



# MG120R013

## 主要参数 MAIN CHARACTERISTICS

|                                     |               |
|-------------------------------------|---------------|
| $I_D$                               | 127A          |
| $V_{CE}$                            | 1200V         |
| $R_{dson-typ}$<br>(@ $V_{GS}=18V$ ) | 13 m $\Omega$ |
| $Q_g-typ$                           | 208nC         |

### 用途

- 光伏逆变器
- 开关模式电源
- 高压 DC/DC 转换器
- 电池充电器
- 电动驱动
- 脉冲电源应用

### APPLICATIONS

- Solar Inverters
- Switch Mode Power Supplies
- High Voltage DC/DC Converters
- Battery Chargers
- Motor Drives
- Pulsed Power applications

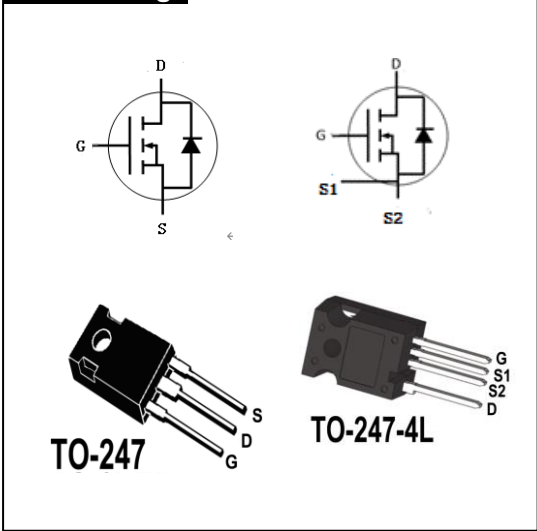
### 产品特性

- 高阻断电压
- 低导通电阻
- 低电容高速开关
- 易于驱动
- 雪崩强度高
- RoHS 产品

### FEATURES

- High Blocking Voltage
- Low On-Resistance
- High Speed Switching with Low Capacitances
- Easy to Parallel and Simple to Drive
- Avalanche Ruggedness
- RoHS product

## 封装 Package



## 订货信息 ORDER MESSAGE

| 订货型号 Order codes        | 印记 Marking | 封装 Package |
|-------------------------|------------|------------|
| 无卤-条管 Halogen-Free-Tube |            |            |
| MG120R013-GE-BR         | MG120R013  | TO-247     |
| MG120R013-GH-BR         | MG120R013  | TO-247-4L  |



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        | 测试条件<br>Tests conditions                          |
|----------------------------------------------------------------|----------------|--------------|--------------------|---------------------------------------------------|
| 最高漏极-源极直流电压<br>Drain-Source Voltage                            | $V_{DSmax}$    | 1200         | V                  | $V_{GS}=0V, I_D=100\mu A$                         |
| 最高栅源电压<br>Gate-Source Voltage                                  | $V_{GSmax}$    | -10/+22      | V                  | Absolute maximum values                           |
| 工作栅源电压<br>Gate-Source Voltage                                  | $V_{GSop}$     | -5/+18       | V                  | Recommended operational values                    |
| 连续漏极电流<br>Drain Current -continuous                            | $I_D$          | 127          | A                  | $V_{GS}=18V, T_c=25^{\circ}\text{C}$              |
|                                                                |                | 89           | A                  | $V_{GS}=18V, T_c=100^{\circ}\text{C}$             |
| 最大脉冲漏极电流<br>Drain Current - pulse                              | $I_{DM}$       | 458          | A                  | Pulse width limited by $T_{jmax}$                 |
| 耗散功率<br>Power Dissipation                                      | $P_D$          | 514          | W                  | $T_c=25^{\circ}\text{C}, T_J=175^{\circ}\text{C}$ |
| 最高结温及存储温度<br>Operating and Storage<br>Temperature Range        | $T_J, T_{STG}$ | -55~+175     | $^{\circ}\text{C}$ |                                                   |
| 引线最高焊接温度<br>Maximum Lead Temperature for<br>Soldering Purposes | $T_L$          | 300          | $^{\circ}\text{C}$ |                                                   |





