

500V N-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

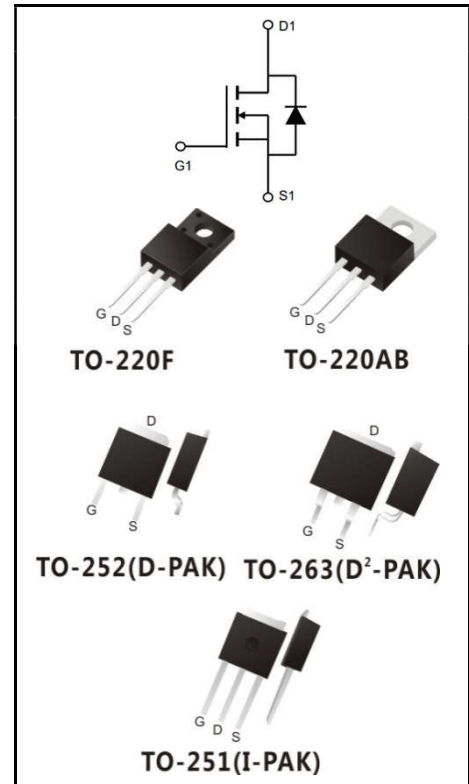
| | |
|--|-----------------------------|
| I_D | 8A |
| V_{DSS} | 500V |
| R_{DS(on)-typ(@V_{GS}=10V)} | <0.85Ω (Type:0.68 Ω) |

Features

- ◆Fast Switching
- ◆Low ON Resistance
- ◆Low Gate Charge
- ◆100% Single Pulse avalanche energy Test
- ◆LeadfreeincomplywithEURoHS2011/65/EUdirectives

Mechanical Data

- ◆Case: Molded plastic
- ◆Mounting Position: Any
- ◆Molded Plastic: UL Flammability Classification Rating 94V-0
- ◆Solder bath temperature275℃maximum,10s per JESD22-106



Product Specification Classification

| Part Number | Package | Marking | Pack |
|-------------|----------------|-------------------|--------------|
| YFW8N50AT | TO-220AB | YFW 8N50AT XXXXX | 50PCS/Tube |
| YFW8N50AF | TO-220F(0.5mm) | YFW 8N50AF XXXXX | 50PCS/Tube |
| YFW8N50AS | TO-263 | YFW 8N50AS XXXXX | 50PCS/Tube |
| YFW8N50AS-R | TO-263 | YFW 8N50AS XXXXX | 800PCS/Tape |
| YFW8N50AMJ | TO-251 | YFW 8N50AMJ XXXXX | 80PCS/Tube |
| YFW8N50AD | TO-252 | YFW 8N50AD XXXXX | 2500PCS/Tape |

Maximum Ratings at Tc=25°C unless otherwise specified

| Characteristics | Symbols | Value | | | Units |
|---|-----------------|-------------|------|-------------|-------|
| | | 220AB | 220F | 251/252/263 | |
| Drain-Source Voltage | V_{DS} | 500 | | | V |
| Gate-Source Voltage | V_{GS} | ±30 | | | V |
| Continue Drain Current | I_D | 8 | | | A |
| -Continuous (TC = 100°C) | | 5.6 | | | |
| Pulsed Drain Current (Note1) | I_{DM} | 32 | | | A |
| Power Dissipation | P_D | 100 | 38 | 100 | W |
| -Derate above 25°C | | 1.25 | 0.3 | 1.14 | W/°C |
| Single Pulse Avalanche Energy (Note2) | E_{AS} | 440 | | | mJ |
| Avalanche Current (Note 1) | I_{AR} | 8 | | | A |
| Repetitive Avalanche Energy (Note 1) | E_{AS} | 13 | | | mJ |
| Operating Temperature Range | T_J | 150 | | | °C |
| Storage Temperature Range | T_{STG} | -55 to +150 | | | °C |
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 0.82 | 2.45 | 0.71 | °C/W |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 62.5 | 62.5 | 62.5 | °C/W |

