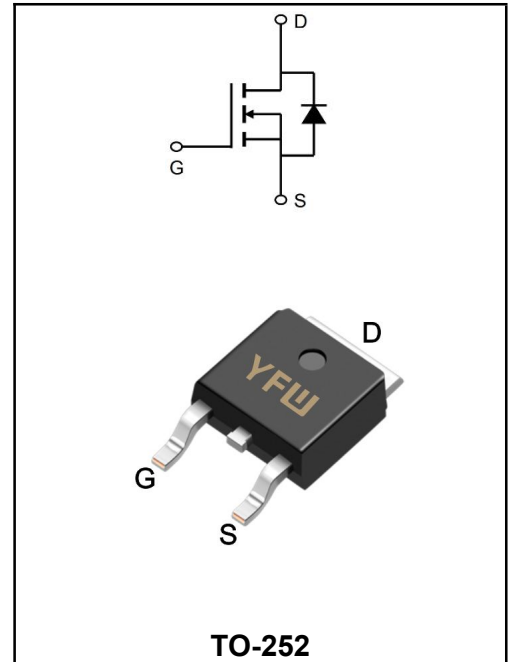


40V N-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

| | |
|--|--------------------------------|
| I_D | 120A |
| V_{DSS} | 40V |
| R_{DS(on)-typ}(@V_{GS}=10V) | < 3.2mΩ (Type:2.5 mΩ) |



Application

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

Maximum Ratings at T_c=25°C unless otherwise specified

| Characteristics | Symbols | Value | Units |
|---|------------------------|-------------|-------------|
| Drain-Source Voltage | V_{DS} | 40 | V |
| Gate - Source Voltage | V_{GS} | ±20 | V |
| Continuous Drain Current, V _{GS} @ 10V ¹ @T _c =25°C | I_D | 120 | A |
| Continuous Drain Current, V _{GS} @ 10V ¹ @T _c =100°C | I_D | 85 | A |
| Pulsed Drain Current ² | I_{DM} | 360 | A |
| Single Pulse Avalanche Energy ³ | E_{AS} | 145 | mJ |
| Avalanche Current | I_{AS} | 57 | A |
| Total Power Dissipation ⁴ @T _c =25°C | P_D | 22 | W |
| Storage Temperature Range | T_{STG} | -55 to +150 | °C |
| Operating Junction Temperature Range | T_J | -55 to +150 | °C |
| Thermal Resistance Junction-Ambient ¹ | R_{θJA} | 55 | °C/W |
| Thermal Resistance Junction-Case ¹ | R_{θJC} | 1.7 | °C/W |

Maximum Ratings at Tc=25°C unless otherwise specified

| Characteristics | Test Condition | Symbols | Min | Typ | Max | Units |
|--|--|--------------|-----|------|------|-------|
| Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$ | BV_{DSS} | 40 | - | - | V |
| Static Drain-Source On-Resistance ² | $V_{GS}=10V, I_D=20A$ | $R_{DS(ON)}$ | - | 2.5 | 3.2 | mΩ |
| | $V_{GS}=4.5V, I_D=15A$ | | - | 3.8 | 5.3 | |
| Gate -Threshold Voltage | $V_{DS}=V_{GS}, I_D=250\mu A$ | $V_{GS(th)}$ | 1.2 | 1.7 | 2.2 | V |
| Drain -Source Leakage Current | $V_{DS}=40V, V_{GS}=0V, T_J=25^\circ C$ | I_{DSS} | - | - | 1 | μA |
| | $V_{DS}=40V, V_{GS}=0V, T_J=55^\circ C$ | | - | - | 5 | |
| Gate-Source Leakage Current | $V_{GS}=\pm 20V, V_{DS}=0V$ | I_{GSS} | - | - | ±100 | nA |
| Forward Transconductance | $V_{DS}=5V, I_D=20A$ | g_{FS} | - | 75 | - | S |
| Gate Resistance | $V_{DS}=0V, V_{GS}=0V, f=1MHz$ | R_g | - | 1.5 | - | Ω |
| Total Gate Charge(4.5V) | $V_{DS}=20V$ $V_{GS}=4.5V$ $I_D=20A$ | Q_g | - | 22.7 | - | nC |
| Gate-Source Charge | | Q_{GS} | - | 7.5 | - | |
| Gate-Drain Charge | | Q_{gd} | - | 5.5 | - | |
| Turn-on delay time | $V_{DD}=20V$ $V_{GS}=10V$ $R_G=3\Omega$ $I_D=20A$ | $t_{d(on)}$ | - | 10 | - | ns |
| Rise Time | | T_r | - | 5 | - | |
| Turn-Off Delay Time | | $t_{d(OFF)}$ | - | 33 | - | |
| Fall Time | | t_f | - | 6.5 | - | |
| Input Capacitance | $V_{DS}=20V$ $V_{GS}=0V$ $f=1.0MHz$ | C_{iss} | - | 2648 | - | pF |
| Output Capacitance | | C_{oss} | - | 899 | - | |
| Reverse Transfer Capacitance | | C_{rss} | - | 71 | - | |
| Continuous Source Current ^{1,6} | $V_G=V_D=0V, \text{Force Current}$ | I_S | - | - | 30 | A |
| Diode Forward Voltage ² | $V_{GS}=0V, I_S=1A, T_J=25^\circ C$ | V_{SD} | - | - | 1 | V |

