

## Product Summary

$BV_{DSS}$	$R_{DS(ON) Max}$	$I_D$ $T_C = +25^\circ C$
60V	7.2mΩ @ $V_{GS} = 10V$	100A

## Description

This new generation MOSFET features low on-resistance and fast switching, making it ideal for high efficiency power management applications.

## Applications

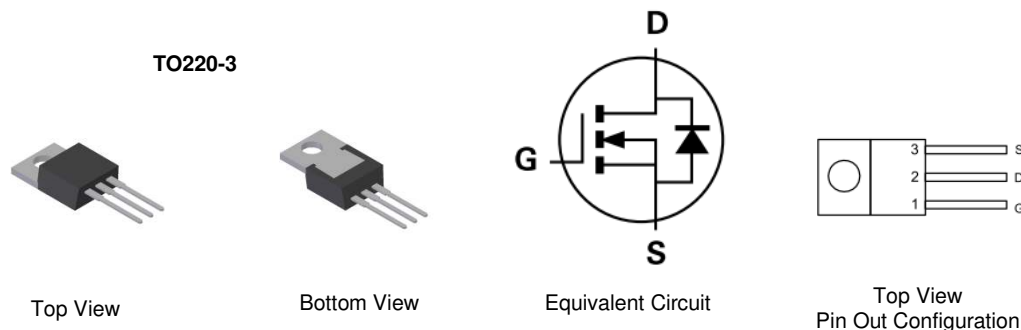
- Power Supplies
- Motor Control
- DC-DC Converters

## Features

- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching – Ensures More Reliable and Robust End Application
- Low Input Capacitance
- Low Input/Output Leakage
- **Lead-Free Finish; RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**

## Mechanical Data

- Case: TO220-3
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Terminals: Matte Tin Finish Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 ③
- Weight: 1.85 grams (Approximate)

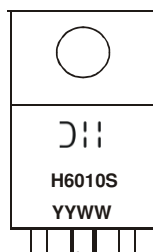


## Ordering Information (Note 4)

Part Number	Case	Packaging
DMTH6010SCT	TO220-3	50 Pieces/Tube

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



DII = Manufacturer's Marking  
 H6010S = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY or YY = Last Two Digits of Year (ex: 15 = 2015)  
 WW or WW = Week Code (01 to 53)

**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	60	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note 6)	$I_D$	$T_C = +25^\circ\text{C}$	100
		$T_C = +100^\circ\text{C}$	76
Maximum Continuous Body Diode Forward Current (Note 6)	$I_S$	100	A
Pulsed Drain Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)	$I_{DM}$	160	A
Avalanche Current, L=0.1mH	$I_{AS}$	20	A
Avalanche Energy, L=0.1mH	$E_{AS}$	20	mJ

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	$P_D$	2.8	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	52.8	$^\circ\text{C/W}$
Total Power Dissipation (Note 6)	$P_D$	125	W
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	1.2	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +175	$^\circ\text{C}$

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	60	—	—	V	$V_{GS} = 0V, I_D = 1mA$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 48V, V_{GS} = 0V$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	2	—	4	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	5.5	7.2	m $\Omega$	$V_{GS} = 10V, I_D = 20A$
Diode Forward Voltage	$V_{SD}$	—	—	1.3	V	$V_{GS} = 0V, I_S = 20A$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	$C_{ISS}$	—	1940	—	pF	$V_{DS} = 30V, V_{GS} = 0V, f = 1MHz$
Output Capacitance	$C_{OSS}$	—	759	—		
Reverse Transfer Capacitance	$C_{RSS}$	—	85	—		
Gate Resistance	$R_g$	—	0.55	—	$\Omega$	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$
Total Gate Charge	$Q_g$	—	36.3	—	nC	$V_{DS} = 30V, I_D = 20A, V_{GS} = 10V$
Gate-Source Charge	$Q_{gs}$	—	7.5	—		
Gate-Drain Charge	$Q_{gd}$	—	10.5	—		
Turn-On Delay Time	$t_{D(ON)}$	—	5.7	—	ns	$V_{DD} = 30V, V_{GS} = 10V, I_D = 20A, R_G = 3\Omega$
Turn-On Rise Time	$t_R$	—	10.4	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	16.3	—		
Turn-Off Fall Time	$t_F$	—	11.2	—		
Reverse Recovery Time	$t_{RR}$	—	35.6	—	ns	$I_F = 20A, di/dt = 100A/\mu\text{s}$
Reverse Recovery Charge	$Q_{RR}$	—	37.9	—	nC	

