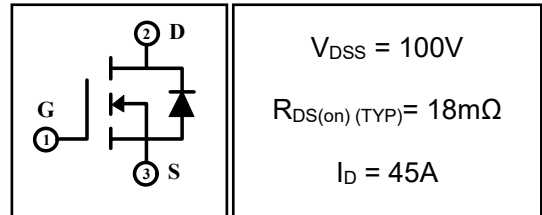


45A 100V N-channel Enhancement Mode Power MOSFET

1 Description

These N-channel enhancement mode power mosfets used advanced SGT trench technology design, provided excellent R_{DS(on)} and low gate charge. Which accords with the RoHS standard.

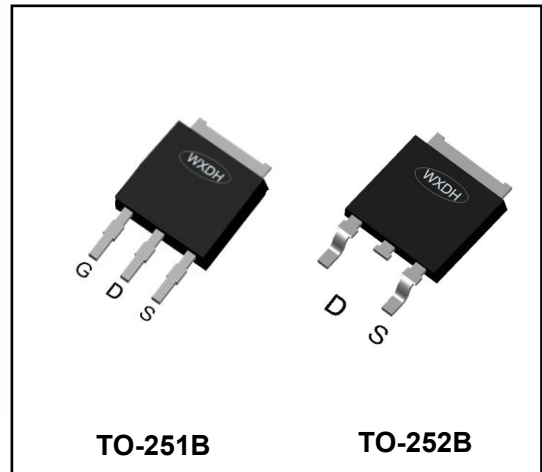


2 Features

- Low on resistance
- Low gate charge
- Fast switching
- Low reverse transfer capacitances
- 100% single pulse avalanche energy test
- 100% ΔV_{DS} test

3 Applications

- Power switching applications
- DC-DC converters
- Full bridge control



4 Electrical Characteristics

4.1 Absolute Maximum Ratings (T_c=25°C, unless otherwise noted)

| Parameter | Symbol | Rating | Units | |
|--|------------------|-----------|-------|---|
| Drain-to-Source Voltage | V_{DSS} | 100 | V | |
| Gate-to-Source Voltage | V_{GSS} | ±20 | V | |
| Continuous Drain Current | I_D | 45 | A | |
| Pulsed Drain Current ⁽¹⁾ | I_{DM} | 150 | A | |
| Single Pulse Avalanche Energy ⁽⁴⁾ | E_{AS} | 144 | mJ | |
| Power Dissipation | $T_a=25^\circ C$ | P_{tot} | 1.67 | W |
| | $T_c=25^\circ C$ | P_{tot} | 89 | W |
| Junction Temperature Range | T_j | -55~150 | °C | |
| Storage Temperature Range | T_{stg} | -55~150 | °C | |

4.2 Thermal Characteristics

| Parameter | Symbol | Rating | Units |
|---|------------|--------|-------|
| Thermal Resistance, Junction to Case-sink | R_{thJC} | 1.4 | °C/W |
| Thermal Resistance, Junction to Ambient | R_{thJA} | 75 | °C/W |

