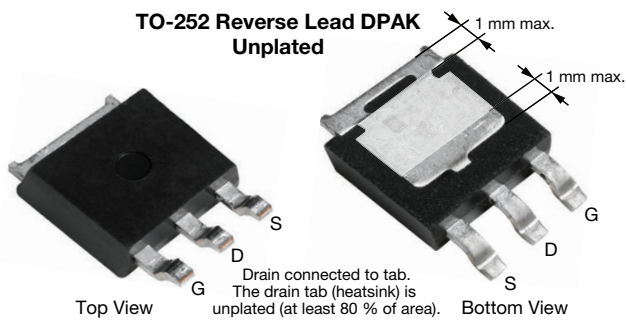


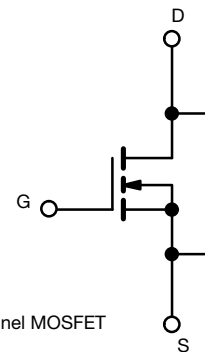
## Automotive N-Channel 100 V (D-S) 175 °C MOSFET



### FEATURES

- TrenchFET® power MOSFET
- Unplated drain tab (heatsink)
- Package with low thermal resistance
- AEC-Q101 qualified
- 100 % R<sub>g</sub> and UIS tested
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

 AUTOMOTIVE  
GRADE

**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**


PRODUCT SUMMARY	
V <sub>DS</sub> (V)	100
R <sub>DS(on)</sub> (Ω) at V <sub>GS</sub> = 10 V	0.0087
R <sub>DS(on)</sub> (Ω) at V <sub>GS</sub> = 4.5 V	0.0106
I <sub>D</sub> (A)	86
Configuration	Single
Package	TO-252 Reverse Lead DPAK

ABSOLUTE MAXIMUM RATINGS (T <sub>C</sub> = 25 °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V <sub>DS</sub>	100	V
Gate-Source Voltage		V <sub>GS</sub>	± 20	
Continuous Drain Current	T <sub>C</sub> = 25 °C	I <sub>D</sub>	86	A
	T <sub>C</sub> = 125 °C		50	
Continuous Source Current (Diode conduction) <sup>a</sup>		I <sub>S</sub>	100	
Pulsed Drain Current <sup>b</sup>		I <sub>DM</sub>	150	
Single Pulse Avalanche Current	L = 0.1 mH	I <sub>AS</sub>	45	
Single Pulse Avalanche Energy		E <sub>AS</sub>	101	
Maximum Power Dissipation <sup>b</sup>	T <sub>C</sub> = 25 °C	P <sub>D</sub>	136	W
	T <sub>C</sub> = 125 °C		45	
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	-55 to +175	°C

THERMAL RESISTANCE RATINGS				
PARAMETER		SYMBOL	LIMIT	UNIT
Junction-to-Ambient	PCB mount <sup>c</sup>	R <sub>thJA</sub>	50	°C/W
Junction-to-Case (Drain)		R <sub>thJC</sub>	1.1	

### Notes

- Package limited.
- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
- When mounted on 1" square PCB (FR4 material).



