

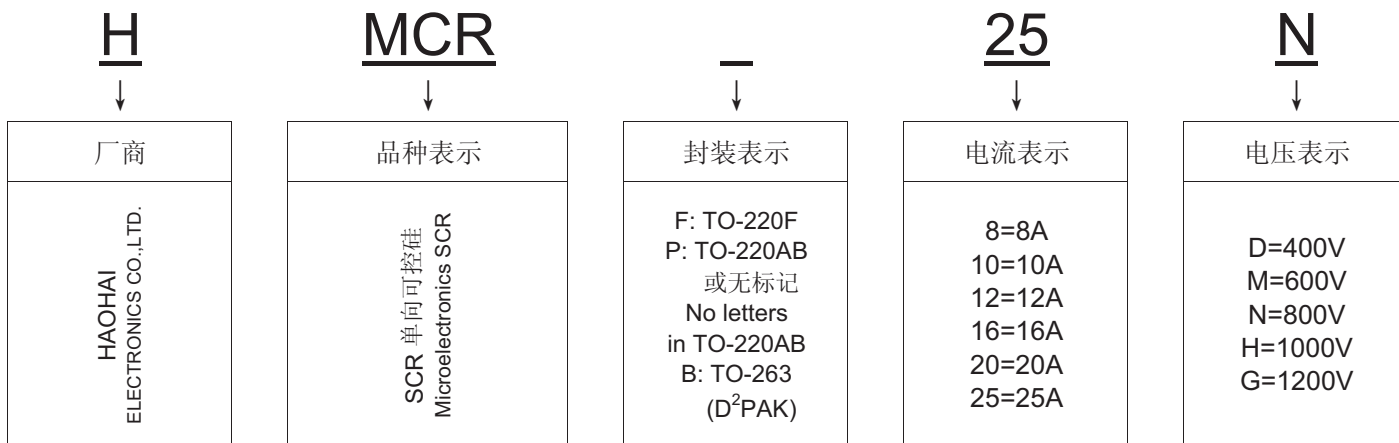
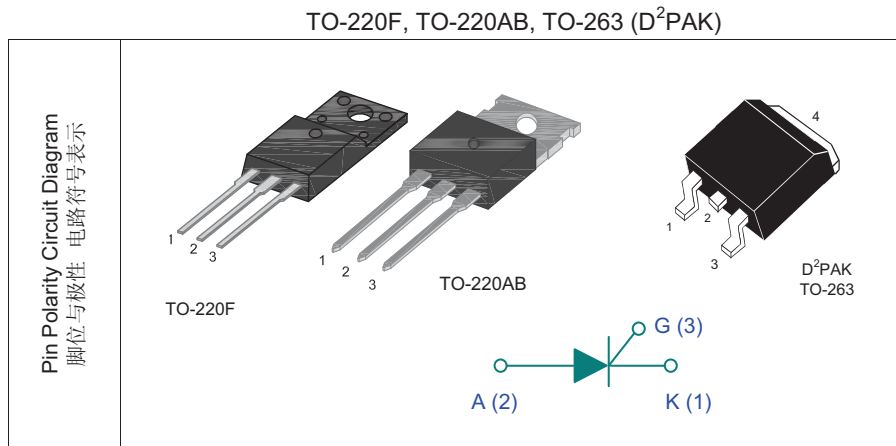
|  |   |
|--|---|
| <ul style="list-style-type: none"> <li>■ Designed primarily for half-wave ac control applications, such as motor controls, heating controls, and power supplies; or wherever half-wave, silicon gate-controlled devices are needed.</li> <li>■ Blocking Voltage to 400V~1200V</li> <li>■ On-State Current Rating of 25 Amperes RMS</li> <li>■ High Surge Current Capability—300A</li> <li>■ Rugged, Economical TO-220AB Package</li> <li>■ Glass Passivated Junctions for Reliability and Uniformity</li> <li>■ Minimum and Maximum Values of <math>I_{GT}</math>, <math>V_{GT}</math>, and <math>I_H</math> Specified for Ease of Design</li> <li>■ High Immunity to <math>dv/dt</math>—100V/sec Minimum @ 125°C</li> </ul> | <ul style="list-style-type: none"> <li>■ 产品特点:<br/>大电流、标准触发、高压单向可控硅; PNPN四层结构硅器件;<br/>双面台面玻璃钝化工艺; 背面多层金属电极;<br/>具有较高的阻断电压和抗电流冲击能力;<br/>可以适应于DB3触发电路、直流和交流光耦触发电路。</li> <li>■ 主要用途:<br/>自动化电气设备; 开关电源; 无功补偿; 复合开关; 交流电开关;<br/>交流/直流电源变换; 工业和家庭电加热器的温度控制; 逆变电源; 大功率捕鱼器;<br/>电机马达调速控制电路; 以及三相交流输入的高压电路、变频电路。</li> <li>■ 代替型号<br/>BT152-500R、BT152-800R、MCR12M、MCR12N、MCR16M、MCR16N、<br/>TYN612、TYN812、TYN1012、TYN616、TYN816、TYN1016、TYN1216、<br/>TYN620、TYN820、TYN1020、TYN625、TYN825、TYN1025、TYN1225、<br/>S6025、S8025、SCP25C60、及其他25A电流高压单向可控硅</li> </ul> |
|--|---|

