

## Features

- Low power loss by high speed switching and low on-resistance
- Excellent thermal behavior
- HBM: JESD22-A114-B: 1A
- Product validation acc. JEDEC Standard

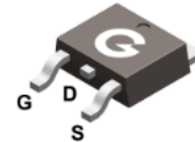
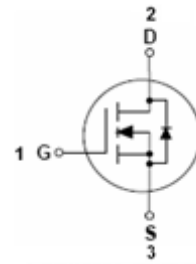
HF

## Applications

- PFC power supply stages
- Lighting applications
- Adapter

## Mechanical Data

- Case: TO-252
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208



TO-252

## Ordering Information

| Part Number | Package | Shipping Quantity                      | Marking Code |
|-------------|---------|----------------------------------------|--------------|
| SJ65R380D   | TO-252  | 80 pcs / Tube & 2500 pcs / Tape & Reel | SJ65R380D    |

## Maximum Ratings (@ $T_c = 25^\circ\text{C}$ unless otherwise specified)

| Parameter                                                                 | Symbol    | Value           | Unit             |
|---------------------------------------------------------------------------|-----------|-----------------|------------------|
| Drain-to-Source Voltage                                                   | $V_{DS}$  | 650             | V                |
| Gate-to-Source Voltage                                                    | $V_{GS}$  | $\pm 30$        | V                |
| Continuous Drain Current ( $T_c = 25^\circ\text{C}$ )                     | $I_D$     | 11              | A                |
| Continuous Drain Current ( $T_c = 100^\circ\text{C}$ )                    |           | 7               | A                |
| Pulsed Drain Current ( $t_p = 10\mu\text{s}$ , $T_c = 25^\circ\text{C}$ ) | $I_{DM}$  | 44              | A                |
| Single Pulse Avalanche Energy <sup>*3</sup>                               | $E_{AS}$  | 100             | mJ               |
| Power Dissipation ( $T_c = 25^\circ\text{C}$ )                            | $P_D$     | 90              | W                |
| Operating Junction Temperature Range                                      | $T_J$     | $-55 \sim +150$ | $^\circ\text{C}$ |
| Storage Temperature Range                                                 | $T_{STG}$ | $-55 \sim +150$ | $^\circ\text{C}$ |

## Thermal Characteristics

| Parameter                                        | Symbol          | Min. | Typ. | Max. | Unit               |
|--------------------------------------------------|-----------------|------|------|------|--------------------|
| Thermal Resistance Junction-to-Case              | $R_{\theta JC}$ | -    | -    | 1.4  | $^\circ\text{C/W}$ |
| Thermal Resistance Junction-to-Air <sup>*1</sup> | $R_{\theta JA}$ | -    | -    | 62   | $^\circ\text{C/W}$ |

