

THINKING ELECTRONIC INDUSTRIAL CO., LTD.

HEAD OFFICE: 12F, No.93, Dashun 1st Rd., Zuoying Dist., Kaohsiung, Taiwan

TEL: 886-7-5577660 FAX: 886-7-5570560

MANUFACTURING SITE

- KAOHSIUNG FACTORY 1:No. 51, Kaifa Rd., N.E.P.Z, Kaohsiung City 81170, Taiwan
TEL: 886-7-9616668 FAX: 886-7-9616698
- KAOHSIUNG FACTORY 2:No. 2-2, Xinjian S. Rd., N.E.P.Z., Kaohsiung City 81170, Taiwan
TEL: 886-7-9630001 FAX: 886-7-3635113
- CHANGZHOU FACTORY: No.6 Longmen Rd., Wujin High & New-Tech Industrial
Development Zone, Changzhou, Jiangsu, China 213161
TEL:86-519-86578999 FAX:86-519-86558643
- DONG GUAN FACTORY: No.45, East Rd., Sha-Tao Dist., Chang-An Town,
Dongguan City, Guangdong, China 523863
TEL:86-769-85542016 FAX:86-769-85546890
- YICHANG FACTORY: No. 283 Xiaoting Avenue, Xiaoting Dist., Yichang
City 443007, Hubei, China
TEL:86-717-6510010 FAX:86-717-6511430

**SPECIFICATION FOR APPROVAL**

| | |
|--------------|-------------------|
| CUSTOMER | 立創電子 |
| CERTIFIED | _____ |
| MODEL/TYPE | _____ |
| PART NO. | SMF130A (RoHS+HF) |
| APPLICATION | _____ |
| CUSTOMER P/N | _____ |
| ISSUE DATE | Jan.23,2021 |
| REV. NO. | _____ |
| REV. DATE | _____ |

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





REVISED RECORD SHEET

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



| INDEX | Page |
|---|--------------|
| ■ Part Number Code | 1 |
| ■ Structure and Dimensions | 2 |
| ■ Electrical Characteristics | 3 ~ 4 |
| ■ Reliability | 5 |
| ■ Soldering Recommendation | 6 |
| ■ Packaging | 7 |
| ■ Pulse Waveform | 8 |
| ■ Pulse Derating Curve | 8 |
| ■ Peak Pulse Power Rating Curve | 9 |
| ■ Steady State Power Derating Curve | 10 |
| ■ Typical Junction Capacitance | 11 |
| ■ RoHS Compliant Declaration | 12 |
| ■ Warehouse Storage Conditions of Products | 12 |
| ■ Certificates & Test Report | 13 |



Part Number Code

Example :

SMF **130** **A**
(1) (2) (3)

| No. | Item | Digit | Specification |
|-----|---|-------|---|
| (1) | Product Type | SMF | Thinking Power TVS SMD Type |
| (2) | Reverse Stand off Voltage (V_{RWM}) | 130 | 130=130 V_{RWM} |
| (3) | Type Code | A | Uni-directional 5% VBR Voltage Tolerance |

Structure and Dimensions

Unit:inch(millimeter)



Electrical CharacteristicsPeak power dissipation with a 10/1000 μ s waveform : 200W

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

| Part No. (Uni) | Part No. (Bi) | Reverse Stand off Voltage | Breakage Voltage VBR @ IT | | Test Current | Maximum Clamping Voltage VC @ Ipp | Maximum Peak Pulse Current | Maximum Reverse Leakage IR @VRWM | Marking 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 μ s waveform : 200W

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

| Part No. (Uni) | Part No. (Bi) | Reverse Stand off Voltage | Breakage Voltage VBR @ IT | | Test Current | Maximum Clamping Voltage VC @ Ipp | Maximum Peak Pulse Current | Maximum Reverse Leakage IR @VRWM | Marking 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 (High Temp. Reverse Bias Test) | MIL-STD-750D METHOD 1038.3 Method 103 | Test Temp. : 150°C Duration 168 hrs with rated VRWM | Electrical properties meet Specifications |
| PCT (Pressure Cooker Test) | MIL-STD-19500 EAPPENDIX C | Test Temp. : 121 °C Pressure:1.2Kg Duration: 96 hrs | Electrical properties meet Specifications |
| TCT | MIL-STD-750D METHOD 1051.5 | Test Temp. : -55°C ~+150°C 20 cycles | Electrical properties meet Specifications |
| Forward Surge | MIL-STD-750D METHOD 4066.3 | Sine half wave 8.3mS 1 shot IFSM:20A forSMF 40A for SMA 100A for SMB 200A for SMC For Uni-directional product only. | Electrical properties meet Specifications |
| Soldering Heat | MIL-STD-750D METHOD 2031.2 | Test Temp. : 260°C Duration:10 sec 1cycle | Electrical properties meet Specifications |

