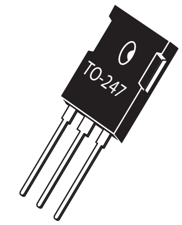
900V 36A
APT36N90BC3G*

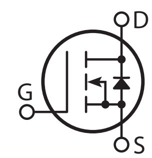
***G Denotes RoHS Compliant, Pb Free Terminal Finish.**

Microsemi
POWER PRODUCTS GROUP

Super Junction MOSFET



- **Ultra Low $R_{DS(ON)}$**
- **Low Miller Capacitance**
- **Ultra Low Gate Charge, Q_g**
- **Avalanche Energy Rated**
- **Extreme $^{dv}/_{dt}$ Rated**
- **Dual die (parallel)**
- **Popular T-MAX Package**



Unless stated otherwise, Microsemi discrete MOSFETs contain a single MOSFET die. This device is made with two parallel MOSFET die. It is intended for switch-mode operation. It is not suitable for linear mode operation.

MAXIMUM RATINGS

All Ratings per die: T_C = 25°C unless otherwise specified.

Symbol	Parameter	APT36N90BC3G	UNIT
V_{DSS}	Drain-Source Voltage	900	Volts
I_D	Continuous Drain Current @ T_C = 25°C	36	Amps
	Continuous Drain Current @ T_C = 100°C	23	
I_{DM}	Pulsed Drain Current [1]	96	
V_{GS}	Gate-Source Voltage Continuous	±20	Volts
P_D	Total Power Dissipation @ T_C = 25°C	390	Watts
T_J,T_{STG}	Operating and Storage Junction Temperature Range	-55 to 150	°C
T_L	Lead Temperature: 0.063" from Case for 10 Sec.	260	
$^{dv}/_{dt}$	Drain-Source Voltage slope (V_{DS} = 400V, I_D = 36A, T_J = 125°C)	50	V/ns
I_{AR}	Avalanche Current [2]	8.8	Amps
E_{AR}	Repetitive Avalanche Energy [2] (Id = 8.8A, Vdd = 50V)	2.9	mJ
E_{AS}	Single Pulse Avalanche Energy (Id = 8.8A, Vdd = 50V)	1940	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
$BV_{(DSS)}$	Drain-Source Breakdown Voltage (V_{GS} = 0V, I_D = 250μA)	900			Volts
$R_{DS(on)}$	Drain-Source On-State Resistance [3] (V_{GS} = 10V, I_D = 18A)		0.10	0.12	Ohms
I_{DSS}	Zero Gate Voltage Drain Current (V_{DS} = 900V, V_{GS} = 0V)	-	-	100	μA
	Zero Gate Voltage Drain Current (V_{DS} = 900V, V_{GS} = 0V, T_C = 150°C)	-	50	-	
I_{GSS}	Gate-Source Leakage Current (V_{GS} = ±20V, V_{DS} = 0V)	-	-	100	nA
$V_{GS(th)}$	Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 2.9mA)	2.5	3	3.5	Volts

CAUTION: These Devices are Sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