Note :

- 1.The data tested by surface mounted on a 1 inch 2 FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=54A$
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Ratings and Characteristic Curves

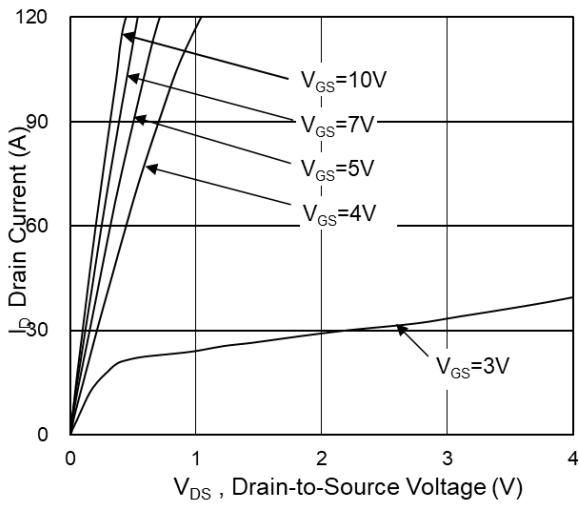


Fig.1 Typical Output Characteristics

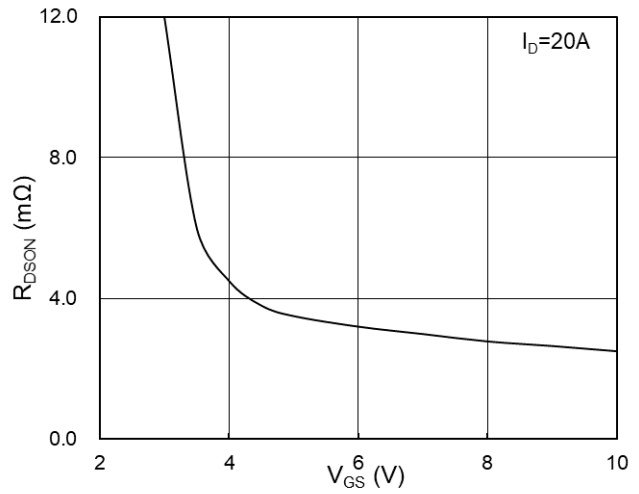


Fig.2 On-Resistance vs G-S Voltage

