



# MUR1620CT

## MURB1620CT

## MURB1620CT-1

### Ultrafast Rectifier

#### Features

- Ultrafast Recovery Time
- Low Forward Voltage Drop
- Low Leakage Current
- 175°C Operating Junction Temperature

$$t_{rr} = 25\text{ns}$$

$$I_{F(AV)} = 16\text{Amp}$$

$$V_R = 200\text{V}$$

#### Description/Applications

International Rectifier's MUR... series are the state of the art Ultra fast recovery rectifiers specifically designed with optimized performance of forward voltage drop and ultra fast recovery time.

The planar structure and the platinum doped life time control, guarantee the best overall performance, ruggedness and reliability characteristics.

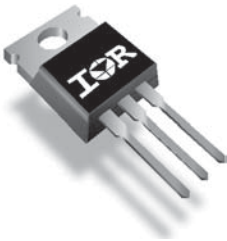
These devices are intended for use in the output rectification stage of SMPS, UPS, DC-DC converters as well as free-wheeling diode in low voltage inverters and chopper motor drives.

Their extremely optimized stored charge and low recovery current minimize the switching losses and reduce over dissipation in the switching element and snubbers.

#### Absolute Maximum Ratings

| Parameters                                                     | Max        | Units            |
|----------------------------------------------------------------|------------|------------------|
| $V_{RRM}$ Peak Repetitive Peak Reverse Voltage                 | 200        | V                |
| $I_{F(AV)}$ Average Rectified Forward Current                  | 8.0        | A                |
| Per Leg                                                        |            |                  |
| Total Device, (Rated $V_R$ ), $T_C = 150^\circ\text{C}$        | 16         |                  |
| Total Device                                                   |            |                  |
| $I_{FSM}$ Non Repetitive Peak Surge Current                    | 100        | A                |
| Per Leg                                                        |            |                  |
| $I_{FM}$ Peak Repetitive Forward Current                       | 16         |                  |
| Per Leg                                                        |            |                  |
| (Rated $V_R$ , Square wave, 20 KHz), $T_C = 150^\circ\text{C}$ |            |                  |
| $T_J, T_{STG}$ Operating Junction and Storage Temperatures     | -65 to 175 | $^\circ\text{C}$ |

#### Case Styles

| MUR1620CT                                                                           | MURB1620CT                                                                          | MURB1620CT-1                                                                          |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |  |
| TO-220AB                                                                            | D <sup>2</sup> PAK                                                                  | TO-262                                                                                |

**Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise specified)**

| Parameters                                                           | Min | Typ | Max   | Units | Test Conditions                                               |
|----------------------------------------------------------------------|-----|-----|-------|-------|---------------------------------------------------------------|
| V <sub>BR</sub> , V <sub>r</sub> Breakdown Voltage, Blocking Voltage | 200 | -   | -     | V     | I <sub>R</sub> = 100μA                                        |
| V <sub>F</sub> Forward Voltage                                       | -   | -   | 0.975 | V     | I <sub>F</sub> = 8A                                           |
|                                                                      | -   | -   | 0.895 | V     | I <sub>F</sub> = 8A, T <sub>J</sub> = 150°C                   |
| I <sub>R</sub> Reverse Leakage Current                               | -   | -   | 5     | μA    | V <sub>R</sub> = V <sub>R</sub> Rated                         |
|                                                                      | -   | -   | 250   | μA    | T <sub>J</sub> = 150°C, V <sub>R</sub> = V <sub>R</sub> Rated |
| C <sub>T</sub> Junction Capacitance                                  | -   | 25  | -     | pF    | V <sub>R</sub> = 200V                                         |
| L <sub>S</sub> Series Inductance                                     | -   | 8.0 | -     | nH    | Measured lead to lead 5mm from package body                   |

