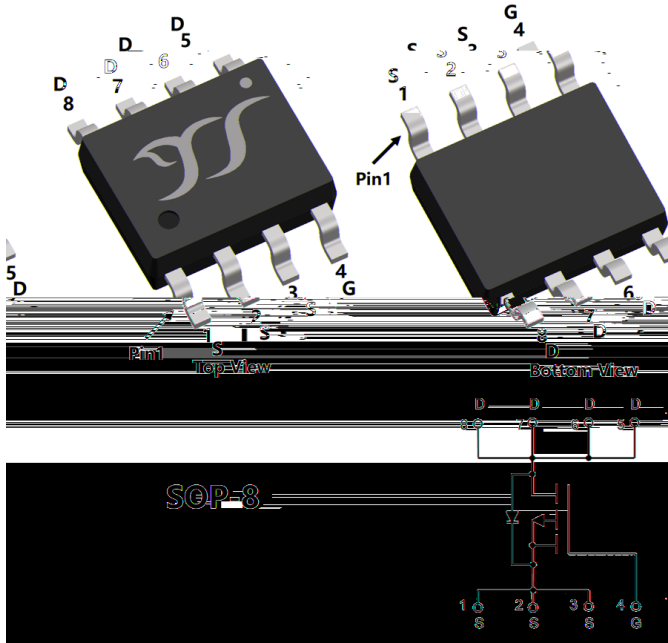


## P-Channel Enhancement Mode Field Effect Transistor



### Product Summary

|                                   |           |
|-----------------------------------|-----------|
| $V_{DS}$                          | -100V     |
| $I_D$                             | -4.5A     |
| $R_{DS(ON)}$ (at $V_{GS}=-10V$ )  | <110 mohm |
| $R_{DS(ON)}$ (at $V_{GS}=-4.5V$ ) | <120 mohm |
| 100% EAS Tested                   |           |
| 100% $\nabla V_{DS}$ Tested       |           |

### General Description

Split gate trench MOSFET technology  
 High density cell design for low  $R_{DS(ON)}$   
 Low  $C_{rss}$ (Typ.25pF)  
 Moisture Sensitivity Level 3  
 Epoxy Meets UL 94 V-0 Flammability Rating  
 Halogen Free

### Applications

DC motor control  
 power supplies

### Absolute Maximum Ratings ( $T_A=25^\circ C$ unless otherwise noted)

| Parameter                              |                   | Symbol         | Limit    | Unit       |
|--|-------------------|----------------|----------|------------|
| Drain-source Voltage                   |                   | $V_{DS}$       | -100     | V          |
| Gate-source Voltage                    |                   | $V_{GS}$       | $\pm 20$ | V          |
| Drain Current                          | $T_A=25^\circ C$  | $I_D$          | -4.5     | A          |
|  | $T_A=100^\circ C$ |                | -2.85    |            |
| Pulsed Drain Current <sup>A</sup>      |                   | $I_{DM}$       | -18      | A          |
| Avalanche energy <sup>B</sup>          |                   | EAS            | 56       | mJ         |
| Total Power Dissipation                | $T_A=25^\circ C$  | $P_D$          | 1.65     | W          |
|  | $T_A=100^\circ C$ |                | 0.65     |            |
| Junction and Storage Temperature Range |                   | $T_J, T_{STG}$ | -55~+150 | $^\circ C$ |

### Thermal resistance

| Parameter   |              | Symbol          | Typ | Max | Units        |
|---|--------------|-----------------|-----|-----|--------------|
| Thermal Resistance Junction-to-Ambient <sup>C</sup> | $t \leq 10S$ | $R_{\theta J}$  | 31  | 40  | $^\circ C/W$ |
|   | Steady-State |                 | 59  | 75  |              |
| Thermal Resistance Junction-to-Lead                 | Steady-State | $R_{\theta JL}$ | 16  | 24  |              |

### Ordering Information (Example)

| PREFERRED P/N | PACKING CODE | Marking | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---------------|--------------|---------|----------------------|-------------------------|----------------------------|---------------|
| YJS05GP10A    | F2           | Q05P10A | 4000                 | 8000                    | 64000                      | 13 reel       |



