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**SPECIFICATION FOR APPROVAL**

CUSTOMER 立創電子

CERTIFIED \_\_\_\_\_

MODEL/TYPE \_\_\_\_\_

PART NO. SMF36A(RoHS+HF)

APPLICATION \_\_\_\_\_

CUSTOMER P/N \_\_\_\_\_

ISSUE DATE Mar.13,2021

REV. NO. \_\_\_\_\_

REV. DATE \_\_\_\_\_

| FOR CUSTOMER APPROVAL | CHECKED BY            |
|-----------------------|-----------------------|
|                       | <i>Yuan Feng</i>      |
|                       | APPROVED BY           |
|                       | <i>Huaifang Zhang</i> |





**REVISED RECORD SHEET**

| REV. NO | REV. DATE | REVISED CONTENT |
|---------|-----------|-----------------|
|         |           |                 |



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Part Number Code

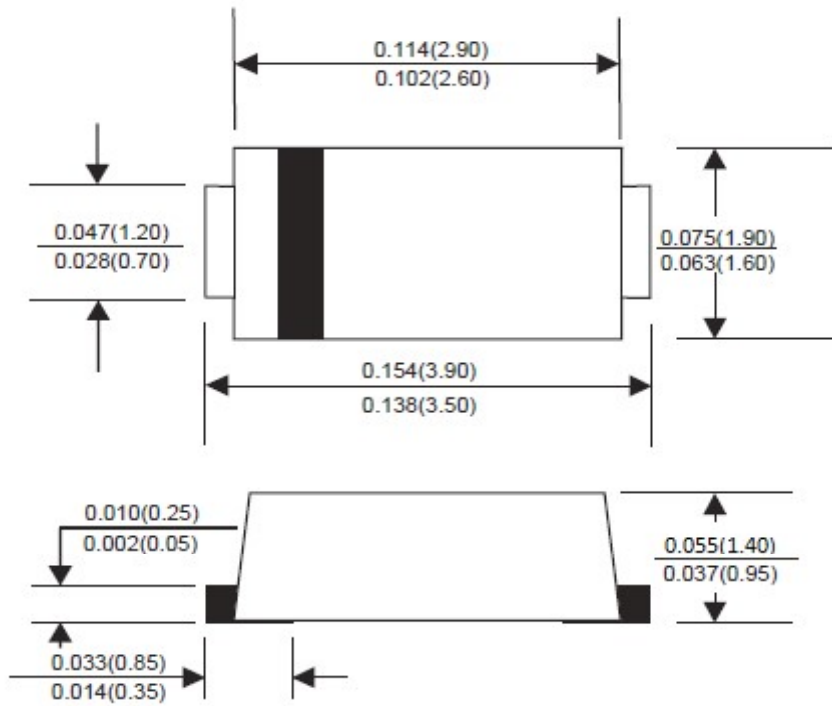
Example :

**SMF**   **36**   **A**  
(1)        (2)    (3)

| No. | Item                                    | Digit | Specification                               |
|-----|---|-------|---|
| (1) | Product Type                            | SMF   | Thinking Power TVS SMD Type                 |
| (2) | Reverse Stand off Voltage ( $V_{RWM}$ ) | 36    | 36=36 $V_{RWM}$                             |
| (3) | Type Code                               | A     | Uni-directional<br>5% VBR Voltage Tolerance |

Structure and Dimensions

Unit:inch(millimeter)



\*The Cathode bend for Uni-directional product only.