Maximum Ratings at Tc=25°C unless otherwise specified

| Characteristics | Test Condition | Symbols | Min | Typ | Max | Units |
|---|---|--------------------------------------|-----|------|------|-------|
| Drain-Source Breakdown Voltage | $V_{GS} = 0 V, I_D = 250 \mu A$ | BV_{DSS} | 500 | - | - | V |
| Breakdown Voltage Temperature Coefficient | $I_D = 250 \mu A$ (Referenced to 25°C) | $\frac{\Delta BV_{DSS}}{\Delta T_J}$ | - | 0.65 | - | V/°C |
| Drain-Source Leakage Current | $V_{DS} = 500 V, V_{GS} = 0 V$ | I_{DSS} | - | - | 1 | uA |
| | $V_{DS} = 400 V, T_c = 125^\circ C$ | | - | - | 10 | |
| Gate Leakage Current | $V_{GS} = \pm 30 V, V_{DS} = 0 V$ | I_{GSS} | - | - | ±100 | nA |
| Gate-Source Threshold Voltage | $V_{DS} = V_{GS}, I_D = 250 \mu A$ | $V_{GS(th)}$ | 2 | - | 4 | V |
| Drain-Source On-State Resistance | $V_{GS} = 10 V, I_D = 4 A$ | $R_{DS(on)}$ | - | 0.68 | 0.85 | Ω |
| Forward Transconductance | $V_{DS} = 15 V, I_D = 4 A$ | g_{fs} | - | 7 | - | S |
| Input Capacitance | $V_{GS} = 0 V, V_{DS} = 25 V,$ $f = 1 MHz$ | C_{iss} | - | 891 | - | pF |
| Output Capacitance | | C_{oss} | - | 110 | - | |
| Reverse Transfer Capacitance | | C_{rss} | - | 7 | - | |
| Turn-on Delay Time | $I_D = 8 A, V_{DD} = 250 V,$ $R_G = 10 \Omega$ (Note3,4) | $td(ON)$ | - | 18 | - | nS |
| Rise Time | | tr | - | 20 | - | |
| Turn-Off Delay Time | | $td(OFF)$ | - | 44 | - | |
| Fall Time | | tf | - | 15 | - | |
| Total Gate Charge | $I_D = 8 A, V_{DD} = 400V,$ $V_{GS} = 10 V$ (Note3,4) | Q_G | - | 22 | - | nC |
| Gate to Source Charge | | Q_{GS} | - | 5 | - | |
| Gate to Drain Charge | | Q_{GD} | - | 9 | - | |

