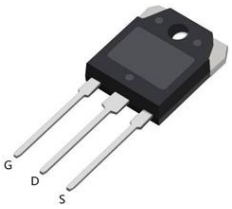
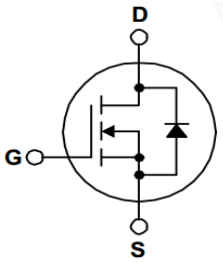
# TH6N90PB

## 900V 6A 1.75Ω Silicon N-Channel Planar Power MOSFET

Features of this MOSFET are 150℃ operating junction temperature and high repetitive peak current capability. These features combine to make this MOSFET a highly efficient, robust and reliable device for PDP driving applications.




Package view and circuit symbol—(TO-3PN)

### General Features

- $V_{DS}$=900V,$I_D$=6A
- Low ON Resistance,$R_{DS(on)}$,typ.=1.75Ω@$V_{GS}$=10V,$I_D$=3A
- Low reverse transfer capacitance
- Low Qg for fast response
- Short fall & rise times for fast switching
- 100% single pulse avalanche energy Test

### Applications

- Power switching application
- Digital amplifier
- Adapter and charger

## Key Performance Parameters

| Parameter | Value | Unit |
|---|---|---|
| $V_{DSS}$, min @ $T_{J = 25\ °C}$ | **900** | V |
| $T_J$, maximum junction temperature | **150** | °C |
| $I_D$ @ $T_{C = 25\ °C}$ | **6** | A |
| $I_{D,pulse}$ @ $T_C$ = 25 °C, tp limited by Tjmax. | **24** | A |
| $R_{DS(on)}$, typ. @ $T_{J = 25\ °C}$ ,$V_{GS = 10\ V}$ | **1.75** | Ω |
| $E_{AS}$, typ. @ $T_{J = 25\ °C}$ | **640** | mJ |

RoHS SGS

## Marking Information

| Product Name | Package | Marking |
|---|---|---|
| TH6N90PB | TO-3PN | TH6N90PB |

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## Maximum Ratings (TJ = 25℃ unless otherwise noted)

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain to Source Voltage | | $V_{DSS}$ | 900 | V |
| Gate to Source Voltage | | $V_{GSS}$ | ±30 | V |
| Drain Current | $T_C$=25℃ | $I_D$ | 6 | A |
| Pulsed Drain Current | $T_C$=25℃<br>tp limited by $T_{vjmax}$ | $I_{DM}$ | 24 | A |
| Avalanche energy, single pulse | L=10mH, $R_g$=25Ω | $E_{AS}$ | 640 | mJ |
| Power Dissipation | $T_C$=25℃ | $P_D$ | 166 | W |
| Operating Junction and Storage Temperature Range | | $T_J$,$T_{stg}$ | -55 To +150 | ℃ |
| Lead Temperature for Soldering Purposes | | $T_L$ | 270 | |

## Thermal Characteristics

| Parameter | Symbol | Max Value | Unit |
|---|---|---|---|
| Thermal Resistance, Junction−to−Case | $R_{thJC}$ | 0.75 | ℃/W |
| Thermal Resistance, Junction−to−Ambient | $R_{thJA}$ | 40 | |

