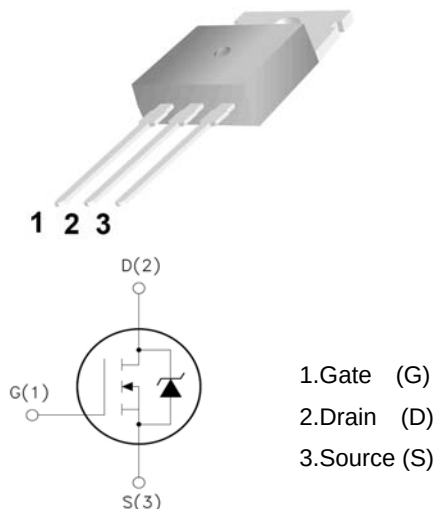


### Features:

- ☐ Low Intrinsic Capacitances.
- ☐ Excellent Switching Characteristics.
- ☐ Extended Safe Operating Area.
- ☐ Unrivalled Gate Charge :Qg= 155nC (Typ.).
- ☐ BVDSS=100V, I<sub>D</sub>=180A
- ☐ R<sub>DS(on)</sub> : 5mΩ (Max) @V<sub>G</sub>=10V
- ☐ 100% Avalanche Tested

TO-220



### Absolute Maximum Ratings (T<sub>A</sub>=25°C unless otherwise noted)

| Symbol                            | Parameter                            | Maximum               | Unit |
|-----------------------------------|--------------------------------------|-----------------------|------|
| V <sub>DSS</sub>                  | Drain-to-Source Voltage              | 100                   | V    |
| V <sub>GSS</sub>                  | Gate-to-Source Voltage               | ±25                   | V    |
| I <sub>D</sub> <sup>3</sup>       | Continuous Drain Current             | T <sub>C</sub> =25°C  | 180  |
|                                   |                                      | T <sub>C</sub> =100°C | 130  |
| I <sub>DP</sub> <sup>4</sup>      | Pulsed Drain Current                 | T <sub>C</sub> =25°C  | 600  |
| I <sub>AS</sub> <sup>5</sup>      | Avalanche Current                    | 40                    | A    |
| EAS <sup>5</sup>                  | Avalanche energy                     | 700                   | mJ   |
| PD                                | Maximum Power Dissipation            | T <sub>C</sub> =25°C  | 240  |
|                                   |                                      | T <sub>C</sub> =100°C | 125  |
| T <sub>J</sub> , T <sub>STG</sub> | Junction & Storage Temperature Range | -55~175               | °C   |

### Thermal Characteristics

| Symbol | Parameter                              | Typical | Unit |
|--------|----------------------------------------|---------|------|
| Rθjc   | Thermal Resistance-Junction to Case    | 0.6     | °C/W |
| Rθja   | Thermal Resistance-Junction to Ambient | 62.5    |      |

