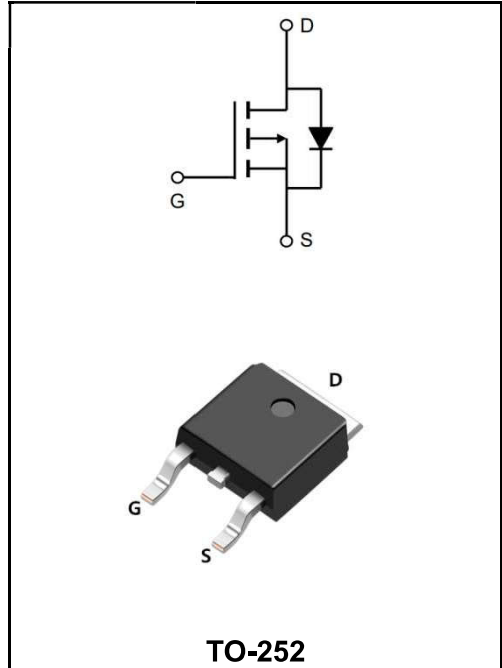


**-12V P-CHANNEL ENHANCEMENT MODE MOSFET**

**MAIN CHARACTERISTICS**

|   |                               |
|---|-------------------------------|
| <b>I<sub>D</sub></b>                                  | -90A                          |
| <b>V<sub>DSS</sub></b>                                | -12V                          |
| <b>R<sub>DS(on)-typ</sub>(@V<sub>GS</sub>= -4.5V)</b> | < 4.5mΩ( <b>Type:3.5 mΩ</b> ) |