4.3 Electrical Characteristics (T_c=25°C, unless otherwise noted)

| Parameter | Symbol | Test Condition | Value | | | Units |
|---|---------------------|---|-------|------|------|-------|
| | | | Min | Typ | Max | |
| Off Characteristics | | | | | | |
| Drain-to-Source Breakdown Voltage | BV _{DSS} | I _D =250μA, V _{GS} =0V | 100 | -- | -- | V |
| Drain-to-Source Leakage Current | I _{DSS} | V _{DS} =100V, V _{GS} =0V, T _C =25°C | -- | -- | 1 | μA |
| | | V _{DS} =80V, V _{GS} =0V, T _C =125°C | -- | -- | 100 | μA |
| Gate-to-Source Leakage Current | I _{GSS} | V _{GS} =±20V, V _{DS} =0V | -- | -- | ±100 | nA |
| On Characteristics | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =250μA | 2.0 | -- | 3.5 | V |
| Drain-to-Source on-state Resistance | R _{DS(on)} | V _{GS} =10V, I _D =25A | -- | 18 | 25 | mΩ |
| Dynamic Characteristics | | | | | | |
| Input Capacitance | C _{iss} | V _{GS} =0V, V _{DS} =50V, f=1.0MHz | -- | 1221 | -- | pF |
| Output Capacitance | C _{oss} | | -- | 153 | -- | |
| Reverse Transfer Capacitance | C _{rss} | | -- | 9.5 | -- | |
| Switching Characteristics | | | | | | |
| Turn-on Delay Time | t _{d(on)} | I _D =47A, V _{DD} =50V, V _{GS} =10V, R _{GEN} =25Ω | -- | 24 | -- | nS |
| Turn-on Rise Time | t _r | | -- | 13 | -- | |
| Turn-off Delay Time | t _{d(off)} | | -- | 27 | -- | |
| Turn-off Fall Time | t _f | | -- | 10 | -- | |
| Total Gate Charge | Q _g | I _D =47A, V _{DD} =80V, V _{GS} =10V | -- | 17 | -- | nC |
| Gate-to-Source Charge | Q _{gs} | | -- | 8.1 | -- | |
| Gate-to-Drain("Miller") Charge | Q _{gd} | | -- | 2.3 | -- | |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage ⁽³⁾ | V _{SD} | V _{GS} =0V, I _S =30A | -- | -- | 1.2 | V |
| Diode Forward Current | I _S | | -- | -- | 45 | A |
| Reverse Recovery Time ⁽³⁾ | t _{rr} | T _J =25°C, I _F =47A, di _F /dt=100A/μS, V _{GS} =0V | -- | 62 | -- | ns |
| Reverse Recovery Charge ⁽³⁾ | Q _{rr} | | -- | 84 | -- | nC |

Notes:

- 1: Repetitive rating, pulse width limited by maximum junction temperature.
- 2: Surface mounted on FR4 Board, t_≤10sec.
- 3: Pulse width ≤ 300μs, duty cycle ≤ 2%.
- 4: L=0.5mH, V_{DD}=80V, Start T_J=25°C.

