

Fast Switching Diode



Features

- 600V diode technology
- Fast recovery
- Soft switching
- Low reverse recovery charge
- Low forward voltage
- Easy paralleling
- Pb-free lead plating; RoHS compliant
- Halogen-free according to IEC61249-2-21
- Qualified according to JEDEC for target applications

Product Summary

V_{RRM}	600	V
I_F	23	A
V_F	1.5	V
T_{jmax}	175	°C



Type	Package	Ordering Code	Marking	Pin 1	PIN 2	PIN 3
IDP23E60	PG-TO220-2	-	D23E60	C	A	-

Maximum Ratings, at $T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Value	Unit
Repetitive peak reverse voltage	V_{RRM}	600	V
Continuous forward current $T_C = 25\text{ °C}$ $T_C = 90\text{ °C}$	I_F	41 28	A
Surge non repetitive forward current $T_C = 25\text{ °C}$, $t_p = 10\text{ ms}$, sine halfwave	I_{FSM}	89	A
Maximum repetitive forward current $T_C = 25\text{ °C}$, t_p limited by $t_{j,max}$, $D = 0.5$	I_{FRM}	65	A
Power dissipation $T_C = 25\text{ °C}$ $T_C = 90\text{ °C}$	P_{tot}	115 65	W
Operating junction temperature	T_j	-40...+175	°C
Storage temperature	T_{stg}	-55...+150	
Soldering temperature 1.6mm (0.063 in.) from case for 10 s	T_S	260	

Thermal Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Characteristics					
Thermal resistance, junction - case	R_{thJC}	-	-	1.3	K/W
SMD version, device on PCB:	R_{thJA}				
@ min. footprint		-	-	75	
@ 6 cm ² cooling area ¹⁾		-	-	50	

Electrical Characteristics, at $T_j = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Reverse leakage current	I_R				μA
$V_R=600\text{V}$, $T_j=25^{\circ}\text{C}$		-	-	50	
$V_R=600\text{V}$, $T_j=150^{\circ}\text{C}$		-	-	1900	
Forward voltage drop	V_F				V
$I_F=23\text{A}$, $T_j=25^{\circ}\text{C}$		-	1.5	2	
$I_F=23\text{A}$, $T_j=150^{\circ}\text{C}$		-	1.5	-	

⁰J-STD20 and JESD22

¹Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6cm² (one layer, 70 μm thick) copper area for drain connection. PCB is vertical without blown air.

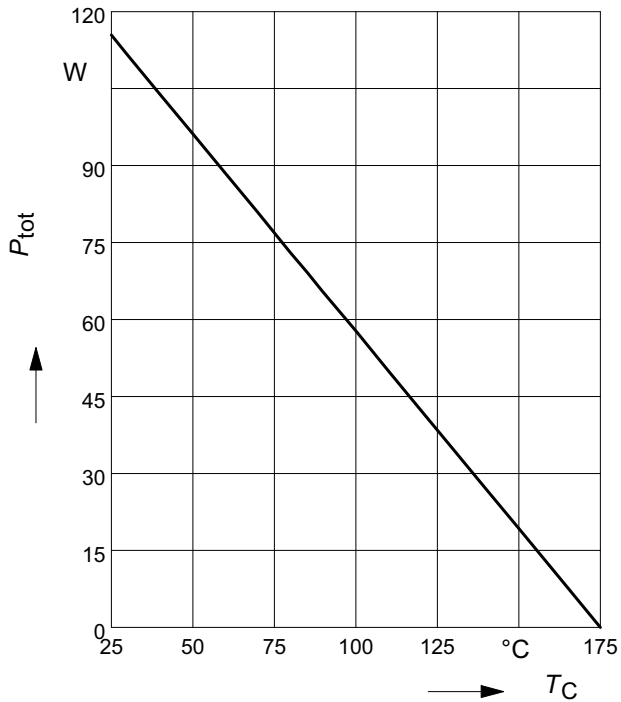
Electrical Characteristics, at $T_j = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Reverse recovery time $V_R=400V, I_F=23A, di_F/dt=1000A/\mu s, T_j=25^{\circ}C$ $V_R=400V, I_F=23A, di_F/dt=1000A/\mu s, T_j=125^{\circ}C$ $V_R=400V, I_F=23A, di_F/dt=1000A/\mu s, T_j=150^{\circ}C$	t_{rr}	- - -	120 164 170	- - -	ns
Peak reverse current $V_R=400V, I_F=23A, di_F/dt=1000A/\mu s, T_j=25^{\circ}C$ $V_R=400V, I_F=23A, di_F/dt=1000A/\mu s, T_j=125^{\circ}C$ $V_R=400V, I_F=23A, di_F/dt=1000A/\mu s, T_j=150^{\circ}C$	I_{rrm}	- - -	17 19.5 21.5	- - -	A
Reverse recovery charge $V_R=400V, I_F=23A, di_F/dt=1000A/\mu s, T_j=25^{\circ}C$ $V_R=400V, I_F=23A, di_F/dt=1000A/\mu s, T_j=125^{\circ}C$ $V_R=400V, I_F=23A, di_F/dt=1000A/\mu s, T_j=150^{\circ}C$	Q_{rr}	- - -	970 1580 1770	- - -	nC
Reverse recovery softness factor $V_R=400V, I_F=23A, di_F/dt=1000A/\mu s, T_j=25^{\circ}C$ $V_R=400V, I_F=23A, di_F/dt=1000A/\mu s, T_j=125^{\circ}C$ $V_R=400V, I_F=23A, di_F/dt=1000A/\mu s, T_j=150^{\circ}C$	S	- - -	4.4 4.8 5	- - -	

