

## 1. Device Overview

### ADAPTER VTLP-2020



#### *Features:*

- AC input range : 90 – 264 VAC.
- DC output : 12V --- 1.5A.
- Protections : OVP, OCP, OTP, Thunderbolt.
- Fully enclosed plastic case.

#### *Applications:*

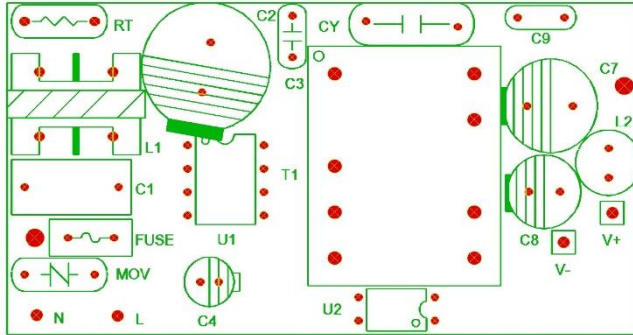
- Consumer electronic devices.
- Telecommunication devices.
- Office facilities.
- Industrial equipments.

## 2. Specifications

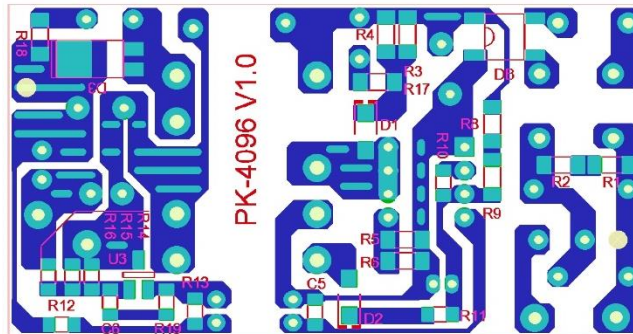
Description	Symbol	Min	Typ	Max	Units	Comment
<b>AC Input</b>						
Voltage	$V_{in}$	90		264	VAC	Two wire ( L, N)
Frequency	$F_{line}$	47	50/60	63	Hz	Sine wave
<b>DC Output</b>						
Output voltage	$V_{out}$	12.25		12.7	V	Measured at end of Output DC Cable
Output current	$I_{out}$		1.5		A	
Output Ripple Voltage	$V_{ripple}$			100	mV <sub>PP</sub>	
Output power	$P_{out}$		18		W	
Over current protection	$I_{out\_max}$			2.5	A	
Active mode efficiency	$\eta$		85		%	@230VAC
<b>Varistor – Thunderbolt protection</b>						
Response Time	$T_r$		10	25	nS	
Rated Wattage	$P_w$			0.4	W	
Clamping Voltage				775	V	0.4 uS
Voltage Rating DC		423	470	517	V	@1mA DC
Peak Surge Current				2.5	kA	0.4 uS
Surge Energy Rating				70	J	0.4 uS

<b>Protection</b>	
Over load (OCP)	Hiccup mode, recovered automatically after fault condition is removed.
Over voltage (OVP)	Clamping by TL431.
Over temperature (OTP)	Shutdown output voltage, recovered automatically after temperature goes down.
Thunderbolt	Use to varistor.
<b>Environmental</b>	
Operation temperature	0 ~ +60°C.
Operation humidity	20 ~ 90% RH non-condensing.
Storage temperature, humidity	-40 ~ +85°C, 10 ~ 95% RH.
<b>Others</b>	
Dimension	78*47*33mm (L*W*H).
Packed	110g± 5g.
<b>Connector</b>	
AC Socket	Support to 2 pole EURO Plug
DC Socket	Length : 1.5m, Jack DC: 5.5 x 2.1mm.

