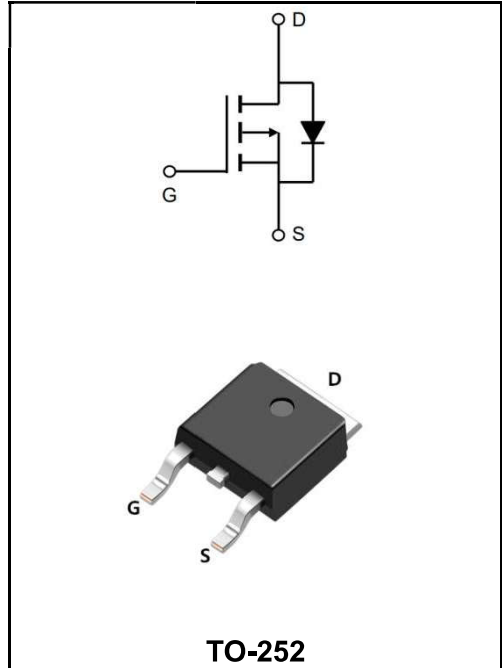


**-30V P-CHANNEL ENHANCEMENT MODE MOSFET**

**MAIN CHARACTERISTICS**

|                                                     |                           |
|-----------------------------------------------------|---------------------------|
| <b>I<sub>D</sub></b>                                | -60A                      |
| <b>V<sub>DSS</sub></b>                              | -30V                      |
| <b>R<sub>DS(on)-typ(@V<sub>GS</sub>=-10V)</sub></b> | < 13mΩ <b>(Type:9 mΩ)</b> |



**Application**

- ◆Lithium battery protection
- ◆Wireless impact
- ◆Mobile phone fast charging

**Product Specification Classification**

| Part Number | Package | Marking           | Pack         |
|-------------|---------|-------------------|--------------|
| YFW60P03AD  | TO-252  | YFW 60P03AD 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>  | -30         | <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</sup> @T <sub>c</sub> =25°C  | <b>I<sub>D</sub></b>   | -60         | <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>   | -30         | <b>A</b>    |
| Pulsed Drain Current <sup>2</sup>                                                    | <b>I<sub>DM</sub></b>  | -150        | <b>A</b>    |
| Single Pulse Avalanche Energy <sup>3</sup>                                           | <b>E<sub>AS</sub></b>  | 125         | <b>mJ</b>   |
| Avalanche Current                                                                    | <b>I<sub>AS</sub></b>  | -50         | <b>A</b>    |
| Total Power Dissipation <sup>4</sup> @T <sub>c</sub> =25°C                           | <b>P<sub>D</sub></b>   | 45          | <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> | 62          | <b>°C/W</b> |
| Thermal Resistance Junction to Case <sup>1</sup>                                     | <b>R<sub>θJC</sub></b> | 2.8         | <b>°C/W</b> |