## Electrical Characteristics

Peak power dissipation with a 10/1000µs waveform : 200W

Operating junction and storage temperature range : -55~+150 °C

| Part No.<br>(Uni) | Part No.<br>(Bi) | Reverse<br>Stand off<br>Voltage | Breakage<br>Voltage<br>VBR @ IT |          | Test<br>Current | Maximum<br>Clamping<br>Voltage<br>VC @ Ipp | Maximum<br>Peak Pulse<br>Current | Maximum<br>Reverse<br>Leakage<br>IR<br>@VRWM | Marking<br>Code |          |
|-------------------|------------------|---------------------------------|---------------------------------|----------|-----------------|--|----------------------------------|--|-----------------|----------|
|                   |                  |                                 | VRWM ( V )                      | Min( V ) |                 |  |                                  |  | Max( V )        | IT( mA ) |
| SMF5.0A           | SMF5.0CA         | 5                               | 6.4                             | 7        | 10              | 9.2  | 21.7                             | 400  | FE.             | KE.      |
| SMF6.0A           | SMF6.0CA         | 6                               | 6.67                            | 7.37     | 10              | 10.3                                       | 19.4                             | 400  | FG.             | KG.      |
| SMF6.5A           | SMF6.5CA         | 6.5                             | 7.22                            | 7.98     | 10              | 11.2                                       | 17.9                             | 250  | FK.             | KK.      |
| SMF7.0A           | SMF7.0CA         | 7                               | 7.78                            | 8.6      | 10              | 12   | 16.7                             | 100  | FM.             | KM.      |
| SMF7.5A           | SMF7.5CA         | 7.5                             | 8.33                            | 9.21     | 1               | 12.9                                       | 15.5                             | 50   | FP.             | KP.      |
| SMF8.0A           | SMF8.0CA         | 8                               | 8.89                            | 9.83     | 1               | 13.6                                       | 14.7                             | 25   | FR.             | KR.      |
| SMF8.5A           | SMF8.5CA         | 8.5                             | 9.44                            | 10.4     | 1               | 14.4                                       | 13.9                             | 10   | FT.             | KT.      |
| SMF9.0A           | SMF9.0CA         | 9                               | 10                              | 11.1     | 1               | 15.4                                       | 13                               | 5  | FV.             | KV.      |
| SMF10A            | SMF10CA          | 10                              | 11.1                            | 12.3     | 1               | 17   | 11.8                             | 2.5  | FX.             | KX.      |
| SMF11A            | SMF11CA          | 11                              | 12.2                            | 13.5     | 1               | 18.2                                       | 11                               | 2.5  | FZ.             | KZ.      |
| SMF12A            | SMF12CA          | 12                              | 13.3                            | 14.7     | 1               | 19.9                                       | 10.1                             | 2.5  | HE.             | LE.      |
| SMF13A            | SMF13CA          | 13                              | 14.4                            | 15.9     | 1               | 21.5                                       | 9.3                              | 1  | HG.             | LG.      |
| SMF14A            | SMF14CA          | 14                              | 15.6                            | 17.2     | 1               | 23.2                                       | 8.6                              | 1  | HK.             | LK.      |
| SMF15A            | SMF15CA          | 15                              | 16.7                            | 18.5     | 1               | 24.4                                       | 8.2                              | 1  | HM.             | LM.      |
| SMF16A            | SMF16CA          | 16                              | 17.8                            | 19.7     | 1               | 26   | 7.7                              | 1  | HP.             | LP.      |
| SMF17A            | SMF17CA          | 17                              | 18.9                            | 20.9     | 1               | 27.6                                       | 7.2                              | 1  | HR.             | LR.      |
| SMF18A            | SMF18CA          | 18                              | 20                              | 22.1     | 1               | 29.2                                       | 6.8                              | 1  | HT.             | LT.      |
| SMF20A            | SMF20CA          | 20                              | 22.2                            | 24.5     | 1               | 32.4                                       | 6.2                              | 1  | HV.             | LV.      |
| SMF22A            | SMF22CA          | 22                              | 24.4                            | 26.9     | 1               | 35.5                                       | 5.6                              | 1  | HX.             | LX.      |
| SMF24A            | SMF24CA          | 24                              | 26.7                            | 29.5     | 1               | 38.9                                       | 5.1                              | 1  | HZ.             | LZ.      |
| SMF26A            | SMF26CA          | 26                              | 28.9                            | 31.9     | 1               | 42.1                                       | 4.8                              | 1  | JE.             | ME.      |
| SMF28A            | SMF28CA          | 28                              | 31.1                            | 34.4     | 1               | 45.4                                       | 4.4                              | 1  | JG.             | MG.      |
| SMF30A            | SMF30CA          | 30                              | 33.3                            | 36.8     | 1               | 48.4                                       | 4.1                              | 1  | JK.             | MK.      |
| SMF33A            | SMF33CA          | 33                              | 36.7                            | 40.6     | 1               | 53.3                                       | 3.8                              | 1  | JM.             | MM.      |
| SMF36A            | SMF36CA          | 36                              | 40                              | 44.2     | 1               | 58.1                                       | 3.4                              | 1  | JP.             | MP.      |
| SMF40A            | SMF40CA          | 40                              | 44.4                            | 49.1     | 1               | 64.5                                       | 3.1                              | 1  | JR.             | MR.      |
| SMF43A            | SMF43CA          | 43                              | 47.8                            | 52.8     | 1               | 69.4                                       | 2.9                              | 1  | JT.             | MT.      |
| SMF45A            | SMF45CA          | 45                              | 50                              | 55.3     | 1               | 72.7                                       | 2.8                              | 1  | JV.             | MV.      |
| SMF48A            | SMF48CA          | 48                              | 53.3                            | 58.9     | 1               | 77.4                                       | 2.6                              | 1  | JX.             | MX.      |
| SMF51A            | SMF51CA          | 51                              | 56.7                            | 62.7     | 1               | 82.4                                       | 2.4                              | 1  | JZ.             | MZ.      |
| SMF54A            | SMF54CA          | 54                              | 60                              | 66.3     | 1               | 87.1                                       | 2.3                              | 1  | XE.             | NE.      |
| SMF58A            | SMF58CA          | 58                              | 64.4                            | 71.2     | 1               | 93.6                                       | 2.1                              | 1  | XG.             | NG.      |
| SMF60A            | SMF60CA          | 60                              | 66.7                            | 73.7     | 1               | 96.8                                       | 1.8                              | 1  | XK.             | NK.      |