■ Product Model Reference & Naming 【产品型号参考及型号命名】

| 25A          | 产品型号列表、对应封装、型号对照电压值 |         |         |         |         |         | $I_{GT}$ |
|--------------|---------------------|---------|---------|---------|---------|---------|----------|
|              | 封装标识                | 400V    | 600V    | 800V    | 1000V   | 1200V   |          |
| TO-220F      | F                   | MCRF25D | MCRF25M | MCRF25N | MCRF25H | MCRF25G | ≤30mA    |
| TO-220AB     | 无标记                 | MCR25D  | MCR25M  | MCR25N  | MCR25H  | MCR25G  |          |
| TO-263       | B                   | MCRB25D | MCRB25M | MCRB25N | MCRB25H | MCRB25G |          |
| Remarks (说明) |                     | 低压品种    | 标准品种    | 高压品种    | 未量产     | 未量产     |          |

■ PINNING: Insulated Package

| Pin in Symbol and Description |   |         |       |
|-------------------------------|---|---------|-------|
| 1                             | K | Cathode | 阴极    |
| 2                             | A | Anode   | 阳极    |
| 3                             | G | Gate    | 门-控制极 |
| 4                             |   | Tab     | 散热片   |



■ ABSOLUTE RATINGS (Limiting Values) 【额定值参数】

| SYMBOL                 | Parameter & Test Conditions   | Value    | Unit  |
|------------------------|---|----------|-------|
| $I_{T(RMS)}$           | On-State RMS Current (180°C Conduction Angles, $T_C=80^\circ\text{C}$ )   | 25       | A     |
| $I_{TSM}$              | Peak Non-Repetitive Surge Current (½ Cycle, Sine Wave) (60Hz, $T_J=125^\circ\text{C}$ )   | 300      |       |
| $I_{GM}$               | Forward Peak Gate Current (Pulse Width $\leq 1\mu\text{s}$ , $T_C=80^\circ\text{C}$ )   | 2.0      |       |
| $I^2t$                 | Circuit Fusing Consideration (t=8.3mS)  | 373      | A2ses |
| $P_{GM}$               | Forward Peak Gate Power (Pulse Width $\leq 1\mu\text{s}$ , $T_C=80^\circ\text{C}$ )   | 20       | W     |
| $P_{G(AV)}$            | Forward Average Gate Power (t=8.3mS, $T_C=80^\circ\text{C}$ )   | 0.5      |       |
| $V_{DRM}$<br>$V_{RRM}$ | Peak Repetitive Off-State Voltage<br>( $T_J=125^\circ\text{C}$ , Sine Wave, 50~60Hz; Gate Open) <small>见参考特性对应说明</small><br>See Reference Feature Description | 400~1200 | V     |
| $T_j$                  | Operating Junction Temperature Range  | -40~+125 | °C    |
| $T_{stg}$              | Storage Temperature Range   | -40~+150 |       |
| $T_L$                  | Maximum Lead Temperature for Soldering Purposes 1/8, from Case for 10 Seconds   | 260      |       |

$V_{DRM}$  and  $V_{RRM}$  for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.

