

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

**MAIN CHARACTERISTICS**

|                                                    |                           |
|----------------------------------------------------|---------------------------|
| <b>I<sub>D</sub></b>                               | 160A                      |
| <b>V<sub>DSS</sub></b>                             | 60V                       |
| <b>R<sub>DS(on)</sub>-typ(@V<sub>GS</sub>=10V)</b> | <3mΩ ( <b>Typ:2.8mΩ</b> ) |

**FEATURES**

◆ Adopt advanced trench technology to provide excellent Battery protection or in other Switching application.

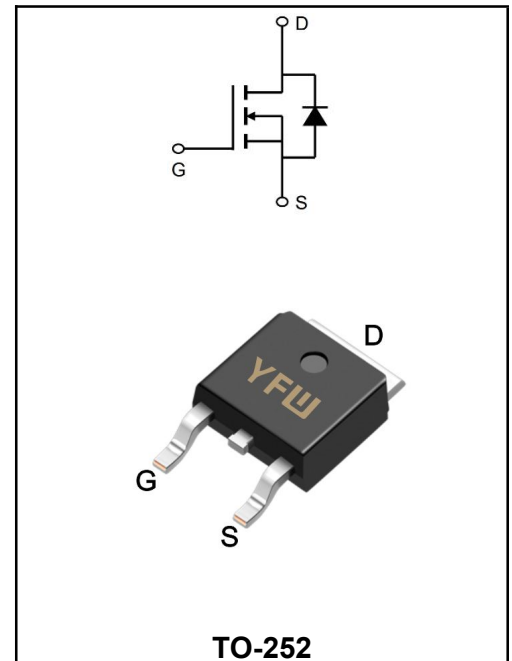
◆ **YFW-SGT technology**

**APPLICATIONS**

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

**MECHANICAL DATA**

- ◆ Case: Molded plastic
- ◆ Mounting Position: Any
- ◆ Molded Plastic: UL Flammability Classification Rating 94V-0
- ◆ Lead free in compliance with EU RoHS 2011/65/EU directive
- ◆ Solder bath temperature 275°C maximum, 10s per JESD 22-B106



**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                | <b>I<sub>D</sub></b>                  | 160         | <b>A</b>    |
| Pulsed drain current(Note1)             | <b>I<sub>DM</sub></b>                 | 240         | <b>A</b>    |
| Power dissipation                       | <b>P<sub>D</sub></b>                  | 210         | <b>W</b>    |
| Single pulsed avalanche energy(Note1)   | <b>E<sub>AS</sub></b>                 | 650         | <b>mJ</b>   |
| Operation and storage temperature       | <b>T<sub>STG</sub> ,T<sub>J</sub></b> | -55 to +150 | <b>°C</b>   |
| Thermal Resistance Junction-Case        | <b>R<sub>θJC</sub></b>                | 0.59        | <b>°C/W</b> |
| Thermal Resistance, Junction-to-Ambient | <b>R<sub>θJA</sub></b>                | 50          | <b>°C/W</b> |

