

# T75N15

## 主要参数 MAIN CHARACTERISTICS

|                        |                  |
|------------------------|------------------|
| <b>Id</b>              | <b>126A</b>      |
| <b>Vdss</b>            | <b>750V</b>      |
| <b>Rdson (Vgs=20V)</b> | <b>15mΩ(typ)</b> |

### 用途

- 负载开关
- 脉宽调制
- 电源管理

### APPLICATIONS

- Load Switch
- PWM Application
- Power Management

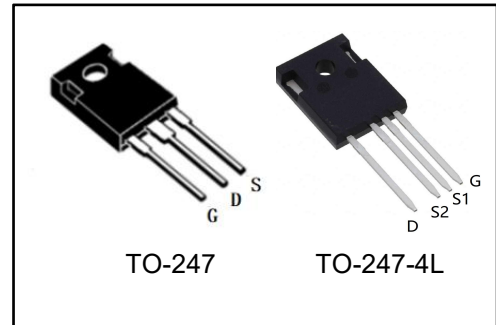
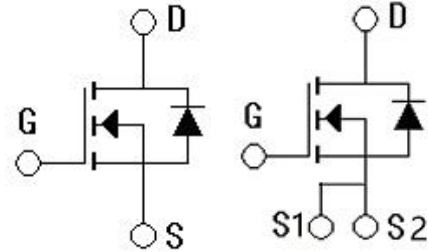
### 产品特性

- 符合环保标准
- 产品无卤素
- 湿敏等级3级

### FEATURES

- RoHS and Reach Compliant
- Halogen and Antimony Free
- Moisture Sensitivity Level 3

## 封装 Package



## 产品中有毒有害物质或元素的名称及含量

| 部件名称<br>(含量要求) | 有害物质或元素                                                                                                                                   |           |           |                 |               |                 |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|-----------------|---------------|-----------------|
|                | 铅<br>(Pb)                                                                                                                                 | 汞<br>(Hg) | 镉<br>(Cd) | 六价铬<br>(Cr(VI)) | 多溴联苯<br>(PBB) | 多溴二苯醚<br>(PBDE) |
|                | ≤0.1%                                                                                                                                     | ≤0.1%     | ≤0.01%    | ≤0.1%           | ≤0.1%         | ≤0.1%           |
| 引线框            | ○                                                                                                                                         | ○         | ○         | ○               | ○             | ○               |
| 塑封树脂           | ○                                                                                                                                         | ○         | ○         | ○               | ○             | ○               |
| 管 芯            | ○                                                                                                                                         | ○         | ○         | ○               | ○             | ○               |
| 内引线            | ○                                                                                                                                         | ○         | ○         | ○               | ○             | ○               |
| 焊 料            | ×                                                                                                                                         | ○         | ○         | ○               | ○             | ○               |
| 说 明            | <p>○: 表示该元素的含量在 SJ/T11363-2006 标准的限量要求以下。</p> <p>×: 表示该元素的含量超出 SJ/T11363-2006 标准的限量要求。</p> <p>目前产品的焊料中含有铅 (Pb) 成分, 但属于欧盟 RoHS 指令豁免范围。</p> |           |           |                 |               |                 |

绝对最大额定值 **ABSOLUTE RATINGS** ( $T_c=25^{\circ}\text{C}$ )

| 项 目<br>Parameter                                     | 符 号<br>Symbol                                              | 数 值<br>Value | 单 位<br>Unit        |
|------------------------------------------------------|------------------------------------------------------------|--------------|--------------------|
| 最高漏极-源极直流电压<br>Drain-Source Voltage                  | $V_{DS}$                                                   | 750          | V                  |
| 连续漏极电流<br>Drain Current-continuous                   | $I_D$<br>$T=25^{\circ}\text{C}$<br>$T=100^{\circ}\text{C}$ | 126<br>95    | A                  |
| 最大脉冲漏极电流<br>Drain Current – pulse <sup>Note 1</sup>  | $I_{DM}$                                                   | 416          | A                  |
| 最高栅源电压<br>Gate-Source Voltage                        | $V_{GS}$                                                   | -10 ~ +22    | V                  |
| 耗散功率<br>Power Dissipation                            | $P_D$<br>$T_c=25^{\circ}\text{C}$                          | 375          | W                  |
| 最高结温及存储温度<br>Operating and Storage Temperature Range | $T_J, T_{STG}$                                             | -55 ~ +175   | $^{\circ}\text{C}$ |

