Technical Data Sheet
Infrared Data Transceiver Module

TM3200/TR2

Features

- Excellent Fluorescent noise immunity and very high EMI immunity
- Wide Operating Voltage Range from 2.4 to 5.0 Volts
- Ultra Small Surface Mount Package:
  - L8.0mm * W3.0mm * H2.5mm
- 2.4kbps to 115.2kbps data rates IrDA compliant
- Link distance:50cm(Min.) at LEDA=70mA
- Few External Components Required
- Pb-free
- The product itself will remain within RoHS compliant version.

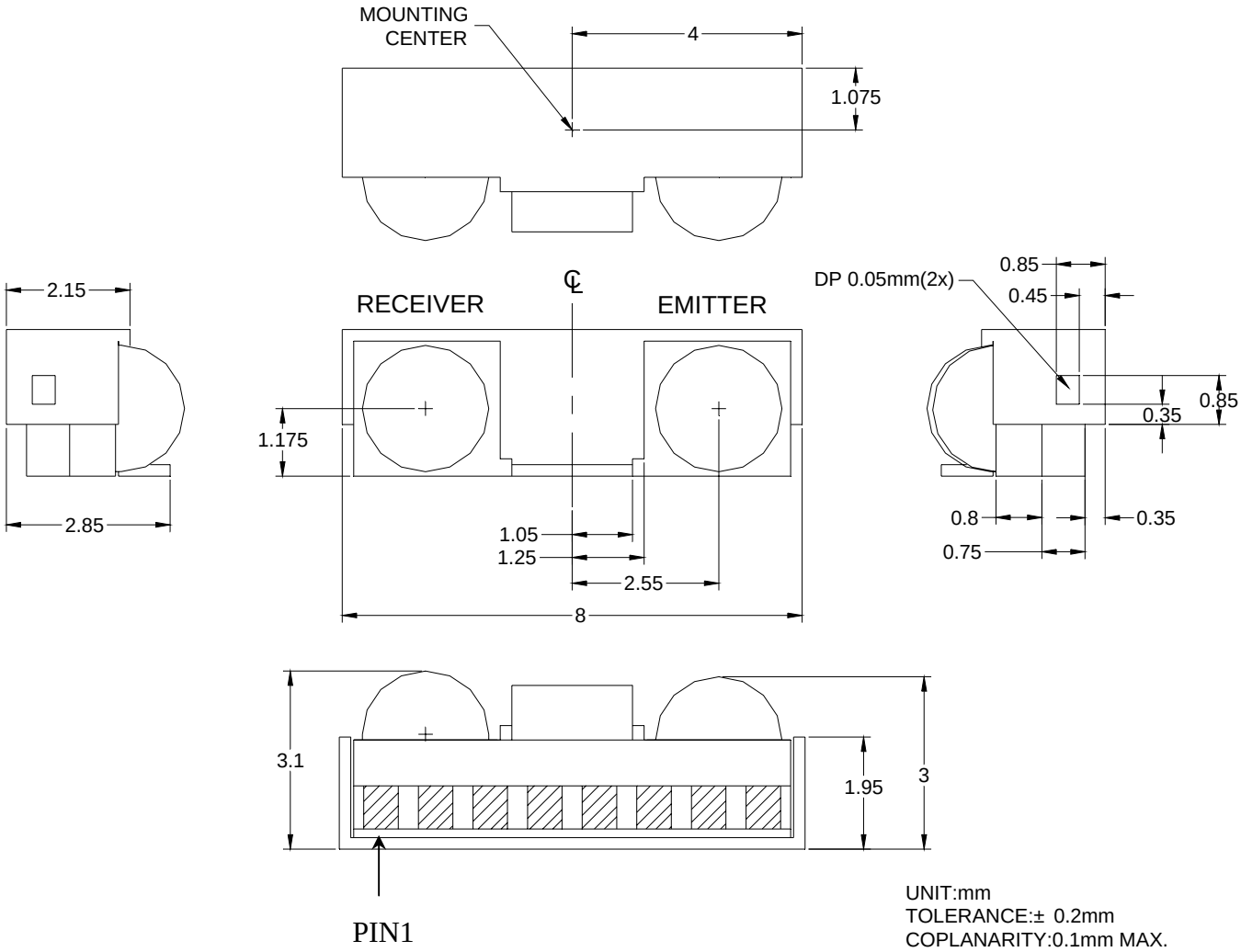
Descriptions

The TM3200/TR2 is a new generation of low cost, multi-mode IrDA module in ultra small surface mount package. The operating voltage can range from 2.4 to 5.0 Volts and independent IrED supply voltage can arrive Vcc+4 Volts. This module supports data rates speed up to 115.2kbps and compliant to the IrDA 1.3. Two operating mode - low power mode, and high power mode. At low power mode, a Vcc bypass capacitor is the only external component required. At high power mode, the IrED current limiting resistor in series with IrED is required when V_{LEDA} operating voltage is higher than 3.6 Volts.

Applications

- Cellular Phones, Pagers, Smart Phones
- PDA, Printers
- Digital Still and Video Cameras
- PCs

Package Dimensions



Device Selection Guide

Mode	Transmitter		Receiver		λ p	Operating Voltage (Vcc)	Data Rate
	Distance	Angle 2θ 1/2	Distance	Angle 2θ 1/2			
TM3200/TR2	>0.5m	+/-15	>0.5m	+/-30	850~900 nm	2.4~5.0 Volts	2.4~115.2 kbps

TRANSCEIVER I/O Truth Table

The LED and RXD outputs are controlled by the combination of the TXD and SD pins and light falling on the receiver.As shown in the table below,the transmitteris non-inverting ;the LED is on when the TXD pin is high and off when TXD is low.The receiver is inverting;the RXD pin is low during IrDA signal pulses and high when the receiver does not see any light.When shutdown(SD pin high),the LED is off (the state of the TXD pin does not matter),and the RXD pin is pulled high with a weak internal pullup.

