

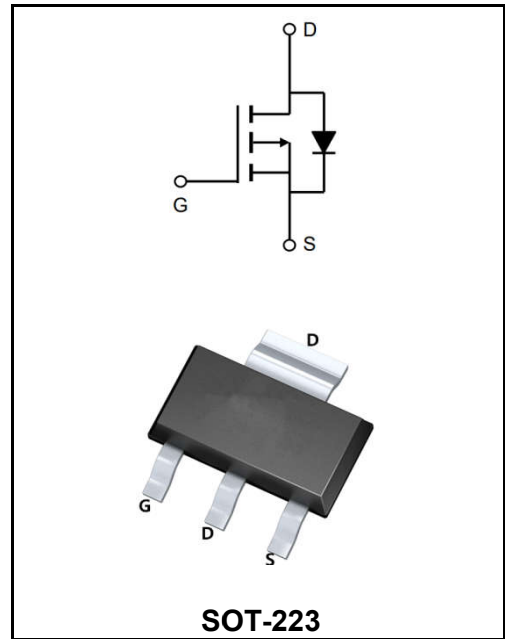
**-60V P-CHANNEL ENHANCEMENT MODE MOSFET**

**MAIN CHARACTERISTICS**

|   |                                |
|---|--------------------------------|
| <b>I<sub>D</sub></b>                                | -5A                            |
| <b>V<sub>DSS</sub></b>                              | -60V                           |
| <b>R<sub>DS(on)-typ(@V<sub>GS</sub>=-10V)</sub></b> | < -130mΩ( <b>Type:110 mΩ</b> ) |

**Application**

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



**Product Specification Classification**

| Part Number | Package | Marking           | Pack         |
|-------------|---------|-------------------|--------------|
| YFW5P06MSI  | SOT-223 | YFW 5P06MSI XXXXX | 3000PCS/Tape |

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

| Characteristics   | Symbols                | Value       | Units       |
|---|------------------------|-------------|-------------|
| Drain-Source Voltage  | <b>V<sub>DS</sub></b>  | -60         | <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>A</sub> =25°C | <b>I<sub>D</sub></b>   | -5          | <b>A</b>    |
| Continuous Drain Current, V <sub>GS</sub> @ -10V <sup>1</sup> @T <sub>A</sub> =70°C | <b>I<sub>D</sub></b>   | -3.5        | <b>A</b>    |
| Pulsed Drain Current <sup>2</sup>   | <b>I<sub>DM</sub></b>  | -14         | <b>A</b>    |
| Total Power Dissipation <sup>3</sup> @T <sub>A</sub> =25°C                          | <b>P<sub>D</sub></b>   | 2           | <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> | 70          | <b>°C/W</b> |
| Thermal Resistance Junction-Case <sup>1</sup>                                       | <b>R<sub>θJC</sub></b> | 100         | <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                 | $V_{GS}=0V, I_D=-250\mu A$                                    | $BV_{DSS}$   | -60  | -67  | -    | <b>V</b>  |
| Static Drain-Source On-Resistance <sup>2</sup> | $V_{GS}=-10V, I_D=-2A$  | $R_{DS(ON)}$ | -    | 110  | 130  | <b>mΩ</b> |
|  | $V_{GS}=-4.5V, I_D=-1.5A$                                     |              | -    | 140  | 190  |           |
| Gate -Threshold Voltage                        | $V_{DS}=V_{GS}, I_D=-250\mu A$                                | $V_{GS(th)}$ | -1.0 | -1.7 | -2.5 | <b>V</b>  |
| Drain -Source Leakage Current                  | $V_{DS}=-48V, V_{GS}=0V, T_J=25^\circ C$                      | $I_{DSS}$    | -    | -    | 1    | <b>μA</b> |
|  | $V_{DS}=-48V, V_{GS}=0V, T_J=150^\circ C$                     |              | -    | -    | 5    |           |
| Gate-Source Leakage Current                    | $V_{GS}=\pm 20V, V_{DS}=0V$                                   | $I_{GSS}$    | -    | -    | ±100 | <b>nA</b> |
| Forward Transconductance                       | $V_{DS}=-5V, I_D=-2A$   | $g_{FS}$     | -    | 5.8  | -    | <b>S</b>  |
| Total Gate Charge(-4.5V)                       | $V_{DS}=-20V$<br>$V_{GS}=-4.5V$<br>$I_D=-2A$                  | $Q_g$        | -    | 5.9  | -    | <b>nC</b> |
| Gate-Source Charge                             |   | $Q_{GS}$     | -    | 2.9  | -    |           |
| Gate-Drain Charge                              |   | $Q_{gd}$     | -    | 1.8  | -    |           |
| Turn-on delay time                             | $V_{DD}=-12V$<br>$V_{GS}=-10V$<br>$R_G=3.3\Omega$<br>$I_D=-1$ | $t_{d(on)}$  | -    | 10   | -    | <b>nS</b> |
| Rise Time                                      |   | $T_r$        | -    | 17   | -    |           |
| Turn-Off Delay Time                            |   | $t_{d(OFF)}$ | -    | 22   | -    |           |
| Fall Time                                      |   | $t_f$        | -    | 21   | -    |           |
| Input Capacitance                              | $V_{DS}=-15V$<br>$V_{GS}=0V$<br>$f=1.0MHz$                    | $C_{iss}$    | -    | 715  | -    | <b>μF</b> |
| Output Capacitance                             |   | $C_{oss}$    | -    | 51   | -    |           |
| Reverse Transfer Capacitance                   |   | $C_{rss}$    | -    | 34   | -    |           |
| Continuous Source Current <sup>1,5</sup>       | $V_G=V_D=0V, \text{Force Current}$                            | $I_S$        | -    | -    | -4   | <b>A</b>  |
| Diode Forward Voltage <sup>2</sup>             | $V_{GS}=0V, I_S=-1A, T_J=25^\circ C$                          | $V_{SD}$     | -    | -    | -1.2 | <b>V</b>  |