5 Typical characteristics diagrams

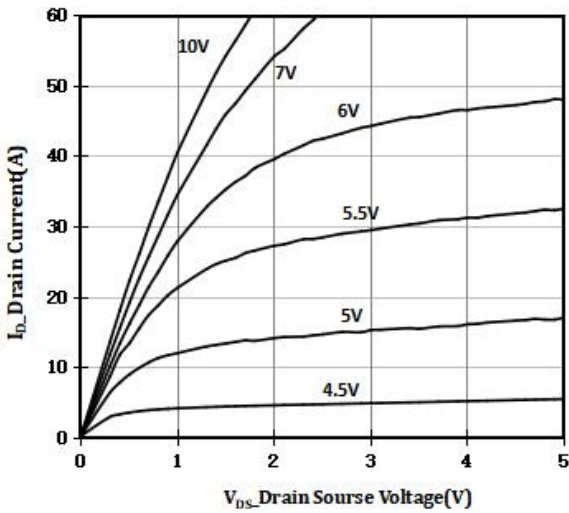


Fig 1 Output Characteristics

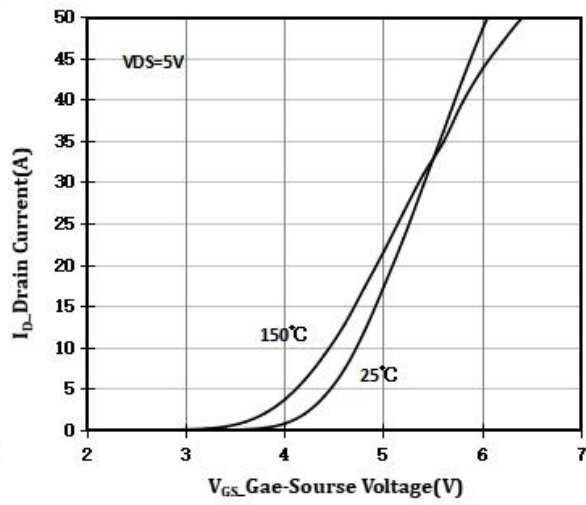


Fig 2 Transfer Characteristics

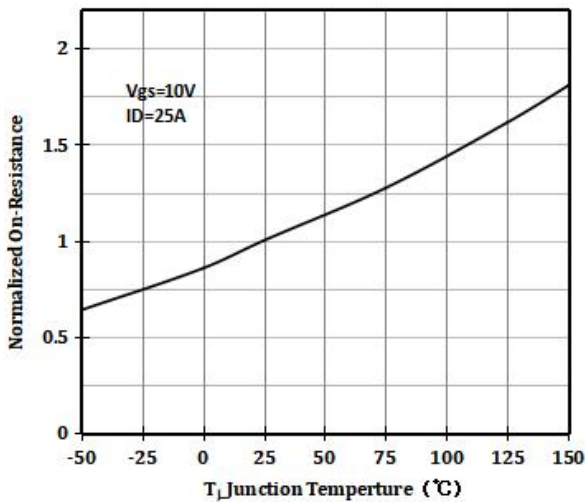


Fig 3 RDSON vs Junction Temperature