SD	TXD	LED	Receiver	RXD
Low	High	On	Don't care	Not Valid
	Low	Off	IrDA Signal	Low
			No Signal	High
High	Don't care	Off	Don't care	High

Pin Descriptions

Pin	Symbol	Function	Description	I/O	Active
1	GND	Ground	Connect to system ground		
2	NC	No Connect			
3	Vcc	Supply Voltage	Supply Voltage from 2.4 to 5.0 Volts. *Note 1		
4	AGND	Analog Ground	Connect to a “quiet” ground.		
5	SD	Shut Down	Must be driven either high or low. *Note 2		
6	RXD	Receiver Data Output	Output is a low pulse when a light pulse is seen. *Note 3	O	Low
7	TXD	Transmitter Data Input	Logic High turn on the IrED. *Note 4	I	High
8	V_{LEDA}	IrED Supply Voltage	IrED Supply Voltage from 2.4 to Vcc+4 Volts.		

Note 1: Receives power supply from 2.4 to 5.0 Volts. This pin provides power for the receiver and transmitter drive section. Power supply noise in 100KHz to 2MHz range must have a dv/dt of less than 50mV/us in receive mode.

Note 2: Asserting this pin above 1.4V causes the device to shut down, disabling transmitter and tri-stating the receiver output; however, it must be driven above Vdd-0.7V for shutdown current consumption to be less 1uA. Power up receiver latency (time to come to full sensitivity) is < 100us. Enabling this pin (asserting logic low) will also clock the TXI input into the TX power mode control D flip flop.

Note 3: Normally high goes low for duration of receive pulse. Output is a CMOS driver providing rail to rail operation. RXD may go low continuously if the DC ambient exceeds input capacity. During shutdown RXD output tri-states with a weak (500K) pull up.

Note 4: Asserting this pin above 1.4V turns on transmitter. This input is gated by the shutdown function and AC coupled. Maximum transmit pulse width is ~50usec. Input has 500K pull down which is active even during shutdown.

Absolute Maximum Ratings (Ta=25℃) reference point Pin GND unless otherwise noted.

Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	All States	Vcc	-0.5		7	V
IrED Supply Voltage	SD=0, TXD=Vcc	V_{LEDA}	-0.5		Vcc+4	V
	Vcc=0~7V, TXD=0	V_{LEDA}	-0.5		9	V
Receiver Data Output	All States	RXD	-0.5		Vcc+0.5	V
Transmitter Data Input	All States	TXD	-0.5		Vcc+0.5	V
Shut Down	All States	SD	-0.5		Vcc+0.5	V
Operating Temperature Range		Tamb	-25		+85	℃
Storage Temperature Range		Tstg	-40		+85	℃
Soldering Temperature	See Recommended Solder Profile			-	260	℃
Average IrED Current		I_{IrED} (DC)		70		mA
Repetitive Pulsed IrED Current	t<50 μ s, t_{on}<20%	I_{IrED} (RP)		400		mA

Electrical Characteristics

Tamb=25℃, Vcc=2.4V to 5.0V unless otherwise noted.

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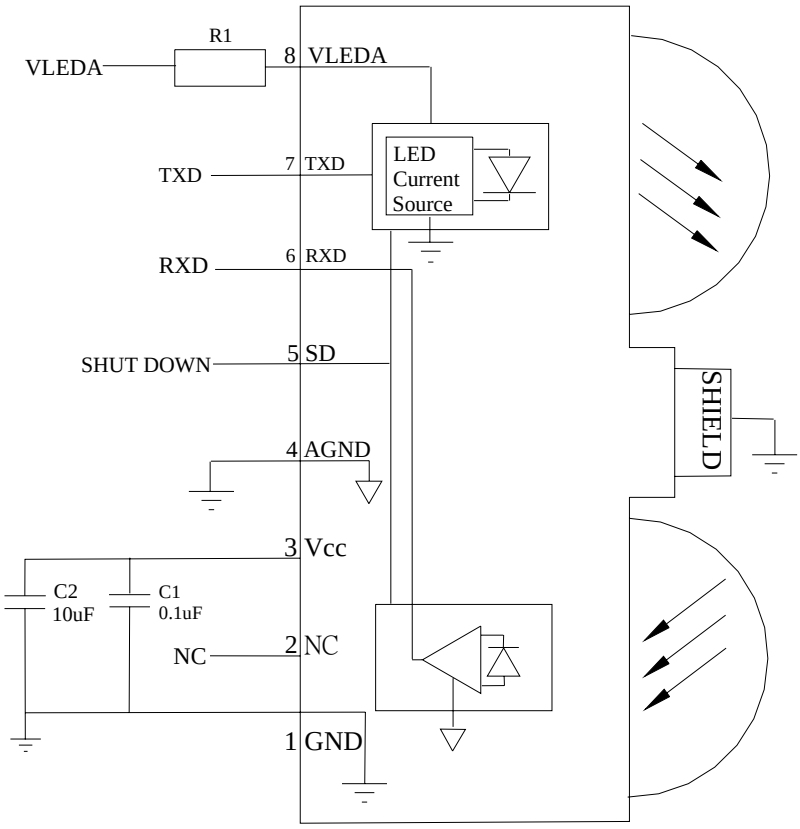
Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
Transceiver						
Supply Voltage		Vcc	2.4		5.0	V
Supply Current Pin Vcc (Receive Mode)	Vcc=2.4 to 5.0V	Icc (Rx)		140		uA
Supply Current Pin Vcc (avg.) (Transmit Mode)	I_{IrED}=400mA (at IrED Anode Pin) Vcc=3.6V	Icc1 (Tx)		1.1		mA
Shut Down Current Pin SD	SD=Vcc=2.4 to 5.0V	I_{SD}		0.01	1	uA
Transmit Receiver Latency		T_{TRL}		50	100	us
Transceiver Power On Setting Time		T_{PON}		100	150	us