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Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 25V f = 1 MHz		7463		pF
C_{oss}	Output Capacitance			6827		
C_{rss}	Reverse Transfer Capacitance			167		
Q_g	Total Gate Charge [4]	V_{GS} = 10V V_{DD} = 450V I_D = 36A @ 25°C		252		nC
Q_{gs}	Gate-Source Charge			38		
Q_{gd}	Gate-Drain ("Miller") Charge			112		
$t_{d(on)}$	Turn-on Delay Time	**INDUCTIVE SWITCHING** V_{GS} = 15V V_{DD} = 600V I_D = 36A @ 25°C R_G = 4.3Ω		70		ns
t_r	Rise Time			20		
$t_{d(off)}$	Turn-off Delay Time			400		
t_f	Fall Time			25		
E_{on}	Turn-on Switching Energy [5]	**INDUCTIVE SWITCHING @ 25°C** V_{DD} = 600V, V_{GS} = 15V I_D = 36A, R_G = 4.3Ω		1500		µJ
E_{off}	Turn-off Switching Energy			750		
E_{on}	Turn-on Switching Energy [5]	**INDUCTIVE SWITCHING @ 125°C** V_{DD} = 600V, V_{GS} = 15V I_D = 36A, R_G = 4.3Ω		2130		
E_{off}	Turn-off Switching Energy			867		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions		MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)			36		Amps
I_{SM}	Pulsed Source Current [1] (Body Diode)			96		
V_{SD}	Diode Forward Voltage [3] (V_{GS} = 0V, I_S = 18A)			0.8	1.2	Volts
$^{dv}/_{dt}$	Peak Diode Recovery $^{dv}/_{dt}$ [6]				10	V/ns
t_{rr}	Reverse Recovery Time (I_S = -36A, $^{di}/_{dt}$ = 100A/µs)	T_j = 25°C		930		ns
		T_j = 125°C		1230		
Q_{rr}	Reverse Recovery Charge (I_S = -36A, $^{di}/_{dt}$ = 100A/µs)	T_j = 25°C		35		µC
		T_j = 125°C		44		
I_{RRM}	Peak Recovery Current (I_S = -36A, $^{di}/_{dt}$ = 100A/µs)	T_j = 25°C		70		Amps
		T_j = 125°C		68		

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.3	°C/W
$R_{\theta JA}$	Junction to Ambient			31	

1 Repetitive Rating: Pulse width limited by maximum junction temperature

2 Repetitive avalanche causes additional power losses that can be calculated as $P_{AV} = E_{AR}*f$. *Pulse width tp limited by Tj max.*

3 Pulse Test: Pulse width < 380 µs, Duty Cycle < 2%

4 See MIL-STD-750 Method 3471

5 Eon includes diode reverse recovery.

6 Maximum 125°C diode commutation speed = di/dt 600A/µs

Microsemi reserves the right to change, without notice, the specifications and information contained herein.

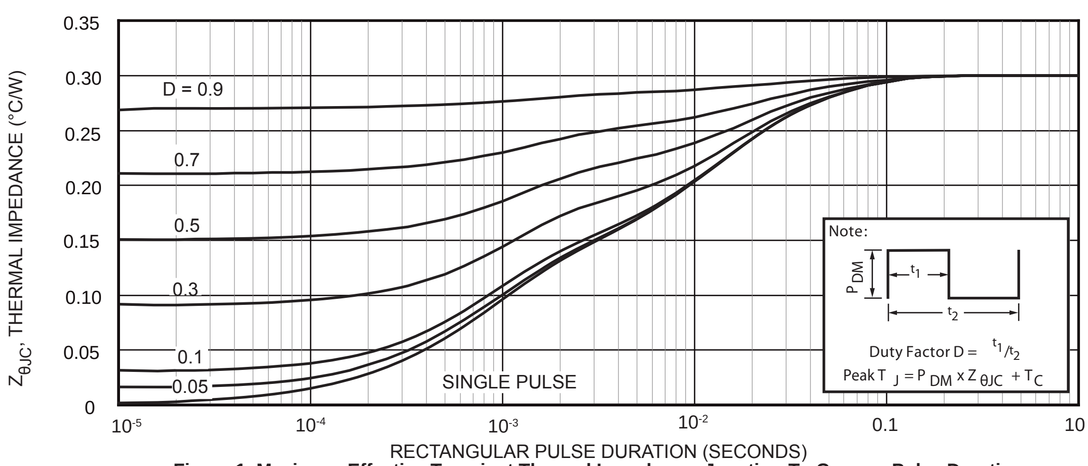


Figure 1, Maximum Effective Transient Thermal Impedance, Junction-To-Case vs Pulse Duration

