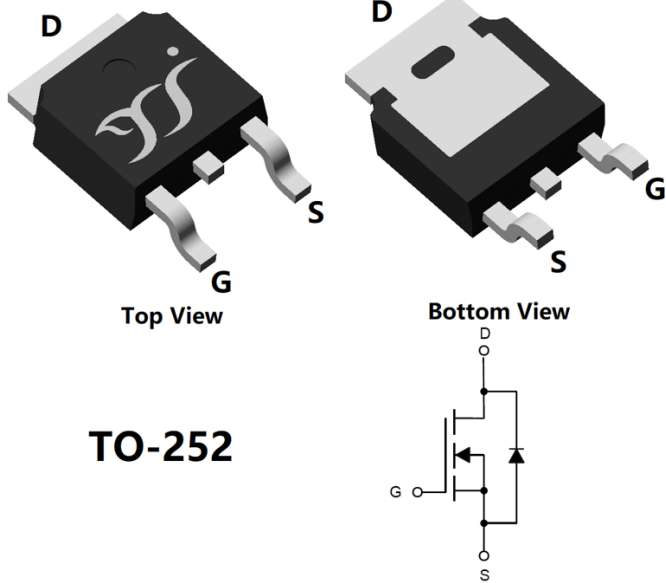


N-Channel Enhancement Mode Field Effect Transistor



TO-252

Product Summary

- V_{DS} 100V
- I_D 25A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) <52mohm
- $R_{DS(ON)}$ (at $V_{GS}=4.5V$) <56mohm
- 100% EAS Tested
- 100% ∇V_{DS} Tested

General Description

- Trench Power MV MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- DC-DC Converters
- Power management functions
- Backlighting

■ Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

| Parameter | | Symbol | Limit | Unit |
|--|-------------------------|-----------------|----------|---------------------------|
| Drain-source Voltage | | V_{DS} | 100 | V |
| Gate-source Voltage | | V_{GS} | ± 20 | V |
| Drain Current | $T_A=25^\circ\text{C}$ | I_D | 4 | A |
| | $T_A=100^\circ\text{C}$ | | 3 | |
| | $T_C=25^\circ\text{C}$ | | 25 | |
| | $T_C=100^\circ\text{C}$ | | 16 | |
| Pulsed Drain Current ^A | | I_{DM} | 100 | A |
| Total Power Dissipation | $T_A=25^\circ\text{C}$ | P_D | 2 | W |
| | $T_A=100^\circ\text{C}$ | | 0.8 | |
| | $T_C=25^\circ\text{C}$ | | 45 | |
| | $T_C=100^\circ\text{C}$ | | 18 | |
| Single Pulse Avalanche Energy ^B | | E_{AS} | 9.9 | mJ |
| Thermal Resistance Junction-to-Case ^C | | $R_{\theta JC}$ | 2.78 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance Junction-to-Air ^C | | $R_{\theta JA}$ | 60 | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range | | T_J, T_{STG} | -55~+150 | $^\circ\text{C}$ |

■ Ordering Information (Example)

| PREFERRED P/N | PACKING CODE | Marking | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---------------|--------------|-----------|----------------------|-------------------------|----------------------------|---------------|
| YJD25N10A | F1/F2 | YJD25N10A | 2500 | / | 25000 | 13" reel |