### Electrical Characteristics (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

| Symbol                             | Parameter                       | Test Condition                                                          | Min. | Typ. | Max. | Unit |
|------------------------------------|---------------------------------|-------------------------------------------------------------------------|------|------|------|------|
| Static Characteristics             |                                 |                                                                         |      |      |      |      |
| V <sub>DSS</sub>                   | Drain-Source Breakdown Voltage  | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA                            | 650  | -    | -    | V    |
| I <sub>DSS</sub>                   | Zero Gate Voltage Drain Current | V <sub>DS</sub> = 650V, V <sub>GS</sub> = 0V                            | -    | -    | 1    | μA   |
| I <sub>GSS</sub>                   | Gate-Body Leakage Current       | V <sub>GS</sub> = ±30V, V <sub>DS</sub> = 0V                            | -    | -    | ±100 | nA   |
| On Characteristics                 |                                 |                                                                         |      |      |      |      |
| R <sub>DS(ON)</sub>                | Drain-Source On-resistance *2   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 5A                              | -    | 0.35 | 0.38 | Ω    |
| V <sub>GS(th)</sub>                | Gate Threshold Voltage          | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA              | 2    | 3    | 4    | V    |
| R <sub>G</sub>                     | Gate Resistance                 | V <sub>GS</sub> = 0V, f = 1MHz                                          | -    | 4    | -    | Ω    |
| Dynamic Characteristics            |                                 |                                                                         |      |      |      |      |
| C <sub>ISS</sub>                   | Input Capacitance               | V <sub>GS</sub> = 0V<br>V <sub>DS</sub> = 40V<br>f = 250kHz             | -    | 633  | -    | pF   |
| C <sub>OSS</sub>                   | Output Capacitance              |                                                                         | -    | 49   | -    |      |
| C <sub>RSS</sub>                   | Reverse Transfer Capacitance    |                                                                         | -    | 2    | -    |      |
| Switching Characteristics          |                                 |                                                                         |      |      |      |      |
| t <sub>d(ON)</sub>                 | Turn-on Delay Time *4           | V <sub>DD</sub> = 480V<br>V <sub>GS</sub> = 10V<br>I <sub>D</sub> = 5A  | -    | 57   | -    | ns   |
| t <sub>r</sub>                     | Turn-on Rise Time *4            |                                                                         | -    | 30   | -    |      |
| t <sub>d(OFF)</sub>                | Turn-Off Delay Time *4          |                                                                         | -    | 73   | -    |      |
| t <sub>f</sub>                     | Turn-Off Fall Time *4           |                                                                         | -    | 15   | -    |      |
| Q <sub>G</sub>                     | Total Gate-Charge               | V <sub>DD</sub> = 480V<br>V <sub>GS</sub> = 10V<br>I <sub>D</sub> = 10A | -    | 24   | -    | nC   |
| Q <sub>GS</sub>                    | Gate to Source Charge           |                                                                         | -    | 3.3  | -    |      |
| Q <sub>GD</sub>                    | Gate to Drain (Miller) Charge   |                                                                         | -    | 14   | -    |      |
| Source-Drain Diode Characteristics |                                 |                                                                         |      |      |      |      |
| V <sub>SD</sub>                    | Diode Forward Voltage *2        | I <sub>SD</sub> = 5A, V <sub>GS</sub> = 0V                              | -    | 0.8  | 1.2  | V    |
| t <sub>rr</sub>                    | Reverse Recovery Time           | I <sub>F</sub> = 10A, V <sub>R</sub> = 400V<br>di/dt = 100A/μs          | -    | 250  | -    | ns   |
| Q <sub>rr</sub>                    | Reverse Recovery Charge         |                                                                         | -    | 2.45 | -    | μC   |

Notes:

- The data tested by surface mounted on a minimum recommended FR-4 board
- The data tested by pulsed, pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$
- The  $E_{AS}$  data shows Max. rating. The test condition is  $V_{DD} = 100\text{V}, V_{GS} = 15\text{V}, L = 50\text{mH}$
- Guaranteed by design, not subject to production

Ratings and Characteristics Curves (@  $T_A = 25^\circ\text{C}$  unless otherwise specified)