## Electerical Characteristics ($T_J$ = 25℃ unless otherwise specified)

| Parameter | Symbol | Test Condition | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | min. | typ. | max. | |
| Drain-to-Source Breakdown Voltage | $B_{VDSS}$ | $V_{GS}$=0V,$I_D$=250μA | 900 | - | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{GS}$=0V $V_{DS}$=$V_{DSS}$ $T_J$=25℃ | - | - | 1 | μA |
| | | $V_{GS}$=0V $V_{DS}$=80%$V_{DSS}$ $T_J$=125℃ | - | - | 10 | |
| Gate−to−Source leakage Current | $I_{GSS}$ | $V_{GS}$=±30V,$V_{DS}$=0V | - | - | ±100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS}$=$V_{DS}$ , $I_D$=250uA $T_J$=25℃ | 2.5 | - | 4.5 | V |
| Drain-Source on-state resistance | $R_{DS(on)}$ | $V_{GS}$=10V, $I_D$=3A $T_J$=25℃ | - | 1.75 | 2.1 | Ω |
| Gate resistance | Rg | $V_{GS}$=0V,$V_{DS}$=0V,f=1MHz | - | 1.5 | - | Ω |
| Transconductance | $g_{fs}$ | $V_{DS}$=50V,$I_D$=3A | - | 5.6 | - | S |
| Input Capacitance | $C_{ISS}$ | $V_{DS}$ = 25 V, $V_{GS}$ = 0 V, f = 1 MHz | - | 1250 | - | pF |
| Output Capacitance | $C_{OSS}$ | | - | 130 | - | |
| Reverse Transfer Capacitance | $C_{RSS}$ | | - | 15 | - | |
| Total Gate Charge | Qg | $V_{DS}$ = 720 V, $V_{GS}$ = 0/10 V, $I_D$ = 6 A | - | 28 | - | nC |
| Gate- Source charge | Qgs | | - | 9.2 | - | |
| Gate-Drain charge | Qgd | | - | 13 | - | |
| Turn−On Delay Time | td(on) | $V_{DS}$ = 450 V $V_{GS}$ = 10 V $I_D$ = 6 A $R_G$ = 25Ω TJ = 25℃ | - | 37 | - | ns |
| Turn−Off Delay Time | td(off) | | - | 57 | - | |
| Rise time | tr | | - | 88 | - | |
| Fall time | tf | | - | 58 | - | |

## Diode Characteristics ($T_J$ = 25℃ unless otherwise specified)

| Parameter | Symbol | Test Condition | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | min. | typ. | max. | |
| Diode Continous Forward Current | $I_S$ | $T_C$=25℃ | - | - | 6 | A |
| Pulsed Diode Forward Current | $I_{SM}$ | | - | - | 24 | |
| Diode Forward Voltage | $V_{SD}$ | $I_S$ =6A $T_J$ = 25℃ | - | - | 1.5 | V |
| Reverse Recovery Time | trr | $V_R$ = 450 V, $I_S$ = 6A, $dI_S/dt$ = 100 A/μs,$T_J$ = 25℃ | - | 620 | - | ns |
| Reverse Recovery Charge | Qrr | | - | 6.8 | - | uC |