# YJS05GP10A

## Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

| Parameter                             | Symbol                | Conditions  | Min                   | Typ  | Max  | Units |
|---------------------------------------|-----------------------|---|-----------------------|------|------|-------|
| <b>Static Parameter</b>               |                       |   |                       |      |      |       |
| Drain-Source Breakdown Voltage        | BV <sub>DSS</sub>     | V <sub>GS</sub> =0V, I <sub>D</sub> =-250 ;   | -100                  |      |      | V     |
| Zero Gate Voltage Drain Current       | I <sub>DSS</sub>      | V <sub>DS</sub> =-100V, V <sub>GS</sub> =0V   | T <sub>J</sub> =25°C  |      | -1   | ;     |
|                                       |                       |   | T <sub>J</sub> =150°C |      | -100 |       |
| Gate-Body Leakage Current             | I <sub>GSS</sub>      | V <sub>GS</sub> = ±20V, V <sub>DS</sub> =0V   |                       |      | ±100 | nA    |
| Gate Threshold Voltage                | V <sub>GS(th)</sub>   | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =-250 ;                                | -1.0                  | -1.8 | -2.5 | V     |
| Static Drain-Source On-Resistance     | R <sub>DS(on)</sub>   | V <sub>GS</sub> = -10V, I <sub>D</sub> =-3A   |                       | 83   | 110  | m     |
|                                       |                       | V <sub>GS</sub> = -4.5V, I <sub>D</sub> =-2A  |                       | 95   | 120  |       |
| Diode Forward Voltage                 | V <sub>SD</sub>       | I <sub>S</sub> =-3A, V <sub>GS</sub> =0V  |                       |      | -1.3 | V     |
| Maximum Body-Diode Continuous Current | I <sub>S</sub>        |   |                       |      | -4.5 | A     |
| <b>Dynamic Parameters</b>             |                       |   |                       |      |      |       |
| Input Capacitance                     | C <sub>iss</sub>      | V <sub>DS</sub> =-50V, V <sub>GS</sub> =0V, f=1MHZ  |                       | 1051 |      | pF    |
| Output Capacitance                    | C <sub>oss</sub>      |   |                       | 119  |      |       |
| Reverse Transfer Capacitance          | C <sub>rss</sub>      |   |                       | 25   |      |       |
| <b>Switching Parameters</b>           |                       |   |                       |      |      |       |
| Total Gate Charge                     | Q <sub>g(-10V)</sub>  | V <sub>GS</sub> =-10V, V <sub>DS</sub> =-50V, I <sub>D</sub> =-5A                         |                       | 20   |      | nC    |
| Total Gate Charge                     | Q <sub>g(-4.5V)</sub> |   |                       | 9.7  |      |       |
| Gate-Source Charge                    | Q <sub>gs</sub>       |   |                       | 3.9  |      |       |
| Gate-Drain Charge                     | Q <sub>gd</sub>       |   |                       | 4.3  |      |       |
| Reverse Recovery Chrage               | Q <sub>rr</sub>       | I <sub>F</sub> =-5A, di/dt=100A/us  |                       | 140  |      | ns    |
| Reverse Recovery Time                 | t <sub>rr</sub>       |   |                       | 80   |      |       |
| Turn-on Delay Time                    | t <sub>D(on)</sub>    | V <sub>GS</sub> =-10V, V <sub>DD</sub> =-50V, I <sub>DS</sub> =-5A<br>R <sub>GEN</sub> =6 |                       | 10   |      | ns    |
| Turn-on Rise Time                     | t <sub>r</sub>        |   |                       | 30   |      |       |
| Turn-off Delay Time                   | t <sub>D(off)</sub>   |   |                       | 77   |      |       |
| Turn-off fall Time                    | t <sub>f</sub>        |   |                       | 81   |      |       |

A. Repetitive rating; pulse width limited by max. junction temperature.

B. Pd is based on max. junction temperature, using ≤10s junction-ambient thermal resistance.

C. The value of R<sub>JA</sub> is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C. The value in any given application depends on the user's specific board design.