1 Power dissipation

$$P_{\text{tot}} = f(T_C)$$

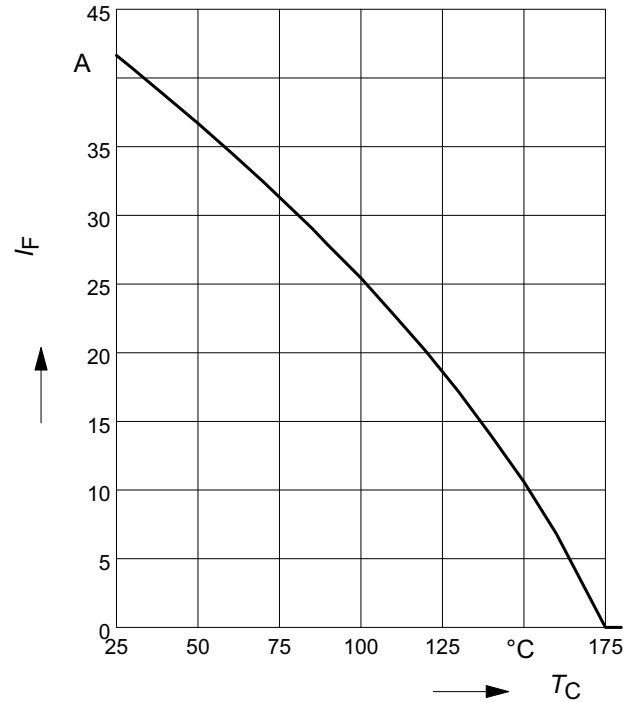
parameter: $T_j \leq 175^\circ\text{C}$



2 Diode forward current

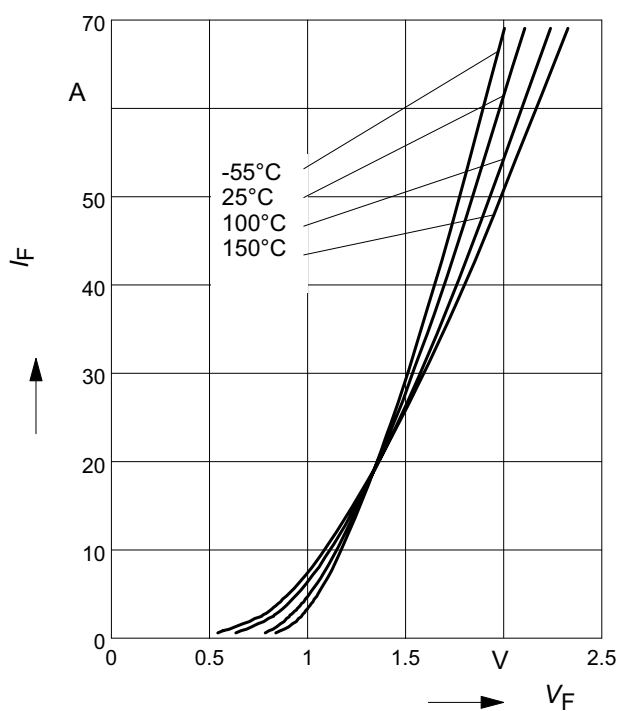
$$I_F = f(T_C)$$

parameter: $T_j \leq 175^\circ\text{C}$



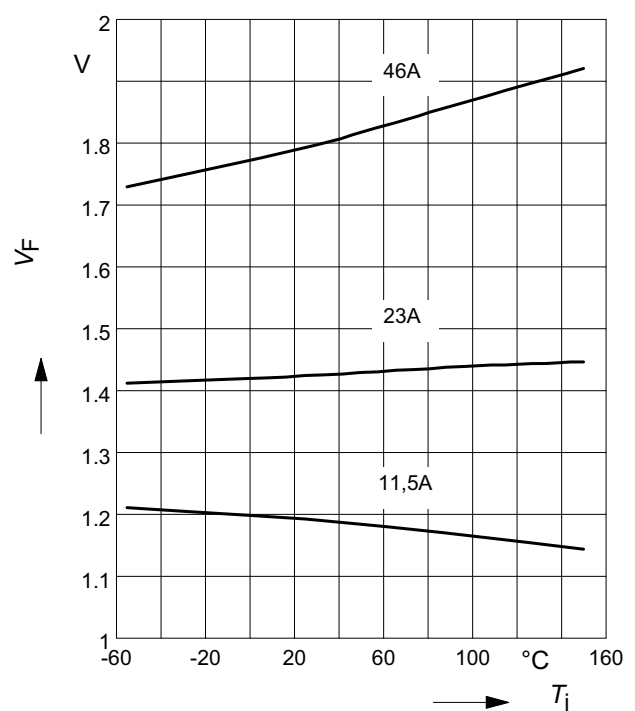
