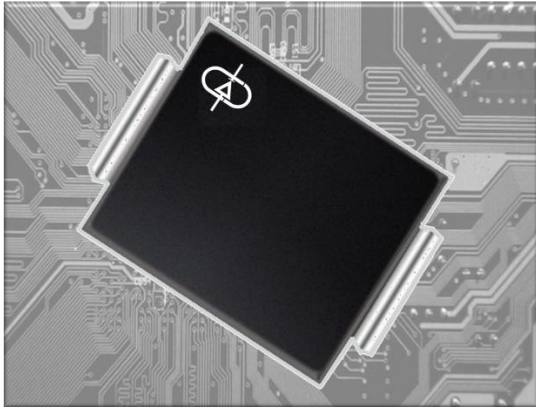
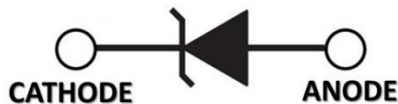


600W SURFACE MOUNT UNIDIRECTIONAL TRANSIENT VOLTAGE SUPPRESSORS DIODES 5.0V-85V

DESCRIPTION:



The ALPSMA6HSXXA series is designed to protect voltage sensitive components from high voltage, high energy transients. The SMA series is supplied in cost-effective, highly reliable package and is ideally suited for use in communication systems, automotive, numerical controls, process controls, medical equipment, business machines, power supplies and many other industrial/consumer applications.



FEATURES:

- Uni-directional
- Very low profile - typical height of 1.0 mm
- 600W peak pulse power capability with a 10/1000 μ s waveform, repetition rate (duty cycle): 0.01%
- Low profile surface mounted application in order to optimize board space
- Excellent clamping capability
- Low incremental surge resistance
- Glass passivated chip junction
- Lead-free parts meet RoHS requirements
- Suffix "-H" indicates Halogen free parts, ex. ALPSMA6HSXXA-H

APPLICATIONS:

- Communication Systems
- Automotive
- Numerical and Process controls
- Medical equipment
- Business machines
- Power supplies
- Industrial/consumer applications.

MECHANICAL CHARACTERISTICS

- Epoxy: UL94-V0 rated flame retardant.
- Case: Molded plastic, DO-221AC / SMA-HS
- Terminals: Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position: Any.
- Approximate Weight: 0.037 grams.

TYPICAL DEVICE CHARACTERISTICS

MAXIMUM RATINGS @ 25°C Unless Otherwise Specified				
PARAMETER		SYMBOL	VALUE	UNITS
Peak Power Dissipation	with a 10/1000μs waveform, Note 1, 2 & Fig. 1	P_{PPM}	600	W
Peak pulse current	with a 10/1000μs waveform	I_{PPM}	See Table 1	A
Steady state power dissipation	at $T_L=75^\circ\text{C}$, Note 2	$P_{M(AV)}$	4.5	W
Peak forward surge current	8.3ms single half sine-wave, Note 3	I_{FSM}	60	A
Maximum instantaneous forward voltage	at $I_F=25$ For uni-directional types only, Note 4	V_F	3.5	V
Typical thermal resistance	Junction to case	$R_{\theta JC}$	32	$^\circ\text{C/W}$
	Junction to ambient	$R_{\theta JA}$	52	
Operating junction temperature range		T_J	-55 to +150	$^\circ\text{C}$
Storage Temperature Range		T_{STG}	-65 to +175	$^\circ\text{C}$
NOTE 1. Non-repetitive current pulse, per Fig. 3 and derated above $T_A=25^\circ\text{C}$ per Fig. 2 2. Mounted on copper pad area of 0.2"x0.2" (5.0x5.0 mm) per Fig 5 3. Measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per minute maximum 4. $V_F<3.5\text{V}$ for $V_{BR}<200\text{V}$.				

ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified							
PART NUMBER (UNI)	REVERSE STAND-OFF VOLTAGE V_{RWM} VOLTS	BREAKDOWN VOLTAGE $V_{(BR)}$ @ I_T VOLTS		TEST CURRENT @ I_T mA	MAXIMUM CLAMPING VOLTAGE @ I_{PP} V_C VOLTS	MAXIMUM REVERSE SURGE CURRENT @ I_{PP} AMPS	MAXIMUM REVERSE LEAKAGE CURRENT @ V_{RWM} I_R μA
		MIN	MAX				
ALPSMA6HS5.0A	5.0	6.40	7.00	10	9.2	65.2	800
ALPSMA6HS6.0A	6.0	6.67	7.37	10	10.3	58.3	800
ALPSMA6HS6.5A	6.5	7.22	7.98	10	11.2	53.6	500
ALPSMA6HS7.0A	7.0	7.78	8.60	10	12.0	50.0	200
ALPSMA6HS7.5A	7.5	8.33	9.21	1.0	12.9	46.5	100
ALPSMA6HS8.0A	8.0	8.89	9.83	1.0	13.6	44.1	50
ALPSMA6HS8.5A	8.5	9.44	10.4	1.0	14.4	41.7	20
ALPSMA6HS9.0A	9.0	10.0	11.1	1.0	15.4	39.0	10
ALPSMA6HS10A	10	11.1	12.3	1.0	17.0	35.3	5
ALPSMA6HS11A	11	12.2	13.5	1.0	18.2	33.0	5
ALPSMA6HS12A	12	13.3	14.7	1.0	19.9	30.2	5
ALPSMA6HS13A	13	14.4	15.9	1.0	21.5	27.9	5
ALPSMA6HS14A	14	15.6	17.2	1.0	23.2	25.9	5
ALPSMA6HS15A	15	16.7	18.5	1.0	24.4	24.6	5

ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified

PART NUMBER (Notes 1-2)	REVERSE STAND-OFF VOLTAGE V_{RWM} VOLTS	BREAKDOWN VOLTAGE $V_{(BR)}$ @ I_T VOLTS		TEST CURRENT @ I_T mA	MAXIMUM CLAMPING VOLTAGE (Fig. 2) @ I_P V_C VOLTS	MAXIMUM REVERSE SURGE CURRENT @ I_{DD} AMPS	MAXIMUM REVERSE LEAKAGE CURRENT @ V_{RWM} I_R μA
		MIN	MAX				
ALPSMA6HS16A	16	17.8	19.7	1.0	26.0	23.0	5
ALPSMA6HS17A	17	18.9	20.9	1.0	27.6	21.7	5
ALPSMA6HS18A	18	20.0	22.1	1.0	29.2	20.5	5
ALPSMA6HS20A	20	22.2	24.5	1.0	32.4	18.5	5
ALPSMA6HS22A	22	24.4	26.9	1.0	35.5	16.9	5
ALPSMA6HS24A	24	26.7	29.5	1.0	38.9	15.4	5
ALPSMA6HS26A	26	28.9	31.9	1.0	42.1	14.2	5
ALPSMA6HS28A	28	31.1	34.4	1.0	45.4	13.2	5
ALPSMA6HS30A	30	33.3	36.8	1.0	48.4	12.4	5
ALPSMA6HS33A	33	36.7	40.6	1.0	53.3	11.2	5
ALPSMA6HS36A	36	40.0	44.2	1.0	58.1	10.3	5
ALPSMA6HS40A	40	44.4	49.1	1.0	64.5	9.3	5
ALPSMA6HS43A	43	47.8	52.8	1.0	69.4	8.6	5
ALPSMA6HS45A	45	50.0	55.3	1.0	72.7	8.2	5
ALPSMA6HS48A	48	53.3	58.9	1.0	77.4	7.7	5
ALPSMA6HS51A	51	56.7	62.7	1.0	82.4	7.2	5
ALPSMA6HS54A	54	60.0	66.3	1.0	87.1	6.9	5
ALPSMA6HS58A	58	64.4	71.2	1.0	93.6	6.4	5
ALPSMA6HS60A	60	66.7	73.7	1.0	96.8	6.2	5
ALPSMA6HS64A	64	71.1	78.6	1.0	103.0	5.8	5
ALPSMA6HS70A	70	77.8	86.0	1.0	113.0	5.3	5
ALPSMA6HS75A	75	83.3	92.1	1.0	121.0	4.9	5
ALPSMA6HS78A	78	86.7	95.8	1.0	126.0	4.7	5
ALPSMA6HS85A	85	94.4	104	1.0	137.0	4.3	5