■ ELECTRICAL CHARACTERISTICS ( $T_J=25^\circ\text{C}$  Unless Otherwise Noted)

| SYMBOL                 | Parameter & Test Conditions  | Min                     | Typ  | Max  | Unit |
|------------------------|--|-------------------------|------|------|------|
| $I_{GT}$               | $V_D=12\text{V}$ , $R_L=100\Omega$ ( $T_J=25^\circ\text{C}$ )  | 4                       | 12   | 30   | mA   |
| $I_H$                  | Holding Current ( $I_T=200\text{mA}$ , $V_D=12\text{V}_{DC}$ ) Gate Open   | 5                       | 13   | 40   |      |
| $I_L$                  | Latching Current ( $V_D=12\text{V}$ , $I_G=30\text{mA}$ ) $T_C=25^\circ\text{C}$   | --                      | 35   | 80   |      |
| $I_{DRM}$<br>$I_{RRM}$ | Peak Repetitive Forward or Reverse Blocking Current<br>( $V_{AK}=\text{Rated } V_{DRM} \text{ or } V_{RRM}$ , Gate Open) | $T_J=25^\circ\text{C}$  | --   | 0.01 | V    |
|                        |  | $T_J=110^\circ\text{C}$ | --   | 2.0  |      |
| $V_{GT}$               | Gate Trigger Voltage ( $V_D=12\text{V}$ , $R_L=100\Omega$ , $T_J=25^\circ\text{C}$ )                                     | 0.5                     | 0.67 | 1.0  | V    |
| $V_{TM}$               | Peak Forward On-State Voltage ( $I_{TM}=50\text{A Peak @ } T_J=25^\circ\text{C}$ )                                       | --                      | --   | 1.8  |      |

■ DYNAMIC CHARACTERISTICS

| SYMBOL        | Parameter & Test Conditions  | Min | Typ | Max  | Unit             |
|---------------|--|-----|-----|------|------------------|
| dv/dt         | Critical Rate of Rise of Off-State Voltage<br>( $V_D=67\%$ of Rated $V_{DRM}$ , Exponential Waveform, Gate Open, $T_J=125^\circ\text{C}$ ) | 100 | 250 | --   | V/ $\mu\text{s}$ |
| di/dt         | Critical Rate of Rise of On-State Current<br>( $I_{PK}=50\text{A}$ , $P_W=30\text{sec}$ , diG/dt=1A/sec, $I_{GT}=50\text{mA}$ )            | --  | --  | 50   | A/ $\mu\text{s}$ |
| $R_{th(j-c)}$ | Thermal Resistance-Junction-to-Case  | --  | --  | 1.5  | °C/W             |
| $R_{th(j-a)}$ | Thermal Resistance-Junction-to-Ambient   | --  | --  | 62.5 |                  |

Indicates Pulse Test: Pulse Width  $\leq 2.0\text{ ms}$ , Duty Cycle  $\leq 2\%$ . 1、 $R_{GK}=1000\Omega$  included in measurement. 2、Does not include  $R_{GK}$  in measurement.

Voltage Current Characteristic of SCR 可控硅电压电流特性

Voltage Current Characteristic of SCR

| Symbol    | Parameter                                 |
|-----------|---|
| $V_{DRM}$ | Peak Repetitive Off State Forward Voltage |
| $I_{DRM}$ | Peak Forward Blocking Current             |
| $V_{RRM}$ | Peak Repetitive Off State Reverse Voltage |
| $I_{RRM}$ | Peak Reverse Blocking Current             |
| $V_{TM}$  | Peak On State Voltage                     |
| $I_H$     | Holding Current                           |

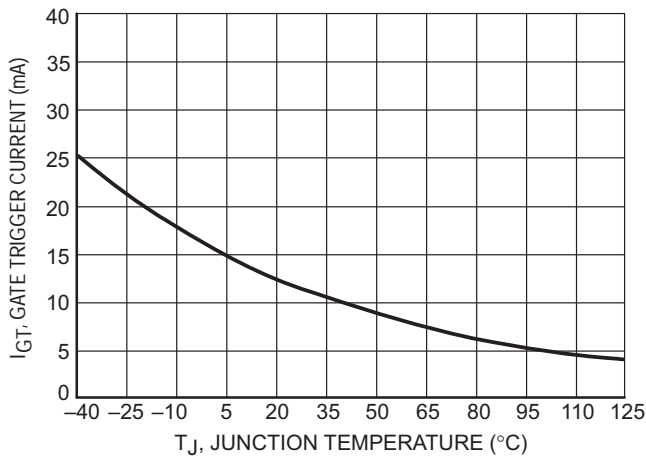
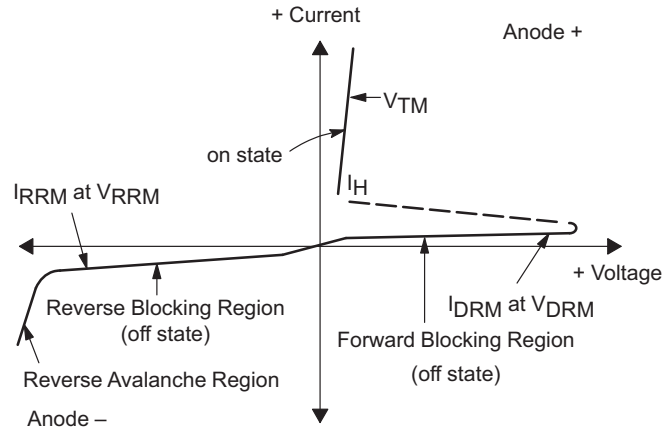


