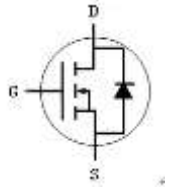
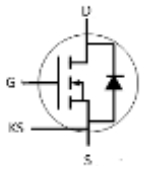
# MG120R040

## 主要参数 MAIN CHARACTERISTICS

| | |
|---|---|
| $I_D$ | 60A |
| $V_{CE}$ | 1200V |
| Rdson-typ (@Vgs=18V) | 45MΩ |
| Qg-typ | 128nC |

封装 **Package**






TO-247 TO-247-4L

## 用途 APPLICATIONS

- ●光伏逆变器 ●Solar Inverters
- ●开关模式电源 ●Switch Mode Power Supplies
- ●高压 DC/DC 转换器 ●High Voltage DC/DC Converters
- ●电池充电器 ●Battery Chargers
- ●电动驱动 ●Motor Drives
- ●脉冲电源应用 ●Pulsed Power applications

## 产品特性 FEATURES

- ●高阻断电压 ●High Blocking Voltage
- ●低导通电阻 ●Low On-Resistance
- ●低电容高速开关 ●High Speed Switching with Low Capacitances
- ●易于驱动 ●Easy to Parallel and Simple to Drive
- ●雪崩强度高 ●Avalanche Ruggedness
- ●RoHS 产品 ●RoHS product

## 订货信息 ORDER MESSAGE

| 订 货 型 号 Order codes<br>无卤-条管 Halogen-Free-Tube | 印 记<br>Marking | 封 装<br>Package |
|---|---|---|
| MG120R040-GE-BR | MG120R040 | TO-247 |
| MG120R040-GH-BR | MG120R040 | TO-247-4L |

## 绝对最大额定值 ABSOLUTE RATINGS (Tc=25℃)

| 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,$I_D$=100μA |
| 最高栅源电压<br>Gate-Source Voltage | $V_{GSmax}$ | -8/+20 | 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 | $I_D$ | 60 | A | $V_{GS}$=20V, $T_C$=25˚C |
| | | 40 | A | $V_{GS}$=20V, $T_C$=100˚C |
| 最大脉冲漏极电流<br>Drain Current - pulse | $I_{DM}$ | 100 | A | Pulse width limited by Tjmax |
| 耗散功率<br>Power Dissipation | $P_D$ | 312 | W | $T_C$=25˚C, $T_J$=175˚C |
| 最高结温及存储温度<br>Operating and Storage Temperature Range | $T_J$，$T_{STG}$ | -55～+175 | ℃ | |
| 引线最高焊接温度<br>Maximum Lead Temperature for Soldering Purposes | $T_L$ | 300 | ℃ | |

## 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 | $BV_{DSS}$ | $I_D$=100μA, $V_{GS}$=0V | 1200 | - | - | V |
| 阈值电压<br>Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$,$I_D$=10mA, $T_C$=25 ˚C | 2.0 | 3.2 | 4 | V |
| | | $V_{DS}$ = $V_{GS}$,$I_D$=10mA, $T_C$=175 ˚C | | 2 | | |
| 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 ˚C | - | 1 | 100 | μA |
| 栅极体漏电流<br>Gate-body leakage current | $I_{GSS}$ | $V_{DS}$=0V, $V_{GS}$ =20V | - | 50 | 200 | nA |
| 导通电阻<br>Drain-Source<br>On-Resistance | $R_{DS(ON)}$ | $V_{GS}$ =18V , $I_D$=33A, $T_C$=25 ˚C | - | 45 | 60 | mΩ |
| | | $V_{GS}$ =18V , $I_D$=33A, $T_C$=175 ˚C | | 68 | | mΩ |
| 跨导<br>Transconductance | $g_{fs}$ | $V_{DS}$ = 20V, $I_D$=33A, TJ = 25 ˚C | - | 20 | - | S |
| | | $V_{DS}$ = 20V, $I_D$=33A, TJ =175 ˚C | | 18.3 | | S |
| 输入电容<br>Input capacitance | $C_{iss}$ | $V_{DS}$=1000V,<br>$V_{GS}$ =0V,<br>f=1.0$MH_Z$ ，<br>$V_{AC}$=25 mV | - | 3700 | - | pF |
| 输出电容<br>Output capacitance | $C_{oss}$ | | - | 120 | - | pF |
| 反向传输电容<br>Reverse transfer capacitance | $C_{rss}$ | | - | 22 | - | pF |
| 导通开关能量<br>Turn-OnSwitching Energy | $E_{ON}$ | $V_{DS}$=800V, $V_{GS}$=-5/18V,$I_D$= 33A,<br>$R_{G(ext)}$ = 5Ω, L= 80μH | - | 1.2 | - | mJ |
| 关断开关能量<br>Turn-OffSwitching Energy | $E_{OFF}$ | | - | 0.44 | - | |
| 延迟时间<br>Turn-On delay time | td(on) | $V_{DD}$=800V, $V_{GS}$=-5/18V<br>$I_D$ =33A, $R_{G(ext)}$ = 5Ω,<br>Timing relative to VDS | - | 69 | - | ns |
| 上升时间<br>Turn-On rise time | tr | | - | 140 | - | ns |
| 延迟时间<br>Turn-Off delay time | td(off) | | - | 50 | - | ns |
| 下降时间<br>Turn-Off Fall time | $t_f$ | | - | 42 | - | ns |
| 栅电阻<br>Intrinsic gate resistance | $R_G$ | f = 1 MHz , $V_{AC}$=25mV | - | 2.1 | - | Ω |
| 栅－源电荷 Gate-Source charge | $Q_{gs}$ | $V_{DD}$=800V, $V_{GS}$=-5/18V $I_D$ = 33A | | 40 | | nC |
| 栅－漏电荷 Gate-Drain charge | $Q_{gd}$ | | | 37 | | |
| 栅极电荷总量 Total Gate Charge | $Q_g$ | | | 28 | | |

