



N 沟道增强型场效应晶体管

N-CHANNEL MOSFET

FHP80N08B/FHS80N08B/FHD80N08B

主要参数 MAIN CHARACTERISTICS

| | |
|------------------------|--------|
| ID | 90 A |
| VDSS | 80 V |
| Rdson-typ (@Vgs=10V) | 6.8 mΩ |
| Qg-typ | 59nC |

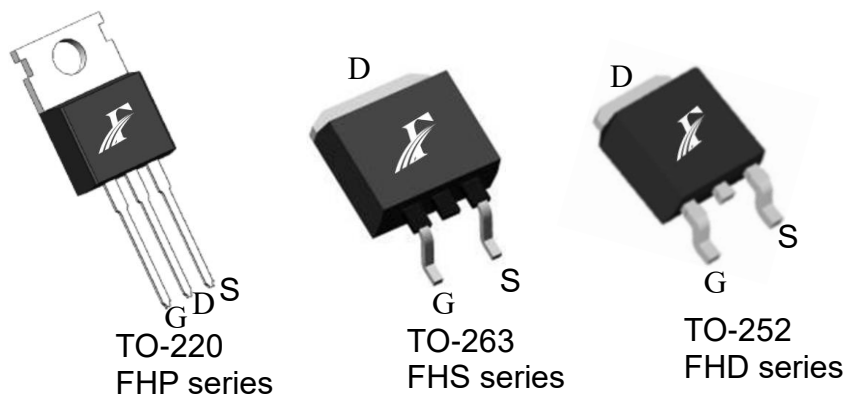
用途 APPLICATIONS

| | |
|------|---------------------------------------|
| 电池管理 | Battery management |
| 逆变电源 | Power management for inverter systems |

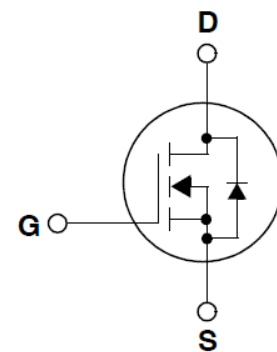
产品特性 FEATURES

| | |
|--------------------|---------------------------|
| 低栅极电荷 | Low gate charge |
| 低 Crss (典型值 351pF) | Low Crss (typical 351pF) |
| 开关速度快 | Fast switching |
| 100%经过 Rg 测试 | 100% Rg tested |
| 100%经过雪崩测试 | 100% avalanche tested |
| 100%经过热阻测试 | 100% DVDS tested |
| 高抗 dv/dt 能力 | Improved dv/dt capability |
| Trench 工艺 | Trench process |
| RoHS 产品 | RoHS product |

封装形式 Package



等效电路 Equivalent Circuit



绝对最大额定值 ABSOLUTE RATINGS (Tc=25°C)

| 项目 Parameter | 符号 Symbol | 数值 Value | | 单位 Unit |
|---|--------------------------------|-------------|-----------|------------|
| | | FHP/S80N08B | FHD80N08B | |
| 最高漏极-源极直流电压 Drain-Source Voltage | Vds | 80 | | V |
| 连续漏极电流* Drain Current -continuous * | Id (Tc=25°C), Silicon Limited | 90 | | A |
| | Id (Tc=100°C), Silicon Limited | 67 | | |
| 最大脉冲漏极电流 (注 1) Drain Current – pulse (note 1) | IDM | 360 | | A |
| 最高栅源电压 Gate-Source Voltage | VGS | ±20 | | V |
| 单脉冲雪崩能量 (注 2) Single Pulsed Avalanche Energy (note 2) | EAS | 180.5 | | mJ |
| 雪崩电流 (注 1) Avalanche Current (note 1) | IAR | 19 | | A |
| 重复雪崩能量 (注 1) Repetitive Avalanche Current (note 1) | EAR | 15 | | mJ |
| 二极管反向恢复最大电压变化速率 (注 3) Peak Diode Recovery dv/dt (note 3) | dv/dt | 5.0 | | V/ns |
| 耗散功率 Power Dissipation | Pd (TC=25°C) | 242 | 115 | W |
| | -Derate above 25°C | 1.6 | 0.92 | |
| 最高结温及存储温度 Operating and Storage Temperature Range | TJ, TSTG | -55~+150 | | °C |
| 引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes | TL | 300 | | °C |

*漏极电流由最高结温限制

*Drain current limited by maximum junction temperature

电特性 ELECTRICAL CHARACTERISTICS

| 项目 Parameter | 符号 Symbol | 测试条件 Tests conditions | 最小 Min | 典型 Typ | 最大 Max | 单位 Units |
|--|--------------------------------------|---|-----------|-----------|-----------|-------------|
| 关态特性 Off –Characteristics | | | | | | |
| 漏-源击穿电压 Drain-Source Voltage | BV _{DSS} | I _D =250μA, V _{GS} =0V | 80 | - | - | V |
| 击穿电压温度特性 Breakdown Voltage Temperature Coefficient | ΔBV _{DSS} /Δ T _J | I _D =250μA, referenced to 25°C | - | 0.08 | - | V/°C |
| 零栅压下漏极漏电流 Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =80V, V _{GS} =0V, T _C =25°C | - | - | 1 | μA |
| | | V _{DS} =64V, T _C =125°C | - | - | 50 | μA |
| 栅极体漏电流 Gate-body leakage current | I _{GSS} (F/R) | V _{DS} =0V, V _{GS} =±20V | - | - | ±100 | nA |
| 通态特性 On-Characteristics | | | | | | |
| 阈值电压 Gate Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D =250μA | 2.0 | 3.0 | 4.0 | V |
| 静态导通电阻 Static Drain-Source On-Resistance | R _{DS(ON)} | V _{GS} =10V , I _D =50A | - | 6.8 | 8.0 | mΩ |
| 正向跨导 Forward Transconductance | g _{fs} | V _{DS} = 10V, I _D =50A (note 4) | - | 103 | - | S |
| 动态特性 Dynamic Characteristics | | | | | | |
| 栅电阻 Gate Resistance | R _g | f=1.0MHz, V _{DS} OPEN | - | 3.5 | - | Ω |
| 输入电容 Input capacitance | C _{iss} | V _{DS} =40V, V _{GS} =0V, f=1.0MHz | - | 6540 | - | pF |
| 输出电容 Output capacitance | C _{oss} | | - | 454 | - | |
| 反向传输电容 Reverse transfer capacitance | C _{rss} | | - | 351 | - | |
| 开关特性 Switching Characteristics | | | | | | |
| 延迟时间 Turn-On delay time | t _{d(on)} | V _{DD} =40V, I _D =30A, R _G =25Ω V _{GS} =10V (note 4, 5) | - | 28 | - | ns |
| 上升时间 Turn-On rise time | t _r | | - | 79 | - | ns |
| 延迟时间 Turn-Off delay time | t _{d(off)} | | - | 114 | - | ns |
| 下降时间 Turn-Off Fall time | t _f | | - | 69 | - | ns |
| 栅极电荷总量 Total Gate Charge | Q _g | V _{DS} =64V , I _D =30A , V _{GS} =10V (note 4, 5) | - | 59 | - | nC |
| 栅-源电荷 Gate-Source charge | Q _{gs} | | - | 13 | - | nC |
| 栅-漏电荷 Gate-Drain charge | Q _{gd} | | - | 36 | - | nC |
| 漏-源二极管特性及最大额定值 Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| 正向最大连续电流 Maximum Continuous Drain -Source Diode Forward Current | | I _S | - | - | 90 | A |
| 正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current | | I _{SM} | - | - | 360 | A |
| 正向压降 Drain-Source Diode Forward Voltage | V _{SD} | V _{GS} =0V, I _S =50A | - | - | 1.4 | V |
| 反向恢复时间 Reverse recovery time | t _{rr} | V _{GS} =0V, I _S =50A ,dI _F /dt=100A/μs (note 4) | - | 49 | - | ns |
| 反向恢复电荷 Reverse recovery charge | Q _{rr} | | - | 76 | - | nC |