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

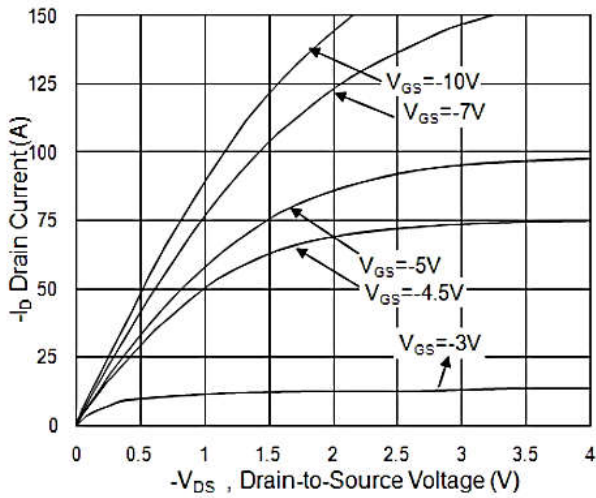
| Characteristics                                | Test Condition                                                  | Symbols                      | Min  | Typ     | Max  | Units |
|------------------------------------------------|-----------------------------------------------------------------|------------------------------|------|---------|------|-------|
| Drain-Source Breakdown Voltage                 | $V_{GS}=0V, I_D=-250\mu A$                                      | $BV_{DSS}$                   | -30  | -32     | -    | V     |
| $BV_{DSS}$ Temperature Coefficient             | Reference to 25°C, $I_D=-1mA$                                   | $\Delta BV_{DSS}/\Delta T_J$ | -    | -0.0232 | -    | V/°C  |
| Static Drain-Source On-Resistance <sup>2</sup> | $V_{GS}=-10V, I_D=-30A$                                         | $R_{DS(ON)}$                 | -    | 9.0     | 13   | mΩ    |
|                                                | $V_{GS}=-4.5V, I_D=-15A$                                        |                              | -    | 13      | 18   |       |
| Gate -Threshold Voltage                        | $V_{DS}=V_{GS}, I_D=-250\mu A$                                  | $V_{GS(th)}$                 | -1.2 | -1.6    | -2.5 | V     |
| $V_{GS(th)}$ Temperature Coefficient           |                                                                 | $\Delta V_{GS(th)}$          | -    | 4.6     | -    | mV/°C |
| Drain-Source Leakage Current                   | $V_{DS}=-24V, V_{GS}=0V, T_J=25^\circ C$                        | $I_{DSS}$                    | -    | -       | -1   | μA    |
|                                                | $V_{DS}=-24V, V_{GS}=0V, T_J=55^\circ C$                        |                              | -    | -       | -5   |       |
| Gate -Source Leakage Current                   | $V_{GS}=\pm 25V, V_{DS}=0V$                                     | $I_{GSS}$                    | -    | -       | ±100 | nA    |
| Forward Transconductance                       | $V_{DS}=-5V, I_D=-30A$                                          | $g_{fs}$                     | -    | 30      | -    | S     |
| Gate Resistance                                | $V_{DS}=0V, V_{GS}=0V, f=1MHz$                                  | $R_g$                        | -    | 9       | -    | Ω     |
| Total Gate Charge(-4.5V)                       | $V_{DS}=-15V$<br>$V_{GS}=-4.5V$<br>$I_D=-15A$                   | $Q_g$                        | -    | 22      | -    | nC    |
| Gate-Source Charge                             |                                                                 | $Q_{gs}$                     | -    | 8.7     | -    |       |
| Gate-Drain Charge                              |                                                                 | $Q_{gd}$                     | -    | 7.2     | -    |       |
| Turn-on delay time                             | $V_{DD}=-15V$<br>$V_{GS}=-10V$<br>$I_D=-15A$<br>$R_G=3.3\Omega$ | $t_{d(on)}$                  | -    | 8       | -    | ns    |
| Rise Time                                      |                                                                 | $T_r$                        | -    | 73.7    | -    |       |
| Turn-Off Delay Time                            |                                                                 | $t_{d(OFF)}$                 | -    | 61.8    | -    |       |
| Fall Time                                      |                                                                 | $t_f$                        | -    | 24.4    | -    |       |
| Input Capacitance                              | $V_{DS}=-15V$<br>$V_{GS}=0V$<br>$f=1MHz$                        | $C_{iss}$                    | -    | 2215    | -    | pF    |
| Output Capacitance                             |                                                                 | $C_{oss}$                    | -    | 310     | -    |       |
| Reverse Transfer Capacitance                   |                                                                 | $C_{rss}$                    | -    | 237     | -    |       |
| Continuous Source Current <sup>1,5</sup>       | $V_G=V_D=0V, \text{ Force Current}$                             | $I_S$                        | -    | -       | -45  | A     |
| Pulsed Source Current <sup>2,5</sup>           |                                                                 | $I_{SM}$                     | -    | -       | -150 | A     |
| Diode Forward Voltage <sup>2</sup>             | $V_{GS}=0V, I_S=-1A, T_J=25^\circ C$                            | $V_{SD}$                     | -    | -       | -1   | V     |
| Reverse Recovery Time                          | $I_F=-15A, dI/dt=100A/\mu s,$<br>$T_J=25^\circ C$               | $t_{rr}$                     | -    | 19      | -    | ns    |
| Reverse Recovery Charge                        |                                                                 | $Q_{rr}$                     | -    | 9       | -    | nC    |