## 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 |
|----------------------------------------------|---------------|-----------------------------------------------------------------|-----------|-----------|-----------|-------------|
| 漏—源击穿电压<br>Drain-Source Voltage              | $BV_{DSS}$    | $I_D=1000\mu A, V_{GS}=0V$                                      | 1200      | -         | -         | V           |
| 阈值电压<br>Gate Threshold Voltage               | $V_{GS(th)}$  | $V_{DS} = V_{GS}, I_D=20mA, T_C=25^\circ C$                     | 2.2       | 3.2       | 4.2       | V           |
|                                              |               | $V_{DS} = V_{GS}, I_D=20mA, T_C=175^\circ C$                    | -         | 2.3       | -         |             |
| 零栅压下漏极漏电流<br>Zero Gate Voltage Drain Current | $I_{DSS}$     | $V_{DS}=1200V, V_{GS}=0V, T_C=25^\circ C$                       | -         | 1         | 10        | $\mu A$     |
| 栅极体漏电流<br>Gate-body leakage current          | $I_{GSS}$     | $V_{DS}=0V, V_{GS}=22V$                                         | -         | -         | 100       | nA          |
|                                              |               | $V_{DS}=0V, V_{GS}=-10V$                                        |           | -         | 100       | nA          |
| 导通电阻<br>Drain-Source<br>On-Resistance        | $R_{DS(on)}$  | $V_{GS}=18V, I_D=80A, T_C=25^\circ C$                           | -         | 13        | 16        | m $\Omega$  |
|                                              |               | $V_{GS}=15V, I_D=80A, T_C=25^\circ C$                           | -         | 18        | -         | m $\Omega$  |
|                                              |               | $V_{GS}=18V, I_D=80A, T_C=175^\circ C$                          |           | 25        |           | m $\Omega$  |
| 输入电容<br>Input capacitance                    | $C_{iss}$     | $V_{DS}=1000V,$<br>$V_{GS}=0V,$<br>$f=1.0MHz$                   | -         | 5293      | -         | pF          |
| 输出电容<br>Output capacitance                   | $C_{oss}$     |                                                                 | -         | 263       | -         | pF          |
| 反向传输电容<br>Reverse transfer capacitance       | $C_{rss}$     |                                                                 | -         | 14        | -         | pF          |
| 导通开关能量<br>Turn-On Switching Energy           | $E_{ON}$      | $V_{DS}=800V, V_{GS}=-5/18V, I_D=80A,$<br>$R_{G(ext)}=10\Omega$ | -         | 1337      | -         | $\mu J$     |
| 关断开关能量<br>Turn-Off Switching Energy          | $E_{OFF}$     |                                                                 | -         | 1382      | -         |             |
| 延迟时间<br>Turn-On delay time                   | $t_d(on)$     | $V_{DD}=800V, V_{GS}=-5/18V$<br>$I_D=80A, R_{G(ext)}=10\Omega$  | -         | 23        | -         | ns          |
| 上升时间<br>Turn-On rise time                    | $t_r$         |                                                                 | -         | 48        | -         | ns          |
| 延迟时间<br>Turn-Off delay time                  | $t_d(off)$    |                                                                 | -         | 86        | -         | ns          |
| 下降时间<br>Turn-Off Fall time                   | $t_f$         |                                                                 | -         | 28        | -         | ns          |
| 栅电阻<br>Intrinsic gate resistance             | $R_G$         | $f=1MHz, I_D=0A$                                                | -         | 1.5       | -         | $\Omega$    |
| 栅—源电荷 Gate-Source charge                     | $Q_{gs}$      | $V_{DD}=800V, V_{GS}=-5/18V, I_D=80A$                           |           | 208       |           | nC          |
| 栅—漏电荷 Gate-Drain charge                      | $Q_{gd}$      |                                                                 |           | 53        |           |             |
| 栅极电荷总量 Total Gate Charge                     | $Q_g$         |                                                                 |           | 85        |           |             |





