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October 2015

# FDMS2672
# N-Channel UltraFET Trench MOSFET
## 200V, 20A, 77mΩ

## Features

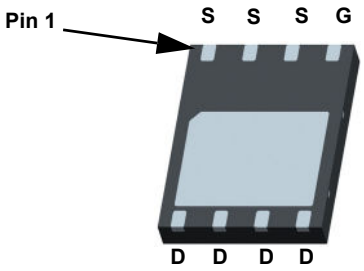
- Max $r_{DS(on)}$ = 77mΩ at $V_{GS}$ = 10V, $I_D$ = 3.7A
- Max $r_{DS(on)}$ = 88mΩ at $V_{GS}$ = 6V, $I_D$ = 3.5A
- Low Miller Charge
- RoHS Compliant

## General Description

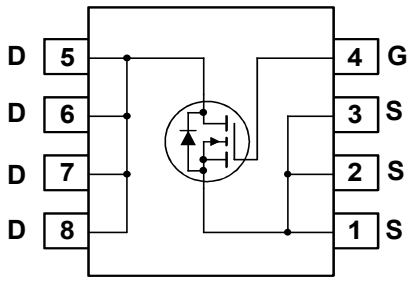
UltraFET devices combine characteristics that enable benchmark efficiency in power conversion applications. Optimized for $r_{DS(on)}$, low ESR, low total and Miller gate charge, these devices are ideal for high frequency DC to DC converters.

## Application

- DC - DC Conversion




Power 56 (Bottom view)




## MOSFET Maximum Ratings $T_A$ = 25°C unless otherwise noted

| Symbol | Parameter | | | Ratings | Units |
|---|---|---|---|---|---|
| $V_{DS}$ | Drain to Source Voltage | | | 200 | V |
| $V_{GS}$ | Gate to Source Voltage | | | ±20 | V |
| $I_D$ | Drain Current -Continuous | $T_C$ = 25°C | (Note 5) | 20 | A |
| | -Continuous | $T_C$ = 100°C | (Note 5) | 13 | |
| | -Continuous | $T_A$ = 25°C | (Note 1a) | 3.7 | |
| | -Pulsed | | (Note 4) | 96 | |
| $E_{AS}$ | Single Pulse Avalanche Energy | | (Note 3) | 33.8 | mJ |
| $P_D$ | Power Dissipation | $T_C$ = 25°C | | 78 | W |
| | Power Dissipation | $T_A$ = 25°C | (Note 1a) | 2.5 | |
| $T_J$, $T_{STG}$ | Operating and Storage Junction Temperature Range | | | -55 to +150 | °C |

### Thermal Characteristics

| | | | |
|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | 1.6 | °C/W |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient (Note 1a) | 50 | |

### Package Marking and Ordering Information

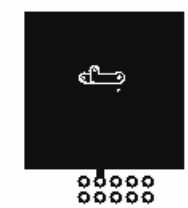
| Device Marking | Device | Package | Reel Size | Tape Width | Quantity |
|---|---|---|---|---|---|
| FDMS2672 | FDMS2672 | Power 56 | 7” | 12mm | 3000 units |