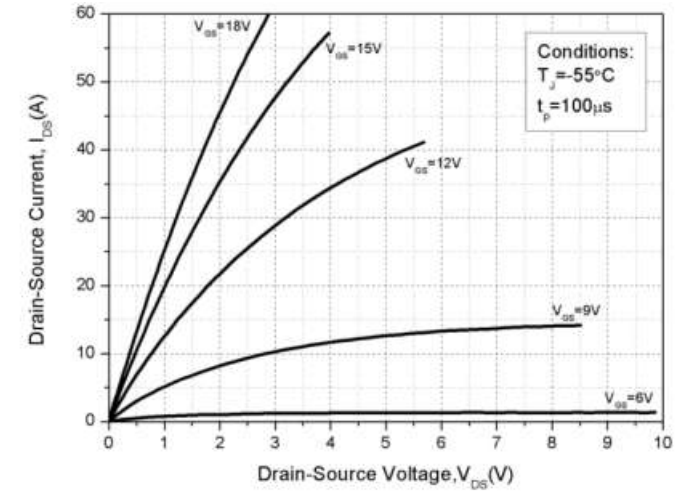
## 漏一源二极管特性 Drain-Source Diode Characteristics

| 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, $I_{SD}$ = 20 A, $T_J$ = 25 °C | 3.6 | | V |
| | | $V_{GS}$ =-5V, $I_{SD}$ =20 A, $T_J$ = 175 °C | 3.3 | | V |
| 正向最大连续电流<br>Maximum Continuous Drain<br>-Source Diode Forward Current | $I_S$ | $T_C$=25 °C | - | 60 | A |
| 反向恢复时间<br>Reverse recovery time | $t_{rr}$ | $V_{GS}$ =-5V, $I_{SD}$ = 33 A, $V_R$=800V, dif/dt=1200A/μs | 37 | | ns |
| 反向恢复电荷<br>Reverse recovery charge | $Q_{rr}$ | | 165 | | nC |
| 峰值反向恢复电流<br>Peak Reverse Recovery Current | Irrm | | 16 | | A |

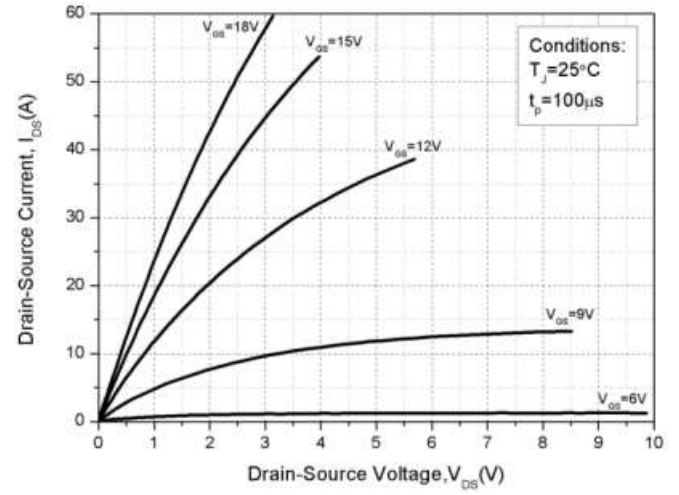
## 热特性 THERMAL CHARACTERISTIC

| 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 | Rth(j-c) | 0.48 | ℃/W |
| 结到环境的热阻<br>Thermal Resistance, Junction to Ambient | $R_{th(j-A)}$ | 42 | ℃/W |

