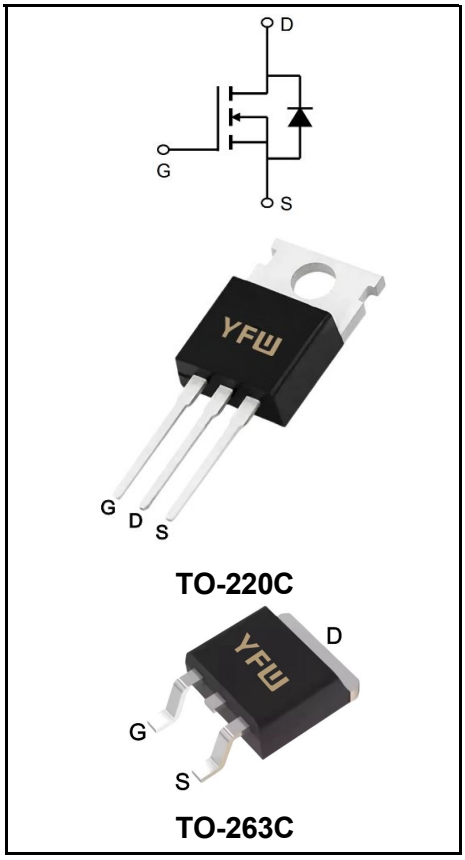
## 200V N-CHANNEL ENHANCEMENT MODE MOSFET

### MAIN CHARACTERISTICS

| | |
|---|---|
| $I_D$ | 90A |
| $V_{DS}$ | 200V |
| $R_{DSON}$-typ(@$V_{GS}$=10V) | <23mΩ(Typ:19mΩ) |




### FEATURES

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

### APPLICATIONS

- Motor control and drive
- Battery management
- UPS (Uninterrupible Power Supplies)

### MECHANICAL DATA

- Case: TO-220C/AC TO-263C/ASC
- Mounting Position: Any

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

| Characteristics | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 200 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Continue Drain Current | $I_D$ | 90 | A |
| Pulsed Drain Current (Note1) | $I_{DM}$ | 360 | A |
| Power Dissipation | $P_D$ | 132 | W |
| Single Pulse Avalanche Energy (Note1) | $E_{AS}$ | 968 | mJ |
| Operating Temperature Range | $T_J$ | 150 | °C |
| Storage Temperature Range | $T_{STG}$ | -55 to +150 | °C |
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 0.95 | °C/W |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 62.5 | °C/W |

Note1:Pulse test: 300 μs pulse width, 2 % duty cycle
Note2:Limited by TJmax , starting TJ=25°C, L = 1mH, VDS =50V.,VGS =10V

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

| Characteristics | Test Condition | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $V_{GS}$ = 0 V,$I_D$ = 250μA | $BV_{DSS}$ | 200 | - | - | V |
| Drain-Source Leakage Current | $V_{DS}$ = 200 V, $V_{GS}$ = 0 V | $I_{DSS}$ | - | - | 1 | μA |
| Gate Leakage Current | $V_{GS}$ = ± 20 V, $V_{DS}$ = 0 V | $I_{GSS}$ | - | - | ±100 | nA |
| Gate-Source Threshold Voltage | $V_{DS}$ = $V_{GS}$ , $I_D$ = 250 μA | $V_{GS(th)}$ | 3 | - | 5 | V |
| Drain-Source On-State Resistance | $V_{GS}$ = 10 V, $I_D$ = 30 A | $R_{DS(on)}$ | - | 19 | 23 | mΩ |
| Forward Transconductance | $V_{DS}$ = 5 V, $I_D$ = 40 A | gfs | - | 65 | - | S |
| Input Capacitance | $V_{GS}$ = 0 V<br>$V_{DS}$ = 25 V<br>f = 1 MHz | $C_{iss}$ | - | 6500 | - | pF |
| Output Capacitance | | $C_{oss}$ | - | 500 | - | |
| Reverse Transfer Capacitance | | $C_{rss}$ | - | 210 | - | |
| Turn-on Delay Time(Note2) | $V_{GS}$=10V<br>$V_{DD}$ =50V<br>$R_G$= 2.5 Ω<br>$I_D$=40A | $t_{d(ON)}$ | - | 45 | - | ns |
| Rise Time(Note2) | | $t_r$ | - | 70 | - | |
| Turn-Off Delay Time(Note2) | | $t_{d(OFF)}$ | - | 110 | - | |
| Fall Time(Note2) | | $t_f$ | - | 90 | - | |
| Total Gate Charge(Note2) | $V_{DS}$=100V<br>$V_{GS}$=10V<br>$I_D$=40A | $Q_G$ | - | 85 | - | nC |
| Gate to Source Charge(Note2) | | $Q_{GS}$ | - | 15 | - | |
| Gate to Drain Charge(Note2) | | $Q_{GD}$ | - | 25 | - | |
| Maximun Body-Diode Continuous Current | | $I_S$ | - | - | 90 | A |
| Maximun Body-Diode Pulsed Current(Note2) | | $I_{SM}$ | - | - | 360 | A |
| Drain-Source Diode Forward Voltage | $V_{GS}$=0V , $I_S$=30A , $T_J$=25°C | $V_{SD}$ | - | - | 1.2 | V |
| Reverse Recovery Time(Note2) | $T_J$ = 25°C, $I_F$= 30A<br>di / dt = 100A/μs | $t_{rr}$ | - | 110 | - | ns |
| Reverse Recovery Charge(Note2) | | $Q_{rr}$ | - | 0.55 | - | nC |