## 漏—源二极管特性 Drain-Source Diode Characteristics

| 项 目<br>Parameter                                                      | 符 号<br>Symbol | 测试条件<br>Tests conditions                                | 典型<br>Typ | 最大<br>Max | 单位<br>Units |
|-----------------------------------------------------------------------|---------------|---------------------------------------------------------|-----------|-----------|-------------|
| 正向压降<br>Drain-Source Diode Forward Voltage                            | $V_{SD}$      | $V_{GS} = -5V, I_{SD} = 80A, T_J = 25^\circ C$          | 4.0       |           | V           |
|                                                                       |               | $V_{GS} = -5V, I_{SD} = 80A, T_J = 175^\circ C$         | 3.7       |           | V           |
| 正向最大连续电流<br>Maximum Continuous Drain<br>-Source Diode Forward Current | $I_S$         | $T_C = 25^\circ C$<br>$T_C = 100^\circ C$               | -         | 128<br>72 | A           |
| 反向恢复时间<br>Reverse recovery time                                       | $t_{rr}$      |                                                         | 25        |           | ns          |
| 反向恢复电荷<br>Reverse recovery charge                                     | $Q_{rr}$      | $I_{SD} = 80A, V_{DD} = 800V,$<br>$di/dt = 1000A/\mu s$ | 225       |           | nC          |
| 峰值反向恢复电流<br>Peak Reverse Recovery Current                             | $I_{rrm}$     |                                                         | 15        |           | A           |