### 3. PCB Drawing



Top layer of PCB



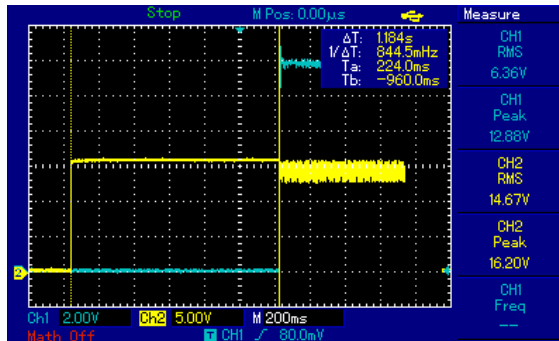
Bottom layer of PCB

## 4. Regulation, Ripple and Efficiency Measurement

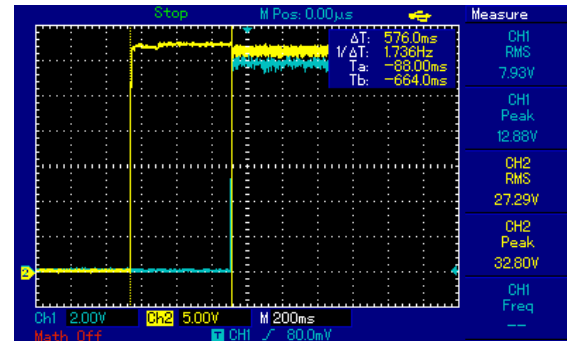
$V_{in}(VAC)$	$I_{out}(A)$	$V_{out}(V)$	$P_{in}(W)$	$P_{out}(W)$	$V_{ripple}(mV)$	$\eta$ (%)	$\eta_{avg}(\%)$
115	0	12,07	0	0,00	40		85,72
	0,5	11,964	6,9	5,98	45	86,70	
	1	11,857	13,77	11,86	60	86,11	
	1,5	11,749	20,89	17,62	70	84,36	
230	0	12,07	0,16	0,00	40	0,00	86,25
	0,5	11,96	7	5,98	45	85,43	
	1	11,853	13,7	11,85	65	86,52	
	1,5	11,746	20,3	17,62	75	86,79	

## 5. Turn on delay time

- Test condition : full load.



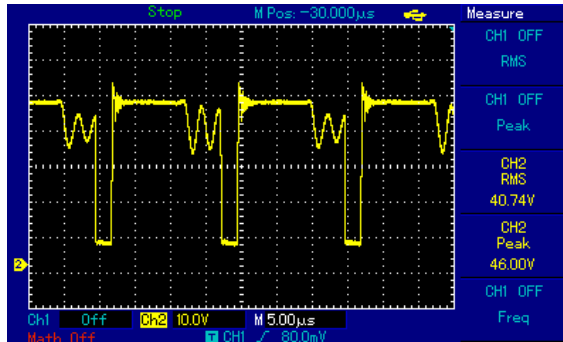
110VAC,  $T_{ST\_Delay} = 1184$  (ms).



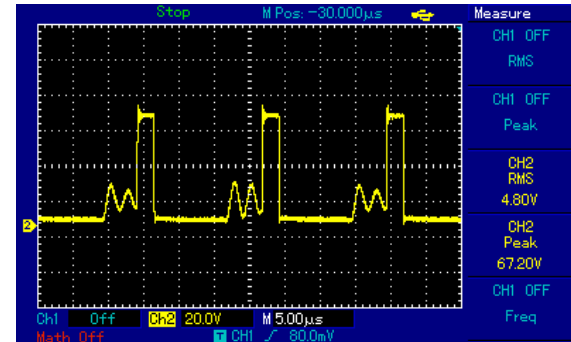
230VAC,  $T_{ST\_Delay} = 576$  (ms).

## 6. $V_{DS}$ and $V_{RRM}$ waveform

- Test condition :  $V_{in} = 265 \text{ VAC}$ ,  $I_{out} = 1.5\text{A}$ .



$V_{DS-Max} = 460 \text{ VDC}$



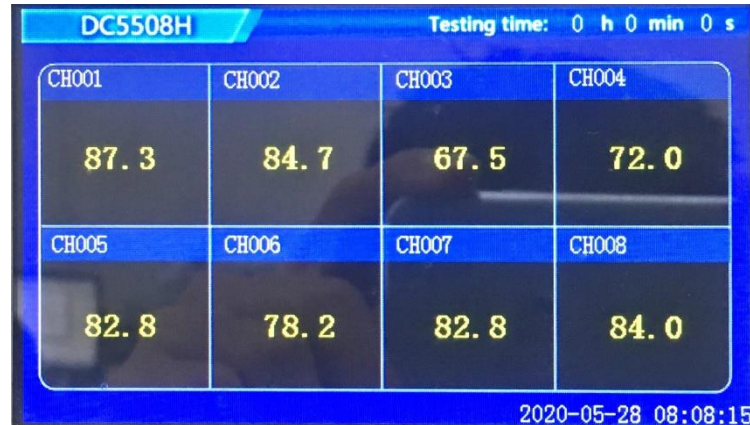
$V_{RRM} = 67.2 \text{ VDC}$

- Integrated Mosfet in Driver IC

Symbol	Parameter	Min	Units
$V_{DS}$	Drain-Source break down voltage.	650	V
$V_{RRM}$	Maximum repetitive peak reverse voltage.	100	V