## Typical Performance Characteristics

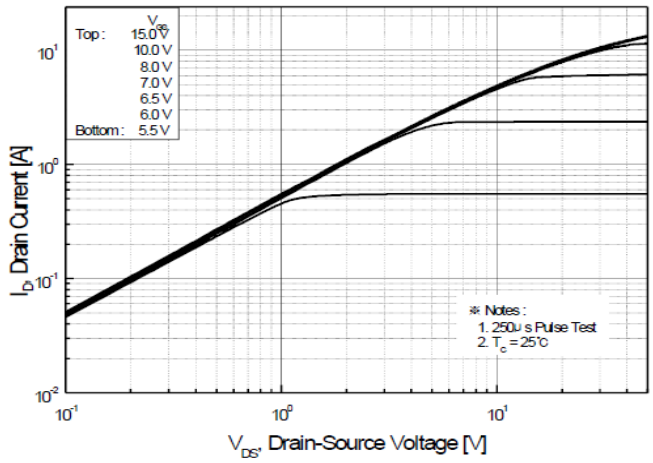



Fig 1. Typical output characteristic

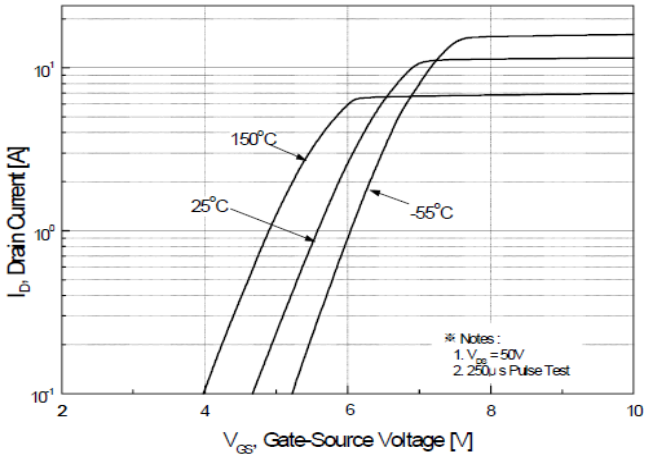



Fig 2. Typical transfer characteristic

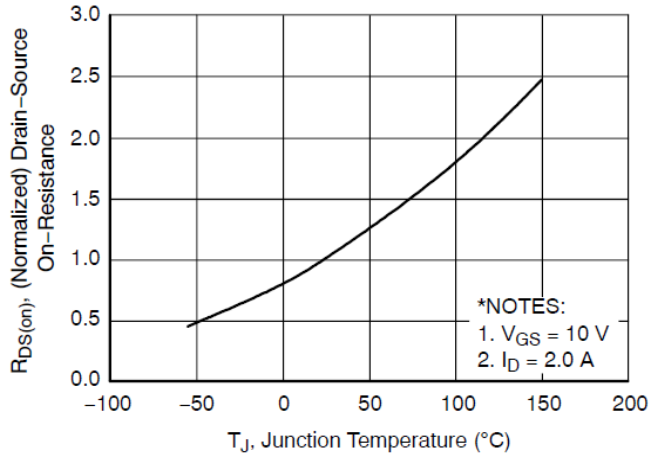



