



P-Channel 12-V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ)
-12	0.037 @ $V_{GS} = -4.5$ V	-7.3	19
	0.046 @ $V_{GS} = -2.5$ V	-6.6	
	0.060 @ $V_{GS} = -1.8$ V	-5.8	

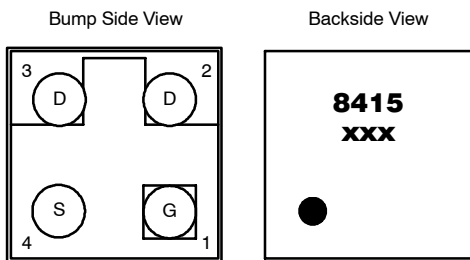
FEATURES

- TrenchFET® Power MOSFET
- New MICRO FOOT® Chipscale Packaging Reduces Footprint Area Profile (0.62 mm) and On-Resistance Per Footprint Area
- Ultra-Low On-Resistance

APPLICATIONS

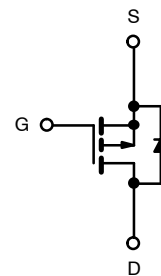
- Load Switch, Charger Switch, and PA Switch for Portable Devices

MICRO FOOT



Device Marking: 8415
xxx = Date/Lot Traceability Code

Ordering Information: Si8415DB-T1—E1



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)					
Parameter	Symbol	5 secs	Steady State	Unit	
Drain-Source Voltage	V_{DS}	-12		V	
Gate-Source Voltage	V_{GS}	± 8			
Continuous Drain Current ($T_J = 150^\circ\text{C}$) ^a	I_D	$T_A = 25^\circ\text{C}$	-7.3	-5.3	A
		$T_A = 70^\circ\text{C}$	-5.9	-4.3	
Pulsed Drain Current	I_{DM}	-25			
Continuous Source Current (Diode Conduction) ^a	I_S	-2.5	-1.3		
Maximum Power Dissipation ^a	P_D	$T_A = 25^\circ\text{C}$	2.77	1.47	W
		$T_A = 70^\circ\text{C}$	1.77	0.94	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150		$^\circ\text{C}$	
Package Reflow Conditions ^b	VPR	215			
	IR/Convection	220			

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient ^a	R_{thJA}	$t \leq 5$ sec	35	45	$^\circ\text{C}/\text{W}$
		Steady State	72	85	
Maximum Junction-to-Foot (drain)	R_{thJF}	16	20		

Notes

a. Surface Mounted on 1" x 1" FR4 Board.

b. Refer to IPC/JEDEC (J-STD-020A), no manual or hand soldering.

