# SPECIFICATION FOR APPROVAL

| CUSTOMER'S APPROVAL CHOP |
|---|
| Approval's condition: _____ |
| Approved date: _____ |

PLEASE KINDLY RETURN A SET WITH YOUR COMPANY'S OFFICIAL STAMP ON APPROVAL OF THIS ITEM

**CUSTOMER'S NAME:** _____

**CUSTOMER'S MODEL NO. :** _____

**CUSTOMER'S PART NO. :** _____

**DESCRIPTION:** **Programmable Overvoltage Protector**

**Semitel'S MODEL NO. :** **SVG120D**

**VERSION:** **A**

**DATE:** **2016/4/12**

**Attachments:**

- ☐ Product specification
- ☐ Sample Qty.
- ☐ Test Data

| Prepared By | Checked By | Approved By |
|---|---|---|
| | | |



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|---|---|
| Semitel International Ltd., | TEL: 886-2-86922121 FAX: 886-2-26483379 |
| www.semitelint.com | 12F, No.183, Sec.1, Datong Rd., Xizhi Dist., New Taipei City 22145, Taiwan |

## Revision Record

| Version | Revision Date | Revision For Items | Revision For Items |
|---|---|---|---|
| A | 2016/4/12 | New Revision | - |
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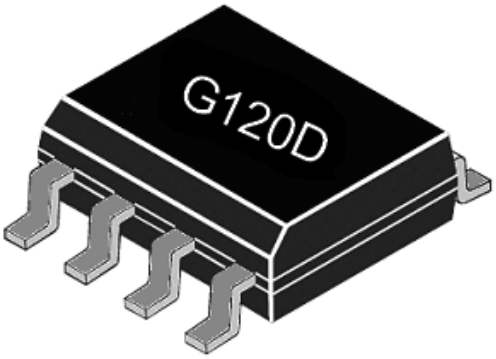
| SEMITEL'S MODEL NO. : | SVG120D | CUSTOMER'S MODEL NO. : | |
| VERSION: | A | CUSTOMER'S PART NO. : | |
| DATE: | 2016/4/12 | | |

## Description

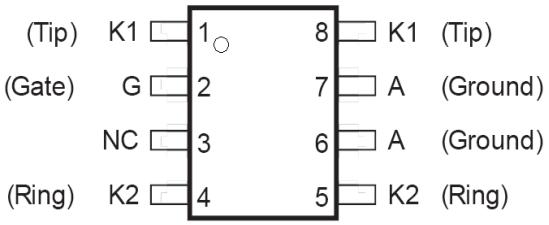
This device is especially designed to protect subscriber line card interfaces (SLIC) against transient overvoltages. Positive overloads are clipped with 2 diodes. Negative surges are suppressed by 2 thyristors, their breakdown voltage being referenced to $-V_{BAT}$ through the gate. This component presents a very low gate triggering current ($I_{GT}$) in order to reduce the current consumption on printed circuit board during the firing phase. A particular attention has been given to the internal wire bonding. The “4-point” configuration ensures reliable protection, eliminating the overvoltage introduced by the parasitic inductances of the wiring (Ldi/dt), especially for very fast transients.

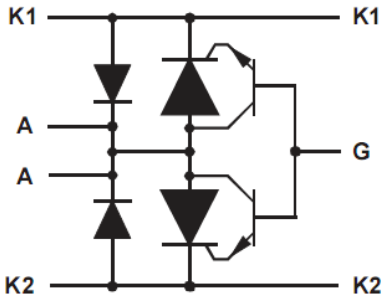



## SOP Package Top View and Device Symbol

### Pin Configuration

| Pin # | Pin Name | Description |
|---|---|---|
| 1, 4, 5, 8 | K1, K2 | Connect to subscriber lines (Tip/Ring) |
| 2 | G | Connect to battery (Reference Voltage) |
| 6, 7 | A | Connect ground |
| 3 | NC | Not connected |




## Features

Dual programmable transient suppressor

- Wide negative firing voltage range: $V_{GKRM}$=-120V max
- Low dynamic switching voltage: $V_{FRM}$ and $V_{GK(BD)}$
- Low gate triggering current: $I_{GT}$=5mA max
- Peak pulse current: $I_{PP}$=30A for 10/1000us surge
- Holding current: $I_H$=150mA min
- MSL: Level 1 - unlimited