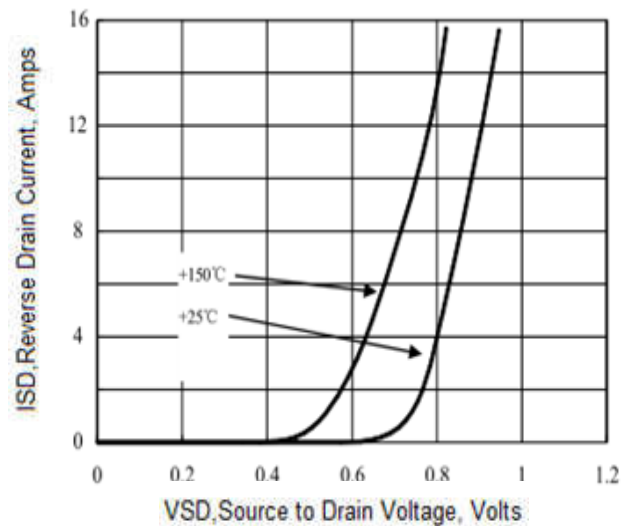
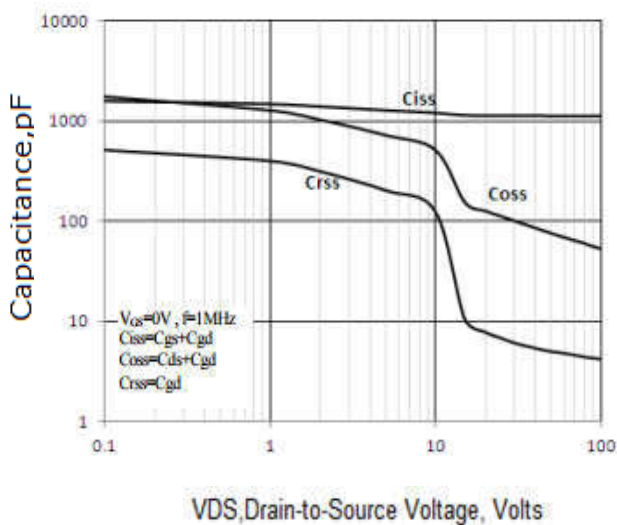
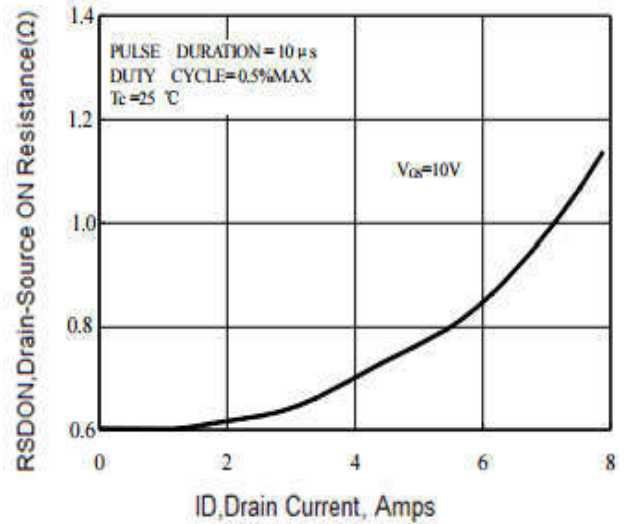
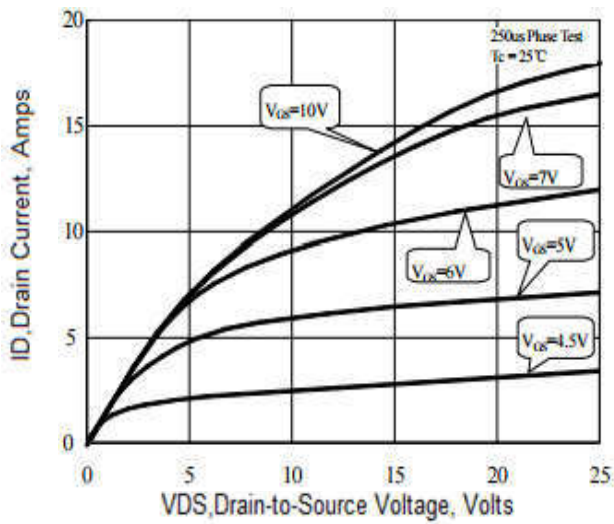
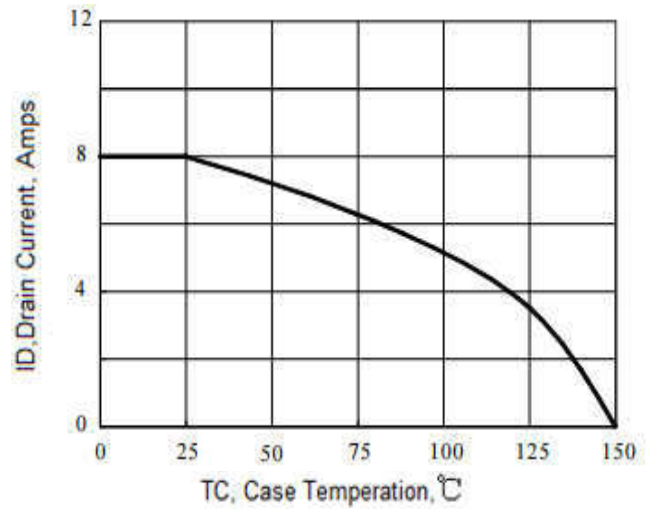
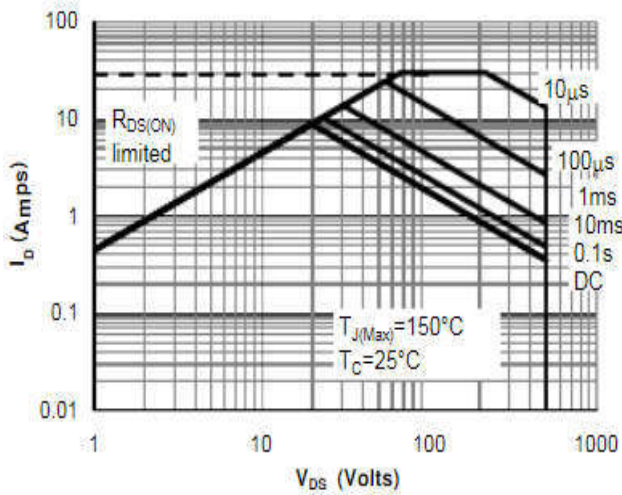
Source-Drain Diode Characteristics at Ta=25°C unless otherwise specified