Note :

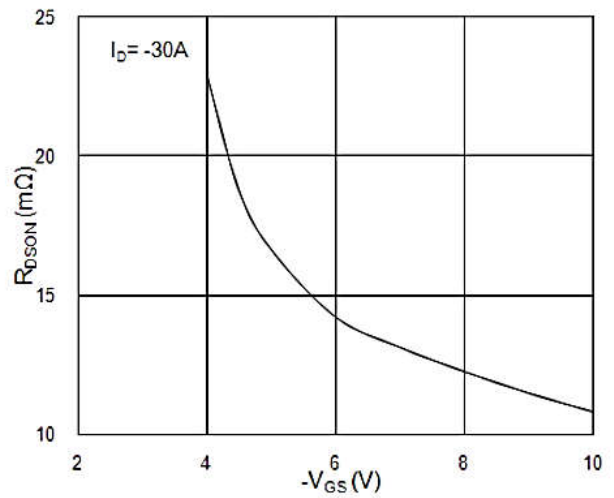
- 1、The data tested by surface mounted on a 1 inch 2 FR-4 board with 20Z copper.
- 2、The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- 3、The EAS data shows Max. rating . The test condition is  $V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{AS}=-50A$
- 4、The power dissipation 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**

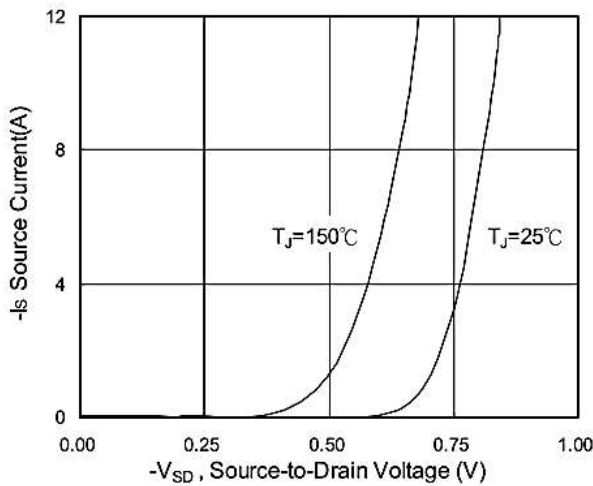
**Typical Characteristics**



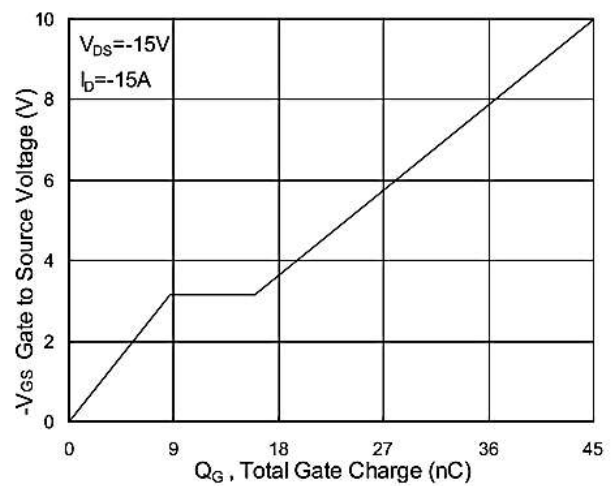
**Fig.1 Typical Output Characteristics**