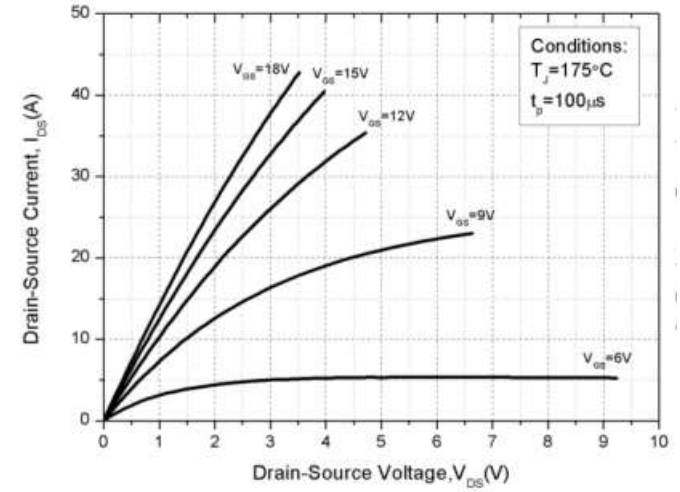
## 典型性能 Typical Performance



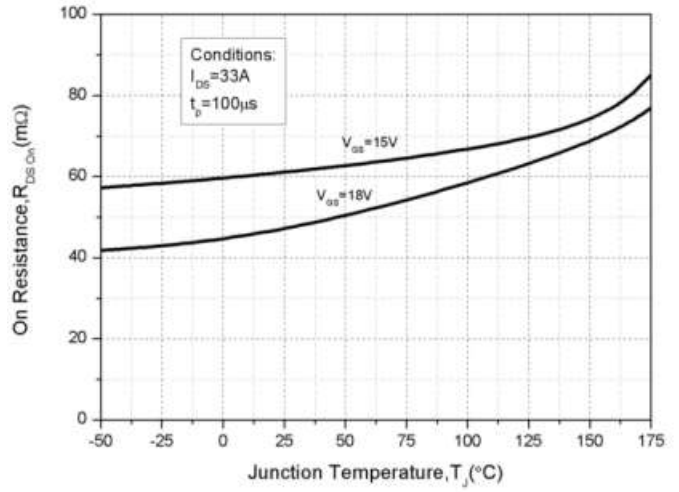

Output Characteristics $T_J$ = -55 ℃



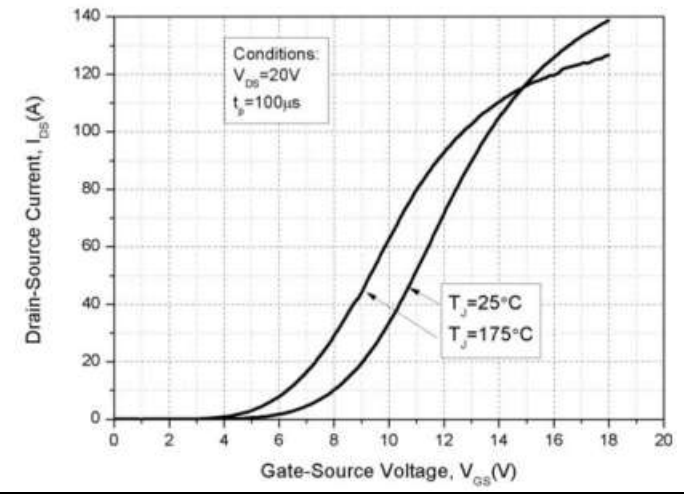

Output Characteristics $T_J$ = 25 ℃



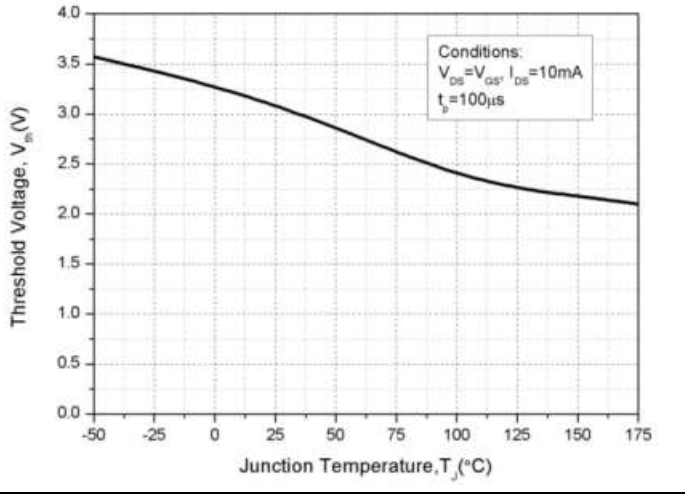

Output Characteristics $T_J$ =175 ℃



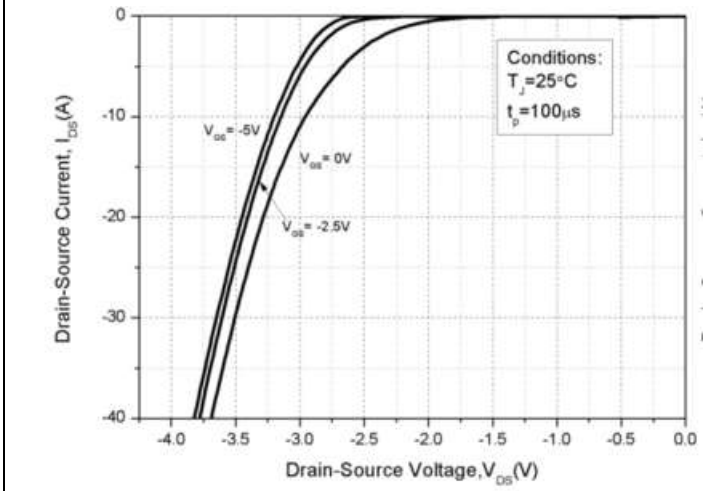

On-Resistance For Various Gate Voltage



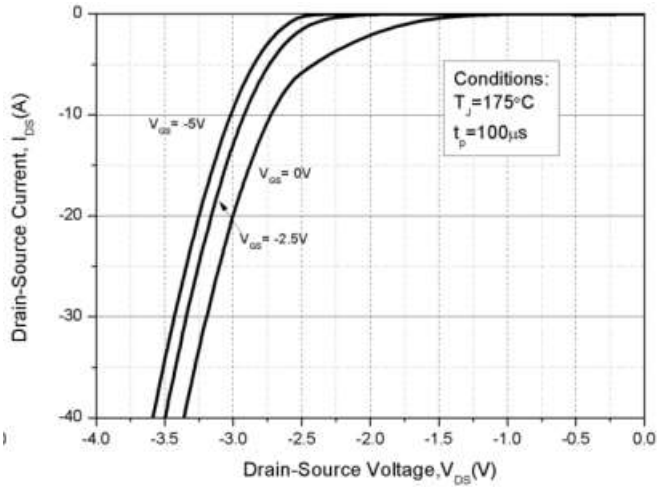

Transfer Characteristic



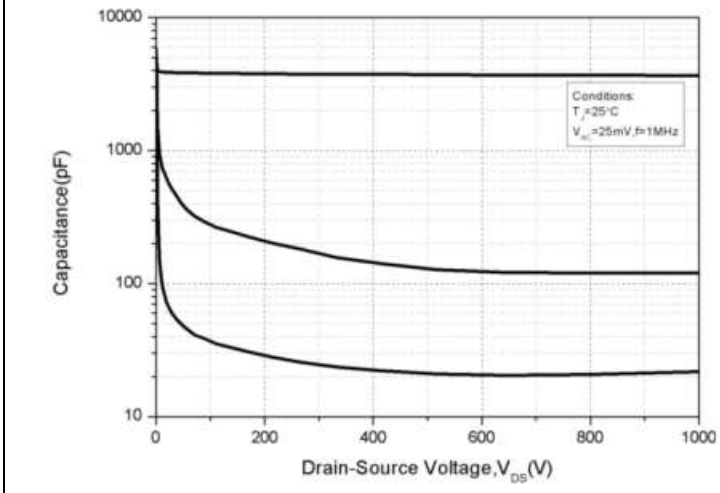

Threshold Voltage vs. Temperature or Various Junction Temperatures



