



产品承认书

Product Approval Sheet

| | |
|---------|------------|
| 编号 NO. | SMAJ-A/0-B |
| 日期 Date | 2021.10.15 |

| | |
|---------------|------|
| 客户 (Customer) | |
| 品名 (Product) | TVS |
| 系列 (Series) | SMAJ |

| 料号 (Part No.) | | 规格描述 (Specification) | 备注 (Remark) |
|--------------------|--|----------------------|-------------|
| 贝特电子 Betterfuse | | | |
| 客户 Customer | | | |

环保符合性说明 (Instructions for HSF)

本产品符合: RoHS 2.0 HF REACH LEAD FREE 其他备注

| 供应商-贝特 Supplier-Better fuse | | 确认合格章 (Confirm qualified Signet) | 客 户 (Customer) | 零件承认章 (Approval Signet) |
|--------------------------------|-----|-------------------------------------|-------------------|----------------------------|
| 制 作 Make | 陈文珊 | | | |
| 审 核 Check | 高飞 | | | |
| 确 认 Approval | 项伟荣 | | | |

联络 (Contact)

| 业务 (Sales) | 电话 (Telephone) | 手机 (Cellphone) | 邮箱 (E-mail) |
|------------|----------------|----------------|-------------|
| | | | |

零件承认后敬请回签一份给我司留存, 或将承认后的封面回传至我司邮箱, 谢谢!

Please sign a copy of the parts for our company or fax the acknowledged cover to our E-mail. Thanks!



变更履历 Modified Information

| 序号 (No.) | 日期 (Date) | 修订内容 (Modified Content) | 页码 (Page) | 版本 (Edition) | 制定人 (Prepared by) | 审核人 (Checked by) |
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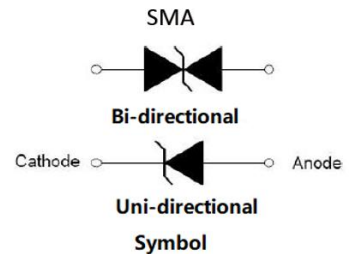
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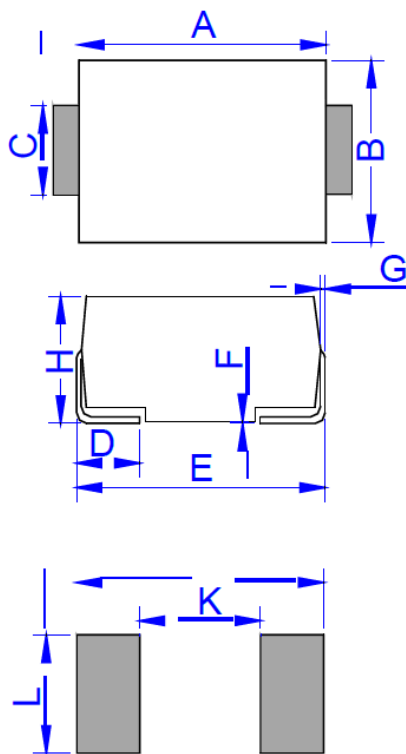


1. Scope and Description

- ◇ Glass passivated or planar junction.
- ◇ Low profile package and low inductance.
- ◇ Excellent clamping capability.
- ◇ Repetition rate(duty cycle): 0.01%.
- ◇ 400W Peak Pulse power capability at 10×1000µs waveform.
- ◇ Typical I_R less than 1µA above 10V.
- ◇ Fast response time: typically less than 1.0ps from 0V to V_{BR} min.
- ◇ High temperature soldering: 260°C/10s at terminals.
- ◇ Plastic package has underwriters laboratory flammability 94V-0.
- ◇ Meets MSL level 1, per J-STD-020.
- ◇ For surface mounted applications in order to optimize board space.



