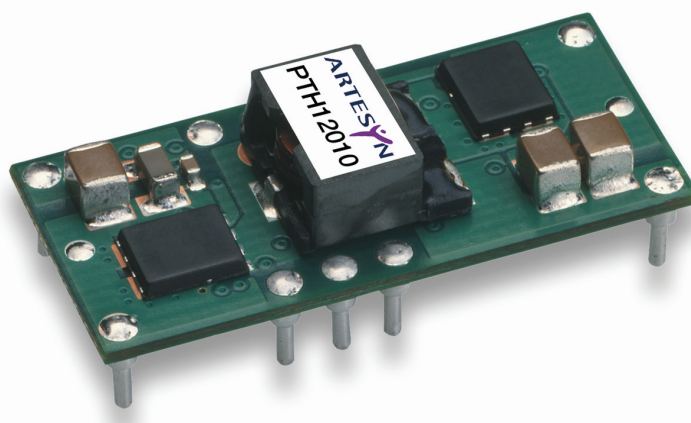


# PTH12010

## 12 Vin

### Single Output

**Total Power:** 66W  
**# of Outputs:** Single



Rev. 2.16.09\_115  
PTH12010 Series  
1 of 6



## Special Features

- 12 A output current
- 12 V input voltage
- Wide-output voltage adjust
  - 1.2 Vdc to 5.5 Vdc for suffix 'W' and 0.8 Vdc to 1.8 Vdc for suffix 'L'
- Auto-track™ sequencing\*
- Margin up/down controls
- Efficiencies up to 94%
- Output ON/OFF inhibit
- Output voltage sense
- Point-of-Load-Alliance (POLA) compatible
- Available RoHS compliant
- 2 Year Warranty

## Safety

- UL/cUL CAN/CSA-C22.2 No. 60950-1-03/UL 60950-1, File No. E174104
- TÜV Product Service (EN60950) Certificate No. B 04 06 38572 044
- CB Report and Certificate to IEC60950, Certificate No. US/8292/UL

## Specifications

| Input                                  |                            |                                                    |
|----------------------------------------|----------------------------|----------------------------------------------------|
| Input voltage range:                   | (See Note 3)               | 10.8 - 13.2 Vdc                                    |
| Input current:                         | No load                    | 10 mA typ.                                         |
| Remote ON/OFF:                         | (See Note 1)               | Positive logic                                     |
| Start-up time:                         |                            | 1 V/ms                                             |
| Undervoltage lockout:                  |                            | 9.0 - 9.5 V typ.                                   |
| Track input voltage:                   | Pin 8 (See Note 6)         | ± 0.3 Vin                                          |
| Output                                 |                            |                                                    |
| Voltage adjustability:<br>(See Note 4) | Suffix '-W'<br>Suffix '-L' | 1.2 - 5.5 Vdc<br>0.8 - 1.8 Vdc                     |
| Setpoint accuracy:                     |                            | ± 2.0% Vo                                          |
| Line regulation:                       |                            | ± 10 mV typ.                                       |
| Load regulation:                       |                            | ± 12 mV typ.                                       |
| Total regulation:                      |                            | ± 3.0% Vo                                          |
| Minimum load:                          |                            | 0 A                                                |
| Ripple and noise:                      | 20 MHz bandwidth           | 25 mV pk-pk                                        |
| Temperature co-efficient:              | -40 °C to +85 °C           | ± 0.5% Vo                                          |
| Transient response:<br>(See Note 5)    |                            | 70 µs recovery time<br>Overshoot/undershoot 100 mV |
| Margin adjustment:                     |                            | ± 5.0% Vo                                          |

All specifications are typical at nominal input, full load at 25 °C unless otherwise stated  
Cin = 560 µF, Cout = 0 µF

\* Auto-track™ is a trade mark of  
Texas Instruments



#### EMC Characteristics

|                          |                       |
|--------------------------|-----------------------|
| Electrostatic discharge: | EN61000-4-2, IEC801-2 |
| Conducted immunity:      | EN61000-4-6           |
| Radiated immunity:       | EN61000-4-3           |

