

## N Channel Enhancement Mode Power MOSFET

### GENERAL DESCRIPTION

The JY09M utilizes the latest trench processing techniques to achieve the high cell density and reduces the on-resistance with low gate charge. These features combine to make this design an extremely efficient and reliable device for use in power switching application and a wide variety of other applications.

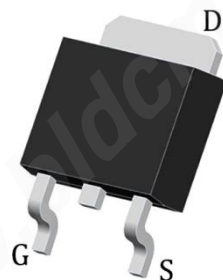
### FEATURES

- 70V/90A,  $R_{DS(ON)} = 6.2m\Omega @ V_{GS} = 10V$  (typical)
- Fast switching and reverse body recovery
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation

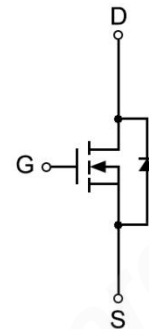
### APPLICATIONS

- Power Switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

### PIN DESCRIPTION



TO-252



N-Channel MOSFET

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### Absolute Maximum Ratings(Tc=25°C Unless Otherwise Noted)

| Symbol                          | Parameter                                        | Limit     | Unit |
|---------------------------------|--------------------------------------------------|-----------|------|
| V <sub>DS</sub>                 | Drain-Source Voltage                             | 70        | V    |
| V <sub>GS</sub>                 | Gate-Source Voltage                              | ±20       | V    |
| I <sub>D</sub>                  | Continuous Drain Current                         | Tc=25° C  | A    |
|                                 |                                                  | Tc=100° C |      |
| I <sub>DM</sub>                 | Pulsed Drain Current                             | 315       | A    |
| P <sub>D</sub>                  | Maximum Power Dissipation                        | 100       | W    |
| T <sub>J</sub> T <sub>STG</sub> | Operating Junction and Storage Temperature Range | -55+175   | °C   |
| R <sub>θJC</sub>                | Thermal Resistance-Junction to Case              | 1.5       | °C/W |
| R <sub>θJA</sub>                | Thermal Resistance-Junction to Ambient           | 62.5      | °C/W |

### Electrical Characteristics(Ta=25°C Unless Otherwise Noted)

| Symbol                        | Parameter                        | Conditions                                                 | Min | Typ | Max  | Unit |
|-------------------------------|----------------------------------|------------------------------------------------------------|-----|-----|------|------|
| <b>Static Characteristics</b> |                                  |                                                            |     |     |      |      |
| BV <sub>DSS</sub>             | Drain-Source Breakdown Voltage   | V <sub>GS</sub> =0V, I <sub>DS</sub> =250uA                | 70  |     |      | V    |
| I <sub>DSS</sub>              | Zero Gate Voltage Drain Current  | V <sub>DS</sub> =70V, V <sub>GS</sub> =0V                  |     |     | 1    | uA   |
| I <sub>GSS</sub>              | Gate-Body Leakage Current        | V <sub>GS</sub> = ±20V, V <sub>DS</sub> =0V                |     |     | ±100 | nA   |
| V <sub>GS(th)</sub>           | Gate Threshold Voltage           | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>DS</sub> =250uA | 2   |     | 4    | V    |
| R <sub>DS(ON)</sub>           | Drain-Source On-state Resistance | V <sub>GS</sub> =10V, I <sub>DS</sub> =30A                 |     | 6.2 | 7.2  | mΩ   |

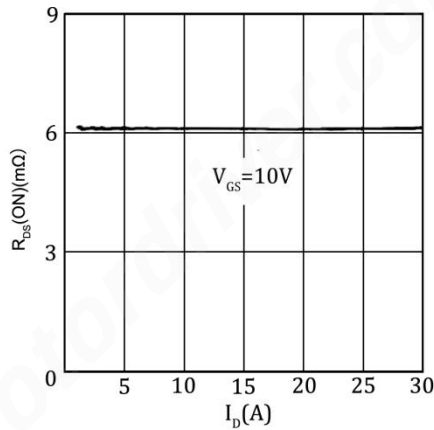
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### Electrical Characteristics(Ta=25°C Unless Otherwise Noted)

