

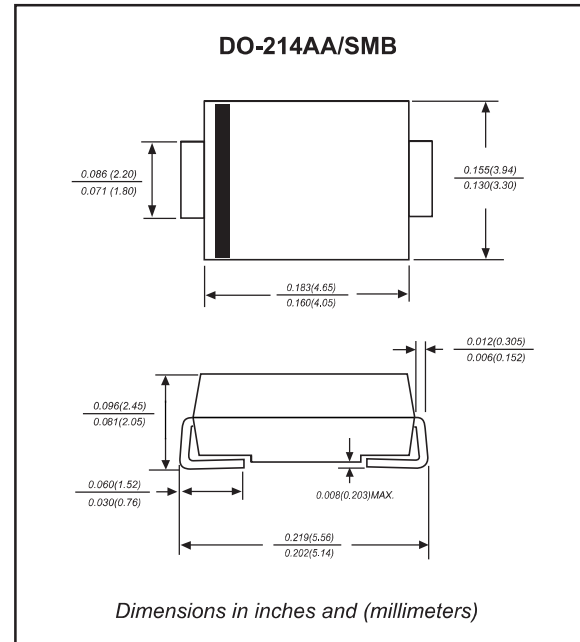
Features

- 600W peak pulse power capability with a 10/1000 μ s waveform, repetition rate (duty cycle): 0.01%.
- Low profile surface mounted application in order to optimize board space.
- Excellent clamping capability.
- Low incremental surge resistance.
- Fast response time from 0V to VBR, typically less than 1 ps for uni-directional & 5 ns for bi-directional types.
- Glass passivated chip junction.
- Lead-free parts meet RoHS requirements.
- Compliant to Halogen-free

Mechanical data

- Epoxy: UL94-V0 rated flame retardant
- Case : Molded plastic, DO-214AA / SMB
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any

Package outline



Maximum ratings (AT $T_A=25^\circ\text{C}$ unless otherwise noted)

| PARAMETER | CONDITIONS | Symbol | Value | UNIT |
|---------------------------------------|---|------------------------------------|-------------|--------------------|
| Peak Power Dissipation | with a 10/1000 μ s waveform, Note 1, 2 & Fig. 1 | P_{PPM} | 600 | W |
| Peak Pulse current | with a 10/1000 μ s waveform | I_{PPM} | See Table 1 | A |
| Steady State Power Dissipation | at $T_c=75^\circ\text{C}$, Note 2 | $P_{M(AV)}$ | 5.0 | W |
| Peak Forward Surge Current | 8.3ms Single Half Sine-Wave, Note 3 | I_{FSM} | 100 | A |
| Maximum Instantaneous Forward Voltage | at 50A For Uni-Directional Types Only, Note 4 | V_F | 3.5/5.0 | V |
| Typical Thermal resistance | Junction to case Junction to ambient | $R_{\theta JC}$ $R_{\theta JA}$ | 30 50 | $^\circ\text{C/W}$ |
| Operating junction temperature range | | T_J | -55 ~ +150 | $^\circ\text{C}$ |
| Storage temperature range | | T_{STG} | -55 ~ +150 | $^\circ\text{C}$ |

Note 1. Non-repetitive current pulse, per Fig. 3 and derated above $T_c=25^\circ\text{C}$ per Fig. 2

2. Mounted on copper pad area of 0.2"x0.2" (5.0x5.0 mm) per Fig 5

3. Measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per minute maximum

4. $V_F < 3.5\text{V}$ for $V_{BR} < 200\text{V}$ and $V_F < 5.0\text{V}$ for $V_{BR} > 201\text{V}$.

Electrical characteristics (at $T_A=25^\circ\text{C}$ unless otherwise noted)

