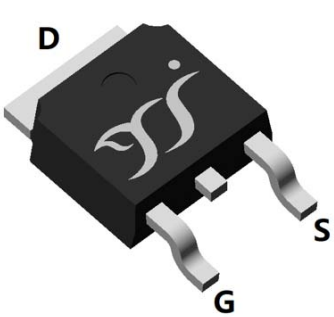
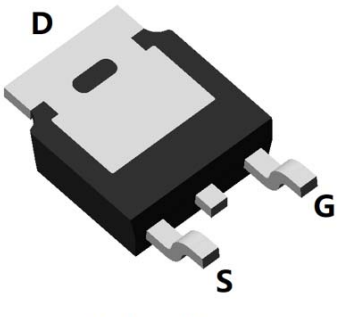
# YJD90G06AQ

## N-Channel Enhancement Mode Field Effect Transistor

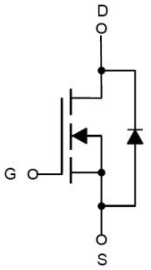



Top View




Bottom View

TO-252




### Product Summary

- $V_{DS}$ 60V
- $I_D$ 90A
- $R_{DS(ON)}$( at $V_{GS}$=10V) ＜4.5mΩ
- $R_{DS(ON)}$( at $V_{GS}$=4.5V) ＜8.0mΩ
- 100% EAS Tested
- 100% ▽$V_{DS}$ Tested

### General Description

- Low $R_{DS(on)}$ & FOM
- Extremely low switching loss
- Excellent stability and uniformity
- Fast switching and soft recovery
- Moisture Sensitivity Level 1
- Part no. with suffix “Q” means AEC-Q101 qualified

### Applications

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply
- DC-DC convertor
- 12V and 24V Automotive systems

■ **Absolute Maximum Ratings** ($T_A$=25℃ unless otherwise noted)

| Parameter | | Symbol | Limit | Unit |
|---|---|---|---|---|
| Drain-source Voltage | | $V_{DS}$ | 60 | V |
| Gate-source Voltage | | $V_{GS}$ | ±20 | V |
| Drain Current | $T_A$=25℃ | $I_D$ | 20 | A |
| | $T_A$ =100℃ | | 14 | |
| | $T_C$=25℃ | | 90 | |
| | $T_C$ =100℃ | | 64 | |
| Pulsed Drain Current [A] | | $I_{DM}$ | 360 | A |
| Avalanche energy [B] | | EAS | 144 | mJ |
| Total Power Dissipation [C] | $T_A$=25℃ | $P_D$ | 3 | W |
| | $T_A$ =100℃ | | 1.5 | |
| | $T_C$=25℃ | | 125 | |
| | $T_C$ =100℃ | | 62 | |
| Junction and Storage Temperature Range | | $T_J$ ,$T_{STG}$ | -55～+175 | ℃ |

## ■Thermal resistance

| Parameter | | Symbol | Typ | Max | Units |
|---|---|---|---|---|---|
| Thermal Resistance Junction-to-Ambient [D] | Steady-State | $R_{\theta JA}$ | 35 | 42 | ℃/W |
| Thermal Resistance Junction-to-Case | Steady-State | $R_{\theta JC}$ | 1 | 1.2 | |

## ■ Ordering Information (Example)

| PREFERED P/N | PACKING CODE | Marking | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---|---|---|---|---|---|---|
| YJD90G06AQ | F1 | YJD90G06A | 2500 | / | 25000 | 13"Reel |

A. Repetitive rating; pulse width limited by max. junction temperature.
B. $T_J$=25℃, $V_{DD}$=40V, $V_G$=10V, $R_G$=25Ω, L=1mH, IAS=17A.
C. $P_d$ is based on max. junction temperature, using junction-case thermal resistance.
D. The value of $R_{\theta JA}$ is measured with the device mounted on the minimum recommend pad size, in the still air environment with $T_A$ =25℃. The maximum allowed junction temperature of 175℃. The value in any given application depends on the user's specific board design.