## ■ Typical Performance Characteristics

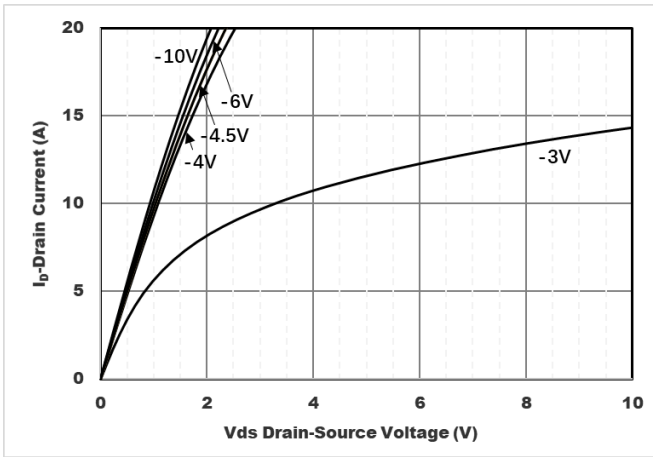


Figure1. Output Characteristics

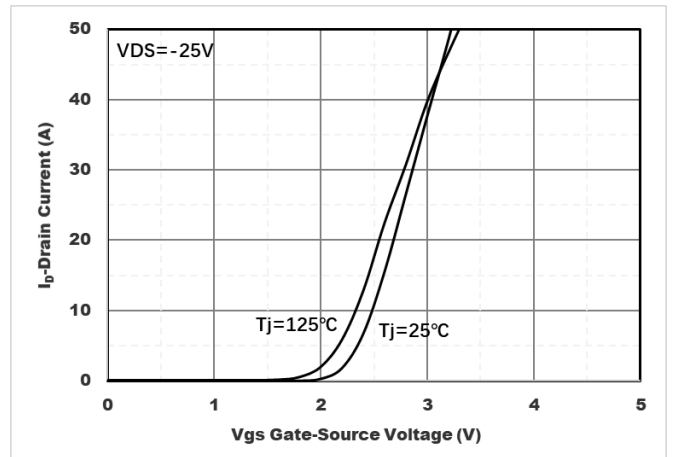


Figure2. Transfer Characteristics

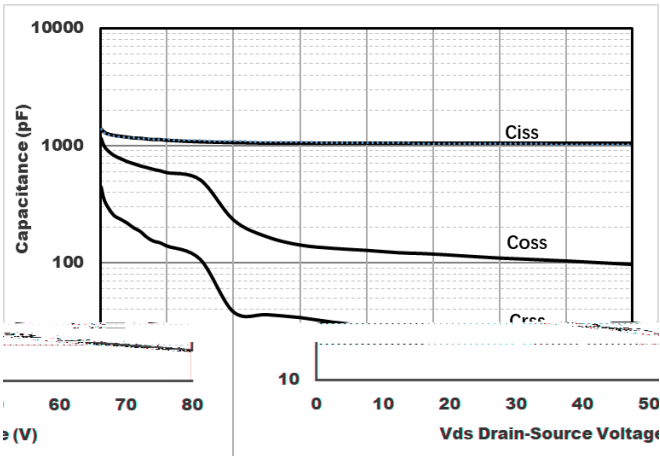


Figure3. Capacitance Characteristics

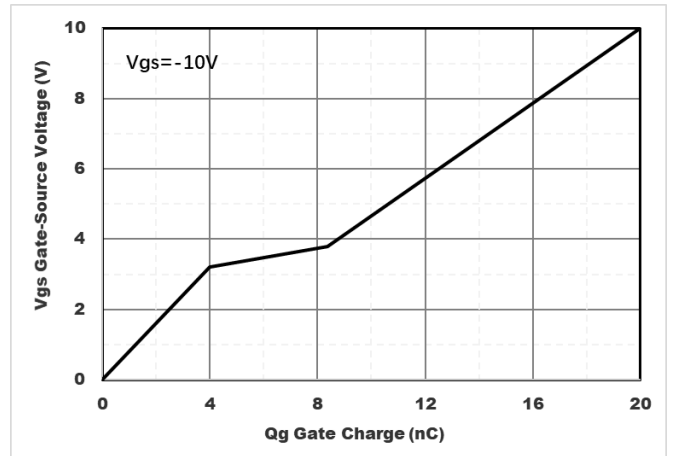