YJD25N10A

■ Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---------------------------------------|--------------|---|-------------------------|------|-----------|------------|
| Static Parameter | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=250\mu A$ | 100 | | | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=100V, V_{GS}=0V$ | $T_J=25^\circ\text{C}$ | | 1 | μA |
| | | | $T_J=150^\circ\text{C}$ | | 100 | |
| Gate-Body Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | | | ± 100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 1.1 | 1.8 | 3.0 | V |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}=10V, I_D=10A$ | | 43 | 52 | m Ω |
| | | $V_{GS}=4.5V, I_D=8A$ | | 46 | 56 | |
| Diode Forward Voltage | V_{SD} | $I_S=25A, V_{GS}=0V$ | | 0.8 | 1.2 | V |
| Maximum Body-Diode Continuous Current | I_S | | | | 25 | A |
| Dynamic Parameters | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=50V, V_{GS}=0V, f=1\text{MHz}$ | | 2071 | | pF |
| Output Capacitance | C_{oss} | | | 73 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 54 | | |
| Switching Parameters | | | | | | |
| Total Gate Charge | Q_g | $V_{GS}=10V, V_{DS}=50V, I_D=10A$ | | 51.4 | | nC |
| Gate-Source Charge | Q_{gs} | | | 9.1 | | |
| Gate-Drain Charge | Q_{gd} | | | 11.5 | | |
| Reverse Recovery Charge | Q_{rr} | $I_F=10A, di/dt=100A/\mu s$ | | 35.3 | | ns |
| Reverse Recovery Time | t_{rr} | | | 38 | | |
| Turn-on Delay Time | $t_{D(on)}$ | $V_{GS}=10V, V_{DD}=50V, I_D=2A$ $R_{GEN}=3\Omega$ | | 10 | | ns |
| Turn-on Rise Time | t_r | | | 19 | | |
| Turn-off Delay Time | $t_{D(off)}$ | | | 42 | | |
| Turn-off fall Time | t_f | | | 26 | | |

A. Pulse Test: Pulse Width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

B. $T_J=25^\circ\text{C}$, $V_{DD}=50V$, $V_G=10V$, $L=0.5\text{mH}$, $I_{AS}=6.3A$

C. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance, where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design, while $R_{\theta JA}$ is determined by the board design. The maximum rating presented here is based on mounting on a 1 in 2 pad of 2oz copper.