## ■ Electrical Characteristics ($T_J$=25℃ unless otherwise noted)

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Static Parameter** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$= 0V, $I_D$=250μA | 60 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=60V, $V_{GS}$=0V | | | 1 | μA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$= ±20V, $V_{DS}$=0V | | | ±100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$= $V_{GS}$, $I_D$=250μA | 1.0 | 1.7 | 2.5 | V |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$=20A | | 3.6 | 4.5 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=10A | | 5.3 | 8 | |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=20A, $V_{GS}$=0V | | 0.85 | 1.2 | V |
| Maximum Body-Diode Continuous Current | $I_S$ | | | | 90 | A |
| Gate resistance | $R_G$ | f=1MHz | | 1.5 | | Ω |
| **Dynamic Parameters** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=25V, $V_{GS}$=0V, f=1MHz | - | 1775 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 760 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 56 | - | |
| **Switching Parameters** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{GS}$=10V, $V_{DS}$=30V, $I_D$=30A | - | 38.5 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 9 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 8.2 | - | |
| Reverse Recovery Charge | $Q_{rr}$ | $I_F$=20A, di/dt=100A/us | - | 31.5 | - | nC |
| Reverse Recovery Time | $t_{rr}$ | | - | 37 | - | ns |
| Turn-on Delay Time | $t_{D(on)}$ | $V_{GS}$=10V,$V_{DD}$=30V,$I_{DS}$=10A,Rg=3Ω | - | 14.2 | - | ns |
| Turn-on Rise Time | $t_r$ | | - | 54.6 | - | |
| Turn-off Delay Time | $t_{D(off)}$ | | - | 28 | - | |
| Turn-off fall Time | $t_f$ | | - | 10.5 | - | |