SPECIFICATIONS ( $T_C = 25\text{ }^\circ\text{C}$ , unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
<b>Static</b>							
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}$ , $I_D = 250\text{ }\mu\text{A}$		100	-	-	V
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 250\text{ }\mu\text{A}$		1.5	2.0	2.5	
Gate-Source Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}$ , $V_{GS} = \pm 20\text{ V}$		-	-	$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS} = 0\text{ V}$	$V_{DS} = 100\text{ V}$	-	-	1	$\mu\text{A}$
		$V_{GS} = 0\text{ V}$	$V_{DS} = 100\text{ V}$ , $T_J = 125\text{ }^\circ\text{C}$	-	-	50	
		$V_{GS} = 0\text{ V}$	$V_{DS} = 100\text{ V}$ , $T_J = 175\text{ }^\circ\text{C}$	-	-	250	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{GS} = 10\text{ V}$	$V_{DS} \geq 5\text{ V}$	50	-	-	A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$	$I_D = 25\text{ A}$	-	0.0072	0.0087	$\Omega$
		$V_{GS} = 4.5\text{ V}$	$I_D = 20\text{ A}$	-	0.0087	0.0106	
		$V_{GS} = 10\text{ V}$	$I_D = 25\text{ A}$ , $T_J = 125\text{ }^\circ\text{C}$	-	-	0.0144	
		$V_{GS} = 10\text{ V}$	$I_D = 25\text{ A}$ , $T_J = 175\text{ }^\circ\text{C}$	-	-	0.0177	
Forward Transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = 15\text{ V}$ , $I_D = 25\text{ A}$		-	80	-	S
<b>Dynamic <sup>b</sup></b>							
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}$	$V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$	-	2550	3500	$\mu\text{F}$
Output Capacitance	$C_{oss}$			-	1350	1900	
Reverse Transfer Capacitance	$C_{rss}$			-	101	140	
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{GS} = 10\text{ V}$	$V_{DS} = 50\text{ V}$ , $I_D = 50\text{ A}$	-	42	65	nC
Gate-Source Charge <sup>c</sup>	$Q_{gs}$			-	7	-	
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$			-	8	-	
Gate Resistance	$R_g$	f = 1 MHz		1.4	2.9	4.4	$\Omega$
Turn-On Delay Time <sup>c</sup>	$t_{d(on)}$	$V_{DD} = 50\text{ V}$ , $R_L = 1\text{ }\Omega$ $I_D \cong 50\text{ A}$ , $V_{GEN} = 10\text{ V}$ , $R_g = 1\text{ }\Omega$		-	12	20	ns
Rise Time <sup>c</sup>	$t_r$			-	5	10	
Turn-Off Delay Time <sup>c</sup>	$t_{d(off)}$			-	35	60	
Fall Time <sup>c</sup>	$t_f$			-	6	15	
<b>Source-Drain Diode Ratings and Characteristics <sup>b</sup></b>							
Pulsed Current <sup>a</sup>	$I_{SM}$			-	-	150	A
Forward Voltage	$V_{SD}$	$I_F = 25\text{ A}$ , $V_{GS} = 0\text{ V}$		-	0.88	1.5	V

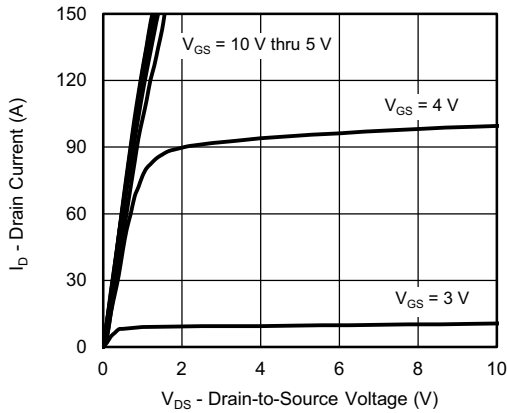
**Notes**

- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .  
b. Guaranteed by design, not subject to production testing.  
c. Independent of operating temperature.

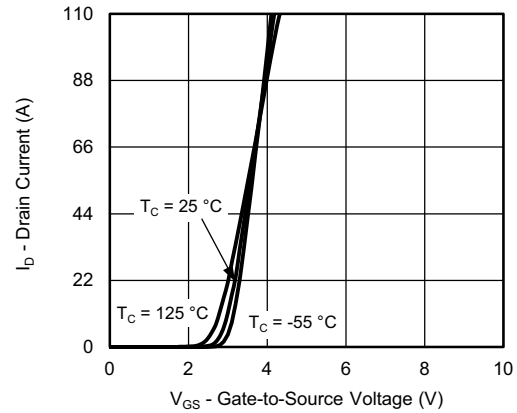
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



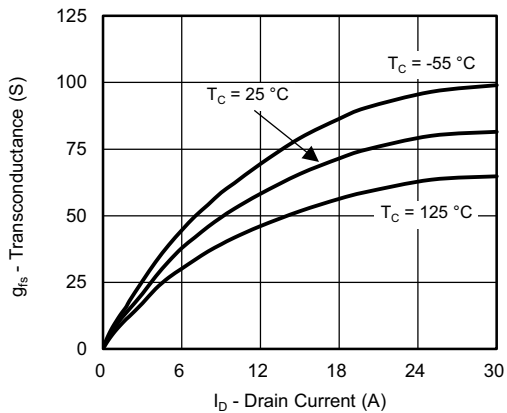
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C, unless otherwise noted)