**Dynamic Recovery Characteristics @ T<sub>J</sub> = 25°C (unless otherwise specified)**

| Parameters                              | Min | Typ | Max | Units | Test Conditions                                                           |
|-----------------------------------------|-----|-----|-----|-------|---------------------------------------------------------------------------|
| t <sub>rr</sub> Reverse Recovery Time   | -   | -   | 35  | ns    | I <sub>F</sub> = 1.0A, di <sub>F</sub> /dt = 50A/μs, V <sub>R</sub> = 30V |
|                                         | -   | -   | 25  |       | I <sub>F</sub> = 0.5A, I <sub>R</sub> = 1.0A, I <sub>REC</sub> = 0.25A    |
|                                         | -   | 20  | -   |       | T <sub>J</sub> = 25°C                                                     |
|                                         | -   | 34  | -   |       | T <sub>J</sub> = 125°C                                                    |
| I <sub>RRM</sub> Peak Recovery Current  | -   | 1.7 | -   | A     | T <sub>J</sub> = 25°C                                                     |
|                                         | -   | 4.2 | -   |       | T <sub>J</sub> = 125°C                                                    |
| Q <sub>rr</sub> Reverse Recovery Charge | -   | 23  | -   | nC    | T <sub>J</sub> = 25°C                                                     |
|                                         | -   | 75  | -   |       | T <sub>J</sub> = 125°C                                                    |

**Thermal - Mechanical Characteristics**

| Parameters                                                          | Min | Typ  | Max         | Units  |
|---------------------------------------------------------------------|-----|------|-------------|--------|
| T <sub>J</sub> Max. Junction Temperature Range                      | -   | -    | - 65 to 175 | °C     |
| T <sub>Stg</sub> Max. Storage Temperature Range                     | -   | -    | - 65 to 175 |        |
| R <sub>thJC</sub> Thermal Resistance, Junction to Case Per Leg      | -   | -    | 3.0         | °C/W   |
| R <sub>thJA</sub> Thermal Resistance, Junction to Ambient Per Leg   | -   | -    | 50          |        |
| R <sub>thCS</sub> <sup>①</sup> Thermal Resistance, Case to Heatsink | -   | 0.5  | -           |        |
| Wt Weight                                                           | -   | 2.0  | -           | g      |
|                                                                     | -   | 0.07 | -           | (oz)   |
| Mounting Torque                                                     | 6.0 | -    | 12          | Kg-cm  |
|                                                                     | 5.0 | -    | 10          | lbf.in |