Figure 1. Typical Gate Trigger Current versus Junction Temperature

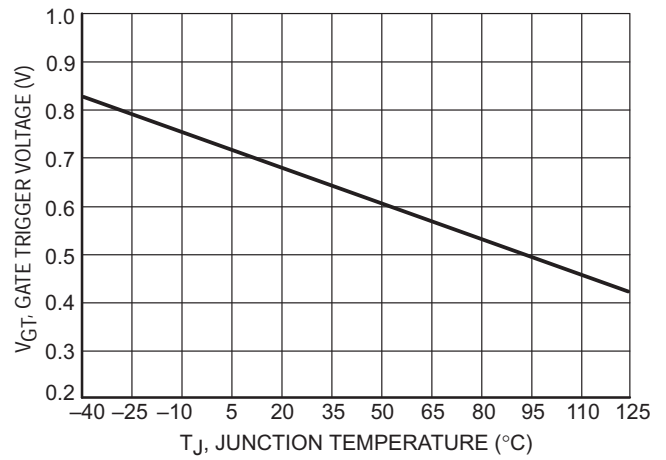
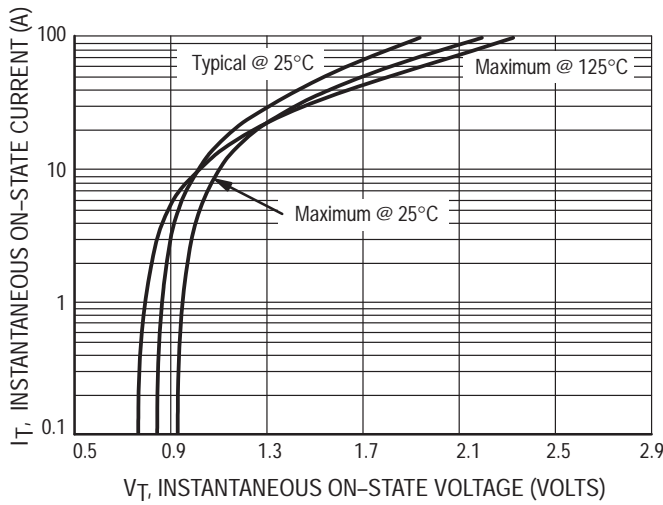
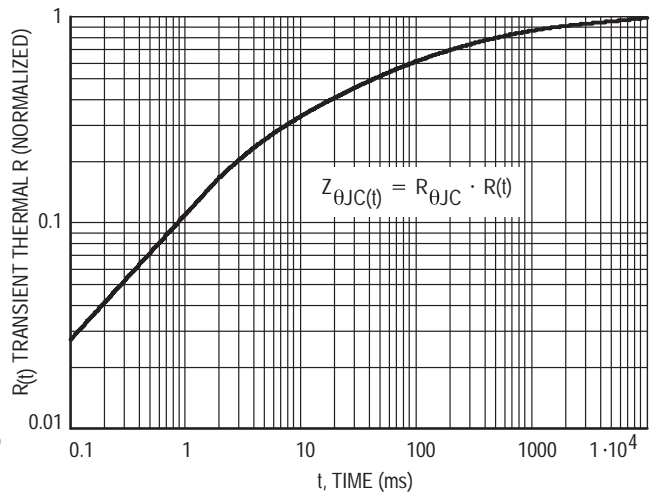