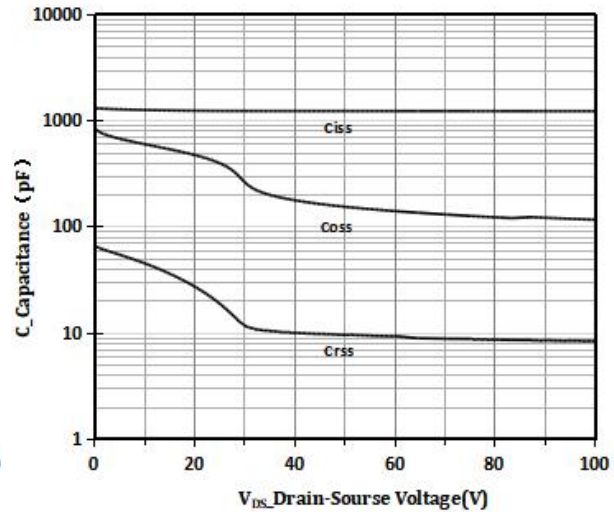


Fig 4 Capacitance vs Vds

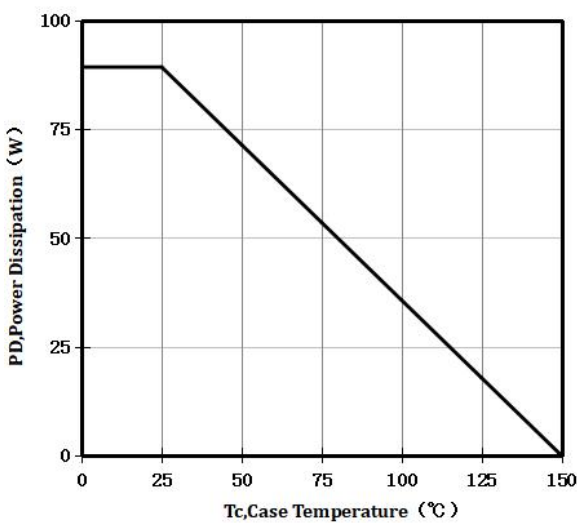


Fig 5 Power De-rating

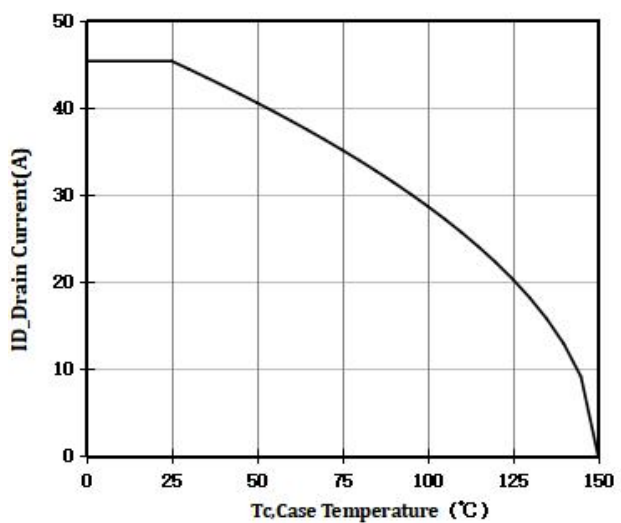


Fig 6 ID Current De-rating

5 Typical characteristics diagrams(continues)

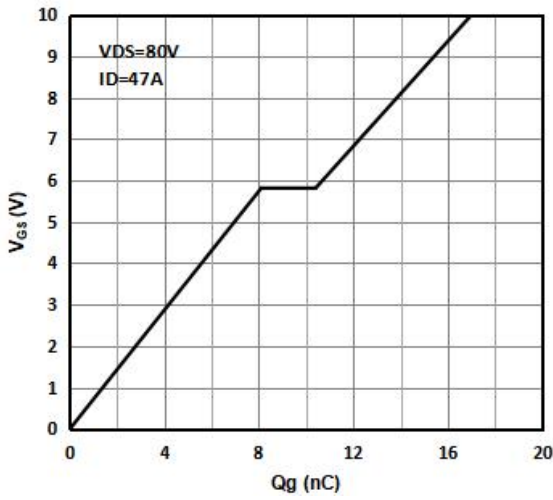