## ■Typical Electrical and Thermal Characteristics Diagrams

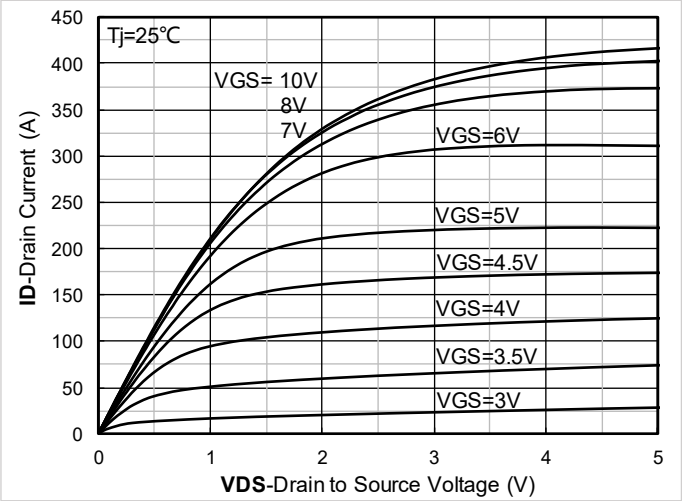



Figure 1. Output Characteristics

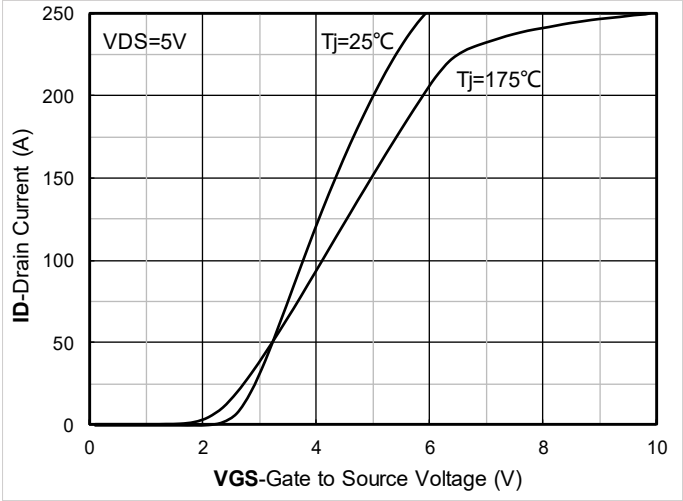



Figure 2. Transfer Characteristics

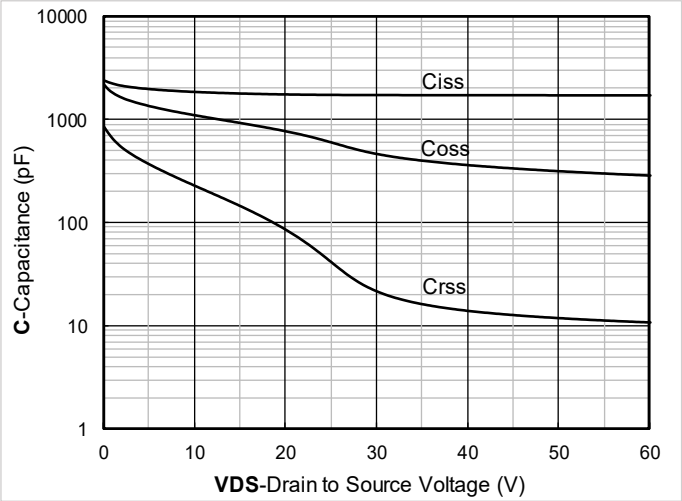



Figure 3. Capacitance Characteristics