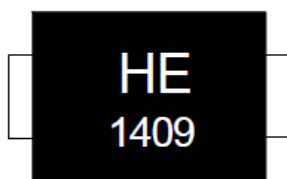
2. Size



DO-214AC(SMA)

| Ref. | Dimensions | | | |
|------|-------------|-------|--------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 3.99 | 4.65 | 0.157 | 0.183 |
| B | 2.50 | 2.90 | 0.098 | 0.114 |
| C | 1.35 | 1.65 | 0.053 | 0.065 |
| D | 0.76 | 1.52 | 0.030 | 0.060 |
| E | 4.93 | 5.28 | 0.194 | 0.208 |
| F | 0.051 | 0.203 | 0.002 | 0.008 |
| G | 0.15 | 0.31 | 0.006 | 0.012 |
| H | 1.98 | 2.41 | 0.078 | 0.095 |
| J | 6.80 | | 0.268 | |
| K | | 2.60 | | 0.102 |
| L | 2.40 | | 0.094 | |

3. Marking



HE: Device Marking Code
1409: In ninth week, 2014

**4. Electrical Characteristics(T_A=25°C)**

| Part Number | | Marking | | V _R | I _R @V _R | V _{BR} @I _T | | I _T | V _C @I _{PP} | I _{PP} ® |
|-------------|-----------|---------|----|----------------|--------------------------------|---------------------------------|--------|----------------|---------------------------------|-------------------|
| Uni-Polar | Bi-Polar | Uni | Bi | V | µA | Min(V) | Max(V) | mA | Max(V) | A |
| SMAJ5.0A | SMAJ5.0CA | HE | TE | 5.0 | 800 | 6.40 | 7.00 | 10 | 9.2 | 43.5 |
| SMAJ6.0A | SMAJ6.0CA | HG | TG | 6.0 | 800 | 6.67 | 7.37 | 10 | 10.3 | 38.8 |
| SMAJ6.5A | SMAJ6.5CA | HK | TK | 6.5 | 500 | 7.22 | 7.98 | 10 | 11.2 | 35.7 |
| SMAJ7.0A | SMAJ7.0CA | HM | TM | 7.0 | 200 | 7.78 | 8.60 | 10 | 12.0 | 33.3 |
| SMAJ7.5A | SMAJ7.5CA | HP | TP | 7.5 | 100 | 8.33 | 9.21 | 1 | 12.9 | 31.0 |
| SMAJ8.0A | SMAJ8.0CA | HR | TR | 8.0 | 50 | 8.89 | 9.83 | 1 | 13.6 | 29.4 |
| SMAJ8.5A | SMAJ8.5CA | HT | TT | 8.5 | 20 | 9.44 | 10.40 | 1 | 14.4 | 27.8 |
| SMAJ9.0A | SMAJ9.0CA | HV | TV | 9.0 | 10 | 10.00 | 11.10 | 1 | 15.4 | 26.0 |