| Characteristics | Test Condition | Symbols | Min | Typ | Max | Units |
|---|---|-----------------------|-----|-----|-----|-----------|
| Maximum Continuous Drain-Source Diode Forward Current | | I_S | - | - | 8 | A |
| Maximum Pulsed Drain-Source Diode Forward Current | | I_{SM} | - | - | 32 | A |
| Drain-Source Diode Forward Voltage | I_{SD} = 8 A | V_{SD} | - | - | 1.4 | V |
| Reverse Recovery Time | I_{SD} = 8 A, V_{GS} = 0 V, dI_F / dt = 100 A/μs | trr | - | 340 | - | nS |
| Reverse Recovery Charge | | Qrr | - | 1.7 | - | uC |

Note:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. IAS =8 A, VDD = 50 V, L =14mH, RG = 25Ω, starting TJ = 25°C.
3. ulse test: Pulse Width ≤300 μ s, Duty Cycle≤2%.
4. Essentially Independent of Operating Temperature.

Ratings and Characteristic Curves



Package Outline Dimensions Millimeters

TO-220AB

| | | | |
|------------------------------|------|----------|-------|
| | Dim. | Min. | Max. |
| | A | 10.15 | 10.35 |
| | B | 2.65 | 2.95 |
| | C | 3.70 | 3.90 |
| | D | 28.5 | 29.5 |
| | E | 1.30 | 1.45 |
| | F | 6.35 | 6.55 |
| | G | 2.9 | 3.3 |
| | H | 15.0 | 16.0 |
| | I | 0.38 | 0.42 |
| | J | 4.45 | 4.55 |
| | K | 1.25 | 1.35 |
| | L | Typ 5.08 | |
| | M | Typ 2.54 | |
| | N | 3.1 | 3.3 |
| O | 0.76 | 0.84 | |
| All Dimensions in millimeter | | | |

TO-220F

| | | | |
|------------------------------|------|----------|-------|
| | Dim. | Min. | Max. |
| | A | 9.95 | 10.25 |
| | B | 2.95 | 3.25 |
| | C | 1.25 | 1.45 |
| | D | 12.95 | 13.25 |
| | E | 0.50 | 0.65 |
| | F | 3.1 | 3.3 |
| | G | 1.30 | 1.45 |
| | H | Typ 2.54 | |
| | I | Typ 5.08 | |
| | J | 4.60 | 4.75 |
| | K | 2.50 | 2.65 |
| | L | 6.35 | 6.55 |
| | M | 15.4 | 16.0 |
| | N | 2.75 | 3.05 |
| O | 0.48 | 0.52 | |
| P | 0.76 | 0.84 | |
| All Dimensions in millimeter | | | |

Package Outline Dimensions Millimeters

TO-263

| | | | |
|------------------------------|------|---------|------|
| | Dim. | Min. | Max. |
| | A | 10.1 | 10.2 |
| | B | 7.4 | 7.6 |
| | C | 1.3 | 1.5 |
| | D | 0.55 | 0.75 |
| | E | 5.0 | 6.0 |
| | F | 1.4 | 1.6 |
| | G | 0.78 | 0.86 |
| | H | 1.2 | 1.3 |
| | I | Typ2.54 | |
| | J | 8.4 | 8.6 |
| | K | 4.45 | 4.55 |
| | L | 1.25 | 1.35 |
| | M | 0.02 | 0.1 |
| N | 2.4 | 2.8 | |
| O | 0.36 | 0.40 | |
| All Dimensions in millimeter | | | |

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 | | | | |

Package Outline Dimensions Millimeters

TO-251

| | | | |
|------------------------------|------|---------|------|
| | Dim. | Min. | Max. |
| | A | 2.2 | 2.4 |
| | A2 | 0.95 | 1.15 |
| | A3 | 0.45 | 0.65 |
| | b | 0.65 | 0.85 |
| | c | 0.45 | 0.55 |
| | D | 6.45 | 6.75 |
| | D2 | 5.2 | 5.4 |
| | E | 5.8 | 6 |
| | E2 | 0.95 | 1.25 |
| | e | Typ 2.3 | |
| | e1 | Typ 4.6 | |
| | L | 4 | 4.2 |
| | L1 | 1.2 | 1.5 |
| All Dimensions in millimeter | | | |

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