Opto-electronic Characteristics

Tamb=25℃,Vcc=2.4V to 5.0V unless otherwise noted.
Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Receiver						
Minimum Detection Threshold Irradiance	SIR Mode, Vcc=5V	Ee	-	-	4	uW/cm^2
	SIR Mode, Vcc=3V	Ee	-	-	10	uW/m^2
Maximum Detection Threshold Irradiance	SIR Mode, Vcc=5V	Ee	-	500		uW/cm^2
	SIR Mode, Vcc=3V	Ee	-	1000		uW/cm^2
Logic LOW Receiver Input Irradiance		Ee			0.4	uW/cm^2
Output Voltage -Active	Vcc=5V, Iol=8mA	V_{OL}	-	0.22		V
	Vcc=2.4V, Iol=2mA	V_{OL}	-	0.17		V
Output Voltage -Non active	Vcc=5V, Iol=8mA	V_{OH}		4.6	-	V
	Vcc=2.4V, Iol=2mA	V_{OH}		1.7	-	V
Rise/Fall Time-RXD	Vcc=5V, C=15pF	$t_r/t_{f\ (RXD)}$		30		ns
	Vcc=2.4V, C=15pF	$t_r/t_{f\ (RXD)}$		63		ns
Transmitter						
IrED Operating Current	Vcc=2.4 to 5.0V	I_{IrED}		400	-	mA
Logic LOW Transmitter Input Voltage		V_{IL}	0		1/3 Vcc	V
Logic HIGH Transmitter Input Voltage		V_{IH}	2/3 Vcc		Vcc	V
Output Radiant Intensity	Vcc=5.0V	Ie	3.6		500	mW/sr
	TXD Logic LOW Level	Ie			0.04	mW/sr
Angle of Half Intensity		$2\theta_{1/2}$	30			°
Peak Wavelength of Emission		λp	850	875	900	nm
Half-Width of Emission Spectrum		$\Delta\lambda$		40		nm
Optical Rise/Fall Time		t_r/t_f			600	ns
Optical Overshoot					25	%

Recommended Circuit Diagram



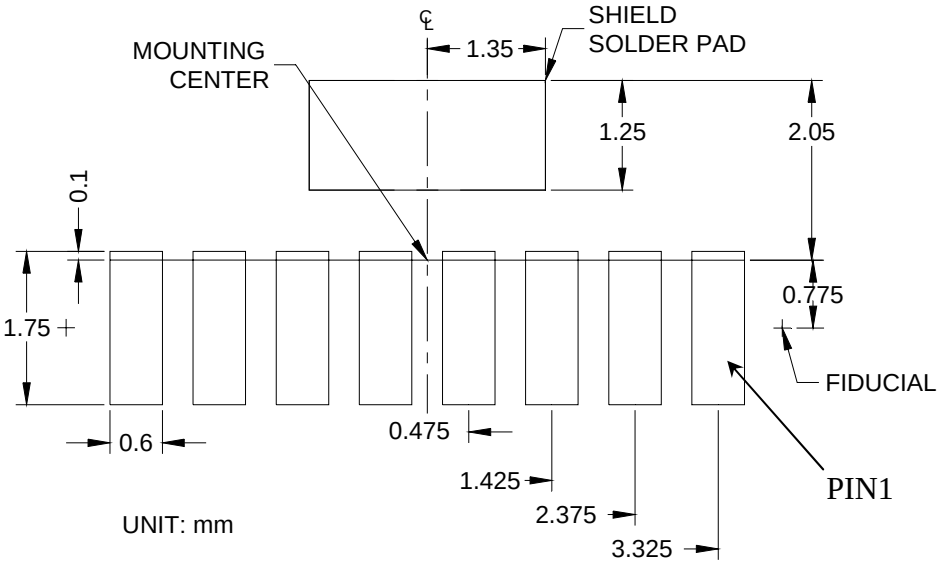
Note:Outlined components are optional depending on the quality of the power supply.