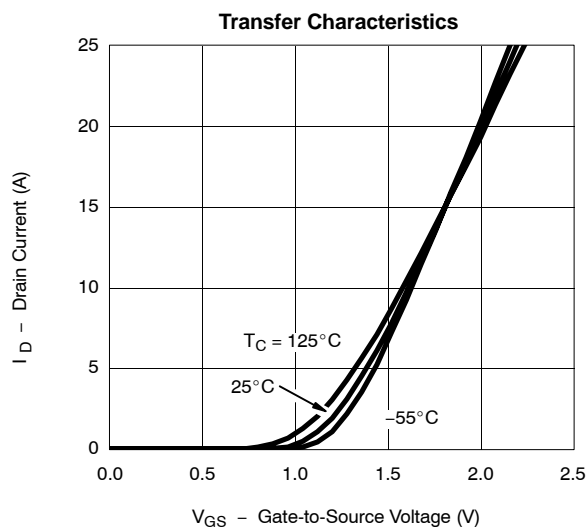
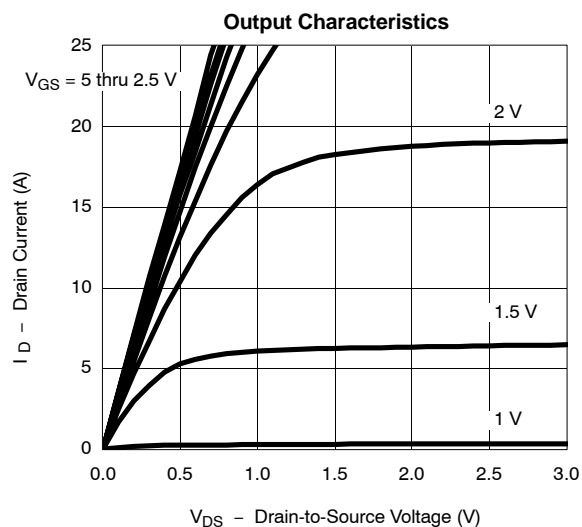
SPECIFICATIONS (T_J = 25 °C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250 μA	-0.4		-1	V
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±8 V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -12 V, V _{GS} = 0 V			-1	μA
		V _{DS} = -12 V, V _{GS} = 0 V, T _J = 70 °C			-5	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≤ -5 V, V _{GS} = -4.5 V	-5			A
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = -4.5 V, I _D = -1 A		0.031	0.037	Ω
		V _{GS} = -2.5 V, I _D = -1 A		0.038	0.046	
		V _{GS} = -1.8 V, I _D = -1 A		0.050	0.060	
Forward Transconductance ^a	g _{fs}	V _{DS} = -10 V, I _D = -1 A		11		S
Diode Forward Voltage ^a	V _{SD}	I _S = -1 A, V _{GS} = 0 V		-0.8	-1.1	V
Dynamic^b						
Total Gate Charge	Q _g	V _{DS} = -6 V, V _{GS} = -4.5 V, I _D = -1 A		19	30	nC
Gate-Source Charge	Q _{gs}		1.9			
Gate-Drain Charge	Q _{gd}		4.8			
Gate Resistance	R _g	f = 1 MHz		19		Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = -6 V, R _L = 6 Ω I _D ≈ -1 A, V _{GEN} = -4.5 V, R _g = 6 Ω		15	25	ns
Rise Time	t _r		32	50		
Turn-Off Delay Time	t _{d(off)}		180	270		
Fall Time	t _f		115	175		
Source-Drain Reverse Recovery Time	t _{rr}	I _F = -1 A, di/dt = 100 A/μs		80	120	