Fig 3. On-Resistance vs. Junction Temperature

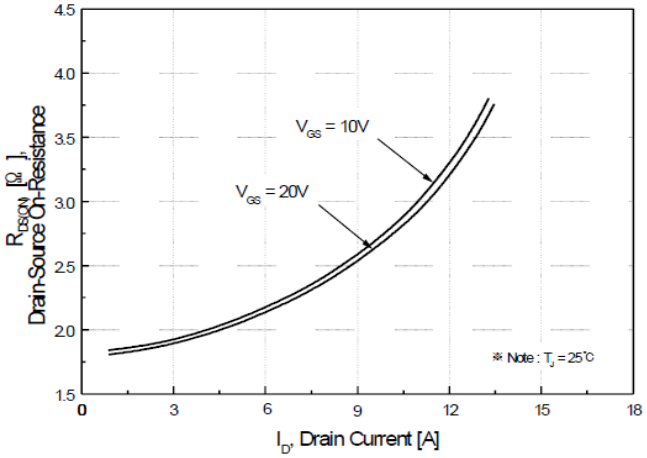



Fig 4. Rds(on) vs Drain Currentand Gate Voltage

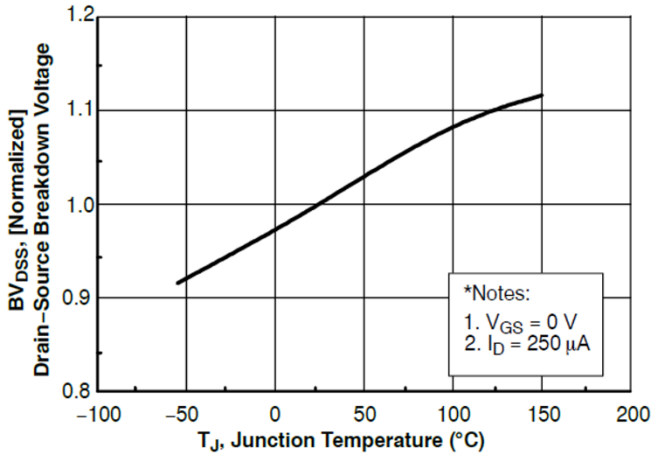



Fig 5. Breakdown Voltage Variation vs Temperature

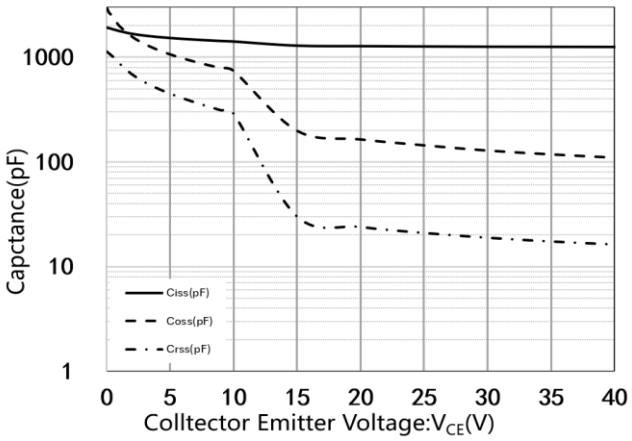