| SMAJ10A | SMAJ10CA | HX | TX | 10.0 | 5 | 11.10 | 12.30 | 1 | 17.0 | 23.5 |
| SMAJ11A | SMAJ11CA | HZ | TZ | 11.0 | 1 | 12.20 | 13.50 | 1 | 18.2 | 22.0 |
| SMAJ12A | SMAJ12CA | IE | TE | 12.0 | 1 | 13.30 | 14.70 | 1 | 19.9 | 20.1 |
| SMAJ13A | SMAJ13CA | IG | UG | 13.0 | 1 | 14.40 | 15.90 | 1 | 21.5 | 18.6 |
| SMAJ14A | SMAJ14CA | IK | UK | 14.0 | 1 | 15.60 | 17.20 | 1 | 23.2 | 17.3 |
| SMAJ15A | SMAJ15CA | IM | UM | 15.0 | 1 | 16.70 | 18.50 | 1 | 24.4 | 16.4 |
| SMAJ16A | SMAJ16CA | IP | UP | 16.0 | 1 | 17.80 | 19.70 | 1 | 26.0 | 15.4 |
| SMAJ17A | SMAJ17CA | IR | UR | 17.0 | 1 | 18.90 | 20.90 | 1 | 27.6 | 14.5 |
| SMAJ18A | SMAJ18CA | IT | UT | 18.0 | 1 | 20.00 | 22.10 | 1 | 29.2 | 13.7 |
| SMAJ20A | SMAJ20CA | IV | UV | 20.0 | 1 | 22.20 | 24.50 | 1 | 32.4 | 12.4 |
| SMAJ22A | SMAJ22CA | IX | UX | 22.0 | 1 | 24.40 | 26.90 | 1 | 35.5 | 11.3 |
| SMAJ24A | SMAJ24CA | IZ | UZ | 24.0 | 1 | 26.70 | 29.50 | 1 | 38.9 | 10.3 |
| SMAJ26A | SMAJ26CA | JE | VE | 26.0 | 1 | 28.90 | 31.90 | 1 | 42.1 | 9.5 |
| SMAJ28A | SMAJ28CA | JG | VG | 28.0 | 1 | 31.10 | 34.40 | 1 | 45.4 | 8.8 |
| SMAJ30A | SMAJ30CA | JK | VK | 30.0 | 1 | 33.30 | 36.80 | 1 | 48.4 | 8.3 |
| SMAJ33A | SMAJ33CA | JM | VM | 33.0 | 1 | 36.70 | 40.60 | 1 | 53.3 | 7.5 |
| SMAJ36A | SMAJ36CA | JP | VP | 36.0 | 1 | 40.00 | 44.20 | 1 | 58.1 | 6.9 |
| SMAJ40A | SMAJ40CA | JR | VR | 40.0 | 1 | 44.40 | 49.10 | 1 | 64.5 | 6.2 |
| SMAJ43A | SMAJ43CA | JT | VT | 43.0 | 1 | 47.80 | 52.80 | 1 | 69.4 | 5.8 |
| SMAJ45A | SMAJ45CA | JV | VV | 45.0 | 1 | 50.00 | 55.30 | 1 | 72.7 | 5.5 |
| SMAJ48A | SMAJ48CA | JX | VX | 48.0 | 1 | 53.30 | 58.90 | 1 | 77.4 | 5.2 |