Notes

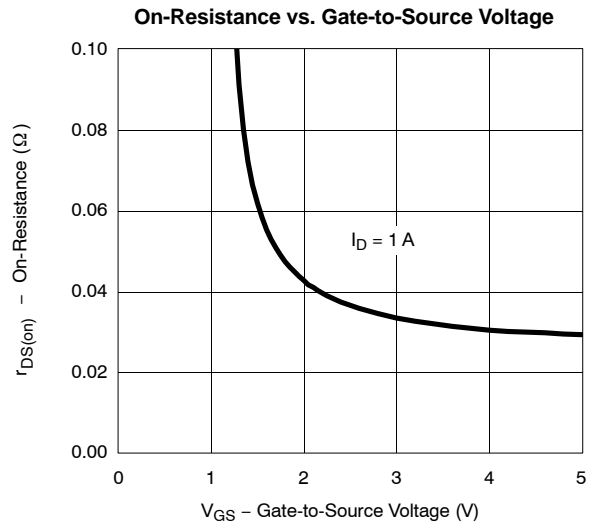
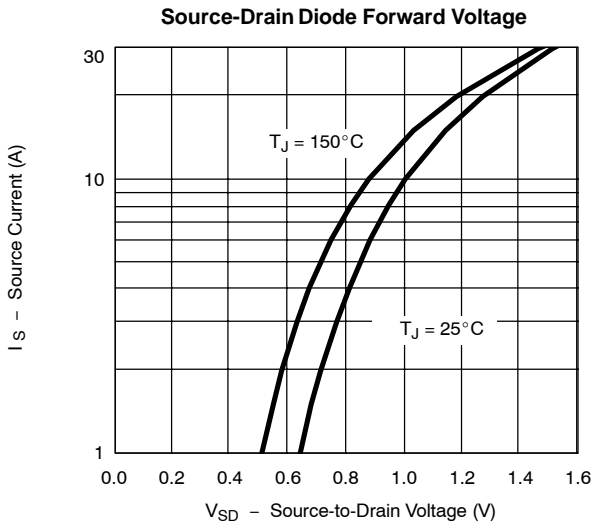
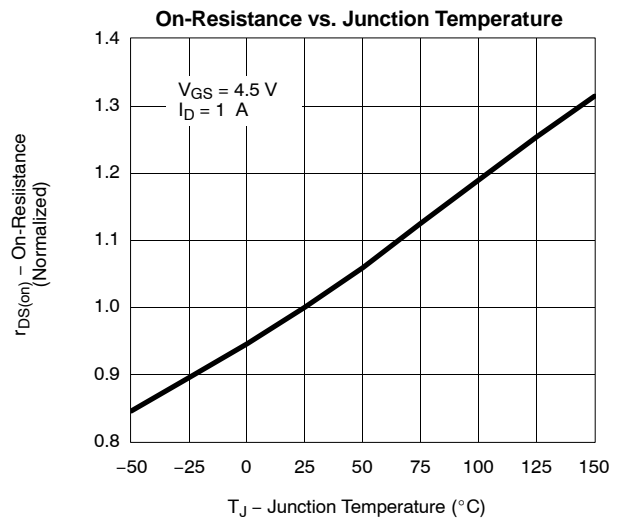
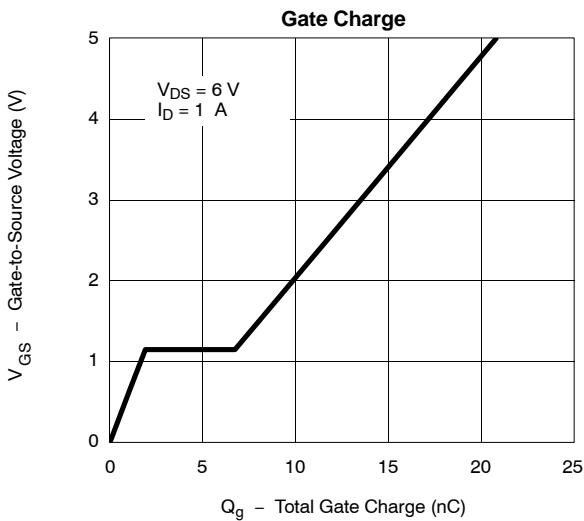
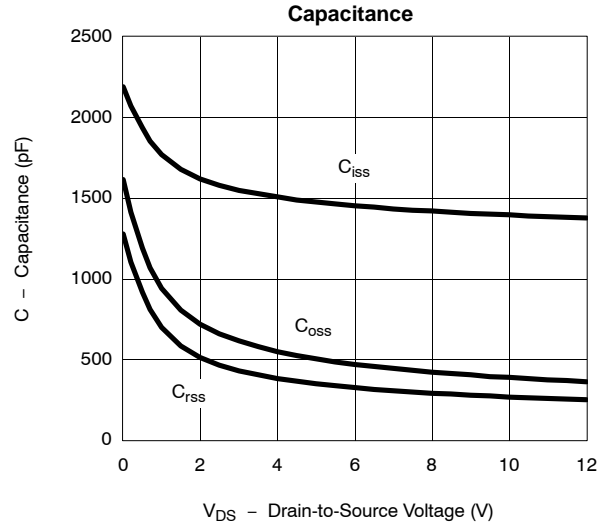
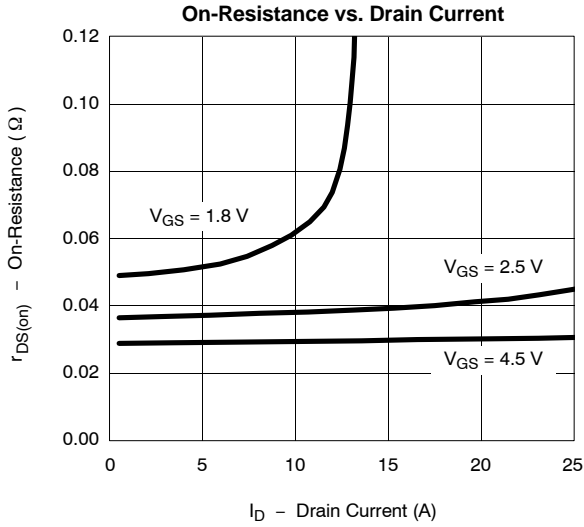
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
 b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