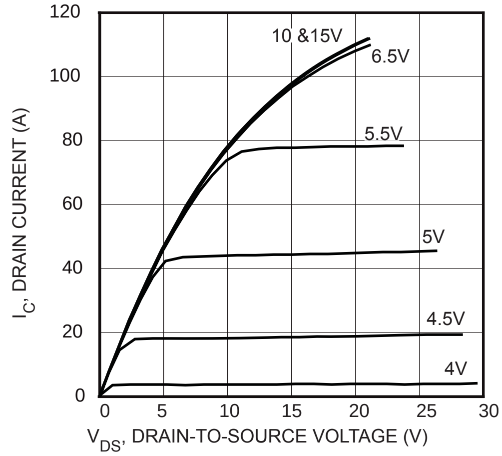


FIGURE 2, Low Voltage Output Characteristics

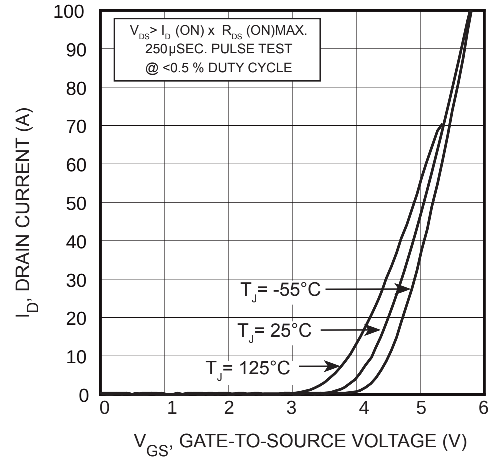


FIGURE 3, Transfer Characteristics

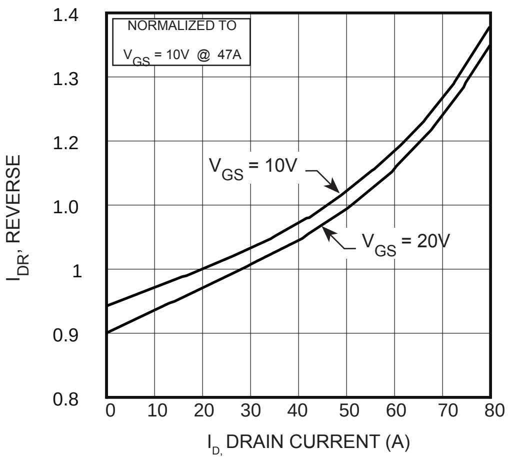


FIGURE 4, R_{DS}(ON) vs Drain Current

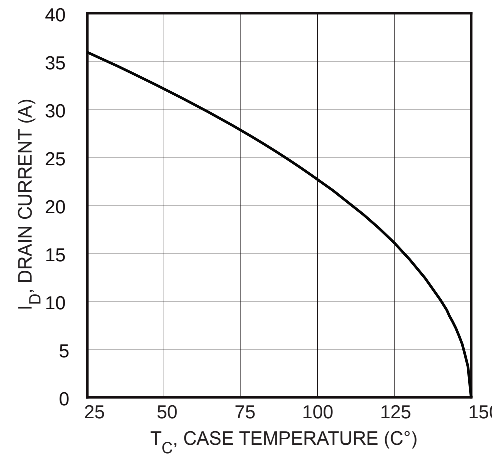


FIGURE 5, Maximum Drain Current vs Case Temperature

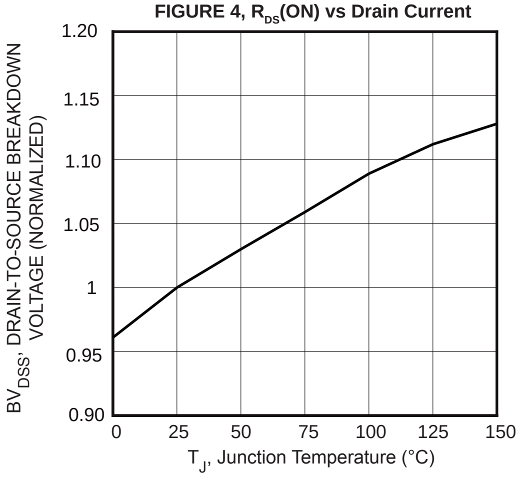


FIGURE 6, Breakdown Voltage vs Temperature