Component	Recommended Value
C1	0.1uF, Ceramic It must be placed within 0.7cm of the TM3200/TR2
C2	10uF, Electrolytic
R1	6.8Ω, 0.25W

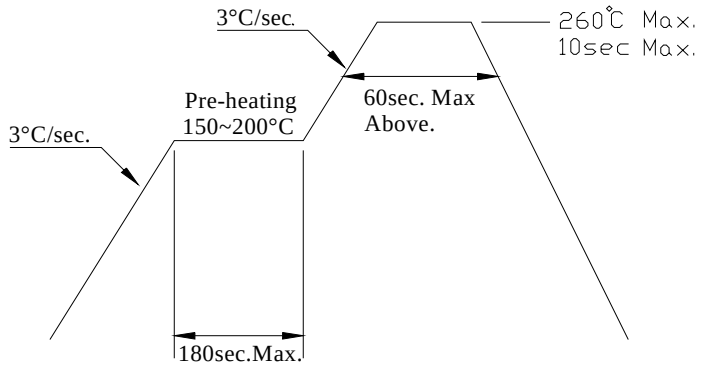
C2 is optional for the same supply voltage of Vcc and V_{LEDA}

R1 is optional for V_{LEDA} =3.6V supply voltage.

Recommended SMD Pad Layout



Recommended Solder Profile



Notice:

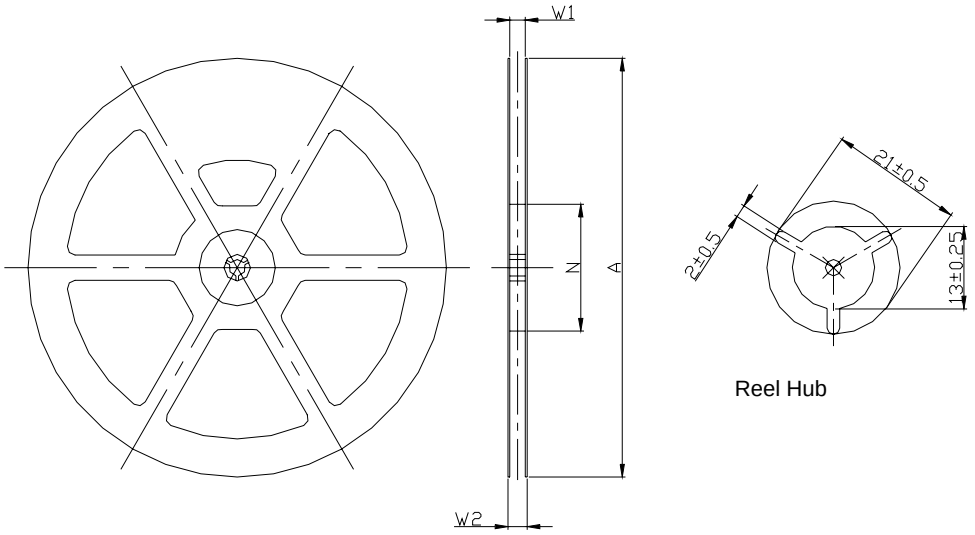
(1) Reflow soldering should not be done more than two times.

(2) When soldering, do not put stress on the IrDA devices during heating.

(3) After soldering, do not warp the circuit board.