| Part Number | | Marking | | V _R | I _R @V _R | V _{BR} @I _T | | I _T | V _C @I _{PP} | I _{PP} Ⓢ |
|-------------|-----------|---------|----|----------------|--------------------------------|---------------------------------|--------|----------------|---------------------------------|-------------------|
| Uni-Polar | Bi-Polar | Uni | Bi | V | μA | Min(V) | Max(V) | mA | Max(V) | A |
| SMAJ51A | SMAJ51CA | JZ | VZ | 51.0 | 1 | 56.70 | 62.70 | 1 | 82.4 | 4.9 |
| SMAJ54A | SMAJ54CA | RE | WE | 54.0 | 1 | 60.00 | 66.30 | 1 | 87.1 | 4.6 |
| SMAJ58A | SMAJ58CA | RG | WG | 58.0 | 1 | 64.40 | 71.20 | 1 | 93.6 | 4.3 |
| SMAJ60A | SMAJ60CA | RK | WK | 60.0 | 1 | 66.70 | 73.70 | 1 | 96.8 | 4.1 |
| SMAJ64A | SMAJ64CA | RM | WM | 64.0 | 1 | 71.10 | 78.60 | 1 | 103.0 | 3.9 |
| SMAJ70A | SMAJ70CA | RP | WP | 70.0 | 1 | 77.80 | 86.00 | 1 | 113.0 | 3.6 |
| SMAJ75A | SMAJ75CA | RR | WR | 75.0 | 1 | 83.30 | 92.10 | 1 | 121.0 | 3.3 |
| SMAJ78A | SMAJ78CA | RT | WT | 78.0 | 1 | 86.70 | 95.80 | 1 | 126.0 | 3.2 |
| SMAJ85A | SMAJ85CA | RV | WV | 85.0 | 1 | 94.40 | 104.0 | 1 | 137.0 | 2.9 |
| SMAJ90A | SMAJ90CA | RX | WX | 90.0 | 1 | 100.0 | 111.0 | 1 | 146.0 | 2.8 |
| SMAJ100A | SMAJ100CA | RZ | WZ | 100.0 | 1 | 100.0 | 111.0 | 1 | 162.0 | 2.5 |
| SMAJ110A | SMAJ110CA | SE | XE | 110.0 | 1 | 111.0 | 123.0 | 1 | 177.0 | 2.3 |
| SMAJ120A | SMAJ120CA | SG | XG | 120.0 | 1 | 122.0 | 135.0 | 1 | 193.0 | 2.1 |
| SMAJ130A | SMAJ130CA | SK | XK | 130.0 | 1 | 133.0 | 147.0 | 1 | 209.0 | 1.9 |
| SMAJ150A | SMAJ150CA | SM | XM | 150.0 | 1 | 144.0 | 159.0 | 1 | 243.0 | 1.7 |
| SMAJ160A | SMAJ160CA | SP | XP | 160.0 | 1 | 167.0 | 185.0 | 1 | 259.0 | 1.6 |
| SMAJ170A | SMAJ170CA | SR | XR | 170.0 | 1 | 178.0 | 197.0 | 1 | 275.0 | 1.5 |
| SMAJ180A | SMAJ180CA | ST | XT | 180.0 | 1 | 189.0 | 209.0 | 1 | 292.0 | 1.4 |
| SMAJ200A | SMAJ200CA | SV | XV | 200.0 | 1 | 201.0 | 222.0 | 1 | 324.0 | 1.3 |
| SMAJ220A | SMAJ220CA | SX | XX | 220.0 | 1 | 211.0 | 234.0 | 1 | 356.0 | 1.1 |
| SMAJ250A | SMAJ250CA | SZ | XZ | 250.0 | 1 | 224.0 | 247.0 | 1 | 405.0 | 1.0 |
| SMAJ300A | SMAJ300CA | ZE | YE | 300.0 | 1 | 233.0 | 258.0 | 1 | 486.0 | 0.8 |
| SMAJ350A | SMAJ350CA | ZG | YG | 350.0 | 1 | 391.0 | 432.0 | 1 | 567.0 | 0.7 |
| SMAJ400A | SMAJ400CA | ZK | YK | 400.0 | 1 | 447.0 | 494.0 | 1 | 648.0 | 0.6 |
| SMAJ440A | SMAJ440CA | ZM | YM | 440.0 | 1 | 492.0 | 543.0 | 1 | 713.0 | 0.6 |