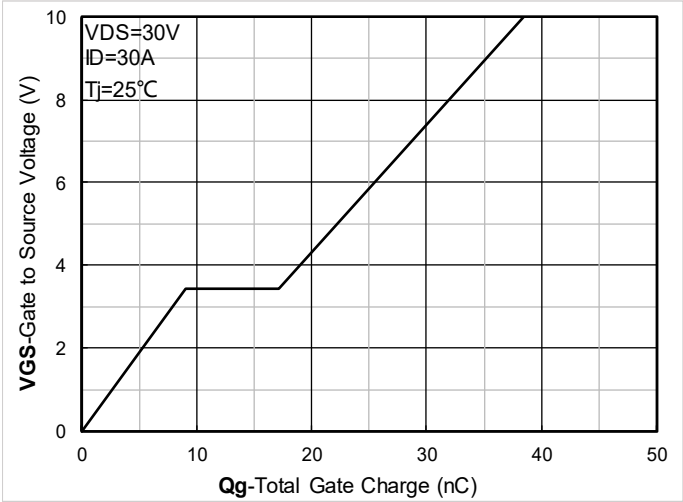



Figure 4. Gate Charge

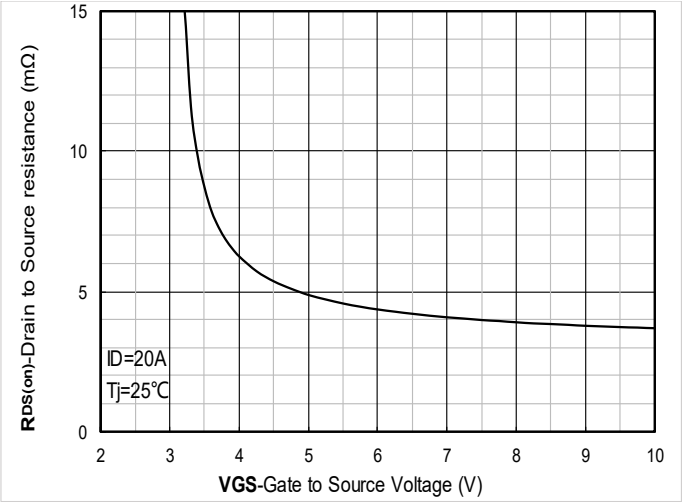



Figure 5. On-Resistance vs Gate to Source Voltage

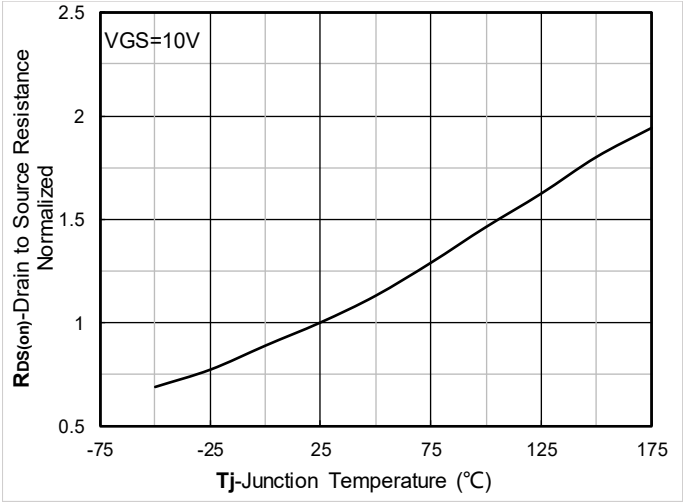



Figure 6. Normalized On-Resistance

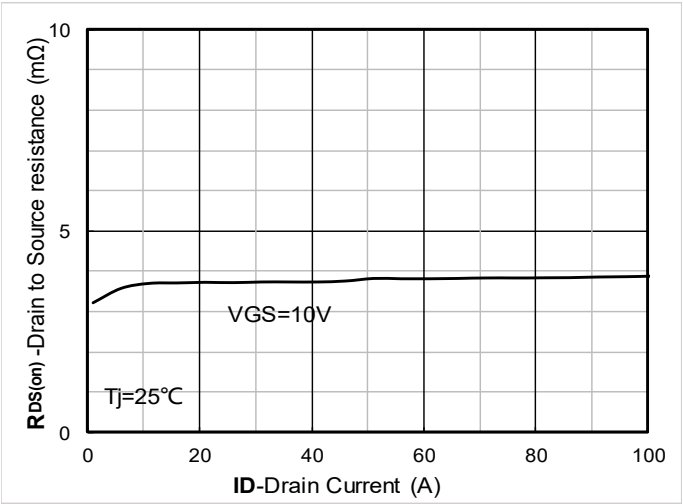



Figure 7. $R_{DS(on)}$ VS Drain Current