| Part No. (Uni) | Part No. (Bi) | Reverse Stand-off Voltage | Breakdown Voltage @ I_T | | Test Current | Maximum Clamping Voltage @ I_{PP} | | Maximum Reverse Leakage Current | Marking Code | |
|-------------------|------------------|---------------------------------|---------------------------|---------------|-----------------|--|----------|--|--------------|----|
| | | V_{RWM} | $V_{BR\ Min}$ | $V_{BR\ Max}$ | I_T | V_c | I_{PP} | $I_R@V_{RWM}$ | | |
| | | Volts | Volts | Volts | mA | Volts | A | μA | UNI | BI |
| SMBJ 5.0A | SMBJ 5.0CA | 5.0 | 6.40 | 7.00 | 10 | 9.2 | 65.2 | 800 | KE | AE |
| SMBJ 6.0A | SMBJ 6.0CA | 6.0 | 6.67 | 7.37 | 10 | 10.3 | 58.3 | 800 | KG | AG |
| SMBJ 6.5A | SMBJ 6.5CA | 6.5 | 7.22 | 7.98 | 10 | 11.2 | 53.6 | 500 | KK | AK |
| SMBJ 7.0A | SMBJ 7.0CA | 7.0 | 7.78 | 8.60 | 10 | 12.0 | 50.0 | 200 | KM | AM |
| SMBJ 7.5A | SMBJ 7.5CA | 7.5 | 8.33 | 9.21 | 1.0 | 12.9 | 46.5 | 100 | KP | AP |
| SMBJ 8.0A | SMBJ 8.0CA | 8.0 | 8.89 | 9.83 | 1.0 | 13.6 | 44.1 | 50 | KR | AR |
| SMBJ 8.5A | SMBJ 8.5CA | 8.5 | 9.44 | 10.4 | 1.0 | 14.4 | 41.7 | 20 | KT | AT |
| SMBJ 9.0A | SMBJ 9.0CA | 9.0 | 10.0 | 11.1 | 1.0 | 15.4 | 39.0 | 10 | KV | AV |
| SMBJ 10A | SMBJ 10CA | 10 | 11.1 | 12.3 | 1.0 | 17.0 | 35.3 | 5 | KX | AX |
| SMBJ 11A | SMBJ 11CA | 11 | 12.2 | 13.5 | 1.0 | 18.2 | 33.0 | 5 | KZ | AZ |
| SMBJ 12A | SMBJ 12CA | 12 | 13.3 | 14.7 | 1.0 | 19.9 | 30.2 | 5 | LE | BE |
| SMBJ 13A | SMBJ 13CA | 13 | 14.4 | 15.9 | 1.0 | 21.5 | 27.9 | 5 | LG | BG |
| SMBJ 14A | SMBJ 14CA | 14 | 15.6 | 17.2 | 1.0 | 23.2 | 25.9 | 5 | LK | BK |
| SMBJ 15A | SMBJ 15CA | 15 | 16.7 | 18.5 | 1.0 | 24.4 | 24.6 | 5 | LM | BM |
| SMBJ 16A | SMBJ 16CA | 16 | 17.8 | 19.7 | 1.0 | 26.0 | 23.0 | 5 | LP | BP |
| SMBJ 17A | SMBJ 17CA | 17 | 18.9 | 20.9 | 1.0 | 27.6 | 21.7 | 5 | LR | BR |
| SMBJ 18A | SMBJ 18CA | 18 | 20.0 | 22.1 | 1.0 | 29.2 | 20.5 | 5 | LT | BT |
| SMBJ 20A | SMBJ 20CA | 20 | 22.2 | 24.5 | 1.0 | 32.4 | 18.5 | 5 | LV | BV |
| SMBJ 22A | SMBJ 22CA | 22 | 24.4 | 26.9 | 1.0 | 35.5 | 16.9 | 5 | LX | BX |
| SMBJ 24A | SMBJ 24CA | 24 | 26.7 | 29.5 | 1.0 | 38.9 | 15.4 | 5 | LZ | BZ |
| SMBJ 26A | SMBJ 26CA | 26 | 28.9 | 31.9 | 1.0 | 42.1 | 14.3 | 5 | ME | CE |
| SMBJ 28A | SMBJ 28CA | 28 | 31.1 | 34.4 | 1.0 | 45.4 | 13.2 | 5 | MG | CG |
| SMBJ 30A | SMBJ 30CA | 30 | 33.3 | 36.8 | 1.0 | 48.4 | 12.4 | 5 | MK | CK |
| SMBJ 33A | SMBJ 33CA | 33 | 36.7 | 40.6 | 1.0 | 53.3 | 11.3 | 5 | MM | CM |
| SMBJ 36A | SMBJ 36CA | 36 | 40.0 | 44.2 | 1.0 | 58.1 | 10.3 | 5 | MP | CP |
| SMBJ 40A | SMBJ 40CA | 40 | 44.4 | 49.1 | 1.0 | 64.5 | 9.3 | 5 | MR | CR |
| SMBJ 43A | SMBJ 43CA | 43 | 47.8 | 52.8 | 1.0 | 69.4 | 8.6 | 5 | MT | CT |
| SMBJ 45A | SMBJ 45CA | 45 | 50.0 | 55.3 | 1.0 | 72.7 | 8.3 | 5 | MV | CV |
| SMBJ 48A | SMBJ 48CA | 48 | 53.3 | 58.9 | 1.0 | 77.4 | 7.8 | 5 | MX | CX |
| SMBJ 51A | SMBJ 51CA | 51 | 56.7 | 62.7 | 1.0 | 82.4 | 7.3 | 5 | MZ | CZ |
| SMBJ 54A | SMBJ 54CA | 54 | 60.0 | 66.3 | 1.0 | 87.1 | 6.9 | 5 | NE | DE |
| SMBJ 58A | SMBJ 58CA | 58 | 64.4 | 71.2 | 1.0 | 93.6 | 6.4 | 5 | NG | DG |
| SMBJ 60A | SMBJ 60CA | 60 | 66.7 | 73.7 | 1.0 | 96.8 | 6.2 | 5 | NK | DK |
| SMBJ 64A | SMBJ 64CA | 64 | 71.1 | 78.6 | 1.0 | 103.0 | 5.8 | 5 | NM | DM |
| SMBJ 70A | SMBJ 70CA | 70 | 77.8 | 86.0 | 1.0 | 113.0 | 5.3 | 5 | NP | DP |
| SMBJ 75A | SMBJ 75CA | 75 | 83.3 | 92.1 | 1.0 | 121.0 | 5.0 | 5 | NR | DR |
| SMBJ 78A | SMBJ 78CA | 78 | 86.7 | 95.8 | 1.0 | 126.0 | 4.8 | 5 | NT | DT |
| SMBJ 85A | SMBJ 85CA | 85 | 94.4 | 104 | 1.0 | 137.0 | 4.4 | 5 | NV | DV |