Figure4. Gate Charge

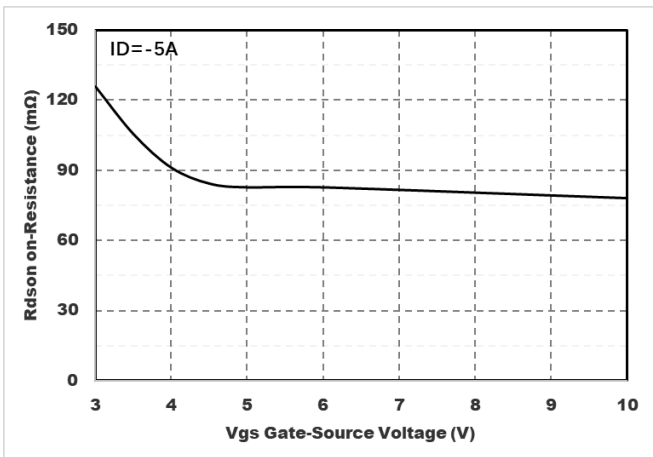


Figure5. : On-Resistance vs. Gate to Source Voltage

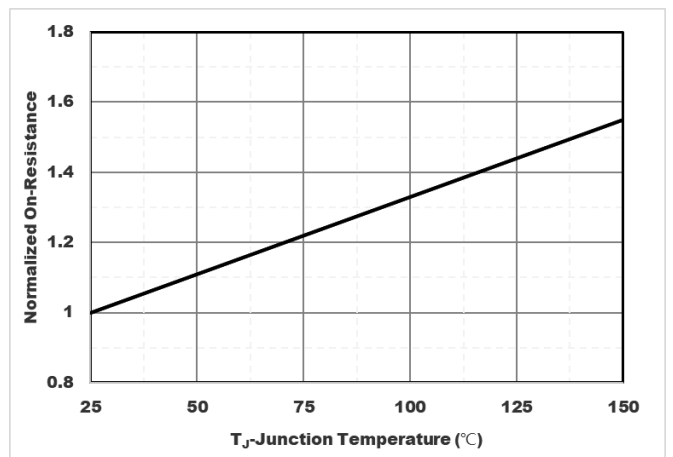


Figure6. Normalized On-Resistance



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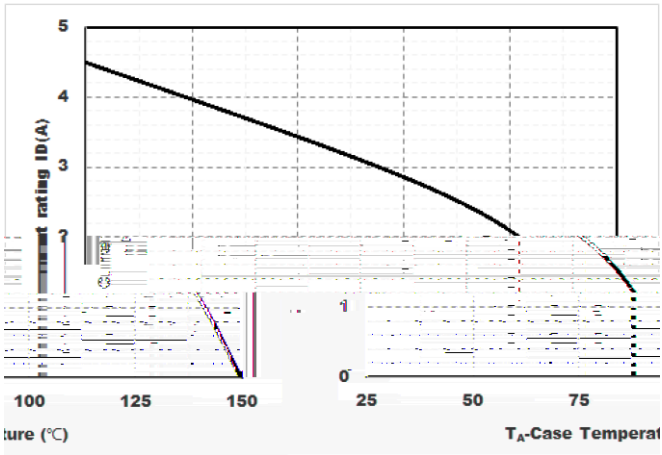