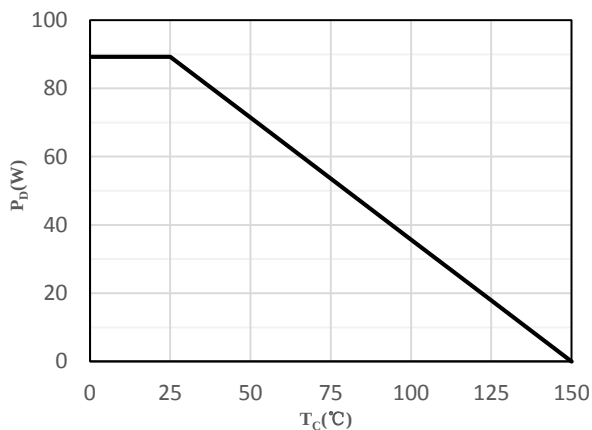


Fig 1 Power Dissipation

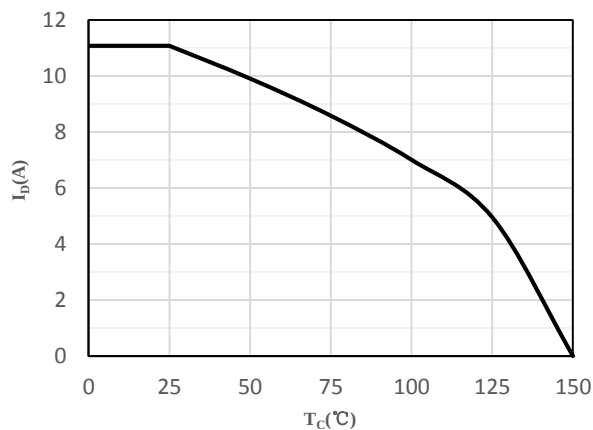


Fig 2 Drain Current

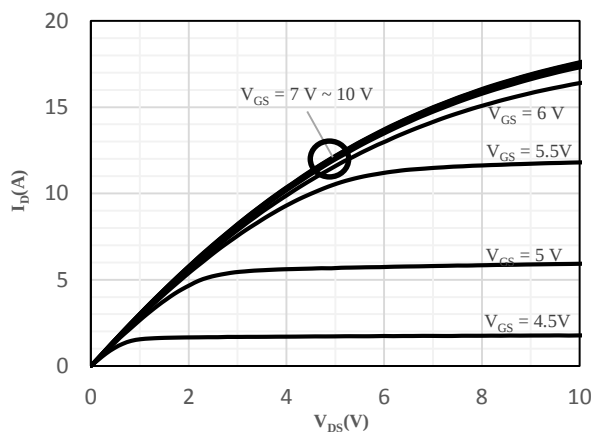


Fig 3 Typical Output Characteristics

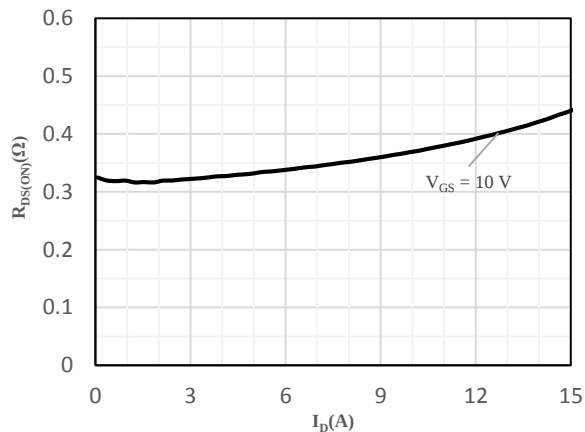


Fig 4 On-Resistance vs. Drain Current  
and Gate Voltage

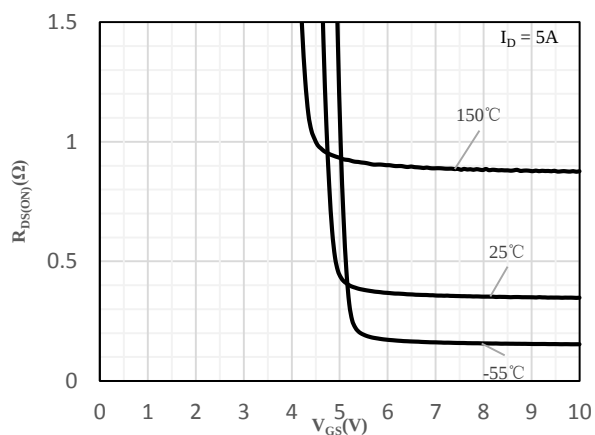