热特性 THERMAL CHARACTERISTIC

| 项目 Parameter | 符号 Symbol | FHP/S80N08B | FHD80N08B | 单位 Unit |
|--|--------------|-------------|-----------|------------|
| 结到管壳的热阻 Thermal Resistance, Junction to Case | Rth(j-c) | 0.62 | 1.08 | °C/W |
| 结到环境的热阻 Thermal Resistance, Junction to Ambient | Rth(j-A) | 62.5 | 62.5 | °C/W |

注释:

- 1: 脉冲宽度由最高结温限制
- 2: L=1mH, I_{AS}=19A, V_{DD}=50V, R_G=25 Ω, 起始结温 T_J=25°C
- 3: I_{SD} ≤90A, di/dt ≤300A/μs, V_{DD} ≤BV_{DSS}, 起始结温 T_J=25°C
- 4: 脉冲测试: 脉冲宽度 ≤300μs, 占空比 ≤2%
- 5: 基本与工作温度无关

Notes:

- 1: Pulse width limited by maximum junction temperature
- 2: L=1mH, I_{AS}=19A, V_{DD}=50V, R_G=25 Ω, Starting T_J=25°C
- 3: I_{SD} ≤90A, di/dt ≤300A/μs, V_{DD} ≤BV_{DSS}, Starting T_J=25°C
- 4: Pulse Test: Pulse Width ≤300μs, Duty Cycle ≤2%
- 5: Essentially independent of operating temperature

