

700V N-Channel Enhancement Mode Power MOSFET

MAIN CHARACTERISTICS

|                                       |                                                       |
|---------------------------------------|-------------------------------------------------------|
| $I_D$                                 | 12A                                                   |
| $V_{DSS}$                             | 700V                                                  |
| $R_{DS(on)-typ}$<br>(@ $V_{GS}=10V$ ) | $<0.95\Omega$ (Type: <b>0.79<math>\Omega</math></b> ) |

Features

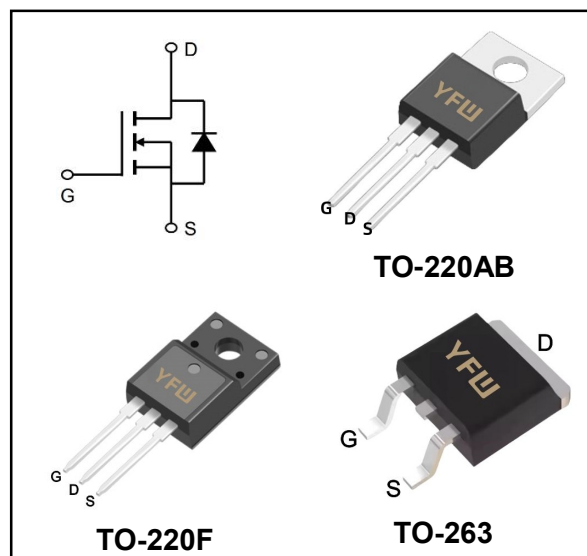
- ♦ Fast Switching
- ♦ Low ON Resistance
- ♦ Low Gate Charge
- ♦ 100% Single Pulse avalanche energy Test

APPLICATIONS

- ♦ power switch circuit of adaptor and charger

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 JESD22-106



Maximum Ratings at  $T_c=25^\circ\text{C}$  unless otherwise specified

| Characteristics                         | Symbol          | Value       |      | Unit               |
|-----------------------------------------|-----------------|-------------|------|--------------------|
|                                         |                 | 220AB/263   | 220F |                    |
| Drain-Source Voltage                    | $V_{DS}$        | 700         |      | V                  |
| Gate-Source Voltage                     | $V_{GS}$        | $\pm 30$    |      | V                  |
| Continue Drain Current                  | $I_D$           | 12          |      | A                  |
| Pulsed Drain Current (Note1)            | $I_{DM}$        | 48          |      | A                  |
| Power Dissipation                       | $P_D$           | 110         | 42   | W                  |
| Single Pulse Avalanche Energy (Note1)   | $E_{AS}$        | 580         |      | mJ                 |
| Operating Temperature Range             | $T_J$           | 150         |      | $^\circ\text{C}$   |
| Storage Temperature Range               | $T_{STG}$       | -55 to +150 |      | $^\circ\text{C}$   |
| Thermal Resistance, Junction to Case    | $R_{\theta JC}$ | 1.1         | 4.2  | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 62.5        | 62.5 | $^\circ\text{C/W}$ |