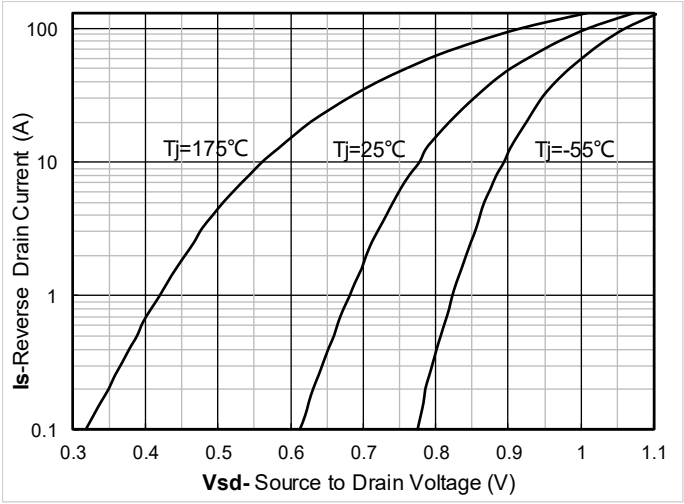



Figure 8. Forward characteristics of reverse diode

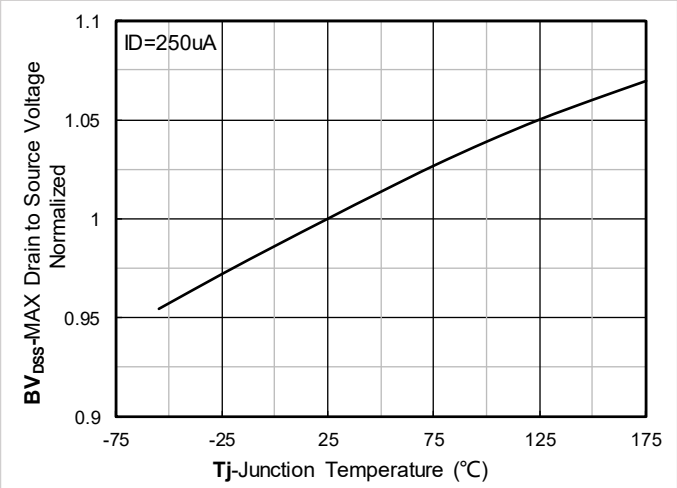



Figure 9. Normalized breakdown voltage

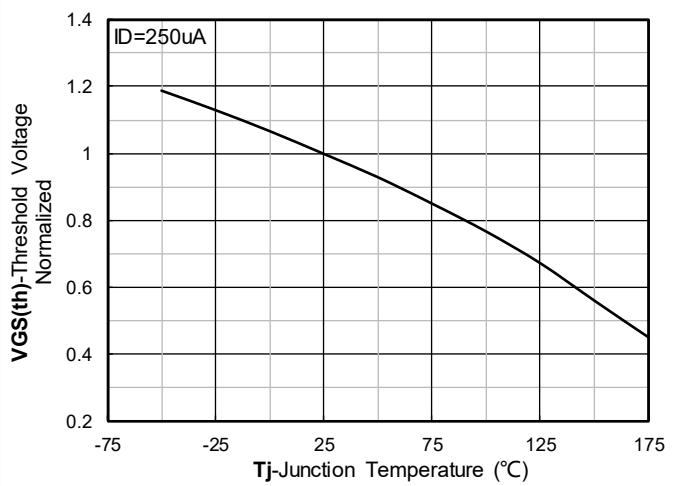



Figure 10. Normalized Threshold voltage