3 Typ. diode forward current

$$I_F = f(V_F)$$



4 Typ. diode forward voltage

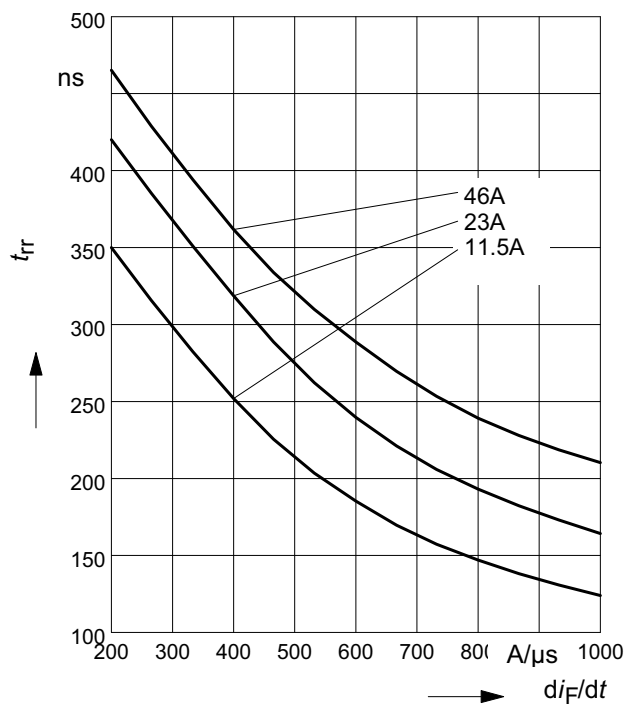
$$V_F = f(T_j)$$



5 Typ. reverse recovery time

$$t_{rr} = f(dI_F/dt)$$

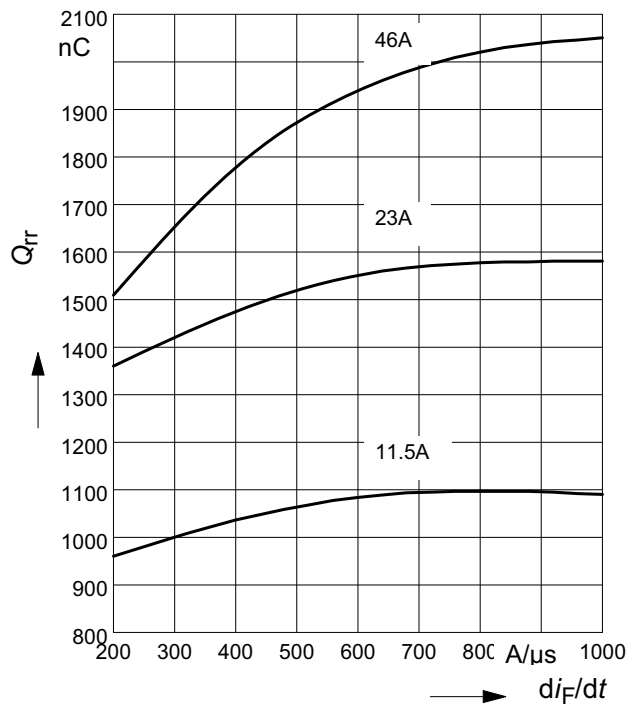
parameter: $V_R = 400V$, $T_j = 125^\circ C$