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
  - Device mounted on infinite heat sink.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

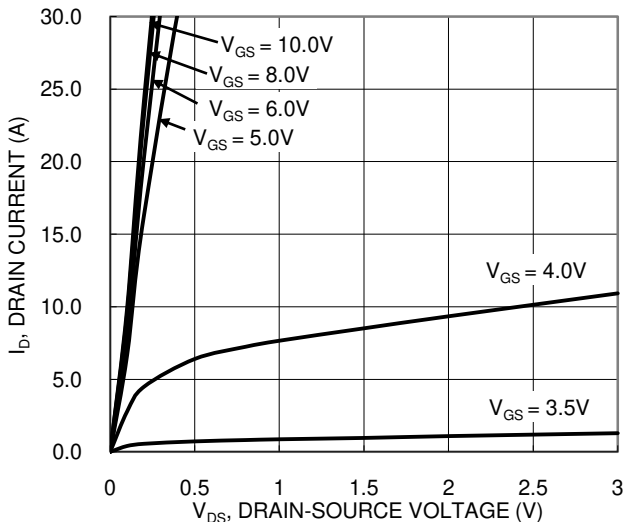


Figure 1. Typical Output Characteristic

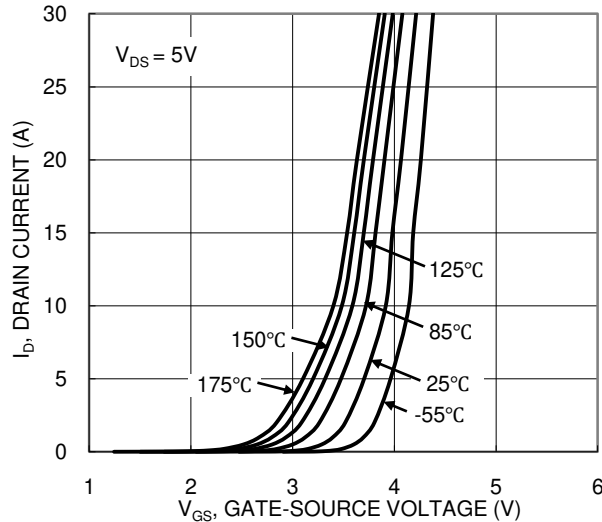


Figure 2. Typical Transfer Characteristic

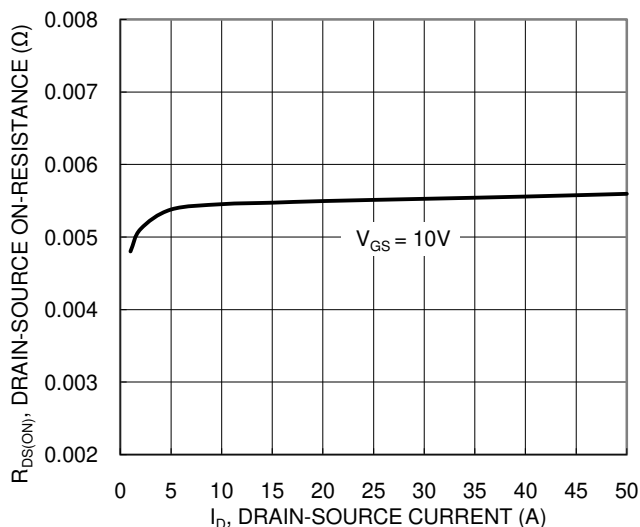


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

