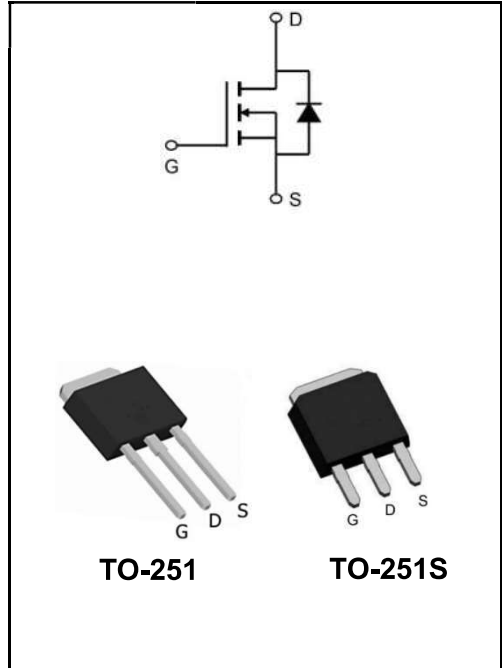


**40V N-CHANNEL ENHANCEMENT MODE MOSFET**

**MAIN CHARACTERISTICS**

|  |                                |
|--|--------------------------------|
| <b>I<sub>D</sub></b>                               | 150A                           |
| <b>V<sub>DSS</sub></b>                             | 40V                            |
| <b>R<sub>DS(on)-typ(@V<sub>GS</sub>=10V)</sub></b> | < 2.5mΩ ( <b>Type:1.9 mΩ</b> ) |



**Application**

◆YFW-SGT technology

**Application**

- ◆Battery protection
- ◆Load switch
- ◆Uninterruptible power supply

**Product Specification Classification**

| Part Number  | Package | Marking             | Pack         |
|--------------|---------|---------------------|--------------|
| YFW150N04AMJ | TO-251  | YFW 150N04AMJ XXXXX | 2500PCS/Tape |
| YFW150N04AMJ | TO-251S | YFW 150N04AMJ XXXXX | 2500PCS/Tape |

**Maximum Ratings at T<sub>c</sub>=25°C unless otherwise specified**

| Characteristics   | Symbols                | Value       | Units       |
|---|------------------------|-------------|-------------|
| Drain-Source Voltage  | <b>V<sub>DS</sub></b>  | 40          | <b>V</b>    |
| Gate - Source Voltage   | <b>V<sub>GS</sub></b>  | ±20         | <b>V</b>    |
| Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1.6</sup> @T <sub>C</sub> =25°C  | <b>I<sub>D</sub></b>   | 150         | <b>A</b>    |
| Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1.6</sup> @T <sub>C</sub> =100°C | <b>I<sub>D</sub></b>   | 90          | <b>A</b>    |
| Pulsed Drain Current <sup>2</sup>   | <b>I<sub>DM</sub></b>  | 450         | <b>A</b>    |
| Single Pulse Avalanche Energy <sup>3</sup>  | <b>E<sub>AS</sub></b>  | 400         | <b>mJ</b>   |
| Avalanche Current   | <b>I<sub>AS</sub></b>  | 40          | <b>A</b>    |
| Total Power Dissipation <sup>4</sup> @T <sub>C</sub> =25°C                            | <b>P<sub>D</sub></b>   | 125         | <b>W</b>    |
| Storage Temperature Range   | <b>T<sub>STG</sub></b> | -55 to +150 | <b>°C</b>   |
| Operating Junction Temperature Range  | <b>T<sub>J</sub></b>   | -55 to +150 | <b>°C</b>   |
| Thermal Resistance Junction-Ambient <sup>1</sup>                                      | <b>R<sub>θJA</sub></b> | 50          | <b>°C/W</b> |
| Thermal Resistance Junction-Case <sup>1</sup>   | <b>R<sub>θJC</sub></b> | 1           | <b>°C/W</b> |