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 power dissipation is limited by 150°C junction temperature
- 4、 The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Ratings and Characteristic Curves

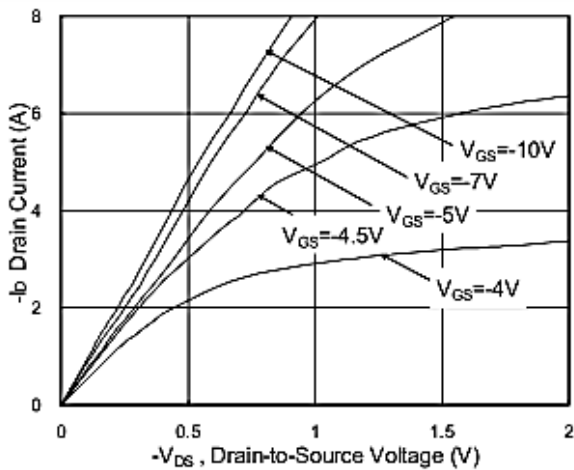


Fig.1 Typical Output Characteristics

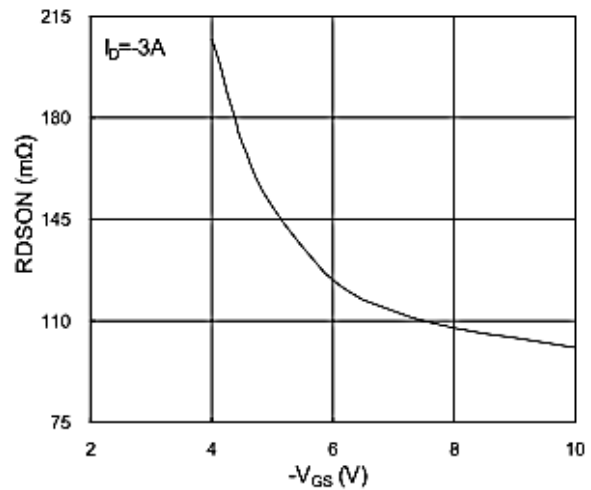


Fig.2 On-Resistance vs. G-S Voltage