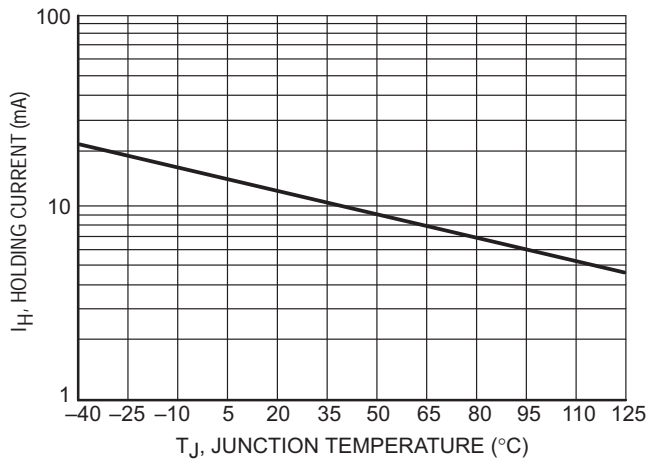
Figure 2. Typical Gate Trigger Voltage versus Junction Temperature



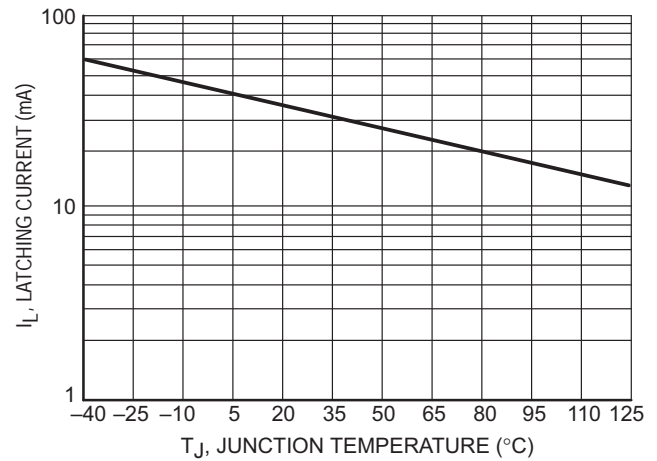
**Figure 3. Typical On-State Characteristics**



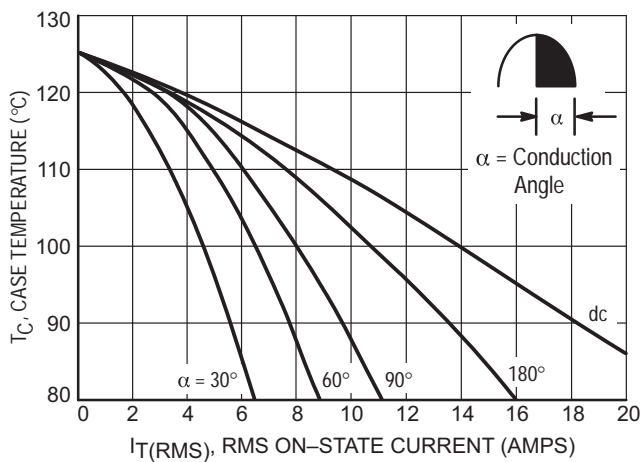
**Figure 4. Transient Thermal Response**



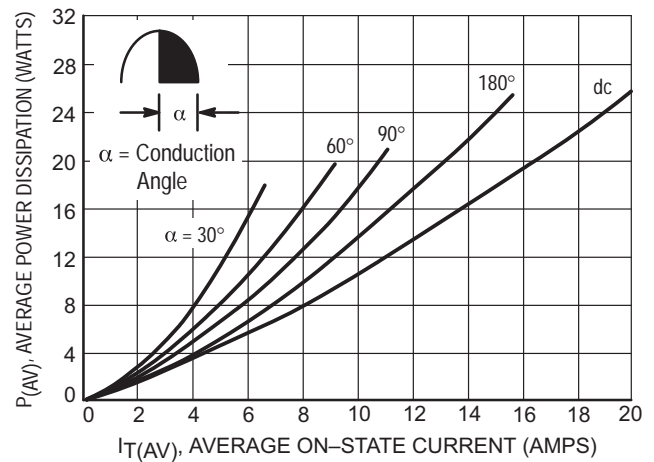
**Figure 5. Typical Holding Current versus Junction Temperature**



**Figure 6. Typical Latching Current versus Junction Temperature**



**Figure 7. Typical RMS Current Derating**



**Figure 8. On State Power Dissipation**

PACKAGE MECHANICAL DATA (mm & inch) 封装尺寸数据 (毫米与英寸对照)