■ Typical Performance Characteristics

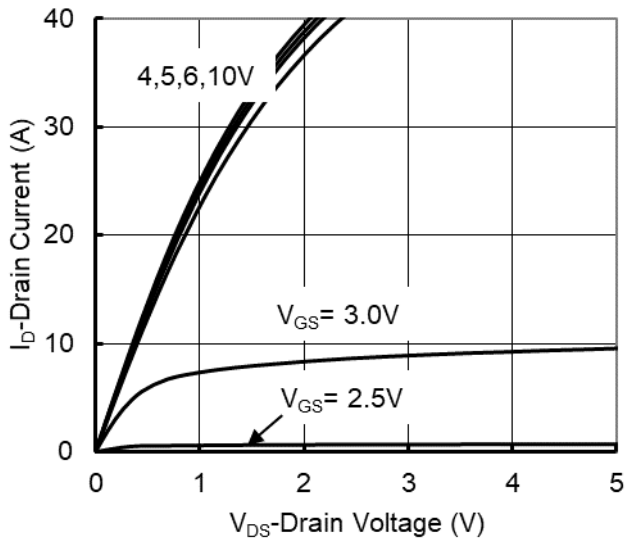


Figure 1. Output Characteristics

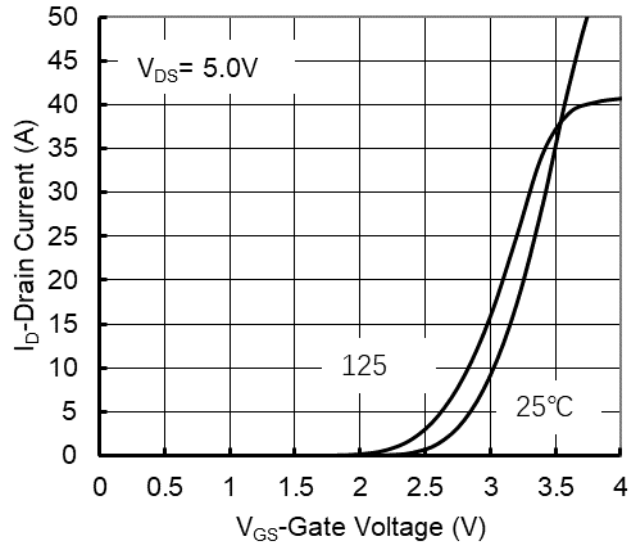


Figure 2. Transfer Characteristics

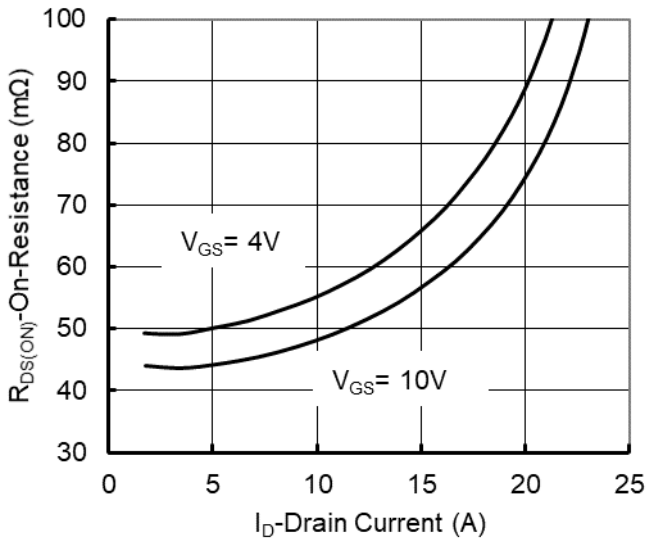


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