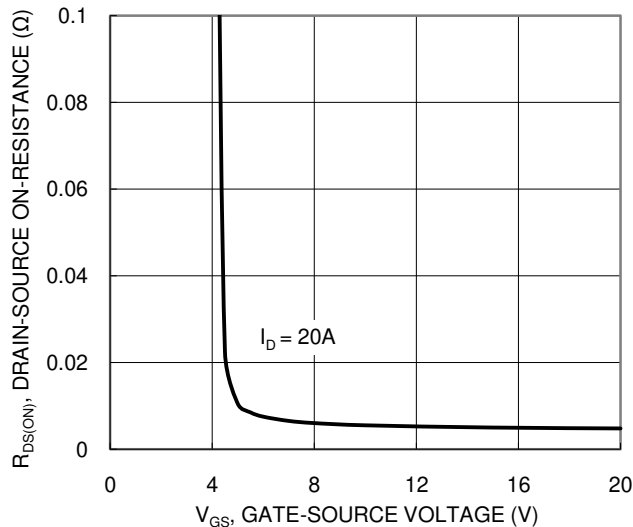


Figure 4. Typical Transfer Characteristic

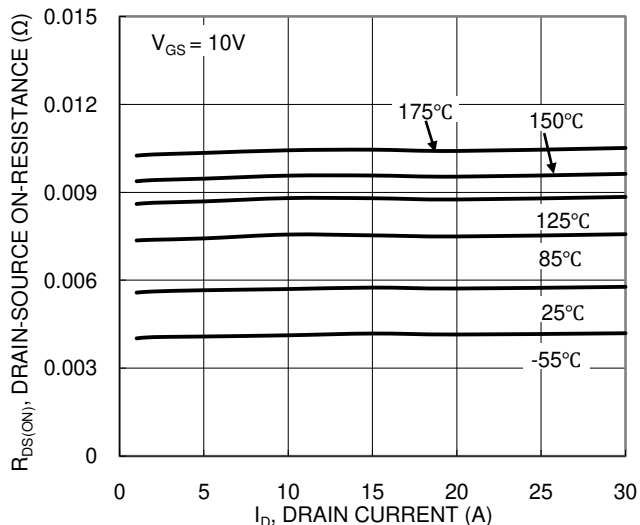


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

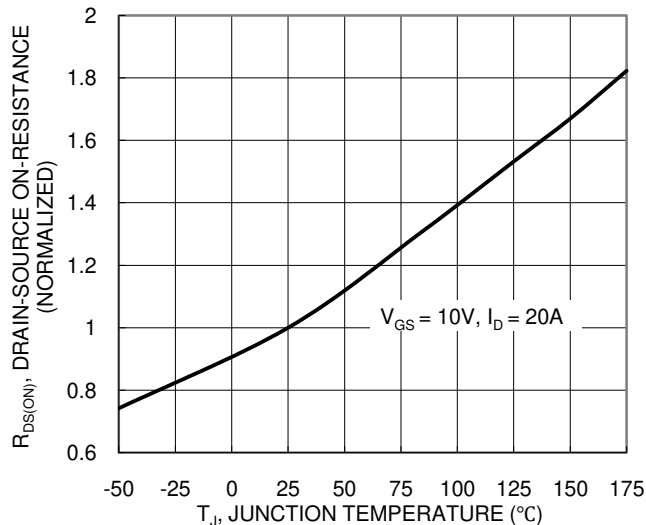


Figure 6. On-Resistance Variation with Junction Temperature

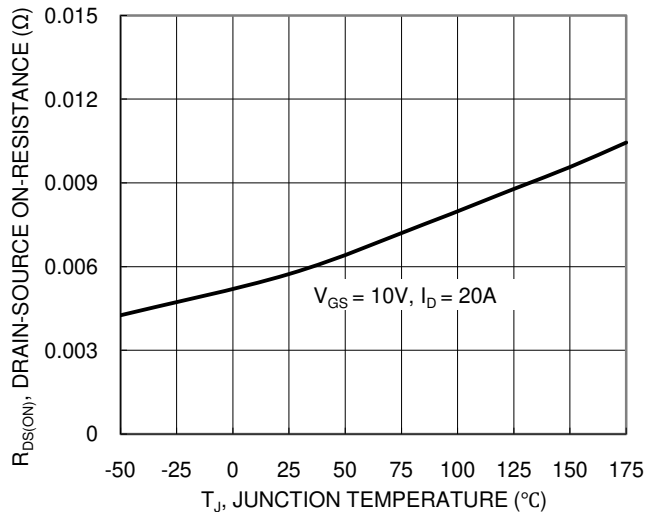


Figure 7. On-Resistance Variation with Junction Temperature

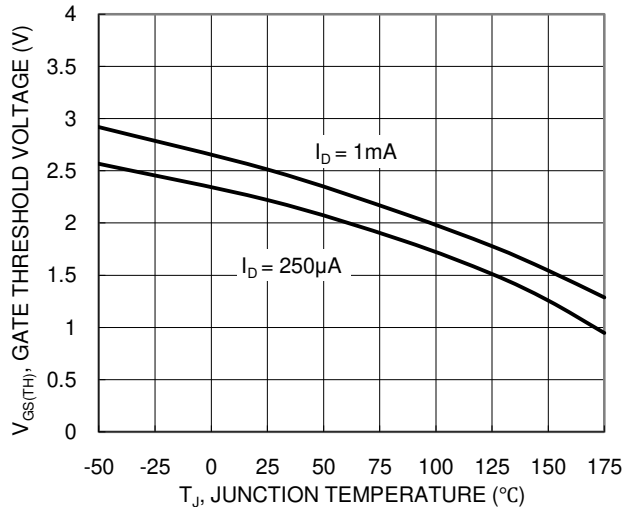