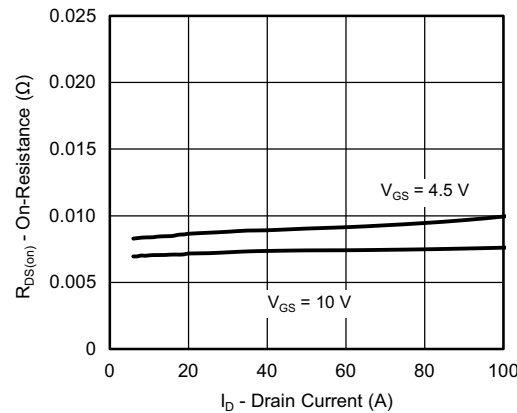
Output Characteristics



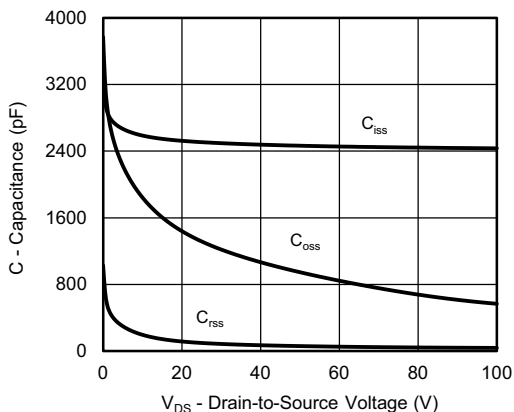
Transfer Characteristics



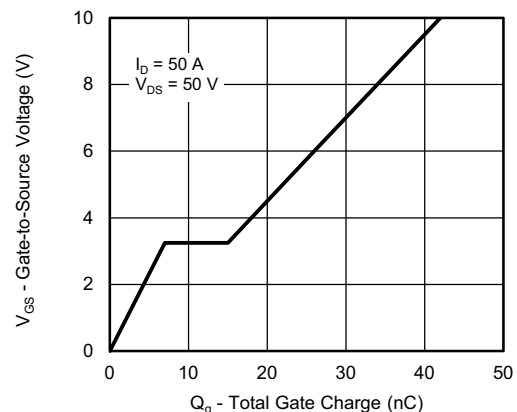
Transconductance



On-Resistance vs. Drain Current



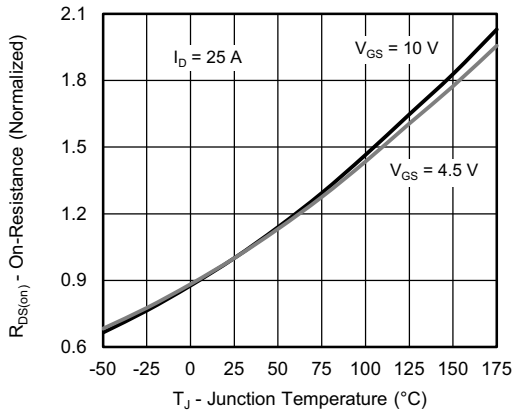
Capacitance



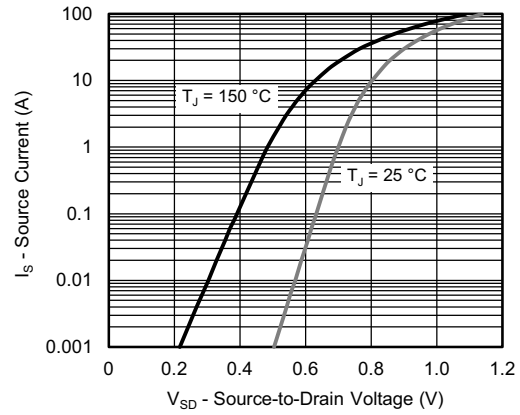
Gate Charge



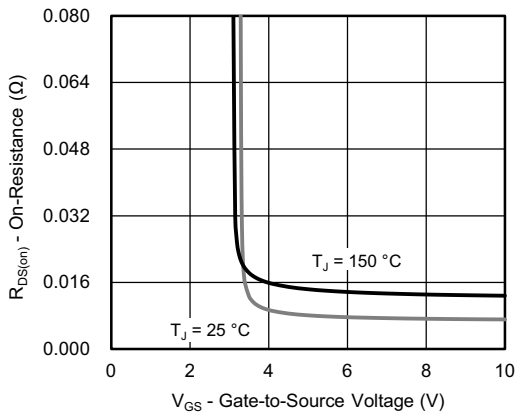
**TYPICAL CHARACTERISTICS** ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted)



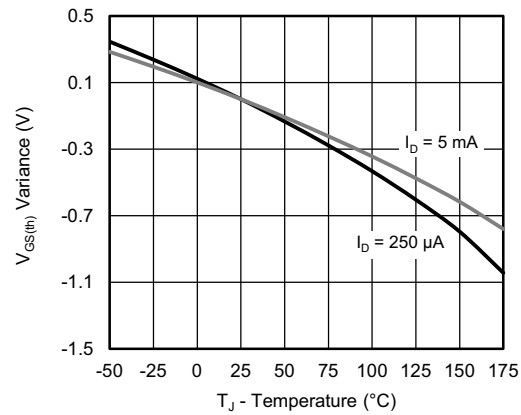
**On-Resistance vs. Junction Temperature**



