# X0405

## 主要参数 MAIN CHARACTERISTICS

| | |
|---|---|
| $I_{T(RMS)}$ | 4A |
| $V_{DRM}/V_{RRM}$ | 600 |
| $I_{GT}$ | 10-100 μ A |

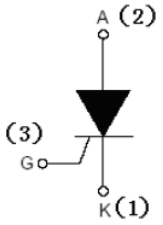
## 用途 APPLICATIONS

- 半交流开关
- 相位控制
- Half AC switching
- Phase control

## 产品特性 FEATURES

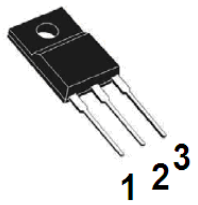
- 玻璃钝化芯片，高可靠性和一致性
- 低通态电流和高浪涌电流能力
- 环保 RoHS 产品
- Glass-passivated mesa chip for high reliability and uniform
- Low on-state voltage and High $I_{TSM}$
- RoHS products

## 封装 Package




| 序号 Pin | 引线名称 Description |
|---|---|
| 1 | 阴极 K |
| 2 | 阳极 A |
| 3 | 门极 G |

TO-220MF-K1




## 订货信息 ORDER MESSAGES

| 订 货 型 号 Order codes | | | | 印 记 Marking | 封 装 Package |
|---|---|---|---|---|---|
| 有卤-条管 | 无卤-条管 | 有卤-袋装 | 无卤-袋装 | | |
| Halogen-Tube | Halogen-Free- Tube | Halogen-Bag | Halogen-Free-Bag | | |
| **X045-F1-B** | **X405 –F1-BR** | N/A | N/A | **X0405** | **TO-220MF-K1** |

## 绝对最大额定值 ABSOLUTE RATINGS ($T_C$=25℃)

| 项 目 Parameter | 符 号 Symbol | 试 验 条 件 Condition | 数 值 Value | 单位 Unit |
|---|---|---|---|---|
| 断态（反向）重复峰值电压 Repetitive peak off-state （reverse） voltage | $V_{DRM}$ /$V_{RRM}$ | | 600 | V |
| 通态平均电流 Average on-state current | $I_{T（AV）}$ | | 2.5 | A |
| 通态方均根电流 On-state RMS current | $I_{T（RMS）}$ | | 4 | A |
| 非重复浪涌峰值通态电流 Non-repetitive surge peak on-state current | $I_{TSM}$ | half sine wave ,t=10ms | 30 | A |
| 熔断 $I^2t$ $I^2t$ for fusing | $I^2t$ | half sine wave，t=10ms | 4.5 | $A^2s$ |
| 通态电流临界上升率 Repetitive rate of rise of on-state current after riggering | dI/dt | $I_{TM}$=2.0A, $I_G$=0.02A,$dI_G/dt$=1.0A/μs | 50 | A/μs |
| 峰值门极电流 Peak gate current | $I_{GM}$ | | 1.2 | A |
| 平均门极功率 Average gate power | $P_{G(AV)}$ | over any 20ms period | 0.2 | W |
| 存储温度 Storage temperature | $T_{stg}$ | | 40~150 | ℃ |
| 操作结温 Operation junction temperature | $T_{VJ}$ | | -40~125 | ℃ |

## 热特性 THERMAL CHARACTERISTIC

| 项 目 Parameter | 符 号 Symbol | 条 件 Condition | 最小 Min | 典型 Typ | 最大 Max | 单位 Unit |
|---|---|---|---|---|---|---|
| 结到引线的热阻 Thermal resistance junction to lead | $R_{th(j-l)}$ | half cycle（TO-220MF-K1） | - | - | 4 | ℃/W |

## 电特性 ELECTRICAL CHARACTERISTIC ($T_C$=25℃)

| 项　　目<br>Parameter | 符　号<br>Symbol | 测 试 条 件<br>Condition | 最小<br>Min | 典型<br>Typ | 最大<br>Max | 单位<br>Unit |
|---|---|---|---|---|---|---|
| 断态峰值重复电流<br>Peak Repetitive Blocking Current | $I_{DRM}$ | $V_{DM}=V_{DRM}$, Tj=125℃, $R_{GK}$=1KΩ | - | - | 1 | mA |
| 反向峰值重复电流<br>Peak Repetitive Reverse Current | $I_{RRM}$ | $V_{RM}=V_{RRM}$, Tj=125℃, $R_{GK}$=1KΩ | - | - | 1 | mA |
| 峰值通态电压<br>Peak on-state voltage | $V_{TM}$ | $I_{TM}$=8A | - | — | 1.8 | V |
| 门极触发电流<br>Gate trigger current | $I_{GT}$ | $V_{AK}$=12V,$R_L$=100Ω | 10 | - | 100 | μA |
| 门极触发电压<br>Gate trigger voltage | $V_{GT}$ | $V_{AK}$=7V,$R_L$=100Ω | - | 0.62 | 0.8 | V |
| 维持电流<br>Holding current | $I_H$ | $V_{AK}$=7V,<br>Initiating Current = 20 mA | - | - | 5 | mA |
| 擎住电流<br>Latch current | $I_L$ | $V_{AK}$=7V,$I_T$=200μA | - | - | 5 | mA |
| 断态临界电压上升率<br>Rise of off- state voltage | dV/dt | $V_{DM}$=100% $V_{DRM(MAX)}$,<br>Tj=125℃,RGK=1KΩ | 15 | | - | V/μs |