**Maximum Ratings at Tc=25°C unless otherwise specified**

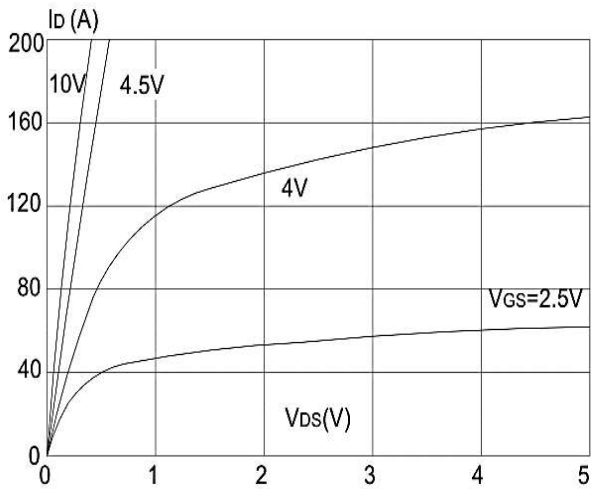
| Characteristics                                | Test Condition   | Symbols      | Min | Typ  | Max  | Units |
|--|--|--------------|-----|------|------|-------|
| Drain-Source Breakdown Voltage                 | $V_{GS}=0V, I_D=250\mu A$                                    | $BV_{DSS}$   | 40  | 47   | -    | V     |
| Static Drain-Source On-Resistance <sup>2</sup> | $V_{GS}=10V, I_D=20A$  | $R_{DS(on)}$ | -   | 1.9  | 2.5  | mΩ    |
|  | $V_{GS}=4.5V, I_D=20A$                                       |              | -   | 3.3  | 5.0  |       |
| Gate -Threshold Voltage                        | $V_{DS}=V_{GS}, I_D=250\mu A$                                | $V_{GS(th)}$ | 1.2 | 1.6  | 2.2  | V     |
| Drain -Source Leakage Current                  | $V_{DS}=32V, V_{GS}=0V, T_J=25^\circ C$                      | $I_{DSS}$    | -   | -    | 1    | μA    |
|  | $V_{DS}=32V, V_{GS}=0V, T_J=55^\circ C$                      |              | -   | -    | 5    |       |
| Gate-Source Leakage Current                    | $V_{GS}=\pm 20V, V_{DS}=0V$                                  | $I_{GSS}$    | -   | -    | ±100 | nA    |
| Forward Transconductance                       | $V_{DS}=5V, I_D=20A$   | $g_{FS}$     | -   | 53   | -    | S     |
| Gate Resistance                                | $V_{DS}=0V, V_{GS}=0V, f=1MHz$                               | $R_g$        | -   | 1.0  | -    | Ω     |
| Total Gate Charge(4.5V)                        | $V_{DS}=15V$<br>$V_{GS}=10V$<br>$I_D=20A$                    | $Q_g$        | -   | 45   | -    | nC    |
| Gate-Source Charge                             |  | $Q_{GS}$     | -   | 12   | -    |       |
| Gate-Drain Charge                              |  | $Q_{gd}$     | -   | 18.5 | -    |       |
| Turn-on delay time                             | $V_{DD}=15V$<br>$V_{GS}=10V$<br>$R_G=3.3\Omega$<br>$I_D=20A$ | $t_{d(on)}$  | -   | 18.5 | -    | ns    |
| Rise Time                                      |  | $T_r$        | -   | 9    | -    |       |
| Turn-Off Delay Time                            |  | $t_{d(OFF)}$ | -   | 58.5 | -    |       |
| Fall Time                                      |  | $t_f$        | -   | 32   | -    |       |
| Input Capacitance                              | $V_{DS}=20V$<br>$V_{GS}=0V$<br>$f=1.0MHz$                    | $C_{iss}$    | -   | 3972 | -    | pF    |
| Output Capacitance                             |  | $C_{oss}$    | -   | 1119 | -    |       |
| Reverse Transfer Capacitance                   |  | $C_{rss}$    | -   | 82   | -    |       |
| Continuous Source Current <sup>1,6</sup>       | $V_G=V_D=0V, \text{Force Current}$                           | $I_S$        | -   | -    | 100  | A     |
| Diode Forward Voltage <sup>2</sup>             | $V_{GS}=0V, I_S=1A, T_J=25^\circ C$                          | $V_{SD}$     | -   | -    | 1.2  | V     |

Note :