# 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 Off –Characteristics                         |                     |                                                                 |           |           |           |             |
| 漏—源击穿电压<br>Drain-Source Voltage                   | BV <sub>DSS</sub>   | I <sub>D</sub> =100μA, V <sub>GS</sub> =0V,T <sub>J</sub> =25℃  | 750       | -         | -         | V           |
| 零栅压下漏极漏电流<br>Zero Gate Voltage Drain Current      | I <sub>DSS</sub>    | V <sub>DS</sub> =750V,V <sub>GS</sub> =0V, T <sub>C</sub> =25℃  | -         | -         | 100       | μA          |
| 正向栅极体漏电流<br>Gate-body leakage current,<br>forward | I <sub>GSSF</sub>   | V <sub>DS</sub> =0V, V <sub>GS</sub> =22V                       | -         | -         | 250       | nA          |
| 反向栅极体漏电流<br>Gate-body leakage current,<br>reverse | I <sub>GSSR</sub>   | V <sub>DS</sub> =0V, V <sub>GS</sub> = -5V                      | -         | -         | -100      | nA          |
| 通态特性 On-Characteristics                           |                     |                                                                 |           |           |           |             |
| 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> =15mA        | 1.8       | 2.2       | 3.8       | V           |
| 静态导通电阻<br>Static Drain-Source<br>On-Resistance    | R <sub>DS(ON)</sub> | V <sub>GS</sub> = 15V,I <sub>D</sub> =50A,T <sub>J</sub> =25℃   | -         | 17        | 23        | mΩ          |
|                                                   |                     | V <sub>GS</sub> = 15V,I <sub>D</sub> =50A,T <sub>J</sub> =25℃   | -         | 15        | 21        |             |
|                                                   |                     | V <sub>GS</sub> = 18V, I <sub>D</sub> =50A,T <sub>J</sub> =150℃ | -         | 19        | -         |             |
| 动态特性 Dynamic Characteristics                      |                     |                                                                 |           |           |           |             |
| 输入电容<br>Input capacitance                         | C <sub>iss</sub>    | V <sub>DS</sub> =500V,<br>V <sub>GS</sub> =0V,<br>f=100KHz      | -         | 4482      | -         | pF          |
| 输出电容<br>Output capacitance                        | C <sub>oss</sub>    |                                                                 | -         | 325       | -         | pF          |
| 反向传输电容<br>Reverse transfer capacitance            | C <sub>rss</sub>    |                                                                 | -         | 23        | -         | pF          |

## 电特性 ELECTRICAL CHARACTERISTICS

| 开关特性 Switching Characteristics                                        |              |                                                            |   |      |   |    |  |
|-----------------------------------------------------------------------|--------------|------------------------------------------------------------|---|------|---|----|--|
| 延迟时间 Turn-On delay time                                               | $t_{d(on)}$  | VDD=500V, ID=55A, RG=2.5Ω<br>TJ =25℃<br>VGS=-4/18V L=59uH  | - | 15   | - | ns |  |
| 上升时间 Turn-On rise time                                                | $t_r$        |                                                            | - | 93   | - | ns |  |
| 延迟时间 Turn-Off delay time                                              | $t_{d(off)}$ |                                                            | - | 72   | - | ns |  |
| 下降时间 Turn-Off Fall time                                               | $t_f$        |                                                            | - | 24   | - | ns |  |
| 开通损耗 Turn-On energy                                                   | $E_{on}$     |                                                            | - | 1580 | - | μJ |  |
| 关断损耗 Turn-off energy                                                  | $E_{off}$    |                                                            | - | 190  | - | μJ |  |
| 栅极电荷总量 Total Gate Charge                                              | $Q_g$        | VDS=500V ,<br>ID=55A<br>VGS =-4V/18V<br>f=1MHz             | - | 187  | - | nC |  |
| 栅一源电荷 Gate-Source charge                                              | $Q_{gs}$     |                                                            | - | 38   | - | nC |  |
| 栅一漏电荷 Gate-Drain charge                                               | $Q_{gd}$     |                                                            | - | 76   | - | nC |  |
| 栅极电阻 Gate Resistance                                                  | $R_g$        |                                                            | - | 1.7  | - | Ω  |  |
| 漏一源二极管特性及最大额定值 Drain-Source Diode Characteristics and Maximum Ratings |              |                                                            |   |      |   |    |  |
| 正向压降<br>Drain-Source Diode Forward Voltage                            | $V_{SD}$     | VGS=0V, IS=30A                                             | - | 4.5  | - | V  |  |
| 反向恢复时间<br>Reverse Recovery Time                                       | $T_{RR}$     | VGS = -4 V, ISD = 55 A,<br>VR = 500 V<br>di/dt = 1329 A/μs | - | 25   | - | ns |  |
| 反向恢复电荷<br>Reverse Recovery Charge                                     | $Q_{RR}$     |                                                            | - | 190  | - | nC |  |
| 反向恢复电流<br>Peak reverse recovery current                               | $I_{rr}$     |                                                            | - | 12   | - | A  |  |

## 热特性 THERMAL CHARACTERISTIC

| 项 目<br>Parameter                                   | 符号<br>Symbol  | 值<br>Value | 单位<br>Unit |
|----------------------------------------------------|---------------|------------|------------|
| 结到管壳的热阻<br>Thermal Resistance, Junction to Case    | $R_{th(j-c)}$ | 0.29       | °C/W       |
| 结到环境的热阻<br>Thermal Resistance, Junction-to-Ambient | $R_{th(j-A)}$ | 40         | °C/W       |

# 特征曲线 ELECTRICAL CHARACTERISTICS

Diagram 1: Typ. output characteristics

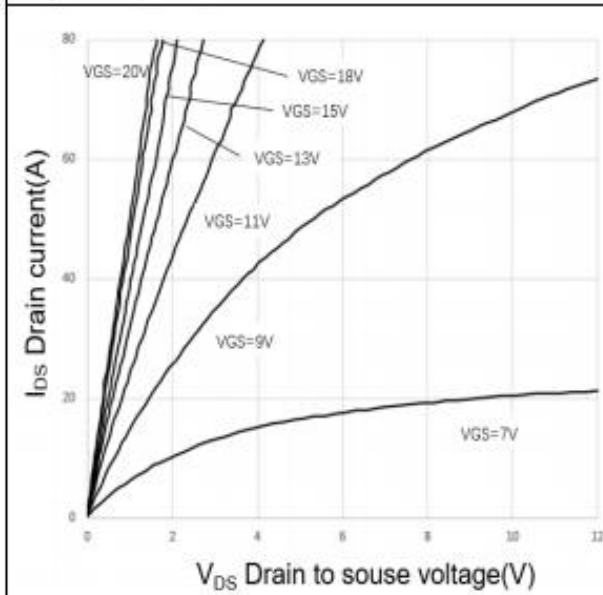

 $I_D = f(V_{DS}); T_J = -40^\circ\text{C}; \text{parameter: } V_{GS}, V_{GS} = 7, 9, 11, 13, 15, 18, 20\text{V}$ 