## 特征曲线 ELECTRICAL CHARACTERISTICS (curves)

**Fig. 1:** Maximum average power dissipation versus average on-state current.

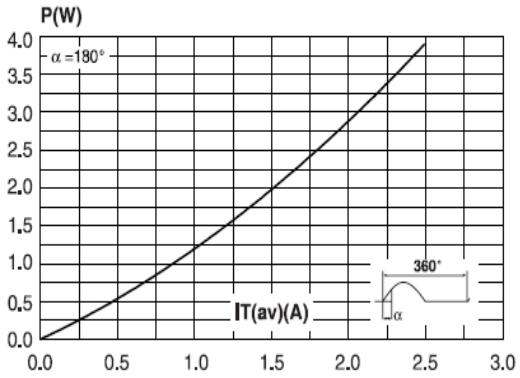



**Fig. 2-1:** Average and D.C. on-state current versus lead temperature.

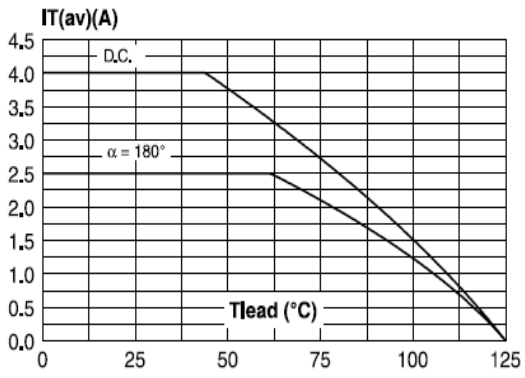


**Fig. 2-2:** Average and D.C. on-state current versus ambient temperature (device mounted on FR4 with recommended pad layout).