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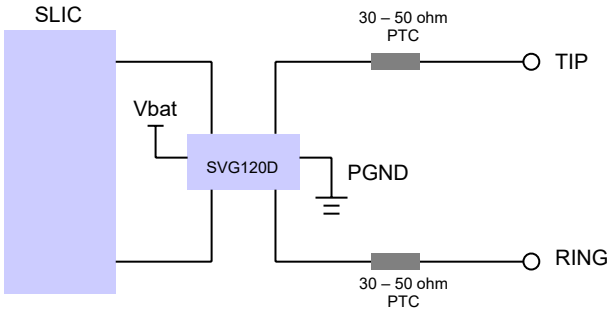
## Applications

Dual SMD PTCs are typically used as the principle over-current protectors in telecom device.

- T-1/E-1, ISDN, and xDSL transmission equipment
- Telecommunications infrastructure
- PBX's and other switches
- Set-top box
- VoIP




Typical VoIP SLIC Protection Circuit

## Telecom Standards

- YD/T 950-1998
- CCITT K20
- FCC part 68
- Bellcore
- TR-NWT-001089

| '1089 TEST CLAUSE AND TEST # | Voltage waveform (μs) | Required peak current(A) |
|---|---|---|
| 4.5.8 Second-Level 1 | 2/10μs | 120 |
| 4.5.7 first-Level 3 | 10/1000μs | 30 |

| '1089 TEST CLAUSE AND TEST # | 60 Hz power fault time | Required peak current(A) |
|---|---|---|
| 4.5.13 Second-Level 2 | 100ms | 11 |
| 4.5.13 Second-Level 2 | 1s | 4.5 |
| 4.5.13 Second-Level 2 | 5s | 2.4 |
| 4.5.13 Second-Level 1 | 300s | 0.95 |
| 4.5.13 Second-Level 1 | 900s | 0.93 |

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## Absolute Maximum Ratings

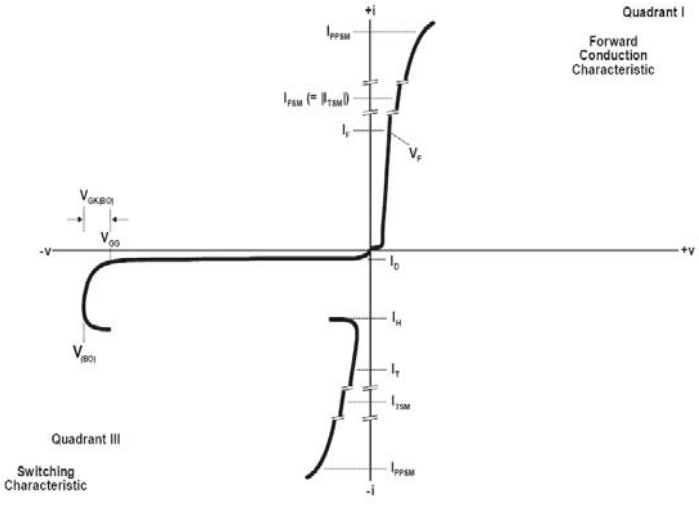
| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $I_{pp}$ | Non-repetitive peak on-state pulse current<br>10/1000μs<br>5/310μs<br>2/10μs | <br>30<br>40<br>120 | A |
| $I_{TSM}$ | Non repetitive surge peak on-state current (sinusoidal) 60Hz<br>0.1s<br>1s<br>5s<br>300s<br>900s | <br>11<br>4.5<br>2.4<br>0.95<br>0.93 | A |
| $V_{DRM}$ | Maximum voltage LINE/GROUND | -120 | V |
| $V_{GKRM}$ | Maximum voltage GATE/LINE | -120 | V |
| $T_A$ | Operating free-air temperature range | -40-85 | ℃ |
| $T_{STG}$ | Storage temperature range | -40-150 | ℃ |
| $T_J$ | Junction temperature | -40-150 | ℃ |
| $T_L$ | Maximum lead temperature for soldering during 10S | 260 | ℃ |

## Thermal Resistance

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $R_{\theta JA}$ | Junction to free air thermal resistance | 120 | ℃/W |

## Electrical Characteristics (Tamb=25℃)

| Symbol | Parameter |
|---|---|
| $I_D$ | Off-state current |
| $I_H$ | Holding current |
| $V_{(BO)}$ | Breakover voltage |
| $V_F$ | Forward voltage |
| $V_{FRM}$ | Peak forward recovery voltage |
| $V_{GK(BD)}$ | Gate-cathode impulse breakover voltage |
| $I_{GKS}$ | Gate reverse current |
| $I_{GT}$ | Gate trigger current |
| $V_{GT}$ | Gate-cathode trigger voltage |
| $C_{KA}$ | Cathode-anode off-state capacitance |