Diagram 2: Typ. output characteristics

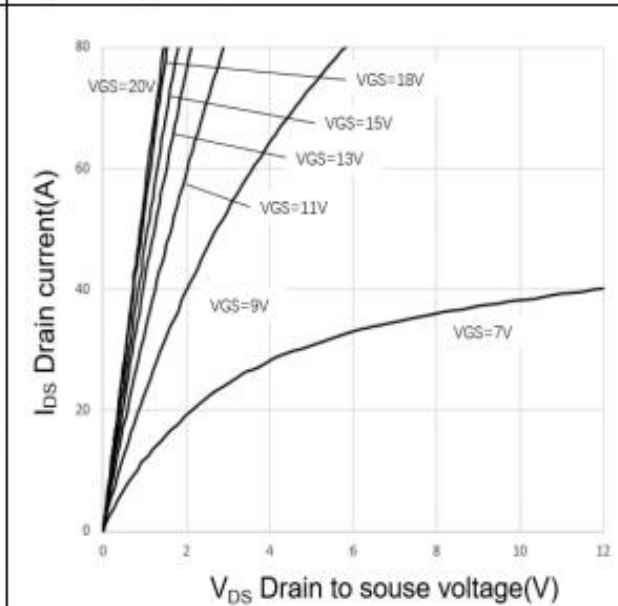

 $I_D = f(V_{DS}); T_J = 25^\circ\text{C}; \text{parameter: } V_{GS}, V_{GS} = 7, 9, 11, 13, 15, 18, 20\text{V}$ 

Diagram 3: Typ. output characteristics

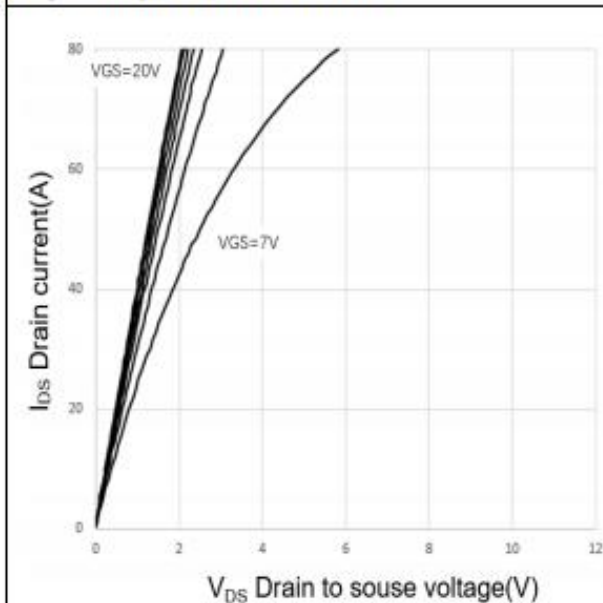
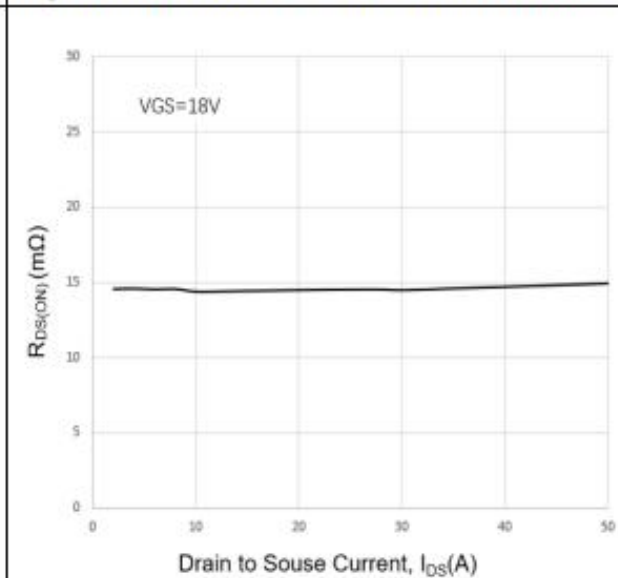

 $I_D = f(V_{DS}); T_J = 175^\circ\text{C}; \text{parameter: } V_{GS}, V_{GS} = 7, 9, 11, 13, 15, 18, 20\text{V}$ 