① Mounting Surface, Flat, Smooth and Greased

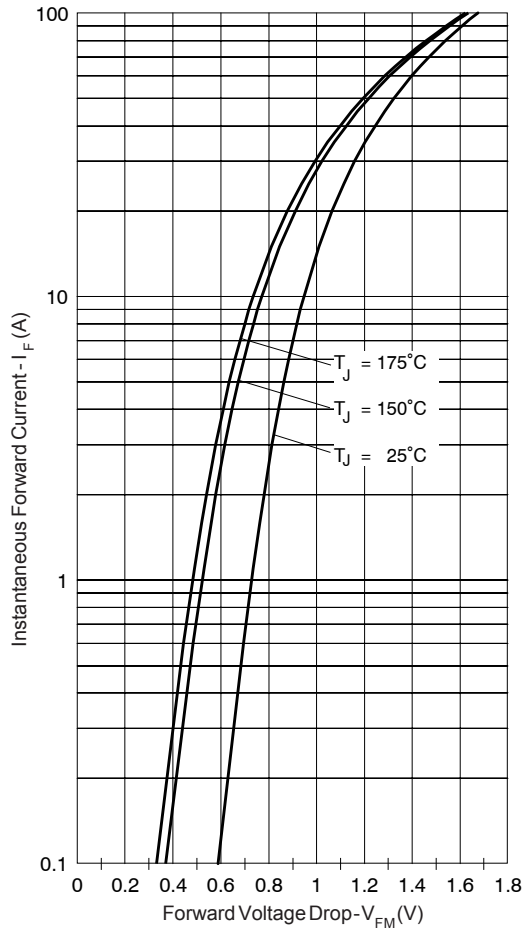


Fig. 1 - Typical Forward Voltage Drop Characteristics

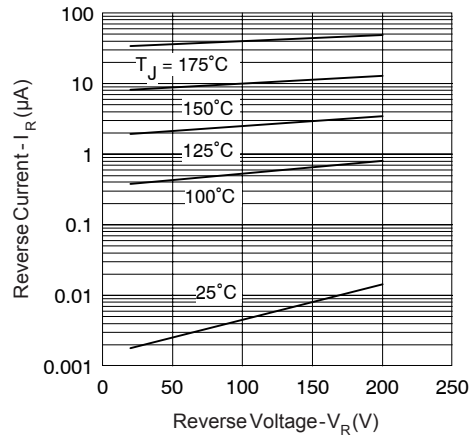


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

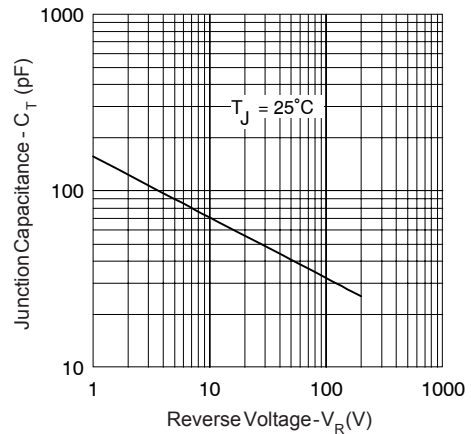


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

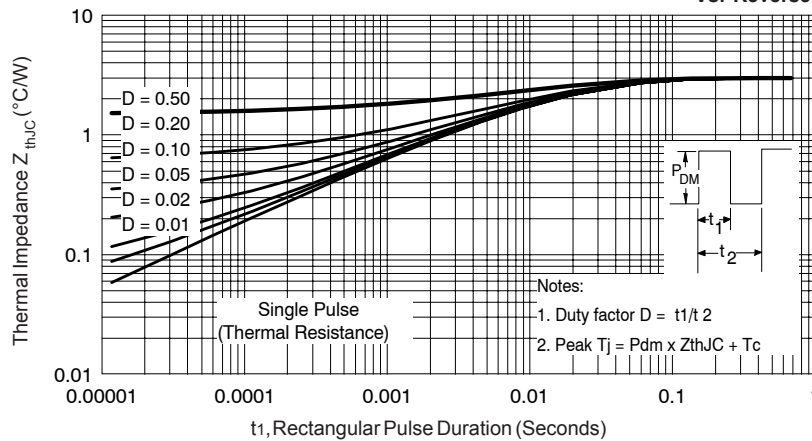
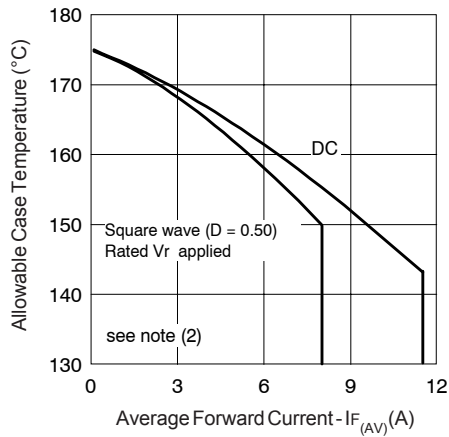
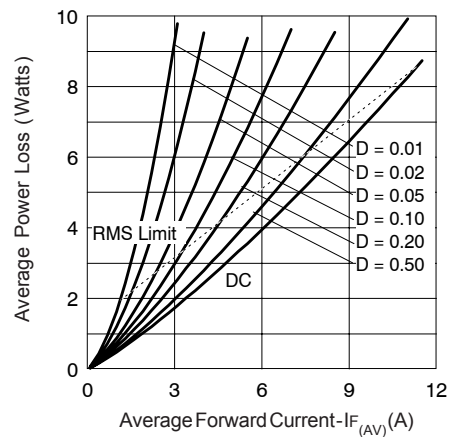


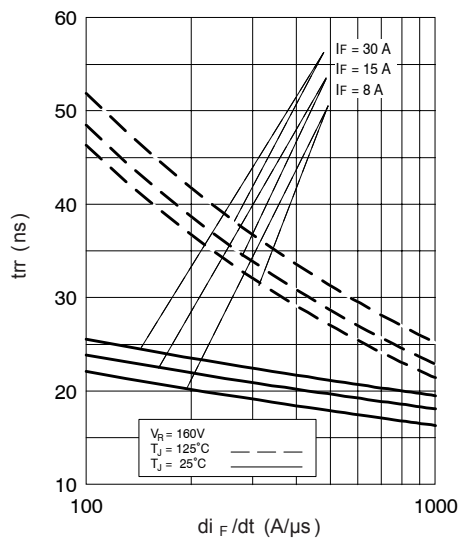
Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics



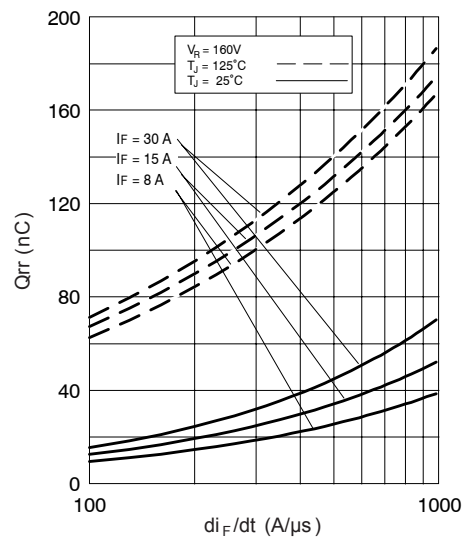
**Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current**



**Fig. 6 - Forward Power Loss Characteristics**



**Fig. 7 - Typical Reverse Recovery vs.  $di_F/dt$**

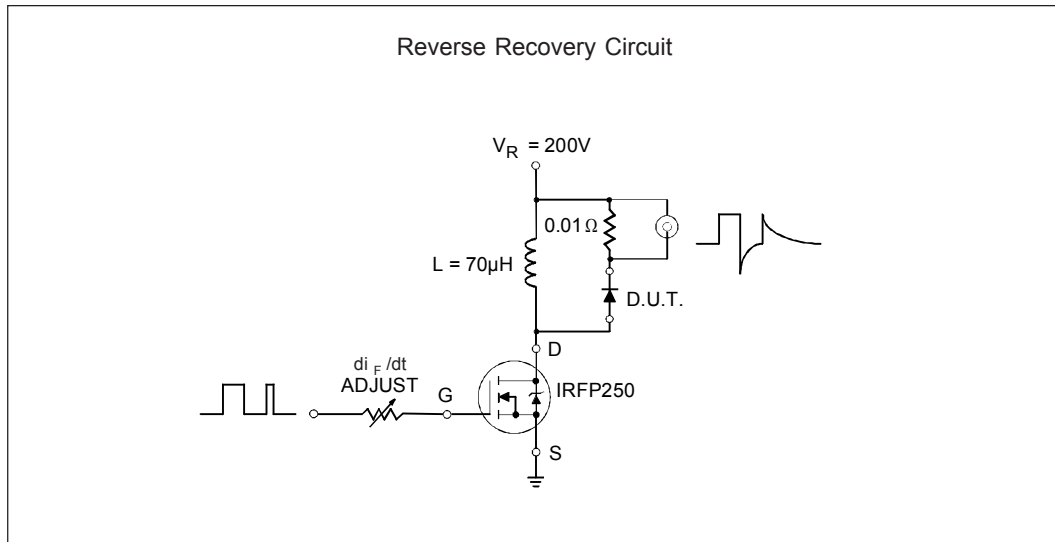


**Fig. 8 - Typical Stored Charge vs.  $di_F/dt$**

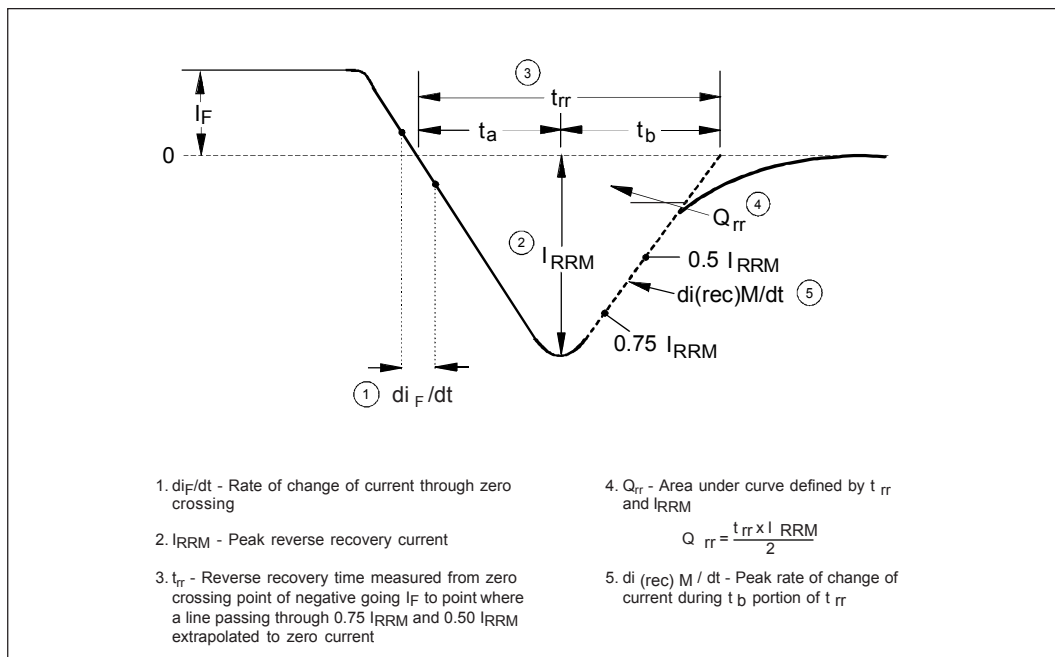
(2) Formula used:  $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$ ;

$P_d$  = Forward Power Loss =  $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$  (see Fig. 6);

$P_{d_{REV}}$  = Inverse Power Loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R @ V_{R1}$  = rated  $V_R$



**Fig. 9- Reverse Recovery Parameter Test Circuit**



**Fig. 10 - Reverse Recovery Waveform and Definitions**

The drawing illustrates the mechanical specifications of the TO-220AB package. It includes three views: a front view, a side view, and a pin connection diagram.

**Front View Dimensions:**

- Overall width: 10.54 (0.41) MAX.
- Distance from top edge to mounting hole center: 15.24 (0.60)
- Distance from mounting hole center to terminal center: 14.84 (0.58)
- Distance from terminal center to lead center: 14.09 (0.55)
- Distance from lead center to bottom edge: 13.47 (0.53)
- Lead diameter: 1.40 (0.05)