Electrical characteristics (at $T_A=25^\circ\text{C}$ unless otherwise noted)

| Part No. (Uni) | Part No. (Bi) | Reverse Stand-off Voltage | Breakdown Voltage @ I_T | | Test Current | Maximum Clamping Voltage @ I_{PP} | | Maximum Reverse Leakage Current | Marking Code | |
|----------------|---------------|---------------------------|---------------------------|--------------|--------------|-------------------------------------|----------|---------------------------------|--------------|----|
| | | V_{RWM} | $V_{BR Min}$ | $V_{BR Max}$ | I_T | V_c | I_{PP} | $I_R @ V_{RWM}$ | | |
| | | Volts | Volts | Volts | mA | Volts | A | μA | UNI | BI |
| SMBJ 90A | SMBJ 90CA | 90 | 100 | 111 | 1.0 | 146.0 | 4.1 | 5 | NX | DX |
| SMBJ 100A | SMBJ 100CA | 100 | 111 | 123 | 1.0 | 162.0 | 3.7 | 5 | NZ | DZ |
| SMBJ 110A | SMBJ 110CA | 110 | 122 | 135 | 1.0 | 177.0 | 3.4 | 5 | PE | EE |
| SMBJ 120A | SMBJ 120CA | 120 | 133 | 147 | 1.0 | 193.0 | 3.1 | 5 | PG | EG |
| SMBJ 130A | SMBJ 130CA | 130 | 144 | 159 | 1.0 | 209.0 | 2.9 | 5 | PK | EK |
| SMBJ 150A | SMBJ 150CA | 150 | 167 | 185 | 1.0 | 243.0 | 2.5 | 5 | PM | EM |
| SMBJ 160A | SMBJ 160CA | 160 | 178 | 197 | 1.0 | 259.0 | 2.3 | 5 | PP | EP |
| SMBJ 170A | SMBJ 170CA | 170 | 189 | 209 | 1.0 | 275.0 | 2.2 | 5 | PR | ER |
| SMBJ 180A | SMBJ 180CA | 180 | 201 | 222 | 1.0 | 292.0 | 2.1 | 5 | PT | ET |
| SMBJ 200A | SMBJ 200CA | 200 | 224 | 247 | 1.0 | 324.0 | 1.9 | 5 | PX | EX |
| SMBJ 220A | SMBJ 220CA | 220 | 246 | 272 | 1.0 | 356.0 | 1.7 | 5 | PV | EV |
| SMBJ 250A | SMBJ 250CA | 250 | 279 | 309 | 1.0 | 405.0 | 1.5 | 5 | PZ | EZ |
| SMBJ 300A | SMBJ 300CA | 300 | 335 | 371 | 1.0 | 486.0 | 1.3 | 5 | QE | FE |
| SMBJ 350A | SMBJ 350CA | 350 | 391 | 432 | 1.0 | 567.0 | 1.1 | 5 | QG | FG |
| SMBJ 400A | SMBJ 400CA | 400 | 447 | 494 | 1.0 | 648.0 | 0.9 | 5 | QK | FK |
| SMBJ 440A | SMBJ 440CA | 440 | 492 | 543 | 1.0 | 713.0 | 0.9 | 5 | QM | FM |