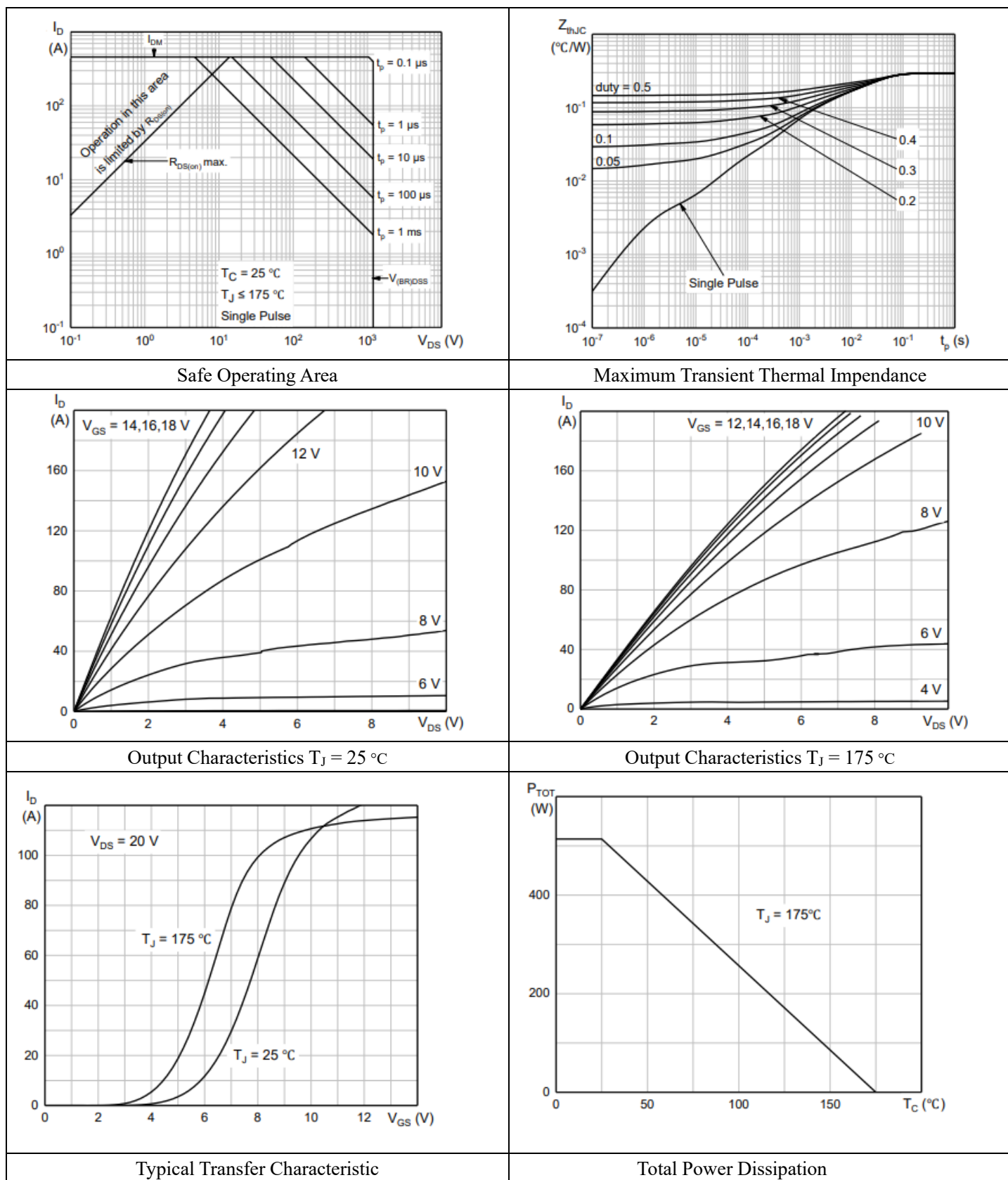
## 热特性 THERMAL CHARACTERISTIC

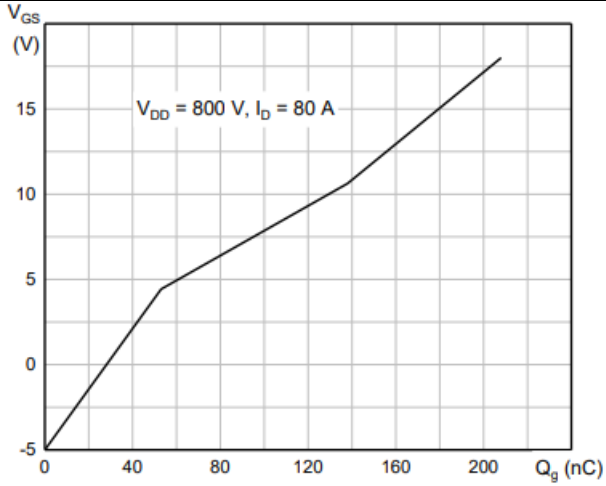
| 项 目<br>Parameter                                   | 符 号<br>Symbol | 典型<br>Typ | 单位<br>Unit   |
|----------------------------------------------------|---------------|-----------|--------------|
| 结到管壳的热阻<br>Thermal Resistance, Junction to Case    | $R_{th(j-c)}$ | 0.29      | $^\circ C/W$ |
| 结到环境的热阻<br>Thermal Resistance, Junction to Ambient | $R_{th(j-A)}$ | 40        | $^\circ C/W$ |



