



# N 沟道增强型场效应晶体管

## N-CHANNEL MOSFET

### FHP100N8F6A/FHS100N8F6A

#### 主要参数 MAIN CHARACTERISTICS

|                       |        |
|-----------------------|--------|
| ID (Silicon Limited)  | 120A   |
| VDSS                  | 85 V   |
| Rdson-typ ( @Vgs=10V) | 5.3 mΩ |
| Qg-typ                | 67nC   |

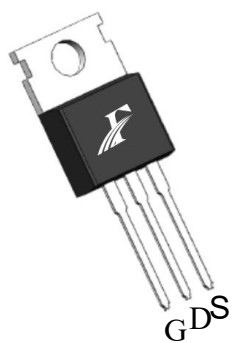
#### 用途 APPLICATIONS

|         |                            |
|---------|----------------------------|
| 电池管理系统  | BMS                        |
| 电机控制和驱动 | Motor control and drive    |
| 不间断电源   | UPS                        |
| 开关电源    | Switch Mode Power Supplies |

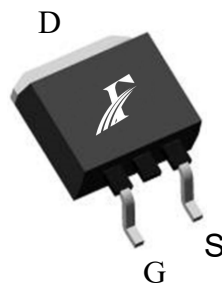
#### 产品特性 FEATURES

|              |                       |
|--------------|-----------------------|
| 低栅极电荷        | Low gate charge       |
| 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      |
| SGT 工艺       | SGT technology        |
| RoHS 产品      | RoHS product          |

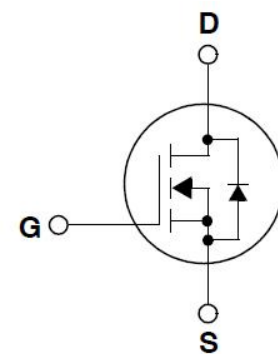
#### 封装形式 Package



TO-220  
FHP series



TO-263  
FHS series



#### 等效电路 Equivalent Circuit

#### 绝对最大额定值 ABSOLUTE RATINGS (Tc=25°C)

| 项目<br>Parameter   | 符号<br>Symbol  | 数值<br>Value |             | 单位<br>Unit |
|---|---|-------------|-------------|------------|
|   |   | FHP100N8F6A | FHS100N8F6A |            |
| 最高漏极-源极直流电压<br>Drain-Source Voltage                         | V <sub>DS</sub>   | 85          |             | V          |
| 连续漏极电流*<br>Drain Current -continuous *                      | I <sub>D</sub> (T <sub>C</sub> =25°C), Silicon Limited  | 120         |             | A          |
|   | I <sub>D</sub> (T <sub>C</sub> =25°C), Package Limited  | 80          |             |            |
|   | I <sub>D</sub> (T <sub>C</sub> =125°C), Silicon Limited | 56          |             |            |
| 最大脉冲漏极电流 (注 1)<br>Drain Current - pulse (note 1)            | I <sub>DM</sub>   | 320         |             | A          |
| 最高栅源电压<br>Gate-Source Voltage                               | V <sub>GS</sub>   | ±20         |             | V          |
| 单脉冲雪崩能量 (注 2)<br>Single Pulsed Avalanche Energy (note 2)    | E <sub>AS</sub>   | 200         |             | mJ         |
| 雪崩电流 (注 1)<br>Avalanche Current (note 1)                    | I <sub>AR</sub>   | 20          |             | A          |
| 重复雪崩能量 (注 1)<br>Repetitive Avalanche Current (note 1)       | E <sub>AR</sub>   | 16          |             | mJ         |
| 二极管反向恢复最大电压变化速率 (注 3)<br>Peak Diode Recovery dv/dt (note 3) | dv/dt   | 5.0         |             | V/ns       |
| 耗散功率<br>Power Dissipation                                   | P <sub>D</sub> (T <sub>C</sub> =25°C)                   | 156         |             | W          |
|   | -Derate above 25°C                                      | 1.25        |             | W/°C       |
| 最高结温及存储温度<br>Operating and Storage Temperature Range        | T <sub>J</sub> , T <sub>STG</sub>                       | -55~+150    |             | °C         |
| 引线最高焊接温度<br>Maximum Lead Temperature for Soldering Purposes | T <sub>L</sub>  | 260         |             | °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<br>Parameter  | 符号<br>Symbol                        | 测试条件<br>Tests conditions  | 最小<br>Min | 典型<br>Typ | 最大<br>Max | 单位<br>Units |
|--|-------------------------------------|---|-----------|-----------|-----------|-------------|
| 关态特性 <b>Off –Characteristics</b>   |                                     |   |           |           |           |             |
| 漏-源击穿电压<br>Drain-Source Voltage  | BV <sub>DSS</sub>                   | I <sub>D</sub> =250μA, V <sub>GS</sub> =0V  | 85        | 95        | -         | V           |
| 击穿电压温度特性<br>Breakdown Voltage<br>Temperature Coefficient                     | ΔBV <sub>DSS</sub> /ΔT <sub>J</sub> | I <sub>D</sub> =250μA, referenced to 25°C   | -         | 0.08      | -         | V/°C        |
| 零栅压下漏极漏电流<br>Zero Gate Voltage Drain<br>Current                              | I <sub>DSS</sub>                    | V <sub>DS</sub> =85V, V <sub>GS</sub> =0V, T <sub>C</sub> =25°C   | -         | -         | 1         | μA          |
|  |                                     | V <sub>DS</sub> =68V, T <sub>C</sub> =125°C   | -         | -         | 100       | μA          |
| 栅极体漏电流<br>Gate-body leakage current  | I <sub>GSS</sub> (F/R)              | V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V  | -         | -         | ±100      | nA          |
| 通态特性 <b>On-Characteristics</b>   |                                     |   |           |           |           |             |
| 阈值电压<br>Gate Threshold Voltage   | V <sub>GS(th)</sub>                 | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA   | 2         | -         | 4         | V           |
| 静态导通电阻<br>Static Drain-Source<br>On-Resistance                               | R <sub>DS(ON)</sub>                 | V <sub>GS</sub> =10V , I <sub>D</sub> =50A  | -         | 5.3       | 6.5       | mΩ          |
| 正向跨导<br>Forward Transconductance   | g <sub>fs</sub>                     | V <sub>DS</sub> = 10V, I <sub>D</sub> =50A (note 4)   | -         | 65        | -         | S           |
| 动态特性 <b>Dynamic Characteristics</b>  |                                     |   |           |           |           |             |
| 栅电阻<br>Gate Resistance   | R <sub>g</sub>                      | f=1.0MHz, V <sub>DS</sub> OPEN  | -         | 1.5       | -         | Ω           |
| 输入电容<br>Input capacitance  | C <sub>iss</sub>                    | V <sub>DS</sub> =40V,<br>V <sub>GS</sub> =0V,<br>f=1.0MHz   | -         | 3374      | -         | pF          |
| 输出电容<br>Output capacitance   | C <sub>oss</sub>                    |   | -         | 507       | -         |             |
| 反向传输电容<br>Reverse transfer capacitance                                       | C <sub>rss</sub>                    |   | -         | 18        | -         |             |
| 开关特性 <b>Switching Characteristics</b>  |                                     |   |           |           |           |             |
| 延迟时间<br>Turn-On delay time   | t <sub>d(on)</sub>                  | V <sub>DD</sub> =40V,<br>I <sub>D</sub> =50A,<br>R <sub>G</sub> =20Ω<br>V <sub>GS</sub> =10V<br>(note 4, 5) | -         | 37        | -         | ns          |
| 上升时间<br>Turn-On rise time  | t <sub>r</sub>                      |   | -         | 30        | -         | ns          |
| 延迟时间<br>Turn-Off delay time  | t <sub>d(off)</sub>                 |   | -         | 37        | -         | ns          |
| 下降时间<br>Turn-Off Fall time   | t <sub>f</sub>                      |   | -         | 20        | -         | ns          |
| 栅极电荷总量<br>Total Gate Charge  | Q <sub>g</sub>                      | V <sub>DS</sub> =40V ,<br>I <sub>D</sub> =50A ,<br>V <sub>GS</sub> =10V<br>(note 4, 5)                      | -         | 67        | -         | nC          |
| 栅-源电荷<br>Gate-Source charge  | Q <sub>gs</sub>                     |   | -         | 19        | -         | nC          |
| 栅-漏电荷<br>Gate-Drain charge   | Q <sub>gd</sub>                     |   | -         | 37        | -         | nC          |
| 漏-源二极管特性及最大额定值 <b>Drain-Source Diode Characteristics and Maximum Ratings</b> |                                     |   |           |           |           |             |
| 正向最大连续电流<br>Maximum Continuous Drain<br>-Source Diode Forward<br>Current     |                                     | I <sub>S</sub>  | -         | -         | 80        | A           |
| 正向最大脉冲电流<br>Maximum Pulsed<br>Drain-Source Diode Forward<br>Current          |                                     | I <sub>SM</sub>   | -         | -         | 320       | A           |
| 正向压降<br>Drain-Source Diode Forward<br>Voltage                                | V <sub>SD</sub>                     | V <sub>GS</sub> =0V, I <sub>S</sub> =50A  | -         | -         | 1.2       | V           |
| 反向恢复时间<br>Reverse recovery time  | t <sub>rr</sub>                     | V <sub>GS</sub> =0V, I <sub>S</sub> =30A , dI <sub>F</sub> /dt=100A/μs<br>(note 4)                          | -         | 48        | -         | ns          |
| 反向恢复电荷<br>Reverse recovery charge  | Q <sub>rr</sub>                     |   | -         | 115       | -         | nC          |