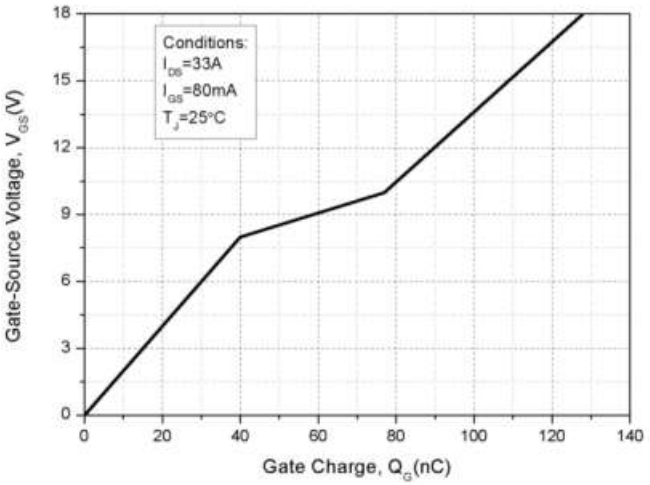

Body Diode Characteristics,$T_J$ = 25 ℃



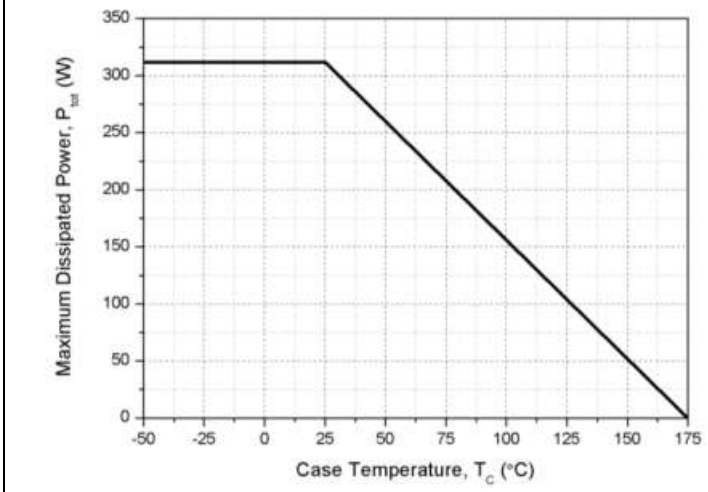

Body Diode Characteristics,$T_J$ = 175 ℃



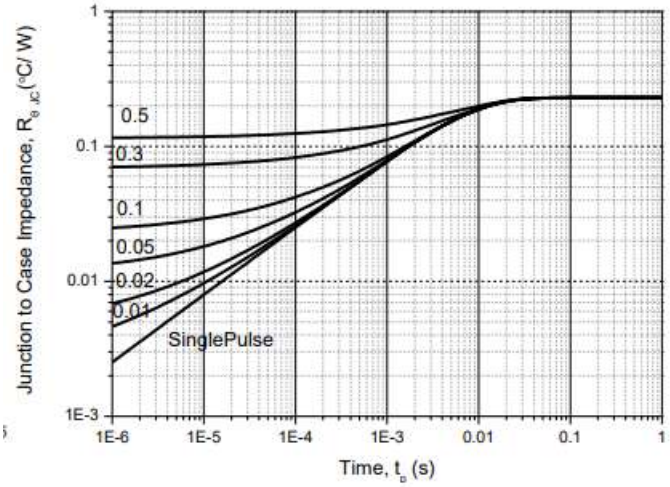

Capacitances vs. Drain-Source Voltage




Gate Charge Characteristics




Power Dissipation Derating

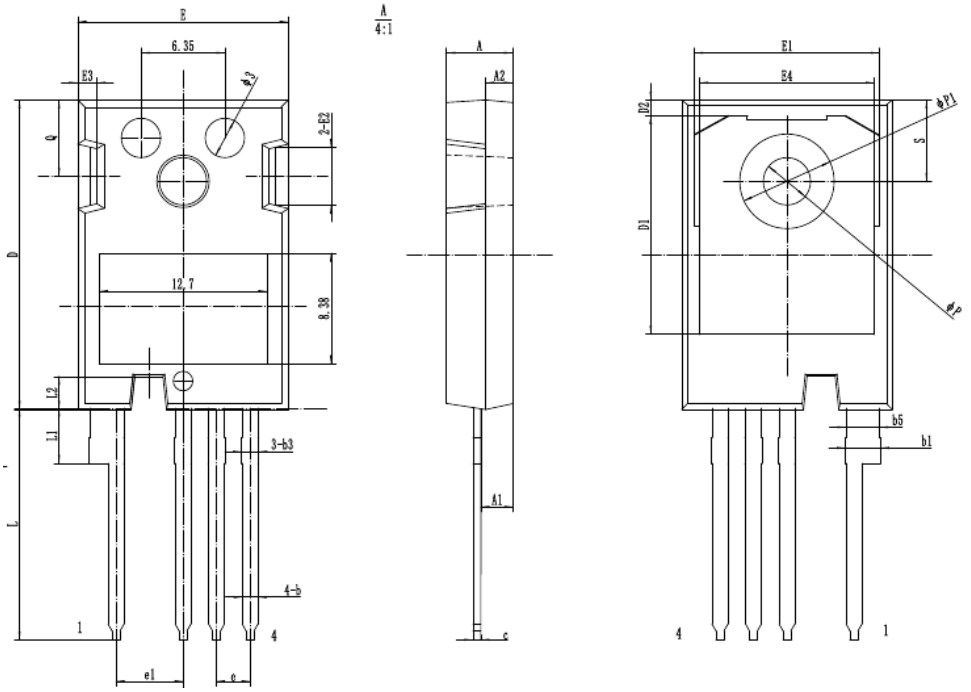



Transient Thermal Impendance

## 外形尺寸 PACKAGE MECHANICAL DATA

**TO-247-4L**

**单位 Unit：mm**

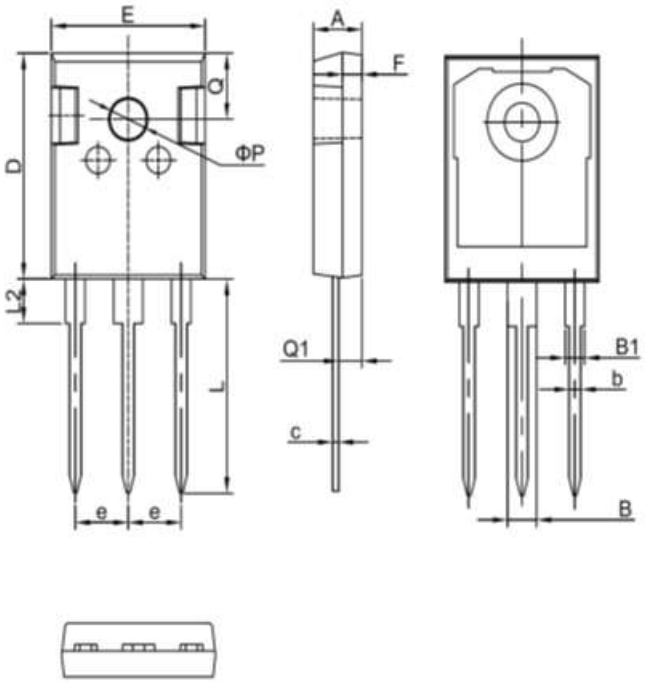



| SYMBOL | mm | | |
|---|---|---|---|
| | MIN | NOM | MAX |
| *A | 4.83 | 5.02 | 5.21 |
| A1 | 2.29 | 2.41 | 2.54 |
| A2 | 1.91 | 2.00 | 2.16 |
| *b | 1.07 | 1.20 | 1.33 |
| b1 | 2.39 | 2.67 | 2.94 |
| b3 | 1.07 | 1.30 | 1.60 |
| b5 | 2.39 | 2.53 | 2.69 |
| *c | 0.55 | 0.60 | 0.68 |
| *D | 23.30 | 23.45 | 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 |
| *ΦP | 3.51 | 3.61 | 3.65 |
| *ΦP1 | | 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 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

1. 吉林华微电子股份有限公司的产品销售分为直销和销售代理，无论哪种方式，订货时请与公司核实。
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3. 在电路设计时请不要超过器件的绝对最大额定值，否则会影响整机的可靠性。
4. 本说明书如有版本变更不另外告知。

## NOTE

1. Jilin Sino-microelectronics co., Ltd sales its product either through direct sales or sales agent , thus, for customers, when ordering , please check with our company.
2. We strongly recommend customers check carefully on the trademark when buying our product, if there is any question, please don't be hesitate to contact us.
3. Please do not exceed the absolute maximum ratings of the device when circuit designing.
4. Jilin Sino-microelectronics co., Ltd reserves the right to make changes in this. specification sheet and is subject to change without prior notice.

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