## Electrical Characteristics $T_J$ = 25°C unless otherwise noted

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| $BV_{DSS}$ | Drain to Source Breakdown Voltage | $I_D$ = 250μA, $V_{GS}$ = 0V | 200 | | | V |
| $\frac{\Delta BV_{DSS}}{\Delta T_J}$ | Breakdown Voltage Temperature Coefficient | $I_D$ = 250μA, referenced to 25°C | | 210 | | mV/°C |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$ = 160V | | | 1 | μA |
| $I_{GSS}$ | Gate to Source Leakage Current | $V_{GS}$ = ±20V, $V_{DS}$ = 0V | | | ±100 | nA |
| **On Characteristics** | | | | | | |
| $V_{GS(th)}$ | Gate to Source Threshold Voltage | $V_{GS}$ = $V_{DS}$, $I_D$ = 250μA | 2 | 3.1 | 4 | V |
| $\frac{\Delta V_{GS(th)}}{\Delta T_J}$ | Gate to Source Threshold Voltage Temperature Coefficient | $I_D$ = 250μA, referenced to 25°C | | -10 | | mV/°C |
| $r_{DS(on)}$ | Drain to Source On Resistance | $V_{GS}$ = 10V, $I_D$ = 3.7A | | 64 | 77 | mΩ |
| | | $V_{GS}$ = 6V, $I_D$ = 3.5A | | 69 | 88 | |
| | | $V_{GS}$ = 10V, $I_D$ = 3.7A $T_J$ = 125°C | | 129 | 156 | |
| $g_{FS}$ | Forward Transconductance | $V_{DS}$ = 10V, $I_D$ = 3.7A | | 14 | | S |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$ = 100V, $V_{GS}$ = 0V, f = 1MHz | | 1740 | 2315 | pF |
| $C_{oss}$ | Output Capacitance | | | 95 | 125 | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | | 30 | 45 | pF |
| $R_g$ | Gate Resistance | | 0.1 | 1 | 5 | Ω |
| **Switching Characteristics** | | | | | | |
| $t_{d(on)}$ | Turn-On Delay Time | $V_{DD}$ = 100V, $I_D$ = 3.7A $V_{GS}$ = 10V, $R_{GEN}$ = 6Ω | | 22 | 34 | ns |
| $t_r$ | Rise Time | | | 11 | 22 | ns |
| $t_{d(off)}$ | Turn-Off Delay Time | | | 36 | 57 | ns |
| $t_f$ | Fall Time | | | 10 | 20 | ns |
| $Q_{g(TOT)}$ | Total Gate Charge at 10V | $V_{GS}$ = 0V to 10V, $V_{DD}$ = 100V, $I_D$ = 3.7A | | 30 | 42 | nC |
| $Q_{gs}$ | Gate to Source Gate Charge | | | 7 | | nC |
| $Q_{gd}$ | Gate to Drain “Miller” Charge | | | 8 | | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| $V_{SD}$ | Source to Drain Diode Forward Voltage | $V_{GS}$ = 0V, $I_S$ = 3.7A (Note 2) | | 0.8 | 1.2 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_F$ = 3.7A, di/dt = 100A/μs | | 70 | 105 | ns |
| $Q_{rr}$ | Reverse Recovery Charge | | | 238 | 357 | nC |

**Notes:**

**1:** $R_{\theta JA}$ is determined with the device mounted on a 1in$^2$ pad 2 oz copper pad on a 1.5 x 1.5 in. board of FR-4 material. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.



a. 50°C/W when mounted on a 1 in$^2$ pad of 2 oz copper

b. 125°C/W when mounted on a minimum pad of 2 oz copper

**2:** Pulse Test: Pulse Width < 300μs, Duty cycle < 2.0%.

**3:** $E_{AS}$ of 33.8mJ is based on starting $T_J$ = 25 C, L = 3mH, $I_{AS}$ = 4.75A, $V_{DD}$ = 25V, $V_{GS}$ = 10V.

**4:** Pulsed Id please refer to Fig 11 SOA graph for more details.

**5:** Computed continuous current limited to Max Junction Temperature only, actual continuous current will be limited by thermal & electro-mechanical application board design.