① Surge waveform: 10/1000μs

V_R: Stand-off voltage -- maximum voltage that can be applied

V_{BR}: Breakdown voltage

V_C: Clamping voltage -- peak voltage measured across the suppressor at a specified IPP

I_R: Reverse leakage current



5. Ratings And V-I Characteristics Curves($T_A=25^{\circ}\text{C}$, Unless otherwise noted)

FIG.1: V-I curve characteristics (Uni-directional)

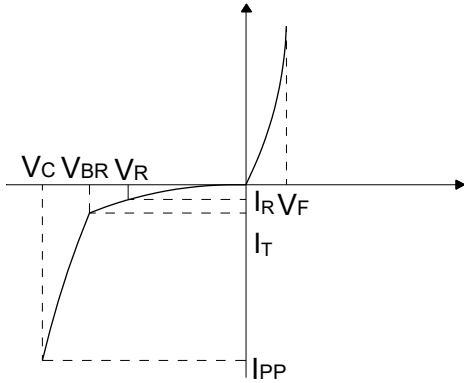


FIG.2: V-I curve characteristic (Bi-directional)

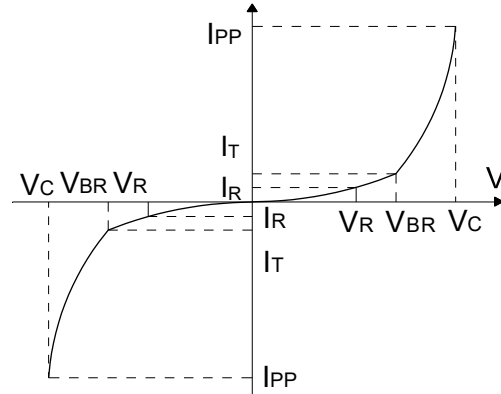


FIG.3: Pulse waveform

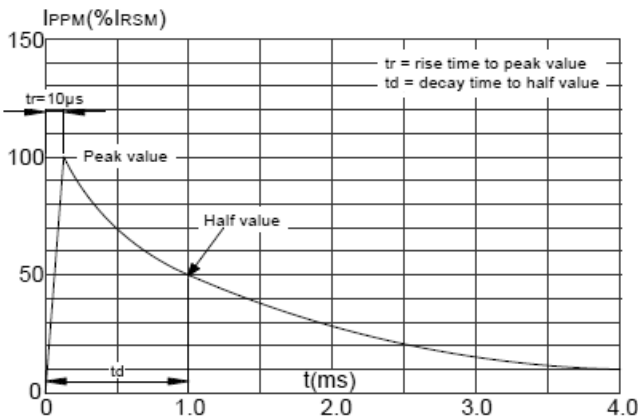
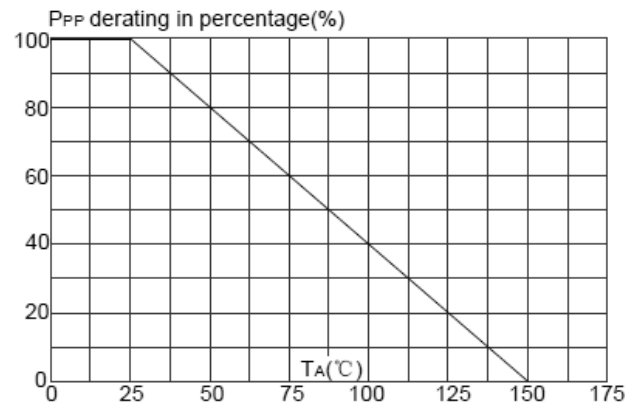


FIG.4: Pulse derating curve



6. Absolute Maximum Ratings($T_A=25^{\circ}\text{C}$, $RH=45\%-75\%$, unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|-------------|-------------|--------------------|
| Storage temperature range | T_{STG} | -55 to +150 | $^{\circ}\text{C}$ |
| Operating junction temperature range | T_J | -55 to +150 | $^{\circ}\text{C}$ |
| Steady state power dissipation at $T_L=75^{\circ}\text{C}$ | $P_{M(AV)}$ | 3.3 | W |
| Peak pulse power dissipation on 10/1000µs waveform | P_{PP} | 400 | W |
| Maximum Instantaneous Forward Voltage at 30A for Unidirectional | V_F | 5.0 | V |



7. Package Information

| Part No. | Package | Quantity (pcs) | Tape&Reel |
|------------|---------------|----------------|-----------|
| SMAJxxCA/A | SMA(DO-214AC) | 5,000 | 13inch |

8. Soldering Parameters

| Reflow Condition | | Pb-Free assembly (see FIG.5) |
|---|-----------------------------------|---------------------------------|
| Pre Heat | -Temperature Min ($T_{s(min)}$) | +150°C |
| | -Temperature Max($T_{s(max)}$) | +200°C |
| | -Time (Min to Max) (t_s) | 60-180 secs. |
| Average ramp up rate (Liquid us Temp (T_L) to peak) | | 3°C/sec. Max |
| $T_{s(max)}$ to T_L - Ramp-up Rate | | 3°C/sec. Max |
| Reflow | -Temperature(T_L)(Liquid us) | +217°C |
| | -Temperature(t_L) | 60-150 secs. |
| Peak Temp (T_P) | | +260(+0/-5)°C |
| Time within 5°C of actual Peak Temp (t_p) | | 30 secs. Max |
| Ramp-down Rate | | 6°C/sec. Max |
| Time 25°C to Peak Temp (T_P) | | 8 min. Max |
| Do not exceed | | +260°C |