## 热特性 THERMAL CHARACTERISTIC

| 项目<br>Parameter                                    | 符号<br>Symbol | FHP100N8F6A | FHS100N8F6A | 单位<br>Unit |
|--|--------------|-------------|-------------|------------|
| 结到管壳的热阻<br>Thermal Resistance, Junction to Case    | Rth(j-c)     | 0.8         |             | °C/W       |
| 结到环境的热阻<br>Thermal Resistance, Junction to Ambient | Rth(j-A)     | 62.5        |             | °C/W       |

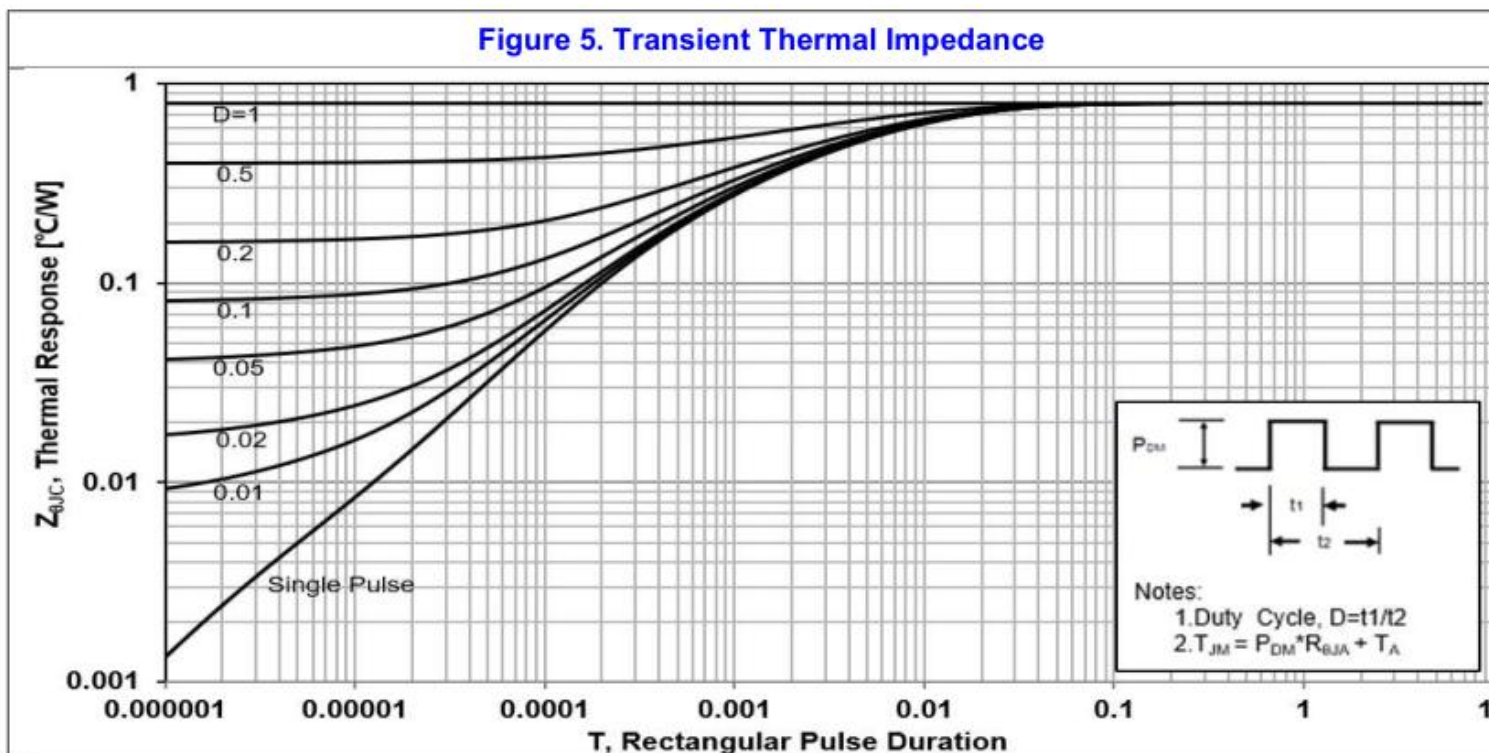
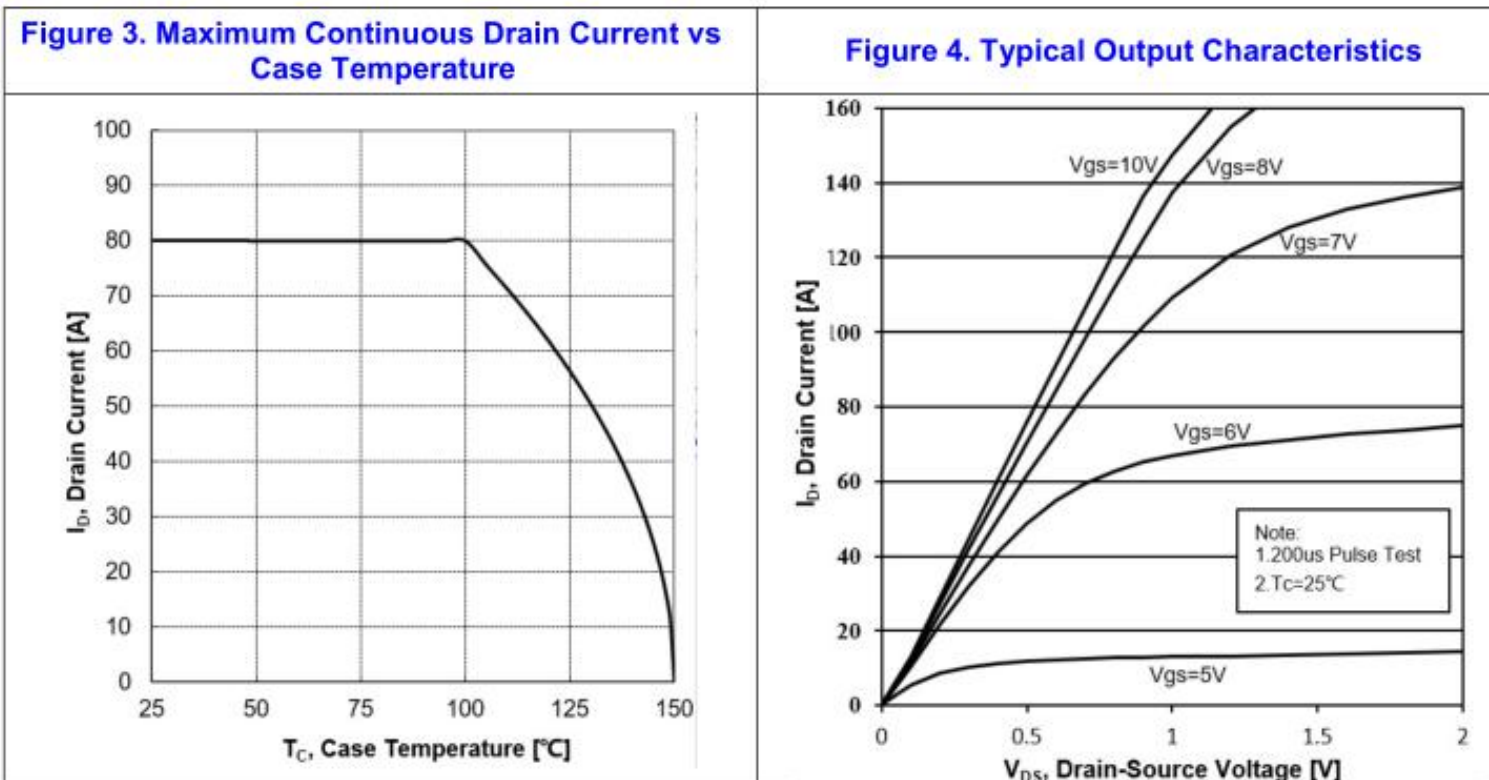
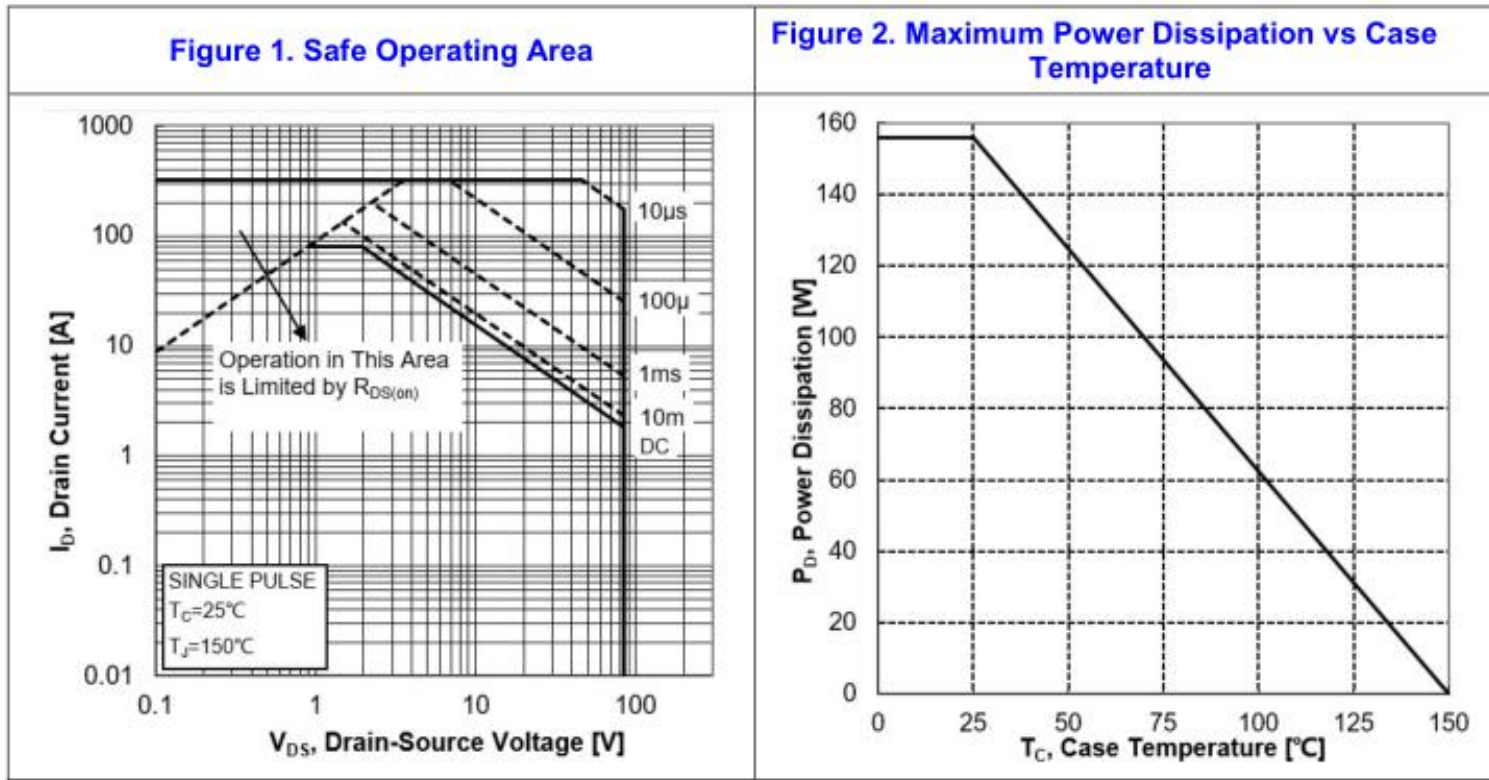
注释:

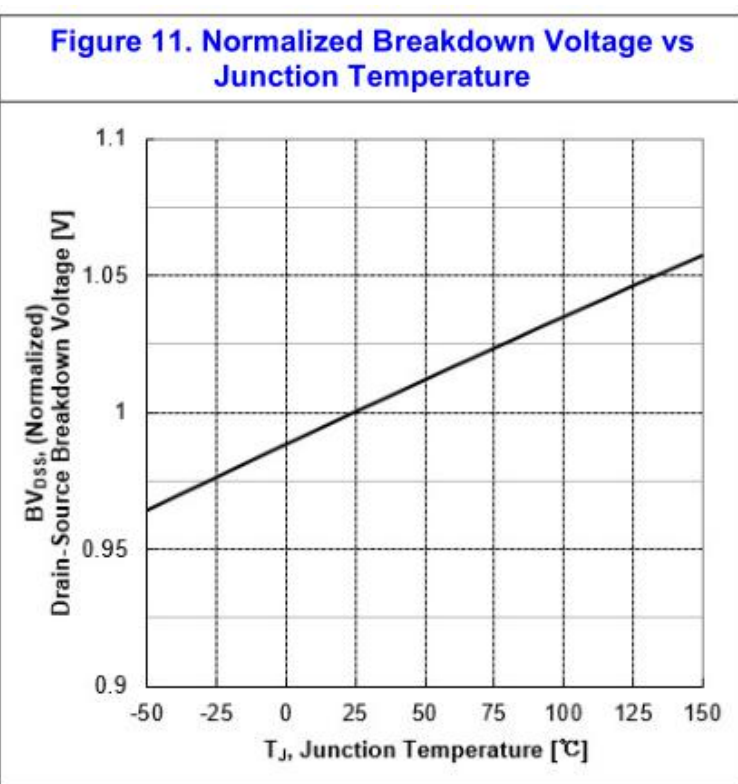
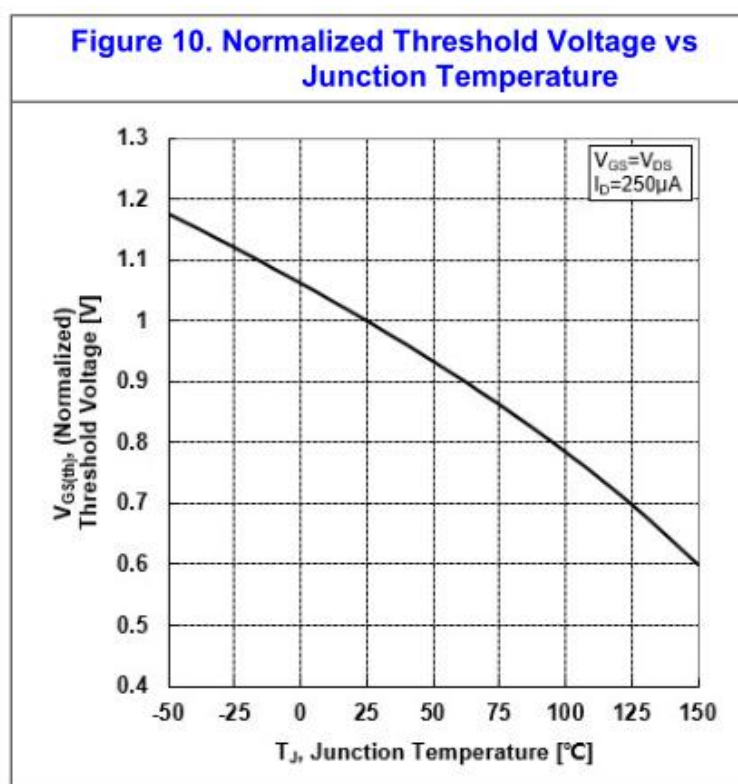
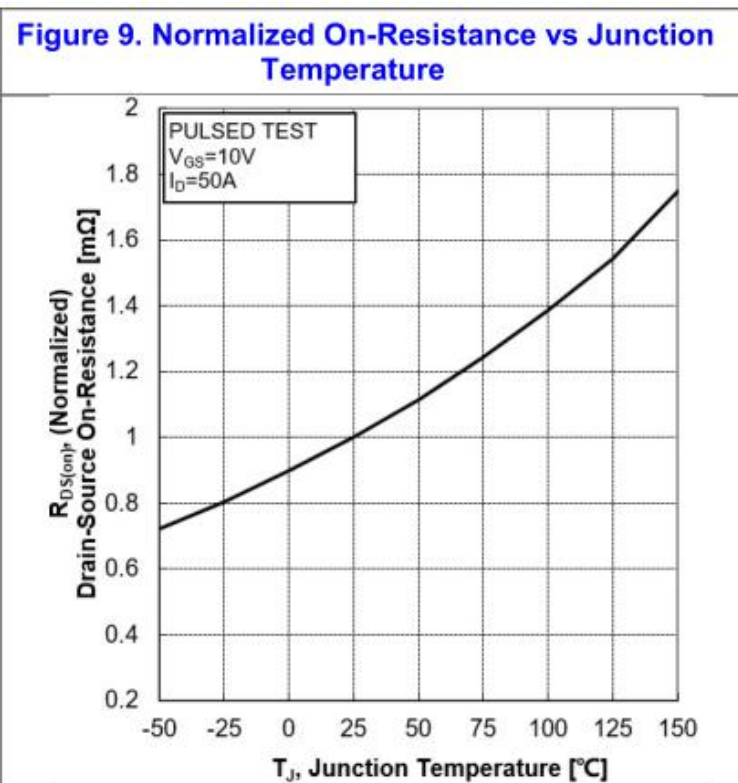
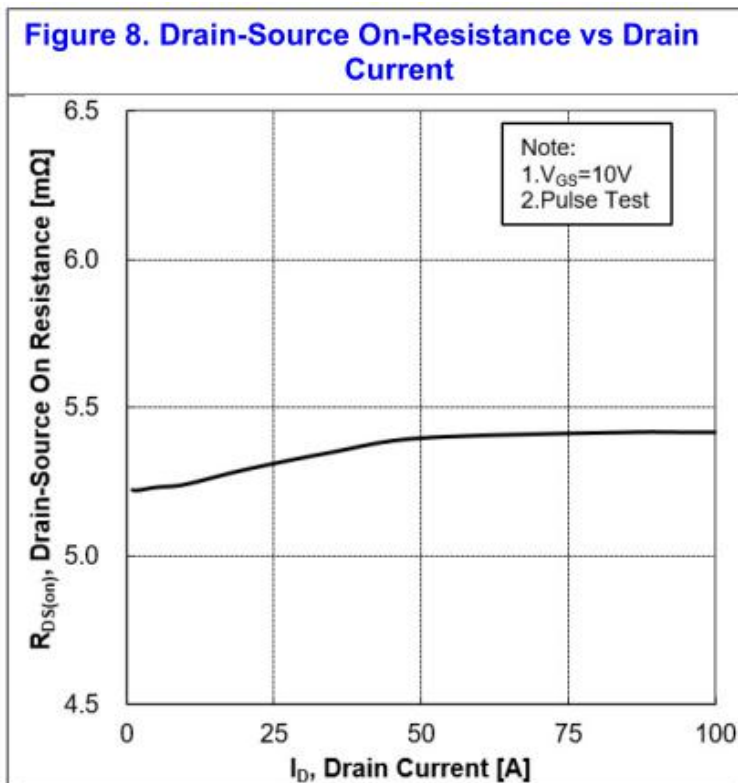
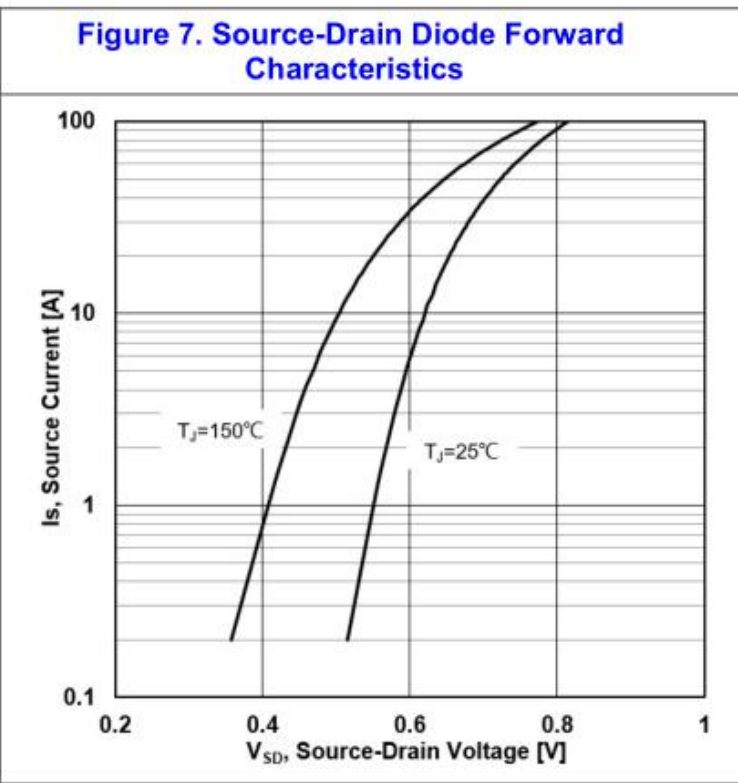
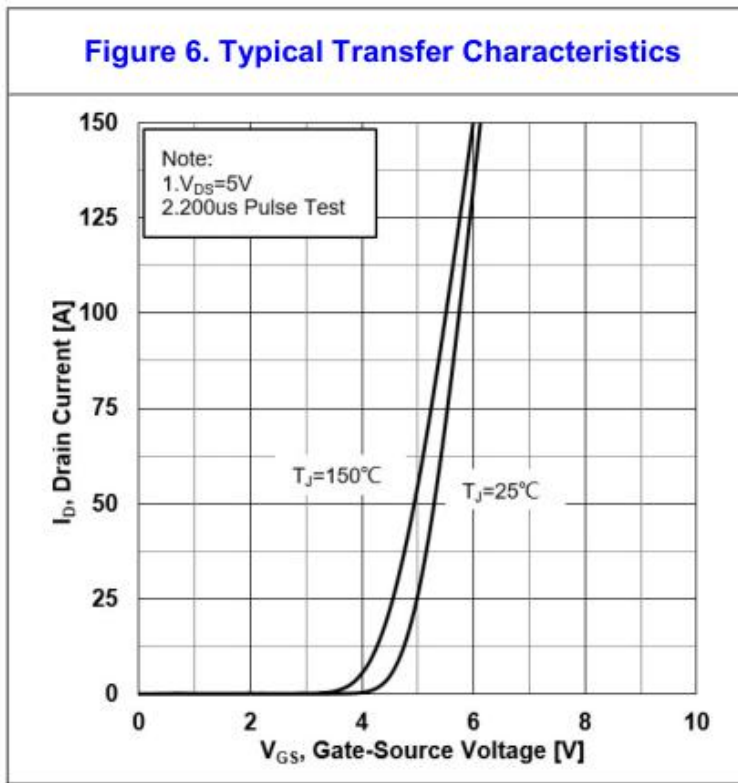
- 1: 脉冲宽度由最高结温限制
- 2: L=1mH, I<sub>AS</sub>=20A, V<sub>DD</sub>=48V, R<sub>G</sub>=25 Ω, 起始结温 T<sub>J</sub>=25°C
- 3: I<sub>SD</sub> ≤80A, di/dt ≤300A/μs, V<sub>DD</sub> ≤BV<sub>DSS</sub>, 起始结温 T<sub>J</sub>=25°C
- 4: 脉冲测试: 脉冲宽度 ≤300μs, 占空比 ≤2%
- 5: 基本与工作温度无关