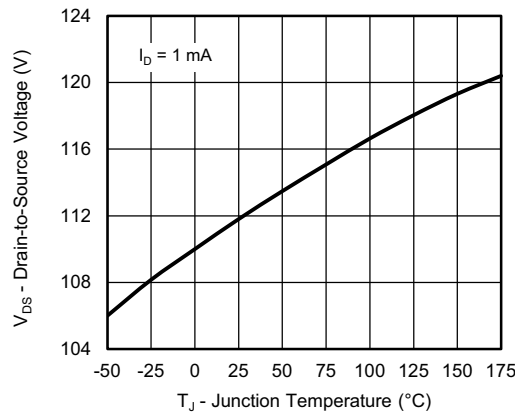
**Source Drain Diode Forward Voltage**



**On-Resistance vs. Gate-to-Source Voltage**



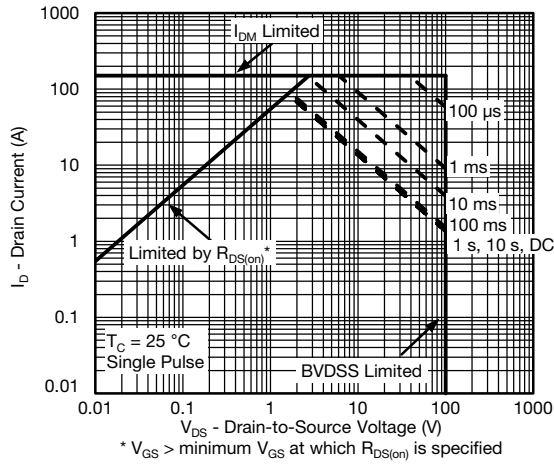
**Threshold Voltage**



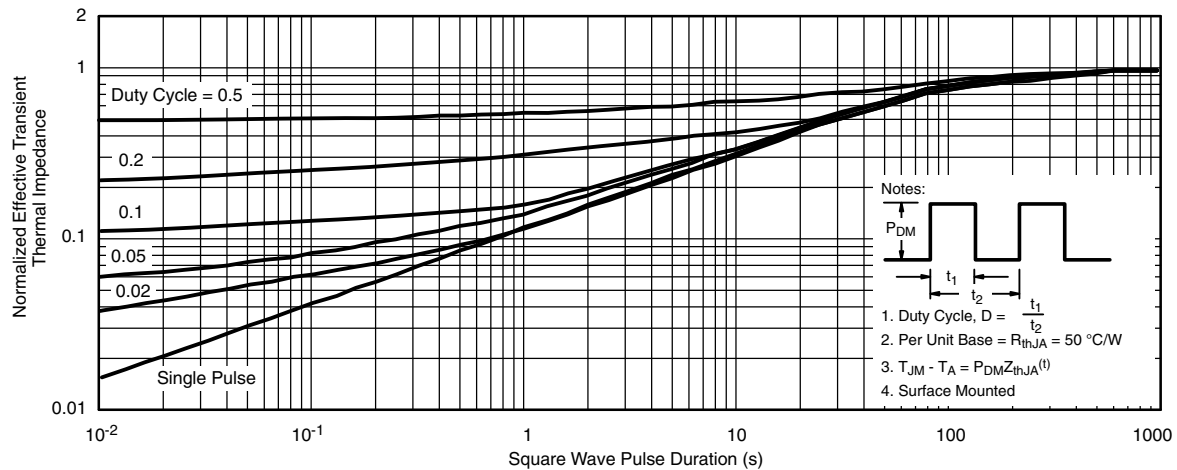
**Drain Source Breakdown vs. Junction Temperature**