Note2:Pulse test: 300 μs pulse width, 2 % duty cycle

## RATINGS AND CHARACTERISTIC CURVES

Figure 1. Maximum Effective Thermal Impedance, Junction-to-Case

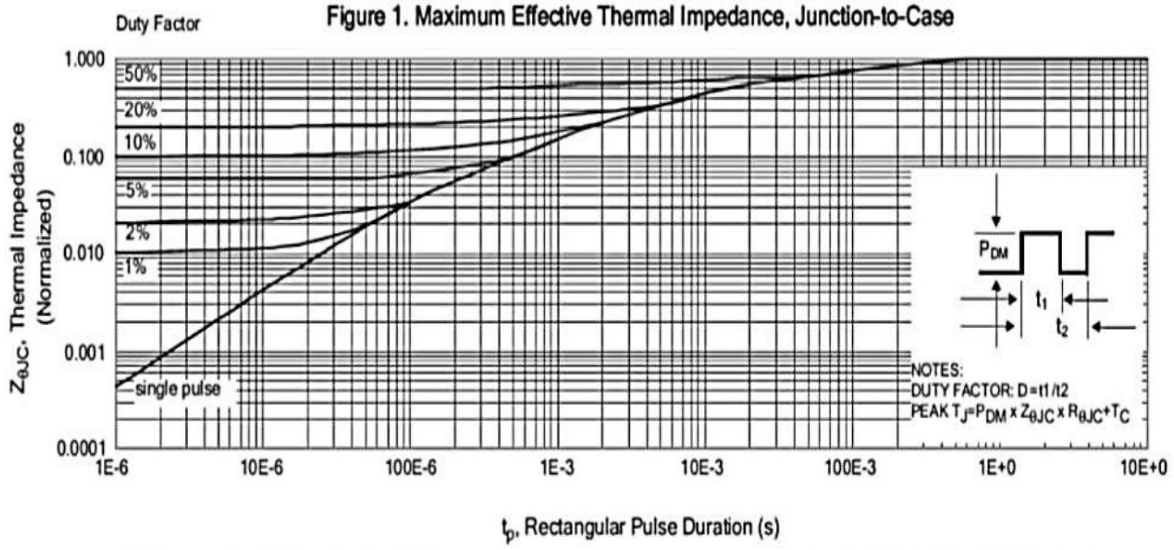



Figure 2 . Max. Power Dissipation vs Case Temperature