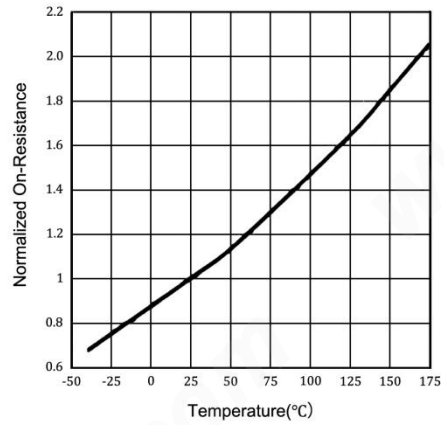
| Symbol                             | Parameter                    | Conditions                                                                                   | Min | Typ  | Max | Unit |
|------------------------------------|------------------------------|----------------------------------------------------------------------------------------------|-----|------|-----|------|
| Drain-Source Diode Characteristics |                              |                                                                                              |     |      |     |      |
| V <sub>SD</sub>                    | Diode Forward Voltage        | V <sub>GS</sub> =0V, I <sub>SD</sub> =30A                                                    |     |      | 1.3 | V    |
| T <sub>rr</sub>                    | Reverse Recovery Time        | I <sub>SD</sub> =30A                                                                         |     | 35   |     | ns   |
| Q <sub>rr</sub>                    | Reverse Recovery Charge      | di/dt=100A/us                                                                                |     | 50   |     | nC   |
| Dynamic Characteristics            |                              |                                                                                              |     |      |     |      |
| T <sub>d(on)</sub>                 | Turn-on Delay Time           | V <sub>DS</sub> =30V, R <sub>G</sub> =3Ω,<br>I <sub>DS</sub> =30A, V <sub>GS</sub> =10V<br>, |     | 15   |     | ns   |
| T <sub>r</sub>                     | Turn-on Rise Time            |                                                                                              |     | 12   |     |      |
| T <sub>d(off)</sub>                | Turn-off Delay Time          |                                                                                              |     | 50   |     |      |
| T <sub>f</sub>                     | Turn-off Fall Time           |                                                                                              |     | 14   |     |      |
| C <sub>ISS</sub>                   | Input Capacitance            | V <sub>GS</sub> =0V,<br>V <sub>DS</sub> =30V,<br>f=1.0MHz                                    |     | 3215 |     | pF   |
| C <sub>OSS</sub>                   | Output Capacitance           |                                                                                              |     | 345  |     |      |
| C <sub>RSS</sub>                   | Reverse Transfer Capacitance |                                                                                              |     | 230  |     |      |
| Q <sub>g</sub>                     | Total Gate Charge            | V <sub>DS</sub> =30V, I <sub>D</sub> =30A,<br>V <sub>GS</sub> =10V                           |     | 86   |     | nC   |
| Q <sub>gs</sub>                    | Gate-Source Charge           |                                                                                              |     | 19   |     |      |
| Q <sub>gd</sub>                    | Gate-Drain Charge            |                                                                                              |     | 25   |     |      |

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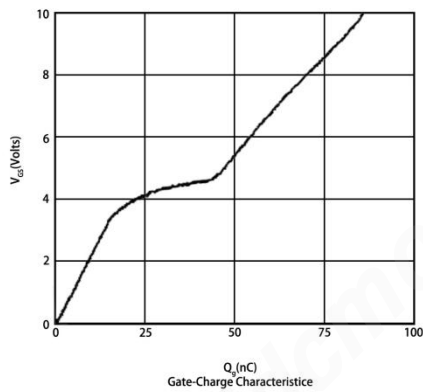
### Typical electrical and thermal characteristics



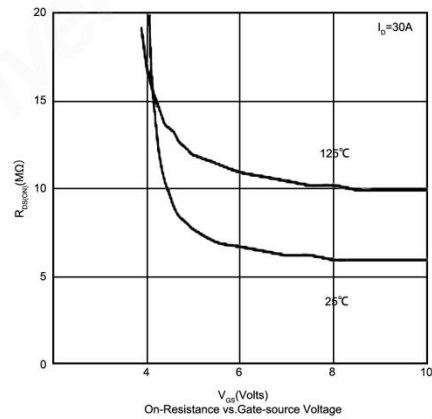
On-Resistance VS. Drain Current and Gate Voltage