Diagram 4: Drain-Source On-Resistance vs Drain Current


 $R_{DS(on)} = f(I_{DS}); T_J = 25^\circ\text{C};$

# 特征曲线 ELECTRICAL CHARACTERISTICS

Diagram 5: Typ. transfer characteristics

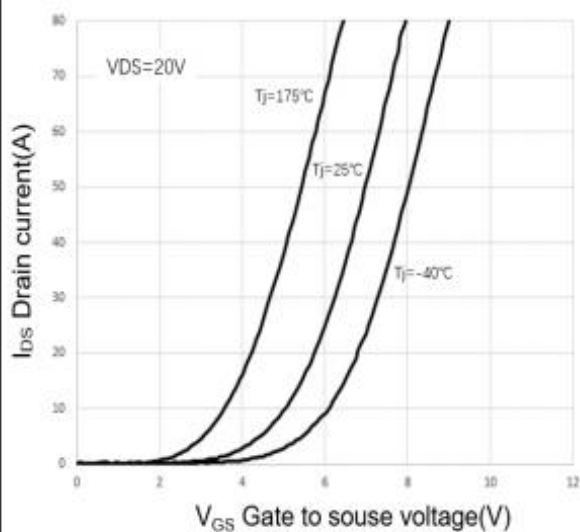

 $I_D = f(V_{GS}); V_{DS} = 20V; \text{parameter: } T_j$ 

Diagram 6: Typ. gate charge

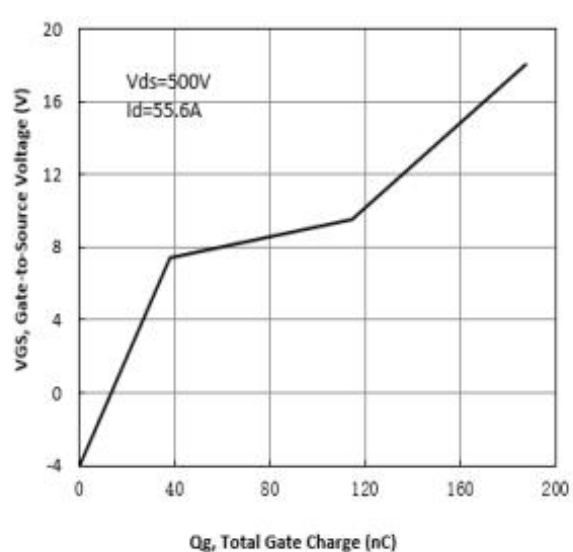

 $V_{GS} = f(Q_{g(on)}); I_D = 55.6A; V_{DS} = 500V; \text{turn-on pulse}$ 

Diagram 7: Typical gate-source threshold voltage as a function of junction temperature

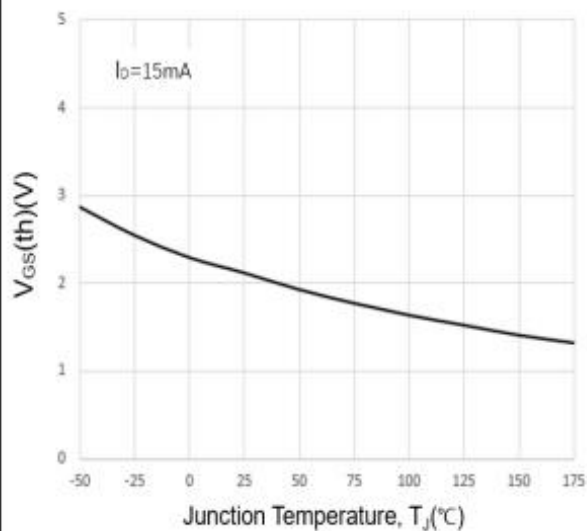
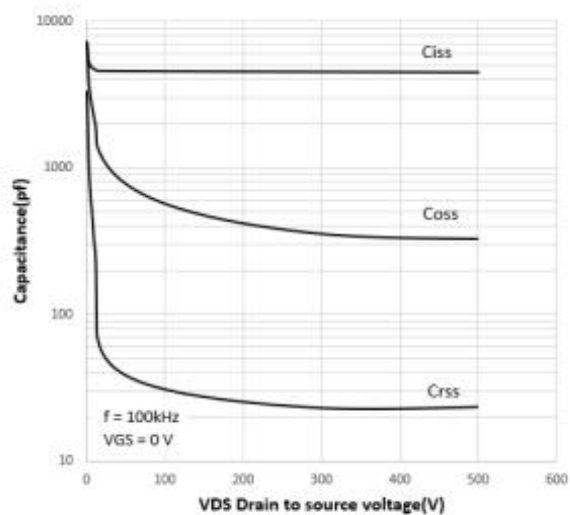
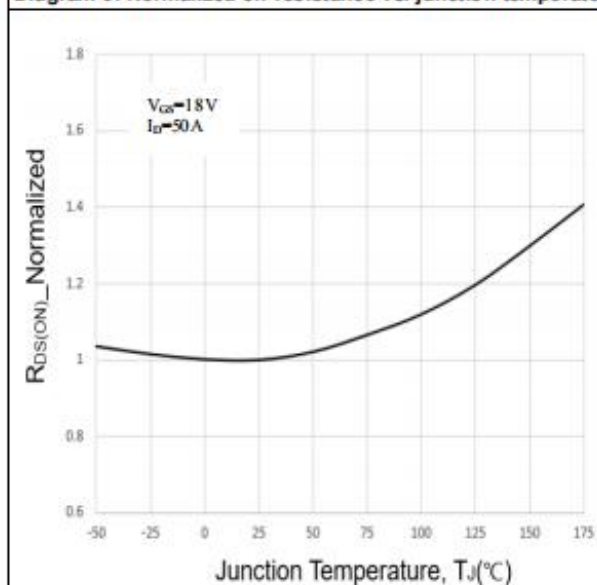