**THERMAL RATINGS** ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted)



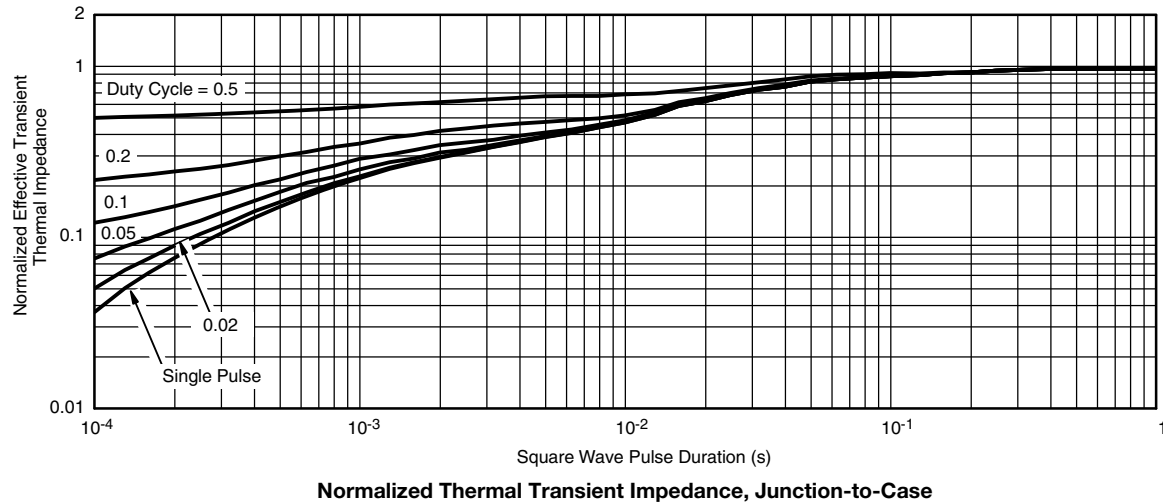
**Safe Operating Area**



**Normalized Thermal Transient Impedance, Junction-to-Ambient**



**THERMAL RATINGS** ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted)

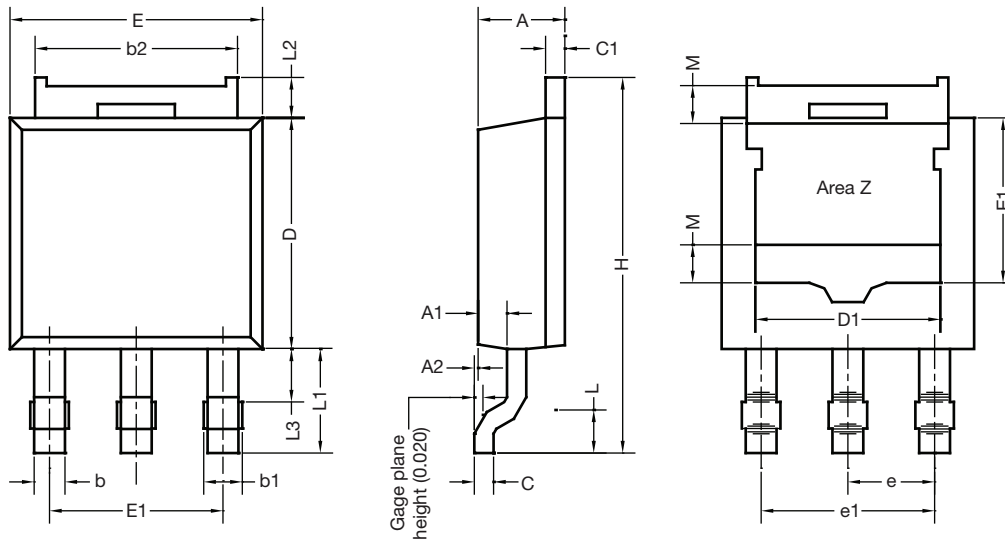


**Note**

- The characteristics shown in the two graphs
  - Normalized Transient Thermal Impedance Junction-to-Ambient (25 °C)
  - Normalized Transient Thermal Impedance Junction-to-Case (25 °C)
 are given for general guidelines only to enable the user to get a “ball park” indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

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## TO-252 Reverse Lead Case Outline



### Notes

- Dimension L3 for reference only
- Area Z: unplated area more than 80 % heatsink area and for partial plating part only

DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.23	2.33	0.088	0.092
A1	0.64	0.89	0.025	0.035
A2	0.03	0.18	0.001	0.007
b	0.71	0.88	0.028	0.035
b1	0.76	1.14	0.030	0.045
b2	5.23	5.44	0.206	0.214
C	0.46	0.58	0.018	0.023
C1	0.46	0.58	0.018	0.023
D	5.97	6.22	0.235	0.245
D1	4.49	5.00	0.177	0.197
E	6.48	6.73	0.255	0.265
E1	4.32	-	0.170	-
e	2.28 BSC		0.090 BSC	
e1	4.57 BSC		0.180 BSC	
H	9.65	10.41	0.380	0.410
L	1.40	1.78	0.055	0.070
L1	2.74 BSC		0.108 BSC	
L2	0.89	1.27	0.035	0.050
L3	1.15	1.52	0.040	0.060
M	-	1.00 (reference only)	-	0.039 (reference only)
ECN: T16-0952-Rev. D, 16-Jan-17				
DWG: 5894				



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