#### General Specifications

|                          |                            |                                                     |
|--------------------------|----------------------------|-----------------------------------------------------|
| Efficiency:              |                            | See tables on page 3                                |
| Insulation voltage:      |                            | Non-Isolated                                        |
| Switching frequency:     | Suffix '-W'<br>Suffix '-L' | 300 kHz to 400 kHz<br>200 kHz to 300 kHz            |
| Approvals and standards: |                            | EN60950, UL/cUL60950                                |
| Material flammability:   |                            | UL94V-0                                             |
| Dimensions:              | (L x W x H)                | 34.80 x 15.75 x 9.00 mm<br>1.370 x 0.620 x 0.354 in |
| Weight:                  |                            | 5g (0.18 oz)                                        |
| MTBF                     | Telcordia SR-332           | 7,092,000 hours                                     |

## Environmental Specifications

|                       |                                                 |                                       |
|-----------------------|-------------------------------------------------|---------------------------------------|
| Thermal performance:  | Operating ambient, temperature<br>Non-operating | -40° C to +85 °C<br>-40° C to +125 °C |
| MSL ('Z' suffix only) | JEDEC J-STD-020C                                | Level 3                               |

#### Protection

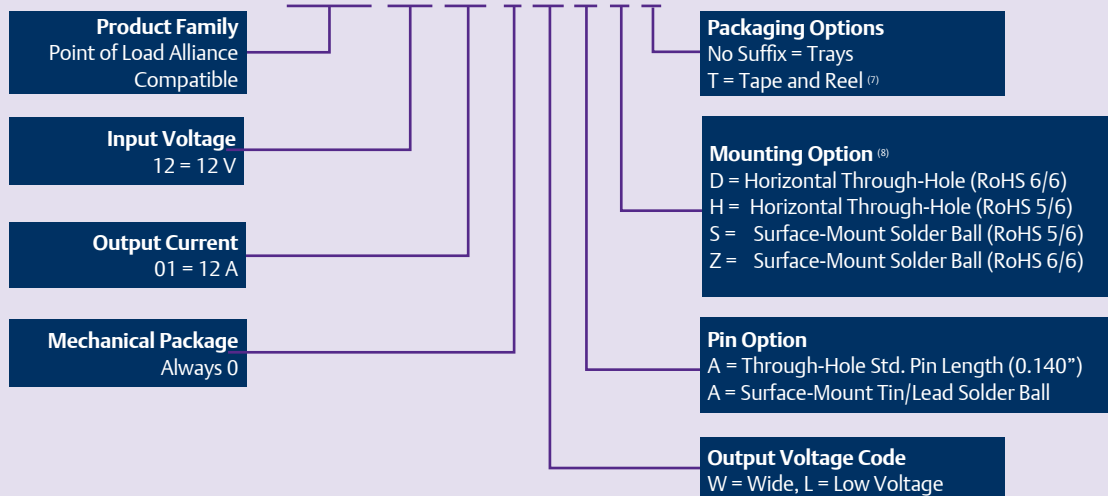
|                |            |           |
|----------------|------------|-----------|
| Short circuit: | Auto reset | 20 A typ. |
|----------------|------------|-----------|

## Ordering Information

| Output Power<br>(max) | Input<br>Voltage | Output<br>Voltage | Output Currents |      | Efficiency<br>(max) | Regulation |        | Model Numbers <sup>(8, 9)</sup> |
|-----------------------|------------------|-------------------|-----------------|------|---------------------|------------|--------|---------------------------------|
|                       |                  |                   | Min             | Max  |                     | Line       | Load   |                                 |
| 66 W                  | 10.8 - 13.2 Vdc  | 0.8 - 1.8 Vdc     | 0 A             | 12 A | 89%                 | ±10 mV     | ±12 mV | PTH12010L                       |
| 66 W                  | 10.8 - 13.2 Vdc  | 1.2 - 5.5 Vdc     | 0 A             | 12 A | 94%                 | ±10 mV     | ±12 mV | PTH12010W                       |

## Part Number System with Options

**PTH12010WAST**



## Output Voltage Adjustment of the PTH12010 Series

The ultra-wide output voltage trim range offers major advantages to users who select the PTH12010. It is no longer necessary to purchase a variety of modules in order to cover different output voltages. The output voltage can be trimmed in a range of 1.2 V to 5.5 V for suffix 'W' and 0.8 Vdc to 1.8 Vdc for suffix 'L'. When the PTH12010 converter leaves the factory the output has been adjusted to the default voltage of 1.2 V for the PTH12010W and 0.8 V for PTH12010L.