 $V_{GS(th)} = f(T_j); I_D = 15mA; V_{GS} = V_{DS}$ 

Diagram 8: Typ. Capacitance as a function of drain-source voltage


 $C = f(V_{DS}); V_{GS} = 0V; f = 100kHz$

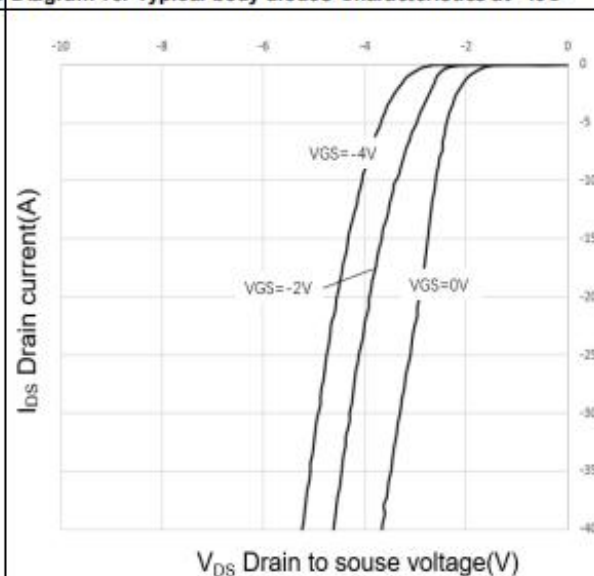
## 特征曲线 ELECTRICAL CHARACTERISTICS

Diagram 9: Normalized on-resistance vs. junction temperature



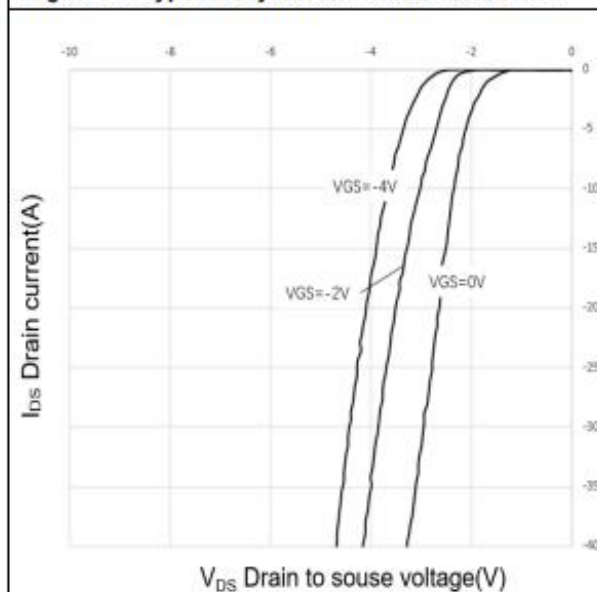
$$R_{DS(on)}=f(T_J); I_D=50A$$

Diagram 10: Typical body diodes Characteristics at -40°C



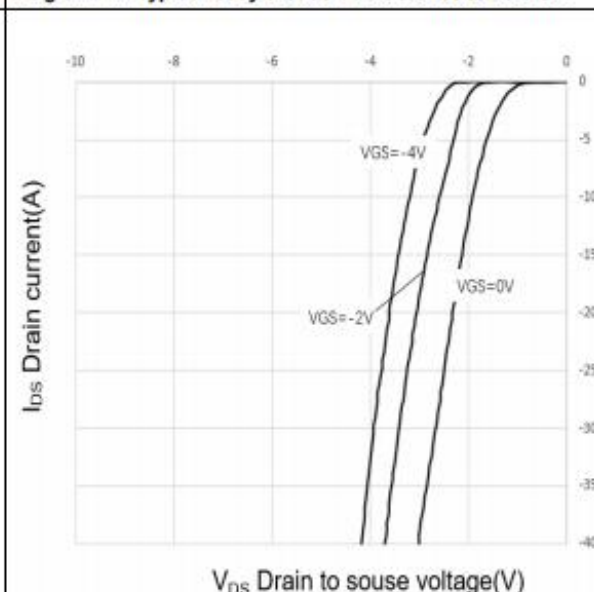
$$I_{DS}=f(V_{DS})$$