Fig 5 On-Resistance vs. Gate-Source Voltage

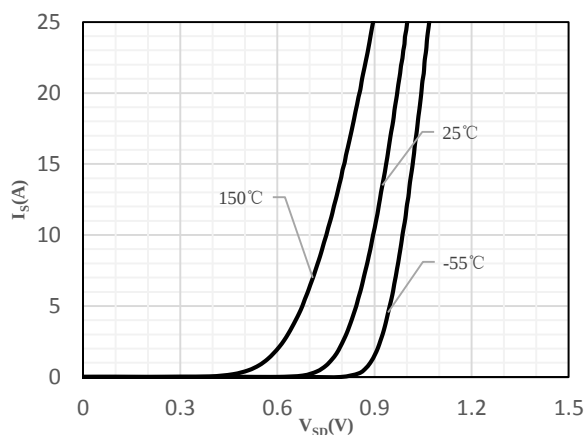


Fig 6 Body-Diode Characteristics

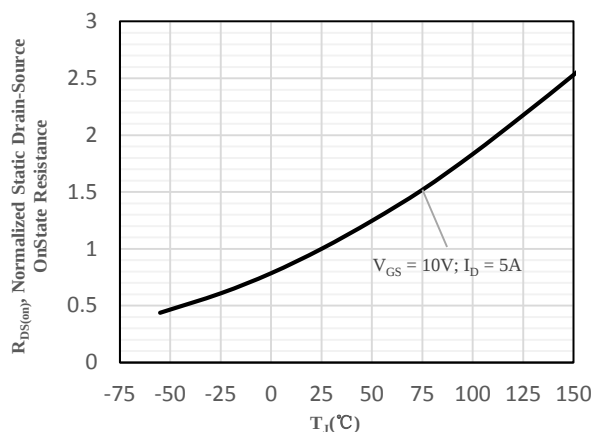


Fig 7 Normalized On-Resistance vs. Junction Temperature

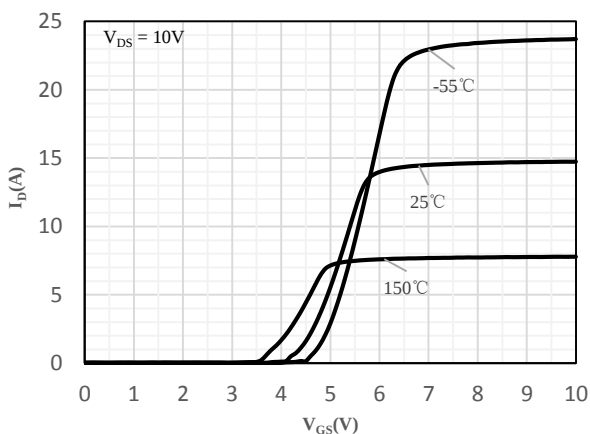


Fig 8 Transfer Characteristics

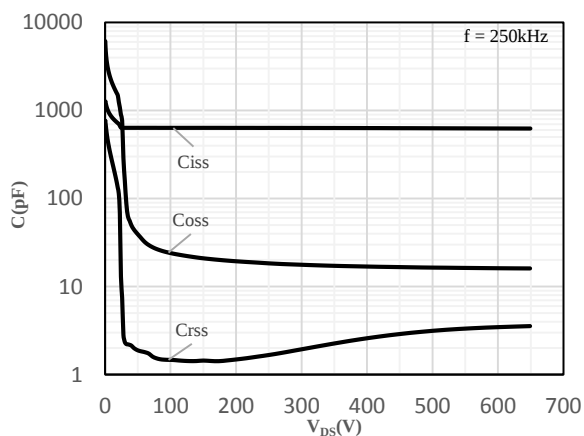