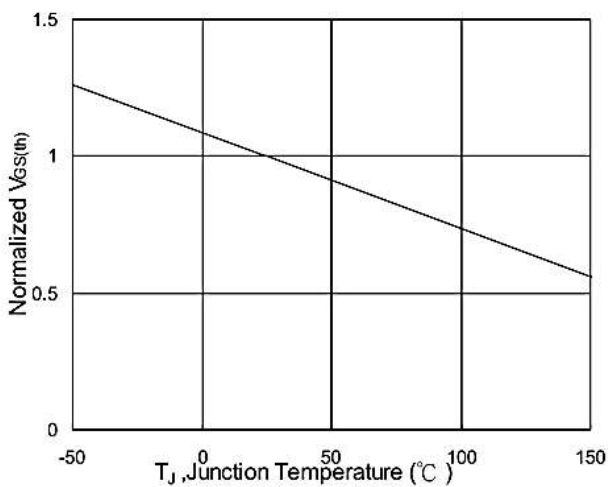
**Fig.2 On-Resistance vs. G-S Voltage**



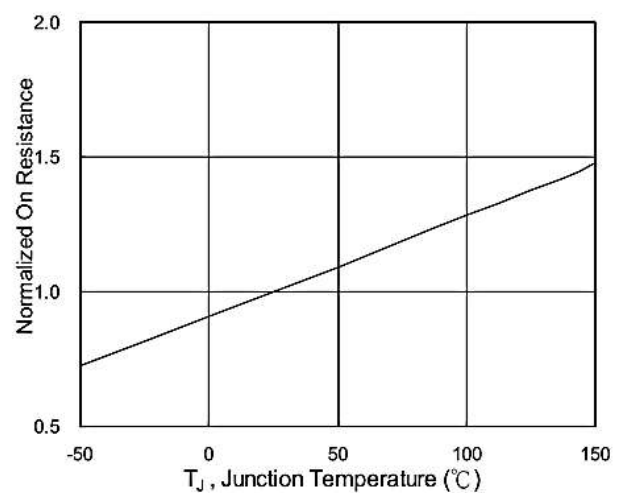
**Fig.3 Forward Characteristics of Reverse**