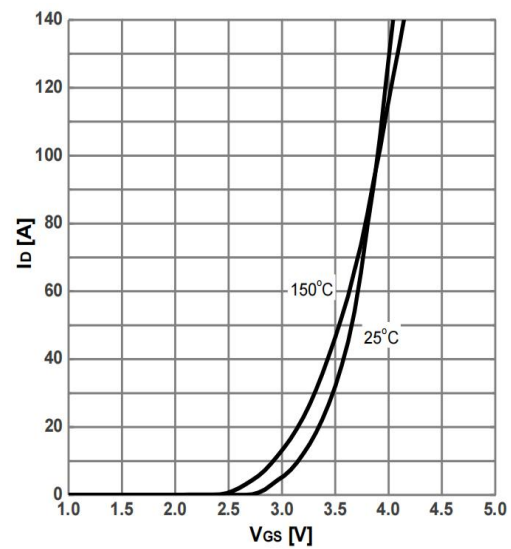
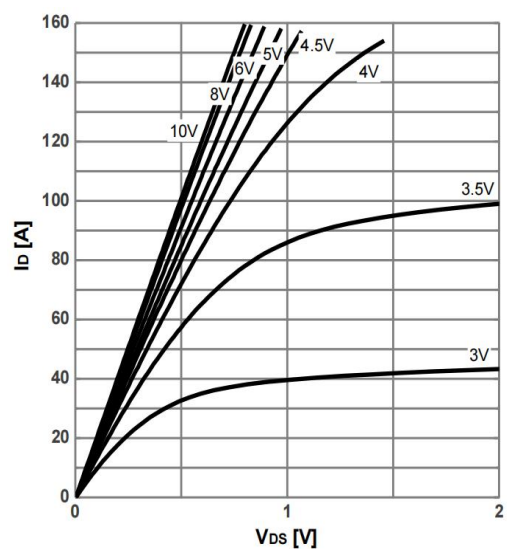
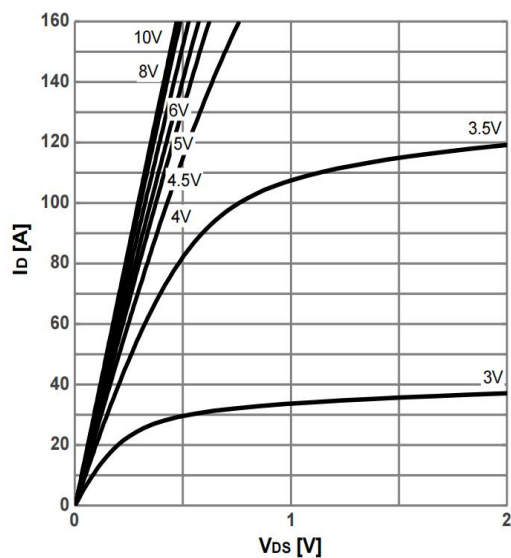
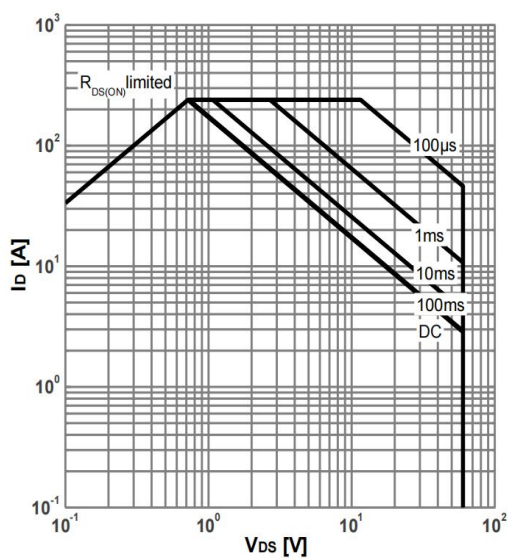
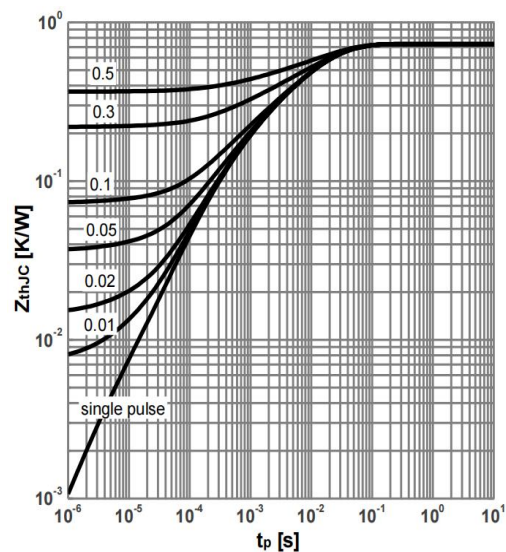
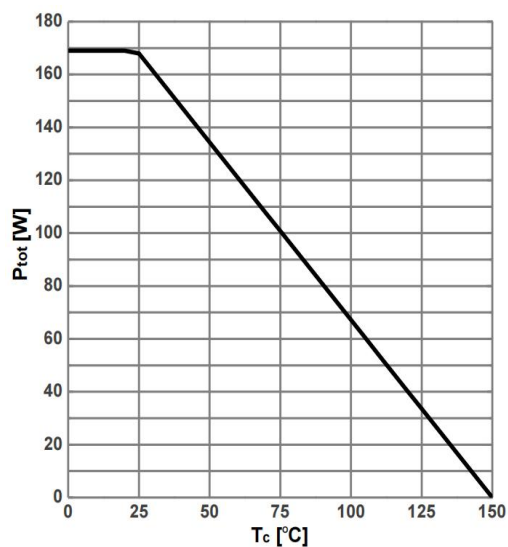
Note1:Pulse test: 300 μs pulse width, 2 % duty cycle