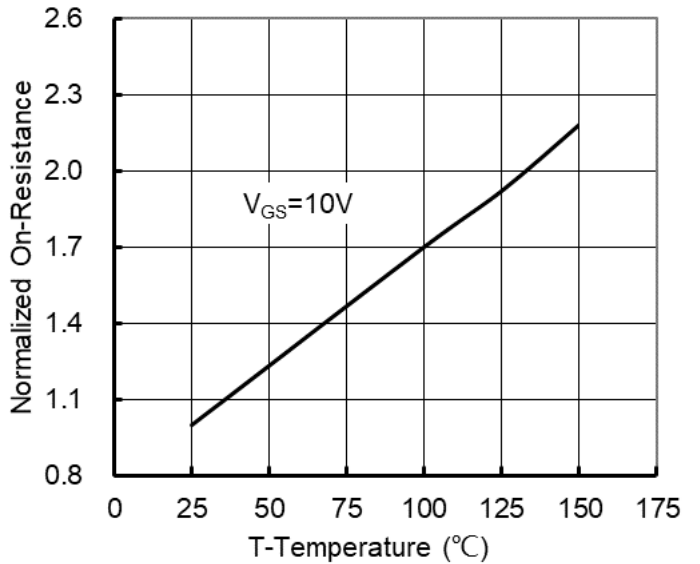


Figure 4. On-Resistance vs. Junction Temperature

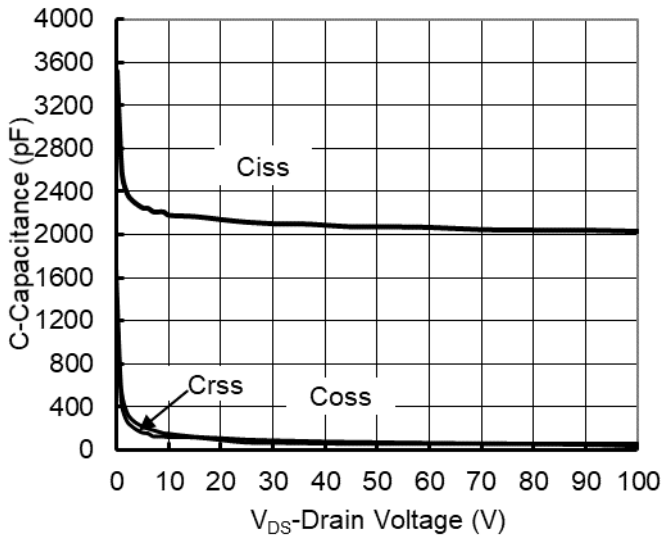


Figure 5. Capacitance Characteristics

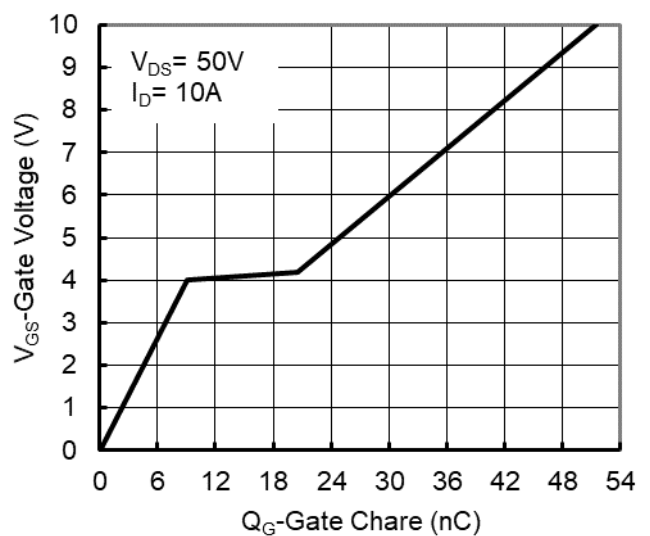


Figure 6. Gate Charge



YJD25N10A

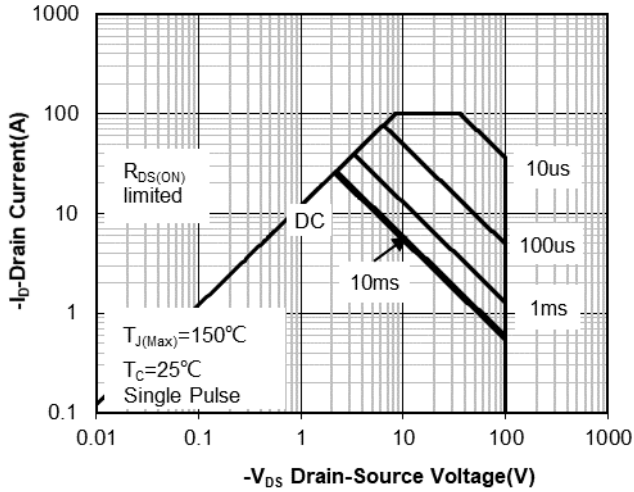


Figure 7. Safe Operation Area