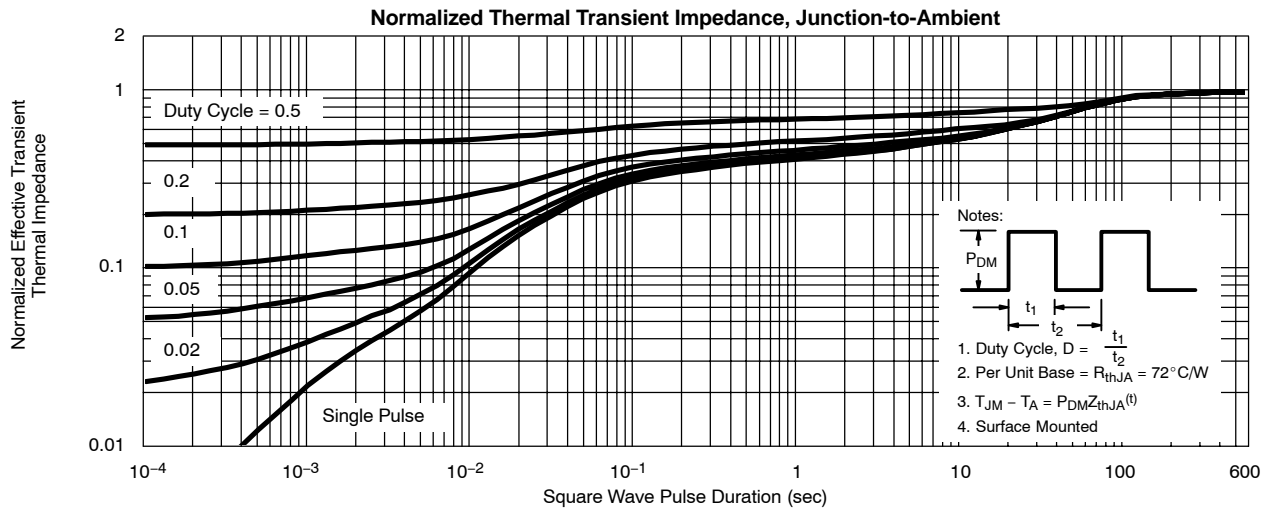
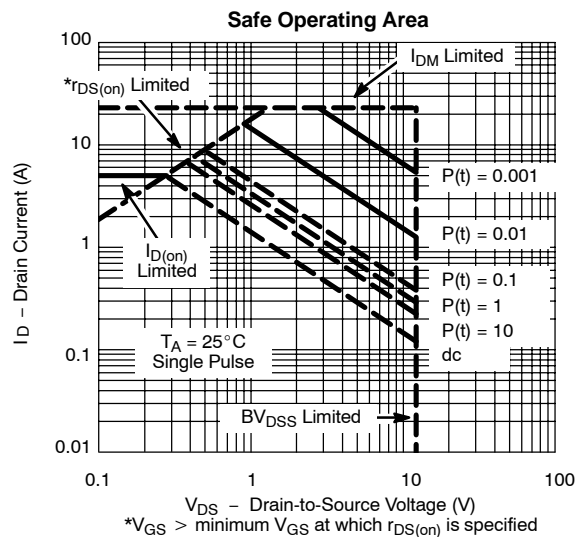
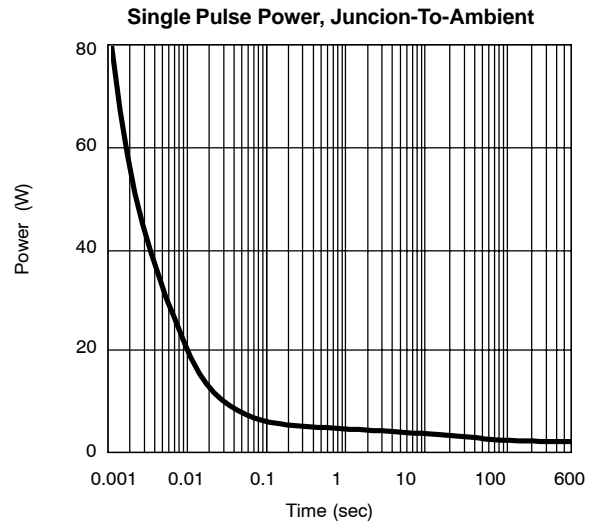
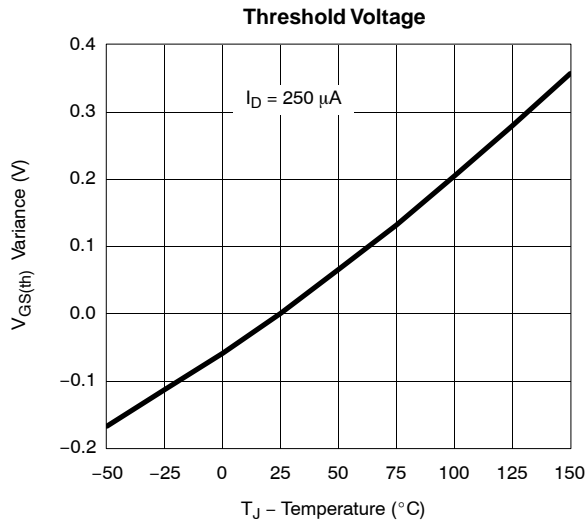
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)