Typical Performance Characteristics

Fig. 1. On-state characteristics

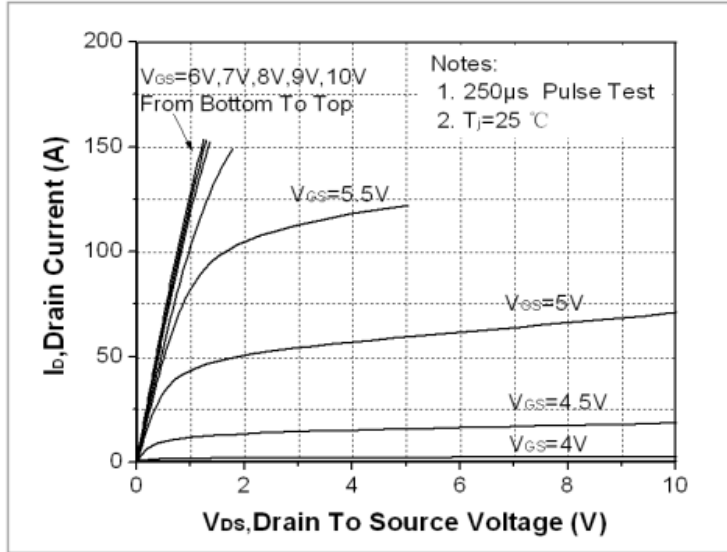


Fig. 2. Transfer Characteristics

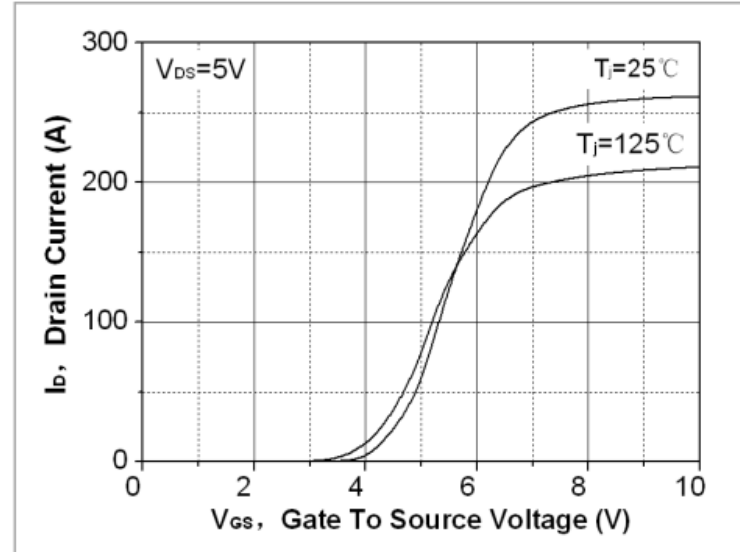


Fig. 3. On-resistance variation vs. drain current and gate voltage

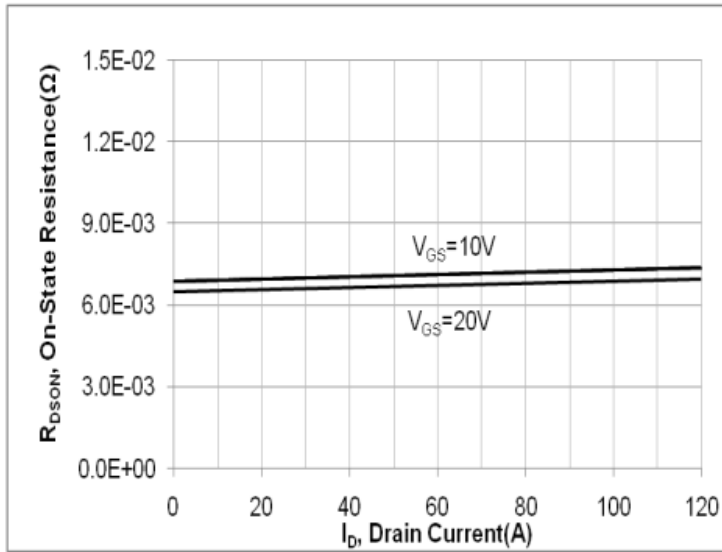


Fig. 4. On-state current vs. diode forward voltage

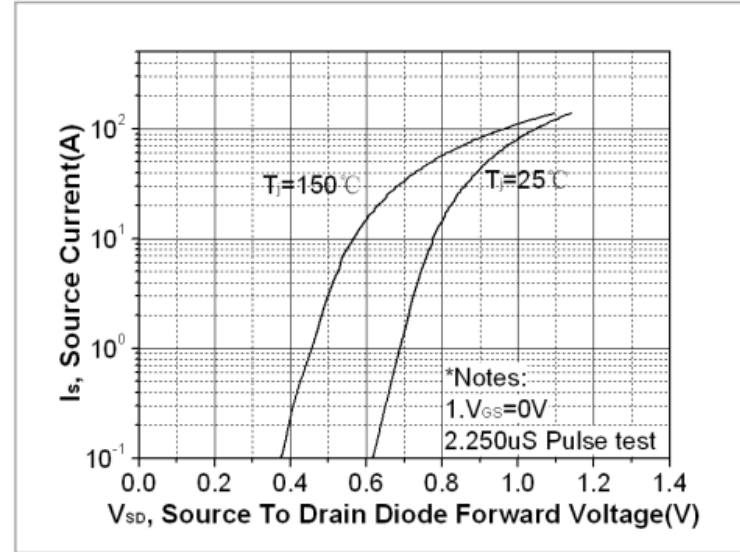


Fig 5. Breakdown voltage variation vs. junction temperature

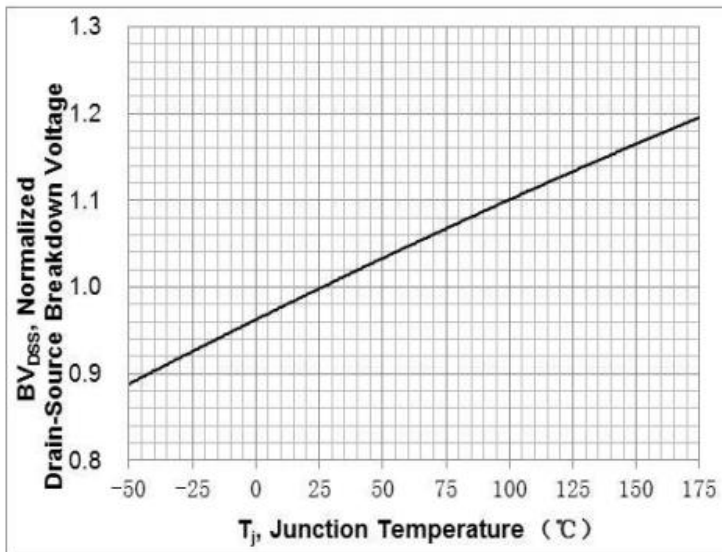


Fig. 6. On-resistance variation vs. junction temperature

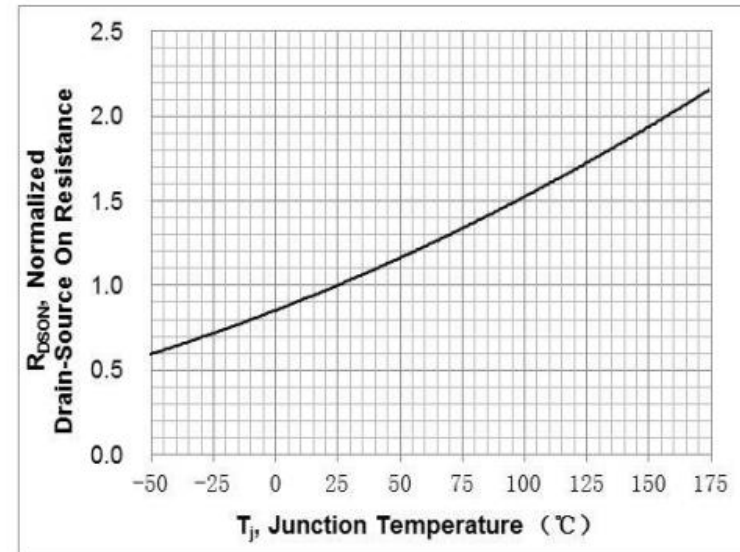


Fig. 7. Gate charge characteristics

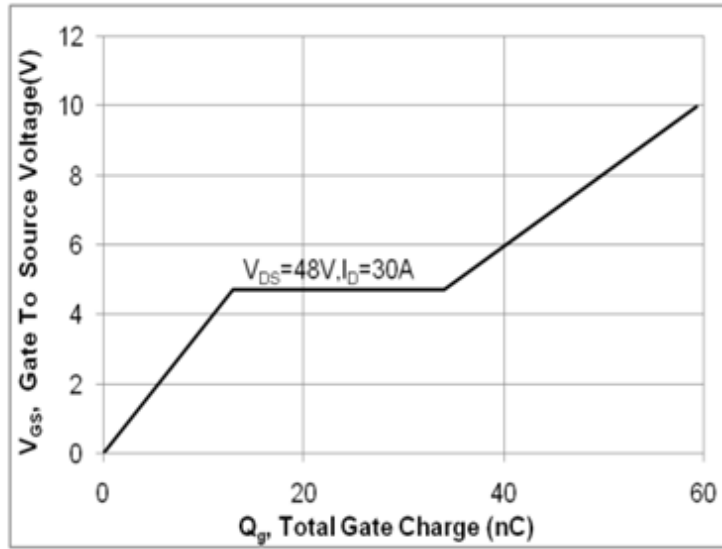


Fig. 8. Capacitance Characteristics

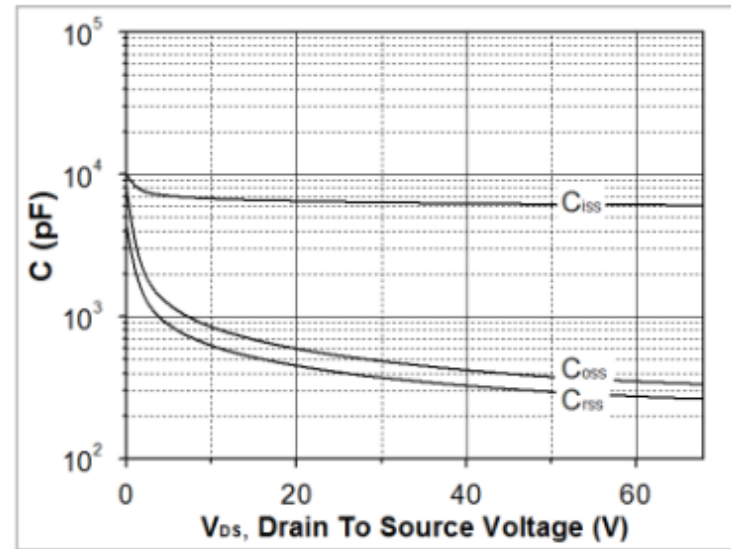


Fig. 9. Maximum safe operating area(TO-220)