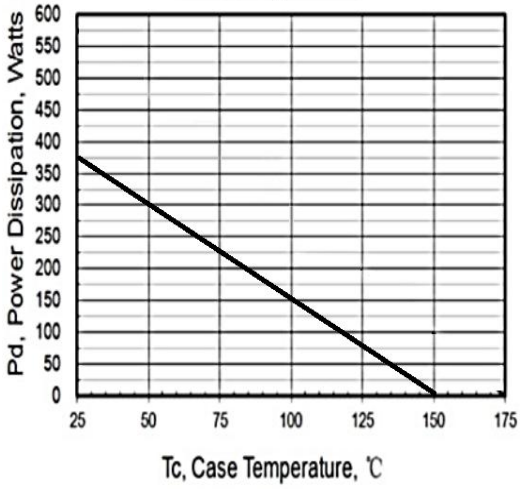



Figure 3 .Maximum Continuous Drain Current vs Tc

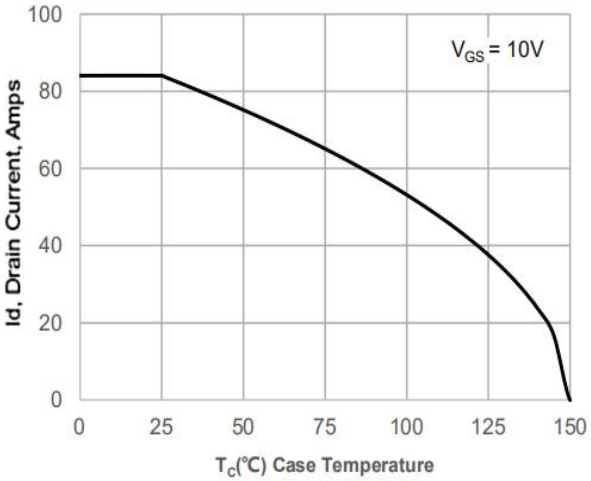



Figure 4. Typical Output Characteristics

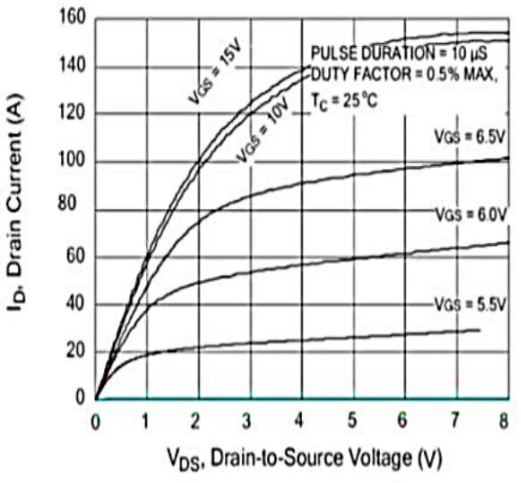
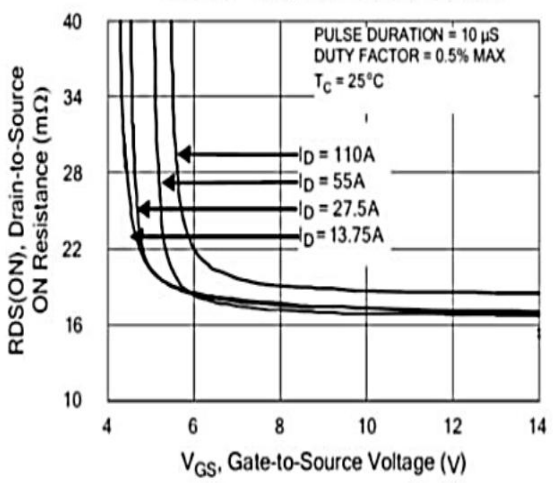