Diagram 11: Typical body diodes Characteristics at 25°C



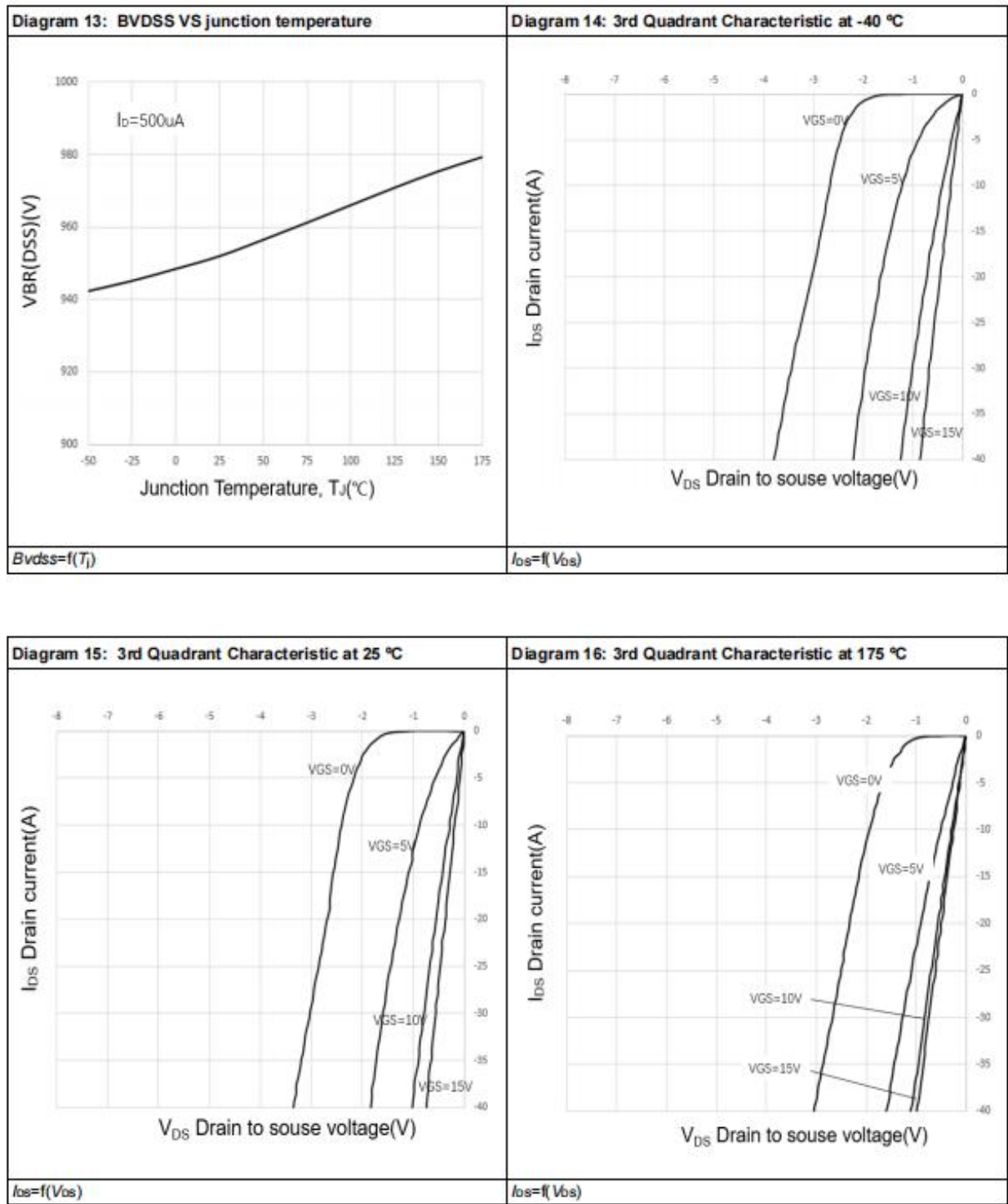
$$I_{DS}=f(V_{DS})$$

Diagram 12: Typical body diodes Characteristics at 175°C



$$I_{DS}=f(V_{DS})$$

特征曲线 ELECTRICAL CHARACTERISTICS



# 特征曲线 ELECTRICAL CHARACTERISTICS

Diagram 17: Safe operating area(SOA)

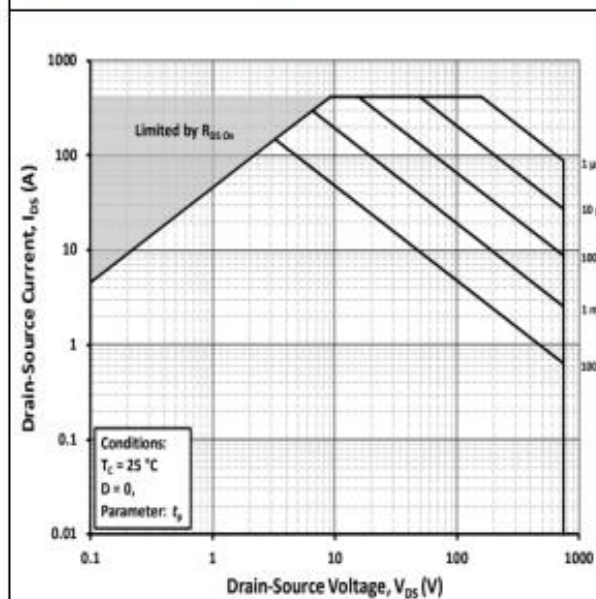

 $V_{DS}=0/18V; T_C=25\text{ }^{\circ}\text{C}; T_J<175\text{ }^{\circ}\text{C}$ 

Diagram 18: Power dissipation as a function of case temperature limited by bond wire