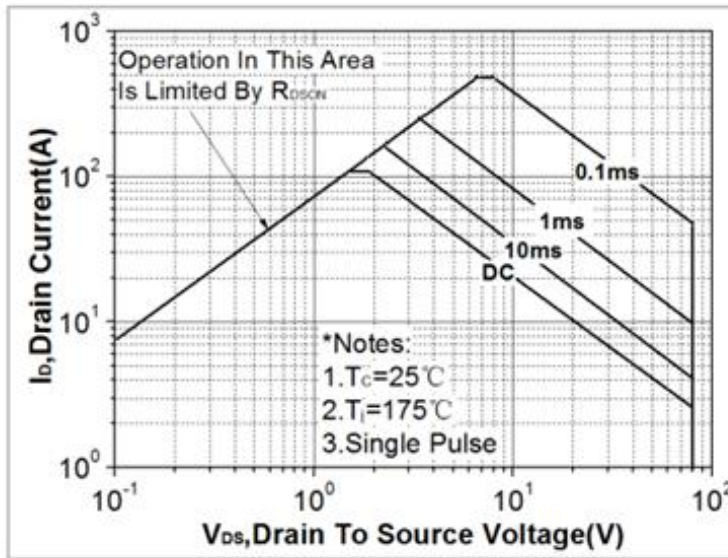


Fig. 10. Maximum drain current vs. case temperature

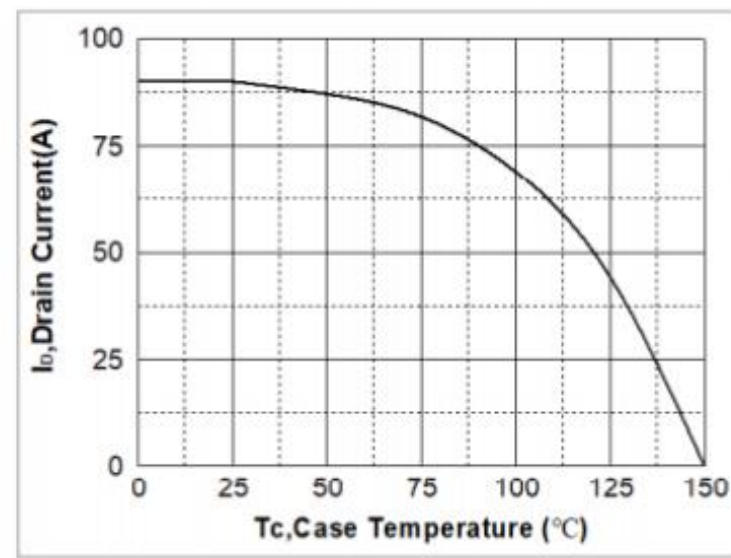
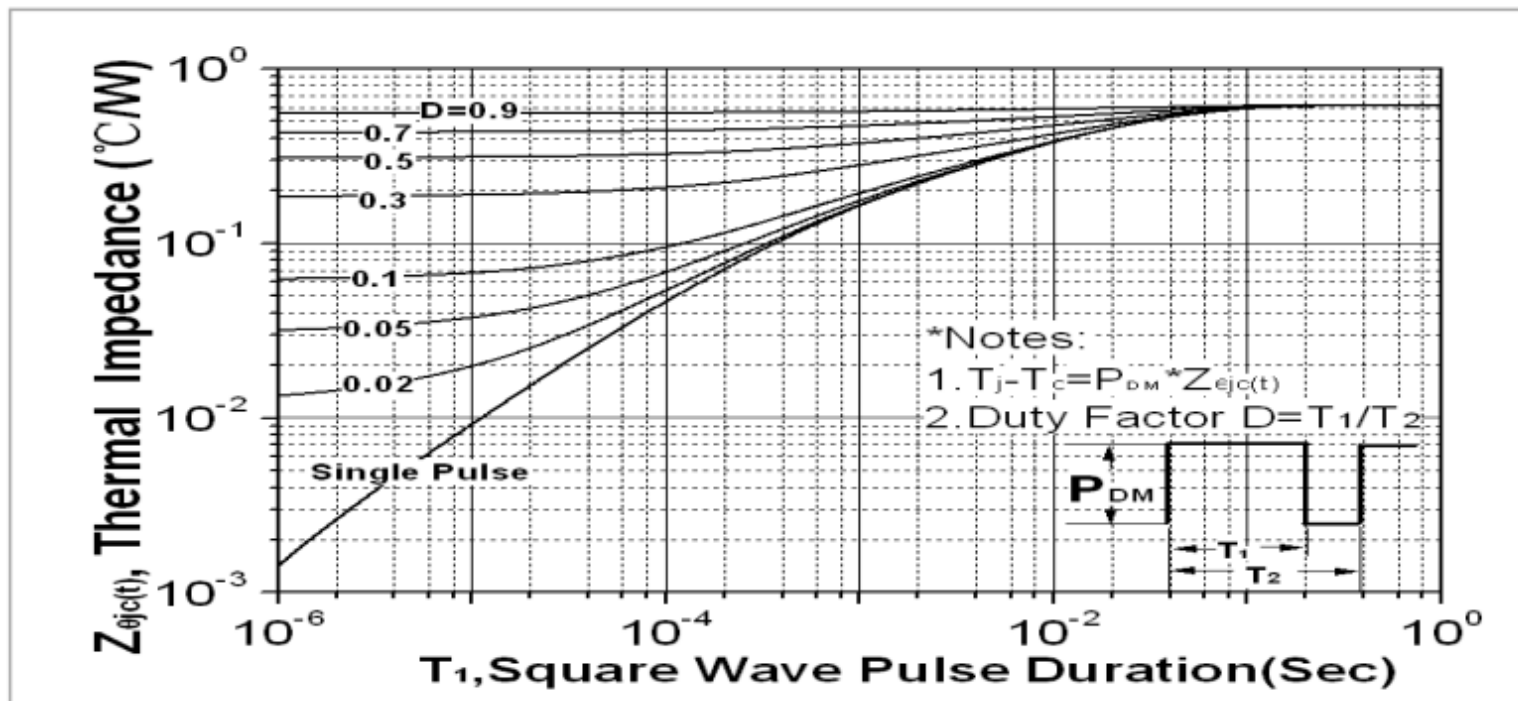


Fig. 11. Transient thermal response curve(TO-220)