Fig 7 Gate Charge Figure

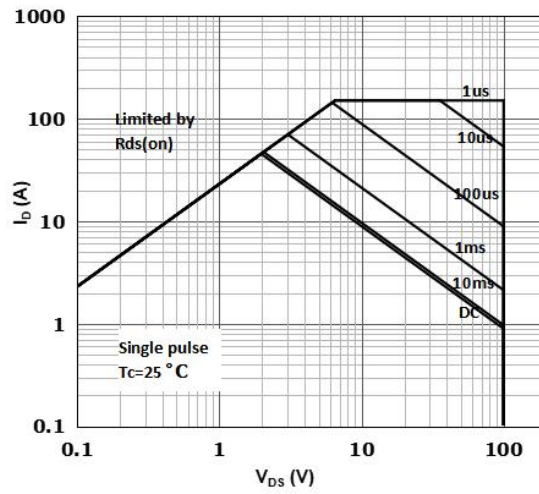


Fig 8 SOA

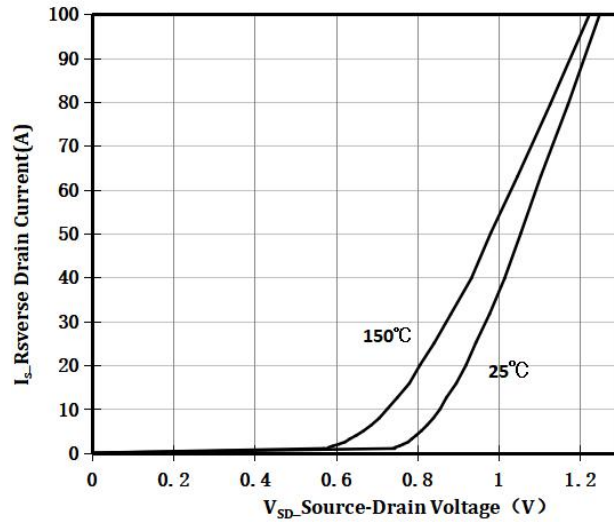


Fig 9 Source-Drain Diode Forward

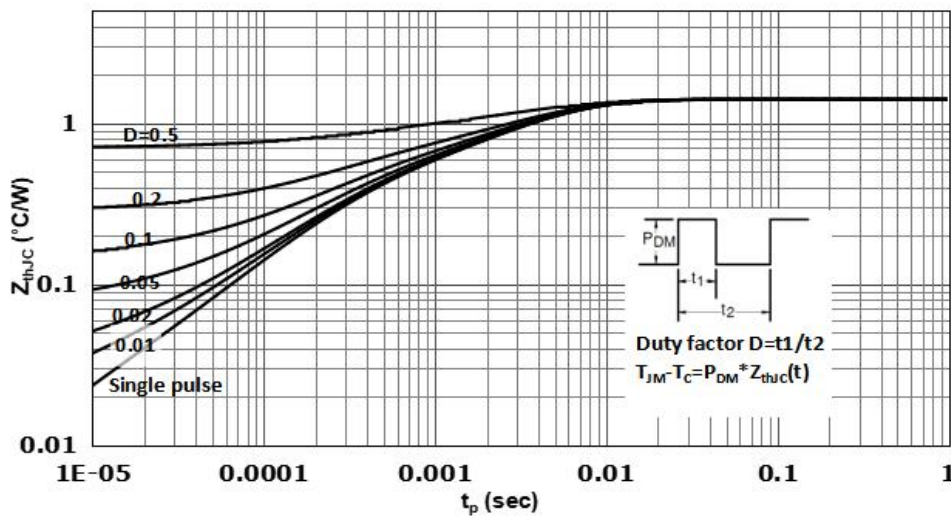
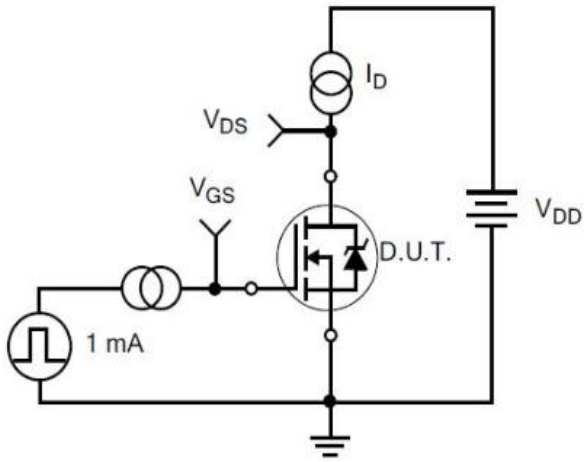
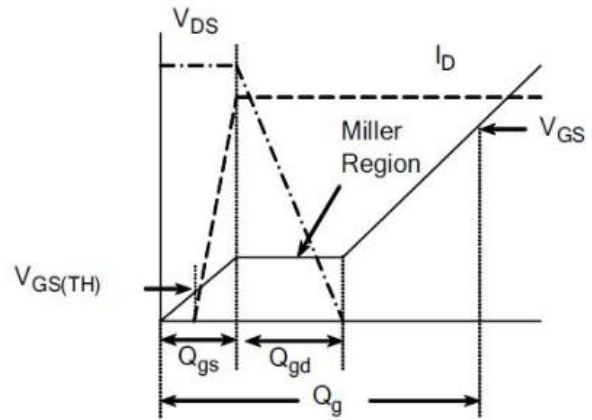