6 Typ. reverse recovery charge

$$Q_{rr} = f(dI_F/dt)$$

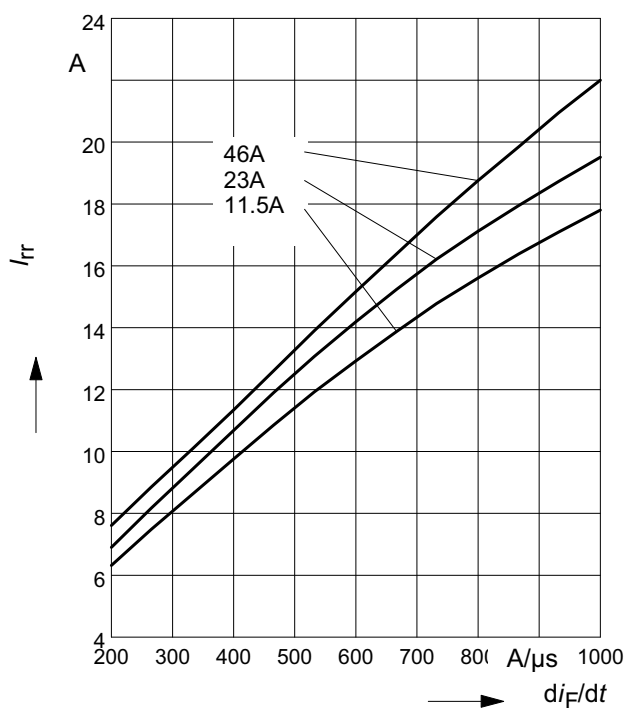
parameter: $V_R = 400V$, $T_j = 125^\circ C$



7 Typ. reverse recovery current

$$I_{rr} = f(dI_F/dt)$$

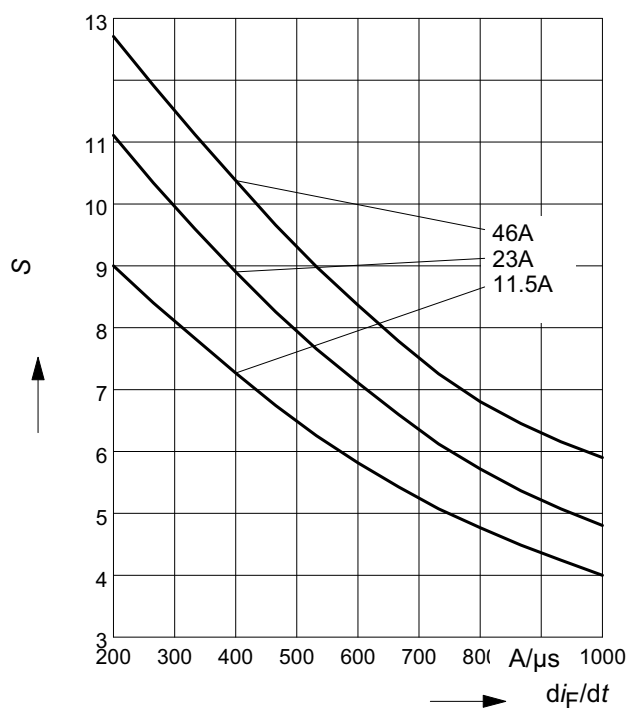
parameter: $V_R = 400V$, $T_j = 125^\circ C$



8 Typ. reverse recovery softness factor

$$S = f(dI_F/dt)$$

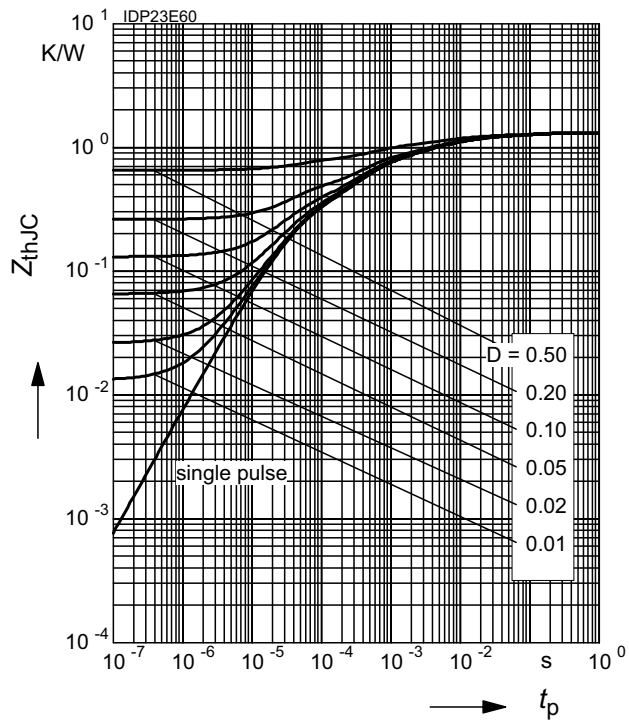
parameter: $V_R = 400V$, $T_j = 125^\circ C$