**Application**

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

**Product Specification Classification**

| Part Number | Package | Marking           | Pack         |
|-------------|---------|-------------------|--------------|
| YFW90P01AD  | TO-252  | YFW 90P01AD 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>                  | -12         | <b>V</b>    |
| Gate - Source Voltage   | <b>V<sub>GS</sub></b>                  | ± 12        | <b>V</b>    |
| Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup> @T <sub>c</sub> =25°C  | <b>I<sub>D</sub></b>                   | -90         | <b>A</b>    |
| Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup> @T <sub>c</sub> =100°C | <b>I<sub>D</sub></b>                   | -54         | <b>A</b>    |
| Drain Current- Pulsed <sup>1</sup>  | <b>I<sub>DM</sub></b>                  | -240        | <b>A</b>    |
| Avalanche Current   | <b>I<sub>AS</sub></b>                  | 50          | <b>A</b>    |
| Single Pulsed Avalanche Energy  | <b>E<sub>AS</sub></b>                  | 560         | <b>mJ</b>   |
| Operating and Storage Temperature Range   | <b>T<sub>J</sub> , T<sub>STG</sub></b> | -55 to +150 | <b>°C</b>   |
| Thermal Resistance Junction-Ambient   | <b>R<sub>θJA</sub></b>                 | 62.5        | <b>°C/W</b> |
| Thermal Resistance Junction-Case  | <b>R<sub>θJC</sub></b>                 | 3           | <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       | $V_{GS}=0V, I_D=-250\mu A$                               | $BV_{DSS}$                   | -12  | -18    | -    | <b>V</b>     |
| BVDSS Temperature Coefficient        | Reference to 25°C, $I_D=-1mA$                            | $\Delta BV_{DSS}/\Delta T_J$ | -    | -0.008 | -    | <b>V/°C</b>  |
| Static Drain-Source On-Resistance    | $V_{GS}=-4.5V, I_D=-20A$                                 | $R_{DS(ON)}$                 | -    | 3.5    | 4.5  | <b>mΩ</b>    |
|                                      | $V_{GS}=-2.5V, I_D=-20A$                                 |                              | -    | 4.8    | 6.0  |              |
| Gate -Threshold Voltage              | $V_{DS}=V_{GS}, I_D=-250\mu A$                           | $V_{GS(th)}$                 | -0.4 | -0.6   | -1.0 | <b>V</b>     |
| $V_{GS(th)}$ Temperature Coefficient |  | $\Delta V_{GS(th)}$          | -    | -3.44  | -    | <b>mV/°C</b> |
| Drain-Source Leakage Current         | $V_{DS}=-20V, V_{GS}=0V, T_J=25^\circ C$                 | $I_{DSS}$                    | -    | -      | -1   | <b>μA</b>    |
|                                      | $V_{DS}=-16V, V_{GS}=0V, T_J=125^\circ C$                |                              | -    | -      | -30  |              |
| Gate -Source Leakage Current         | $V_{GS}=\pm 12V, V_{DS}=0V$                              | $I_{GSS}$                    | -    | -      | ±500 | <b>nA</b>    |
| Forward Transconductance             | $V_{DS}=-10V, I_S=-3A$                                   | $g_{fs}$                     | -    | 30     | -    | <b>S</b>     |
| Total Gate Charge                    | $V_{DS}=-16V$<br>$V_{GS}=-4.5V$<br>$I_D=-5A$             | $Q_g$                        | -    | 149    | 225  | <b>nC</b>    |
| Gate-Source Charge                   |  | $Q_{gs}$                     | -    | 14.4   | 22   |              |
| Gate-Drain Charge                    |  | $Q_{gd}$                     | -    | 42.8   | 65   |              |
| Turn-on delay time                   | $V_{DD}=-15V$<br>$V_{GS}=-4.5V$<br>$I_D=-1A$<br>$R_G=25$ | $t_{d(on)}$                  | -    | 21.2   | 42   | <b>ns</b>    |
| Rise Time                            |  | $T_r$                        | -    | 20.6   | 40   |              |
| Turn-Off Delay Time                  |  | $t_{d(OFF)}$                 | -    | 26     | 52   |              |
| Fall Time                            |  | $t_f$                        | -    | 400    | 600  |              |
| Input Capacitance                    | $V_{DS}=-15V$<br>$V_{GS}=0V$<br>$f=1MHz$                 | $C_{iss}$                    | -    | 6800   | -    | <b>μF</b>    |
| Output Capacitance                   |  | $C_{oss}$                    | -    | 769    | -    |              |
| Reverse Transfer Capacitance         |  | $C_{rss}$                    | -    | 726    | -    |              |
| Gate resistance                      | $V_{GS}=0V, V_{DS}=0V, F=1MHz$                           | $R_g$                        | -    | 2.6    | -    | <b>Ω</b>     |
| Continuous Source Current            | $V_G=V_D=0V, \text{Force Current}$                       | $I_S$                        | -    | -      | -90  | <b>A</b>     |
| Pulsed Source Current                |  | $I_{SM}$                     | -    | -      | -180 | <b>A</b>     |
| Diode Forward Voltage                | $V_{GS}=0V, I_S=1A, T_J=25^\circ C$                      | $V_{SD}$                     | -    | -      | -1   | <b>V</b>     |

Note :

- 1、 The data tested by surface mounted on a 1 inch 2 FR-4 board with 2OZ copper.
- 2、 The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- 3、 The EAS data shows Max. rating . The test condition is  $V_{DD}=8V, V_{GS}=4.5V, L=0.1mH, I_{AS}=50A$
- 4、 The power dissipation is limited by 150°C junction temperature
- 5、 The data is theoretically the same as  $I_D$  and  $I_{DM}$  , in real applications , should be limited by total power dissipation.