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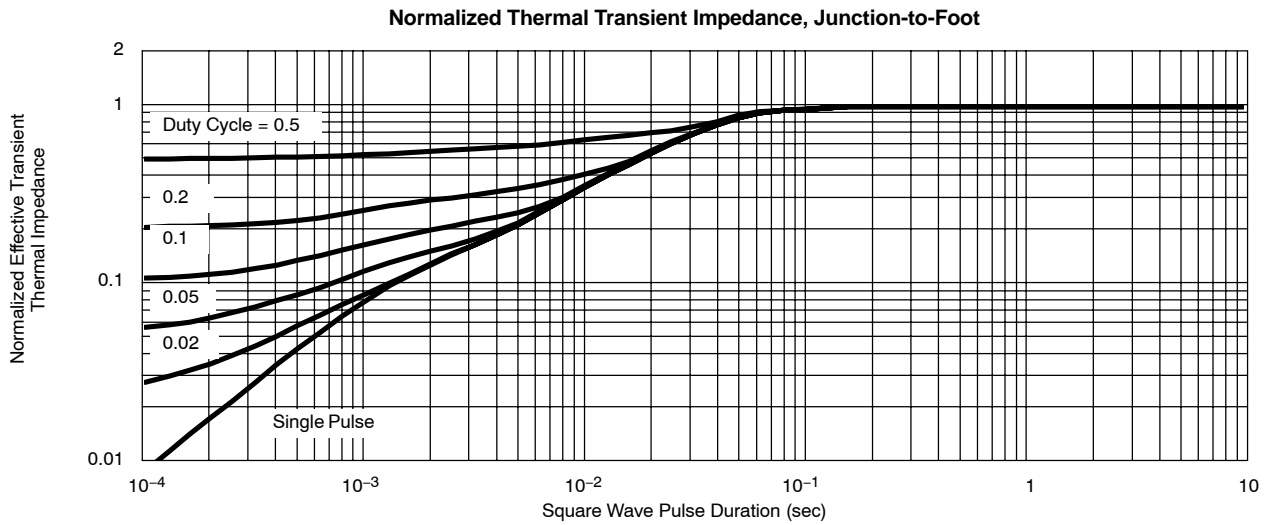