Figure5. Typical Drain-to-Source ON Resistance vs Gate Voltage and Drain Current



## RATINGS AND CHARACTERISTIC CURVES

Figure 6. Peak Current Capability

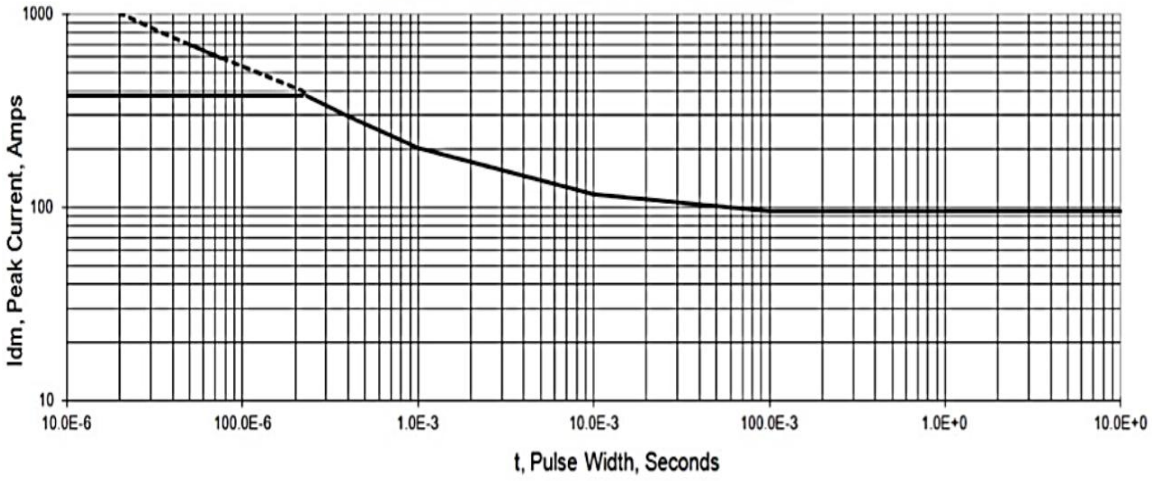



Figure 7. Typical Transfer Characteristics

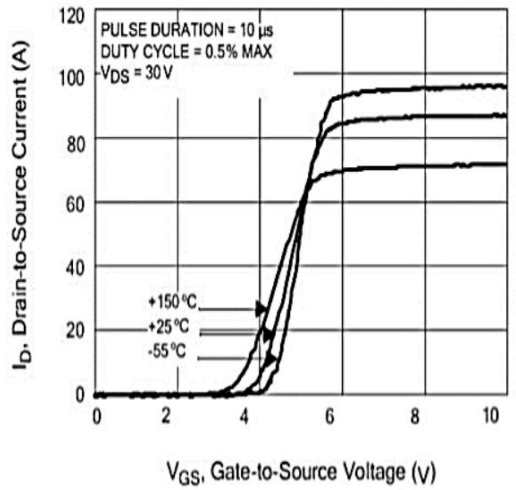



Figure8. Unclamped Inductive Switching Capability

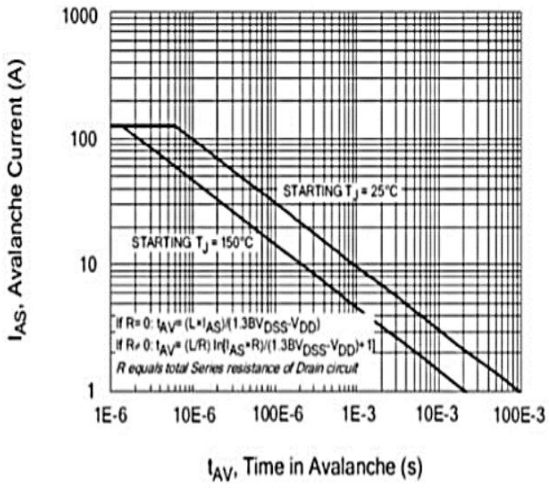



Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current

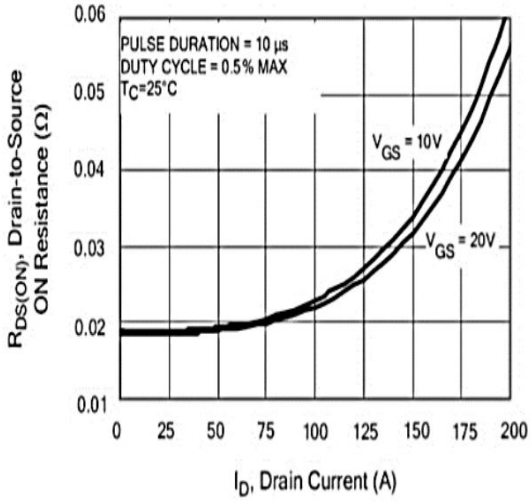
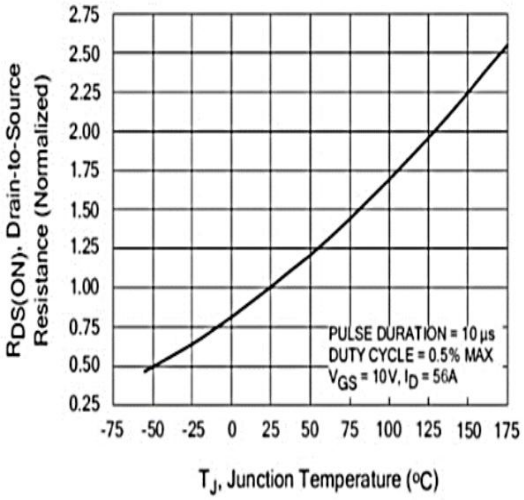



Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature



## RATINGS AND CHARACTERISTIC CURVES

Figure 11. Typical Breakdown Voltage vs Junction Temperature

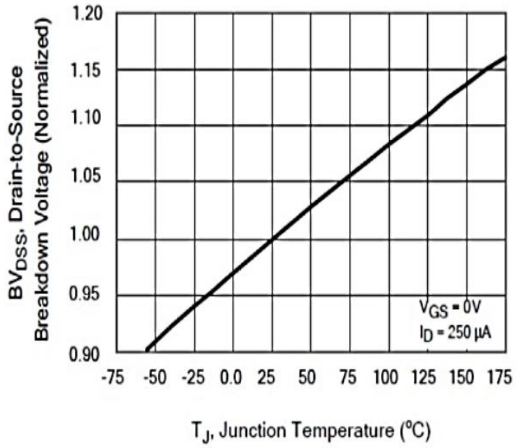



Figure 12. Typical Threshold Voltage vs Junction Temperature

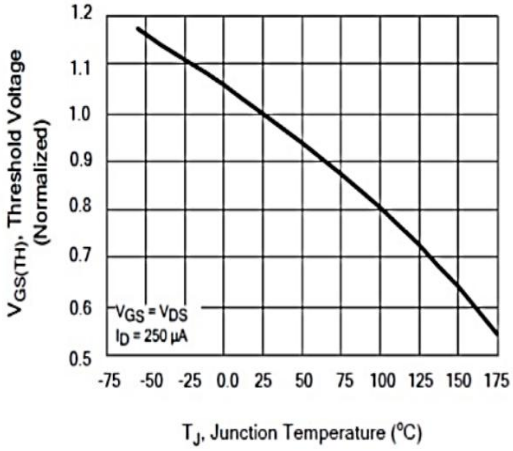