Note1: Pulse test: 300  $\mu\text{s}$  pulse width, 2 % duty cycle

### Electrical Characteristics at Tc=25°C unless otherwise specified

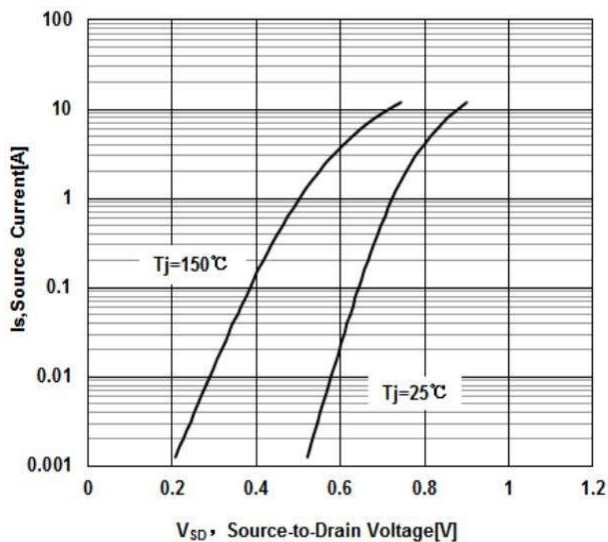
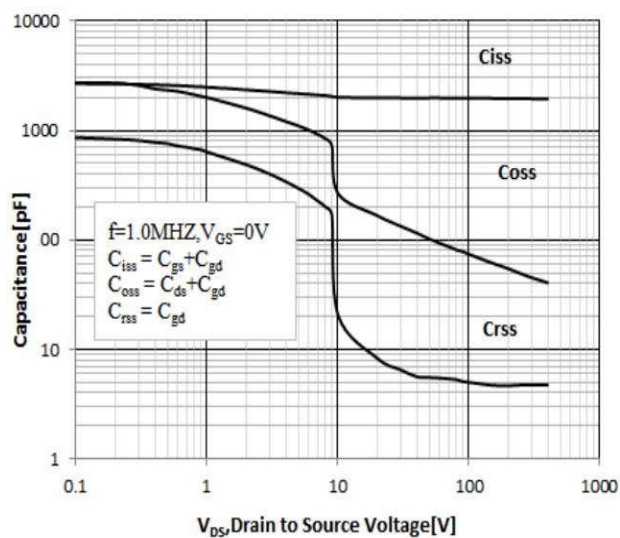
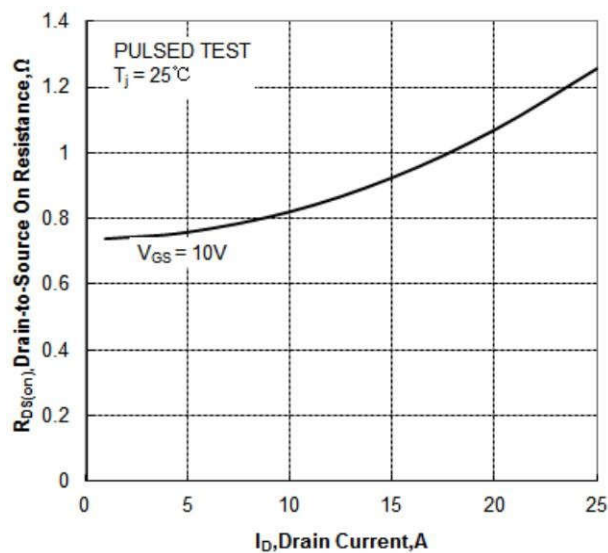
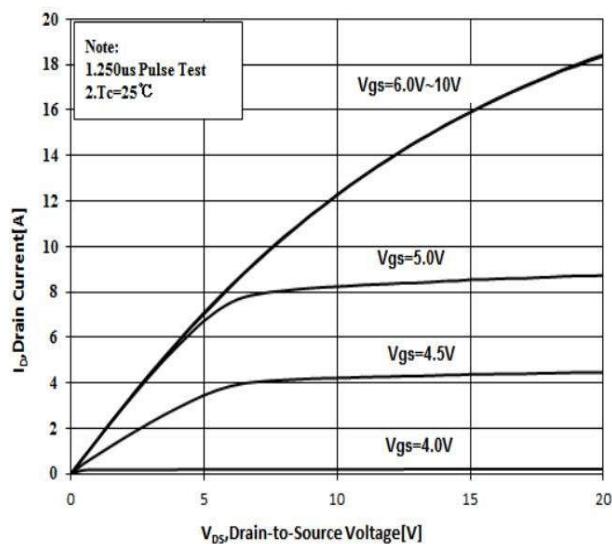
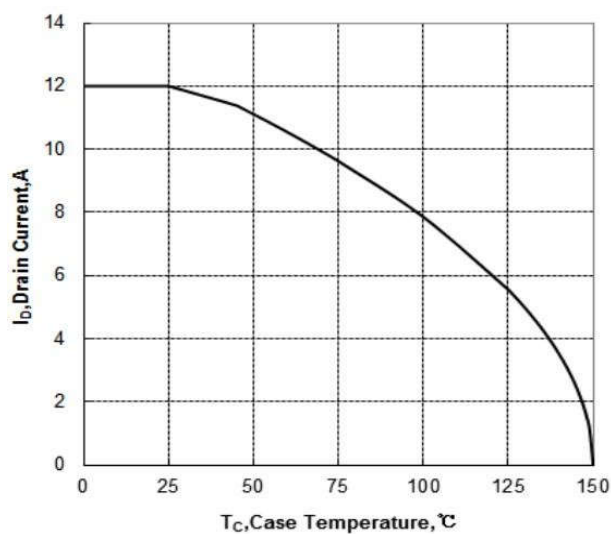
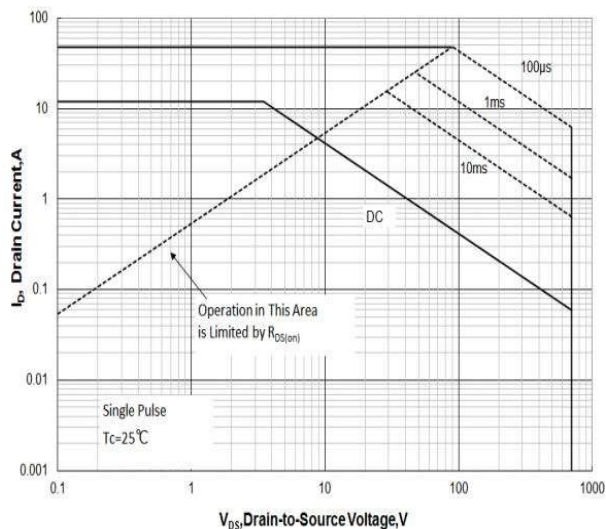
| Characteristics                  | Test Condition                                                   | Symbol       | Min | Typ   | Max      | Unit          |
|----------------------------------|------------------------------------------------------------------|--------------|-----|-------|----------|---------------|
| Drain-Source Breakdown Voltage   | $V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$              | $BV_{DSS}$   | 700 | -     | -        | V             |
| Drain-Source Leakage Current     | $V_{DS} = 700\text{ V}, V_{GS} = 0\text{ V}$                     | $I_{DSS}$    | -   | -     | 0.1      | $\mu\text{A}$ |
| Gate Leakage Current             | $V_{GS} = \pm 30\text{ V}, V_{DS} = 0\text{ V}$                  | $I_{GSS}$    | -   | -     | $\pm 80$ | nA            |
| Gate-Source Threshold Voltage    | $V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$                  | $V_{GS(th)}$ | 2   | -     | 4        | V             |
| Drain-Source On-State Resistance | $V_{GS} = 10\text{ V}, I_D = 6\text{ A}$                         | $R_{DS(on)}$ | -   | 0.79  | 0.95     | $\Omega$      |
| Forward Transconductance         | $V_{DS} = 15\text{ V}, I_D = 6\text{ A}$                         | $g_{fs}$     | -   | 12    | -        | S             |