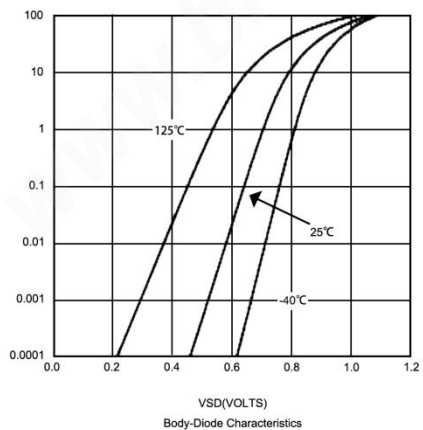
On-Resistance vs. Junction Temperature



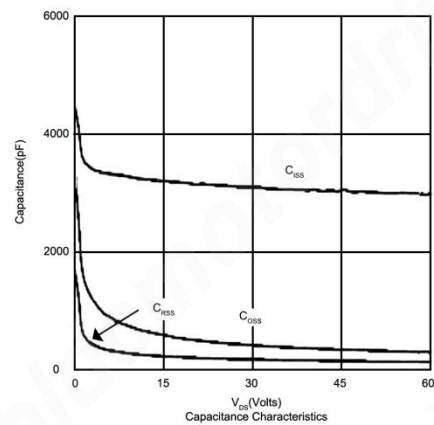
Gate-Charge Characteristic



On-Resistance vs. Gate-source Voltage

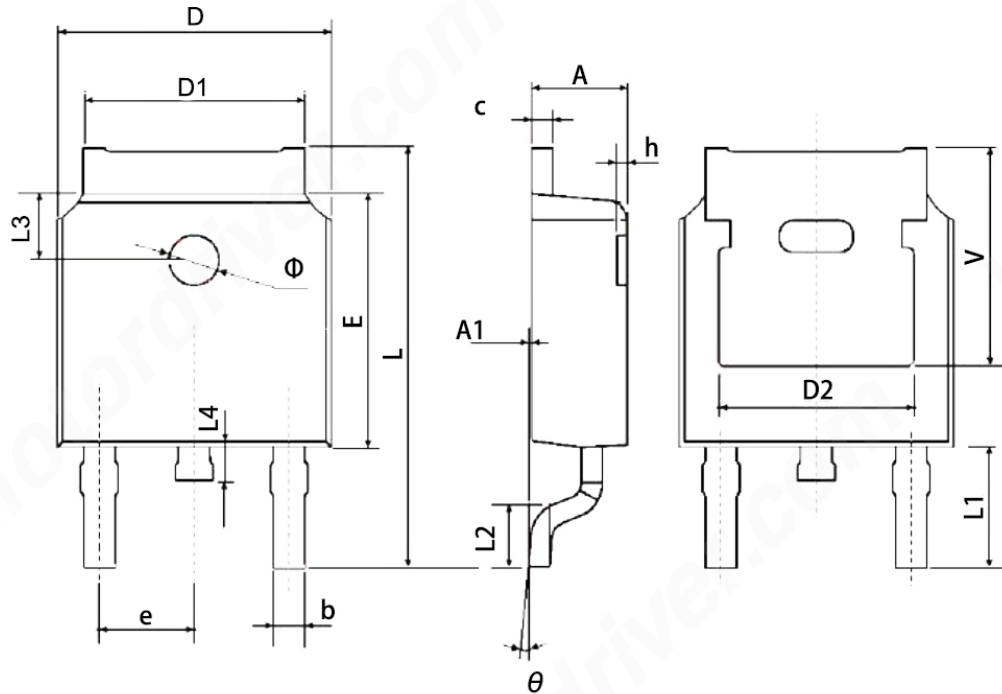


Body-Diode Characteristics



Capacitance Characteristics

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| Symbol | Dimensions In Millimeters |        | Dimensions In Inches |       |
|--------|---------------------------|--------|----------------------|-------|
|        | Min.                      | Max.   | Min.                 | Max.  |
| A      | 2.200                     | 2.400  | 0.087                | 0.094 |
| A1     | 0.000                     | 0.127  | 0.000                | 0.005 |
| b      | 0.660                     | 0.860  | 0.026                | 0.034 |
| c      | 0.460                     | 0.580  | 0.018                | 0.023 |
| D      | 6.500                     | 6.700  | 0.256                | 0.264 |
| D1     | 5.100                     | 5.460  | 0.201                | 0.215 |
| D2     | 0.483 TYP.                |        |                      |       |
| E      | 6.000                     | 6.200  | 0.236                | 0.244 |
| e      | 2.186                     | 2.386  | 0.086                | 0.094 |
| L      | 9.800                     | 10.400 | 0.386                | 0.409 |
| L1     | 2.900 TYP.                |        | 0.114 TYP.           |       |
| L2     | 1.400                     | 1.700  | 0.055                | 0.067 |
| L3     | 1.600 TYP.                |        | 0.063 TYP            |       |
| L4     | 0.600                     | 1.000  | 0.024                | 0.039 |
| Φ      | 1.100                     | 1.300  | 0.043                | 0.051 |
| θ      | 0°                        | 8°     | 0°                   | 8°    |
| h      | 0.000                     | 0.300  | 0.000                | 0.012 |
| V      | 5.350 TYP.                |        | 0.211TYP.            |       |