Fig 10 Normalized Maximum Transient Thermal Impedance

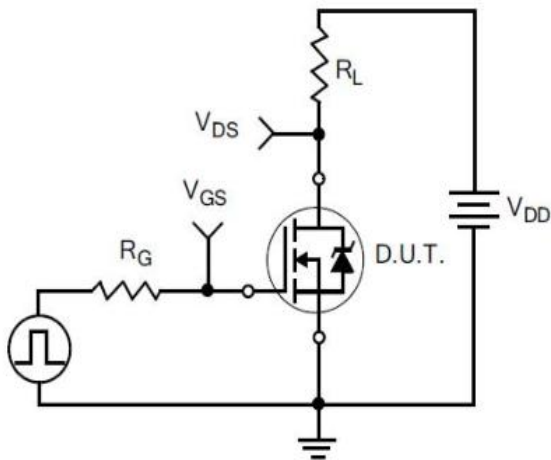
6 Typical Test Circuit and Waveform



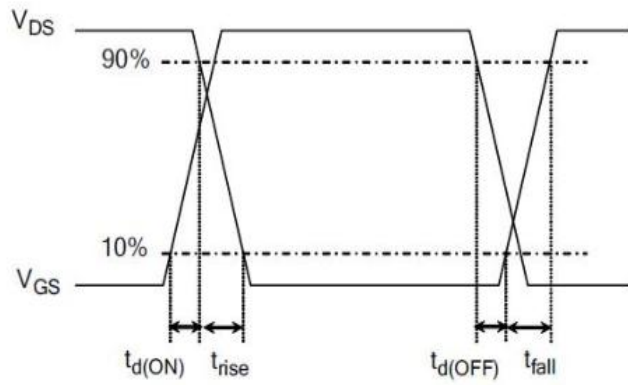
1) Gate Charge Test Circuit



2) Gate Charge Waveform

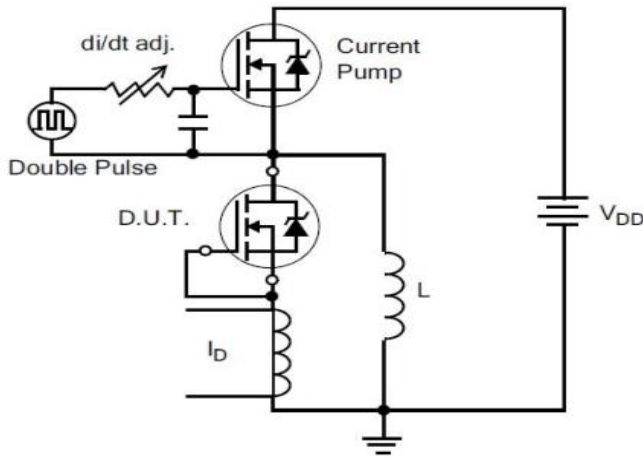


3) Resistive Switching Test Circuit

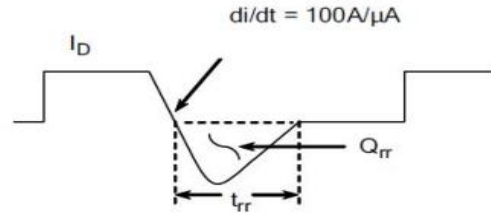


4) Resistive Switching Waveforms

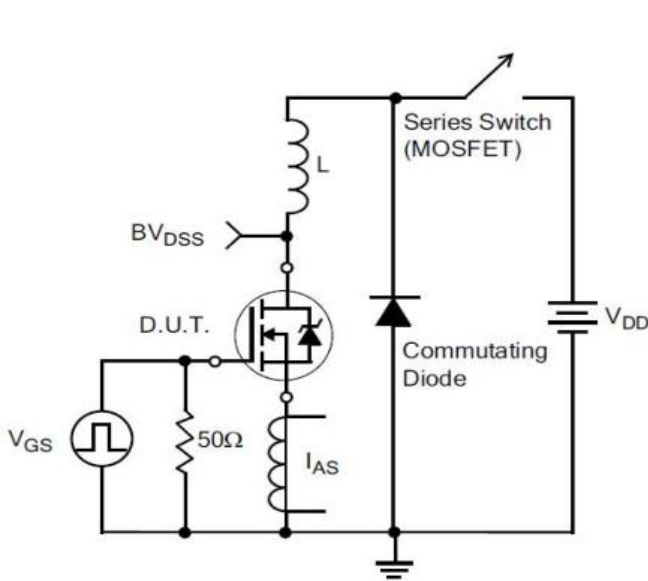
6 Typical Test Circuit and Waveform(continues)



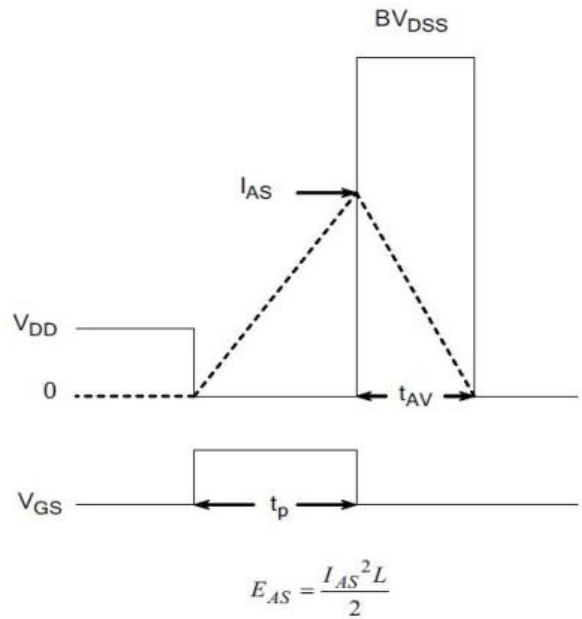
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform



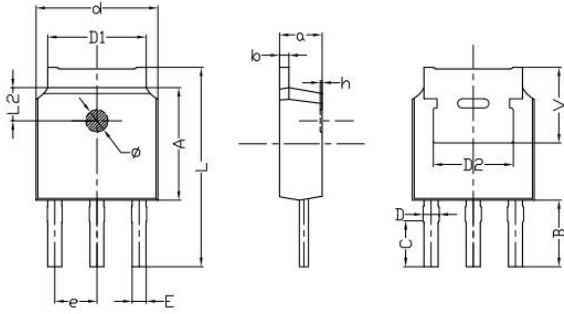
7) . Unclamped Inductive Switching Test Circuit