## Typical Characteristics $T_J$ = 25°C unless otherwise noted

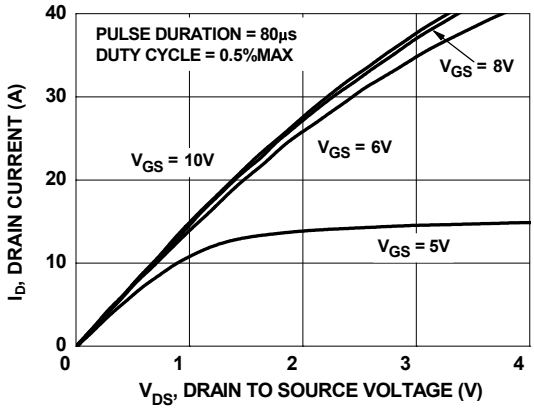



**Figure 1. On Region Characteristics**

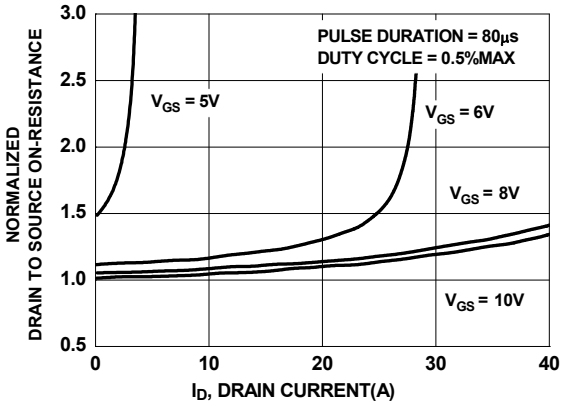



**Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage**

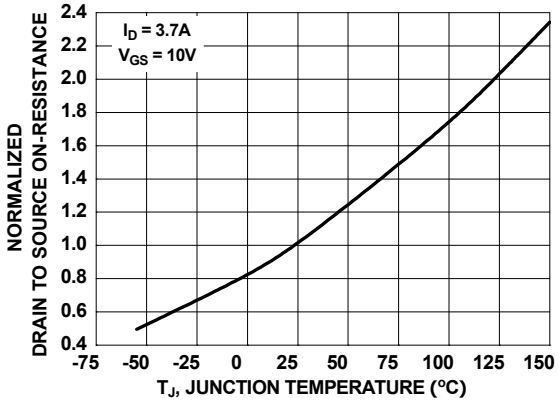



**Figure 3. Normalized On Resistance vs Junction Temperature**

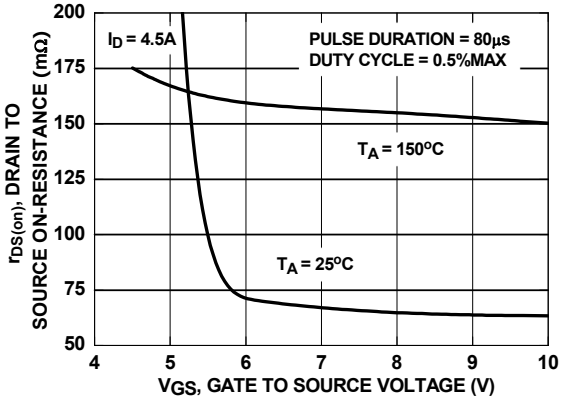



**Figure 4. On-Resistance vs Gate to Source Voltage**

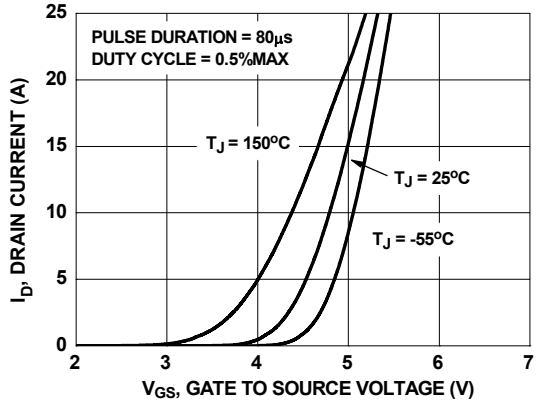