Fig 9 Capacitance Characteristics

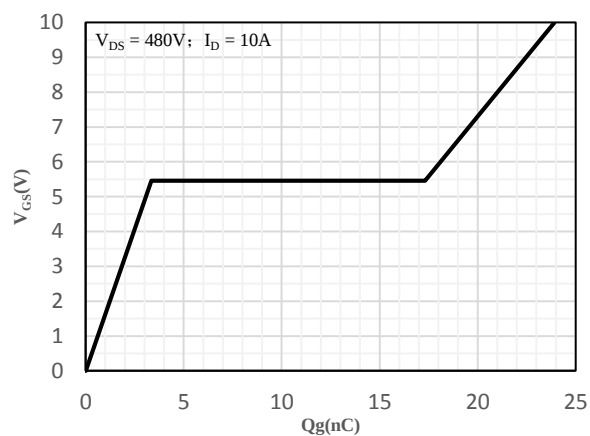


Fig 10 Gate-Charge Characteristics

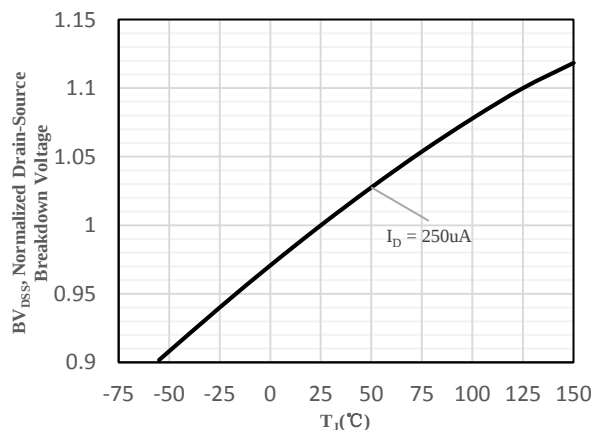


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

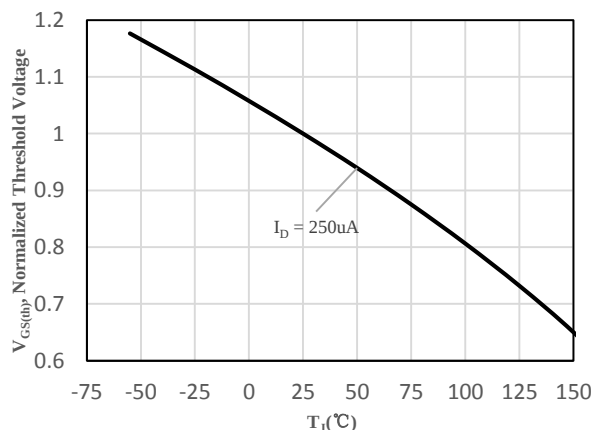


Fig 12 Normalized  $V_{GS(th)}$  vs. Junction Temperature

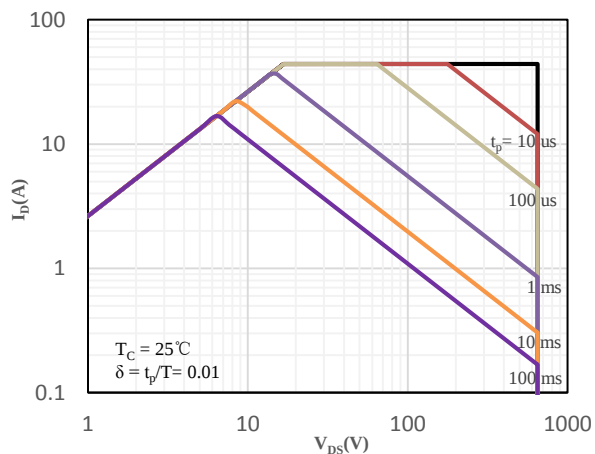