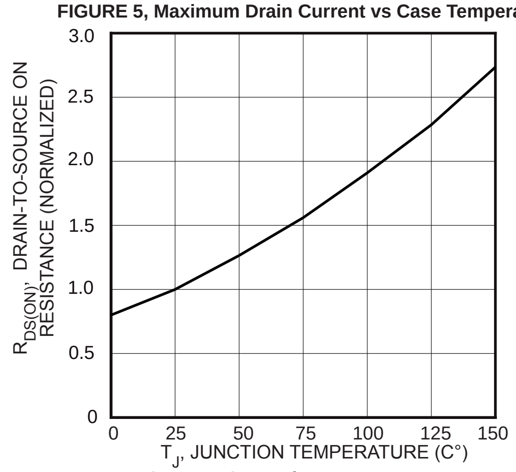


FIGURE 7, On-Resistance vs Temperature

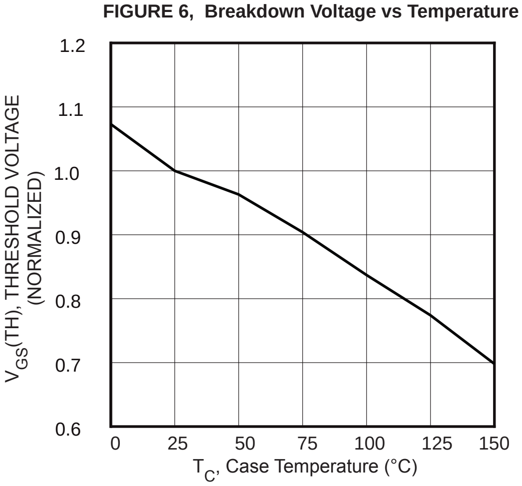


FIGURE 8, Threshold Voltage vs Temperature

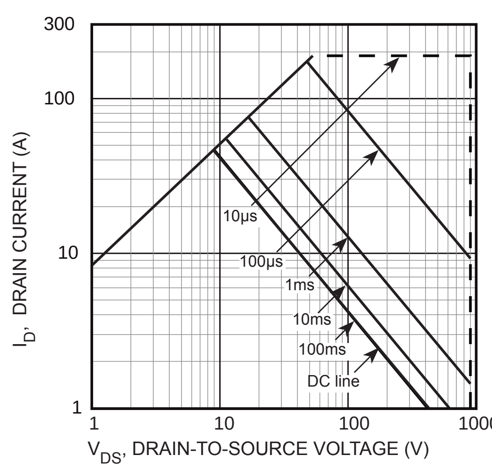


FIGURE 9, Maximum Safe Operating Area

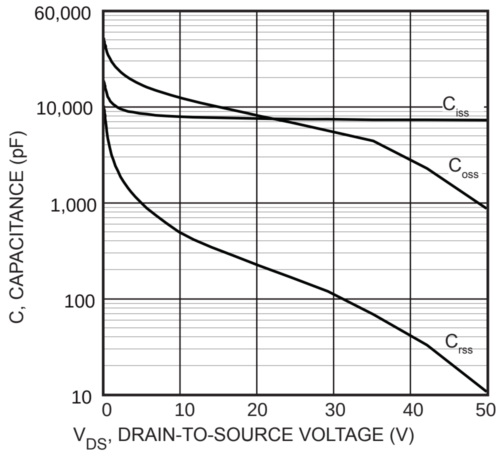


FIGURE 10, Capacitance vs Drain-To-Source Voltage

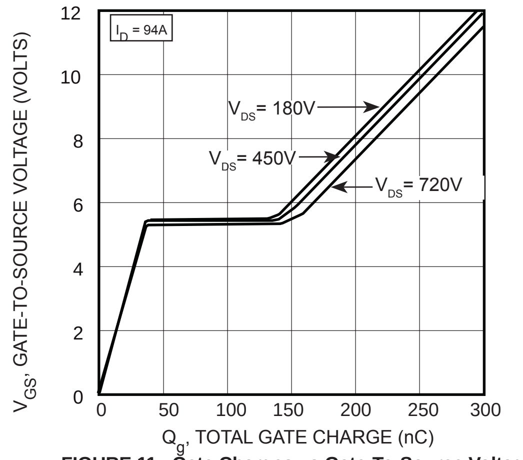


FIGURE 11, Gate Charges vs Gate-To-Source Voltage