Test Circuit & Waveform

Fig. 12. Gate charge test circuit & waveform

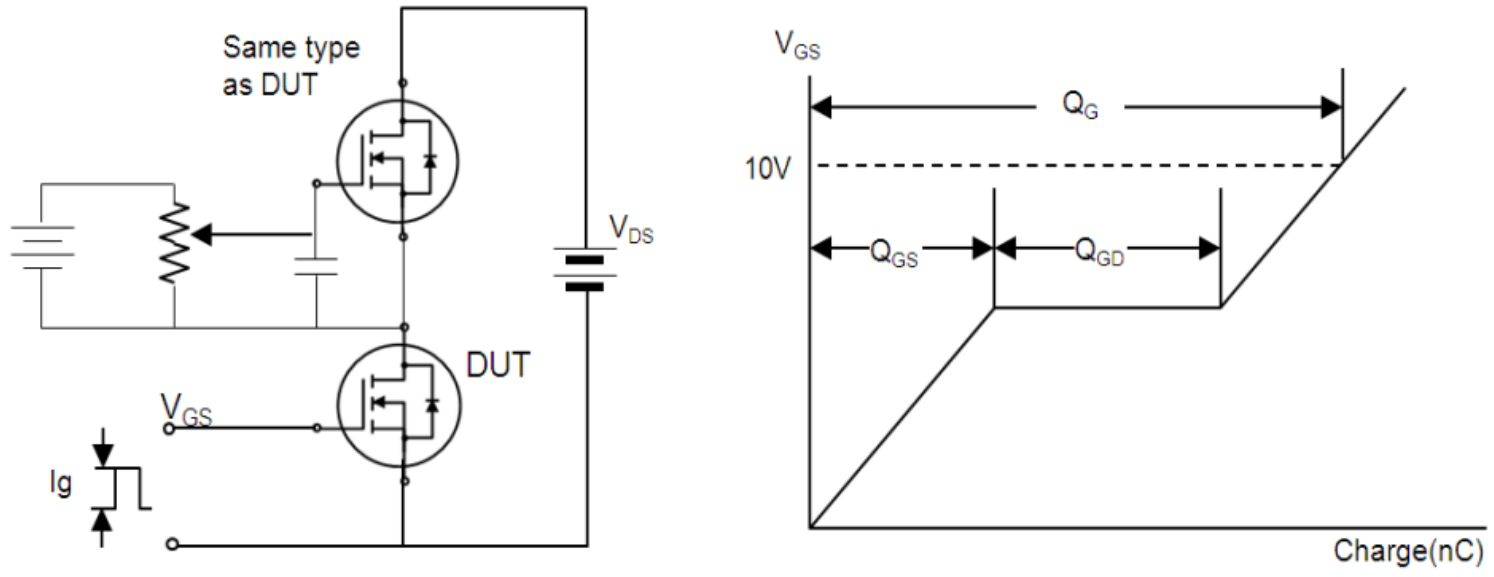


Fig. 13. Switching time test circuit & waveform

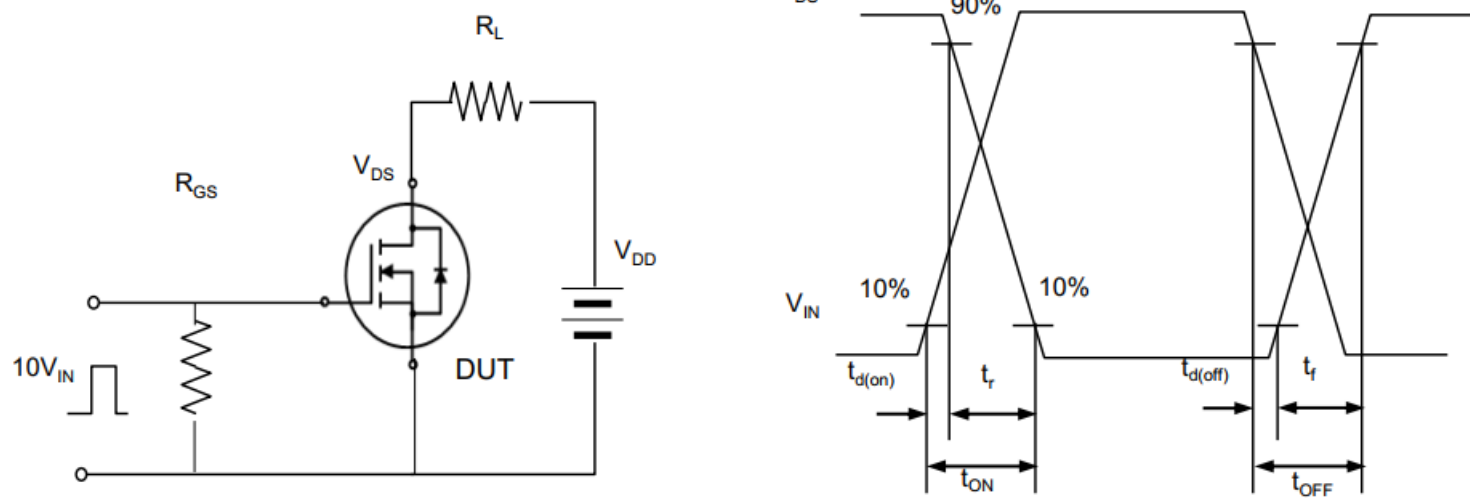


Fig. 14. Unclamped Inductive switching test circuit & waveform