Fig 6. Capacitance Characteristics

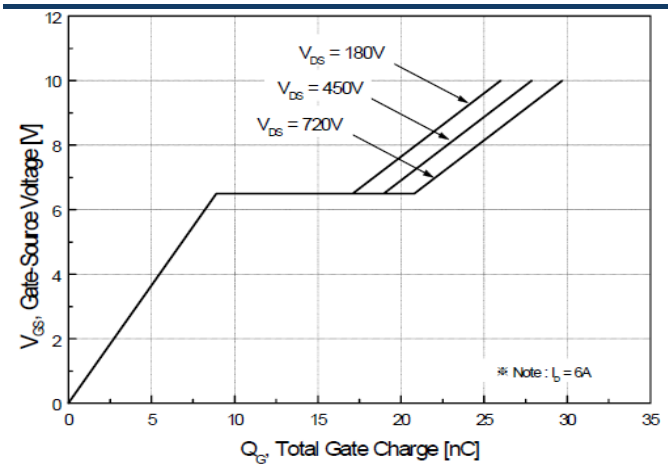



Fig 7. Gate Charge Characteristics

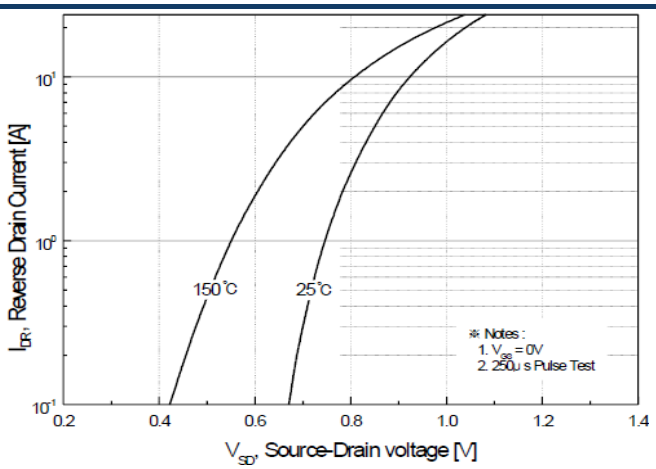



Fig 8. Body-diode Forward Characteristics

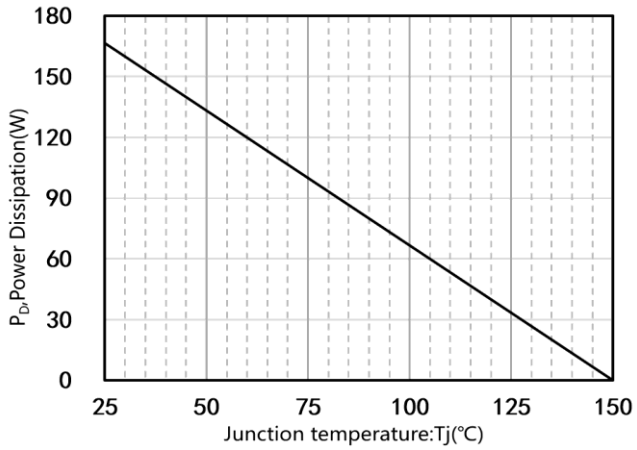



Fig 9. Power Dissipation