Figure 8. Gate Threshold Variation vs. Junction Temperature

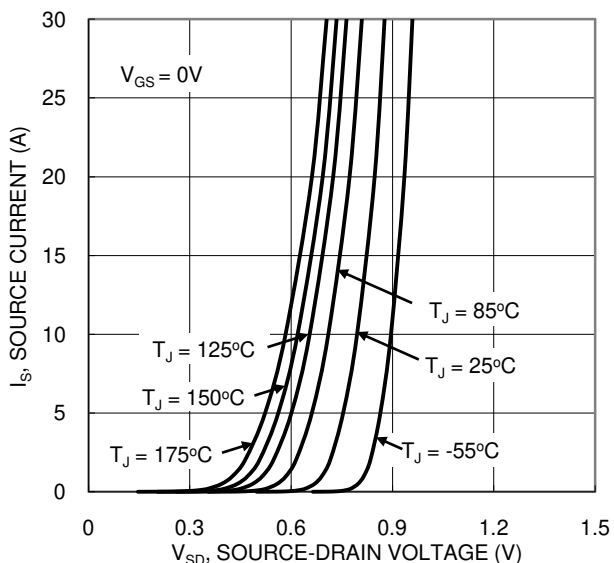


Figure 9. Diode Forward Voltage vs. Current

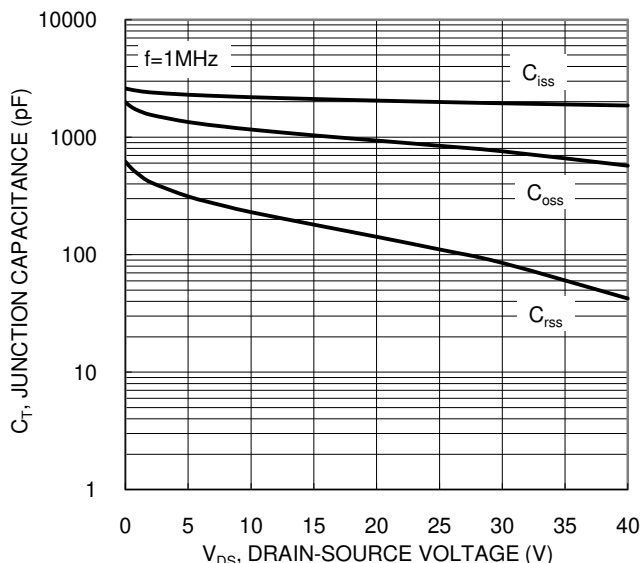


Figure 10. Typical Junction Capacitance

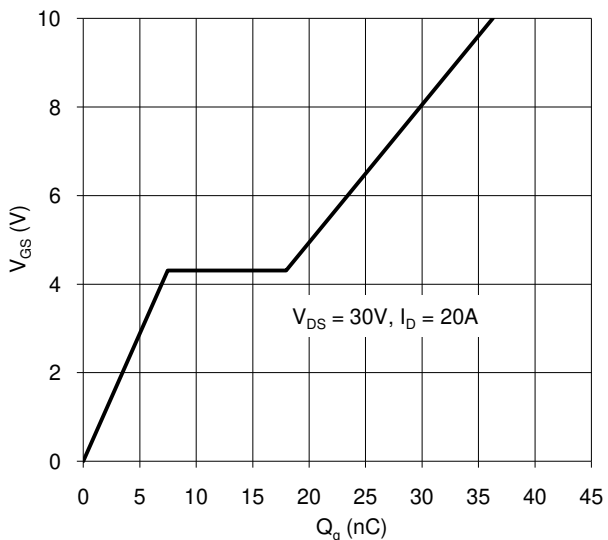


Figure 11. Gate Charge

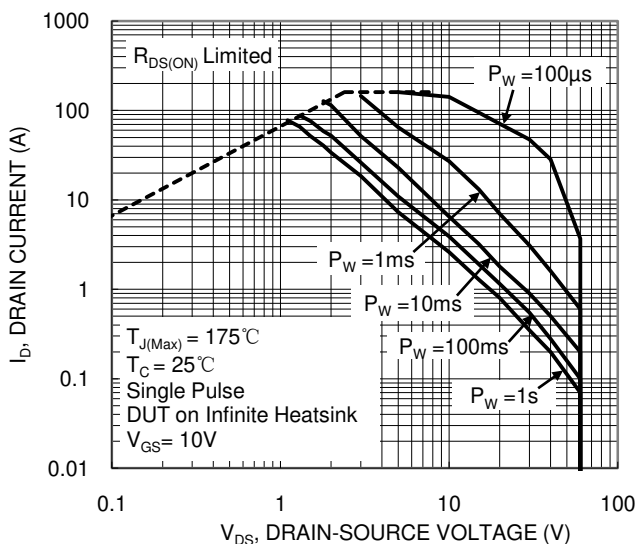


Figure 12. SOA, Safe Operation Area

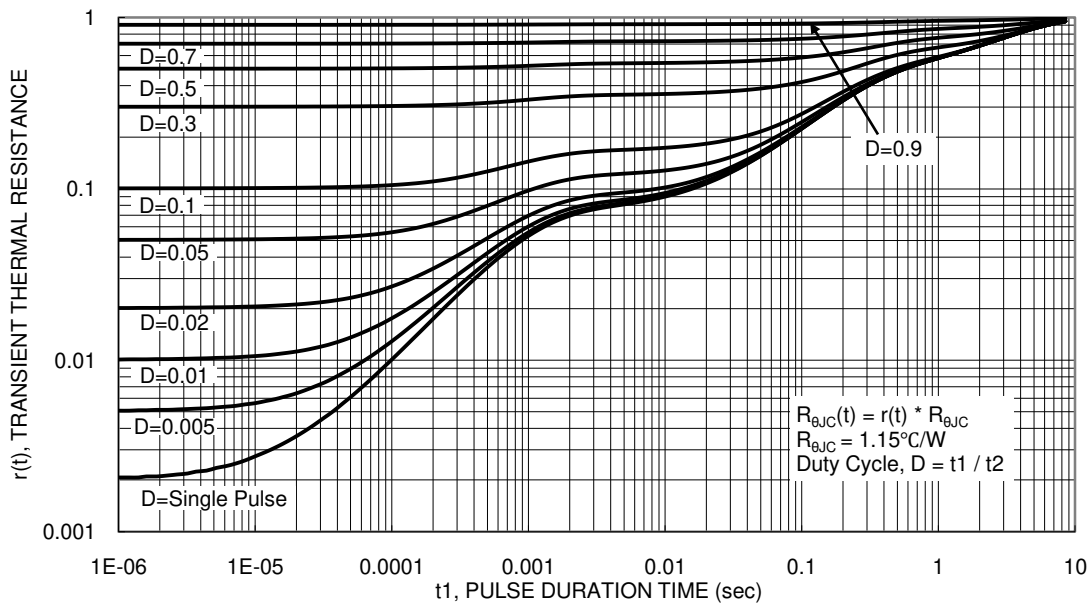