Efficiency Table - PTH12010W ( $I_O = 8$  A)

| Output Voltage | Efficiency |
|----------------|------------|
| $V_O = 5.0$ V  | 94%        |
| $V_O = 3.3$ V  | 93%        |
| $V_O = 2.5$ V  | 91%        |
| $V_O = 2.0$ V  | 90%        |
| $V_O = 1.8$ V  | 89%        |
| $V_O = 1.5$ V  | 88%        |
| $V_O = 1.2$ V  | 86%        |

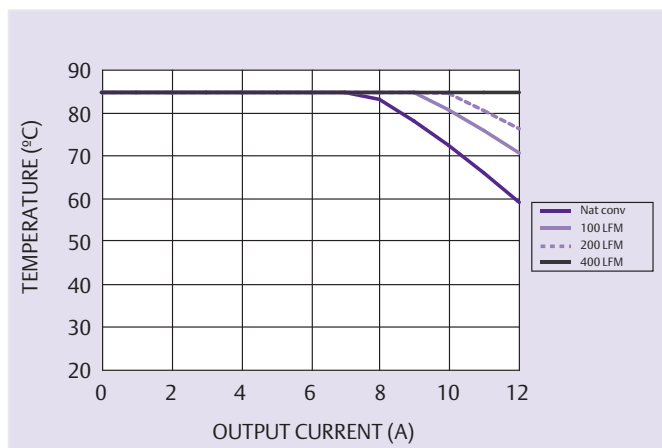
Efficiency Table - PTH12010L ( $I_O = 8$  A)

| Output Voltage | Efficiency |
|----------------|------------|
| $V_O = 1.8$ V  | 89%        |
| $V_O = 1.5$ V  | 88%        |
| $V_O = 1.2$ V  | 86%        |
| $V_O = 1.0$ V  | 84%        |
| $V_O = 0.8$ V  | 82%        |

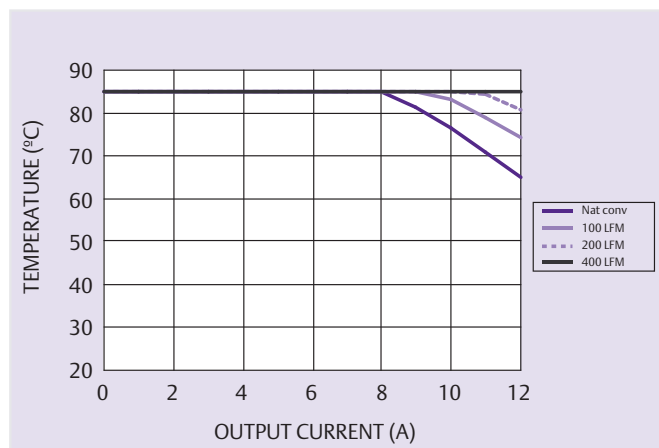
## Notes

- Remote ON/OFF. Positive Logic  
ON: Pin 3 open; or  $V > V_{in} - 0.5$  V  
OFF: Pin 3 GND; or  $V < 0.8$  V (min - 0.2 V).
- See Figures 1, 2 and 3 for safe operating curves for the PTH12010W and Figures 6 and 7 for PTH12010L.
- A 560  $\mu$ F electrolytic input capacitor is required for proper operation. The capacitor must be rated for a minimum of 800 mA rms of ripple current.
- An external output capacitor is not required for basic operation. Adding 330  $\mu$ F of distributed capacitance at the load will improve the transient response.
- 1 A/ $\mu$ s load step, 50 to 100%  $I_{Omax}$ ,  $C_{out} = 330$   $\mu$ F.
- If utilized  $V_{out}$  will track applied voltage by  $\pm 0.3$  V (up to  $V_O$  set point).
- Tape and reel packaging only available on the surface-mount versions.
- To order Pb-free (RoHS compatible) surface-mount parts replace the mounting option 'S' with 'Z', e.g. PTH12010WAZ. To order Pb-free (RoHS compatible) through-hole parts replace the mounting option 'H' with 'D', e.g. PTH12010WAD.
- NOTICE: Some models do not support all options. Please contact your local Emerson Network power representative or use the on-line model number search tool at <http://www.PowerConversion.com> to find a suitable alternative.