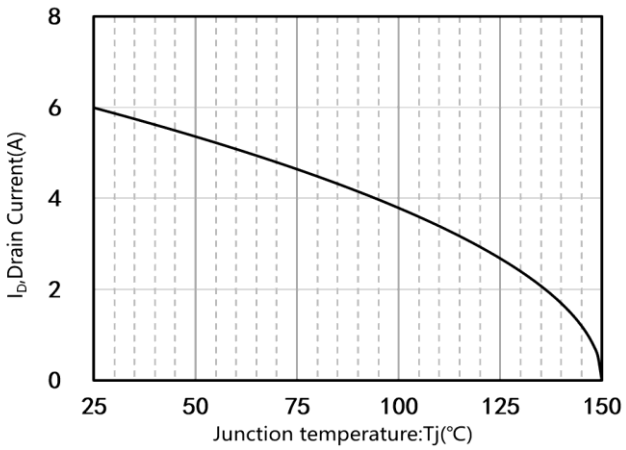



Fig 10. Drain Current Derating

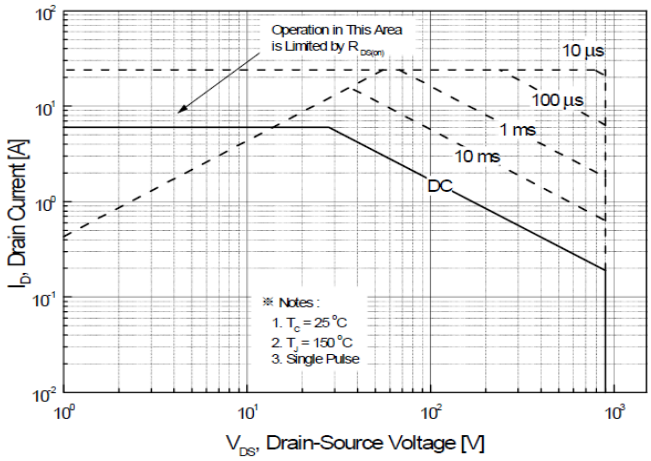



Fig 11. Safe Operating Area

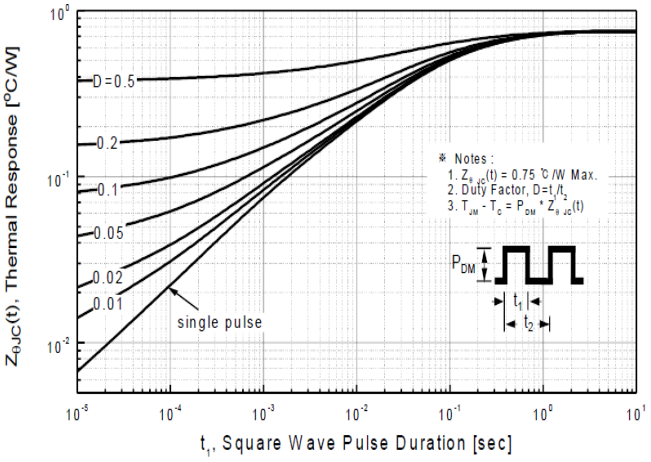
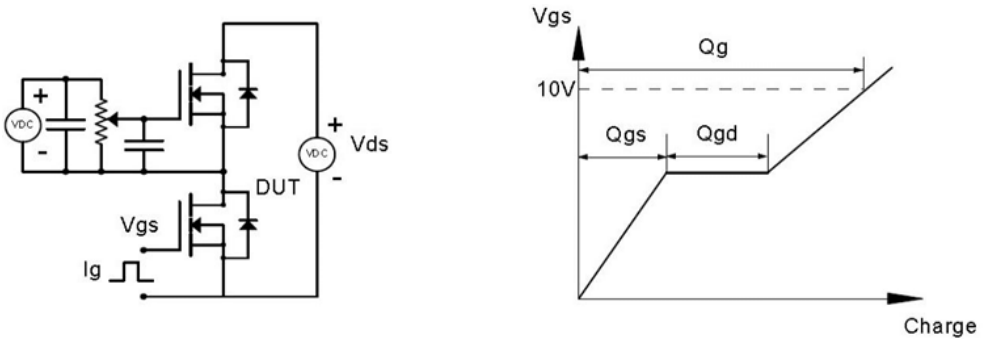
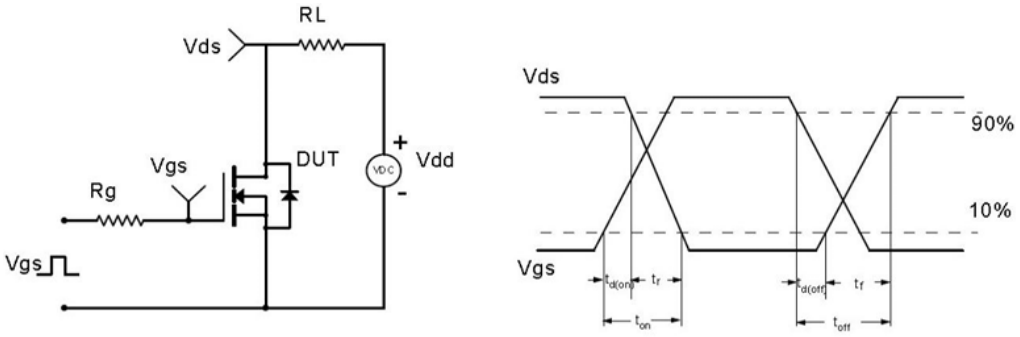