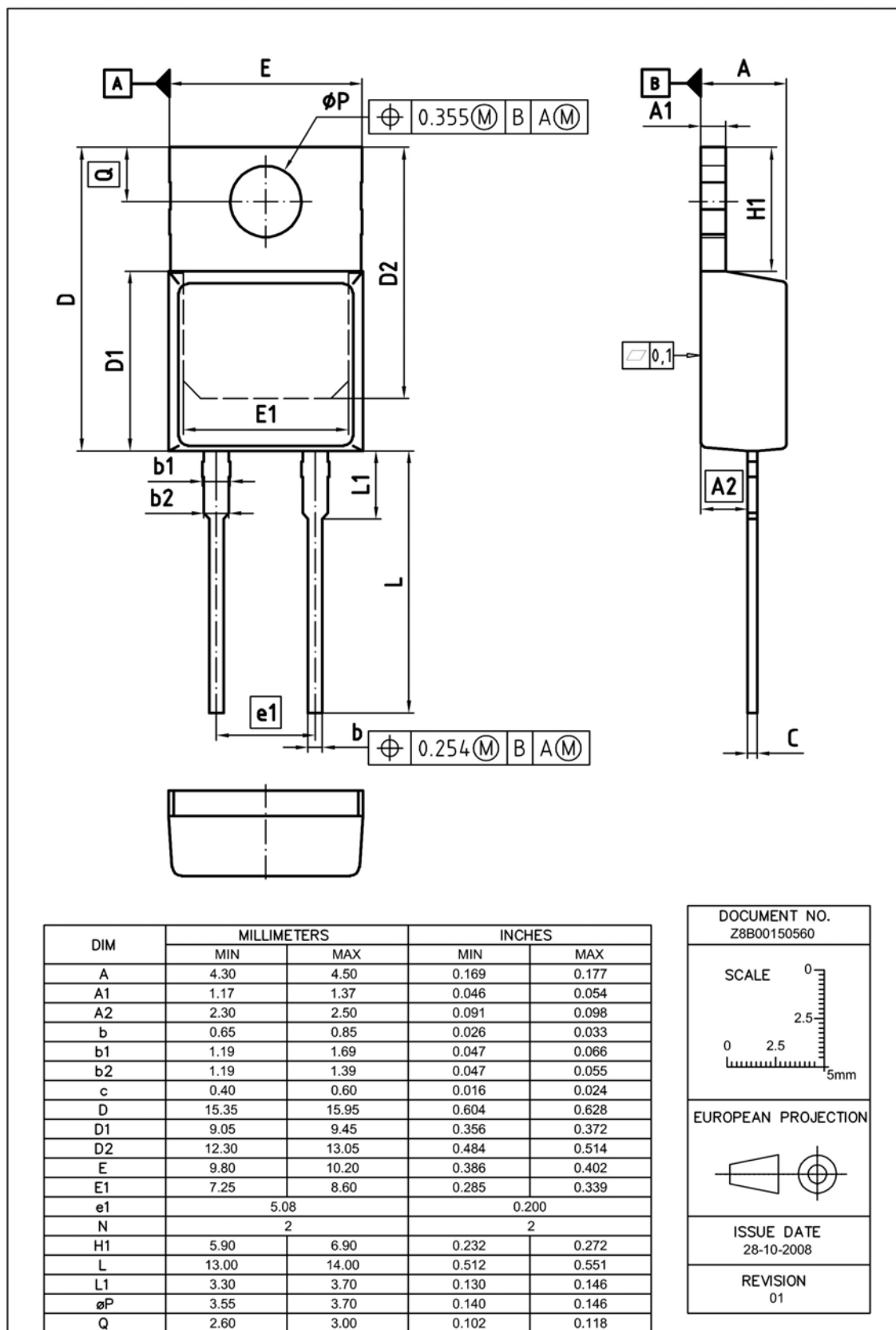
9 Max. transient thermal impedance

$$Z_{thJC} = f(t_p)$$

parameter : $D = t_p/T$



Outline drawing: TO220-2



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