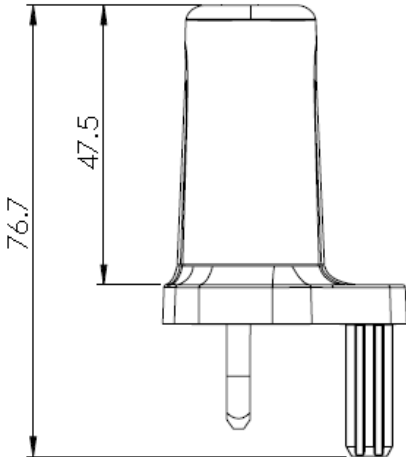
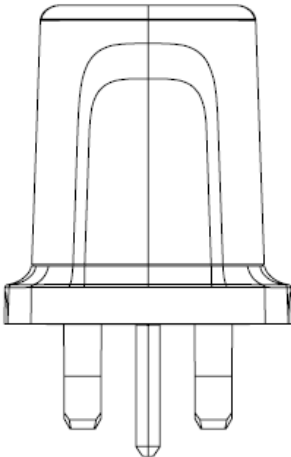
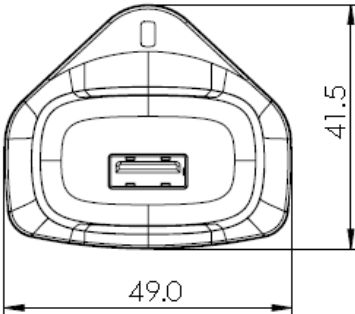


Note: All dimensions in mm.

# MECHANICAL SPECIFICATIONS

## Mechanical Outlines (Dimensioning)

### DA10-050UK Mechanical Outline



Note: All dimensions in mm.

# MECHANICAL SPECIFICATIONS

## Weight

The DA45C series weight is 0.075lb / 34g nominal.

## ENVIRONMENTAL SPECIFICATIONS

### EMC Immunity

DA10-050 series power supply is designed to meet the following EMC immunity specifications.

Table 4. Environmental Specifications	
Document	Description
FCC Part 15 Subpart B/ EN55032, Class B	Conducted and Radiated EMI Limits
EN61000-3-3	Voltage Fluctuations, $\delta_{max} \leq 4\%$
EN61000-4-2	Electromagnetic Compatibility (EMC) - Testing and measurement techniques – Electrostatic discharge immunity test. +/-8KV contact discharge, performance Criteria B
EN61000-4-3	Electromagnetic Compatibility (EMC) - Testing and measurement techniques, Radiated, radio-frequency, electromagnetic field immunity test, Criteria A
EN61000-4-4	Electromagnetic Compatibility (EMC) - Testing and measurement techniques, Electrical Fast Transient/Burst Immunity Test. +/-1KV , I/O and signal ports performance Criteria A.
EN61000-4-5	Electromagnetic Compatibility (EMC) - Testing and measurement techniques. +/-1KV for DC ports performance criteria A.
EN61000-4-6	Immunity to conducted disturbances, induced by radio-frequency fields – performance criteria A
EN61000-4-11	Electromagnetic Compatibility (EMC) - Testing and measurement techniques : Voltage Dips and Interruptions: performance Criteria B(For 100% reduction, Criteria C).
High Frequency Pulses / Rings longer than 250ns	Common Mode Noise: Less than or equal to 2.0 Vpp.

## ENVIRONMENTAL SPECIFICATIONS

### Safety Certifications

The DA10-050 series power supply is in compliance with the following safety requirements.

Table 5. Safety Certifications for DA10-050 Series Power Supply System		
Document	File #	Description
cUL/UL 60950-1	E132002-A402-UL	US and Canada Requirements
Level VI Compliance	15459	US Efficiency Standards for External Power Supplies.
IEC/EN 60950-1	E132002-A402-CB-1	European Requirements
IEC 62368-1	DK-46911-UL	Audio/video, information and communication technology equipment.
CB Certificate and Report	DK-49542-UL	(All CENELEC Countries)
CHINA CCC Approval	2015010907769437	China Requirements
CE Mark	8544	LVD
NOM-NYCE		Mexico Approval
GS		GS Mark Certification
SPRING		PSB Spring certification
IRAM		Argentina IRAM certification
C-Tick		C-Tick mark
NSW		NSW Certificate

## ENVIRONMENTAL SPECIFICATIONS

### Operating Temperature

The DA10-050 series power supply is designed to meet all of its specifications during any combination of operating ambient conditions and after exposure to any combination of non-operating ambient conditions specified in this section.

Table 6. Environmental Specifications					
Parameter	Condition	Min	Typ	Max	Unit
Operating Ambient Temperature	Natural Convection $I_O = I_{O,max}$	0	-	40	°C
Case (Enclosure) Temperature Rise over Ambient Temperature.	Natural Convection $T_A = 40^\circ\text{C}$	-	-	45	°C
Electrolytic Cap. Life Expectancy	$V_{IN,AC} = 115 / 230\text{Vac}$ $I_O = I_{O,max}$	1.5	-	-	10 K Hr
MTBF	$V_{IN,AC} = 115 / 230\text{Vac}$ $I_O = I_{O,max}$	1	-	-	100 K Hr
Acoustic Noise	All	-	-	25	dBA



# RECORD OF REVISION AND CHANGES

Issue	Date	Description	Originators
1.0	07.08.2016	First Issue	S. Yang



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## ABOUT ADVANCED ENERGY

Advanced Energy (AE) has devoted more than three decades to perfecting power for its global customers. AE designs and manufactures highly engineered, precision power conversion, measurement and control solutions for mission-critical applications and processes.

Our products enable customer innovation in complex applications for a wide range of industries including semiconductor equipment, industrial, manufacturing, telecommunications, data center computing, and medical. With deep applications know-how and responsive service and support across the globe, we build collaborative partnerships to meet rapid technological developments, propel growth for our customers, and innovate the future of power.

## PRECISION | POWER | PERFORMANCE

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