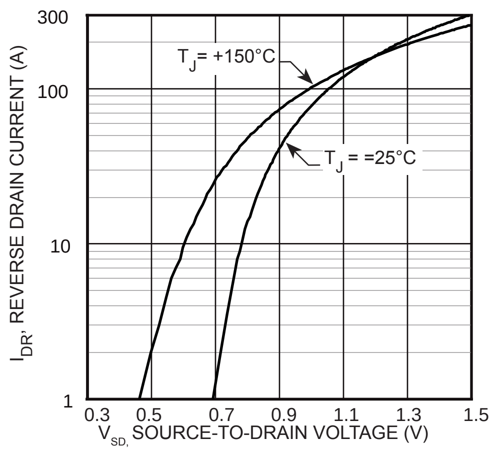


FIGURE 12, Source-Drain Diode Forward Voltage

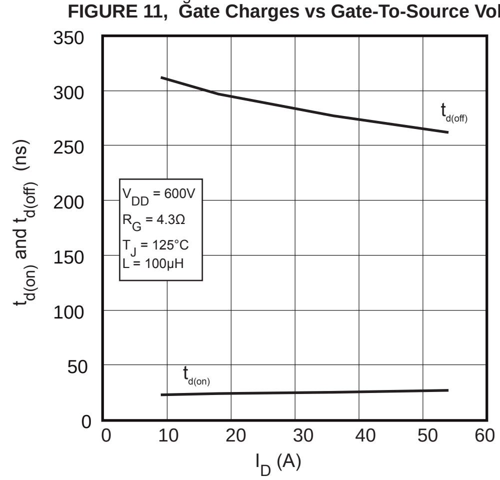


FIGURE 13, Delay Times vs Current

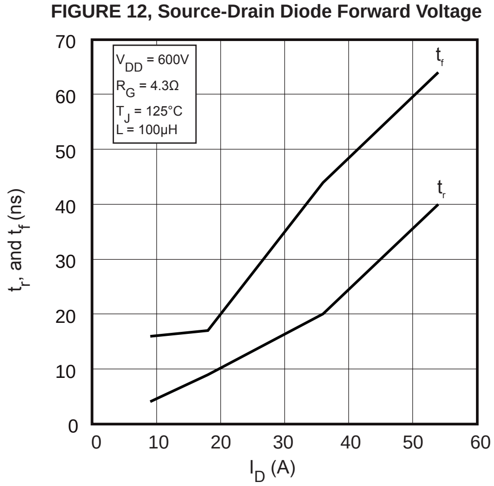


FIGURE 14 , Rise and Fall Times vs Current

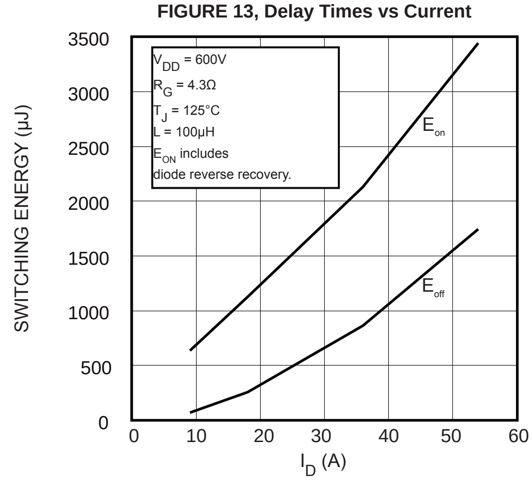


FIGURE 15, Switching Energy vs Current

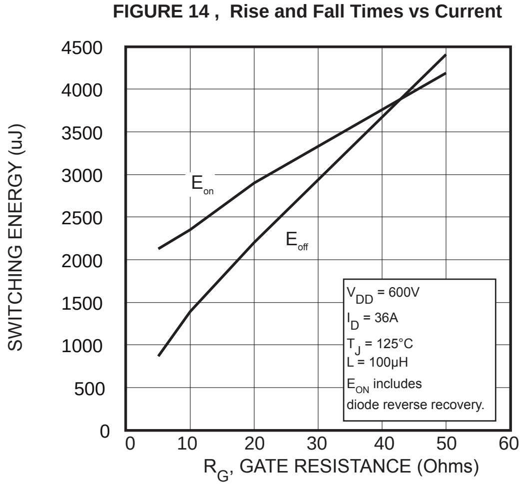


FIGURE 16, Switching Energy vs Gate Resistance