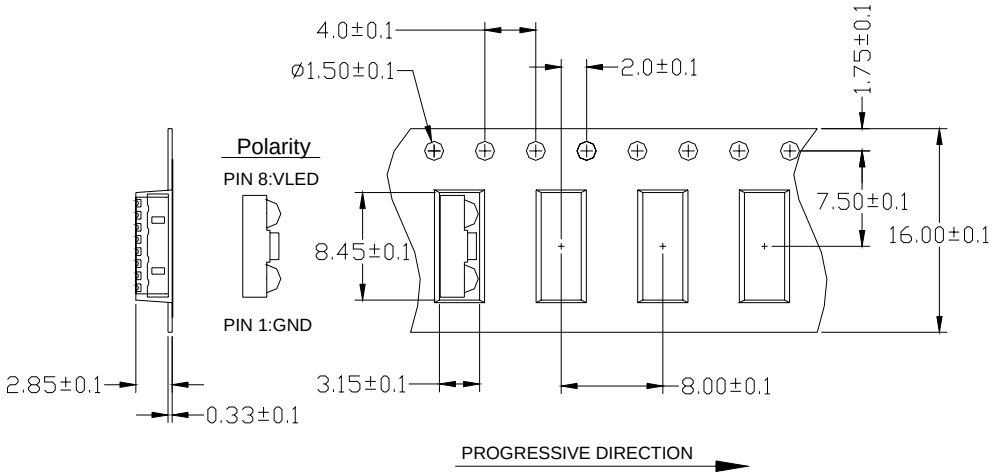
Taping and Packing Information

Shape of Reel and Dimensions

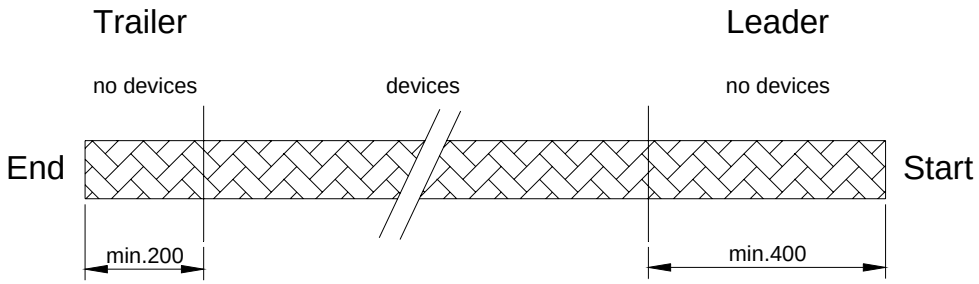


Version	Tape Width	A	N	W1	W2max
C	16	330±1	100±1.5	18±2	21.7

Tape Dimensions



Leader and Trailer



Quantity

TM3200/TR2 2500 pcs per reel

Cover Tape Peel Strength

According to IEC 286

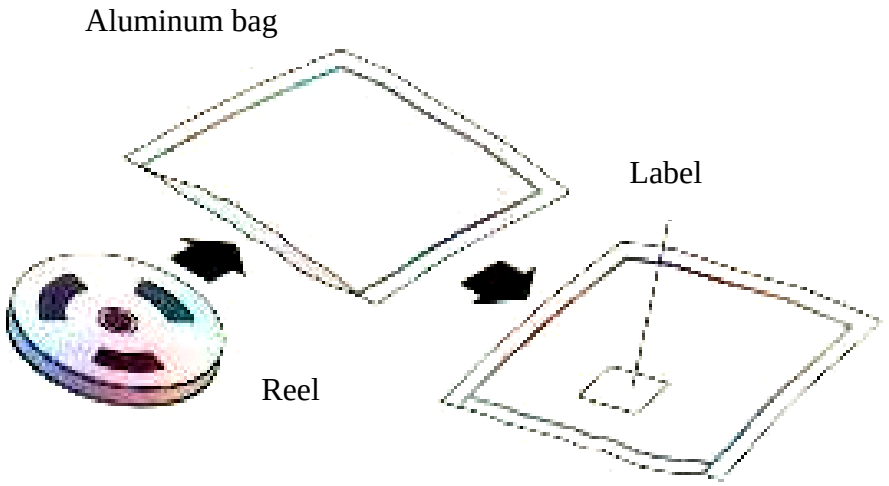
0.1 to 1.3N

300±10%mm/min

165°-180°peel angle

Damp Proof Packing.

The reel is packed in a damp proof aluminum bag to protect the devices from absorbing moisture during transportation and storage.



Recommended Method of Storage

Dry box storage is recommended as soon as the aluminum bag has been opened to prevent moisture absorption. The following conditions should be observed, if dry boxes are not available:

- Storage temperature 10℃ to 30℃
- Storage humidity ≦60%RH max.

After more than 72hours under these conditions moisture content will be too high for reflow soldering.

In case of moisture absorption, the devices will recover to the former condition by drying under the following condition:

192 hours at 40℃+5℃/-0℃ and 5% RH(dry air/nitrogen) or

96 hours at 60℃+5℃ and <5% RH for all device containers or

24 hours at 125℃+5℃not suitable for reel or tubes.

ESD Precaution

Proper storage and handling procedures should be followed to prevent ESD damage to the devices especially when they are removed from the Antistatic Shielding Bag. Electro-Static Sensitive Devices warning labels are on the packing.

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