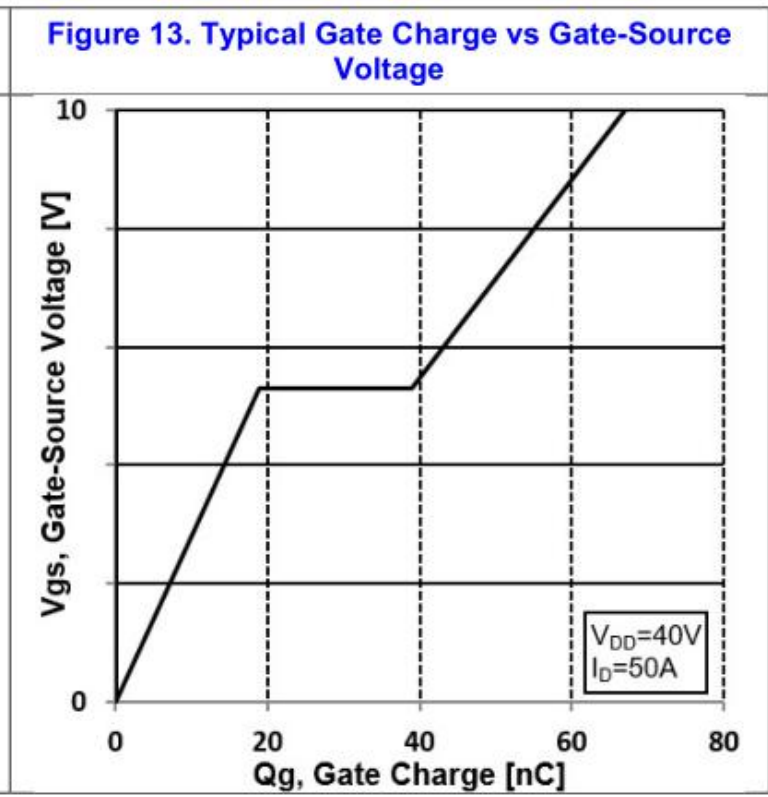
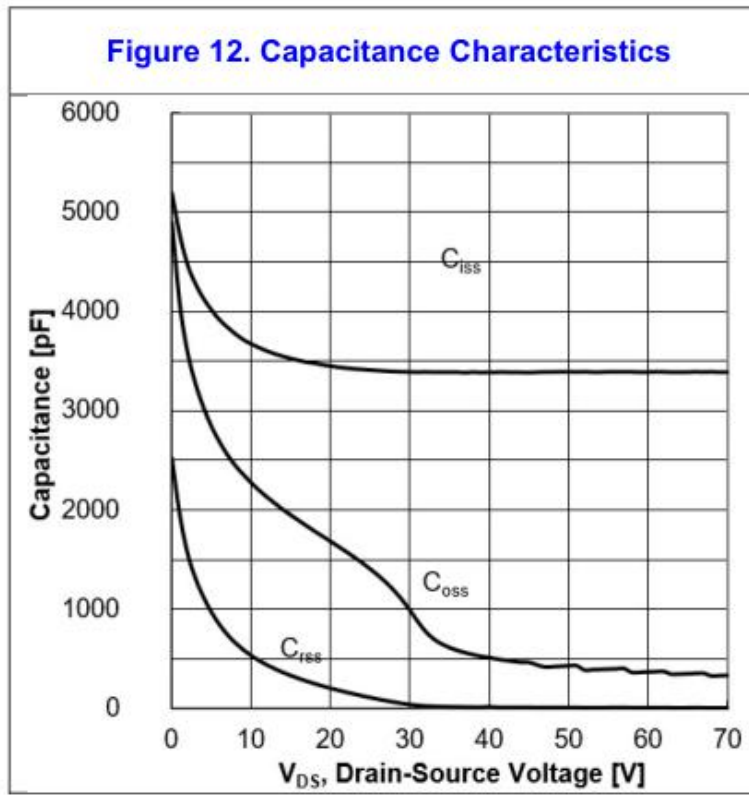
Notes:

- 1: Pulse width limited by maximum junction temperature
- 2: L=1mH, I<sub>AS</sub>=20A, V<sub>DD</sub>=48V, R<sub>G</sub>=25 Ω, Starting T<sub>J</sub>=25°C
- 3: I<sub>SD</sub> ≤80A, di/dt ≤300A/μs, V<sub>DD</sub> ≤BV<sub>DSS</sub>, Starting T<sub>J</sub>=25°C
- 4: Pulse Test: Pulse Width ≤300μs, Duty Cycle ≤2%
- 5: Essentially independent of operating temperature

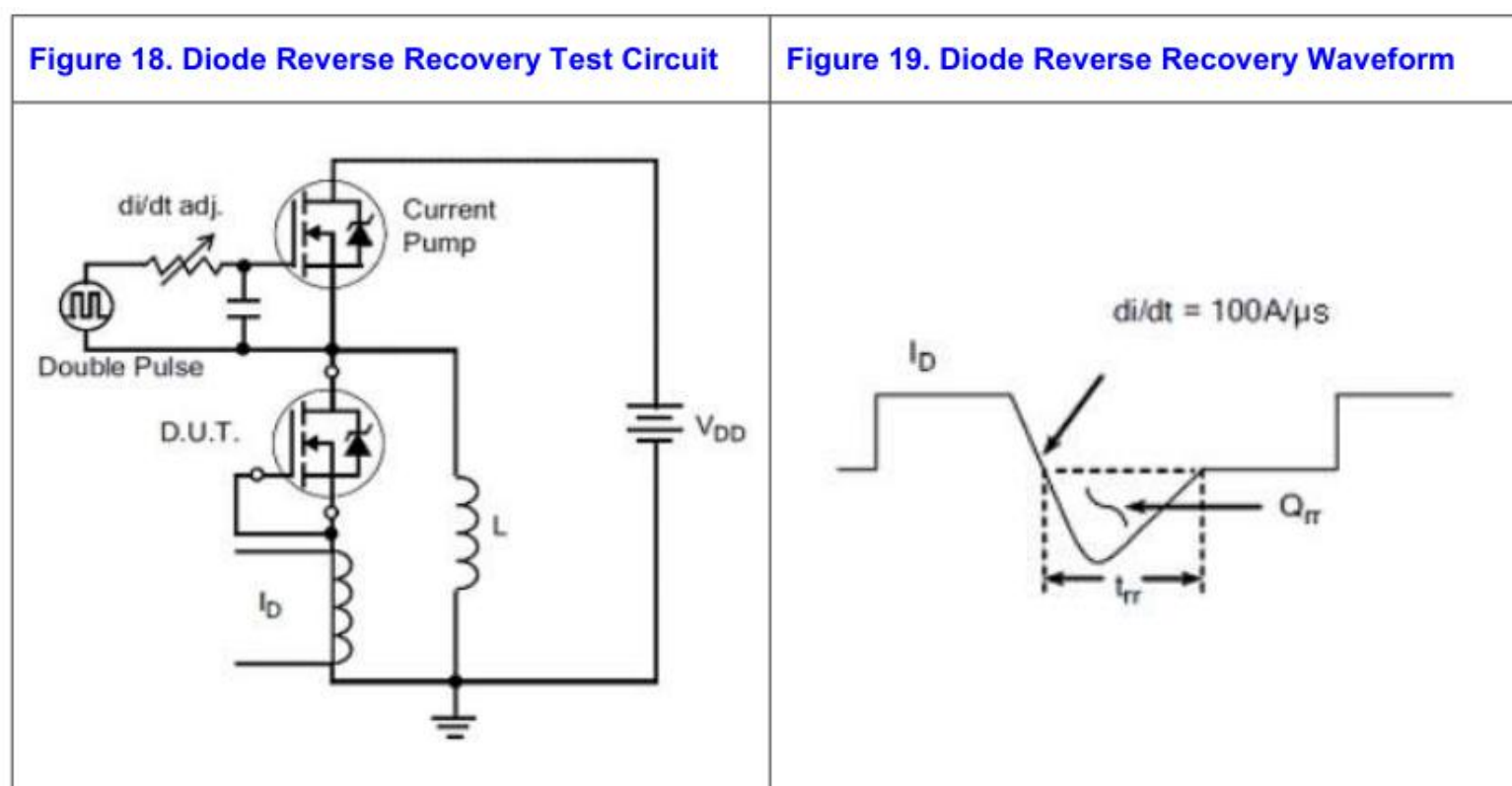
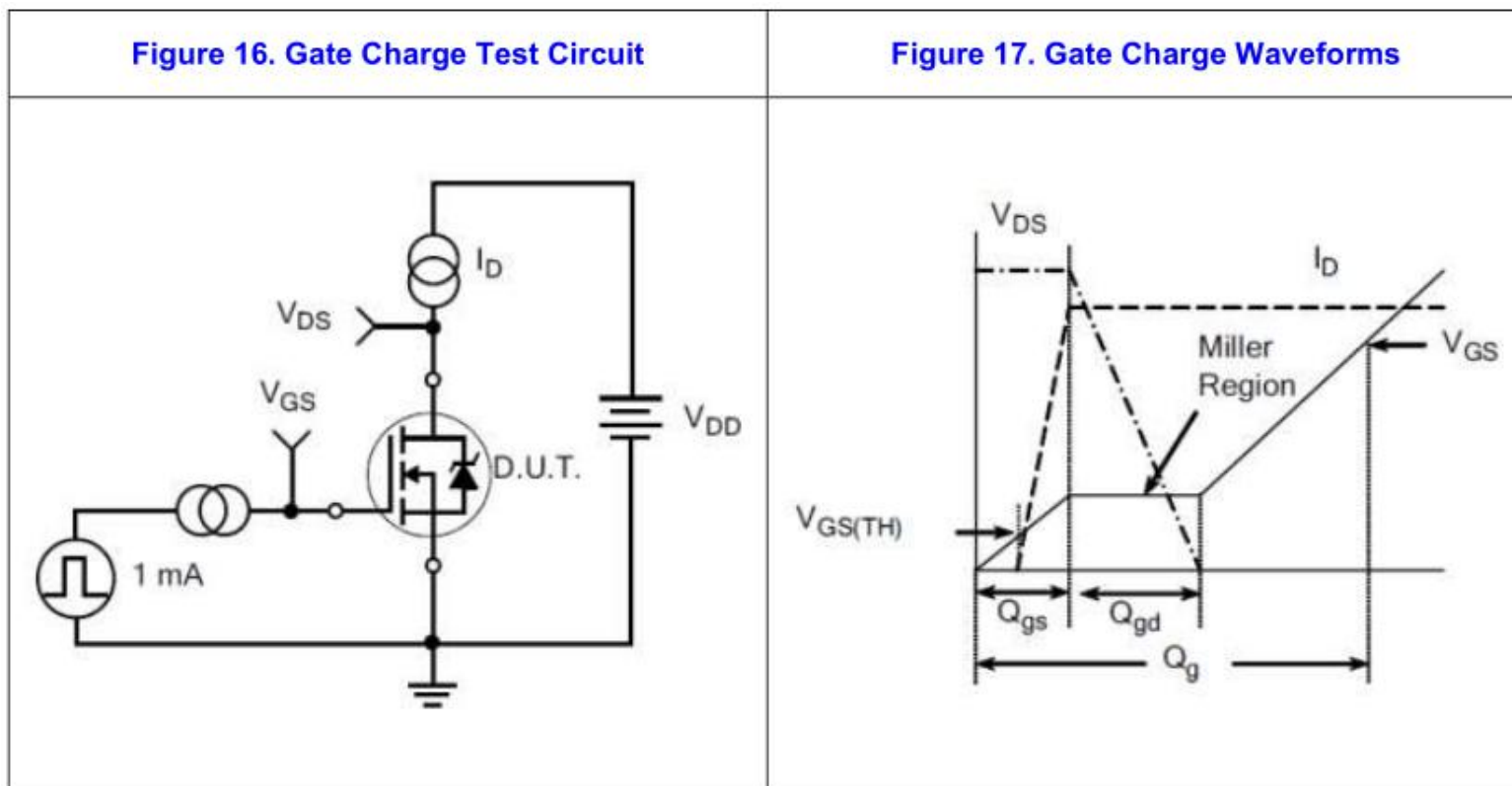
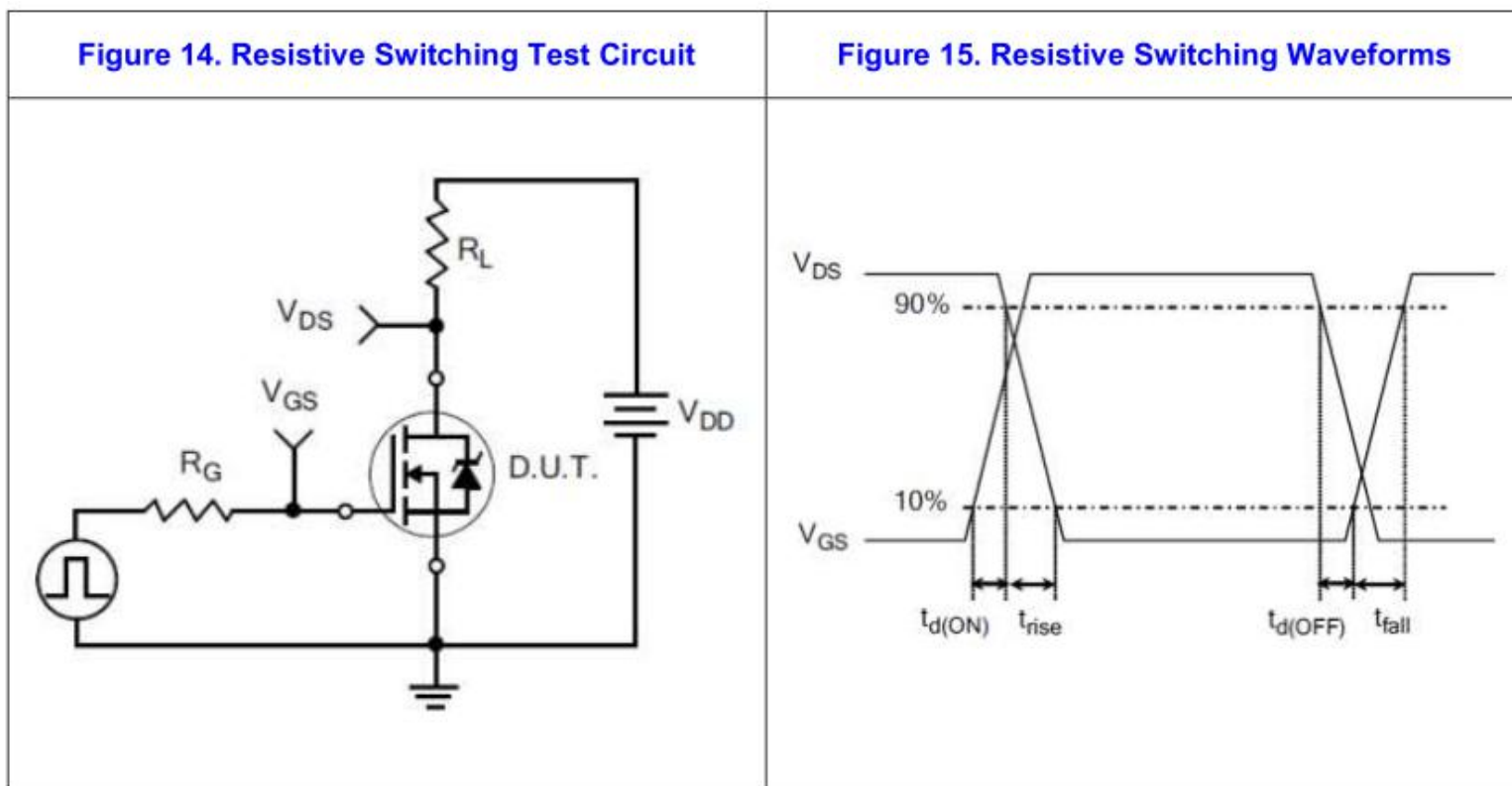
# Typical Performance