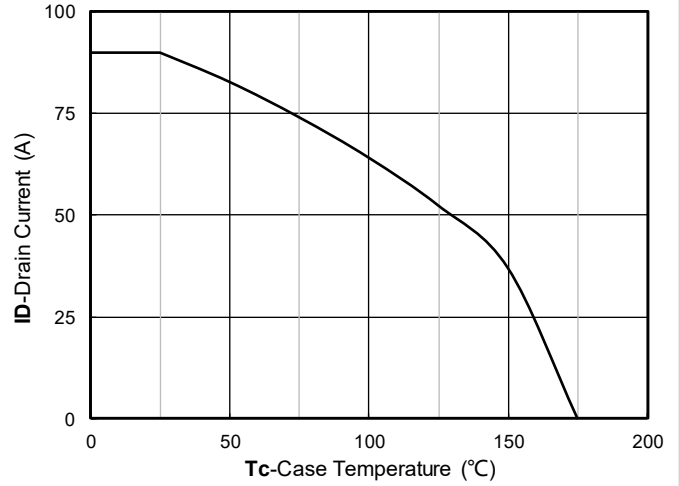



Figure 11. Current dissipation

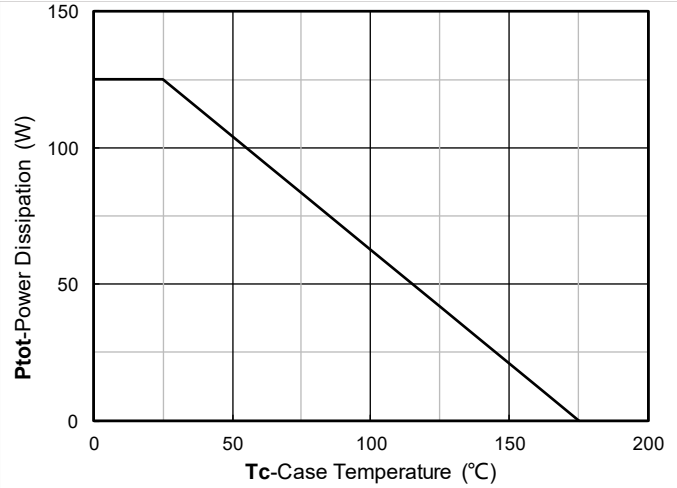



Figure 12. Power dissipation

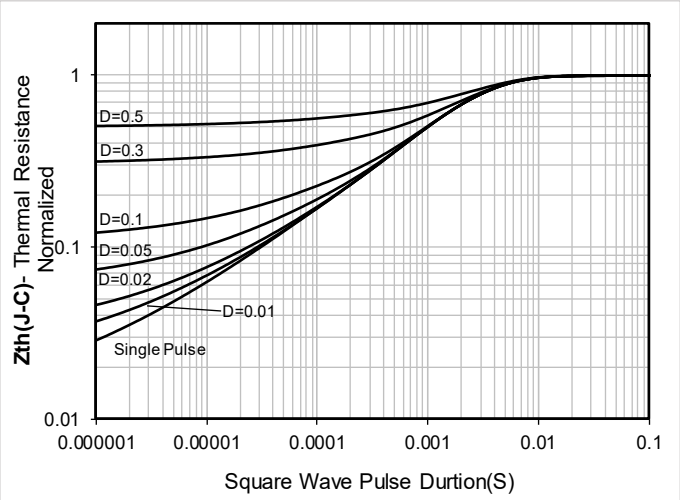



Figure 13. Maximum Transient Thermal Impedance

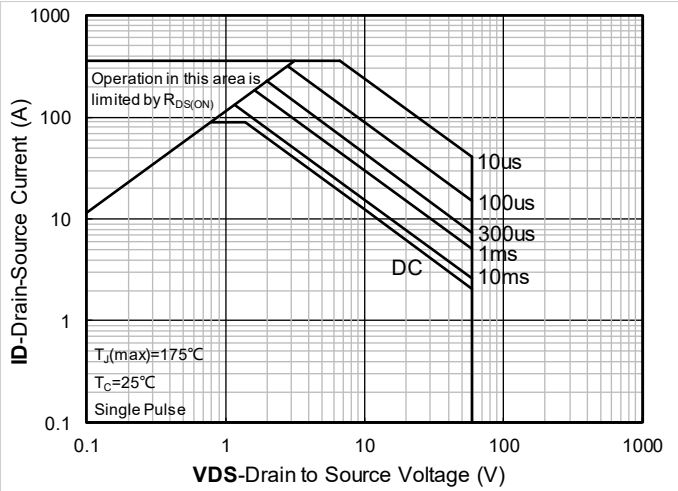
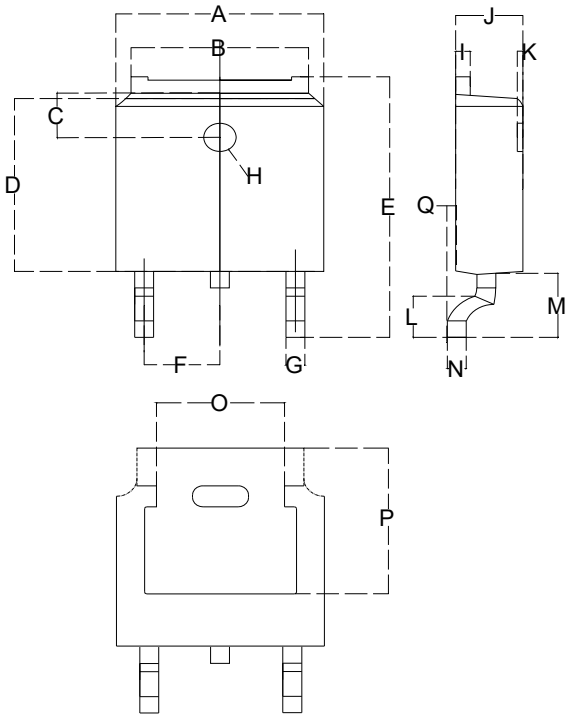