- Distance from bottom edge to lead center: 1.15 (0.04)
- Lead spacing: 0.94 (0.04)
- Lead thickness: 0.69 (0.03)
- Mounting hole diameter: 3.78 (0.15) DIA.
- Distance from mounting hole center to terminal center: 3.54 (0.14)
- Terminal width: 2.92 (0.11)
- Terminal spacing: 2.54 (0.10)
- Terminal thickness: 3.96 (0.16)
- Terminal width: 3.55 (0.14)
- Terminal thickness: 2.04 (0.080) MAX.

**Side View Dimensions:**

- Base thickness: 1.32 (0.05)
- Base width: 1.22 (0.05)
- Lead height: 6.48 (0.25)
- Lead width: 6.23 (0.24)
- Lead angle: 2°
- Lead thickness: 0.10 (0.004)
- Lead width: 2.89 (0.11)
- Lead thickness: 2.64 (0.10)

**Pin Connection Diagram:**

- Pin 1: ANODE
- Pin 2: COMMON CATHODE
- Pin 3: ANODE

**Bottom View Dimensions:**

- Distance from top edge to terminal center: 4.57 (0.18)
- Distance from top edge to lead center: 4.32 (0.17)
- Terminal width: 0.61 (0.02) MAX.
- Terminal spacing: 5.08 (0.20) REF.

**Conforms to JEDEC Outline TO-220AB**  
Dimensions in millimeters and (inches)

**Modified JEDEC outline TO-362**  
Dimensions in millimeters and (inches)

**SECTION X-X**

0.55 (0.022)  
0.45 (0.018)

0.939 (0.037)  
0.686 (0.027)

10.54 (0.415)  
10.29 (0.405)

TERM. 2

1.15 (0.45) MIN.  
10.16 (0.400)  
10.00 (0.394) REF.