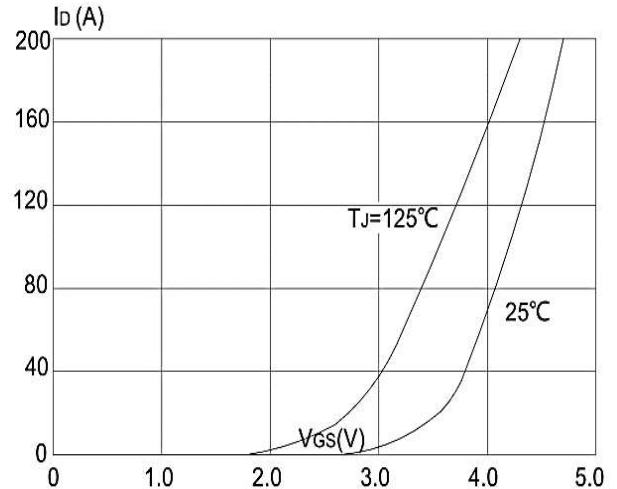
- 1、 The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.
- 2、 The data tested by pulsed , pulse width  $\cong 300\mu s$  , duty cycle  $\cong 2\%$
- 3、 The EAS data shows Max. rating . The test condition is  $V_{DD}=25V, V_{GS}=10V, L=0.5mH, I_{AS}=40A$
- 4、 The power dissipation is limited by 150°C junction temperature
- 5、 The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation

**Ratings and Characteristic Curves**

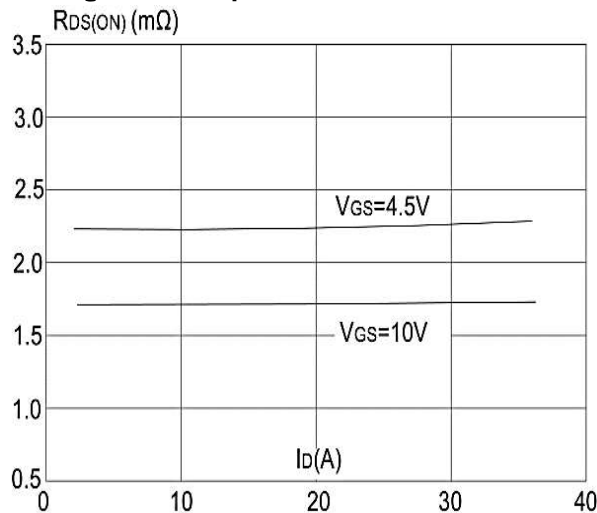
**Typical Characteristics**



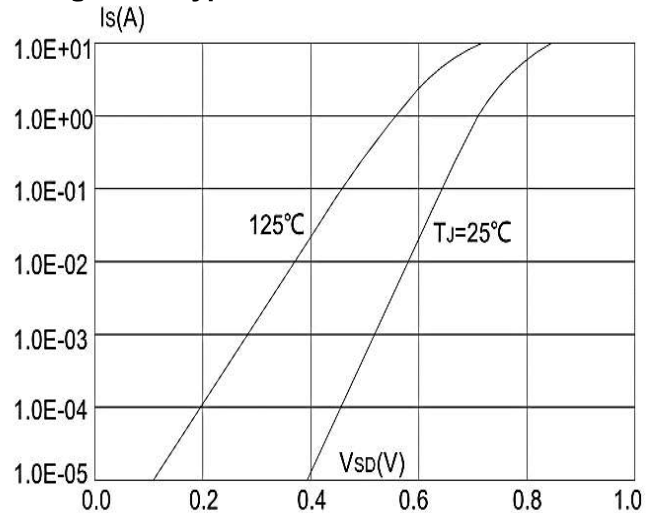
**Figure 1: Output Characteristics**



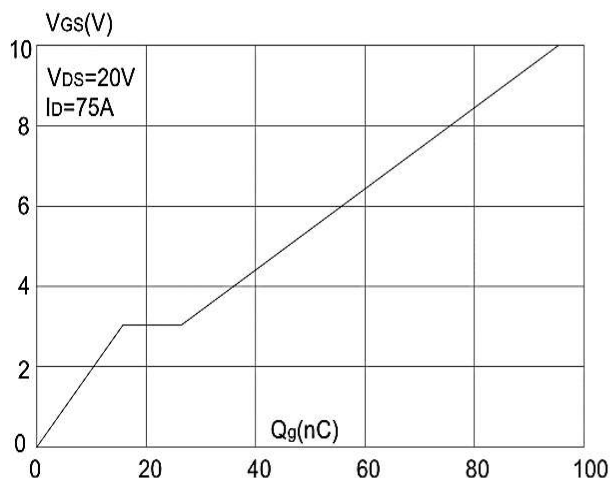
**Figure 2: Typical Transfer Characteristics**



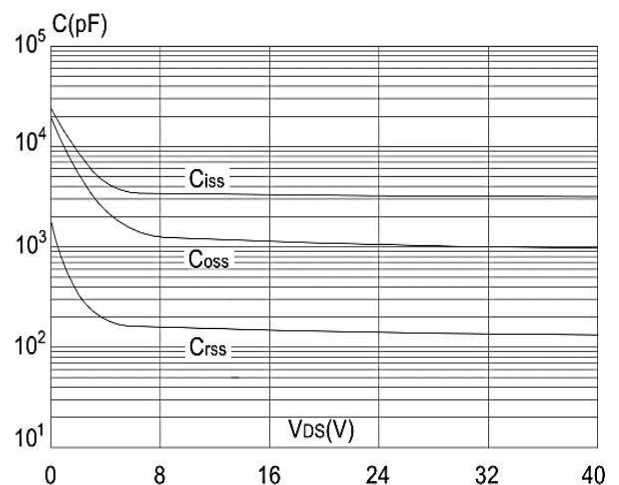
**Figure 3: On-resistance vs. Drain Current**