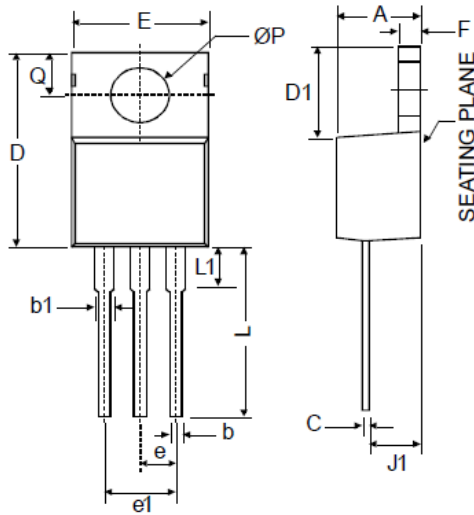


Figure 13. Transient Thermal Resistance

**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**TO220-3**



TO220-3		
Dim	Min	Max
A	3.55	4.85
b	0.51	1.14
b1	1.14	1.78
C	0.31	1.14
D	14.20	16.50
D1	5.84	6.86
E	9.70	10.70
e	2.79	2.99
e1	4.83	5.33
F	0.51	1.40
J1	2.03	2.92
L	12.72	14.72
L1	3.66	6.35
P	3.53	4.09
Q	2.54	3.43
<b>All Dimensions in mm</b>		

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