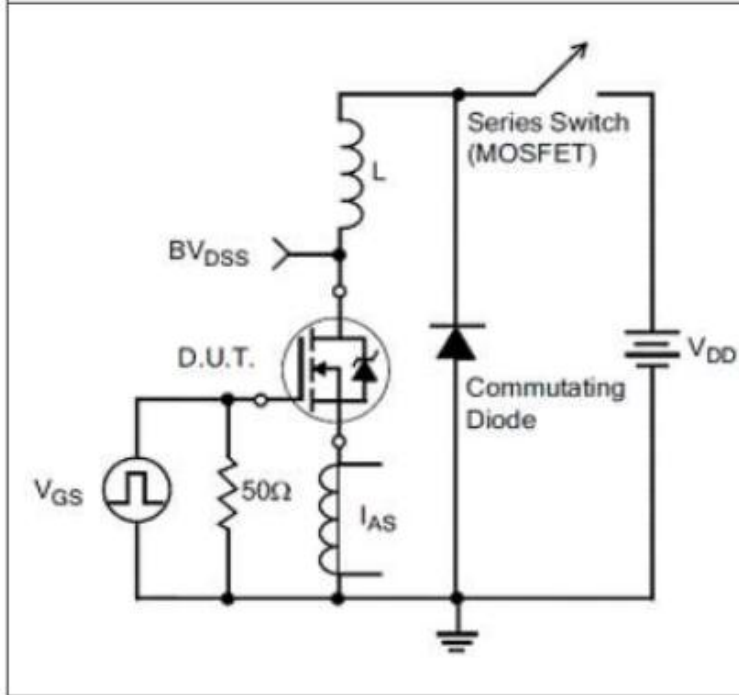




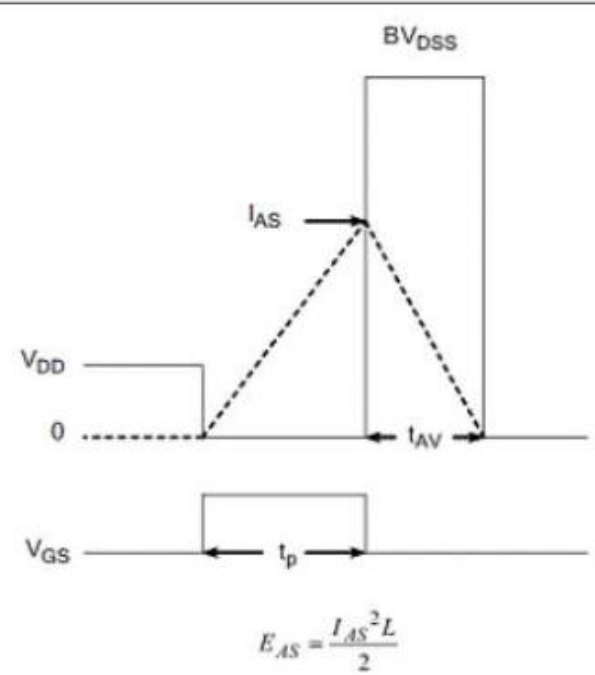
# Test Circuit & Wavef



**Figure 20. Unclamped Inductive Switching Test Circuit**

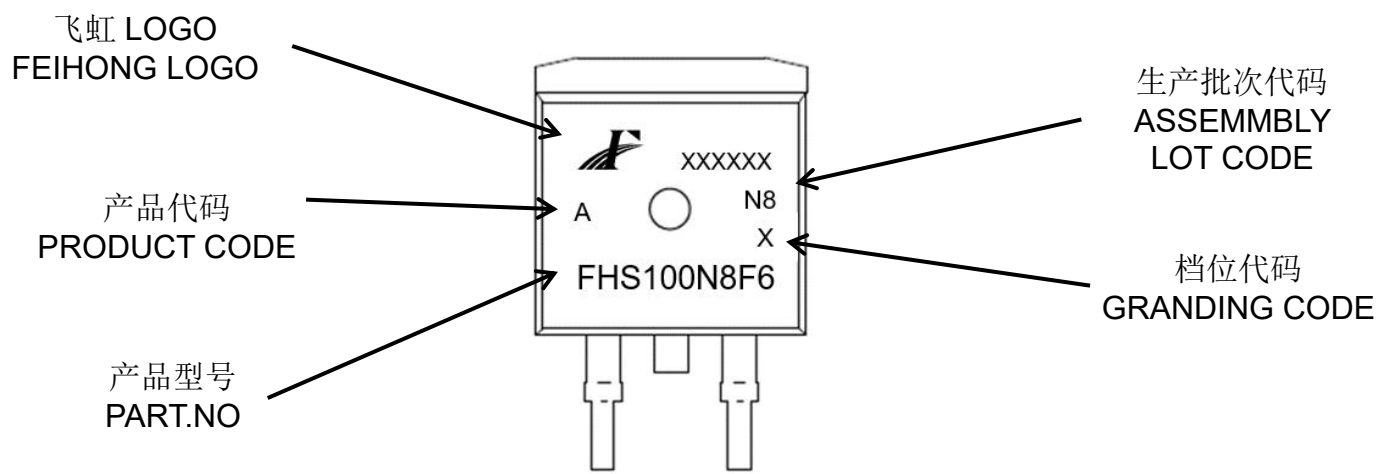
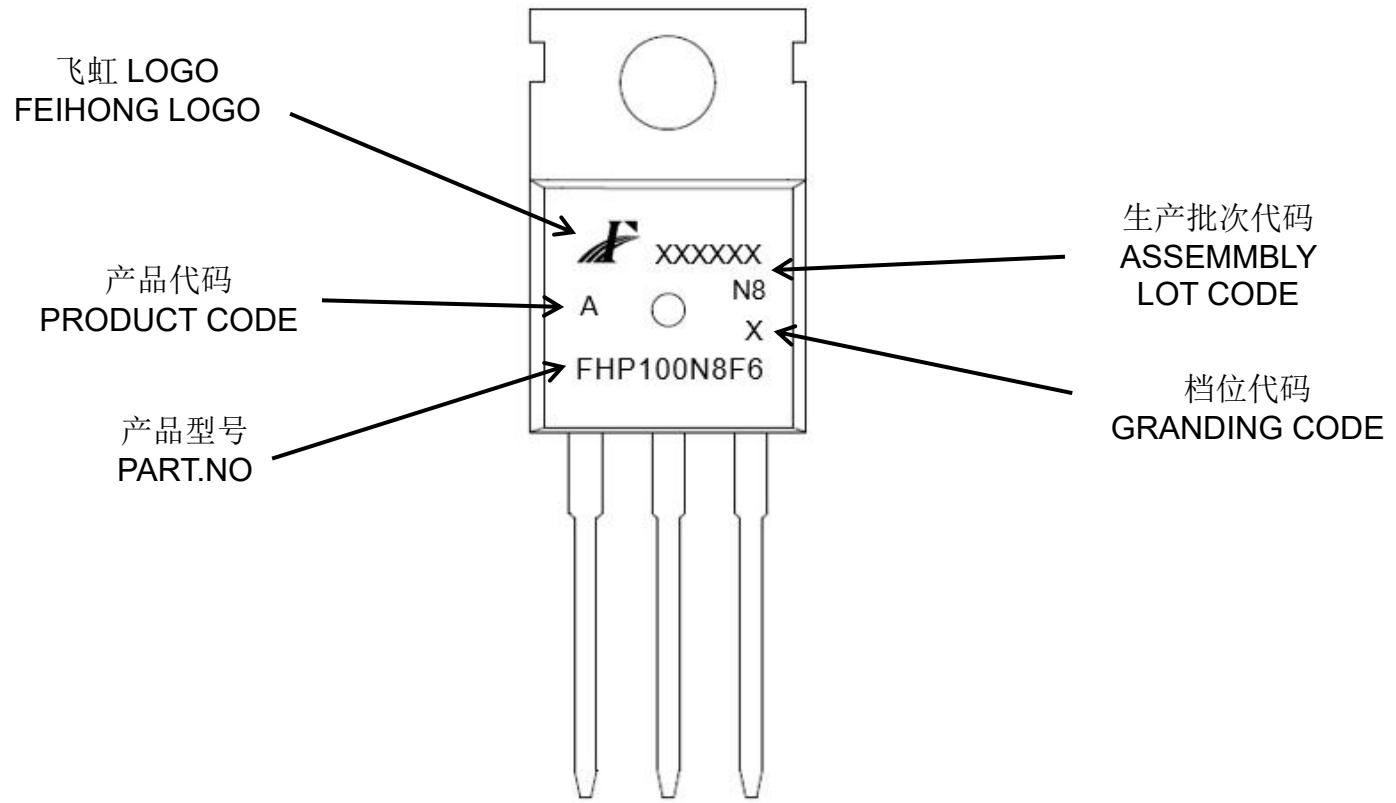