Ratings and Characteristic Curves

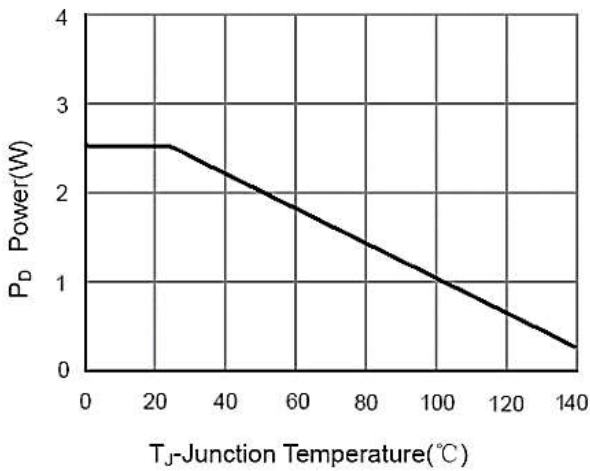


Figure 1: Power Dissipation

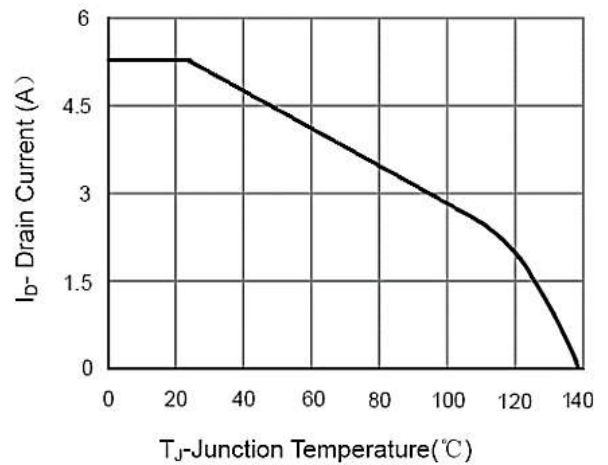


Figure 2: Drain Current

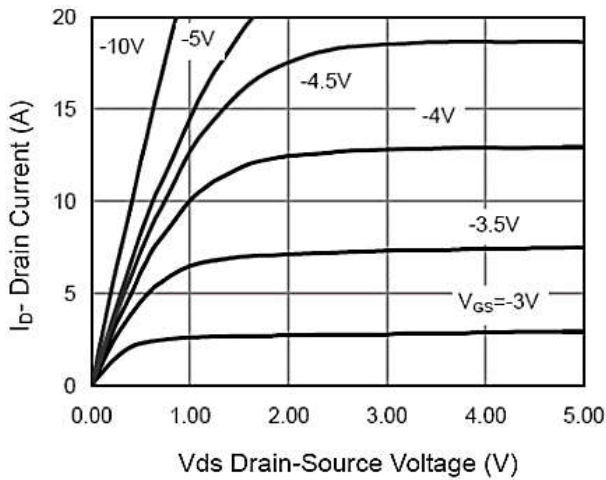


Figure 3: Output Characteristics

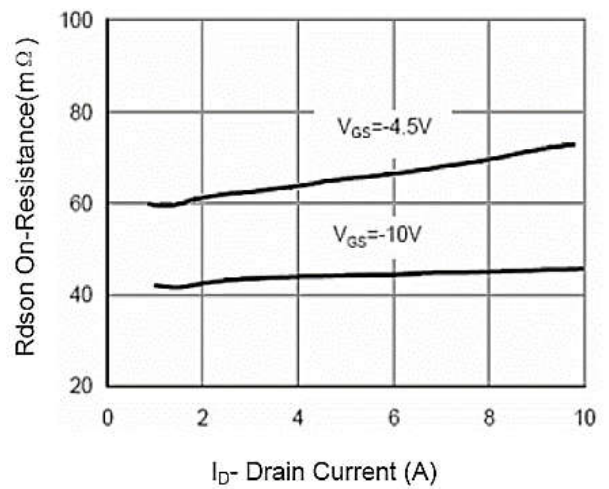


Figure 4: Drain-Source On-Resistance

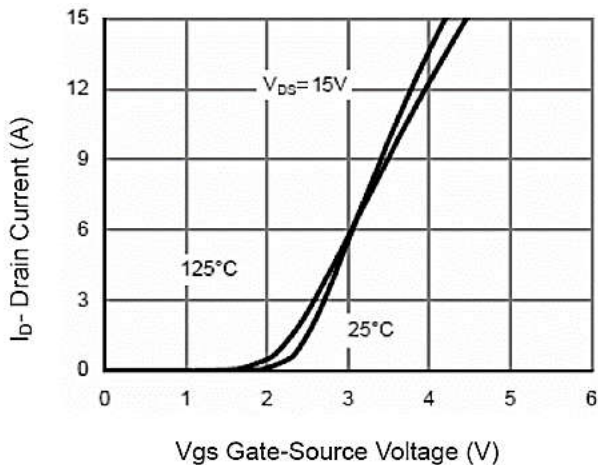


Figure 5: Transfer Characteristics

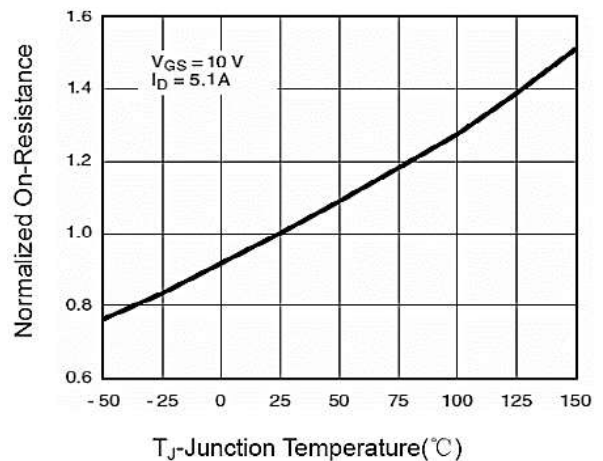


Figure 6: Drain-Source On-Resistance

Ratings and Characteristic Curves

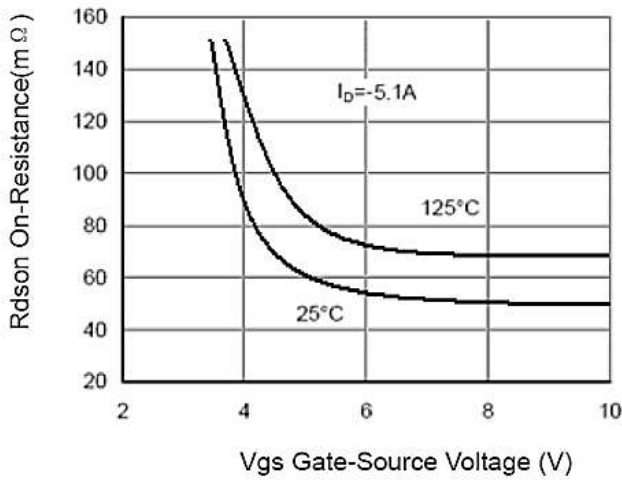


Figure 7: Rdson vs Vgs

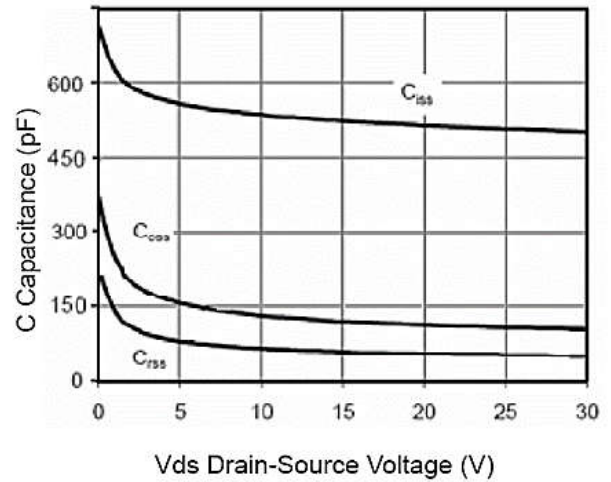


Figure 8: Capacitance vs Vds