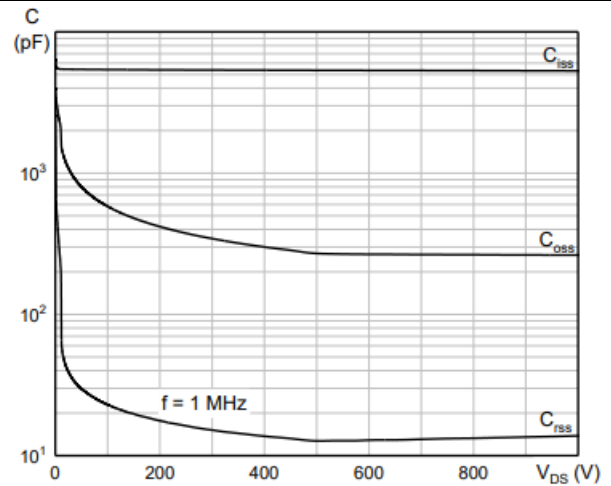


## 典型性能 Typical Performance

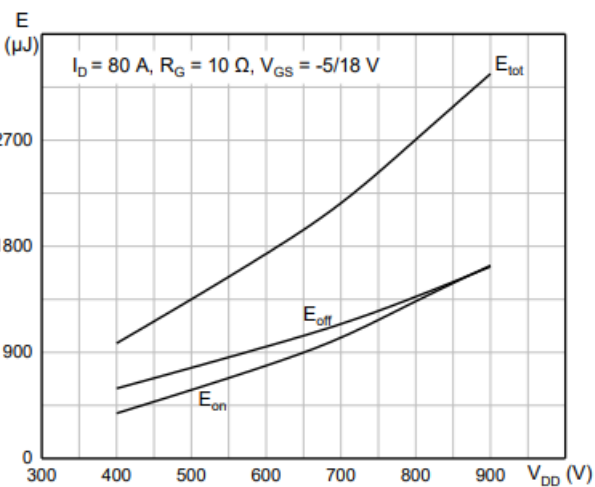




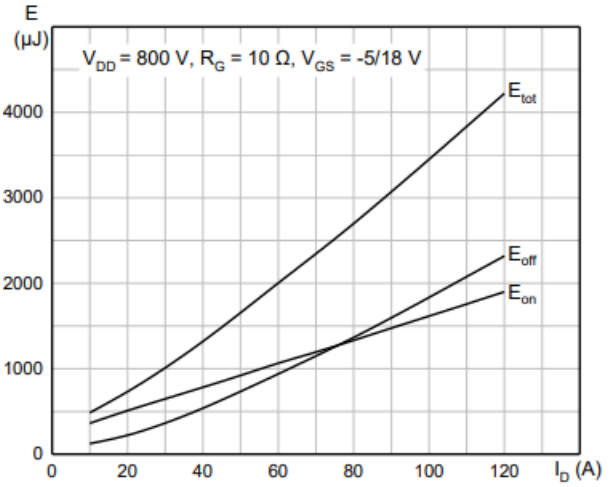
Typical Gate Charge Characteristics



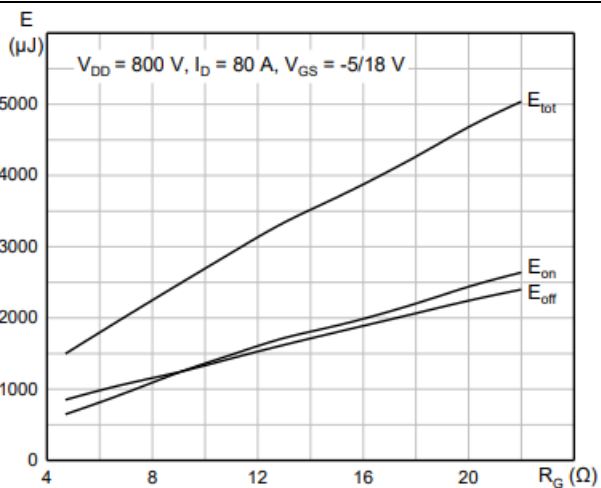
Typical Capacitance Characteristics



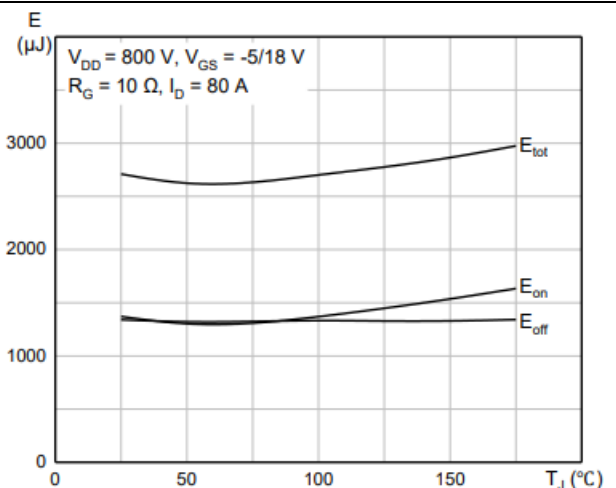
Typical Switching Energy vs. Supply Voltage