Figure 14. Safe Operation Area

## ■ TO-252 Package information

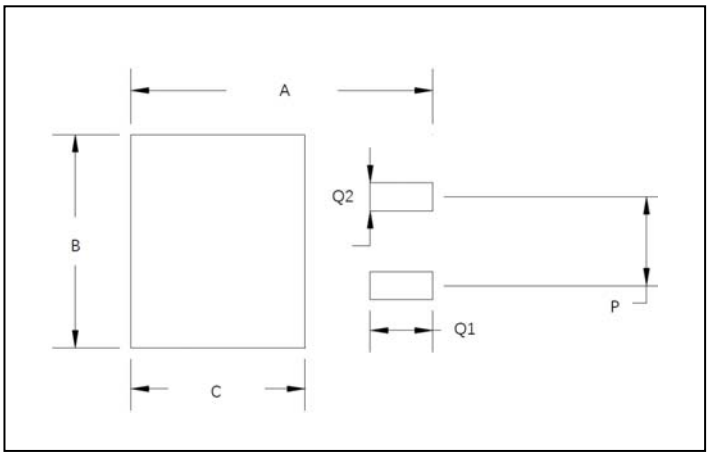
TO-252




Dimensions in millimeters

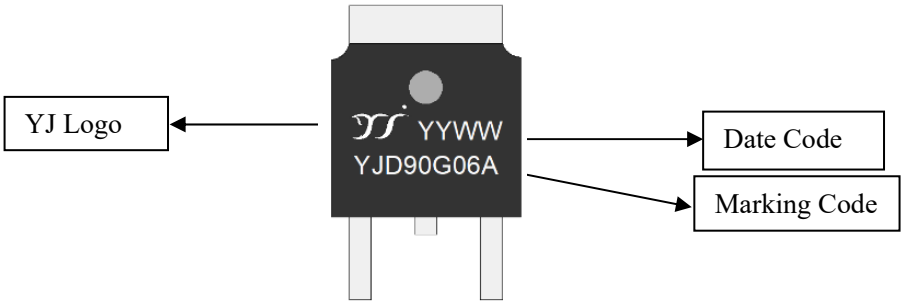
| TO-252 | | |
|---|---|---|
| Dim | Min | Max |
| A | 6.500 | 6.700 |
| B | 5.100 | 5.460 |
| C | 1.400 | 1.800 |
| D | 6.000 | 6.200 |
| E | 10.000 | 10.400 |
| F | 2.166 | 2.366 |
| G | 0.660 | 0.860 |
| H | Φ1.050 | Φ1.350 |
| I | 0.460 | 0.580 |
| J | 2.200 | 2.400 |
| K | 0 | 0.300 |
| L | 0.890 | 2.290 |
| M | 2.730 | 3.080 |
| N | 0.430 | 0.580 |
| O | 3.800 | 4.500 |
| P | 5.15 | 5.45 |
| Q | 0 | 0.2 |

## ■ Suggested Pad Layout




| Dim | Millimeters |
|---|---|
| A | 11.4 |
| B | 6.74 |
| C | 6.23 |
| P | 4.56 |
| Q1 | 2.28 |
| Q2 | 1.52 |

## ■ Marking Information




Note：
1. All marking is at middle of the product body
2. All marking is in laser printing
3. YJD90G06A is Marking Code, YYWW is date code, “YY” is year, “WW” is week
4. Body color: Black

## Disclaimer

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