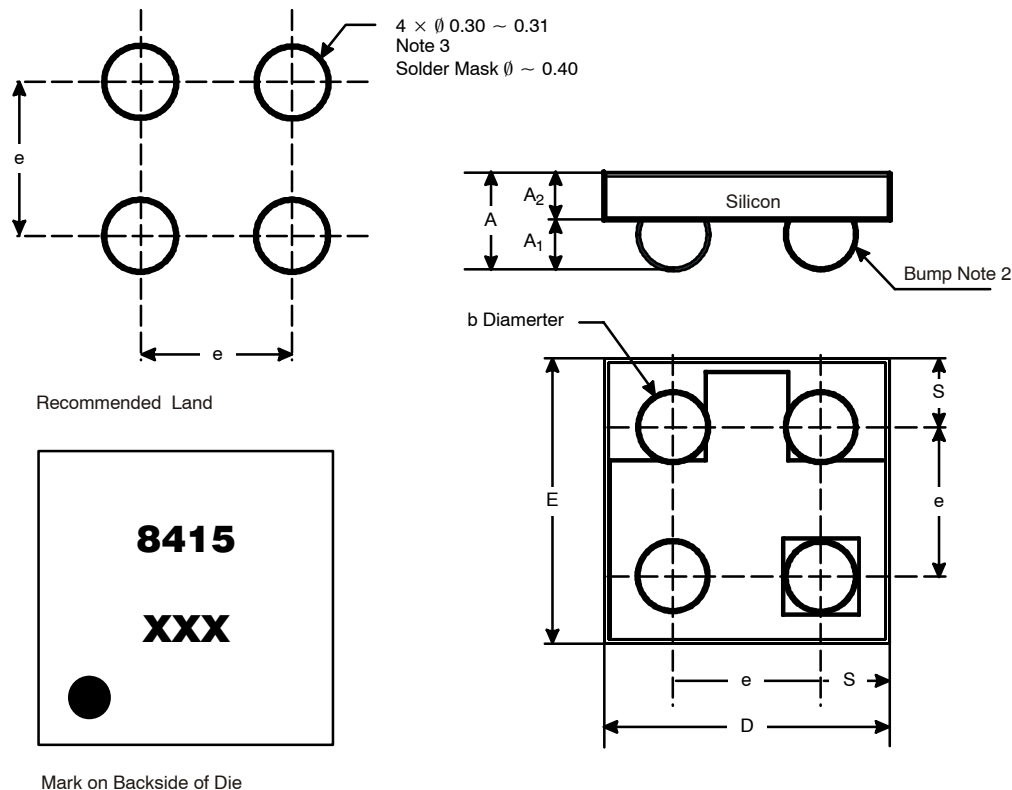
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TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)



PACKAGE OUTLINE
MICRO FOOT: 4-BUMP (2 X 2, 0.8-mm PITCH)


NOTES (Unless Otherwise Specified):

1. Laser mark on the silicon die back, coated with a thin metal.
2. Bumps are Eutectic solder 63/57 Sn/Pb.
3. Non-solder mask defined copper landing pad.
4. The flat side of wafers is oriented at the bottom.

Dim	MILLIMETERS*		INCHES	
	Min	Max	Min	Max
A	0.600	0.650	0.0236	0.0256
A ₁	0.260	0.290	0.0102	0.0114
A ₂	0.340	0.360	0.0134	0.0142
b	0.370	0.410	0.0146	0.0161
D	1.520	1.600	0.0598	0.0630
E	1.520	1.600	0.0598	0.0630
e	0.750	0.850	0.0295	0.0335
S	0.370	0.380	0.0146	0.0150

* Use millimeters as the primary measurement.

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