Figure 13 . Maximum Safe Operating Area

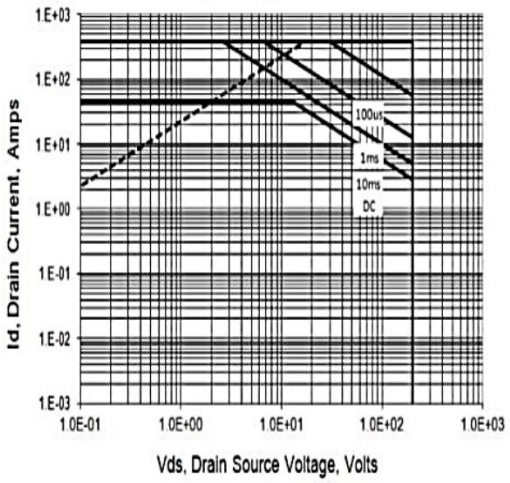



Figure 14. Capacitance vs Vds

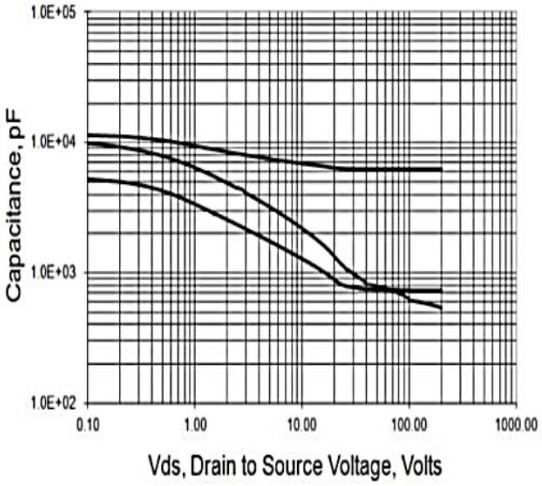



Figure 15 . Typical Gate Charge

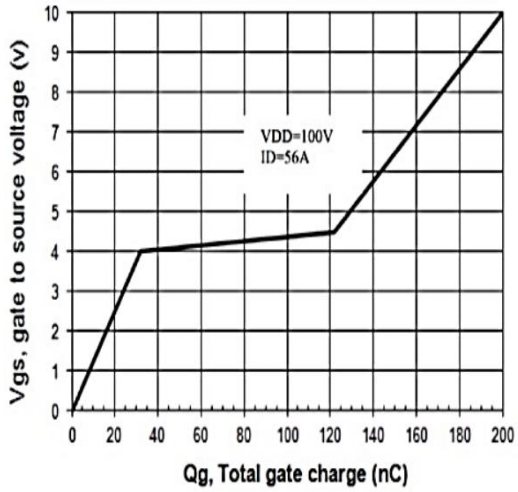
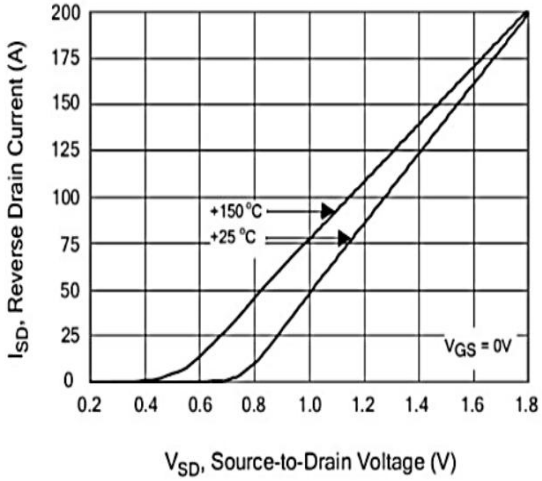
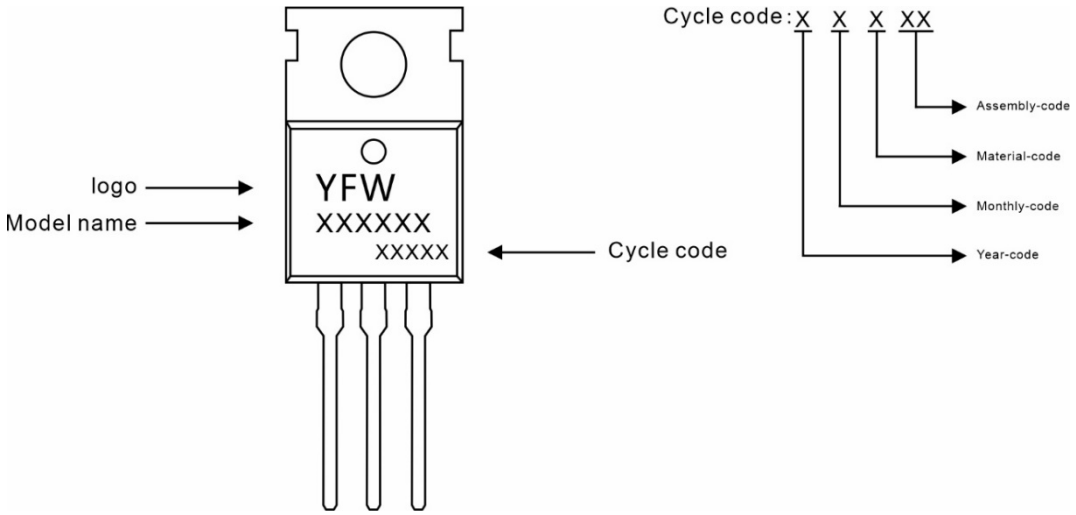