| Input Capacitance                | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1.0\text{ MHz}$  | $C_{iss}$    | -   | 1981  | -        | pF            |
| Output Capacitance               |                                                                  | $C_{oss}$    | -   | 146.9 | -        | pF            |
| Reverse Transfer Capacitance     |                                                                  | $C_{rss}$    | -   | 6.9   | -        | pF            |
| Turn-on Delay Time(Note2)        | $I_D = 12\text{ A}, V_{DD} = 350\text{ V}, R_G = 10\Omega$       | $t_{d(ON)}$  | -   | 28    | -        | ns            |
| Rise Time(Note2)                 |                                                                  | $t_r$        | -   | 26    | -        | ns            |
| Turn-Off Delay Time(Note2)       |                                                                  | $t_{d(OFF)}$ | -   | 64    | -        | ns            |
| Fall Time(Note2)                 |                                                                  | $t_f$        | -   | 45    | -        | ns            |
| Total Gate Charge(Note2)         | $I_D = 12\text{ A}, V_{DD} = 560\text{ V}, V_{GS} = 10\text{ V}$ | $Q_G$        | -   | 38.6  | -        | nC            |
| Gate to Source Charge(Note2)     |                                                                  | $Q_{GS}$     | -   | 9.2   | -        | nC            |
| Gate to Drain Charge(Note2)      |                                                                  | $Q_{GD}$     | -   | 16    | -        | nC            |