Figure7. Drain current

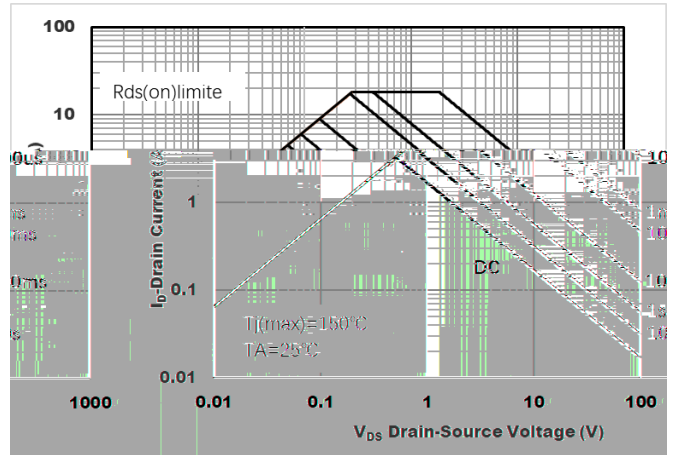


Figure8.Safe Operation Area

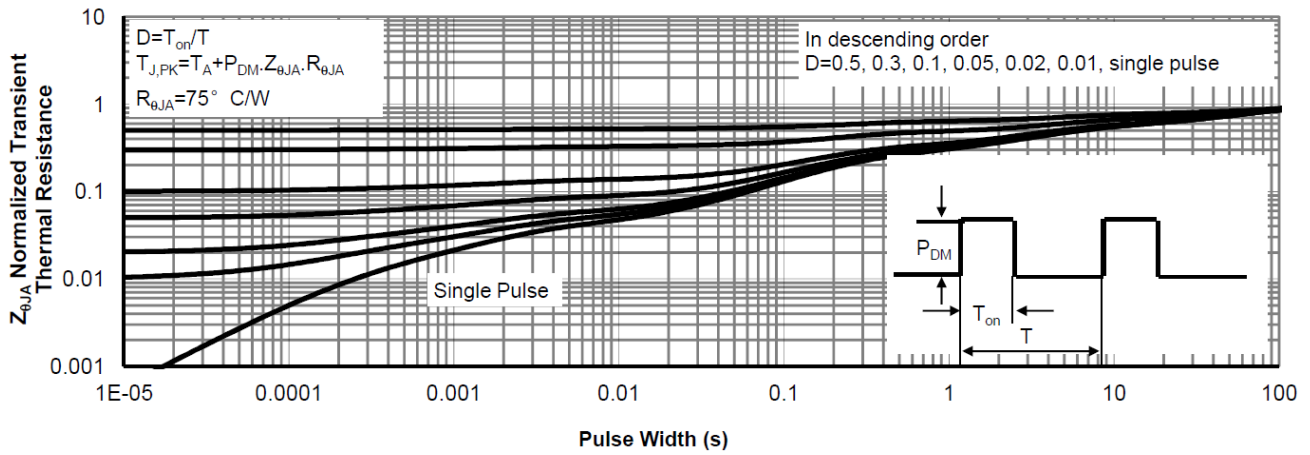
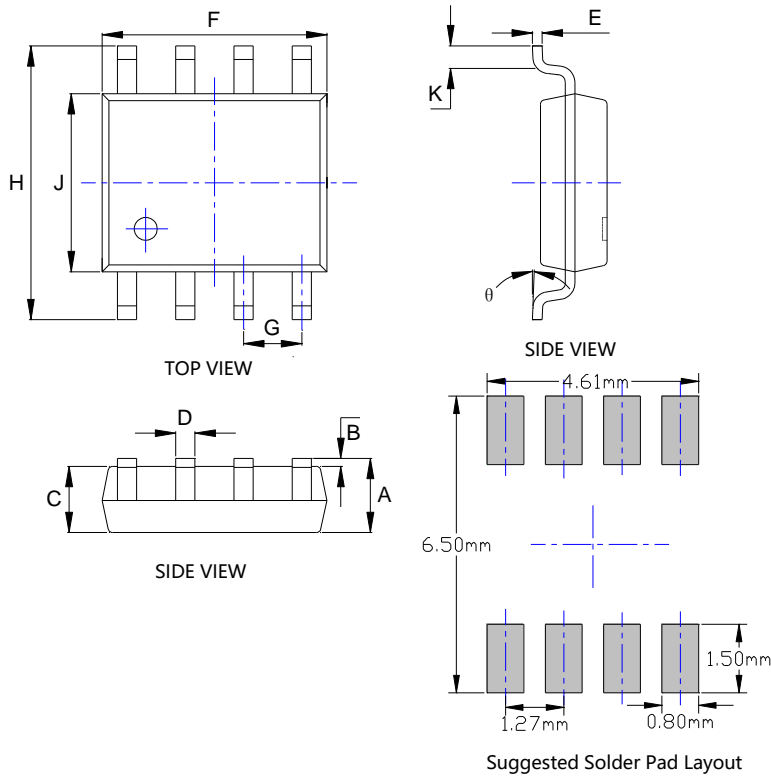


Figure9. Normalized Maximum Transient Thermal Impedance



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## SOP-8 Package Information



| SYMBOL   | DIMENSIONS |       |            |       |
|----------|------------|-------|------------|-------|
|          | INCHES     |       | Millimeter |       |
|          | MIN.       | MAX.  | MIN.       | MAX.  |
| A        | 0.053      | 0.069 | 1.350      | 1.750 |
| B        | 0.004      | 0.010 | 0.100      | 0.250 |
| C        | 0.053      | 0.061 | 1.350      | 1.550 |
| D        | 0.013      | 0.020 | 0.330      | 0.510 |
| E        | 0.007      | 0.010 | 0.170      | 0.250 |
| F        | 0.189      | 0.197 | 4.800      | 5.000 |
| G        | 0.050BSC   |       | 1.270BSC   |       |
| H        | 0.228      | 0.244 | 5.800      | 6.200 |
| J        | 0.150      | 0.157 | 3.800      | 4.000 |
| K        | 0.016      | 0.050 | 0.400      | 1.270 |
| $\theta$ | 0°         | 8°    | 0°         | 8°    |

**Note:**

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.



# YJS05GP10A

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