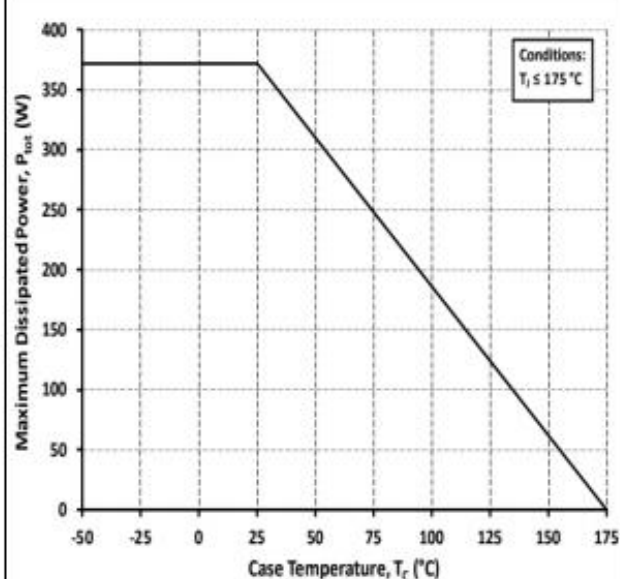

 $P_{tot} = f(T_C)$ 

Diagram 19: Continuous Drian Current Derating vs. Case Temperature

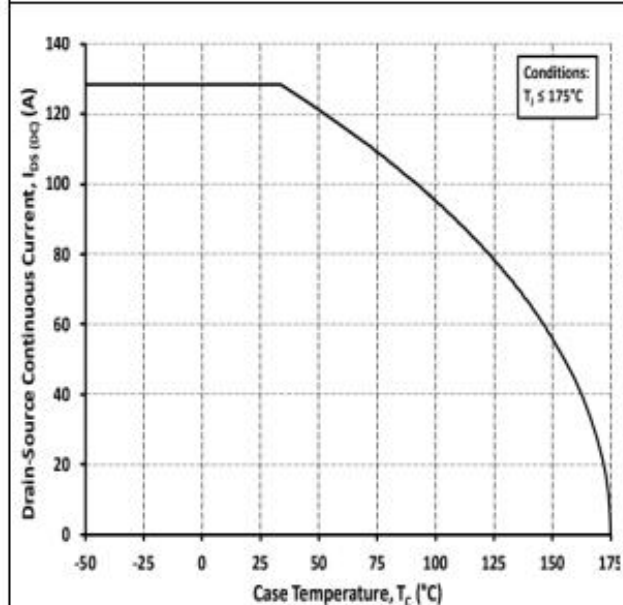
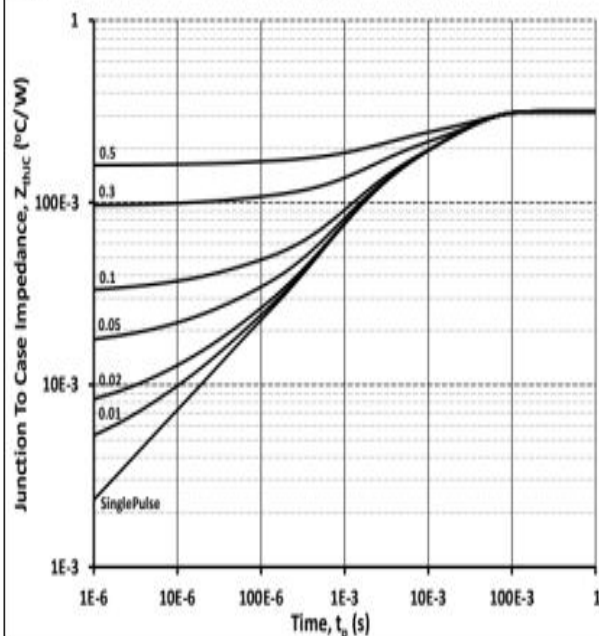
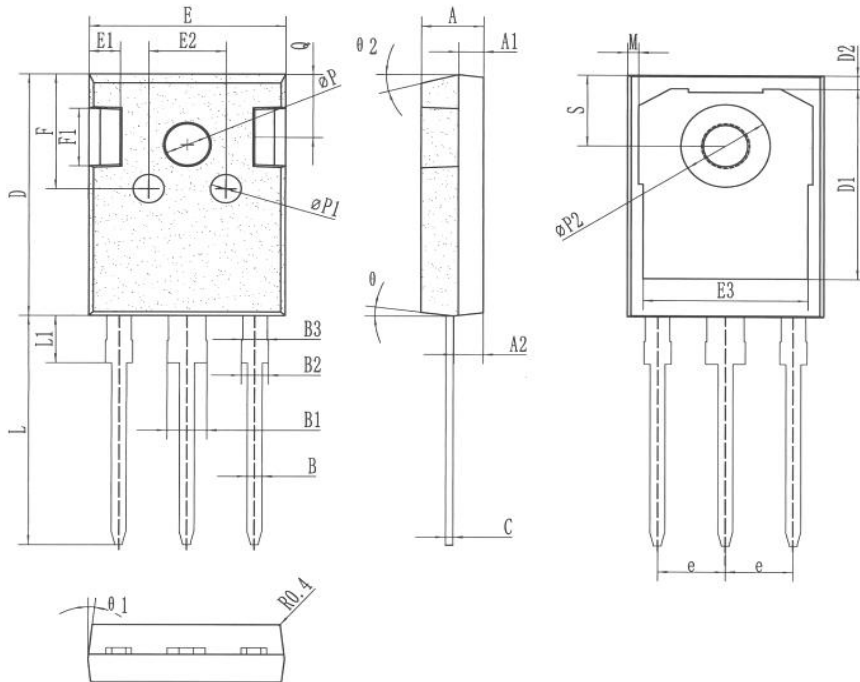

 $I_{DS} = f(T_C)$ 

Diagram 20: Max. transient thermal resistance(MOSFET/diodes)