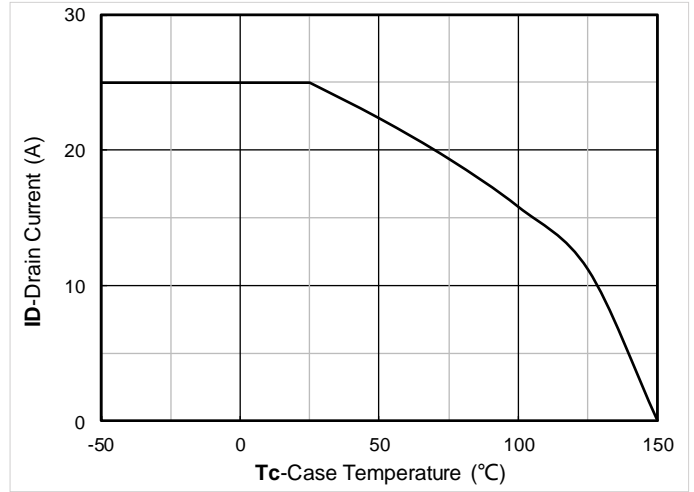


Figure 8. Maximum Continuous Drain Current vs Case Temperature

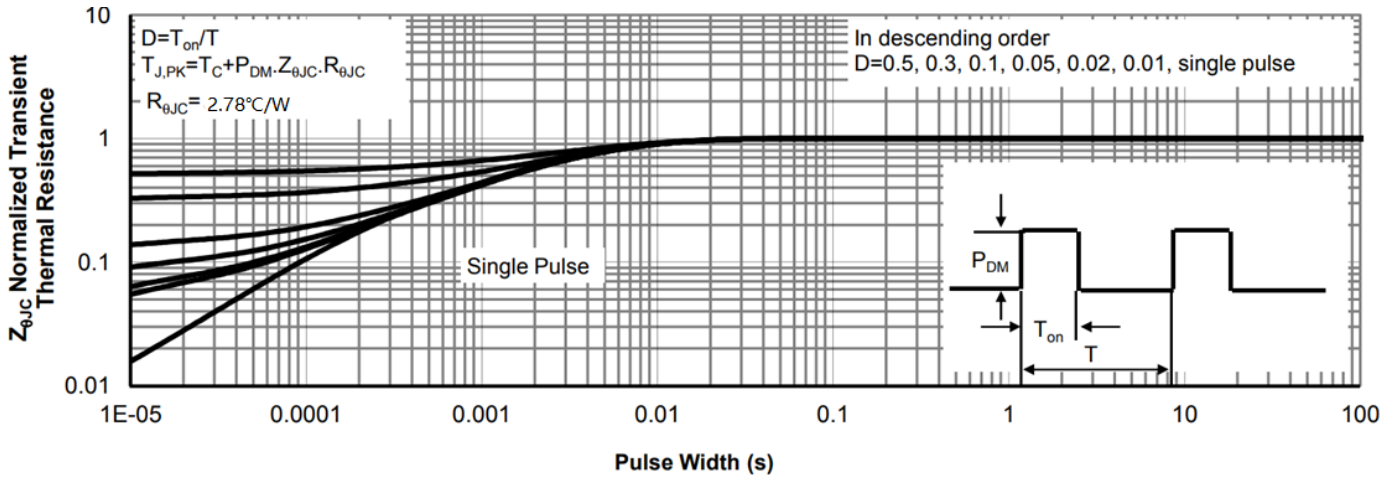
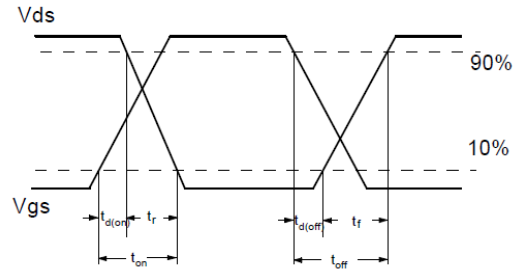
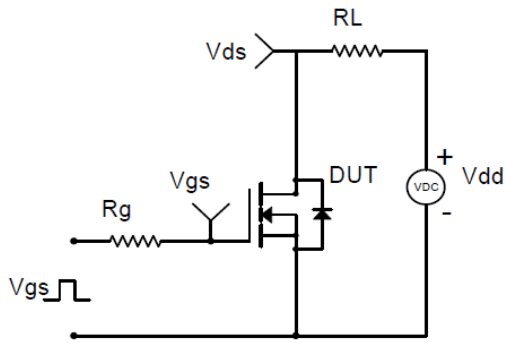
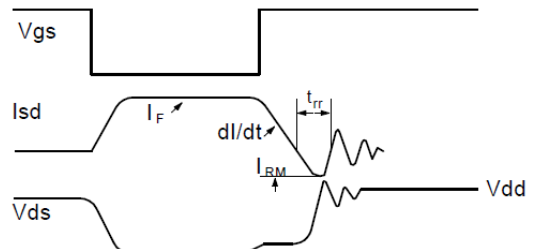
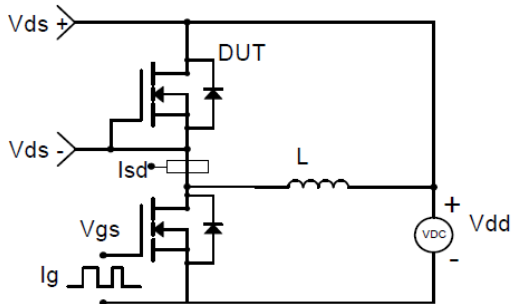