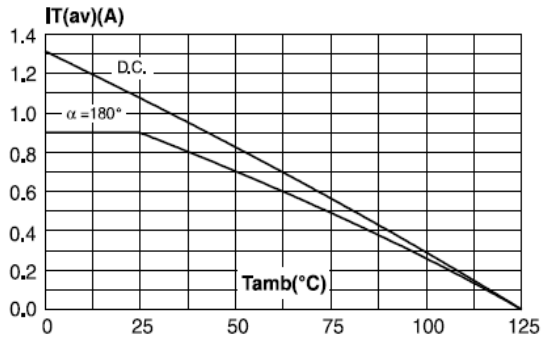



**Fig. 3:** Relative variation of thermal impedance junction to ambient versus pulse duration.

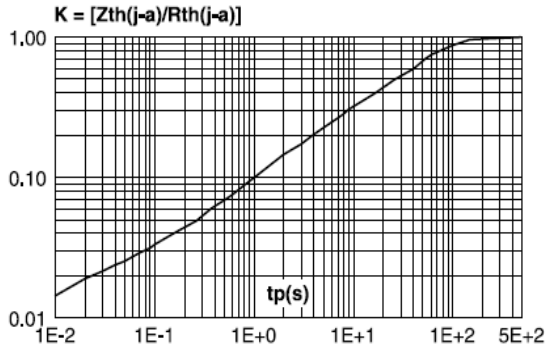



**Fig. 4:** Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values).

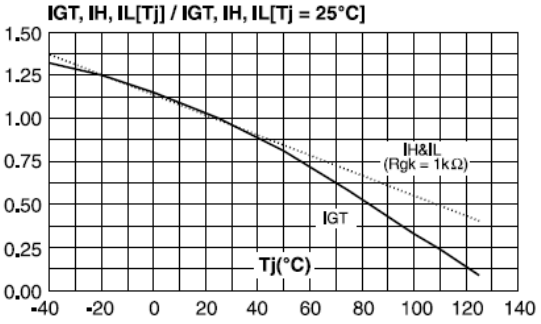



**Fig. 5:** Relative variation of holding current versus gate-cathode resistance (typical values).

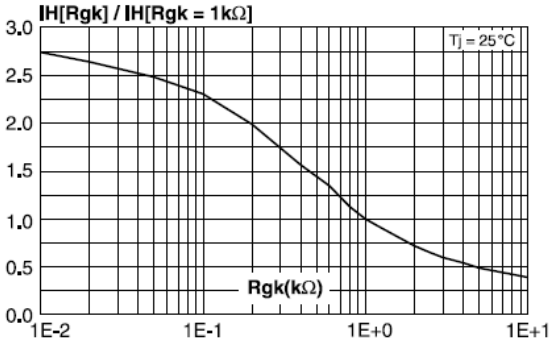



**Fig. 6:** Relative variation of dV/dt immunity versus gate-cathode resistance (typical values).

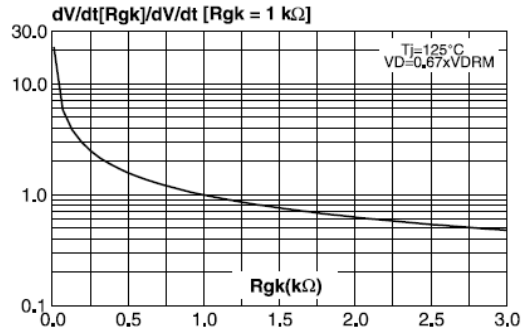
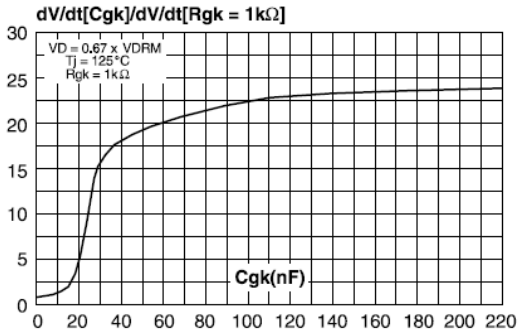
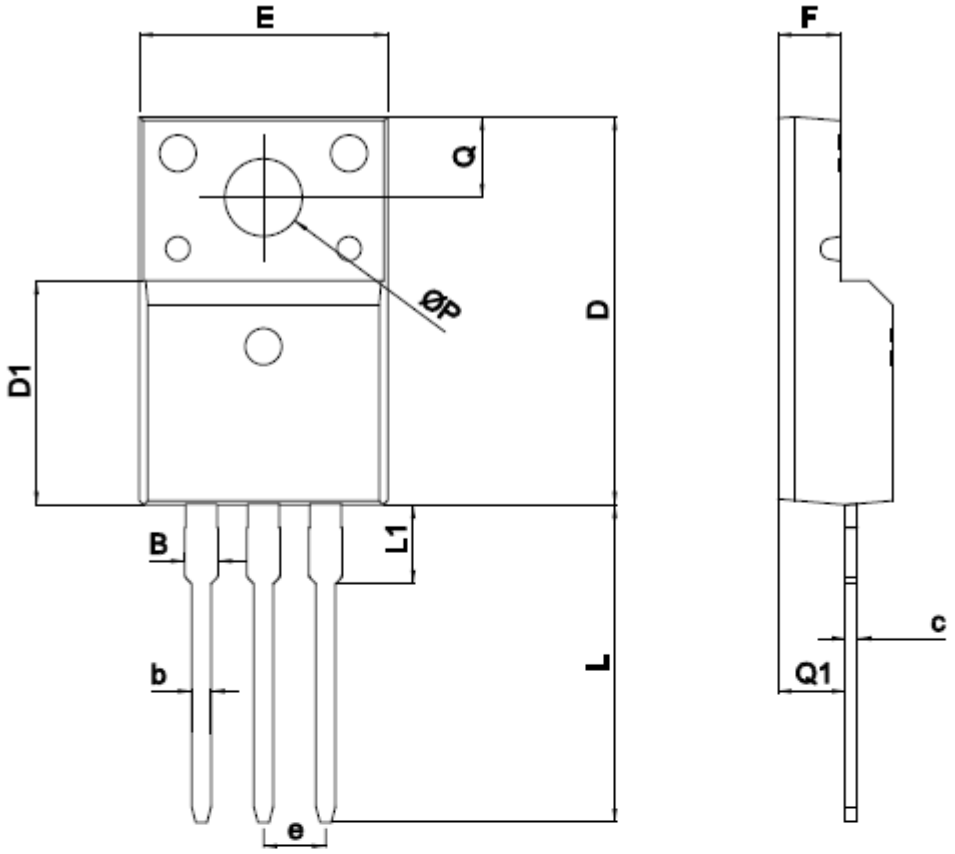



**Fig. 7:** Relative variation of dV/dt immunity versus gate-cathode capacitance (typical values).



外形尺寸 **PACKAGE MECHANICAL DATA** 单位**Unit ： mm**

**TO-220MF-K1**





| SYMBOL | mm | |
|---|---|---|
| | MIN | MAX |
| A | 4.5 | 4.9 |
| B | 1.22 | 1.47 |
| b | 0.7 | 0.9 |
| c | 0.45 | 0.60 |
| D | 15.6 | 16.1 |
| D1 | 9.0 | 9.3 |
| e | 2.54TYPE | |
| E | 9.9 | 10.4 |
| F | 2.3 | 2.8 |
| L | 12.6 | 13.3 |
| L1 | 3.1 | 3.4 |
| Q | 3.2 | 3.4 |
| Q1 | 2.6 | 2.9 |
| ΦP | 3.0 | 3.5 |

## 注意事项

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