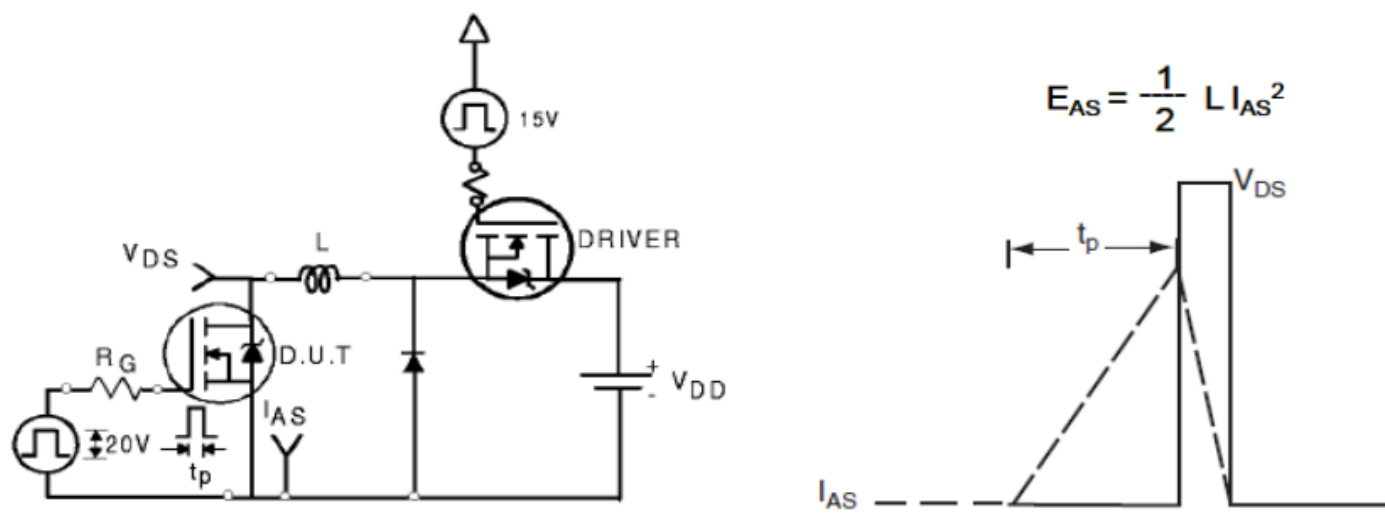
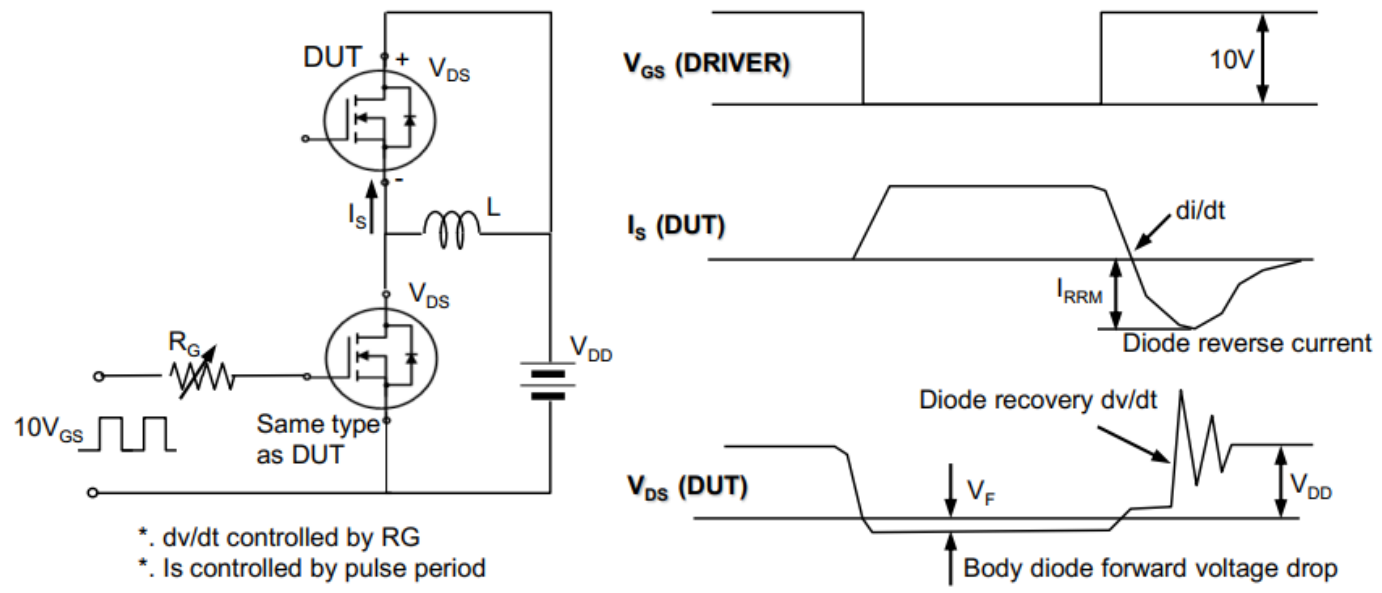
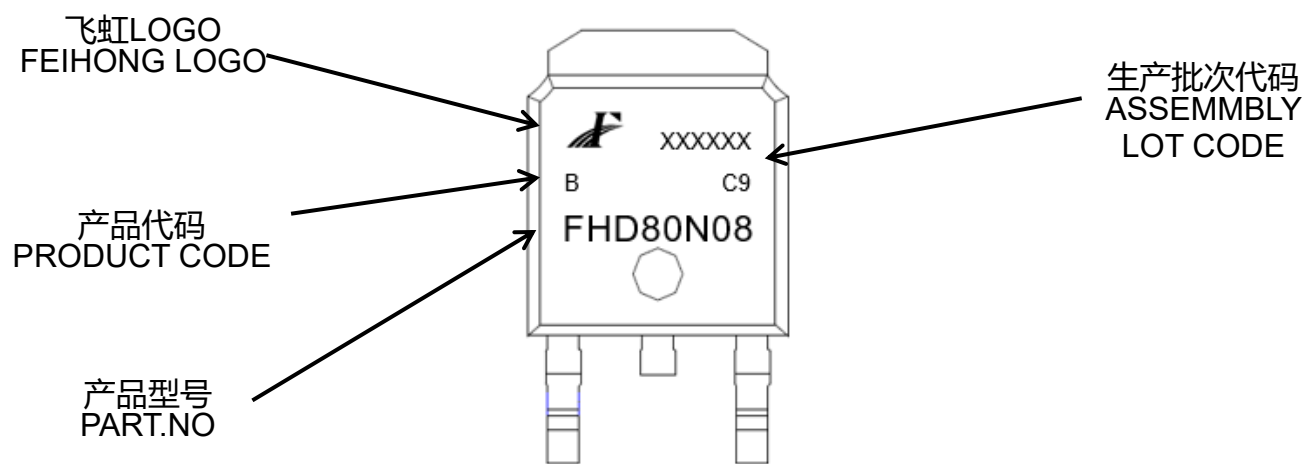
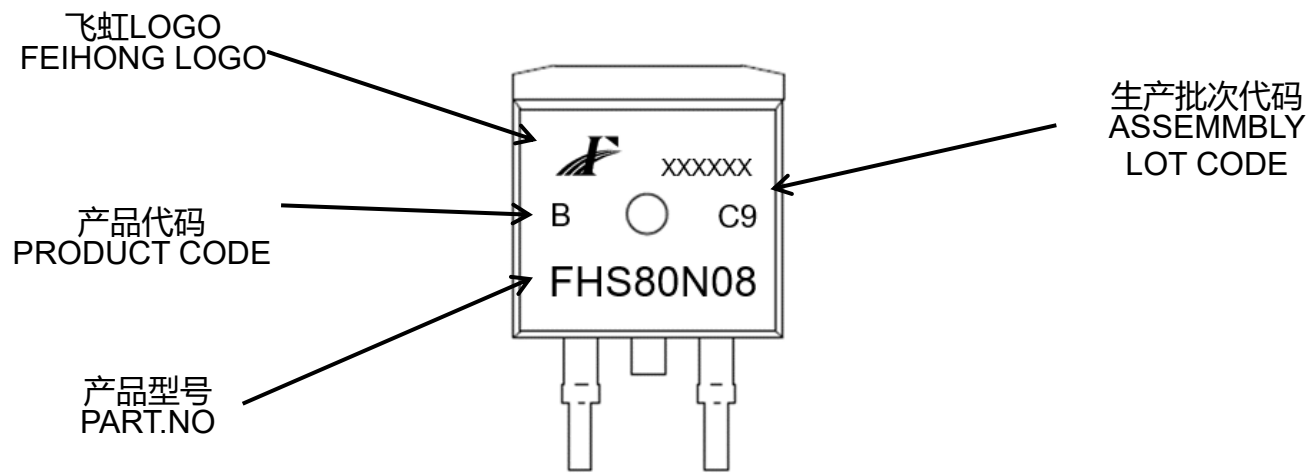
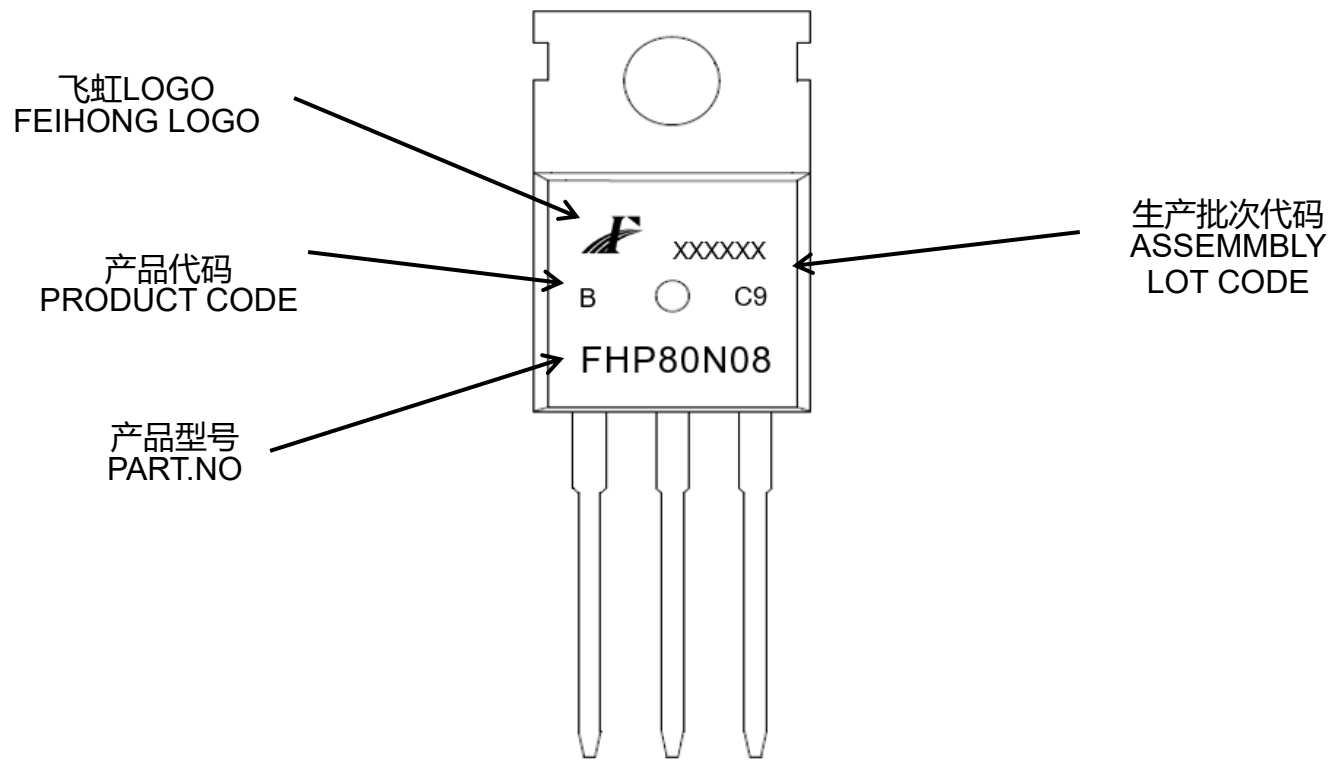