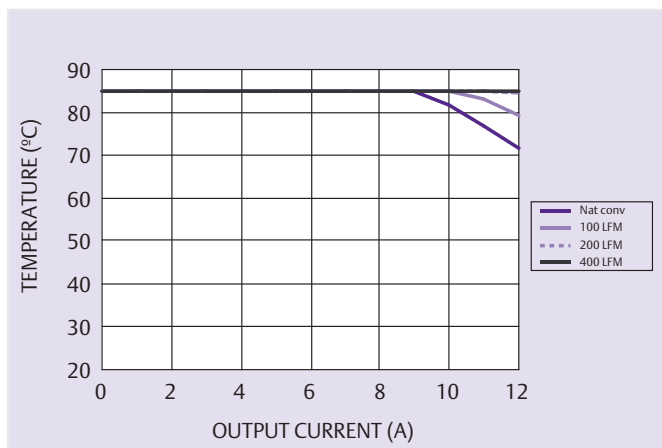
## PTH12010W Characteristic Data



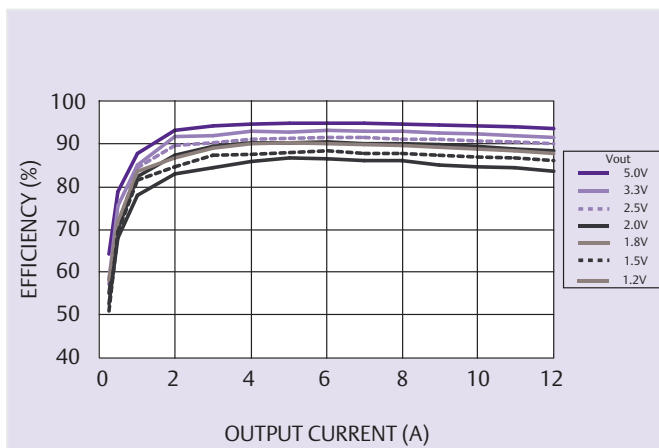
**Figure 1 - Safe Operating Area**  
 $V_{in} = 12\text{ V}$ , Output Voltage = 5 V (See Note A)



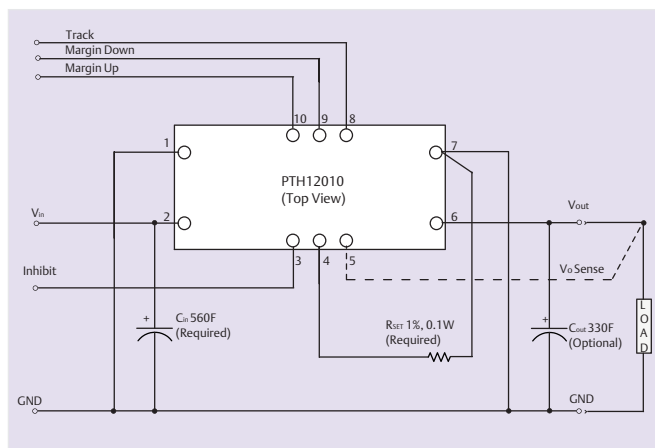
**Figure 2 - Safe Operating Area**  
 $V_{in} = 12\text{ V}$ , Output Voltage = 3.3 V (See Note A)