**Figure 4: Body Diode Characteristics**

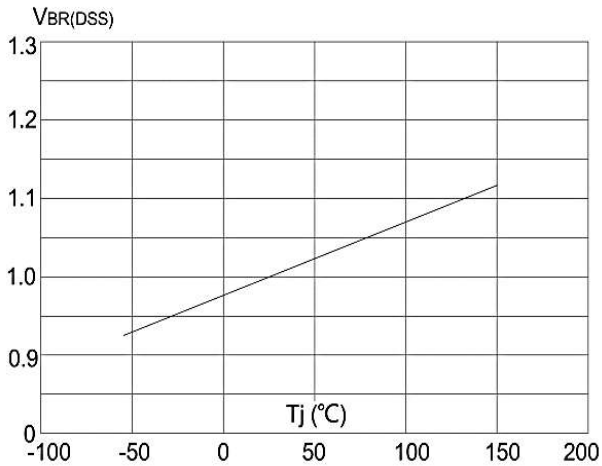


**Figure 5: Gate Charge Characteristics**

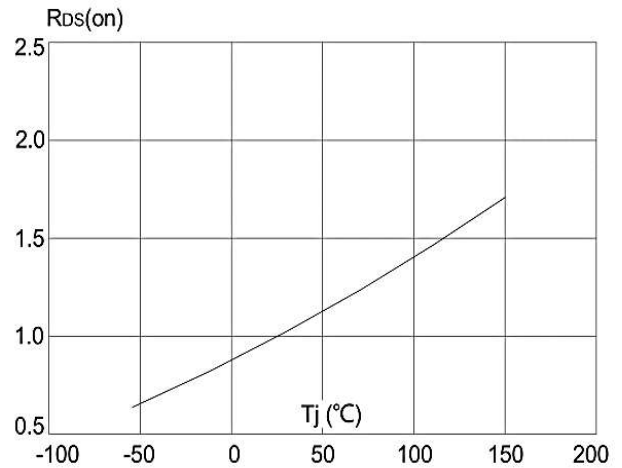


**Figure 6: Capacitance Characteristics**

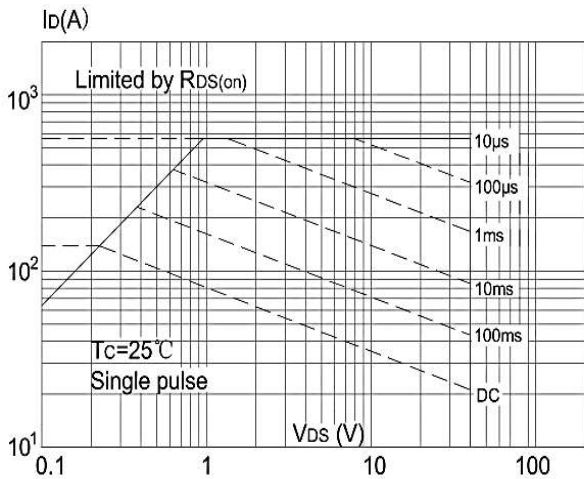
**Ratings and Characteristic Curves**



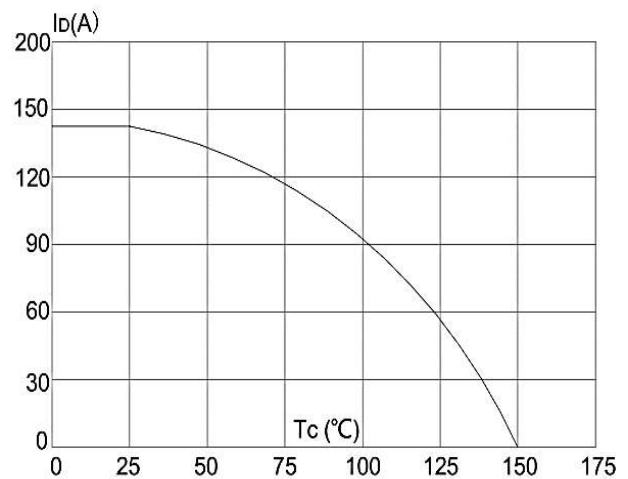
**Figure 7: Normalized Breakdown Voltage vs. Junction Temperature**



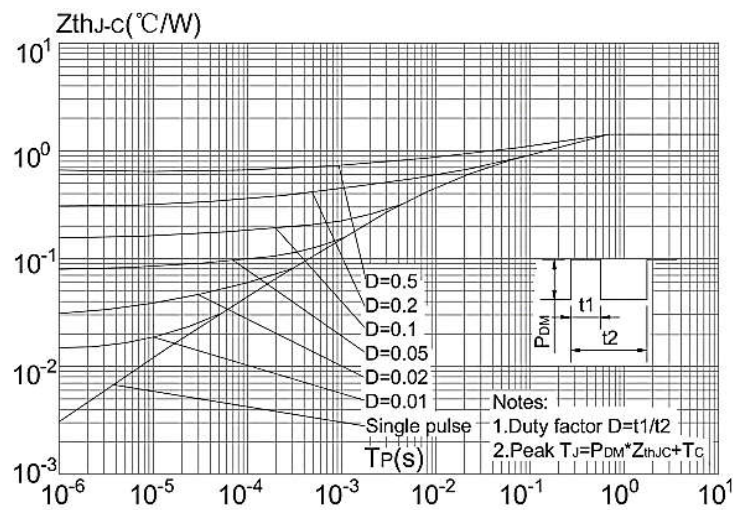
**Figure 8: Normalized on Resistance vs. Junction Temperature**