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

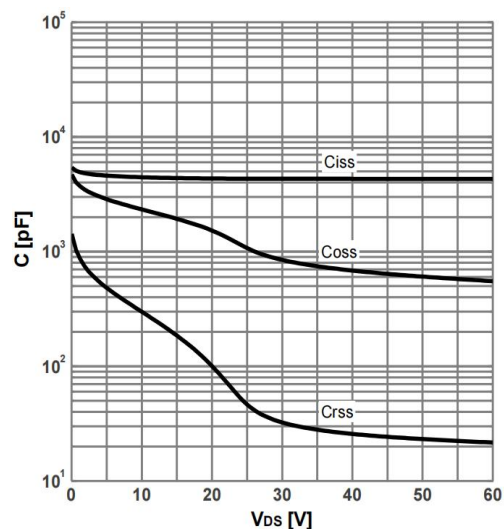
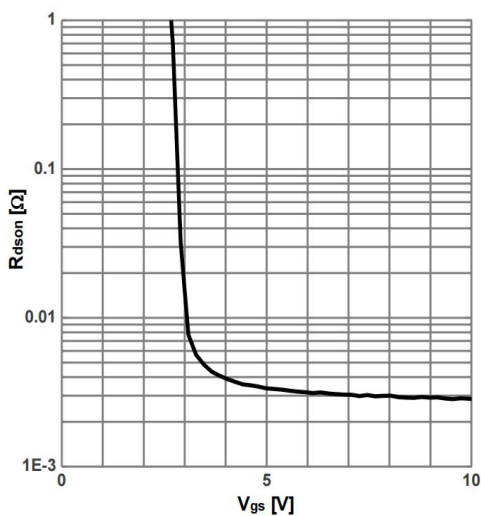
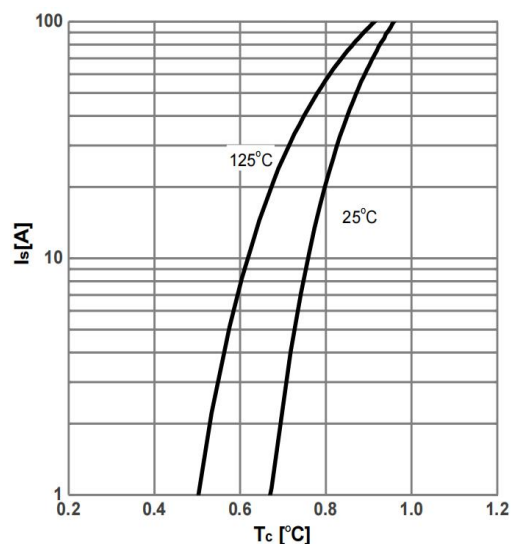
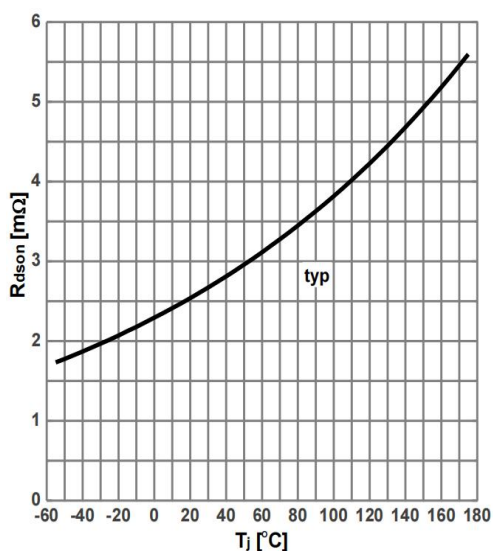
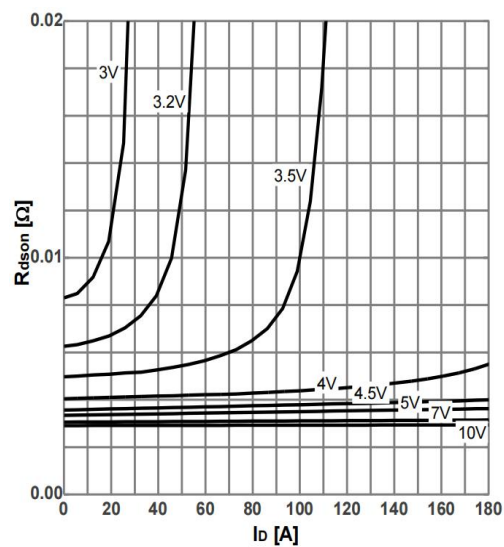
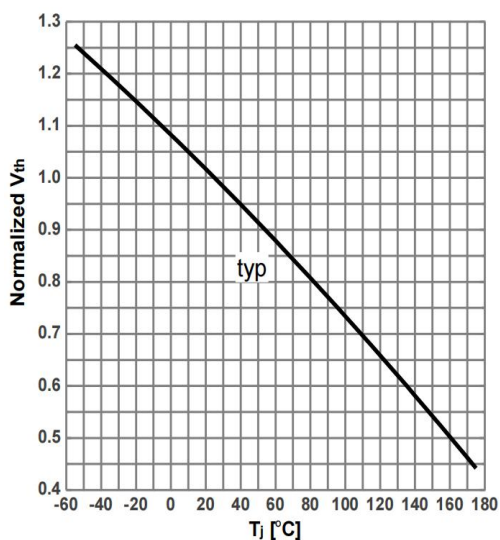
| Characteristics                           | Test Condition                                              | Symbols      | Min | Typ  | Max       | Units      |
|-------------------------------------------|-------------------------------------------------------------|--------------|-----|------|-----------|------------|
| Drain-Source Breakdown Voltage            | $V_{GS}=0V, I_D=250\mu A$                                   | $BV_{DSS}$   | 60  | -    | -         | V          |
| Zero Gate Voltage Drain Current           | $V_{DS}=60V, V_{GS}=0V$                                     | $I_{DSS}$    | -   | -    | 1.0       | $\mu A$    |
| Gate to Body Leakage Current              | $V_{GS}=\pm 20V, V_{DS}=0V$                                 | $I_{GSS}$    | -   | -    | $\pm 100$ | nA         |
| Gate Threshold Voltage                    | $V_{DS}=V_{GS}, I_D=250\mu A$                               | $V_{GS(th)}$ | 2.0 | -    | 4.0       | V          |
| Drain-Source On-State Resistance          | $V_{GS}=10V, I_D=20A$                                       | $R_{DS(on)}$ | -   | 2.8  | 3         | m $\Omega$ |
| Transconductance                          | $V_{DS}=5V, I_D=20A$                                        | $g_{fs}$     | -   | 130  | -         | S          |
| Input Capacitance                         | $V_{DS}=25V$<br>$V_{GS}=0V$<br>$f=1.0MHz$                   | $C_{iss}$    | -   | 4200 | -         | pF         |
| Output Capacitance                        |                                                             | $C_{oss}$    | -   | 1080 | -         |            |