**Figure 5. Transfer Characteristics**

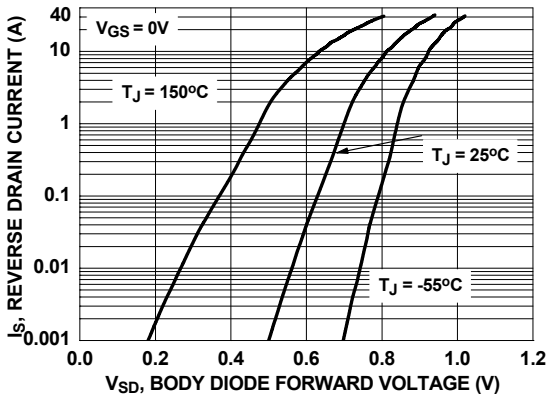



**Figure 6. Source to Drain Diode Forward Voltage vs Source Current**

## Typical Characteristics $T_J$ = 25°C unless otherwise noted

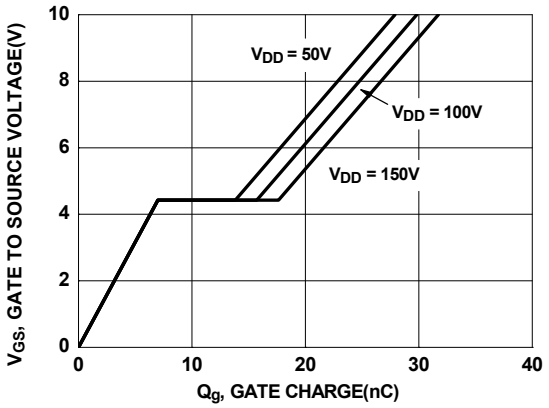



**Figure 7. Gate Charge Characteristics**

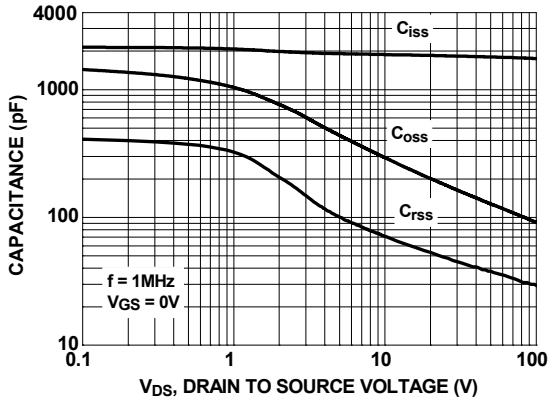



**Figure 8. Capacitance vs Drain to Source Voltage**

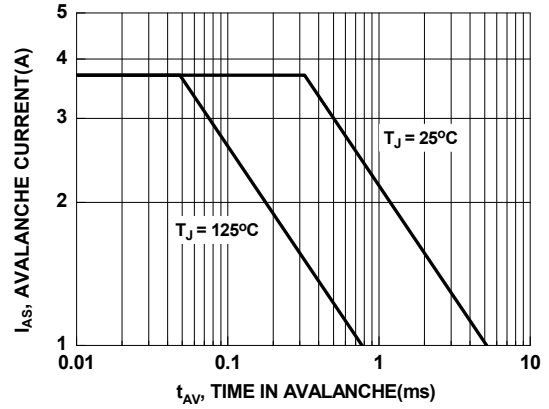