NOTE

1. V_{BR} measured after I_T applied for 300 μs , I_T = square wave pulse or equivalent
2. Surge current waveform per Fig. 3 and derated per Fig. 2
3. Suffix 'A' denotes 5% tolerance devices
4. All terms and symbols are consistent with ANS/IEEE C62.35
5. Transient Voltage Suppressors (TVS) are devices used to protect vulnerable circuits from electrical overstress such as that caused by electrostatic discharge, inductive load switching and induced lightning. Within the TVS, damaging voltage spikes are limited by clamping or avalanche action of a rugged silicon pn junction which reduces the amplitude of the transient to a nondestructive level. See Fig. 7 & Fig. 8

TYPICAL DEVICE CHARACTERISTICS CURVES

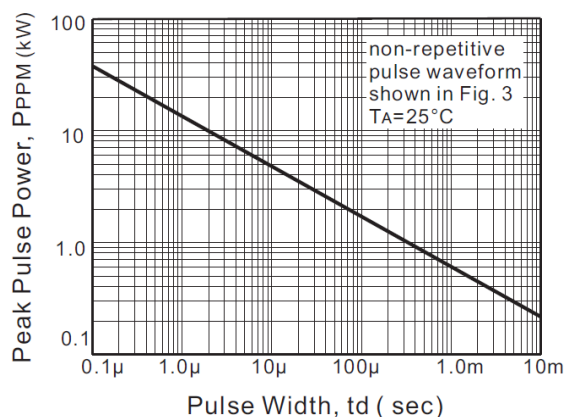


Fig1. PEAK PULSE POWER RATING CURVE

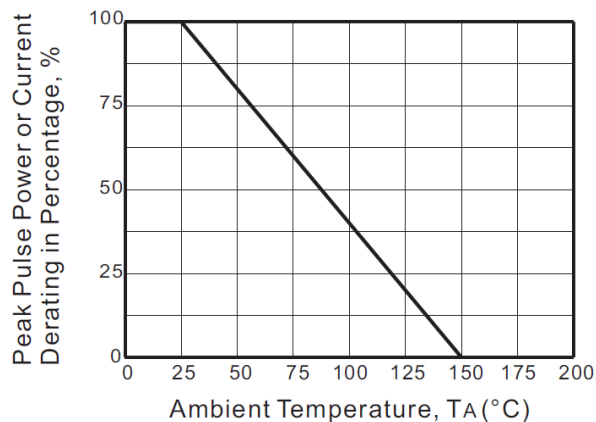


Fig2. PULSE DERATING CURVE

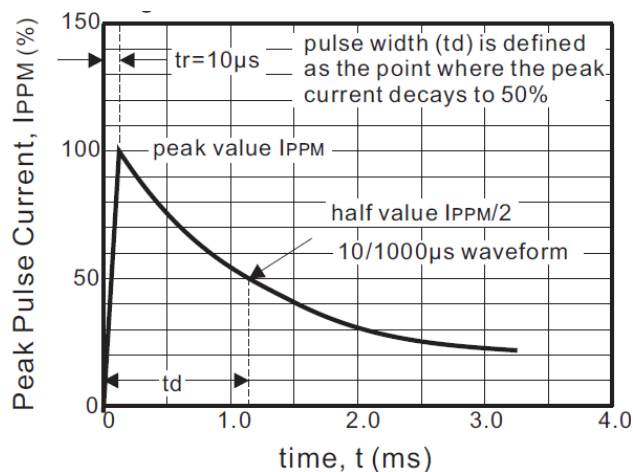


Fig3. PULSE WAVEFORM

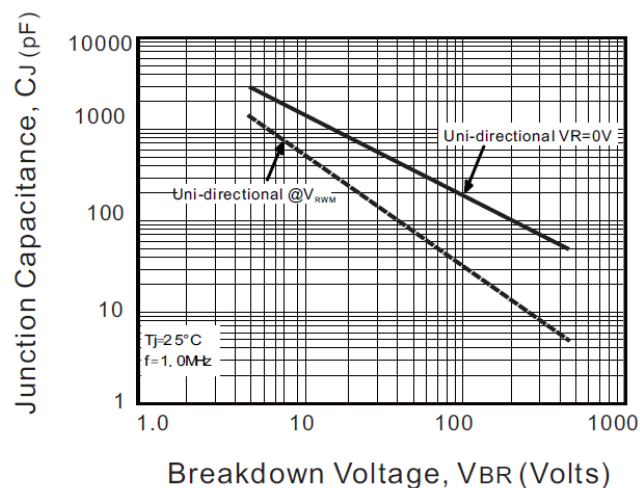


Fig4. TYPICAL JUNCTION CAPACITANCE

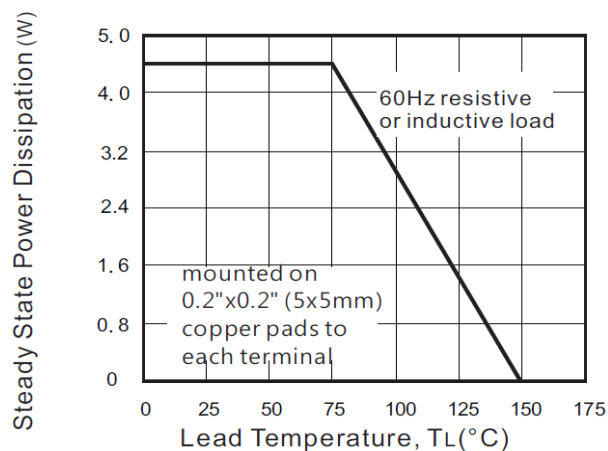


Fig5. STEADY STATE POWER DERATING CURVE

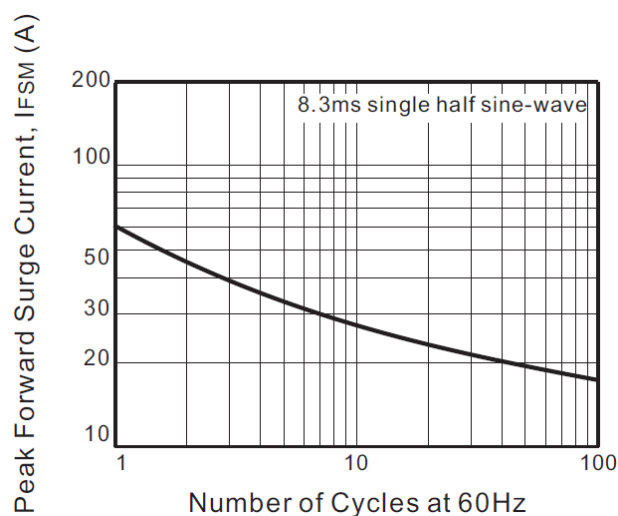


Fig6. MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT

RATING AND CHARACTERISTICS CURVES

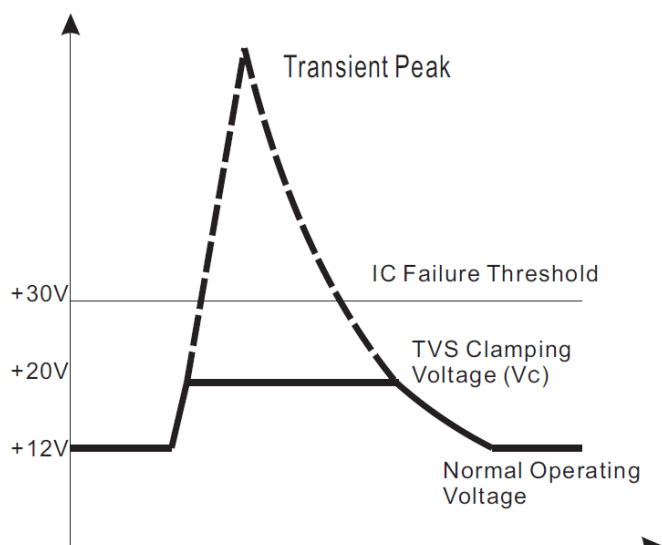


Fig. 7 - TRANSIENTS OF SEVERAL THOUSAND VOLTS CAN BE CLAMPED TO A SAFE LEVEL BY THE TVS