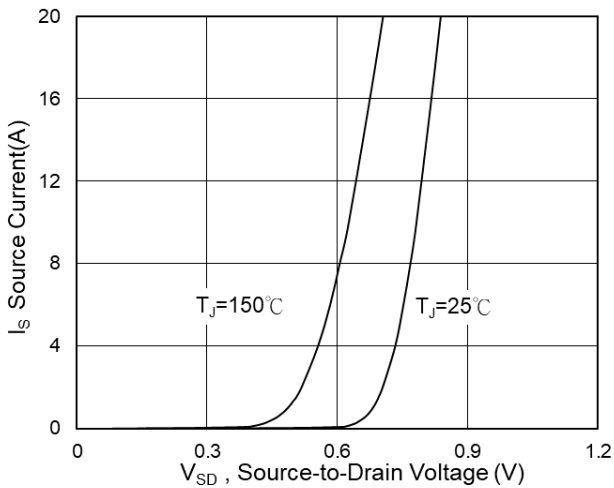


Fig.3 Source Drain Forward Characteristics

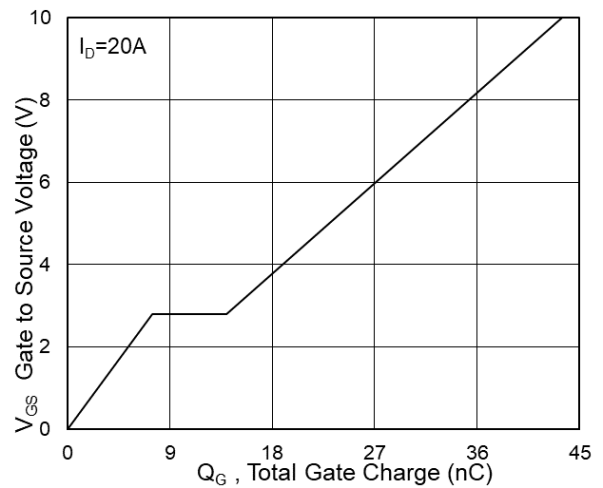


Fig.4 Gate-Charge Characteristics

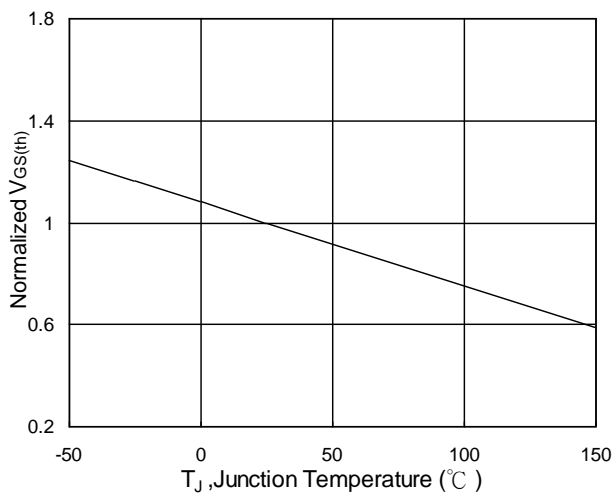


Fig.5 Normalized $V_{GS(th)}$ vs T_J

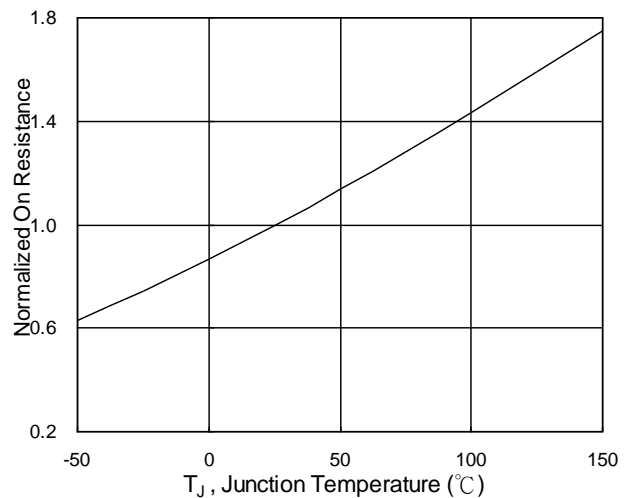


Fig.6 Normalized $R_{DS(on)}$ vs T_J

Ratings and Characteristic Curves