Fig. 15. Peak diode recovery dv/dt test circuit & waveform



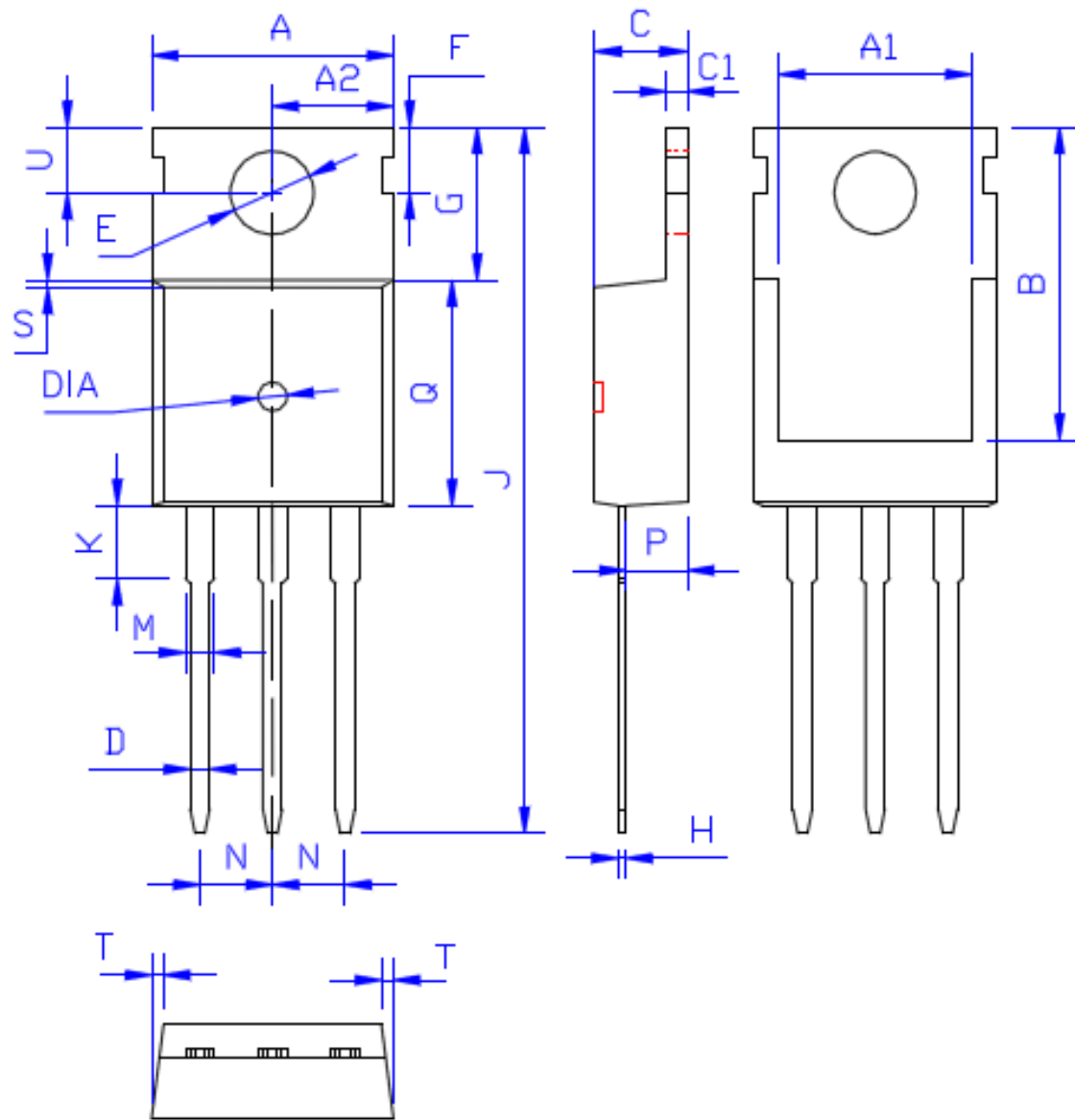
印记 Marking:



外形尺寸:

Package Dimension:

TO-220



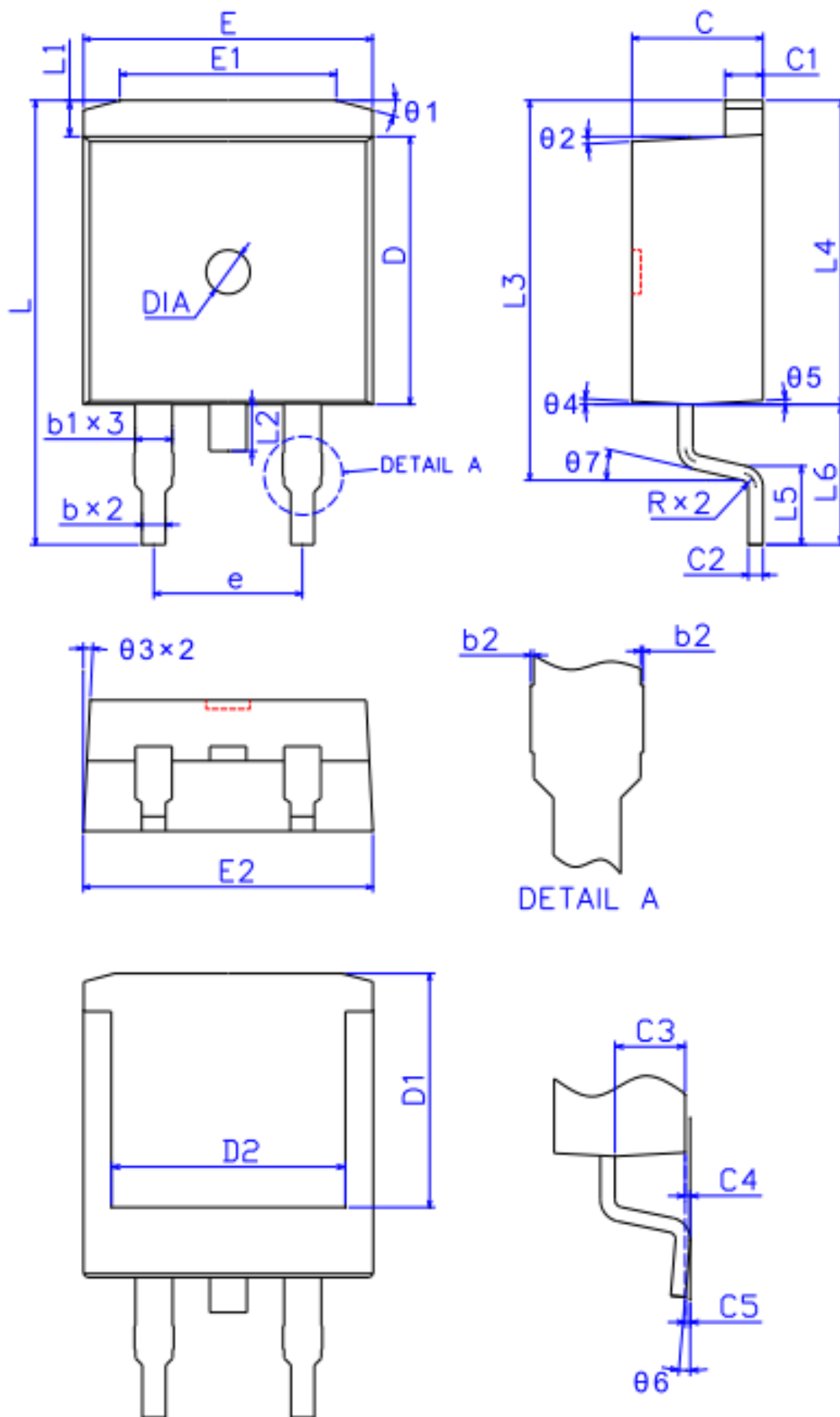
| DIM | MILLIMETERS |
|-----|-----------------------------|
| A | 10.00 ± 0.30 |
| A1 | 8.00 ± 0.30 |
| A2 | 5.00 ± 0.30 |
| B | 13.20 ± 0.40 |
| C | 4.50 ± 0.20 |
| C1 | 1.30 ± 0.20 |
| D | 0.80 ± 0.20 |
| E | 3.60 ± 0.20 |
| F | 3.00 ± 0.30 |
| G | 6.60 ± 0.40 |
| H | 0.50 ± 0.20 |
| J | 28.88 ± 0.50 |
| K | 3.00 ± 0.30 |
| M | 1.30 ± 0.30 |
| N | Typical 2.54 |
| P | 2.40 ± 0.40 |
| Q | 9.20 ± 0.40 |
| S | 0.25 ± 0.15 |
| T | 0.25 ± 0.15 |
| U | 2.80 ± 0.30 |
| DIA | 宽 1.50 ± 0.10 深 0.50 MAX |