**Fig.4 Gate-charge Characteristics**

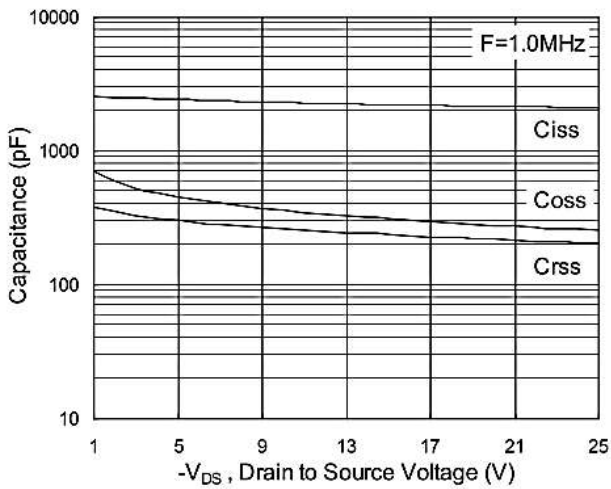


**Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$**

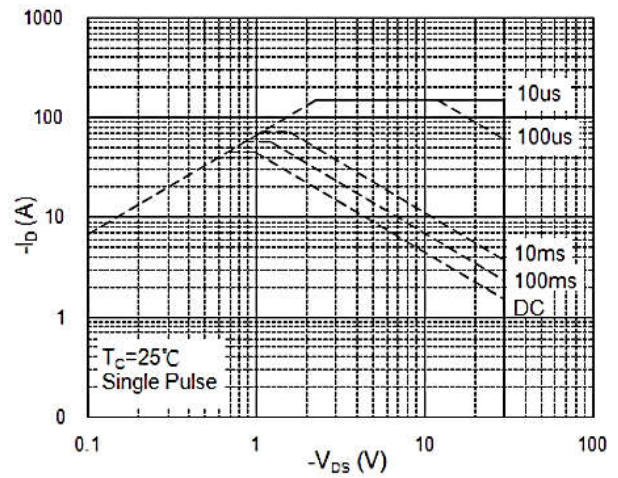


**Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$**

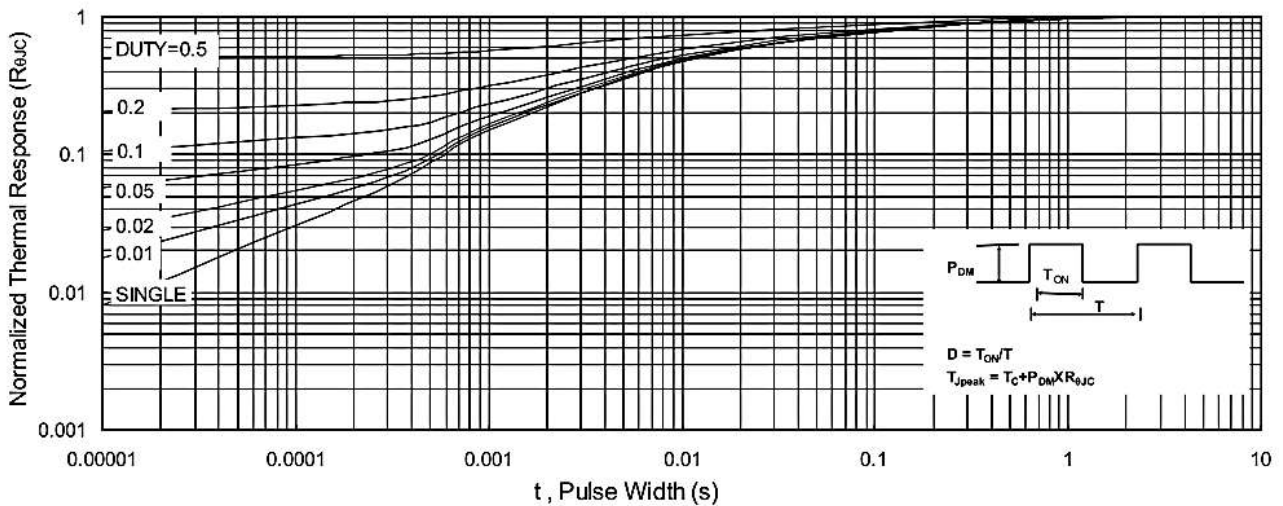
**Ratings and Characteristic Curves**



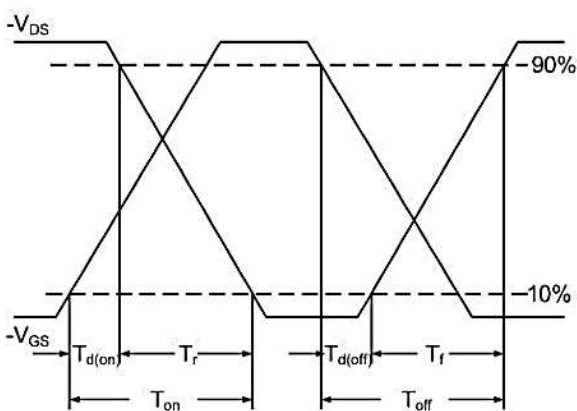
**Fig.7 Capacitance**



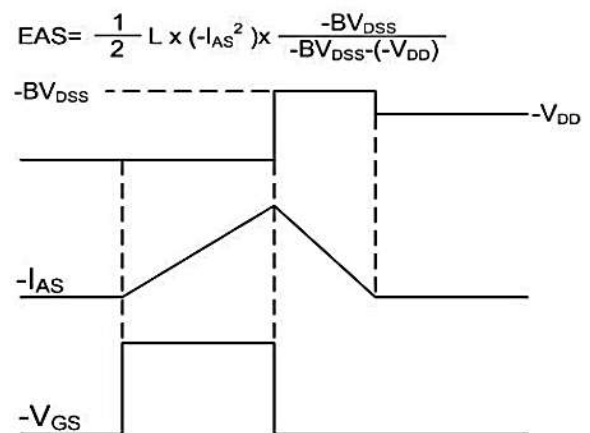
**Fig.8 Safe Operating Area**



**Fig.9 Normalized Maximum Transient Thermal Impedance**



**Fig.10 Switching Time Waveform**



**Fig.11 Unclamped Inductive Switching Waveform**

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 |      |         |      |       |