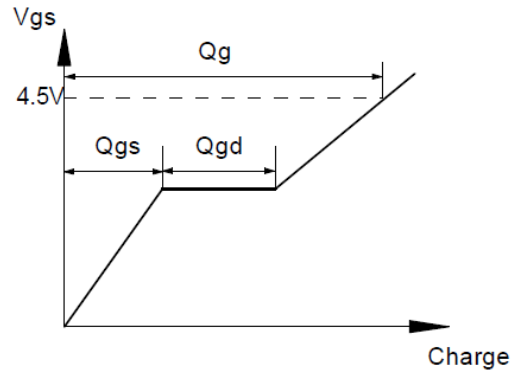
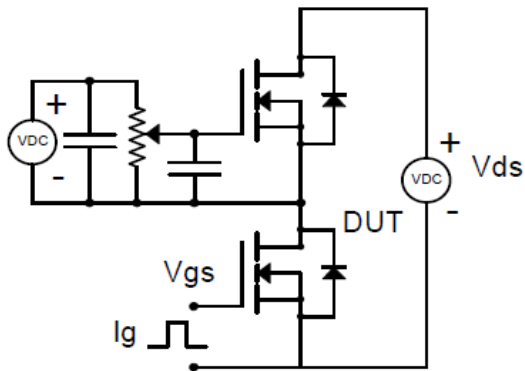
Figure 9. Normalized Maximum Transient Thermal Impedance



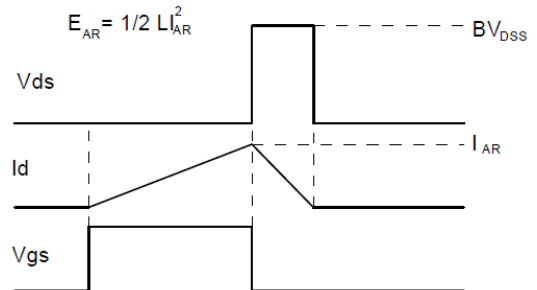
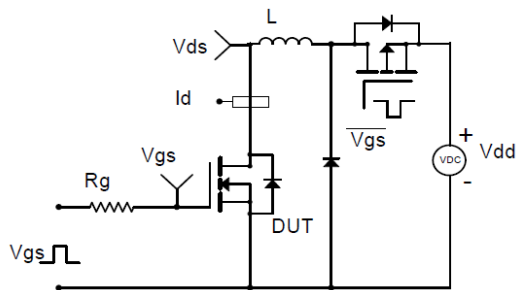
Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Gate Charge Test Circuit & Waveform