## Electrical Characteristics (TA=25°C unless otherwise noted)

| Symbol                                   | Parameter                        | Test Conditions                                                     | Min.                                                                                       | Typ  | Max. | Unit |
|------------------------------------------|----------------------------------|---------------------------------------------------------------------|--------------------------------------------------------------------------------------------|------|------|------|
| Static Characteristics                   |                                  |                                                                     |                                                                                            |      |      |      |
| BV <sub>DSS</sub>                        | Drain-Source Breakdown Voltage   | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA                          | 100                                                                                        | —    | —    | V    |
| I <sub>DSS</sub>                         | Zero Gate Voltage Drain Current  | V <sub>DS</sub> =80V, V <sub>GS</sub> =0V                           | —                                                                                          | —    | 1    | uA   |
|                                          |                                  | T <sub>J</sub> =125°C                                               | —                                                                                          | —    | 100  |      |
| V <sub>GS(th)</sub>                      | Gate Threshold Voltage           | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA            | 2                                                                                          | 3    | 4    | V    |
| I <sub>GSS</sub>                         | Gate Leakage Current             | V <sub>GS</sub> =±25V, V <sub>DS</sub> =0V                          | —                                                                                          | —    | ±100 | nA   |
| R <sub>DS(on)</sub> <sup>1</sup>         | Drain-Source On-Resistance       | V <sub>GS</sub> =10V, I <sub>D</sub> =40A                           | —                                                                                          | 4.5  | 5    | mΩ   |
|                                          |                                  |                                                                     | —                                                                                          | —    | —    |      |
| Diode Characteristics                    |                                  |                                                                     |                                                                                            |      |      |      |
| V <sub>SD</sub> <sup>1</sup>             | Diode Forward Voltage            | I <sub>SD</sub> =40A, V <sub>GS</sub> =0V                           | —                                                                                          | 0.8  | 1.3  | V    |
| I <sub>S</sub> <sup>3</sup>              | Diode Continuous Forward Current |                                                                     | —                                                                                          | —    | 180  | A    |
| t <sub>rr</sub>                          | Reverse Recovery Time            | I <sub>F</sub> =40A,<br>dI/dt=100A/us                               | —                                                                                          | 65   | —    | nS   |
| Q <sub>rr</sub>                          | Reverse Recovery Charge          |                                                                     | —                                                                                          | 103  | —    | nC   |
| Dynamic Characteristics <sup>2</sup>     |                                  |                                                                     |                                                                                            |      |      |      |
| R <sub>G</sub>                           | Gate Resistance                  | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V,<br>Frequency=1MHz         | —                                                                                          | 2.5  | —    | Ω    |
| C <sub>iss</sub>                         | Input Capacitance                | V <sub>GS</sub> =0V, V <sub>DS</sub> =25V<br>Frequency=1MHz         | —                                                                                          | 7850 | —    | pF   |
| C <sub>oss</sub>                         | Output Capacitance               |                                                                     | —                                                                                          | 1010 | —    |      |
| C <sub>rss</sub>                         | Reverse Transfer Capacitance     |                                                                     | —                                                                                          | 630  | —    |      |
| t <sub>d(on)</sub>                       | Turn-On Delay Time               |                                                                     | V <sub>DD</sub> =37.5V, I <sub>D</sub> =40A,<br>V <sub>GS</sub> =10V, R <sub>G</sub> =6.8Ω | —    | 28   | —    |
| t <sub>r</sub>                           | Rise Time                        | —                                                                   |                                                                                            | 45   | —    |      |
| t <sub>d(off)</sub>                      | Turn-Off Delay Time              | —                                                                   |                                                                                            | 84   | —    |      |
| t <sub>f</sub>                           | Fall Time                        | —                                                                   |                                                                                            | 49   | —    |      |
| Gate Charge Characteristics <sup>2</sup> |                                  |                                                                     |                                                                                            |      |      |      |
| Q <sub>g</sub>                           | Total Gate Charge                | V <sub>DS</sub> =37.5V, V <sub>GS</sub> =10V<br>I <sub>D</sub> =40A | —                                                                                          | 184  | —    | nC   |
| Q <sub>gs</sub>                          | Gate-to-Source Charge            |                                                                     | —                                                                                          | 33   | —    |      |
| Q <sub>gd</sub>                          | Gate-to-Drain Charge             |                                                                     | —                                                                                          | 60   | —    |      |

Note: 1: Pulse test; pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .

2: Guaranteed by design, not subject to production testing.

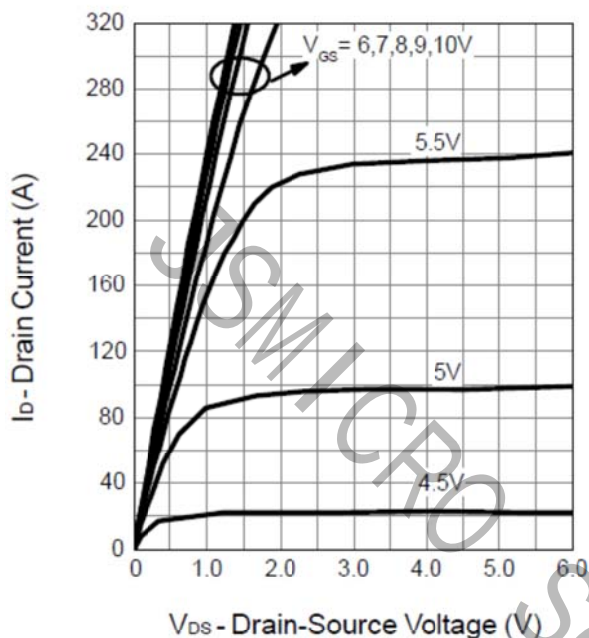
3: Package limitation current is 50A. Calculated continuous current based on maximum allowable junction temperature.