**Figure 9. Unclamped Inductive Switching Capability**

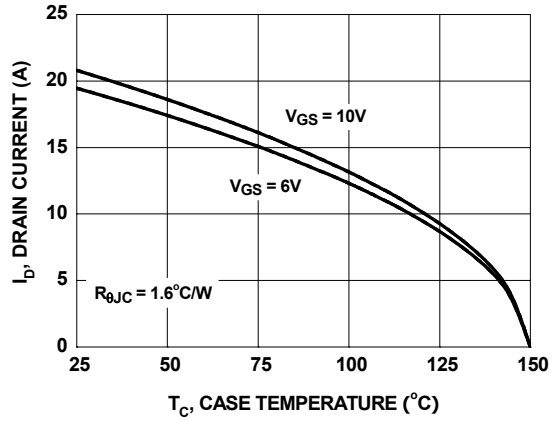



**Figure 10. Maximum Continuous Drain Current vs Case Temperature**

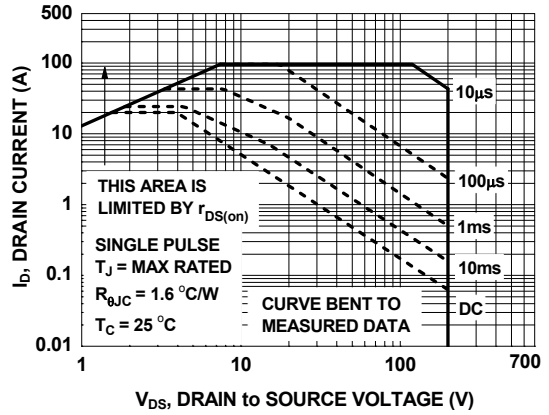



**Figure 11. Forward Bias Safe Operating Area**

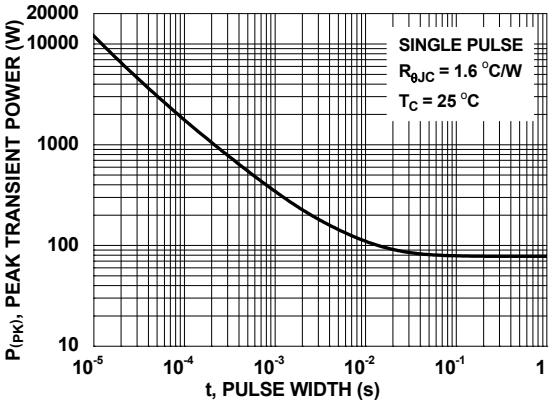



**Figure 12. Single Pulse Maximum Power Dissipation**

## Typical Characteristics $T_J$ = 25°C unless otherwise noted

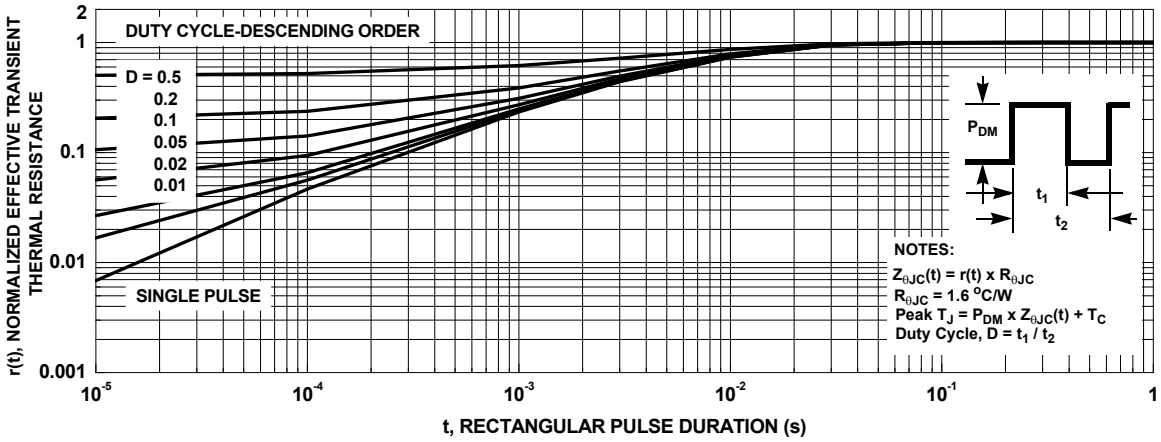
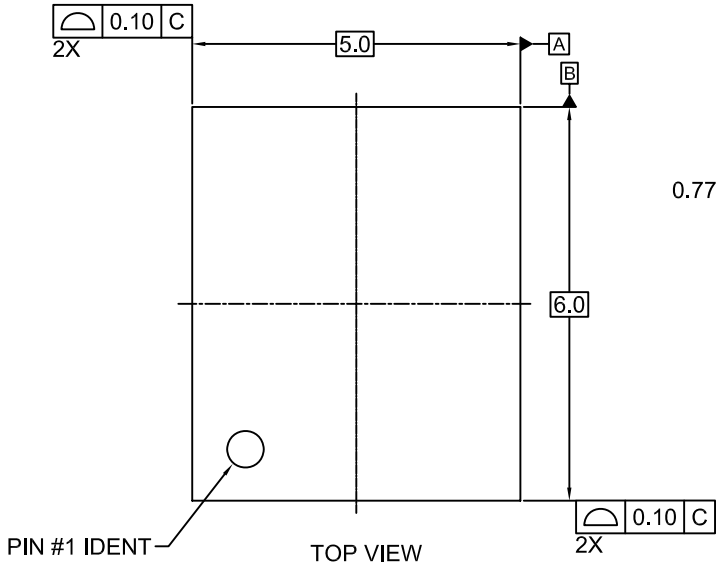
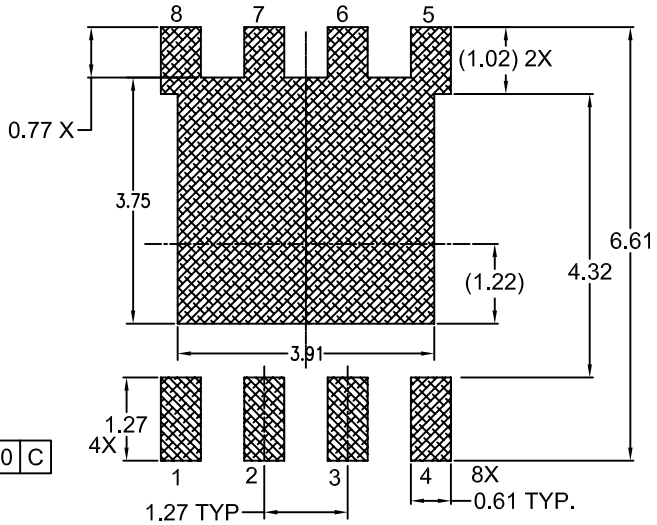