Typical Switching Energy vs. Drain Current

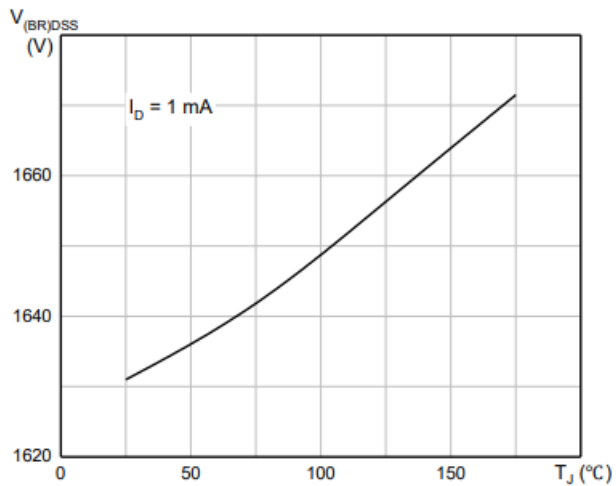


Typical Switching Energy vs. Gate Resistance

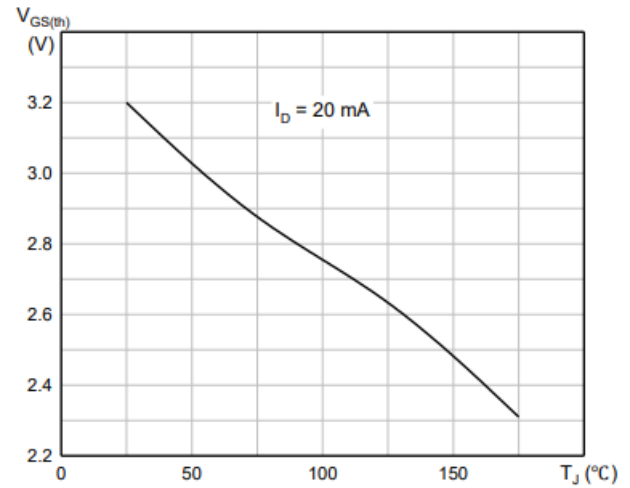


Typical Switching Energy vs. Temperature

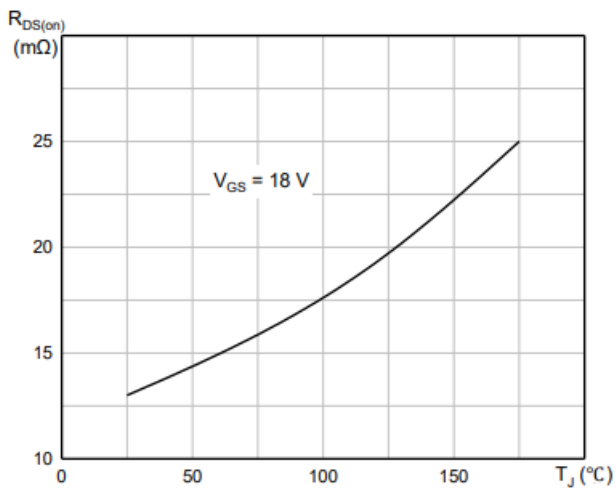




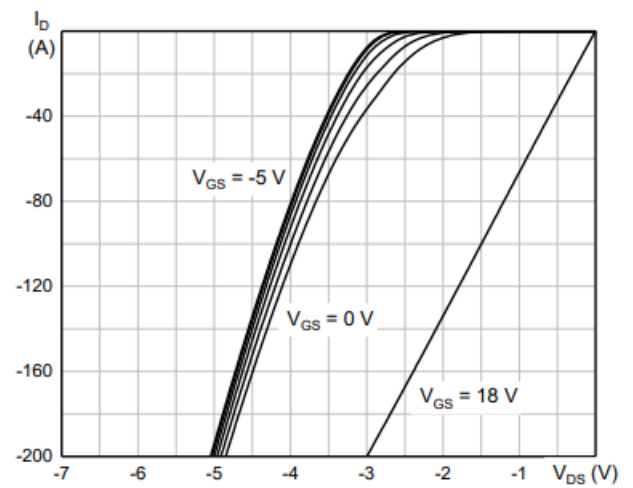