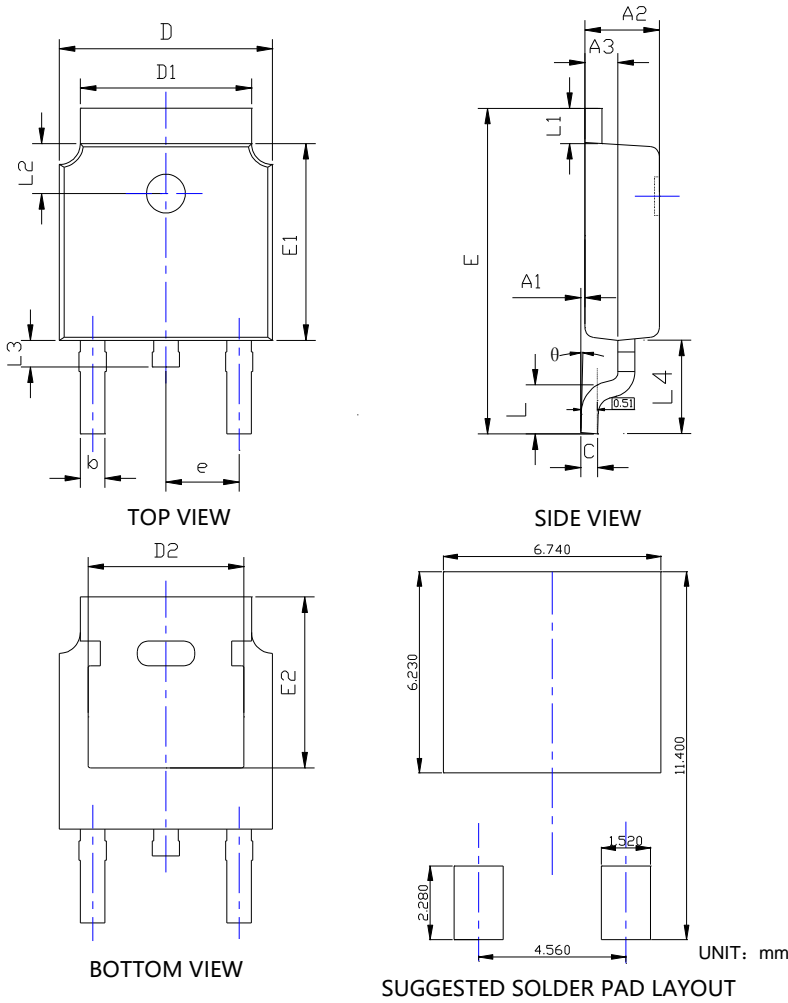


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



YJD25N10A

■ TO-252-B Package information



| SYMBOL | DIMENSIONS | | | | | |
|----------|------------|-------|-------|------------|--------|--------|
| | INCHES | | | Millimeter | | |
| | MIN. | NDM. | MAX. | MIN. | NDM. | MAX. |
| A1 | 0.000 | --- | 0.008 | 0.000 | --- | 0.200 |
| A2 | 0.087 | 0.091 | 0.094 | 2.200 | 2.300 | 2.400 |
| A3 | 0.035 | 0.039 | 0.043 | 0.900 | 1.000 | 1.100 |
| b | 0.026 | 0.030 | 0.034 | 0.660 | 0.760 | 0.860 |
| c | 0.018 | 0.020 | 0.023 | 0.460 | 0.520 | 0.580 |
| D | 0.256 | 0.260 | 0.264 | 6.500 | 6.600 | 6.700 |
| D1 | 0.203 | 0.209 | 0.215 | 5.150 | 5.300 | 5.450 |
| D2 | 0.181 | 0.189 | 0.195 | 4.600 | 4.800 | 4.950 |
| E | 0.390 | 0.398 | 0.406 | 9.900 | 10.100 | 10.300 |
| E1 | 0.236 | 0.240 | 0.244 | 6.000 | 6.100 | 6.200 |
| E2 | 0.203 | 0.209 | 0.215 | 5.150 | 5.300 | 5.450 |
| e | 0.090BSC | | | 2.286BSC | | |
| L | 0.049 | 0.059 | 0.069 | 1.250 | 1.500 | 1.750 |
| L1 | 0.035 | --- | 0.050 | 0.900 | --- | 1.270 |
| L2 | 0.055 | --- | 0.075 | 1.400 | --- | 1.900 |
| L3 | 0.240 | 0.310 | 0.039 | 0.600 | 0.800 | 1.000 |
| L4 | 0.114REF | | | 2.900REF | | |
| θ | 0° | --- | 10° | 0° | --- | 10° |

NOTE:
 1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
 2. TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.
 3. THE PAD LAYOUT IS FOR REFERENCE PURPOSES ONLY.



YJD25N10A

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