**Figure 21. Unclamped Inductive Switching Waveform**





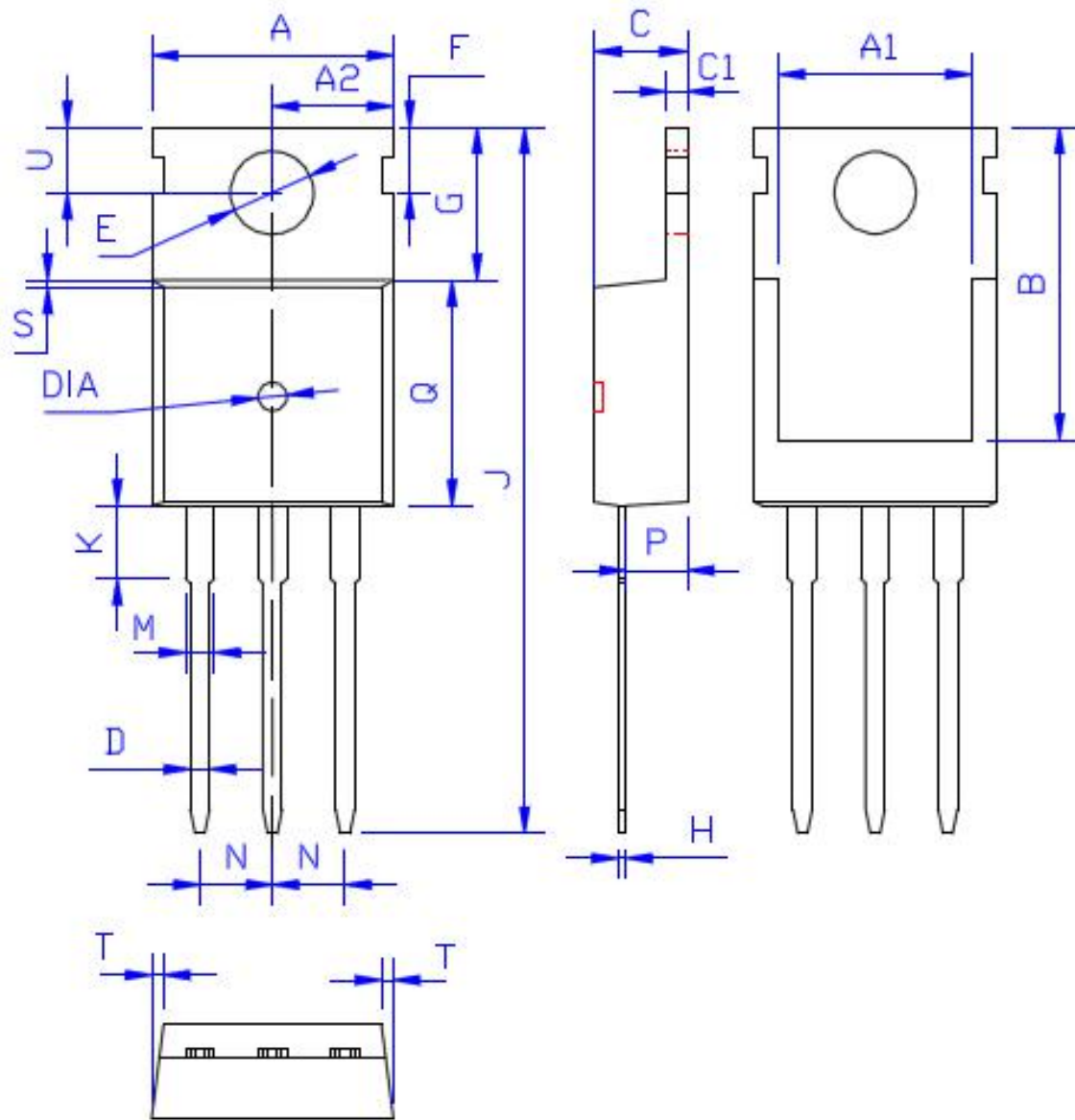
印记 Marking:



外形尺寸:

Package Dimension:

TO-220



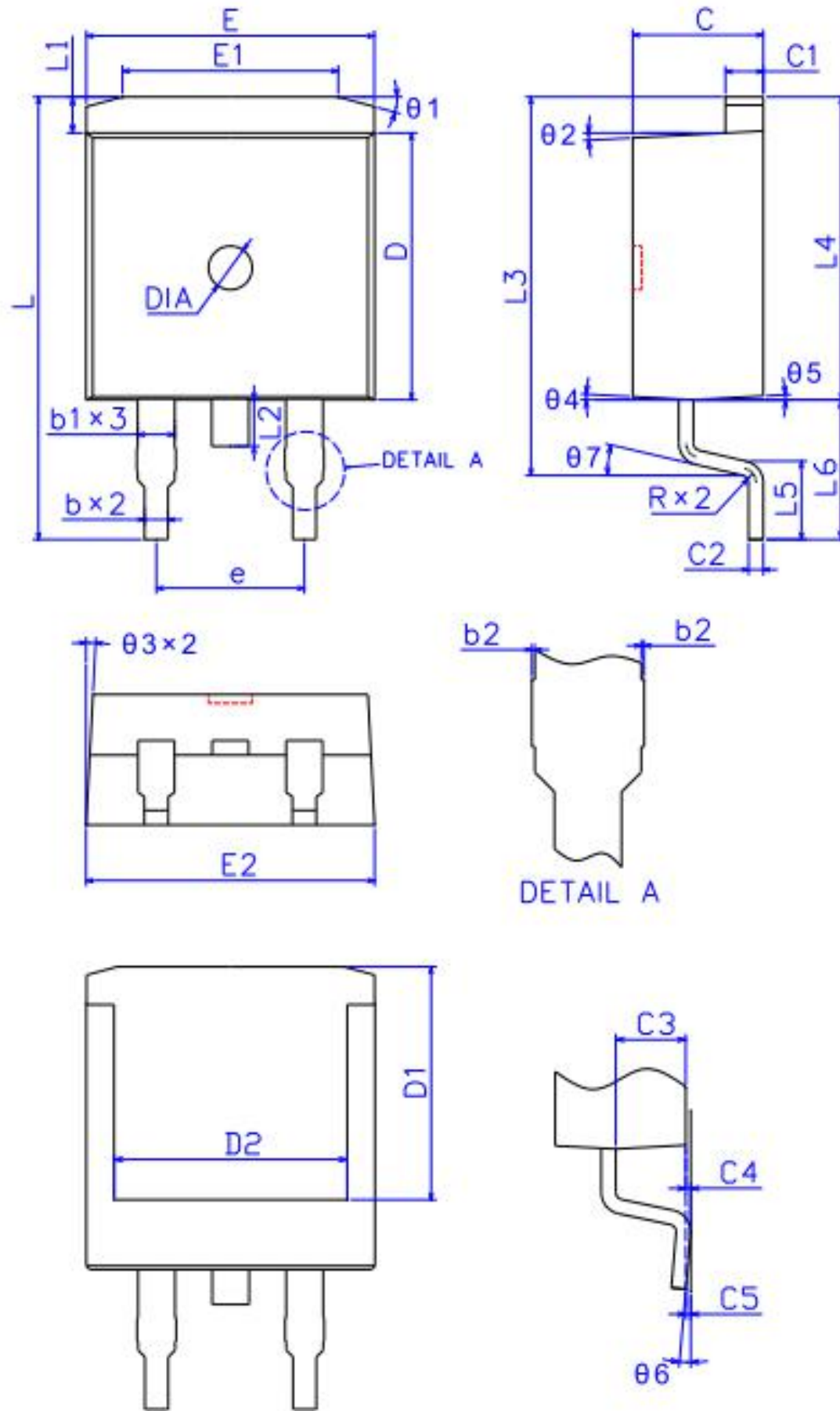
| DIM | MILLIMETERS                 |
|-----|-----------------------------|
| A   | 10.00 ± 0.30                |
| A1  | 8.00 ± 0.30                 |
| A2  | 5.00 ± 0.30                 |
| B   | 13.20 ± 0.40                |
| C   | 4.50 ± 0.20                 |
| C1  | 1.30 ± 0.20                 |
| 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<br>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<br>深 0.30±0.15 |