Electrical CharacteristicsPeak power dissipation with a 10/1000 $\mu$ s waveform : 200W

Operating junction and storage temperature range : -55~+150 °C

| Part No.<br>(Uni) | Part No.<br>(Bi) | Reverse<br>Stand off<br>Voltage | Breakage<br>Voltage<br>VBR @ IT |          | Test<br>Current | Maximum<br>Clamping<br>Voltage<br>VC @ Ipp | Maximum<br>Peak Pulse<br>Current | Maximum<br>Reverse<br>Leakage<br>IR<br>@VRWM | Marking<br>Code |          |
|-------------------|------------------|---------------------------------|---------------------------------|----------|-----------------|--|----------------------------------|--|-----------------|----------|
|                   |                  |                                 | VRWM ( V )                      | Min( V ) |                 |  |                                  |  | Max( V )        | IT( mA ) |
| SMF64A            | SMF64CA          | 64                              | 71.1                            | 78.6     | 1               | 103  | 1.7                              | 1  | XM.             | NM.      |
| SMF70A            | SMF70CA          | 70                              | 77.8                            | 86       | 1               | 113  | 1.5                              | 1  | XP.             | NP.      |
| SMF75A            | SMF75CA          | 75                              | 83.3                            | 92.1     | 1               | 121  | 1.4                              | 1  | XR.             | NR.      |
| SMF78A            | SMF78CA          | 78                              | 86.7                            | 95.8     | 1               | 126  | 1.4                              | 1  | XT.             | NT.      |
| SMF85A            | SMF85CA          | 85                              | 94.4                            | 104      | 1               | 137  | 1.3                              | 1  | XV.             | NV.      |
| SMF90A            | SMF90CA          | 90                              | 100                             | 111      | 1               | 146  | 1.2                              | 1  | XX.             | NX.      |
| SMF100A           | SMF100CA         | 100                             | 111                             | 123      | 1               | 162  | 1.1                              | 1  | XZ.             | NZ.      |
| SMF110A           | SMF110CA         | 110                             | 122                             | 135      | 1               | 177  | 1                                | 1  | TE.             | PE.      |
| SMF120A           | SMF120CA         | 120                             | 133                             | 147      | 1               | 193  | 0.9                              | 1  | TG.             | PG.      |
| SMF130A           | SMF130CA         | 130                             | 144                             | 159      | 1               | 209  | 0.8                              | 1  | TK.             | PK.      |
| SMF150A           | SMF150CA         | 150                             | 167                             | 185      | 1               | 243  | 0.7                              | 1  | TM.             | PM.      |
| SMF160A           | SMF160CA         | 160                             | 178                             | 197      | 1               | 259  | 0.7                              | 1  | TP.             | PP.      |
| SMF170A           | SMF170CA         | 170                             | 189                             | 209      | 1               | 275  | 0.6                              | 1  | TR.             | PR.      |