4: Repetitive rating, pulse width limited by max junction temperature.

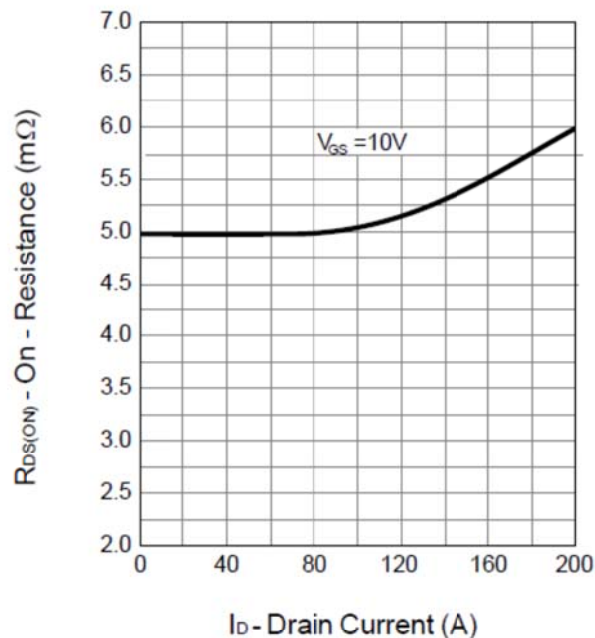
5: Starting  $T_J = 25^\circ C$ ,  $L = 0.5mH$ ,  $V_{DD}=80V$ ,  $I_{AS} = 74A$ .