**Figure 9: Maximum Safe Operating Area**



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

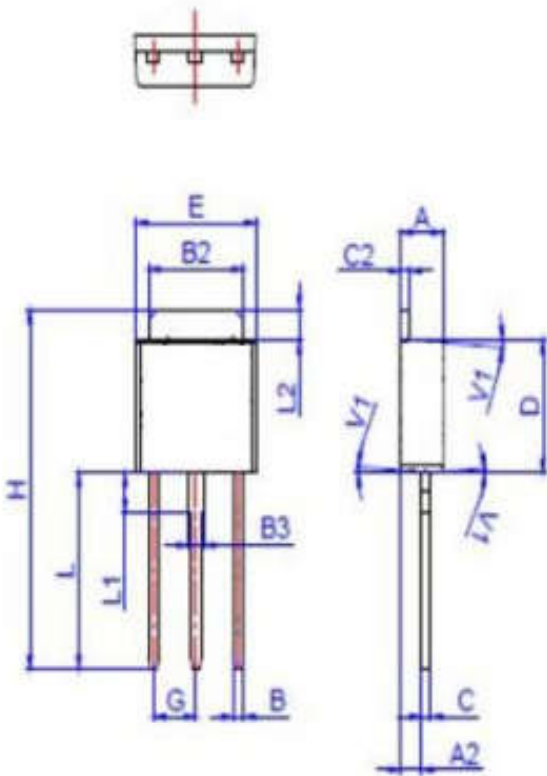


**Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Cas**

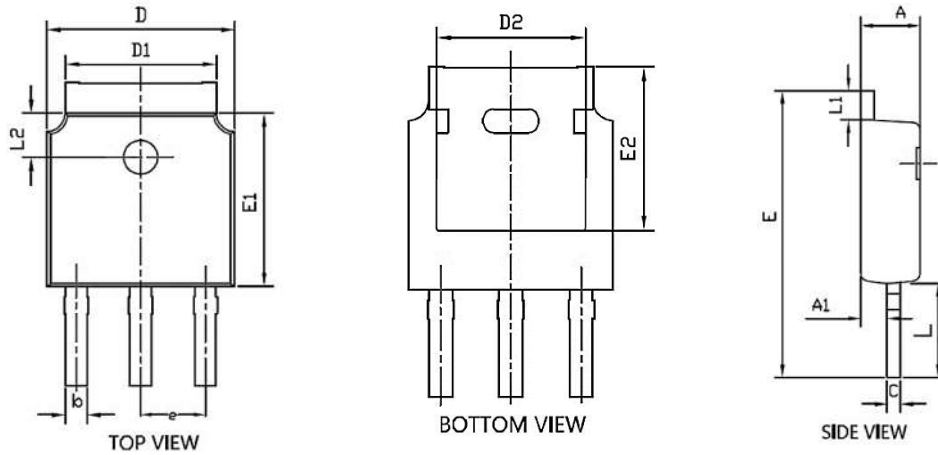
Package Outline Dimensions Millimeters

TO-251

| Pef. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millometers |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 2.20        |      | 2.40 | 0.088  |       | 0.095 |
| A2   | 0.90        |      | 1.20 | 0.035  |       | 0.047 |
| B    | 0.55        |      | 0.65 | 0.022  |       | 0.026 |
| B2   | 5.10        |      | 5.40 | 0.200  |       | 0.213 |
| B3   | 0.76        |      | 0.85 | 0.030  |       | 0.033 |
| C    | 0.45        |      | 0.62 | 0.018  |       | 0.024 |
| C2   | 0.48        |      | 0.62 | 0.019  |       | 0.024 |
| D    | 6.00        |      | 6.20 | 0.236  |       | 0.244 |
| E    | 6.40        |      | 6.70 | 0.252  |       | 0.264 |
| G    |             | 2.30 |      |        | 0.091 |       |
| H    | 16.0        |      | 17.0 | 0.630  |       | 0.669 |
| L    | 8.90        |      | 9.40 | 0.350  |       | 0.370 |
| L1   | 1.80        |      | 1.90 | 0.071  |       | 0.075 |
| L2   | 1.37        |      | 1.50 | 0.054  |       | 0.059 |
| V1   |             | 4°   |      |        | 4°    |       |



**TO-251S**



| Symbol | Common   |      |      |
|--------|----------|------|------|
|        | mm       |      |      |
|        | Mim      | Nom  | Max  |
| A      | 2.2      | 2.3  | 2.4  |
| A1     | 0.9      | 1.0  | 1.1  |
| b      | 0.66     | 0.76 | 0.86 |
| C      | 0.46     | 0.52 | 0.58 |
| D      | 6.50     | 6.6  | 6.7  |
| D1     | 5.15     | 5.3  | 5.45 |
| D2     | 4.6      | 4.8  | 4.95 |
| E      | 10.4     | ---- | 11.5 |
| E1     | 6.0      | 6.1  | 6.2  |
| E2     | 5.400REF |      |      |
| e      | 2.286BSC |      |      |
| L      | 3.5      | 4.0  | 4.3  |
| L1     | 0.9      | ---  | 1.27 |
| L2     | 1.4      | ---  | 1.9  |