### Source-Drain Diode Characteristics at Ta=25°C unless otherwise specified

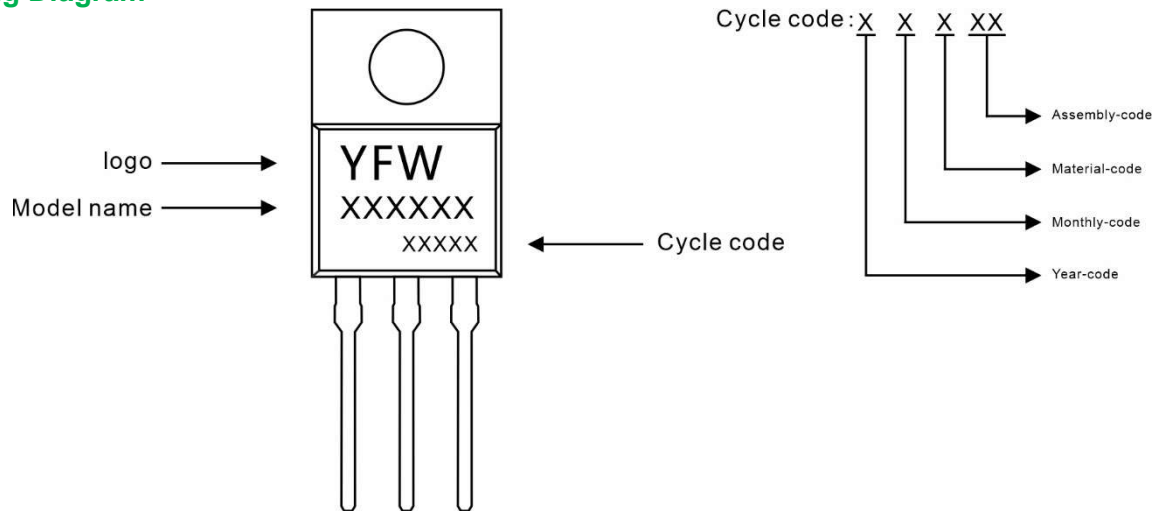
| Characteristics                          | Test Condition                                                                    | Symbol   | Min. | Typ. | Max. | Unit          |
|------------------------------------------|-----------------------------------------------------------------------------------|----------|------|------|------|---------------|
| Maximun Body-Diode Continuous Current    |                                                                                   | $I_S$    | -    | -    | 12   | A             |
| Maximun Body-Diode Pulsed Current(Note2) |                                                                                   | $I_{SM}$ | -    | -    | 48   | A             |
| Drain-Source Diode Forward Voltage       | $I_{SD} = 12\text{ A}$                                                            | $V_{SD}$ | -    | -    | 1.5  | V             |
| Reverse Recovery Time(Note2)             | $I_{SD} = 12\text{ A}, V_{GS} = 0\text{ V}, dI_F / dt = 100\text{ A}/\mu\text{s}$ | $t_{rr}$ | -    | 536  | -    | ns            |
| Reverse Recovery Charge(Note2)           |                                                                                   | $Q_{rr}$ | -    | 4693 | -    | $\mu\text{C}$ |