## Typical Characteristics

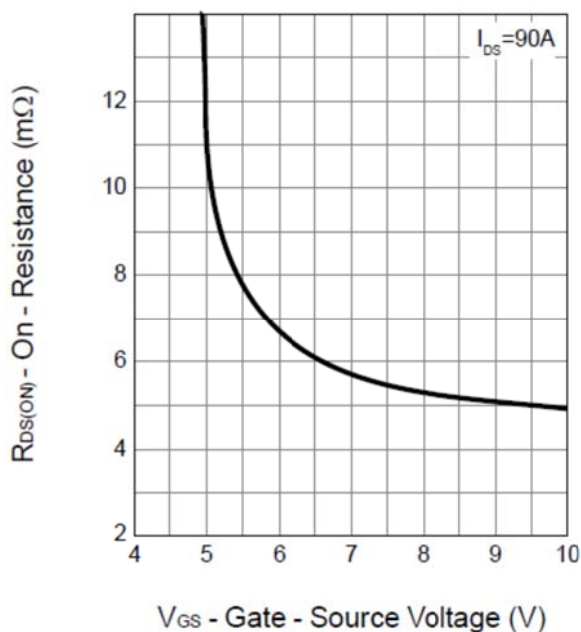
Output Characteristics



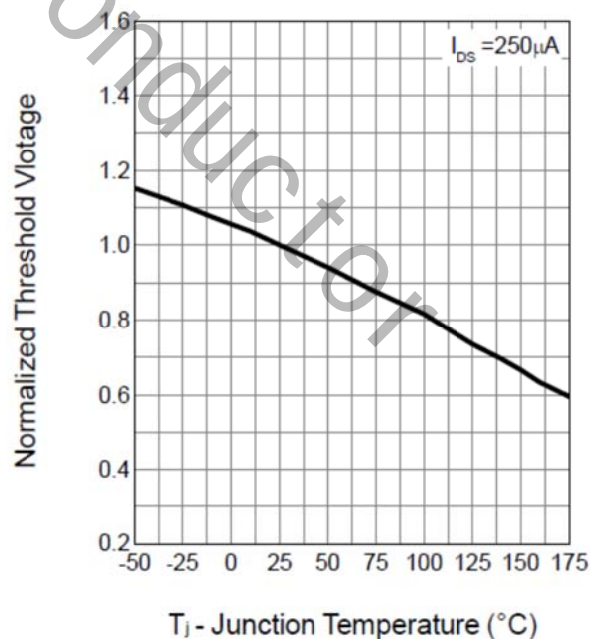
Drain-Source On Resistance



Drain-Source On Resistance

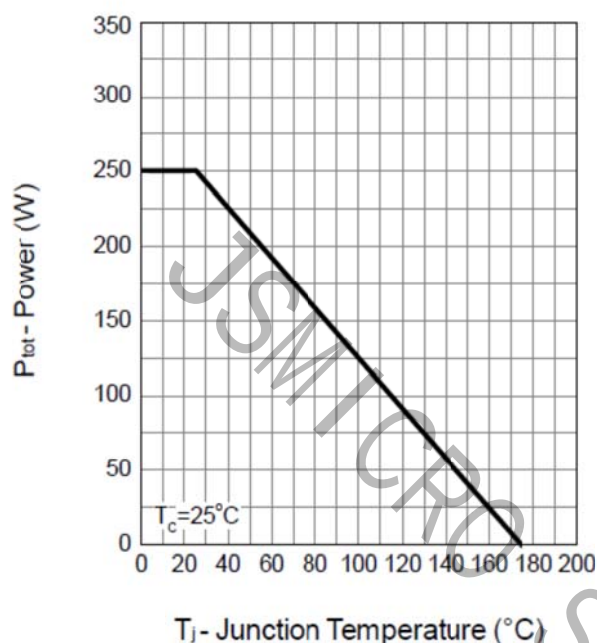


Gate Threshold Voltage

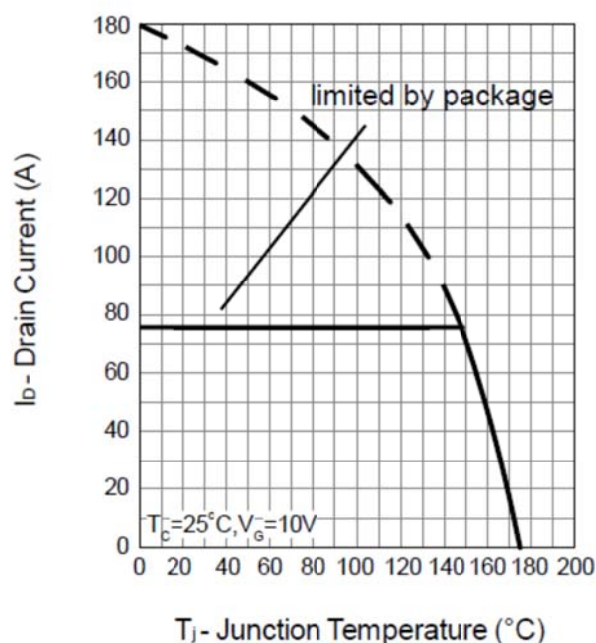


## Typical Characteristics (Continued)

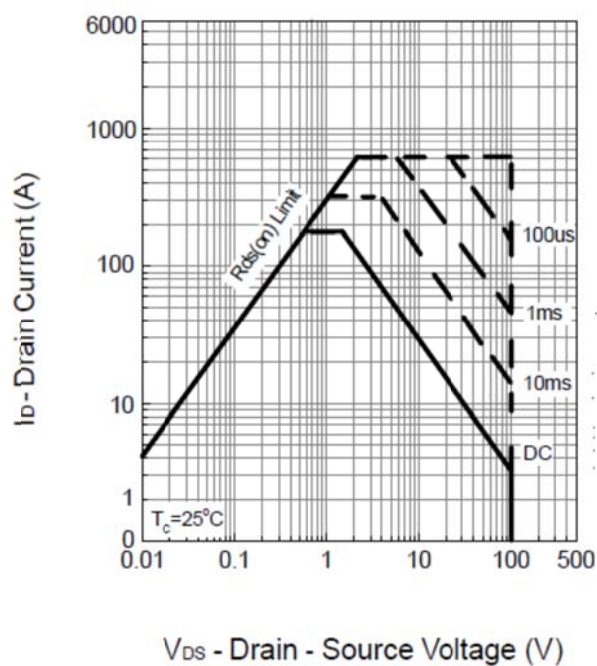
Power Dissipation



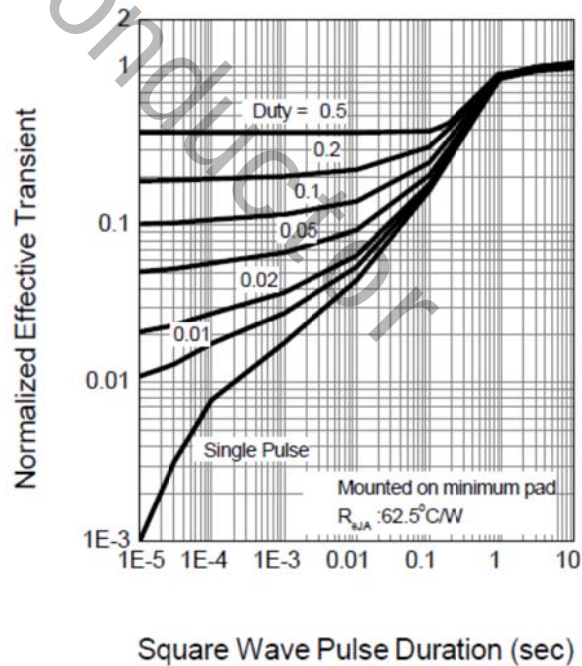