Fig 13 Safe Operating Area

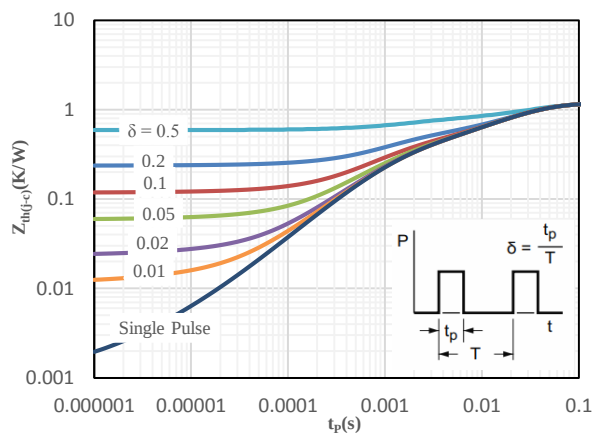
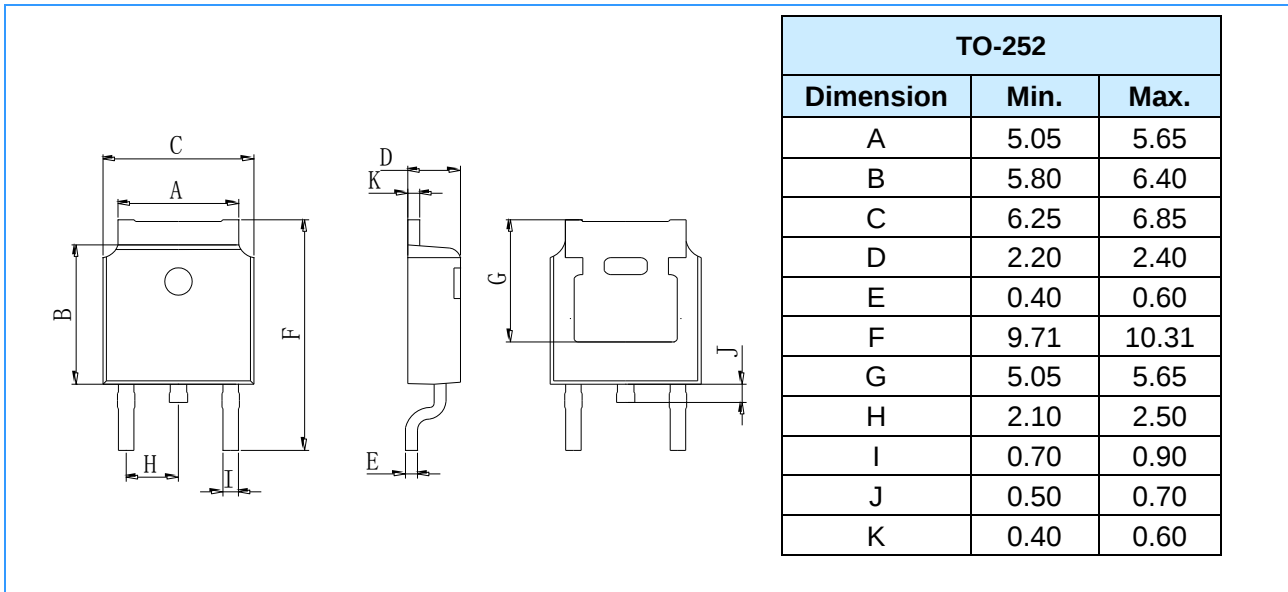
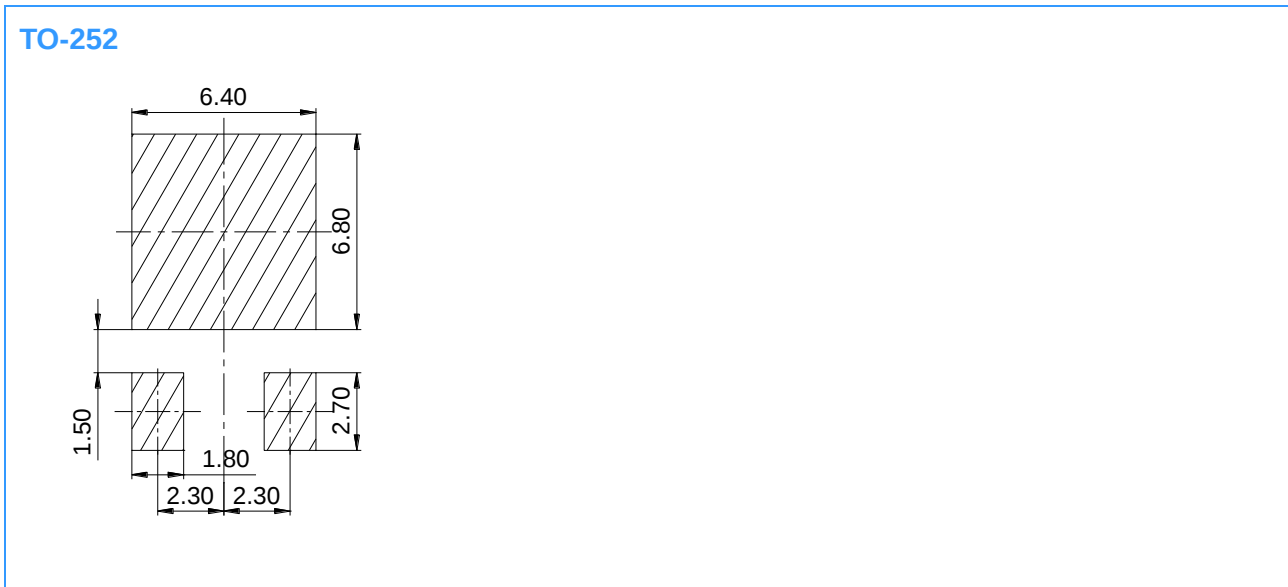


Fig 14 Maximum transient thermal impedance

## Package Outline Dimensions (Unit: mm)



## Mounting Pad Layout (Unit: mm)



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