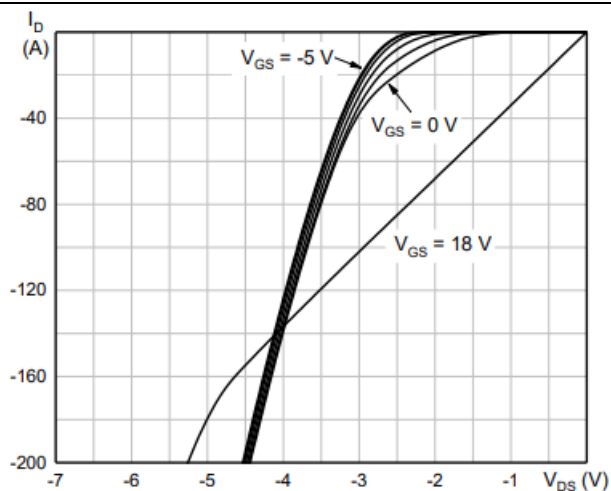
Breakdown Voltage vs. Temperature



Gate Threshold vs. Temperature



On-Resistance vs. Temperature

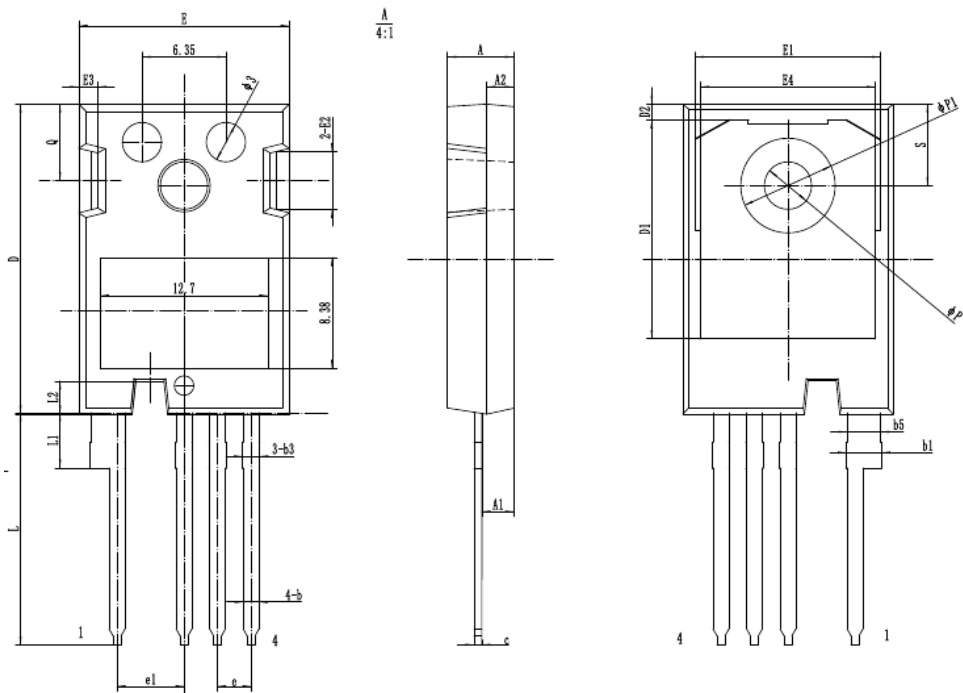
Body Diode Characteristics,  $T_J = 25^{\circ}C$ Body Diode Characteristics,  $T_J = 175^{\circ}C$ 