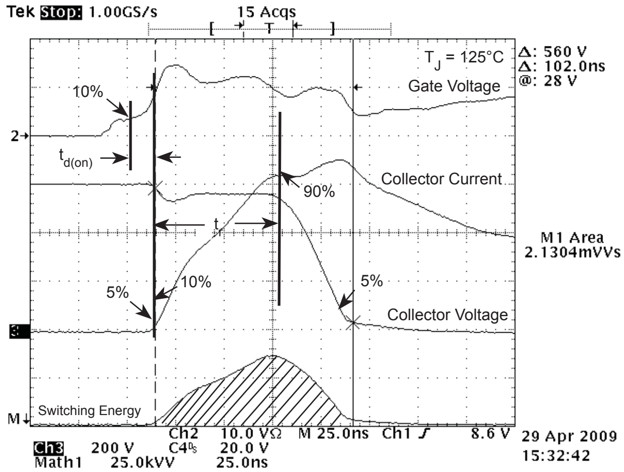


Figure 17, Turn-on Switching Waveforms and Definitions

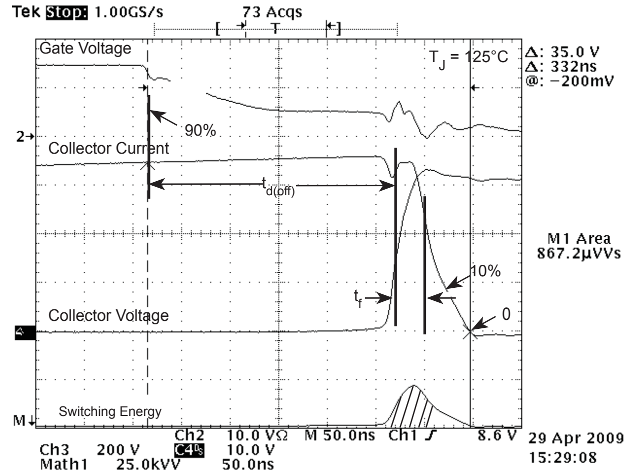


Figure 18, Turn-off Switching Waveforms and Definitions

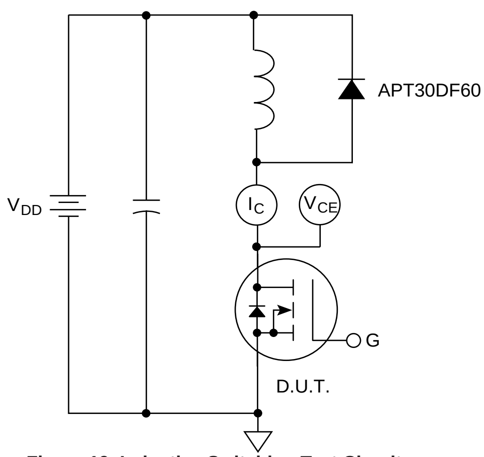
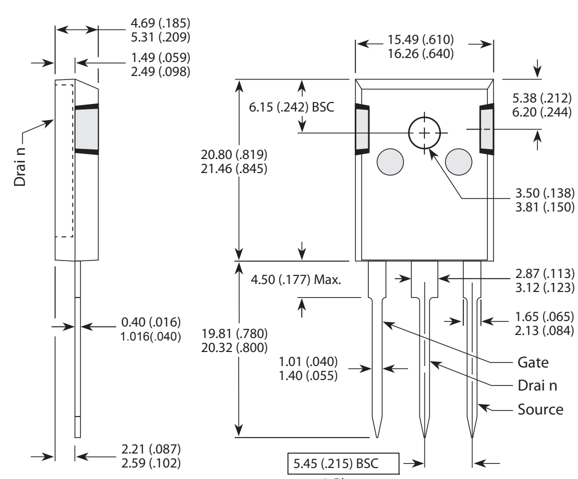


Figure 19, Inductive Switching Test Circuit

TO-247® Package Outline



Dimensions in Millimeters and (Inches)

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