 $Z_{\theta JC,avg} = f(t_b), \text{parameter } D = t_b/T$

外形尺寸 **PACKAGE MECHANICAL DATA**

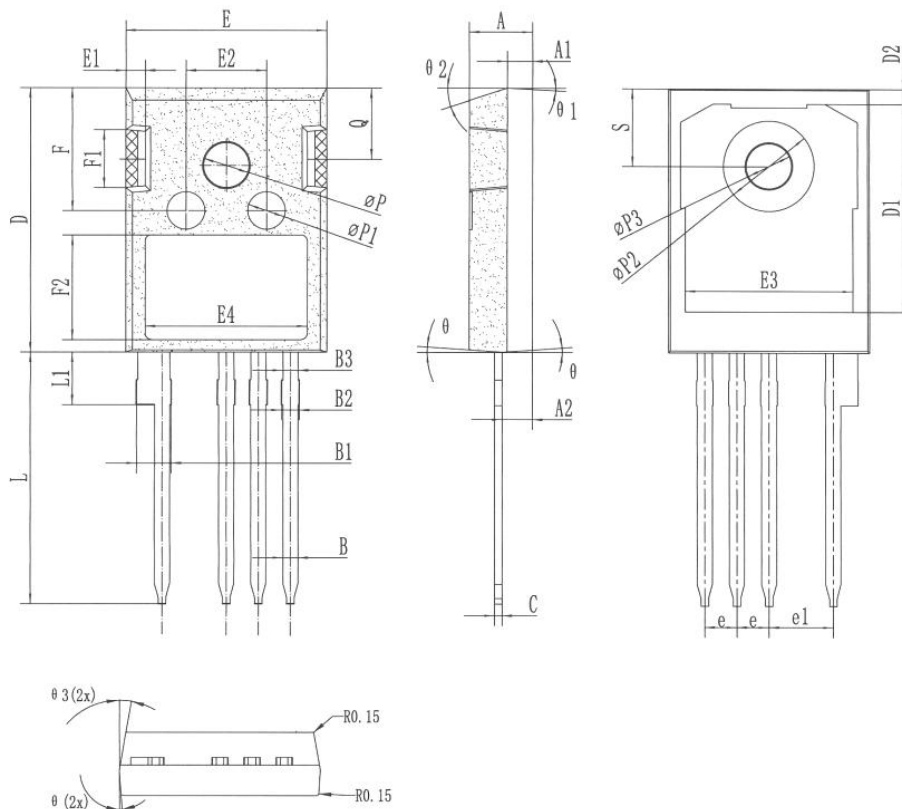
**TO-247**



COMMON DIMENSIONS

| SYMBOL | MM       |       |       |
|--------|----------|-------|-------|
|        | MIN      | NOM   | MAX   |
| A      | 4.90     | 5.00  | 5.10  |
| A1     | 1.90     | 2.00  | 2.10  |
| A2     | 2.30     | 2.40  | 2.50  |
| B      | 1.15     | 1.20  | 1.25  |
| B1     | 3.05     | 3.15  | 3.25  |
| B2     | 2.00     | 2.10  | 2.20  |
| B3     | 1.90     | 2.00  | 2.10  |
| C      | 0.55     | 0.60  | 0.65  |
| D      | 20.90    | 21.00 | 21.10 |
| D1     | 16.35    | 16.55 | 16.75 |
| D2     | 1.02     | 1.17  | 1.32  |
| E      | 15.70    | 15.80 | 15.90 |
| E1     | 2.40     | 2.50  | 2.60  |
| E2     | 6.10     | 6.20  | 6.30  |
| E3     | 13.10    | 13.30 | 13.50 |
| F      | 9.80     | 10.00 | 10.20 |
| F1     | 4.90     | 5.00  | 5.10  |
| e      | 5.44 BSC |       |       |
| L      | 19.72    | 19.92 | 20.12 |
| L1     | 3.90     | 4.10  | 4.30  |
| φP     | 3.50     | 3.60  | 3.70  |
| φP1    | 2.40     | 2.50  | 2.60  |
| φP2    | 7.10     | 7.20  | 7.30  |
| S      | 6.05     | 6.15  | 6.25  |
| M      | 0.45     | —     | 0.95  |
| Q      | 5.60     | 5.80  | 6.00  |
| θ      | 5°       | 7°    | 9°    |
| θ 1    | 5°       | 7°    | 9°    |
| θ 2    | 13°      | 15°   | 17°   |

**TO-247-4L**



COMMON DIMENSIONS

| SYMBOL | MM       |       |       |
|--------|----------|-------|-------|
|        | MIN      | NOM   | MAX   |
| A      | 4.90     | 5.00  | 5.10  |
| A1     | 1.90     | 2.00  | 2.10  |
| A2     | 2.31     | 2.41  | 2.51  |
| B      | 1.15     | 1.20  | 1.25  |
| B1     | 2.50     | 2.65  | 2.80  |
| B2     | 1.20     | 1.35  | 1.45  |
| B3     | 1.15     | 1.20  | 1.25  |
| C      | 0.55     | 0.60  | 0.65  |
| D      | 20.75    | 20.95 | 21.15 |
| D1     | 16.35    | 16.55 | 16.75 |
| D2     | 1.02     | 1.17  | 1.32  |
| E      | 15.70    | 15.90 | 16.10 |
| E1     | 1.45     | 1.55  | 1.65  |
| E2     | 6.25     | 6.35  | 6.45  |
| E3     | 13.05    | 13.25 | 13.45 |
| E4     | 12.70    | 12.80 | 12.90 |
| F      | 9.55     | 9.75  | 9.95  |
| F1     | 4.50     | 4.60  | 4.70  |
| F2     | 8.20     | 8.30  | 8.40  |
| e      | 2.54 BSC |       |       |
| e1     | 5.08 BSC |       |       |
| L      | 19.80    | 20.00 | 20.20 |
| L1     | 3.97     | 4.17  | 4.37  |
| φP     | 3.70     | 3.80  | 3.90  |
| φP1    | 2.90     | 3.00  | 3.10  |
| φP2    | 7.10     | 7.20  | 7.30  |
| φP3    | 3.50     | 3.60  | 3.70  |
| S      | 6.05     | 6.15  | 6.25  |
| Q      | 5.50     | 5.60  | 5.70  |
| θ      | 2°       | 4°    | 6°    |
| θ 1    | 1°       | 3°    | 5°    |
| θ 2    | 16°      | 18°   | 20°   |
| θ 3    | 8°       | 10°   | 12°   |