外形尺寸 PACKAGE MECHANICAL DATA

TO-247-4L

单位 Unit: mm



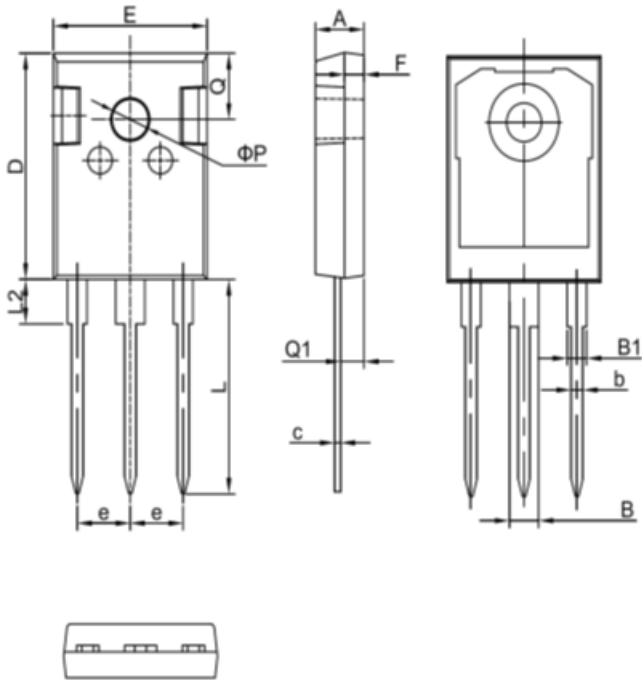
| SYMBOL      | mm    |         |       |
|-------------|-------|---------|-------|
|             | MIN   | NOM     | MAX   |
| *A          | 4.83  | 5.02    | 5.21  |
| A1          | 2.29  | 2.41    | 2.54  |
| A2          | 1.91  | 2.00    | 2.16  |
| *b          | 1.07  | 1.20    | 1.33  |
| b1          | 2.39  | 2.67    | 2.94  |
| b3          | 1.07  | 1.30    | 1.60  |
| b5          | 2.39  | 2.53    | 2.69  |
| *c          | 0.55  | 0.60    | 0.68  |
| *D          | 23.30 | 23.45   | 23.60 |
| D1          | 16.25 | 16.55   | 17.65 |
| D2          | 0.95  | 1.19    | 1.25  |
| *E          | 15.75 | 15.94   | 16.13 |
| E1          | 13.10 | 14.02   | 14.15 |
| E2          | 3.68  | 4.40    | 5.10  |
| E3          | 1.00  | 1.45    | 1.90  |
| E4          | 12.38 | 13.26   | 13.43 |
| *e          |       | 2.54BSC |       |
| e1          |       | 5.08BSC |       |
| *L          | 17.31 | 17.57   | 17.82 |
| *L1         | 3.97  | 4.19    | 4.37  |
| *L2         | 2.30  | 2.50    | 2.65  |
| * $\phi P$  | 3.51  | 3.61    | 3.65  |
| * $\phi P1$ |       | 7.19REF |       |
| *Q          | 5.49  | 5.79    | 6.00  |
| S           | 6.04  | 6.17    | 6.30  |



外形尺寸 PACKAGE MECHANICAL DATA

TO-247

单位 Unit: mm



| 符号<br>symbol | MIN   | MAX   |
|--------------|-------|-------|
| A            | 4.90  | 5.10  |
| B            | 2.95  | 3.35  |
| B1           | 1.95  | 2.35  |
| b            | 1.15  | 1.35  |
| c            | 0.50  | 0.70  |
| D            | 20.90 | 21.10 |
| E            | 15.70 | 15.90 |
| e            | 5.34  | 5.54  |
| F            | 1.90  | 2.10  |
| L            | 19.40 | 20.40 |
| L2           | 4.03  | 4.23  |
| Q            | 6.00  | 6.40  |
| Q1           | 2.30  | 2.50  |
| P            | 3.50  | 3.70  |

←



## 注意事项

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## 联系方式

### 吉林华微电子股份有限公司

公司地址：吉林省吉林市深圳街 99 号

邮编：132013

总机：86-432-64678411

传真：86-432-64665812

网址：[www.hwdz.com.cn](http://www.hwdz.com.cn)

## CONTACT

### JILIN SINO-MICROELECTRONICS CO., LTD.

ADD: No.99 Shenzhen Street, Jilin City, Jilin Province, China.

Post Code: 132013

Tel: 86-432-64678411

Fax: 86-432-64665812

Web Site: [www.hwdz.com.cn](http://www.hwdz.com.cn)