**Figure 3 - Safe Operating Area**  
 $V_{in} = 12\text{ V}$ , Output Voltage  $\leq 1.8\text{ V}$  (See Note A)



**Figure 4 - Efficiency vs Load Current**  
 $V_{in} = 12\text{ V}$  (See Note B)

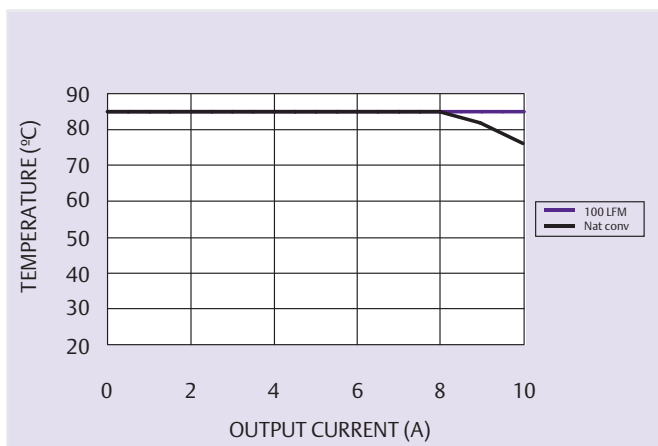


**Figure 5 - Standard Application**

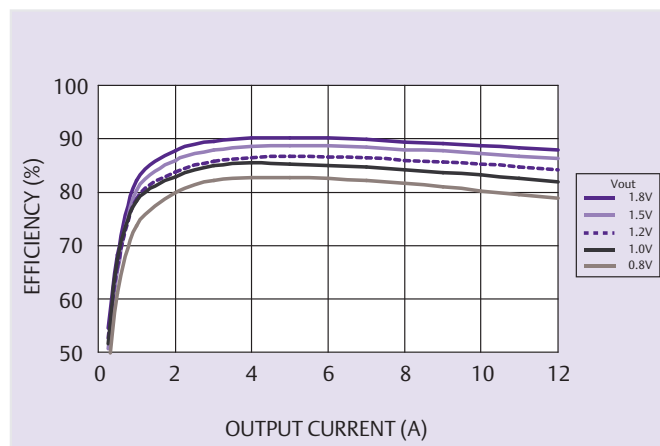
### Notes

- A SOA curves represent the conditions at which internal components are within the Emerson Network Power derating guidelines.
- B Characteristic data has been developed from actual products tested at 25 °C. This data is considered typical data for the converter.

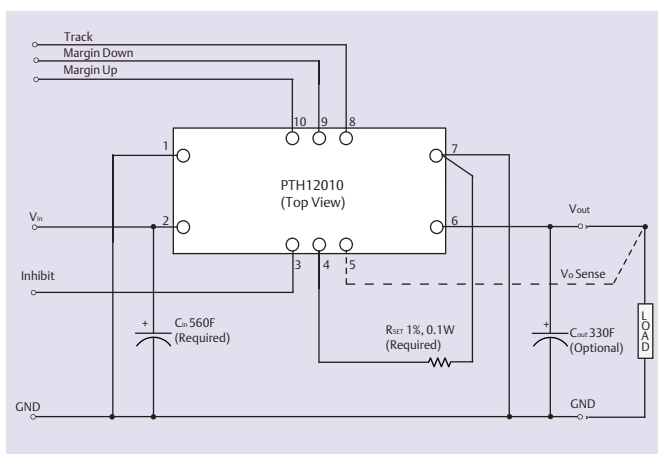
## PTH12010L Characteristic Data



**Figure 6 - Safe Operating Area**  
 $V_{in} = 12\text{ V}$ , Output Voltage  $\leq 1.8\text{ V}$  (See Note A)



**Figure 7 - Efficiency vs Load Current**  
 $V_{in} = 12\text{ V}$  (See Note B)



**Figure 8 - Standard Application**

### Notes

- A SOA curves represent the conditions at which internal components are within the Emerson Network Power derating guidelines.
- B Characteristic data has been developed from actual products tested at 25 °C. This data is considered typical data for the converter.