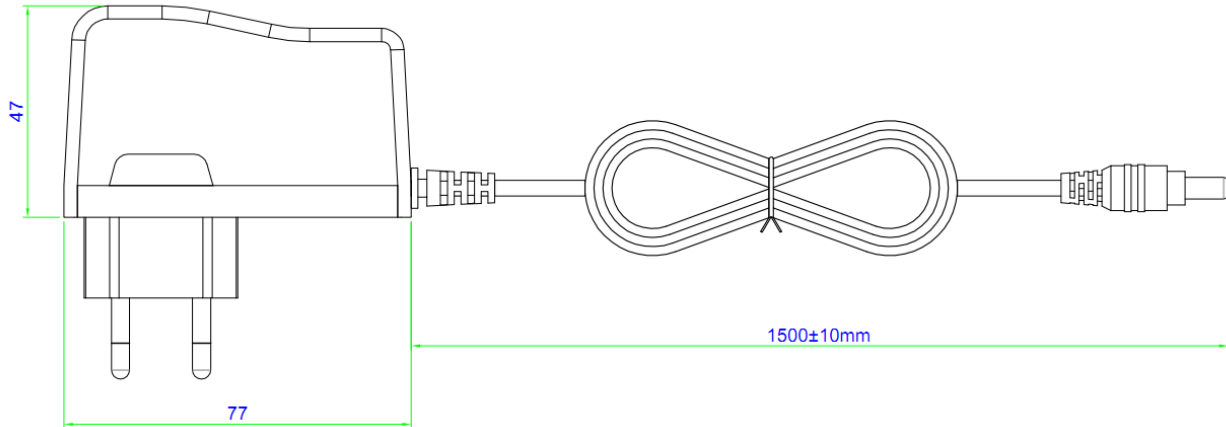
## 6. Testing thermal for critical components

Items	Temp (°C)	Notes
IC	87,3	<ul style="list-style-type: none"> <li>- Adapter is assembled with case.</li> <li>- Test condition: <math>V_{in} = 220VAC</math>, <math>I_{out} = 1.5A</math>.</li> <li>- Timing test : 12 hours.</li> </ul>
Transformer	84,7	
Dual diode(output)	67,5	
Cap(output)	72	

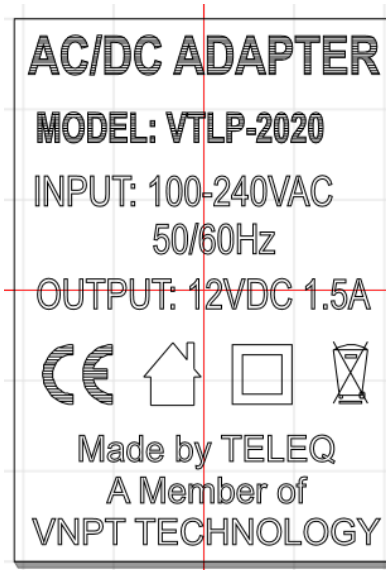




## 7. Outside dimension

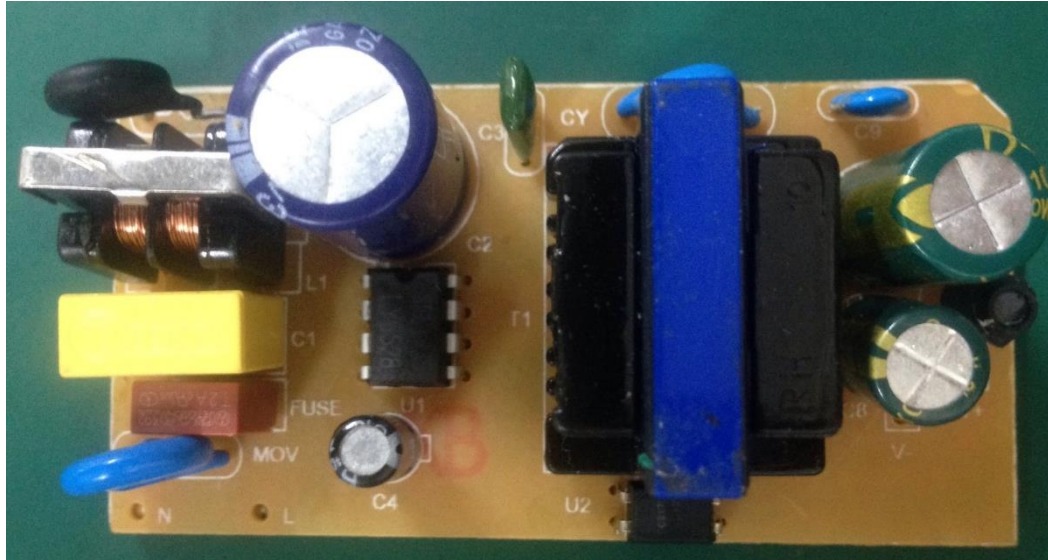


## 8. Label on case



Dimension : 21 x 30 mm

## 9. Inside of device



Components at top PCBA