Figure 16. Typical Body Diode Transfer Characteristics



## Marking Diagram

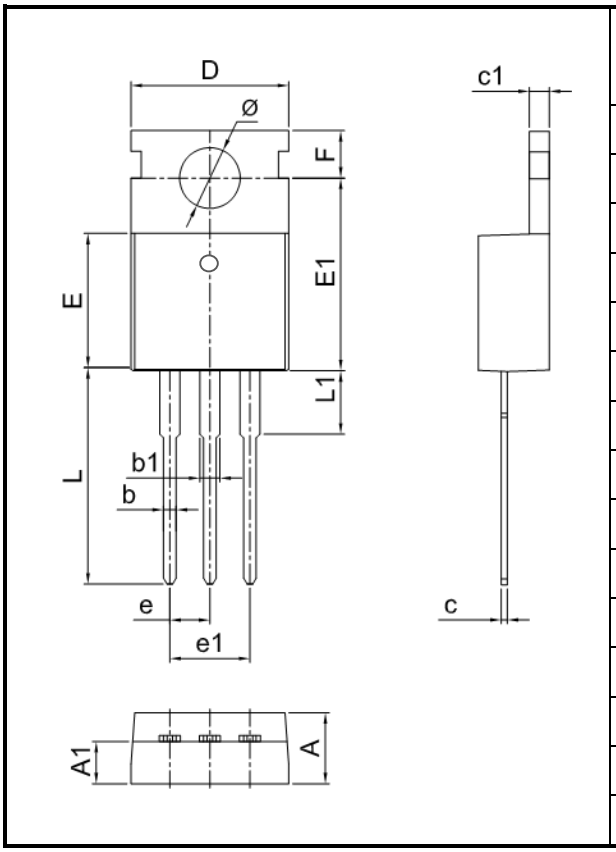



## Ordering information

| Model name | Package | Unit Weight | Base Quantity | Packing Quantity |
|---|---|---|---|---|
| YFW90N20AC | TO-220C | 0.07oz(1.96g) | 50pcs/tube | 1000PCS/Box 5000PCS/Carton |

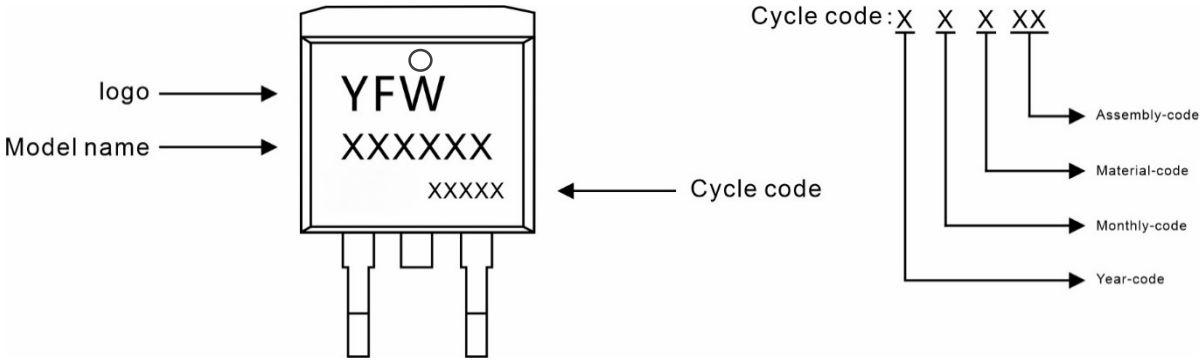
## Package Dimensions

**TO-220C**




| Dim | Millimeter | | Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 4.34 | 4.67 | 0.171 | 0.184 |
| 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

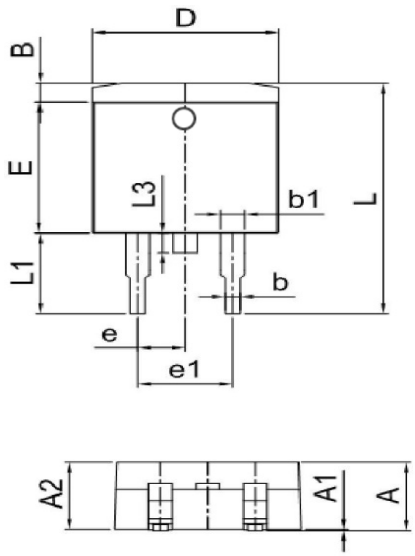


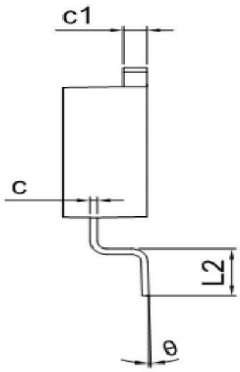

## Ordering information

| Model name | Package | Unit Weight | Base Quantity | Packing Quantity |
|---|---|---|---|---|
| YFW90N20ASC | TO-263C | 0.04oz(1.16g) | 800pcs/reel | 1600pcs/box 8000pcs/Carton |

## Package Dimensions

**TO-263C**




| 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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