| Reverse Transfer Capacitance              |                                                             | $C_{rss}$    | -   | 41   | -         |            |
| Total Gate Charge                         | $V_{DS}=30V$<br>$I_D=20A$<br>$V_{GS}=10V$                   | $Q_g$        | -   | 42   | -         | nC         |
| Gate-Source Charge                        |                                                             | $Q_{gs}$     | -   | 10   | -         |            |
| Gate-Drain("Miller") Charge               |                                                             | $Q_{gd}$     | -   | 12   | -         |            |
| Turn-on delay time                        | $V_{DS}=30V$<br>$I_D=100A$<br>$R_G=3\Omega$<br>$V_{GS}=10V$ | $t_{d(on)}$  | -   | 13.5 | -         | ns         |
| Turn-on Rise Time                         |                                                             | $T_r$        | -   | 95.5 | -         |            |
| Turn-Off Delay Time                       |                                                             | $t_{d(OFF)}$ | -   | 40   | -         |            |
| Turn-Off Fall Time                        |                                                             | $t_f$        | -   | 110  | -         |            |
| Maximun Body-Diode Continuous Current     |                                                             | $I_S$        | -   | -    | 160       | A          |
| Drain to Source Diode Forward Voltage     | $V_{GS}=0V, I_S=30A$                                        | $V_{SD}$     | -   | -    | 1.2       | V          |
| Body Diode Reverse Recovery Time(Note2)   | $T_J = 25^\circ C, I_F = 60A$<br>$di / dt = 100 A/\mu s$    | $t_{rr}$     | -   | 35   | -         | ns         |
| Body Diode Reverse Recovery Charge(Note2) |                                                             | $Q_{rr}$     | -   | 30   | -         | nC         |