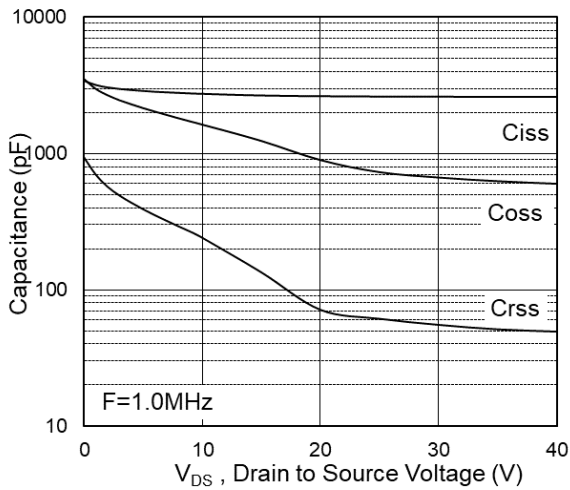


Fig.7 Capacitance

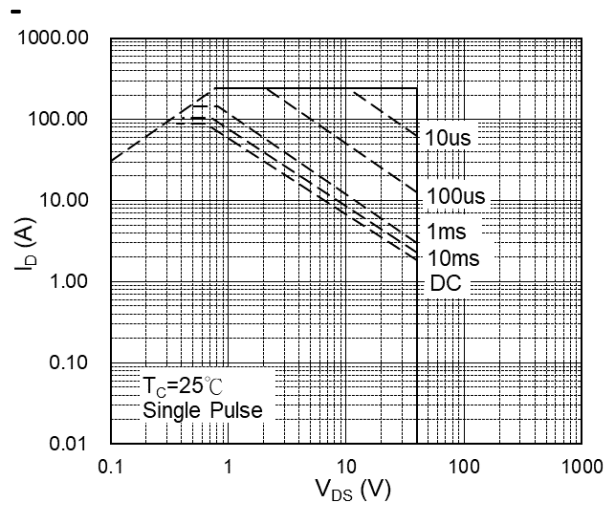


Fig.8 Safe Operating Area

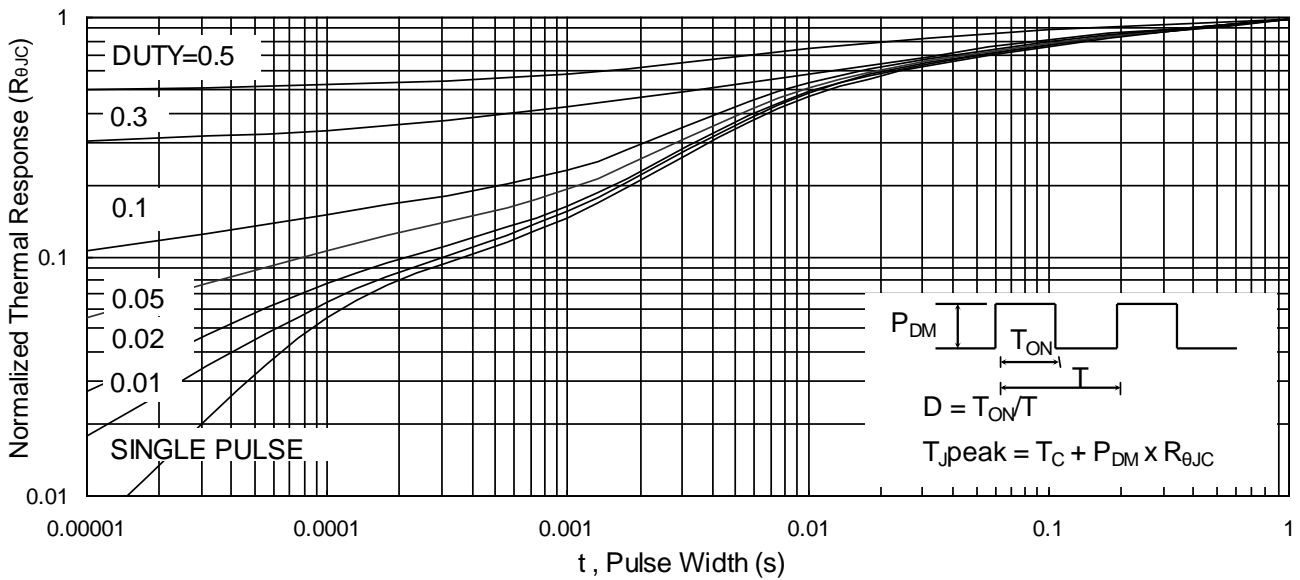


Fig.9 Normalized Maximum Transient Thermal Impedance

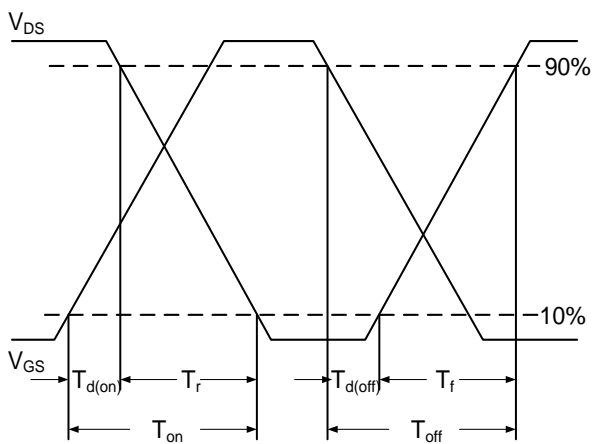


Fig.10 Switching Time Waveform

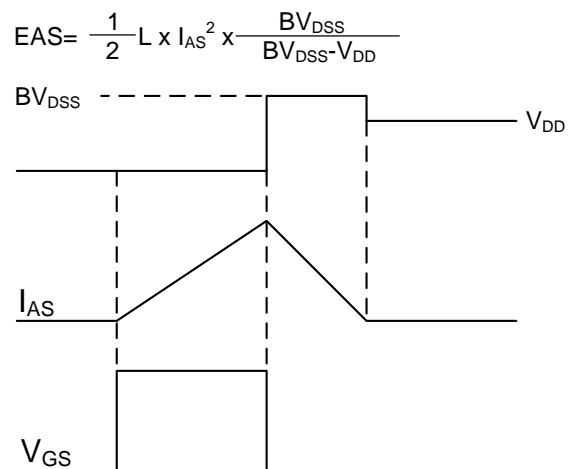
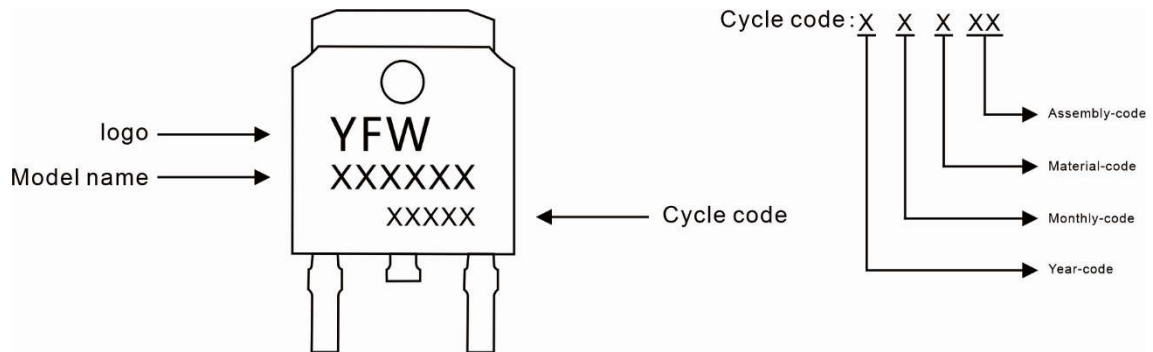


Fig.11 Unclamped Inductive Switching Wave

Marking Diagram



Ordering information

| Model name | Package | Unit Weight | Base Quantity | Packing Quantity |
|-------------|---------|----------------|---------------|-----------------------------|
| YFW120N04AD | 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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