- Note 1. V_{BR} measured after I_T applied for 300us, I_T =square wave pulse or equivalent
- 2. Surge current waveform per Fig. 3 and derated per Fig. 2
- 3. For bi-directional types having V_{RWM} of 10 volts and less, the I_R limit is doubled
- 4. Suffix 'C' denotes bi-directional devices. Suffix 'A' denotes 5% tolerance devices, no suffix denotes 10% tolerance devices.

Fig. a - Transients of several thousand volts can be clamped to a safe level by the TVS

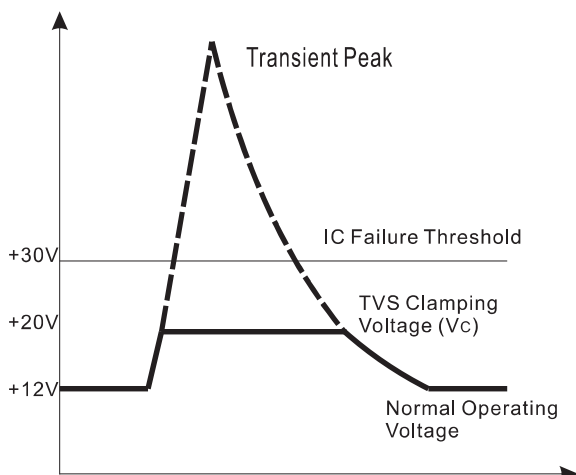
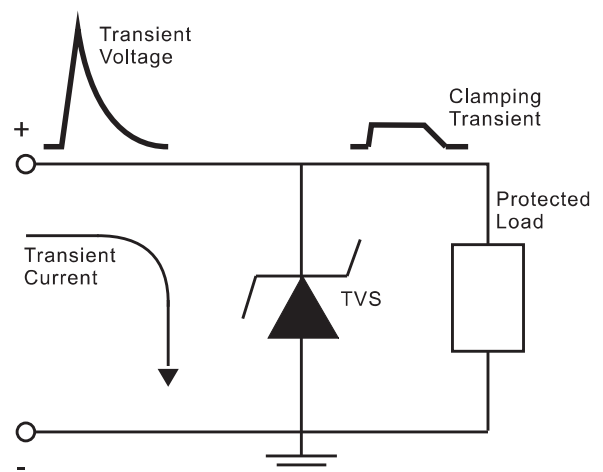


Fig. b - Transient current is diverted to ground thru TVS; the voltage seen by the protected load is limited to the clamping voltage level