**TO-220AB PACKAGE DIMENSIONS**

| REF | Dimensions  |      |        |       |
|-----|-------------|------|--------|-------|
|     | Millimeters |      | Inches |       |
|     | Min.        | Max. | Min.   | Max.  |
| A   | 4.40        | 4.60 | 0.173  | 1.181 |
| B   | 0.70        | 0.90 | 0.027  | 0.035 |
| C   | 0.45        | 0.60 | 0.018  | 0.024 |
| C2  | 1.23        | 1.32 | 0.048  | 0.052 |
| C3  | 2.20        | 2.60 | 0.086  | 0.102 |
| D   | 8.90        | 9.90 | 0.350  | 0.390 |
| E   | 9.90        | 10.3 | 0.390  | 0.406 |
| F   | 6.30        | 6.90 | 0.248  | 0.272 |
| G   | 2.54        |      | 0.100  |       |
| H   | 28.0        | 29.8 | 11.0   | 11.70 |
| L1  | 3.20        |      | 0.126  |       |
| L2  | 1.14        | 1.70 | 0.045  | 0.067 |
| L3  | 2.65        | 2.95 | 0.104  | 0.116 |
| Φ   | 3.60        |      | 0.142  |       |

打印标识

**Marking**

H: HAOHAI  
XXXXXXXXXX: Part Number  
KKG: Registered trademark  
aa: Year  
bb: Week (01-53)  
LOGO in  
The upper left corner mark

H: 浩海电子  
XXXXXXXXXX: 产品型号  
KKG: 注册商标  
aa: 出厂年份  
bb: 出厂自然周 (01-53)  
左上角为公司LOGO

**TO-220F PACKAGE DIMENSIONS**

| REF | Dimensions  |       |        |       |
|-----|-------------|-------|--------|-------|
|     | Millimeters |       | Inches |       |
|     | Min.        | Max.  | Min.   | Max.  |
| A   | 4.40        | 4.80  | 0.173  | 0.189 |
| B   | 0.74        | 0.83  | 0.029  | 0.033 |
| C   | 0.50        | 0.75  | 0.020  | 0.030 |
| C2  | 2.40        | 2.70  | 0.094  | 0.106 |
| C3  | 2.60        | 3.00  | 0.102  | 0.118 |
| D   | 8.80        | 9.30  | 0.346  | 0.367 |
| E   | 9.70        | 10.30 | 0.382  | 0.406 |
| F   | 6.40        | 6.80  | 0.252  | 0.268 |
| G   | 5.00        | 5.20  | 0.197  | 0.205 |
| H   | 28.0        | 29.80 | 11.00  | 11.70 |
| L1  | 3.63 TYP    |       | 0.143  |       |
| L2  | 1.14        | 1.70  | 0.044  | 0.067 |
| L3  | 3.30 TYP    |       | 0.130  |       |
| V1  | 40          |       | 40     |       |

Marking

**Marking**

H: HAOHAI  
XXXXXXXXXX: Part Number  
KKG: Registered trademark  
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bb: Week (01-53)  
LOGO in  
The upper left corner mark