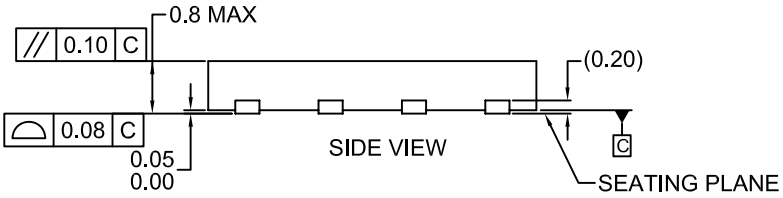

**Figure 13. Junction-to-Case Transient Thermal Response Curve**

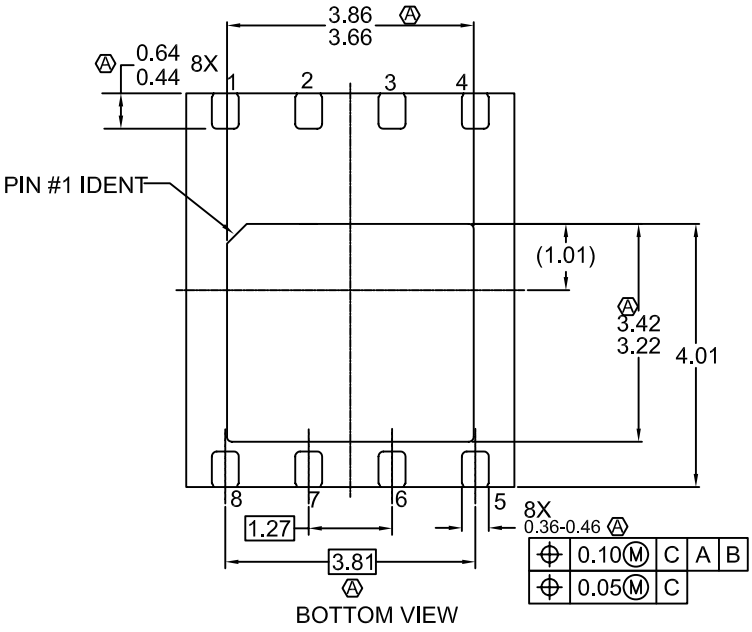
| REVISIONS | | | |
|---|---|---|---|
| NBR | DESCRIPTION | DATE | NAME/SITE |
| 1 | RELEASE TO DOCUMENT CONTROL | 090305 | David/FSPM |
| 2 | REVISE TO CORRECT DAP SIZE | 080605 | David/FSPM |
| 3 | I) REVISE TO CORRECT PKG THK<br>II) REVISE THE PKG PROFILE TOLERANCE | 210306 | CK/FSPM |
| 4 | ADD IN LEAD LENGTH FOR LAND PATTERN | 220908 | LY/FSPM |




RECOMMENDED LAND PATTERN

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| ENGR. CHK. DAVID | 01 Nov 08 |

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