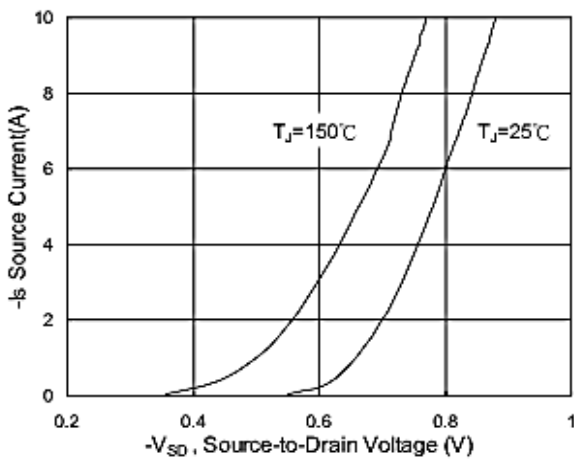


Fig.3 Forward Characteristics Of Reverse

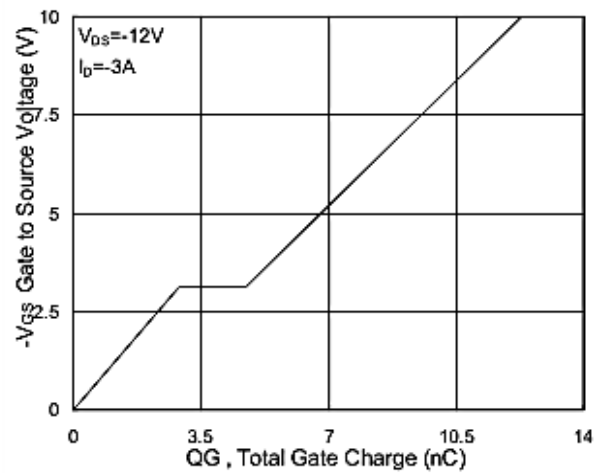


Fig.4 Gate-Charge Characteristics

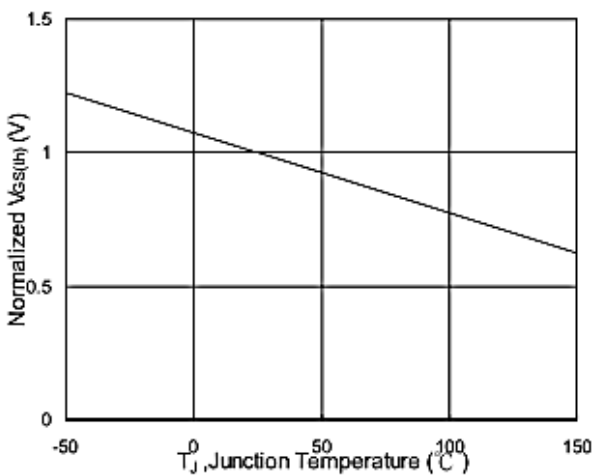


Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$

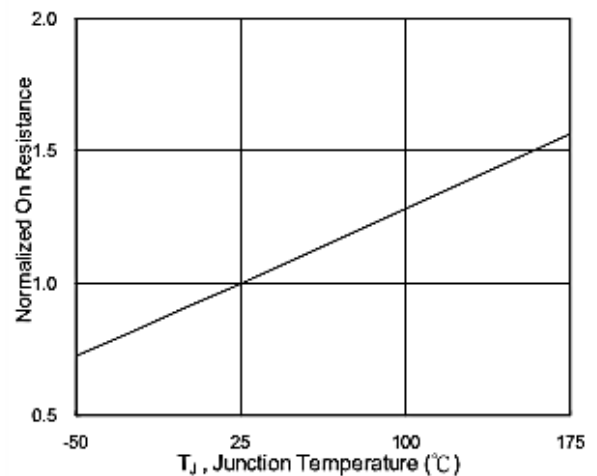
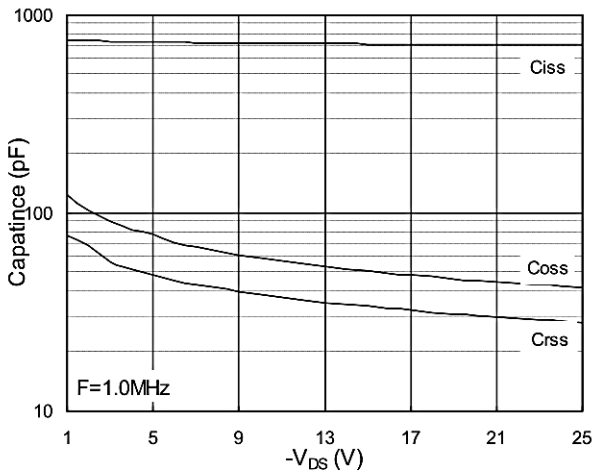
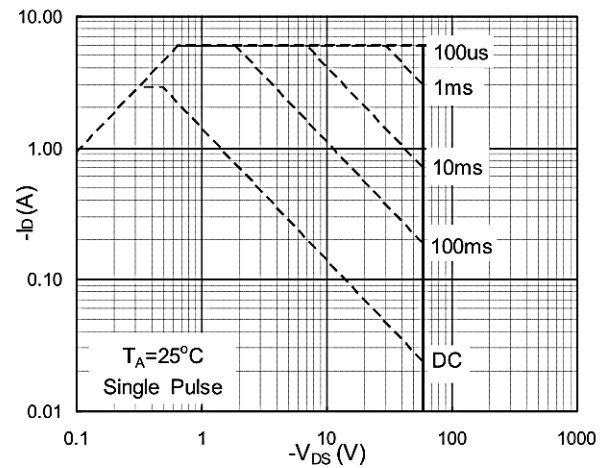


Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$

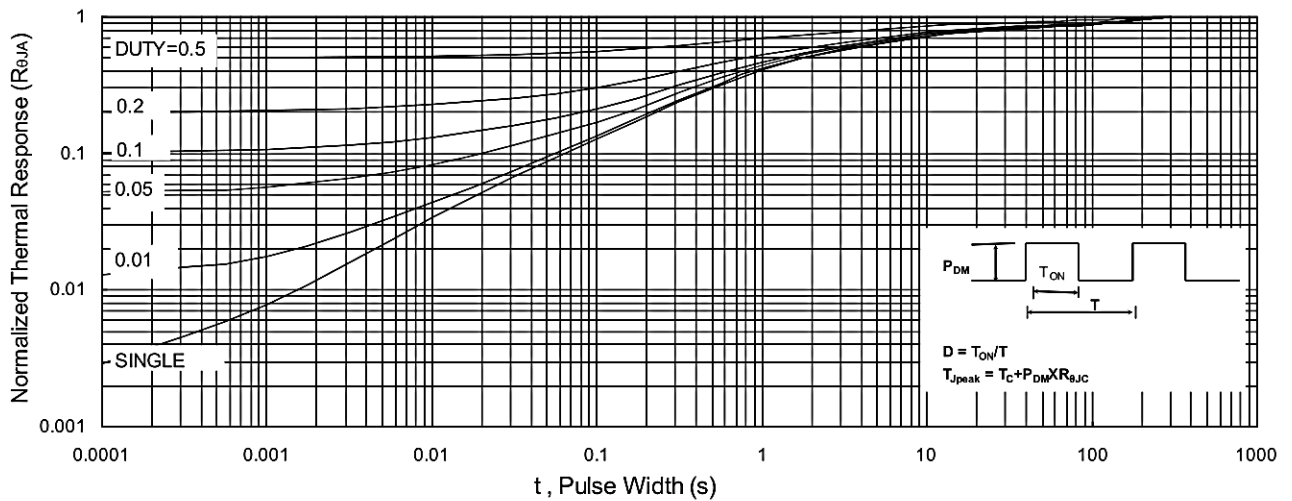
**Ratings and Characteristic Curves**



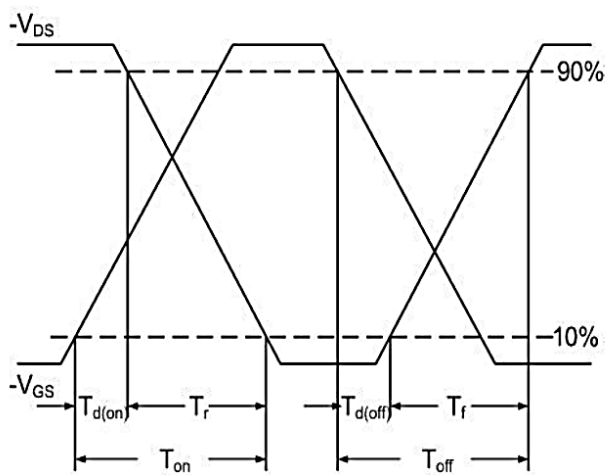
**Fig.7 Capacitance**



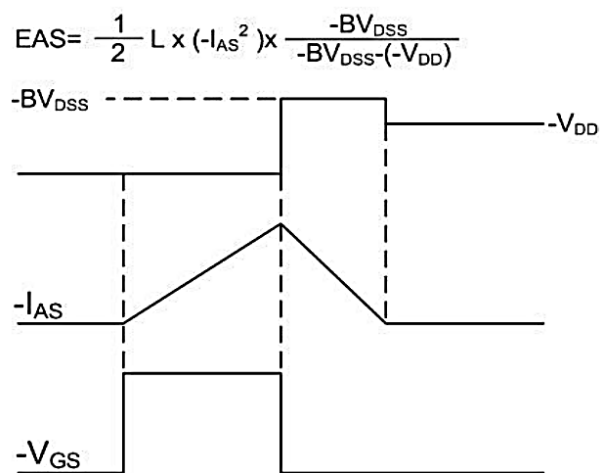
**Fig.8 Safe Operating Area**



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

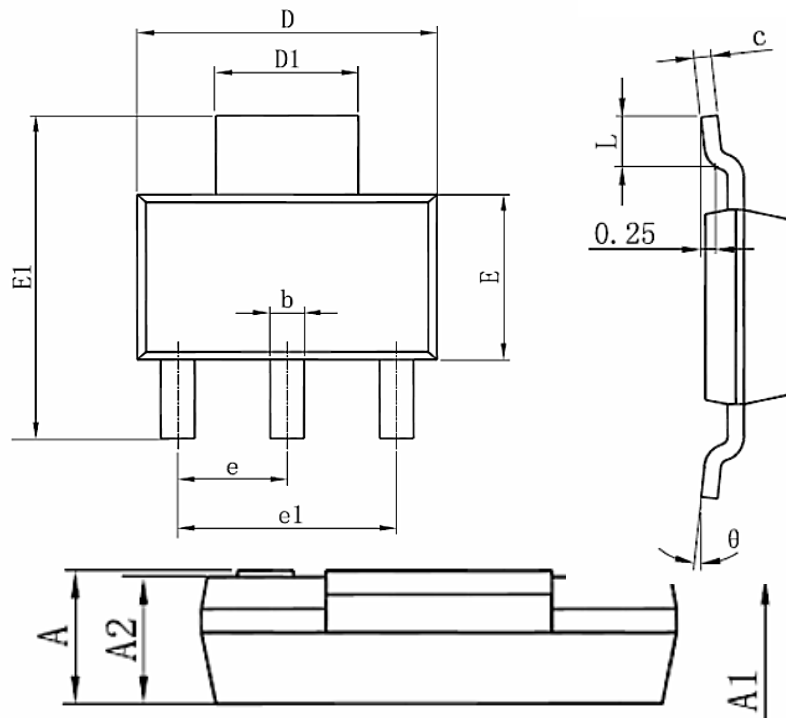


**Fig.10 Switching Time Waveform**



**Fig.11 Unclamped Inductive Waveform**

SOT-223



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 1.52                      | 1.8   | 0.06                 | 0.049 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 1.5                       | 1.7   | 0.059                | 0.045 |
| b      | 0.66                      | 0.82  | 0.026                | 0.032 |
| c      | 0.25                      | 0.35  | 0.010                | 0.014 |
| D      | 6.2                       | 6.4   | 0.244                | 0.252 |
| D1     | 2.9                       | 3.1   | 0.114                | 0.122 |
| E      | 3.3                       | 3.7   | 0.130                | 0.146 |
| E1     | 6.83                      | 7.07  | 0.269                | 0.278 |
| e      | 2.300(BSC)                |       | 0.037(BSC)           |       |
| e1     | 4.500                     | 4.700 | 0.177                | 0.185 |
| L      | 0.900                     | 1.15  | 0.035                | 0.045 |
| θ      | 0°                        | 10°   | 0°                   | 10°   |