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

RATINGS AND CHARACTERISTIC CURVES



### Marking Diagram



### Ordering information

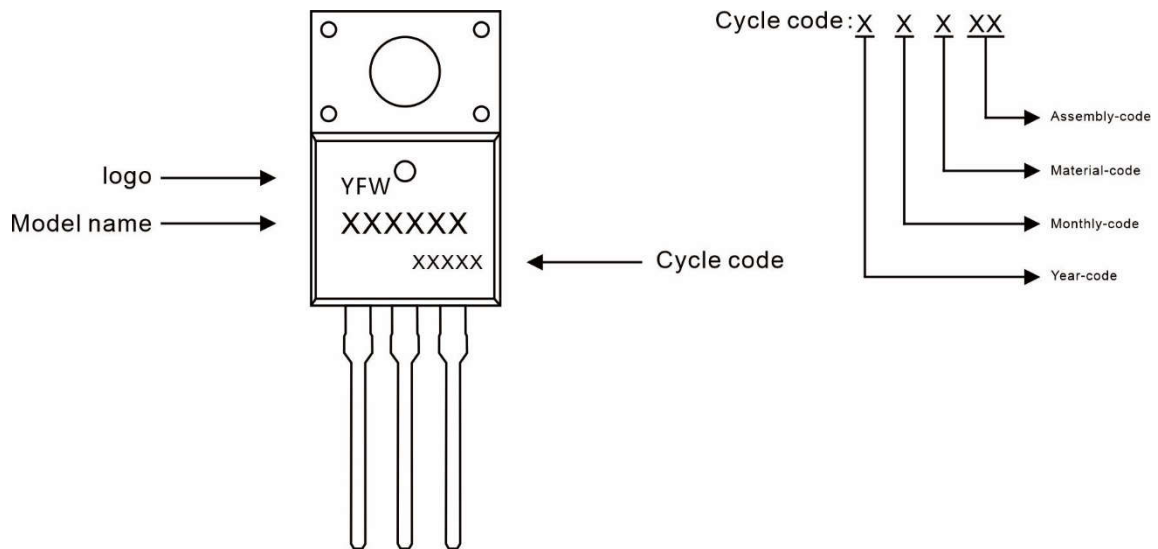
| Model name | Package  | Unit Weight   | Base Quantity | Packing Quantity           |
|------------|----------|---------------|---------------|----------------------------|
| YFW12N70AT | TO-220AB | 0.07oz(1.96g) | 50pcs/tube    | 1000PCS/Box 5000PCS/Carton |

### Package Dimensions

#### TO-220AB

| Symbol | Millimeter |       | Inches |       |
|--------|------------|-------|--------|-------|
|        | Min.       | Max.  | Min.   | Max.  |
| A      | 4.30       | 4.70  | 0.169  | 0.185 |
| A1     | 2.52       | 2.82  | 0.099  | 0.111 |
| b      | 0.71       | 0.91  | 0.028  | 0.036 |
| b1     | 1.17       | 1.37  | 0.046  | 0.054 |
| c      | 0.30       | 0.50  | 0.012  | 0.020 |
| c1     | 1.17       | 1.37  | 0.046  | 0.054 |
| D      | 9.90       | 10.20 | 0.390  | 0.402 |
| E      | 8.50       | 8.90  | 0.335  | 0.350 |
| E1     | 12.00      | 12.50 | 0.472  | 0.492 |
| e      | 2.44       | 2.64  | 0.096  | 0.104 |
| e1     | 4.88       | 5.28  | 0.192  | 0.208 |
| F      | 2.60       | 2.80  | 0.102  | 0.110 |
| L      | 13.20      | 13.80 | 0.520  | 0.543 |
| L1     | 3.80       | 4.20  | 0.150  | 0.165 |
| Φ      | 3.60       | 3.96  | 0.142  | 0.156 |