## Mechanical Drawings

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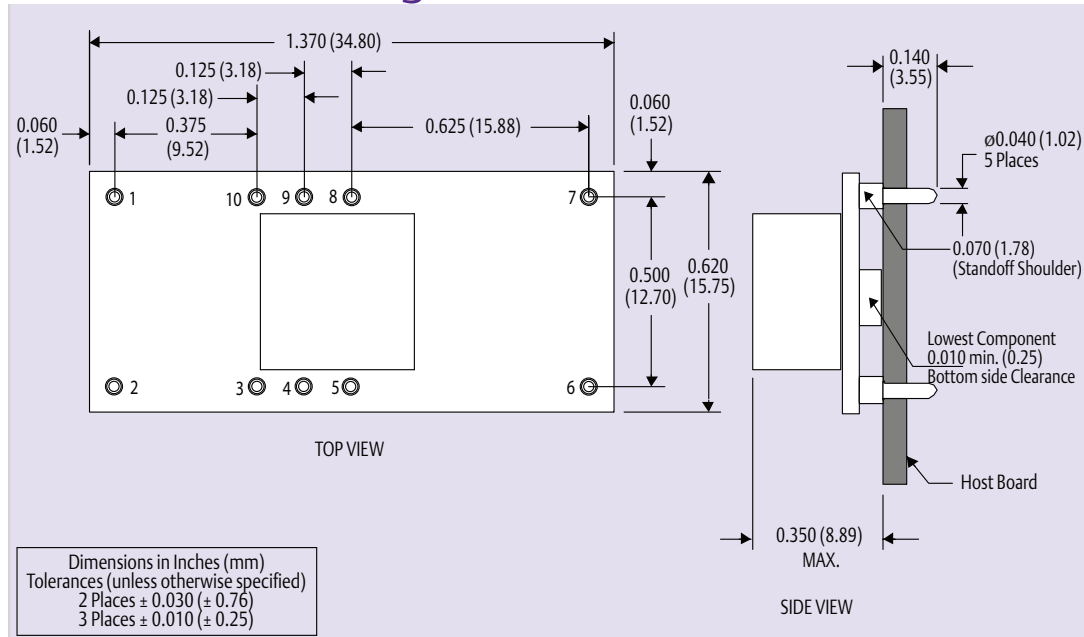


Figure 9 - Plated Through-Hole

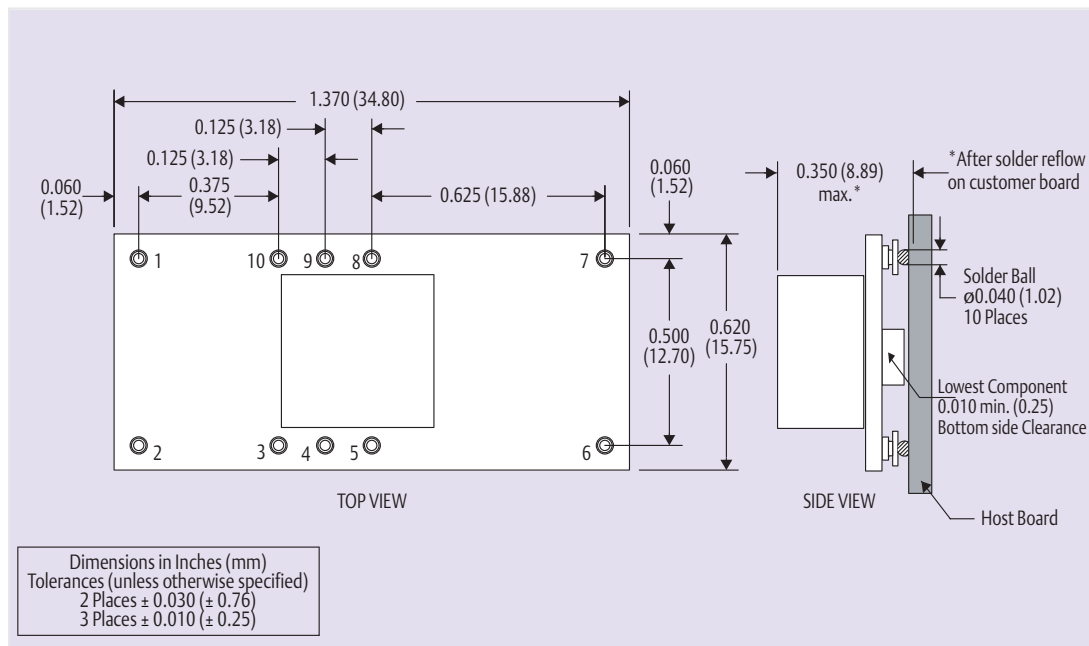


Figure 10 - Surface-Mount

| Pin Connections |           |
|-----------------|-----------|
| Pin No.         | Function  |
| Pin 1           | Ground    |
| Pin 2           | Vin       |
| Pin 3           | Inhibit*  |
| Pin 4           | Vo adjust |
| Pin 5           | Vo sense  |

| Pin Connections cont. |              |
|-----------------------|--------------|
| Pin No.               | Function     |
| Pin 6                 | Vout         |
| Pin 7                 | Ground       |
| Pin 8                 | Track        |
| Pin 9                 | Margin down* |
| Pin 10                | Margin up*   |

\* Denotes negative logic:  
Open = Normal operation  
Ground = Function active

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