**Note2:Pulse test: 300  $\mu s$  pulse width, 2 % duty cycle**

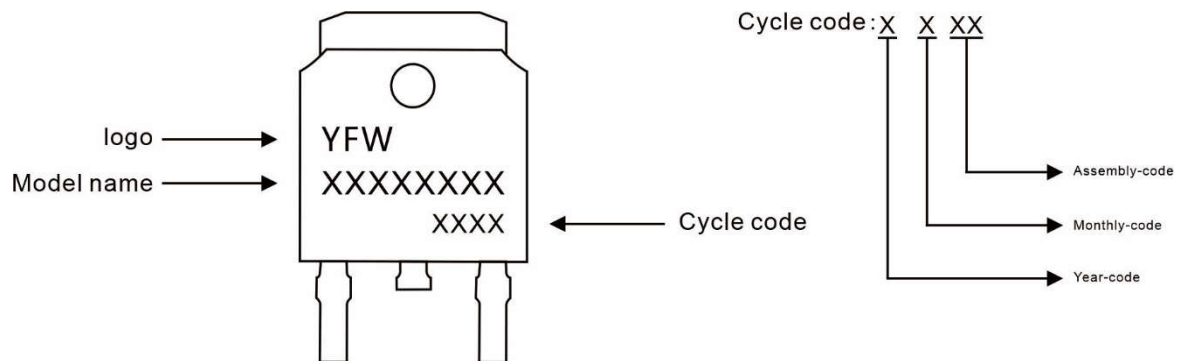
Ratings and Characteristic Curves



**Ratings and Characteristic Curves**



## Marking Diagram



## Ordering information

| Model name    | Package | Unit Weight    | Base Quantity | Packing Quantity            |
|---------------|---------|----------------|---------------|-----------------------------|
| YFWG160N06HAD | TO-252  | 0.011oz(0.32g) | 2500pcs/reel  | 5000pcs/box 25000pcs/Carton |

## Package Dimensions

### TO-252

| Dim | Millimeter |       | Inches |       |
|-----|------------|-------|--------|-------|
|     | Min.       | Max.  | Min.   | Max.  |
| A   | 2.20       | 2.50  | 0.087  | 0.098 |
| A1  | 0.00       | 0.12  | 0.000  | 0.005 |
| A2  | 2.20       | 2.40  | 0.087  | 0.094 |
| B   | 1.20       | 1.60  | 0.047  | 0.063 |
| b   | 0.50       | 0.70  | 0.020  | 0.028 |
| b1  | 0.70       | 0.90  | 0.028  | 0.035 |
| c   | 0.40       | 0.60  | 0.016  | 0.024 |
| c1  | 0.40       | 0.60  | 0.016  | 0.024 |
| D   | 6.35       | 6.65  | 0.250  | 0.262 |
| D1  | 5.20       | 5.40  | 0.205  | 0.213 |
| E   | 5.40       | 5.70  | 0.213  | 0.224 |
| e   | 2.20       | 2.40  | 0.087  | 0.094 |
| e1  | 4.40       | 4.80  | 0.173  | 0.189 |
| L   | 10.00      | 11.00 | 0.393  | 0.433 |
| L1  | 2.70       | 3.10  | 0.106  | 0.122 |
| L2  | 1.40       | 1.80  | 0.055  | 0.071 |
| L3  | 0.90       | 1.50  | 0.035  | 0.059 |

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