## Marking Diagram



## Ordering information

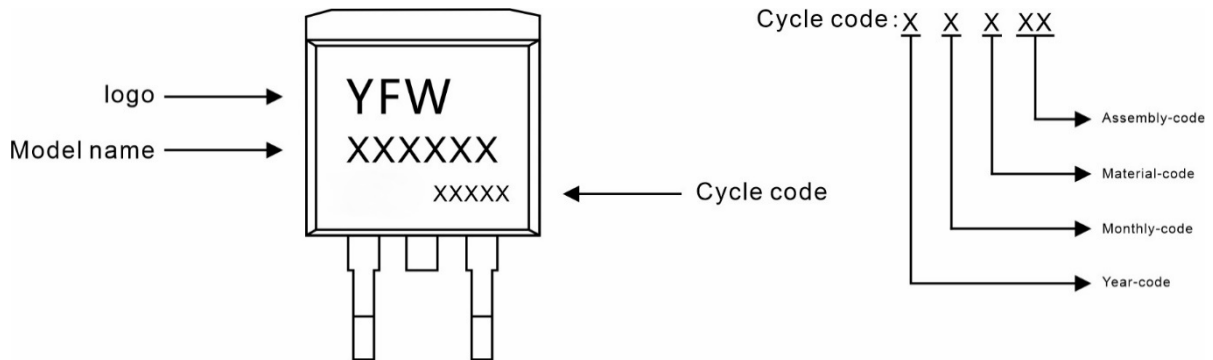
| Model name | Package | Unit Weight   | Base Quantity | Packing Quantity           |
|------------|---------|---------------|---------------|----------------------------|
| YFW12N70AF | TO-220F | 0.06oz(1.74g) | 50pcs/tube    | 1000PCS/Box 5000PCS/Carton |

## Package Dimensions

### TO-220F

| Symbol | Millimeter |       | Inches |       |
|--------|------------|-------|--------|-------|
|        | Min.       | Max.  | Min.   | Max.  |
| A      | 4.50       | 4.90  | 0.177  | 0.193 |
| A1     | 2.34       | 2.74  | 0.092  | 0.108 |
| A2     | 2.66       | 2.86  | 0.105  | 0.113 |
| b      | 0.75       | 0.85  | 0.030  | 0.033 |
| b1     | 1.24       | 1.44  | 0.049  | 0.057 |
| c      | 0.40       | 0.60  | 0.016  | 0.024 |
| D      | 10.00      | 10.32 | 0.394  | 0.406 |
| E      | 15.75      | 16.05 | 0.620  | 0.632 |
| e      | 2.44       | 2.64  | 0.096  | 0.104 |
| e1     | 4.88       | 5.28  | 0.192  | 0.208 |
| F      | 3.10       | 3.5   | 0.122  | 0.138 |
| L      | 13.50      | 13.90 | 0.531  | 0.547 |
| L1     | 2.90       | 3.30  | 0.114  | 0.130 |
| Φ      | 3.10       | 3.30  | 0.122  | 0.130 |

## Marking Diagram



## Ordering information

| Model name | Package | Unit Weight   | Base Quantity | Packing Quantity           |
|------------|---------|---------------|---------------|----------------------------|
| YFW12N70AS | TO-263  | 0.04oz(1.16g) | 800pcs/reel   | 1600pcs/box 8000pcs/Carton |

## Package Dimensions

### TO-263

| Dim | Millimeter |       | Inches |       |
|-----|------------|-------|--------|-------|
|     | Min.       | Max.  | Min.   | Max.  |
| A   | 4.30       | 4.70  | 0.169  | 0.185 |
| A1  | 0.00       | 0.15  | 0.000  | 0.006 |
| A2  | 4.30       | 4.55  | 0.169  | 0.179 |
| B   | 1.10       | 1.50  | 0.043  | 0.059 |
| b   | 0.70       | 0.90  | 0.028  | 0.035 |
| b1  | 1.20       | 1.50  | 0.047  | 0.059 |
| c   | 0.30       | 0.60  | 0.012  | 0.024 |
| c1  | 1.17       | 1.37  | 0.046  | 0.054 |
| D   | 9.90       | 10.20 | 0.390  | 0.402 |
| E   | 8.50       | 8.90  | 0.335  | 0.350 |
| e   | 2.44       | 2.64  | 0.096  | 0.104 |
| e1  | 4.88       | 5.28  | 0.192  | 0.208 |
| L   | 15.00      | 15.30 | 0.591  | 0.602 |
| L1  | 5.20       | 5.40  | 0.205  | 0.213 |
| L2  | 2.40       | 2.60  | 0.094  | 0.102 |
| L3  | 1.60       | 1.80  | 0.063  | 0.071 |

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