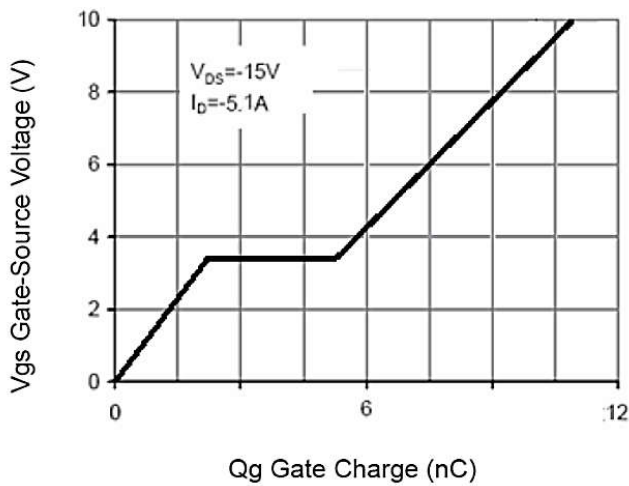


Figure 9: Gate Charge

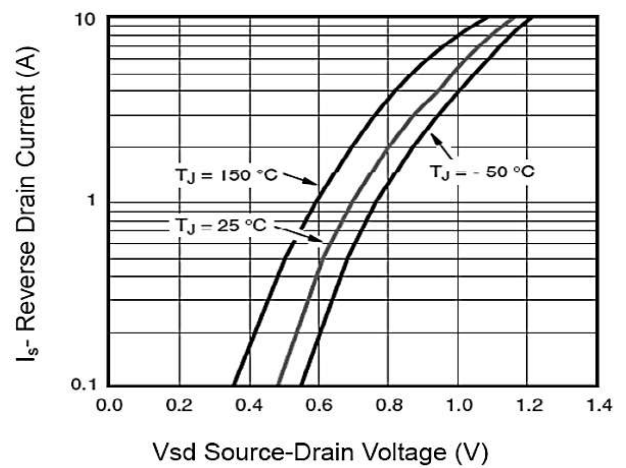


Figure 10: Source-Drain Diode Forward

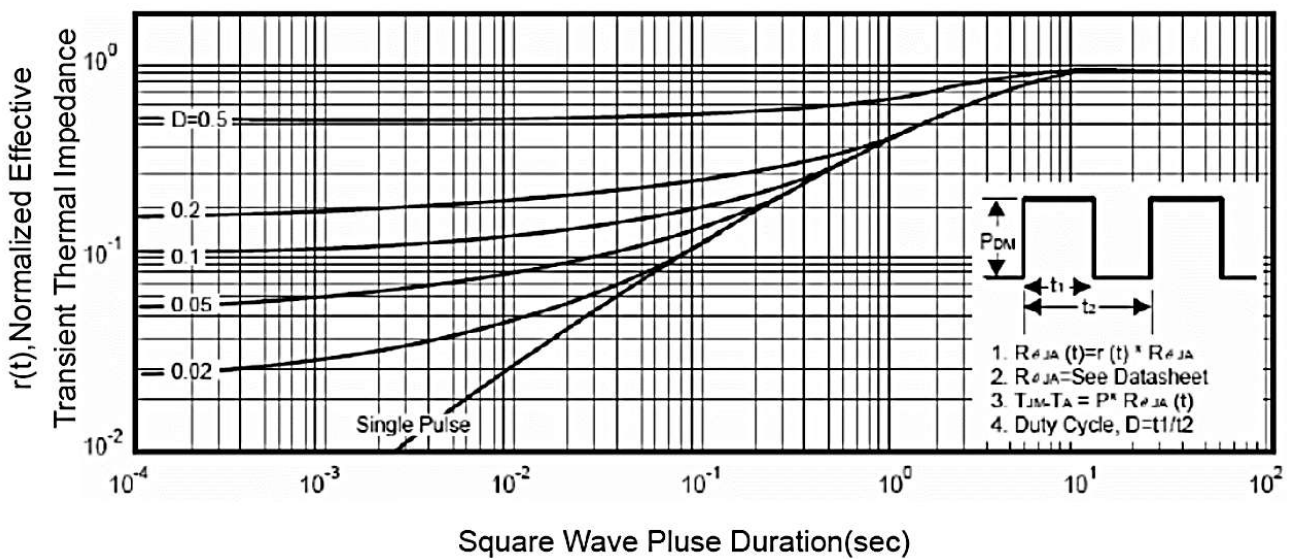


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

Package Outline Dimensions Millimeters

TO-252

| Dim.                         | Min.    | Typ. | Max.  |
|------------------------------|---------|------|-------|
| A                            | 2.10    | -    | 2.50  |
| A2                           | 0       | -    | 0.10  |
| B                            | 0.66    | -    | 0.86  |
| B2                           | 5.18    | -    | 5.48  |
| C                            | 0.40    | -    | 0.60  |
| C2                           | 0.44    | -    | 0.58  |
| D                            | 5.90    | -    | 6.30  |
| D1                           | 5.30REF |      |       |
| E                            | 6.40    | -    | 6.80  |
| E1                           | 4.63    | -    | -     |
| G                            | 4.47    | -    | 4.67  |
| H                            | 9.50    | -    | 10.70 |
| L                            | 1.09    | -    | 1.21  |
| L2                           | 1.35    | -    | 1.65  |
| V1                           | -       | 7°   | -     |
| V2                           | 0°      | -    | 6°    |
| All Dimensions in millimeter |         |      |       |