8) Unclamped Inductive Switching Waveforms

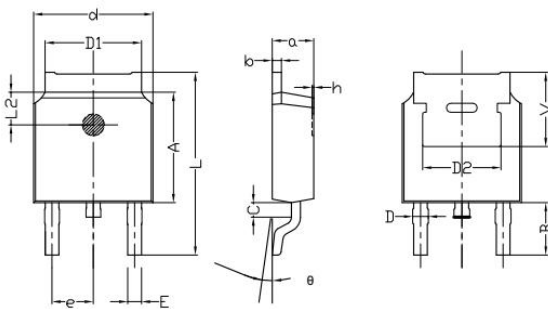
6 Dimensions

TO-251B PACKAGE OUTLINE DIMENSIONS



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|--------|
| | min. | max. | min. | max. |
| a | 2.20 | 2.40 | 0.087 | 0.0946 |
| b | 0.46 | 0.58 | 0.018 | 0.023 |
| c | 2.45 | 2.65 | 0.097 | 0.104 |
| D | 0.80 | 0.90 | 0.032 | 0.035 |
| d | 6.30 | 6.70 | 0.248 | 0.264 |
| D1 | 5.00 | 5.50 | 0.197 | 0.217 |
| D2 | TYP 4.83 | | TYP 0.190 | |
| A | 5.80 | 6.20 | 0.228 | 0.244 |
| e | 2.19 | 2.39 | 0.086 | 0.094 |
| L | 10.40 | 11.00 | 0.4098 | 0.4334 |
| B | 3.50 | 3.70 | 0.1379 | 0.1458 |
| L2 | 1.5 | 1.8 | 0.059 | 0.071 |
| Φ | 1.10 | 1.30 | 0.0433 | 0.0512 |
| h | 0.00 | 0.30 | 0.000 | 0.012 |
| V | 5.25 | 5.85 | 0.207 | 0.230 |
| E | 0.60 | 0.80 | 0.0236 | 0.0315 |

TO-252B PACKAGE OUTLINE DIMENSIONS



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | min. | max. | min. | max. |
| a | 2.20 | 2.40 | 0.087 | 0.095 |
| b | 0.46 | 0.58 | 0.018 | 0.023 |
| c | 0.70 | 0.90 | 0.028 | 0.035 |
| D | 0.80 | 1.00 | 0.032 | 0.039 |
| d | 6.30 | 6.70 | 0.248 | 0.264 |
| D1 | 5.00 | 5.50 | 0.197 | 0.217 |
| D2 | TYP 4.83 | | TYP 0.190 | |
| A | 5.80 | 6.20 | 0.228 | 0.244 |
| e | 2.19 | 2.39 | 0.086 | 0.094 |
| L | 9.40 | 10.40 | 0.370 | 0.409 |
| B | 2.6 | 3.2 | 0.102 | 0.126 |
| L2 | 1.5 | 1.8 | 0.059 | 0.071 |
| θ | 0 | 8 | 0 | 8 |
| h | 0 | 0.3 | 0 | 0.012 |
| V | 5.25 | 5.85 | 0.207 | 0.230 |
| E | 0.6 | 0.8 | 0.024 | 0.032 |

7 Product Specifications and Packaging Models

| Product Model | Package Type | Mark Name | RoHS | Package | Quantity |
|---------------|--------------|-------------|---------|-------------|----------|
| DHS160N100B | TO-251B | DHS160N100B | Pb-free | Tube | 3000/box |
| DHS160N100D | TO-252B | DHS160N100D | Pb-free | Tape & Reel | 2500/box |

8 Attentions

- Jiangsu Donghai Semiconductor Technology CO.,LTD. reserves the right to change the specification without prior notice! The customer should obtain the latest version of the information before making the order and verify that the information is complete and up to date.
- It is the responsibility of the purchaser for any failure or failure of any semiconductor product under certain conditions. It is the responsibility of the purchaser to comply with safety standards and to take safety measures in the system design and machine manufacturing of Donghai products in order to avoid potential risk of failure. Injury or property damage.
- Product promotion is endless, our company will be dedicated to provide customers with better products.

9 Appendix

Revision history:

| Date | REV. | Description | Page |
|------------|------|-------------|------|
| 2017.09.09 | 1.0 | Original | |
| 2023.9.12 | 2.0 | Update | 8 |