Rating and characteristic curves

Fig.1 - Peak Pulse Power Rating Curve

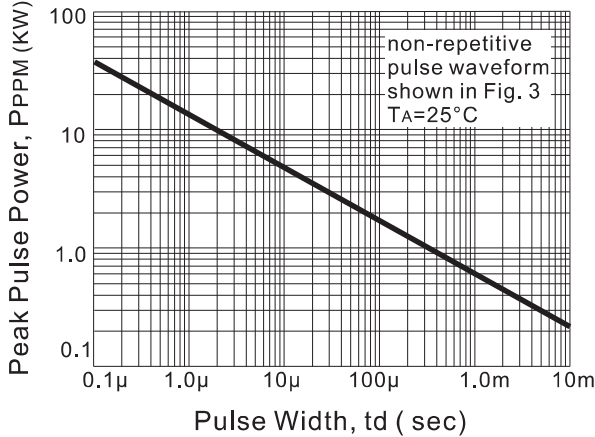


Fig.2 - Pulse Derating Curve

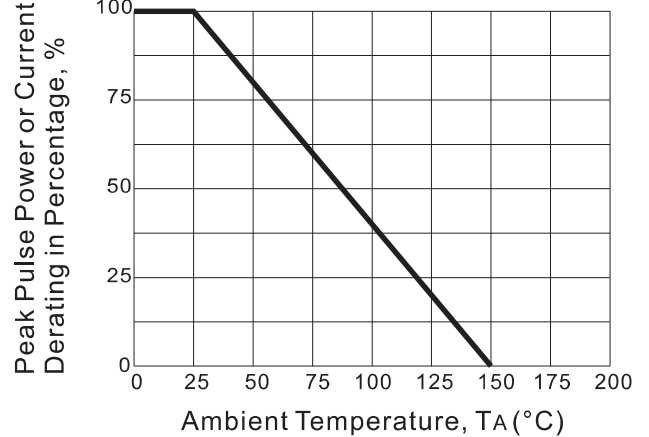


Fig.3 - Pulse Waveform

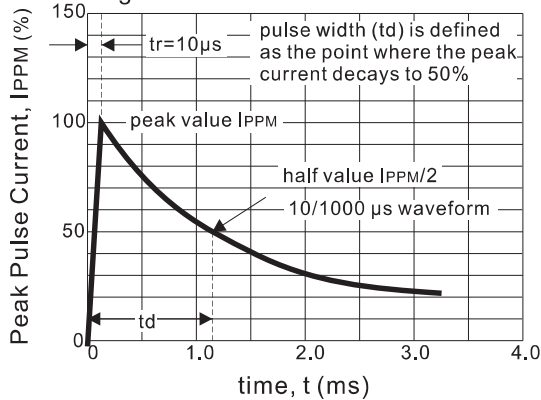


Fig.4 - Typical Junction Capacitance

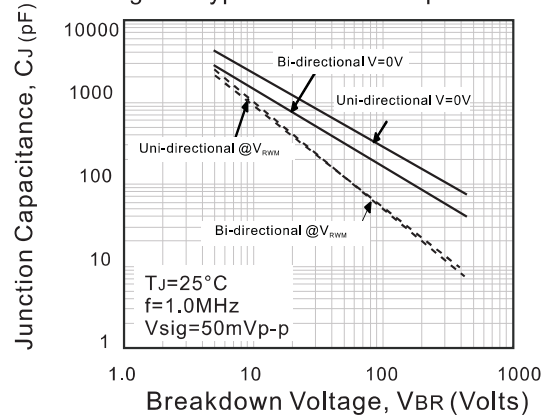


Fig.5 - Steady State Power Derating Curve

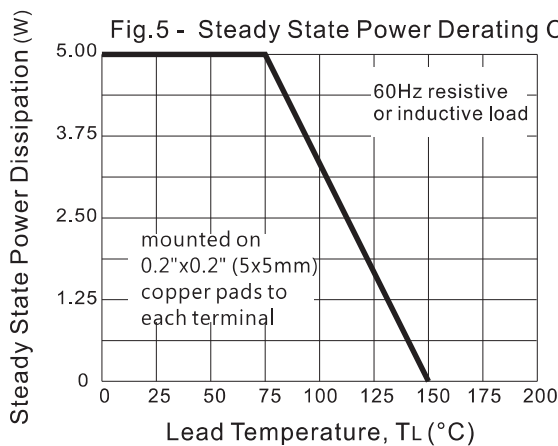
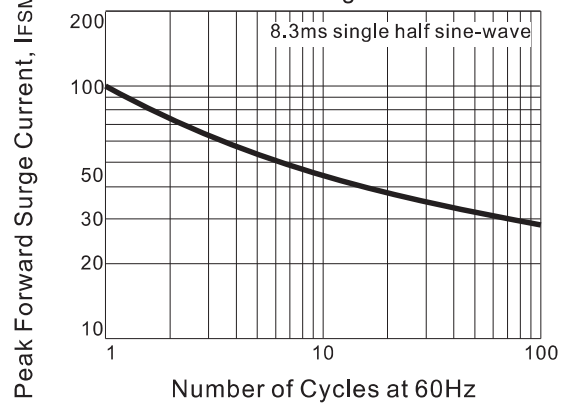