Reliability

| Item   | Standard                                    | Test conditions / Methods  | Specifications                                  |
|--|---|--|---|
| HTRB<br>(High Temp.<br>Reverse Bias<br>Test) | MIL-STD-750D<br>METHOD 1038.3<br>Method 103 | Test Temp. : 150°C<br>Duration 168 hrs with rated VRWM   | Electrical<br>properties meet<br>Specifications |
| PCT<br>(Pressure<br>Cooker Test)             | MIL-STD-19500<br>EAPPENDIX C                | Test Temp. : 121 °C<br>Pressure:1.2Kg<br>Duration: 96 hrs  | Electrical<br>properties meet<br>Specifications |
| TCT  | MIL-STD-750D<br>METHOD 1051.5               | Test Temp. : -55°C ~+150°C<br>20 cycles  | Electrical<br>properties meet<br>Specifications |
| Forward<br>Surge                             | MIL-STD-750D<br>METHOD 4066.3               | Sine half wave 8.3mS 1 shot<br>IFSM:20A forSMF<br>40A for SMA<br>100A for SMB<br>200A for SMC<br>For Uni-directional product only. | Electrical<br>properties meet<br>Specifications |
| Soldering<br>Heat                            | MIL-STD-750D<br>METHOD 2031.2               | Test Temp. : 260°C<br>Duration:10 sec<br>1cycle  | Electrical<br>properties meet<br>Specifications |



## Soldering Recommendation

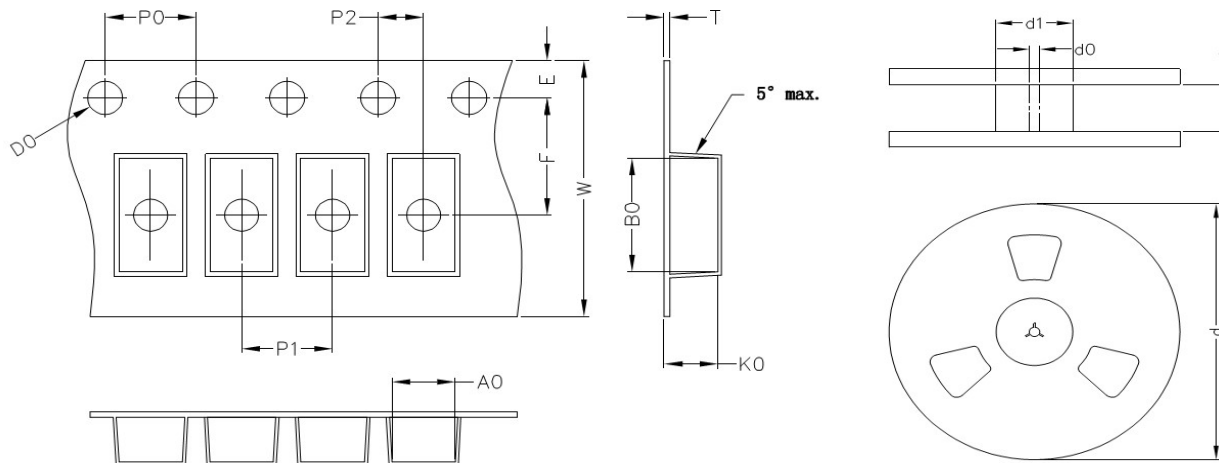
### ■ IR-reflow soldering profile



| Reflow Condition  | Lead-free assembly                 |
|---|------------------------------------|
| <b>Preheat</b><br>-Temperature Min(Ts min)<br>-Temperature Min(Ts max)<br>-Time (min to max) (ts) | 150°C<br>200°C<br>60 – 180 seconds |
| <b>Average ramp up rate</b><br>-Temperature Liquidus (TL) to peak                                 | 3°C/second max                     |
| <b>Ts(max) to TL</b><br>-Ramp-up Rate   | 3°C/second max.                    |
| <b>Reflow</b><br>-Temperature Liquidus (TL)<br>-Time (tl)   | 217°C<br>60 – 150 seconds          |
| <b>Peak Temperature (TP)</b>  | 260°C                              |
| <b>Time within 5°C of actual peak Temperature(tp)</b>   | 20 – 40 seconds                    |
| <b>Ramp-down Rate</b>   | 6°C/second max.                    |
| <b>Time 25°C to peak Temperature(TP)</b>  | 8 minutes max.                     |
| <b>Do not exceed</b>  | 260°C                              |

## Packaging

### ■ Taping Specification



(Unit : mm)

| Index | A0 | B0   | K0   | D0   | E    | F   | P0 | P1 | P2 | T    | W | d (7") | d1 | d0 | w1  |
|-------|----|------|------|------|------|-----|----|----|----|------|---|--------|----|----|-----|
| SMF   | 2  | 3.95 | 1.45 | 1.55 | 1.75 | 3.5 | 4  | 4  | 2  | 0.23 | 8 | 178    | 60 | 13 | 9.5 |

Notes : 1.The tolerance of carrier tape and top cover is  $\pm 0.1$ mm,the tolerance of reel is  $\pm 2$ mm

Notes : 2.For the SMF series, different reel materials will produce differently structured reels