24.25 (0.955)  
23.47 (0.924)

14.09 (0.555)  
13.47 (0.530)

3.96 (0.156)  
3.55 (0.140)

1.40 (0.055) MAX.  
8.76 (0.345)  
8.61 (0.339)

1.32 (0.052)  
1.22 (0.048)

1.40 (0.055)  
1.15 (0.045)

2.89 (0.114)  
2.64 (0.104)

TERM 2-CATHODE  
TERM 1-ANODE  
TERM 3-ANODE

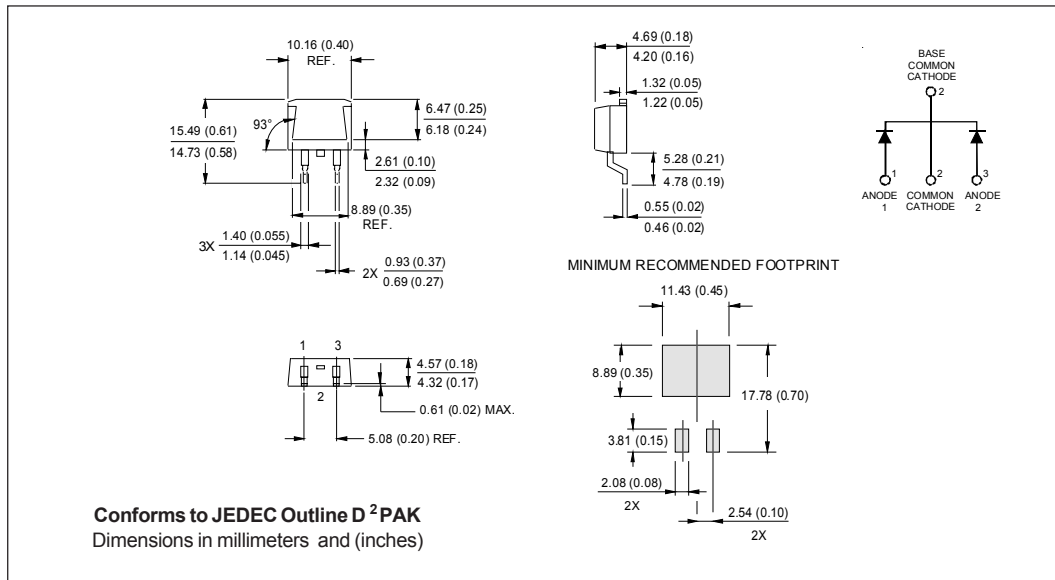
4.57 (0.180)  
4.32 (0.170)

0.61 (.024) MAX.

2.79 (0.110)  
2.29 (0.090)

5.33 (0.210)  
4.83 (0.190)

## Outline Table



## Ordering Information Table

| Device Code |                                                               |           |           |           |           |
|-------------|---------------------------------------------------------------|-----------|-----------|-----------|-----------|
| <b>MUR</b>  | <b>B</b>                                                      | <b>16</b> | <b>20</b> | <b>CT</b> | <b>-1</b> |
| 1           | 2                                                             | 3         | 4         | 5         | 6         |
| <b>1</b>    | - Ultrafast MUR Series                                        |           |           |           |           |
| <b>2</b>    | - B = D <sup>2</sup> Pak / TO-262<br>None = TO-220AB          |           |           |           |           |
| <b>3</b>    | - Current Rating (16 = 16A)                                   |           |           |           |           |
| <b>4</b>    | - Voltage Rating (20 = 200V)                                  |           |           |           |           |
| <b>5</b>    | - CT = Center Tap (Dual) TO-220 / D <sup>2</sup> PAK / TO-262 |           |           |           |           |
| <b>6</b>    | - "-1" = TO-262 Option                                        |           |           |           |           |

MUR1620CT, MURB1620CT, MURB1620CT-1

Bulletin PD-20718 rev. C 12/03

International  
**IOR** Rectifier

Data and specifications subject to change without notice.  
This product has been designed and qualified for Industrial Level.  
Qualification Standards can be found on IR's Web site.

International  
**IOR** Rectifier

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