Fig.6 - Maximum Non-Repetitive Forward Surge Current



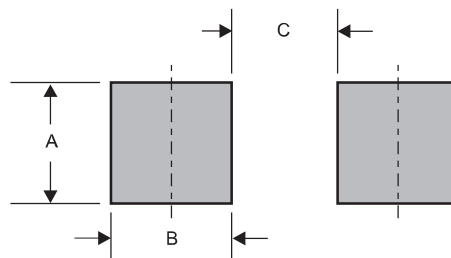
Pinning information

| Pin | Simplified outline | Symbol |
|---|--------------------|--------|
| Uni-Directional Pin1 cathode Pin2 anode | | |
| Bi-Directional | | |

Marking

| Type number | Example |
|-----------------|---------|
| Uni-Directional | |
| Bi-Directional | |

Suggested solder pad layout

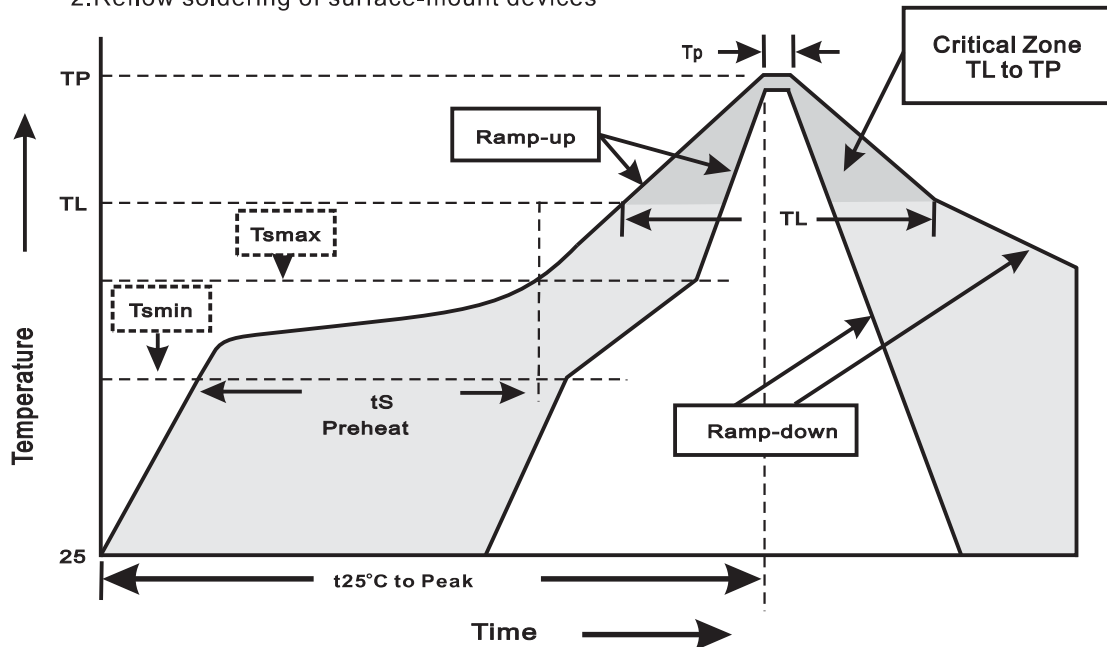


Dimensions in inches and (millimeters)

| PACKAGE | A | B | C |
|---------|--------------|--------------|--------------|
| SMB | 0.078 (2.00) | 0.059 (1.50) | 0.110 (2.80) |

Suggested thermal profiles for soldering processes

- 1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%
- 2.Reflow soldering of surface-mount devices



3.Reflow soldering

| Profile Feature | Soldering Condition |
|--|-----------------------------|
| Average ramp-up rate(TL to TP) | <3°C/sec |
| Preheat -Temperature Min(Tsmin) -Temperature Max(Tsmax) -Time(min to max)(ts) | 150°C 200°C 60~120sec |
| Tsmax to TL -Ramp-upRate | <3°C/sec |
| Time maintained above: -Temperature(TL) -Time(tL) | 217°C 60~260sec |
| Peak Temperature(TP) | 255°C-0/+5°C |
| Time within 5°C of actual Peak Temperature(tp) | 10~30sec |
| Ramp-down Rate | <6°C/sec |
| Time 25°C to Peak Temperature | <6minutes |