Drain Current



Safe Operation Area

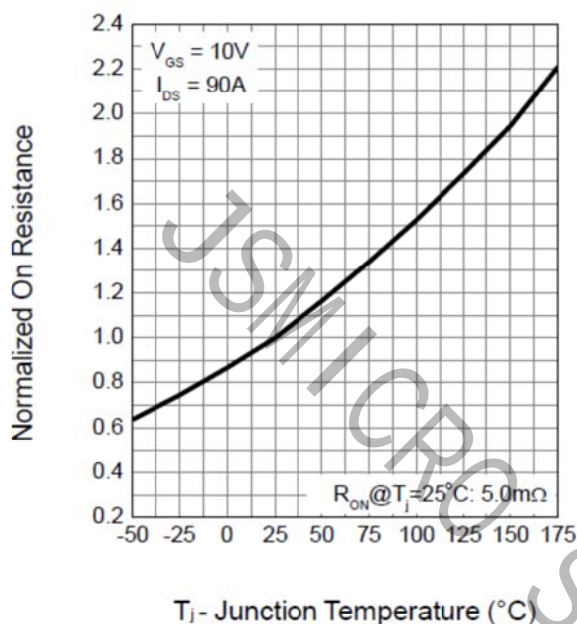


Thermal Transient Impedance

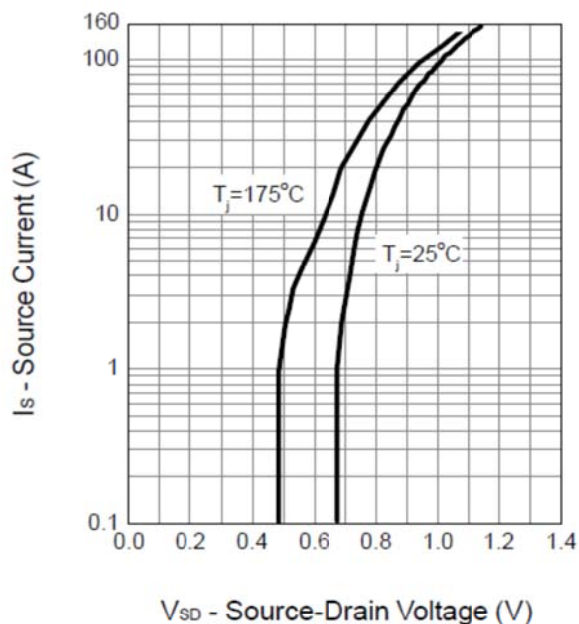


## Typical Characteristics (Continued)

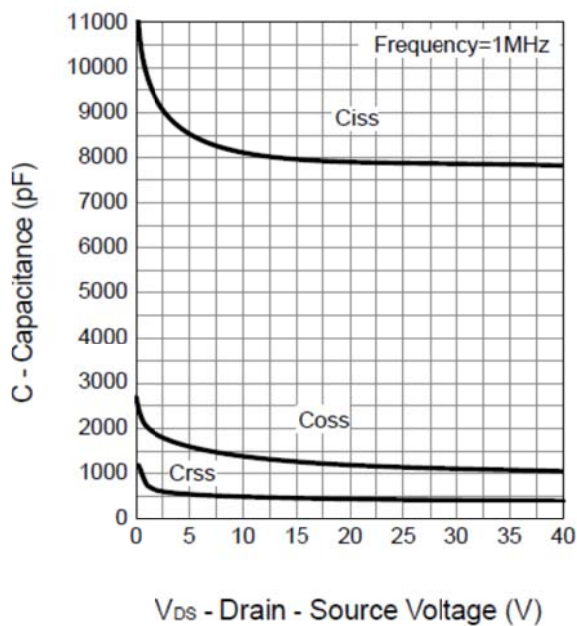
Drain-Source On Resistance



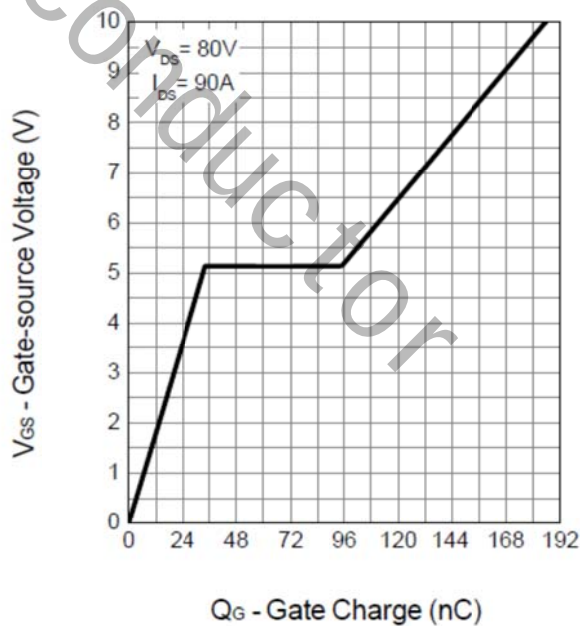
Source-Drain Diode Forward



Capacitance



Gate Charge

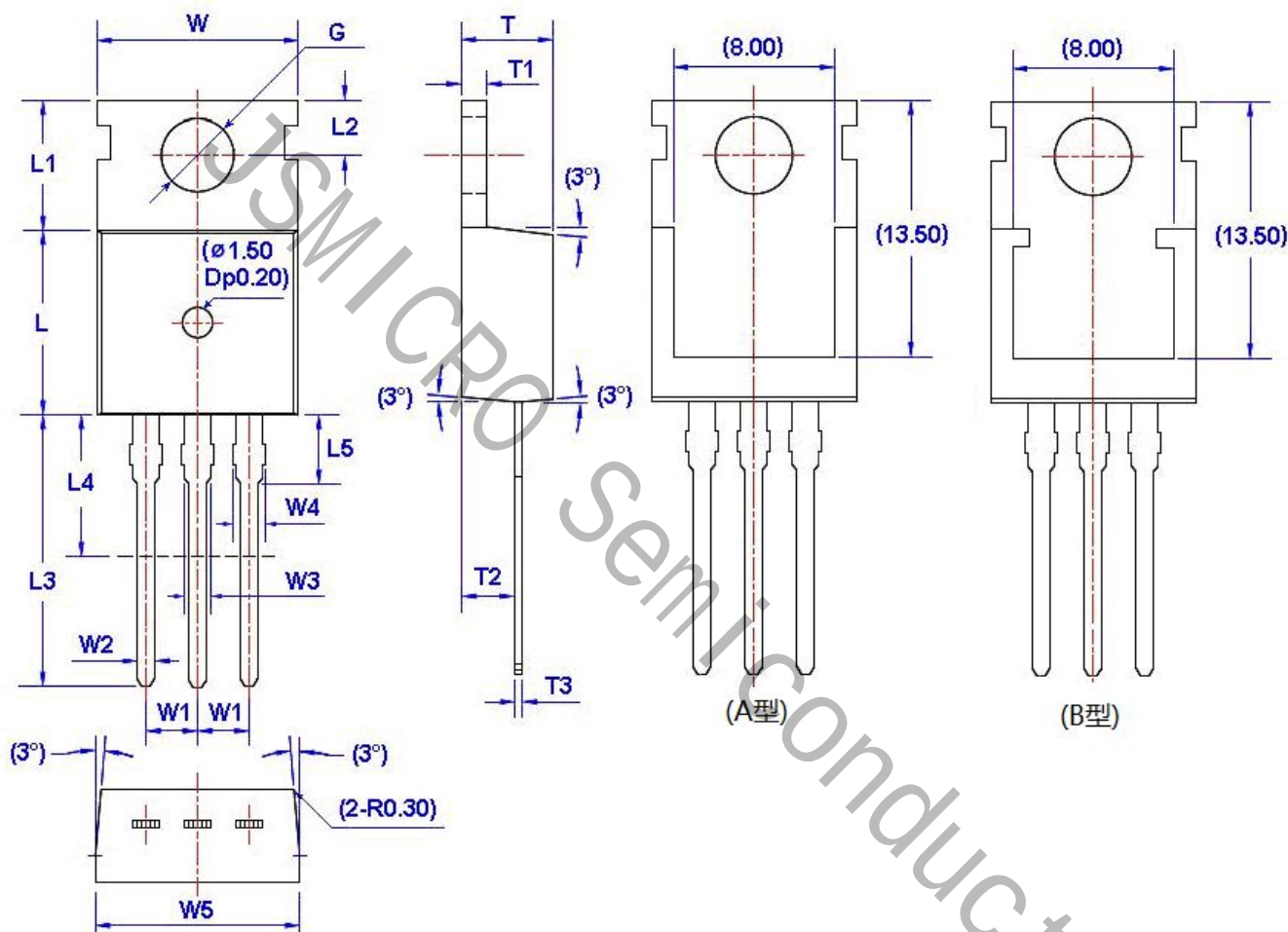




**Package Dimension**

**TO-220**

Unit:mm



| Symbol | Size       |       | Symbol | Size  |       | Symbol | Size |      | Symbol | Size |      |
|--------|------------|-------|--------|-------|-------|--------|------|------|--------|------|------|
|        | Min        | Max   |        | Min   | Max   |        | Min  | Max  |        | Min  | Max  |
| W      | 9.66       | 10.28 | W5     | 9.80  | 10.20 | L4**   | 6.20 | 6.60 | T3     | 0.45 | 0.60 |
| W1     | 2.54 (TYP) |       | L      | 9.00  | 9.40  | L5     | 2.79 | 3.30 | G(Φ)   | 3.50 | 3.70 |
| W2     | 0.70       | 0.95  | L1     | 6.40  | 6.80  | T      | 4.30 | 4.70 |        |      |      |
| W3     | 1.17       | 1.37  | L2     | 2.70  | 2.90  | T1     | 1.15 | 1.40 |        |      |      |
| W4*    | 1.32       | 1.72  | L3     | 12.70 | 14.27 | T2     | 2.20 | 2.60 |        |      |      |