(Unit: mm)

外形尺寸:

Package Dimension:

TO-263

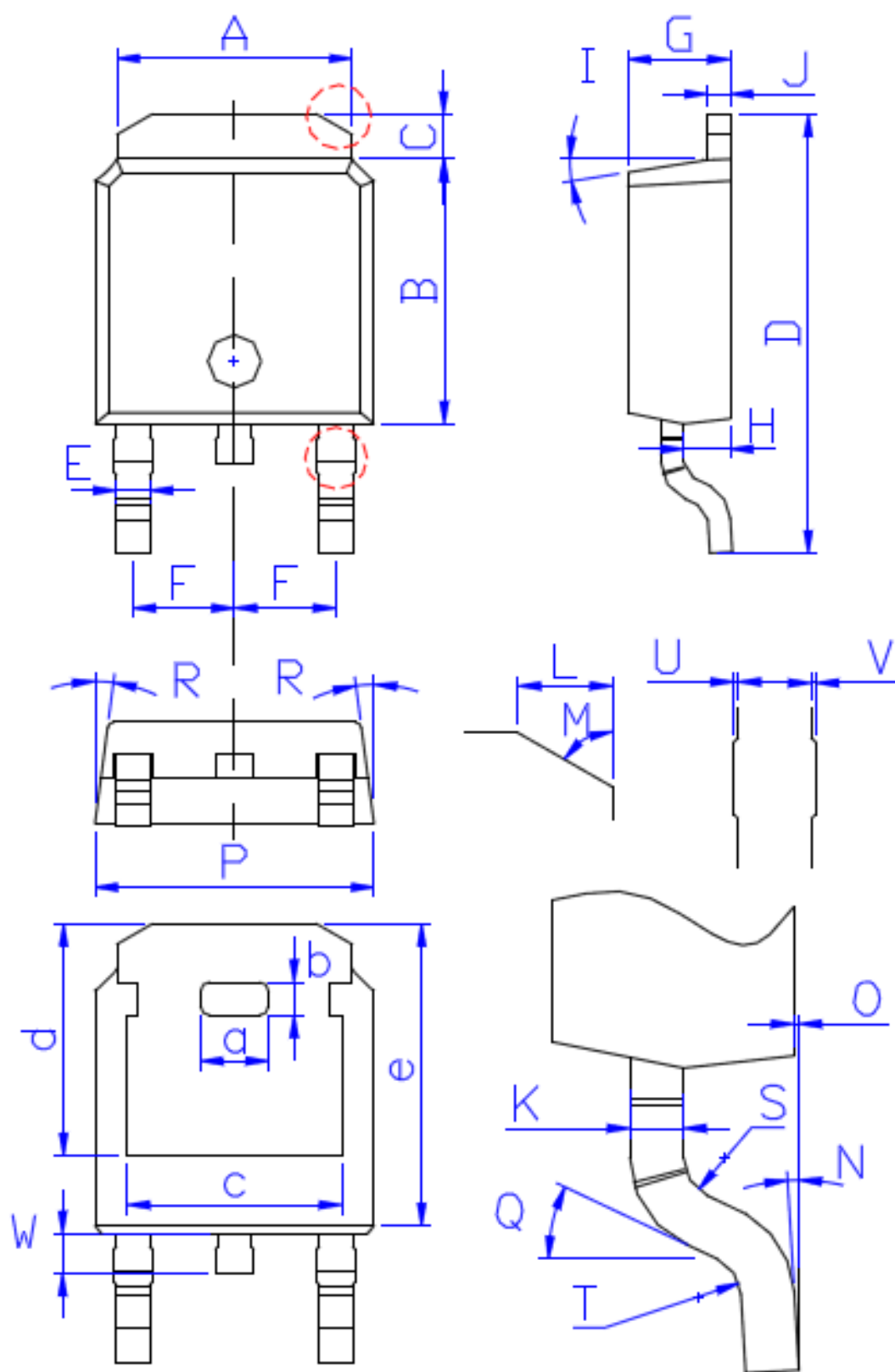


| 标注 | 尺寸(mm) |
|-----|----------------------------|
| E | 9.88±0.10 |
| E1 | 7.40±0.20 |
| E2 | 9.90±0.15 |
| L | 15.20±0.25 |
| L1 | 1.30±0.15 |
| L2 | 1.60±0.10 |
| L3 | 13.00±0.20 |
| L4 | 10.40±0.15 |
| L5 | 2.60±0.15 |
| L6 | 4.80±0.20 |
| b | 0.80±0.07 |
| b1 | 1.27±0.07 |
| b2 | 0.05±0.07 |
| C | 4.48±0.10 |
| C1 | 1.30±0.07 |
| C2 | 0.50±0.07 |
| C3 | 2.40±0.06 |
| C4 | 0.10±0.08 |
| C5 | 0.10±0.08 |
| D | 9.20±0.10 |
| D1 | 8.00±0.10 |
| D2 | 8.00±0.10 |
| R | 0.50±0.10 |
| θ1 | 15° ±2° |
| θ2 | 3° ±2° |
| θ3 | 3° ±2° |
| θ4 | 3° ±2° |
| θ5 | 3° ±2° |
| θ6 | 0° ~6° |
| θ7 | 13° ±2° |
| e | 5.08±0.10 |
| DIA | 宽 1.50±0.10 深 0.30±0.15 |

外形尺寸:

Package Dimension:

TO-252



| DIM | MILLIMETERS |
|-----|-------------|
| A | 5.34±0.30 |
| B | 6.00±0.30 |
| C | 1.05±0.30 |
| D | 9.95±0.30 |
| E | 0.76±0.15 |
| F | 2.28±0.15 |
| G | 2.30±0.30 |
| H | 1.06±0.30 |
| I | (4-10)° |
| J | 0.51±0.15 |
| K | 0.52±0.15 |
| L | 0.80±0.30 |
| M | 60° |
| N | (0-10)° |
| O | 0.05±0.05 |
| P | 6.60±0.30 |
| Q | 25° |
| R | (4-8.5)° |
| S | R0.40 |
| T | R0.40 |
| U | 0.05±0.05 |
| V | 0.05±0.05 |
| W | 0.90±0.30 |
| a | 1.80±0.30 |
| b | 0.75±0.30 |
| c | 4.85±0.30 |
| d | 5.30±0.30 |
| e | 6.90±0.30 |

(Units: mm)