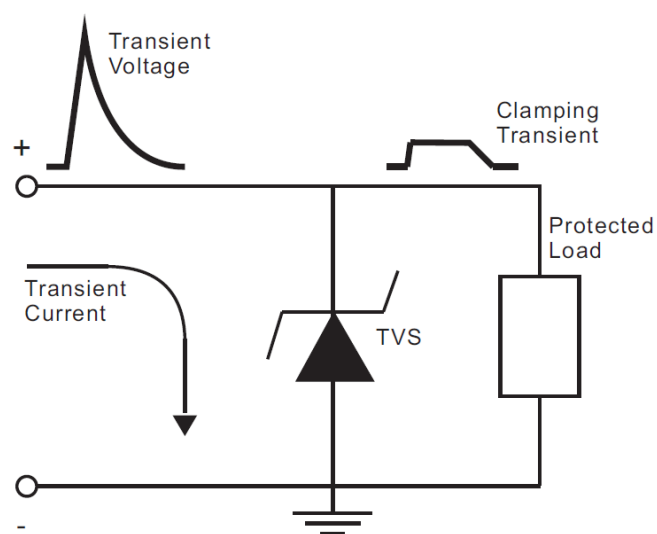
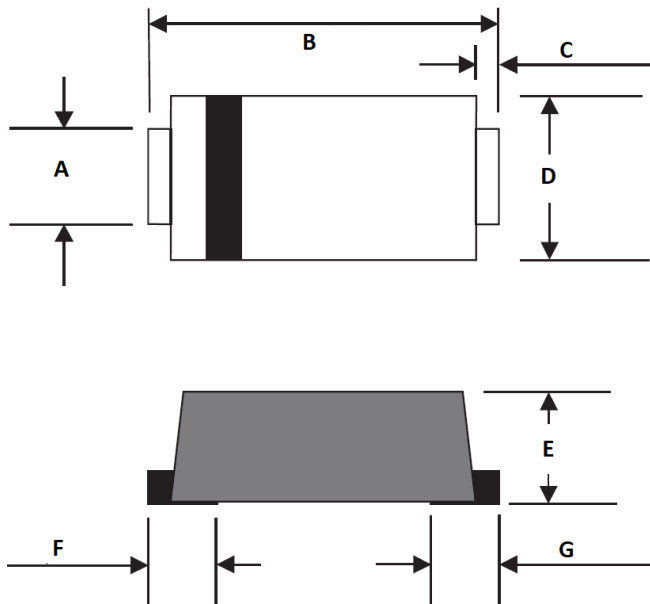


Fig. 8 - TRANSIENT CURRENT IS DIVERTED TO GROUND THRU TVS; THE VOLTAGE SEEN BY THE PROTECTED LOAD IS LIMITED TO THE CLAMPING VOLTAGE LEVEL

PINNING INFORMATION

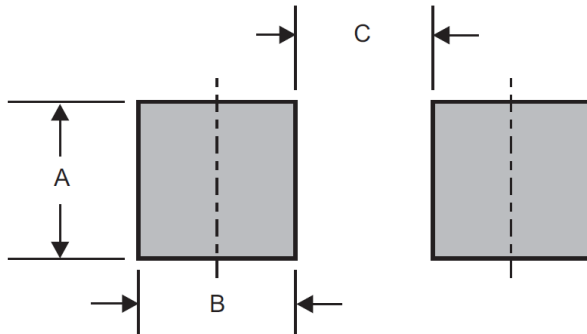
PIN	SIMPLIFIED OUTLINE	SYMBOL
Uni-Directional Pin1 cathode Pin2 anode		

PACKAGE INFORMATION
DO-221AC / SMA-HS

OUTLINE DIMENSIONS

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.15	1.75	0.045	0.069
B	5.00	5.40	0.197	0.213
C	0.45 Typ.		0.018 Typ.	
D	2.40	2.80	0.095	0.111
E	0.95	1.05	0.037	0.041
F	1.0 Typ.		0.040 Typ.	
G	1.0 Typ.		0.040 Typ.	