Fig 12. :Transient Thermal Response Curve

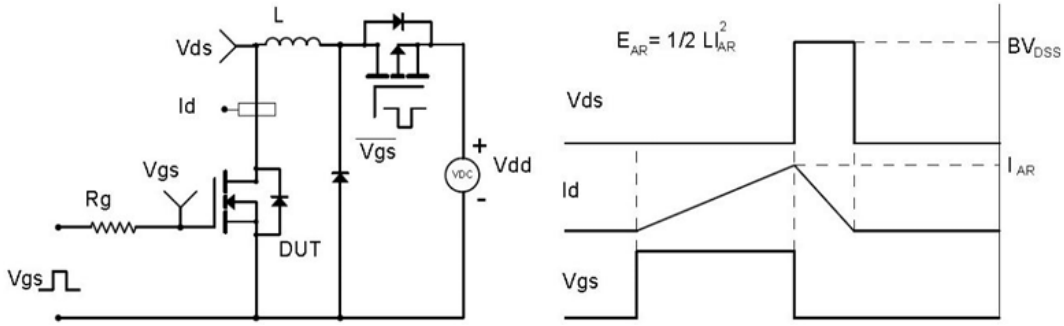
## Test Circuit & Waveform



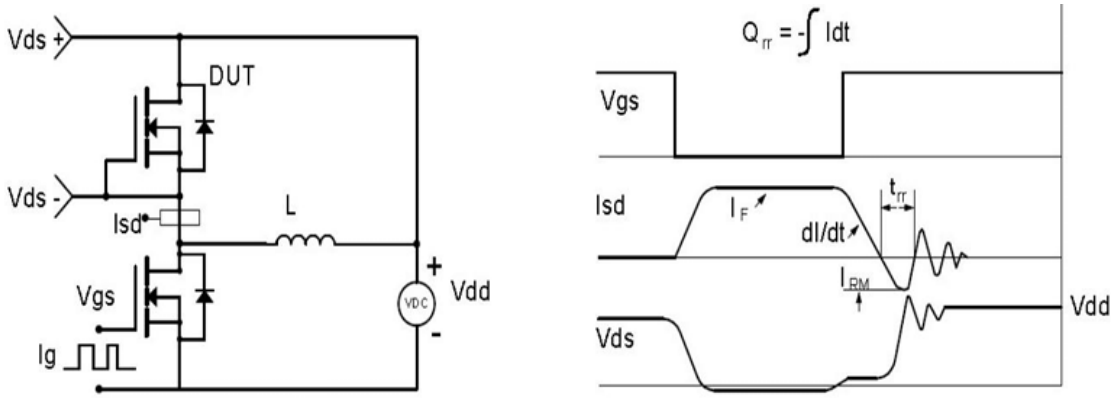

Gate Charge Test Circuit & Waveform




Resistive Switching Test Circuit & Waveforms

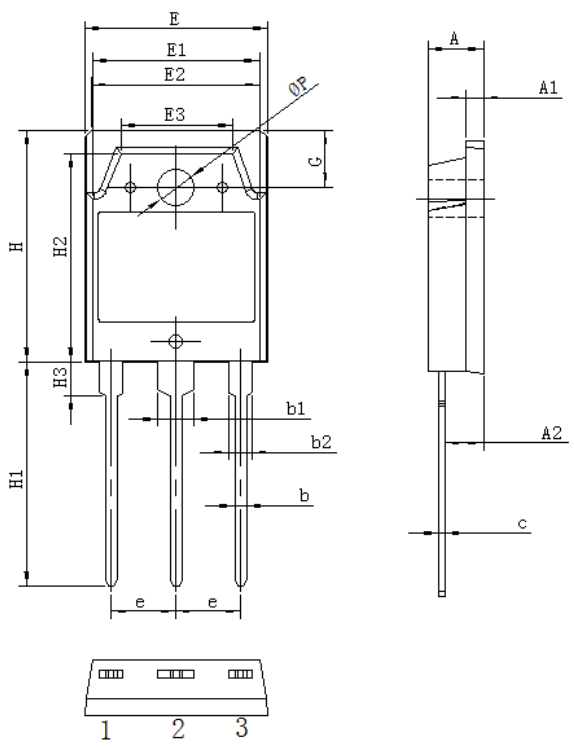



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms




Diode Recovery Test Circuit & Waveforms

## Package Information




| Symbol | 单位 mm | | |
|---|---|---|---|
| | Min | Nom | Max |
| A | 4.60 | 4.80 | 5.00 |
| A1 | 1.3 | 1.5 | 1.7 |
| A2 | 2.20 | 2.40 | 2.60 |
| b | 0.80 | 1.0 | 1.20 |
| b1 | 2.90 | 3.10 | 3.30 |
| b2 | 1.90 | 2.10 | 2.30 |
| c | 0.50 | 0.60 | 0.70 |
| e | 5.25 | 5.45 | 5.65 |
| E | 15.2 | 15.6 | 16.0 |
| E1 | 13.2 | 13.4 | 13.6 |
| E2 | 13.1 | 13.3 | 13.5 |
| E3 | 9.1 | 9.3 | 9.5 |
| H | 19.8 | 20.0 | 20.2 |
| H1 | 19.4 | 19.8 | 20.2 |
| H2 | 18.5 | 18.7 | 18.9 |
| H3 | 2.9 | 3.1 | 3.3 |
| G | 4.8 | 5.0 | 5.2 |
| ΦP | 3.00 | 3.20 | 3.40 |

## Notice

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