Soldering Recommendation

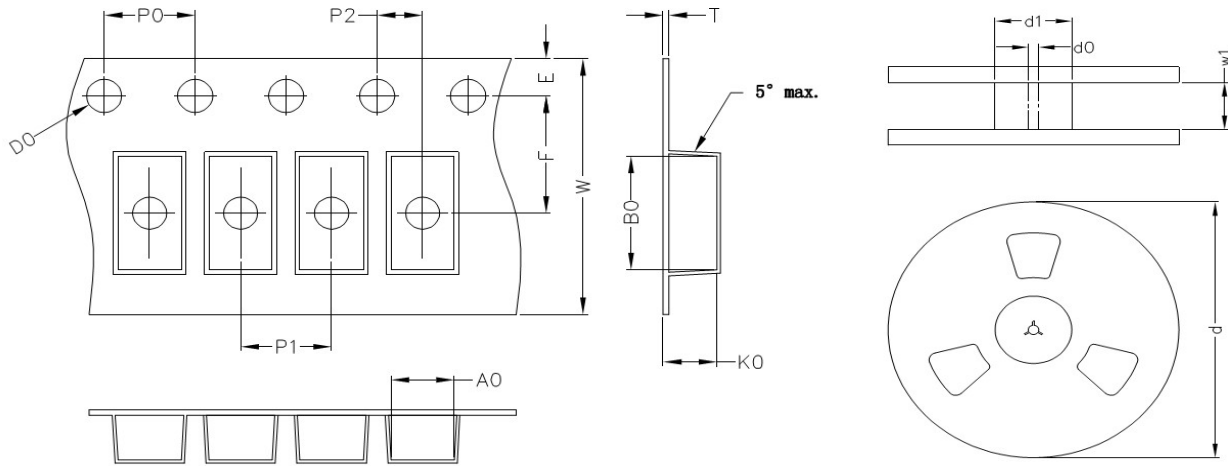
■ IR-reflow soldering profile



| Reflow Condition | Lead-free assembly |
|---|------------------------------------|
| Preheat -Temperature Min(Ts min) -Temperature Min(Ts max) -Time (min to max) (ts) | 150°C 200°C 60 – 180 seconds |
| Average ramp up rate -Temperature Liquidus (TL) to peak | 3°C/second max |
| Ts(max) to TL -Ramp-up Rate | 3°C/second max. |
| Reflow -Temperature Liquidus (TL) -Time (tl) | 217°C 60 – 150 seconds |
| Peak Temperature (TP) | 260°C |
| Time within 5°C of actual peak Temperature(tp) | 20 – 40 seconds |
| Ramp-down Rate | 6°C/second max. |
| Time 25°C to peak Temperature(TP) | 8 minutes max. |
| Do not exceed | 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 ± 0.1 mm,the tolerance of reel is ± 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

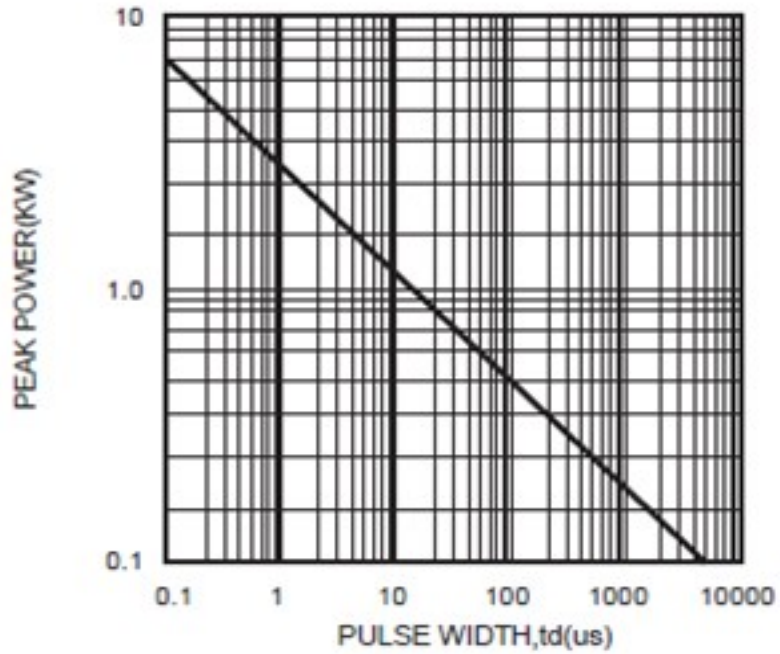


Pulse Derating Curve



Peak Pulse Power Rating Curve

SMF series



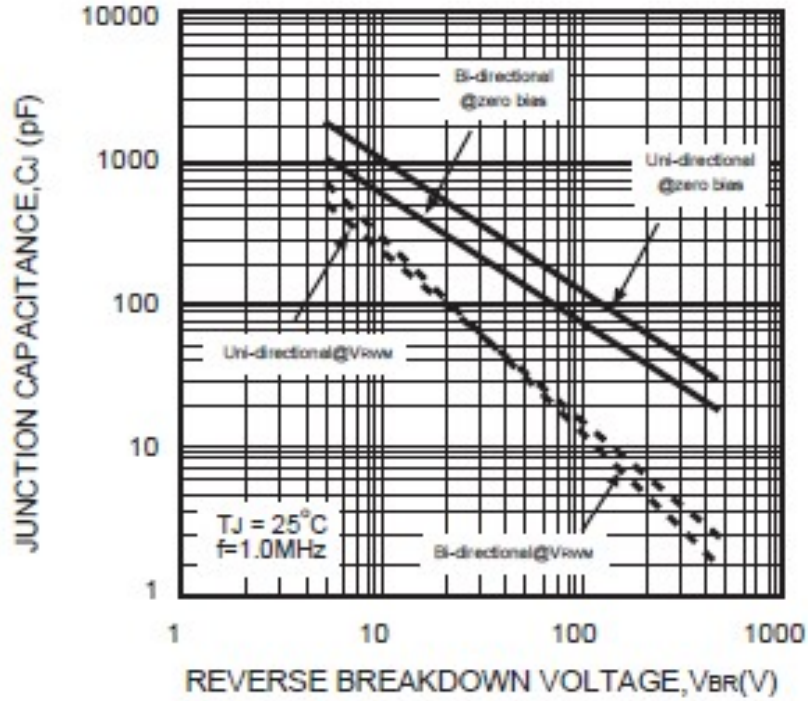
Steady State Power Derating Curve

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 : $\leq 75\% \text{RH}$
- 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