NOTES

- Dimensions are exclusive of mold flash and metal burrs.

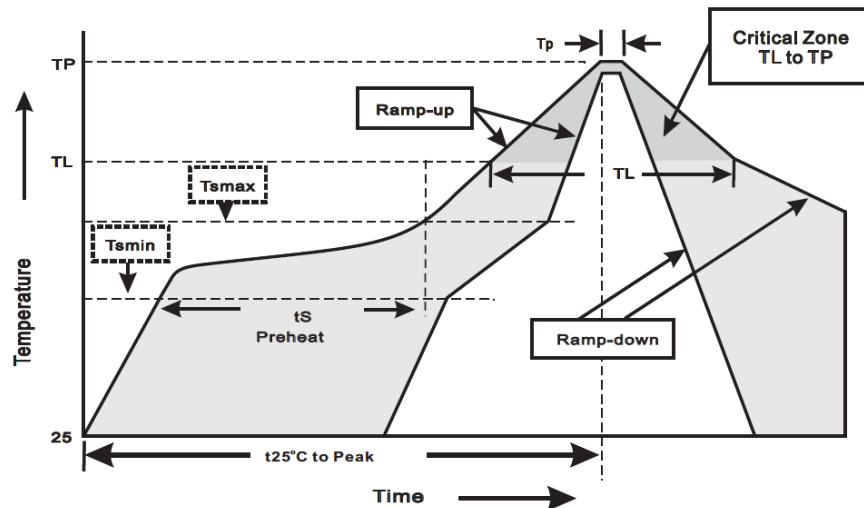

PAD LAYOUT DIMENSIONS

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.52	-	0.060	-
B	1.20	-	0.048	-
C	3.12	-	0.123	-

SOLDERING PARAMETERS

SUGGESTED THERMAL PROFILES FOR SOLDERING PROCESSES

1. Storage environment: Temperature=5 °C~40 °C Humidity=55% ±25%
2. Reflow soldering of surface-mount devices



3. Reflow soldering

PROFILE FEATURE	SOLDERING CONDITION
Average ramp-up rate (T_L to T_P)	<3 °C/sec
Preheat	
- Temperature Min (T_{smin})	150 °C
- Temperature Max (T_{smax})	200 °C
- Time (min to max) (t_s)	60 ~ 120 sec
T_{smax} to T_L	
- Ramp-upRate	<3 °C/sec
Time maintained above:	
- Temperature (T_L)	217 °C
- Time(t_L)	60 ~ 260 sec
Peak Temperature (T_P)	255 °C-0/+5 °C
Time within 5 °C of actual Peak Temperature(t_P)	10 ~ 30 sec
Ramp-down Rate	<6 °C/sec
Time 25 °C to Peak Temperature	<6 minutes



beyond boundaries...

ALPSMA6HSXXA Series SMA-HS

PRODUCT HIGH RELIABILITY TEST CAPABILITIES

ITEM	TEST CONDITIONS	STANDARD
Solder Resistance	At 260±5°C for 10±Sec.	MIL-STD-750D METHOD-2031
Solderability	At 245±5°C for 5 sec.	MIL-STD-202F METHOD-208
High Temperature Reverse Bias	$V_{BR} = V_{BR\ NOM} * 80\%$ at $T_J = 150^\circ$ for 168 hrs.	MIL-STD-750D METHOD-1038
Pressure Cooker	15P _{SIG} at $T_A = 121^\circ\text{C}$ for 4Hrs	JESD22-A102
Temperature Cycling	-55°C to +125°C dwelled for 30min and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
Humidity	At $T_A = 85^\circ\text{C}$, RH=85% for 1000hrs.	MIL-STD-750D METHOD-1021
High Temperature Storage Life	At 175°C for 1000hrs.	MIL-STD-750D METHOD-1031



beyond boundaries...

ALPSMA6HSXXA Series SMA-HS

CUSTOMER NOTE:

DISCLAIMER

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1. ALPINESEMI™ Semiconductor Devices are RoHS compliant and hence customers are requested to dispose as per the prevailing Environmental Legislation put forth in their specific country.
2. In Europe, please dispose as per EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).



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