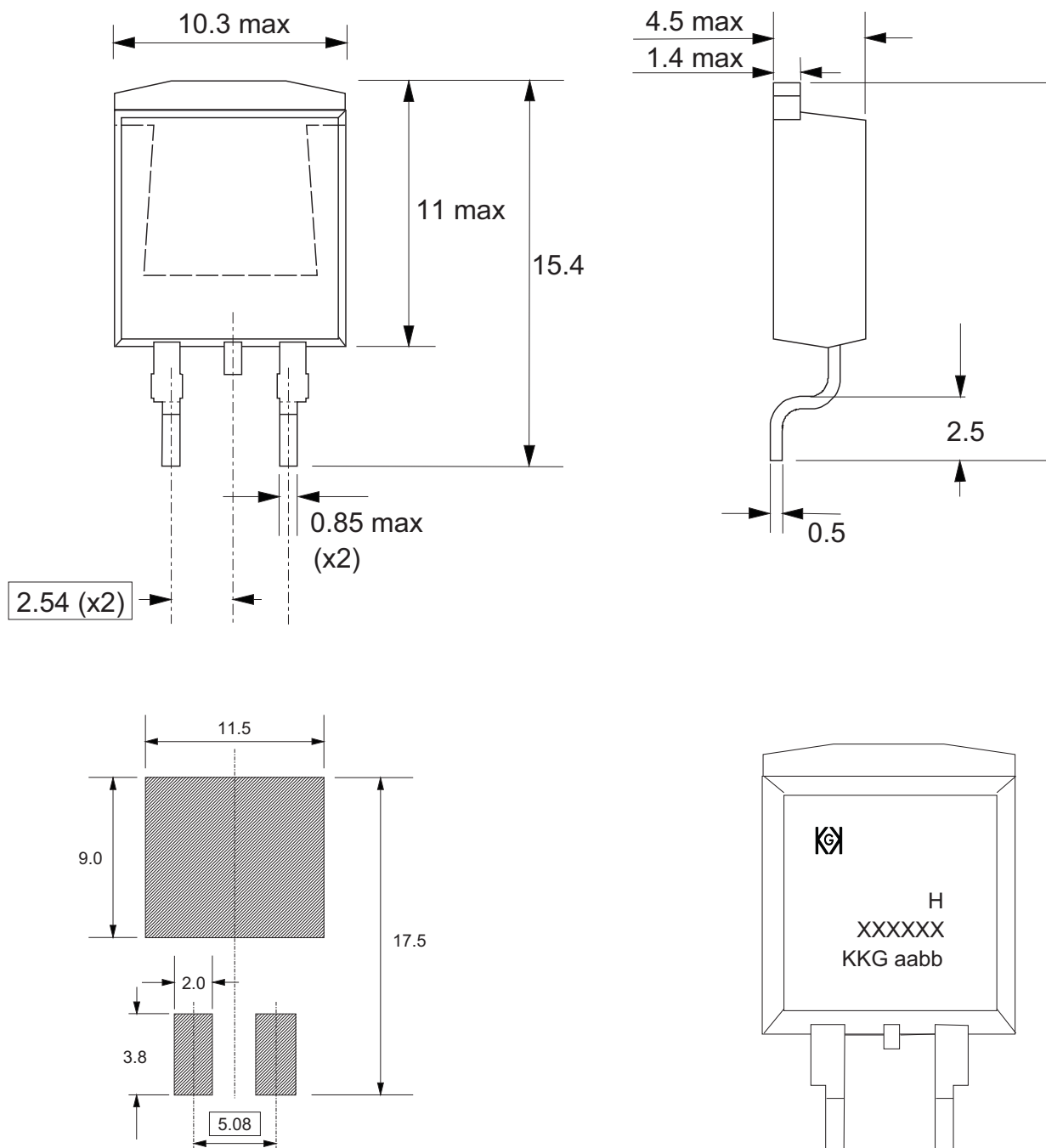
H: 浩海电子  
XXXXXXXXXX: 产品型号  
KKG: 注册商标  
aa: 出厂年份  
bb: 出厂自然周 (01-53)  
左上角为公司LOGO

■ Packaging Specifications (包装规格、装箱规格、包装尺寸数据)

| TO-220AB |        |           |           | TO-220F |           |           |
|----------|--------|-----------|-----------|---------|-----------|-----------|
| REF.     | Tube.  | BOX       | Carton    | Tube.   | BOX       | Carton    |
| QTY      | 50 Pcs | 1,000 Pcs | 5,000 Pcs | 50 Pcs  | 1,000 Pcs | 5,000 Pcs |

PACKAGE DIMENSIONS

■ TO-263 (D<sup>2</sup>PAK) PACKAGE INFORMATION (TO-263封装尺寸数据) 单位: mm (毫米)



■ 包装规格 Packaging Specifications

|                              |  |
|------------------------------|--|
| TO-263<br>D <sup>2</sup> PAK | 一、管装, 每管50只, 每盒1000只, 每箱10000只 (50Pcs/Tub, 1Kpcs/BOX, 10Kpcs/Carton) |
|                              | 二、载带卷盘包装, 每卷盘800只, 每盒1卷盘, 每箱8000只 (800Pcs/Reel, 8Kpcs/Carton)        |

Manufacturers version information  
2006-07-01, KKG™ Product Data-1.0  
2010-04-01, KKG™ Product Data-1.1  
2014-08-10, KKG™ Product Data-1.2



经中华人民共和国工商行政管理总局商标局批准  
KKG 图案、字母、均为我公司正式注册商标，仿冒、盗用均属侵权，违法必究！  
WARN, Letters, patterns, are officially registered my trademark counterfeiting, theft are all violations, violators will be held liable !

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