### ■ Quantity

| Series Type | Reel size | Quantity (pcs/reel) |
|-------------|-----------|---------------------|
| SMF         | 7"        | 3,000               |

Pulse Waveform

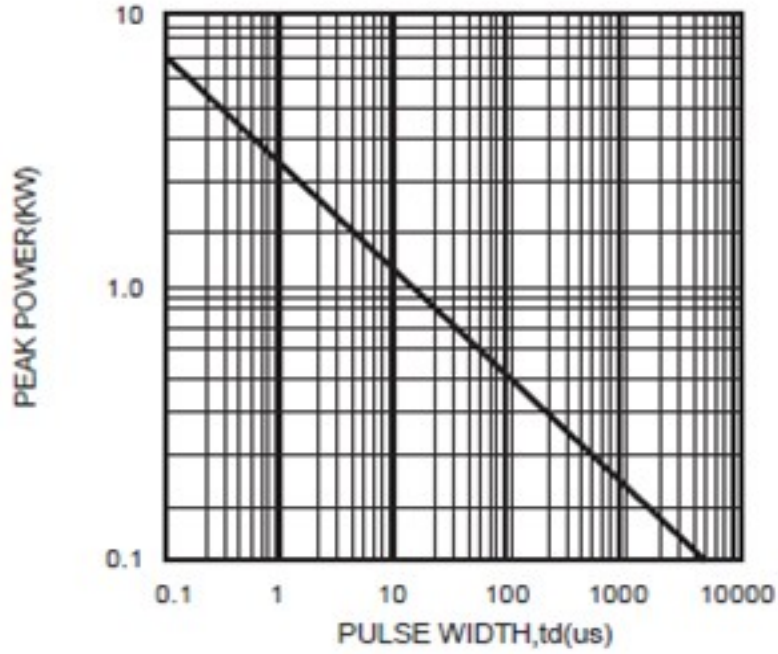


Pulse Derating Curve



Peak Pulse Power Rating Curve

SMF series



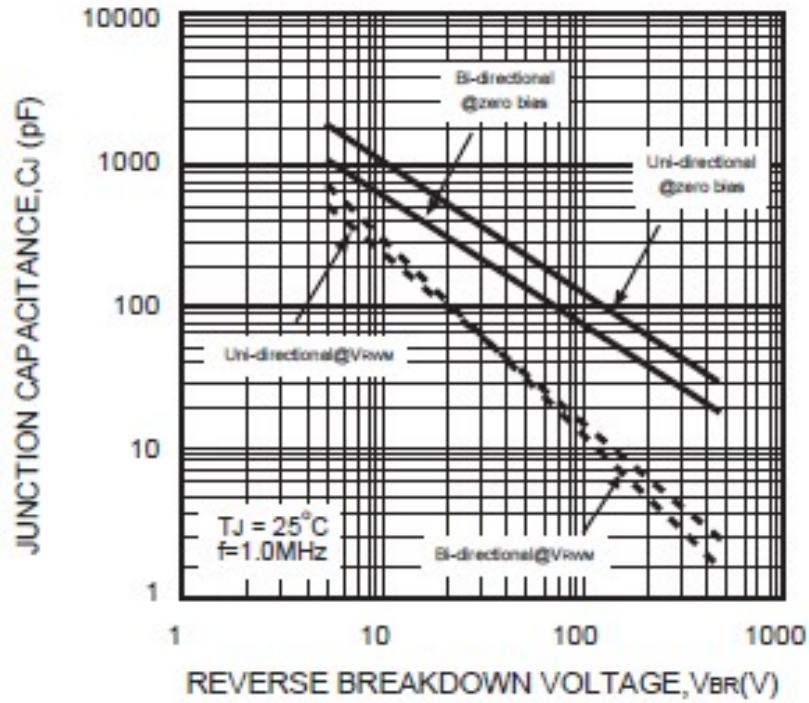
Steady State Power Derating Curve

SMF series



Typical Junction Capacitance

SMF series



### RoHS Compliant Declaration

We hereby declare that the components delivered to your company are compliant with RoHS directive 2015/863/EU.

### Warehouse Storage Conditions of Products

(I) Storage Conditions :

- 1.Storage Temperature :  $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$
- 2.Relative Humidity :  $\leq 75\%RH$
- 3.Keep away from corrosive atmosphere and sunlight.

(II) Period of Storage : 1 year



### Certificates

- (1) IATF 16949 certificate
- (2) ISO 9001 certificate

### Test Report

- (1) RoHS test report
- (2) Halogen-free test report



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