Voltage-Current Characteristic
Unless Otherwise Noted, All Voltages are Referenced to the Anode

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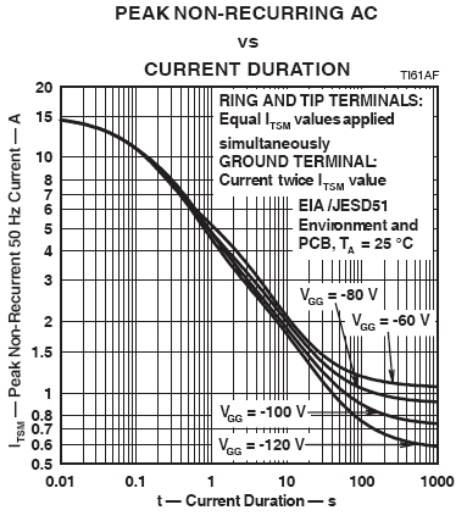
## Parameters Related to The Diode (Tamb=25℃)

| Parameter | Test conditions | Min. | Typ. | Max. | Unit. |
|---|---|---|---|---|---|
| $V_F$ forward voltage | $I_F$=5A, $t_w$=200μs | | | 3 | V |
| $V_{FRM}$ peak forward recovery voltage | 10/700μs,1.5kV,$R_P$=10Ω | | | 5 | V |
| | 2/10μs,$I_F$=56A,Rs=45Ω,$V_{GG}$=-48V,$C_G$=220nF | | 6 | | |
| | 2/10μs,$I_F$=100A,Rs=50Ω,$V_{GG}$=-48V,$C_G$=220nF | | 8 | | |
| | 1.2/50μs,$I_F$=53A,Rs=47Ω,$V_{GG}$=-48V,$C_G$=220nF | | 8 | | |
| | 1.2/50μs,$I_F$=96A,Rs=52Ω,$V_{GG}$=-48V,$C_G$=220nF | | 12 | | |

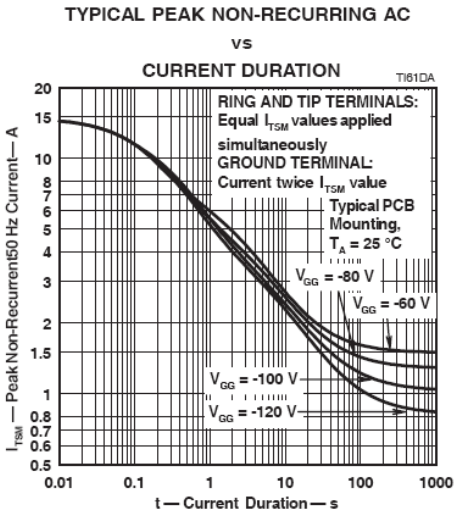
## Parameters Related to The Protection Thyristor (Tamb=25℃)

| Parameter | Test conditions | | Min. | Typ. | Max. | Unit. |
|---|---|---|---|---|---|---|
| $I_D$ off-state current | $V_D$=$V_{DRM}$, $V_{GK}$=0 | $T_J$=25℃ | | | -5 | μA |
| | | $T_J$=85℃ | | | -50 | μA |
| $V_{BO}$ breakover voltage | 10/700μs,1.5kV,$R_P$=10Ω,Ipp=30A | | | | -58 | V |
| | 2/10μs, $I_T$=-56A, Rs=45Ω,$V_{GG}$=-48V,$C_G$=220nF | | | -57 | | |
| | 2/10μs, $I_T$=-100A, Rs=50Ω,$V_{GG}$=-48V,$C_G$=220nF | | | -60 | | |
| | 1.2/50μs, $I_T$=-53A, Rs=47Ω,$V_{GG}$=-48V,$C_G$=220nF | | | -60 | | |
| | 1.2/50μs, $I_T$=-96A, Rs=52Ω,$V_{GG}$=-48V,$C_G$=220nF | | | -64 | | |
| $I_H$ holding current | $I_T$=-1A, di/dt=1A/ms,$V_{GG}$=-48V | | -150 | | | mA |
| $I_{GAS}$ gate reverse current | $V_{GG}$=$V_{GK}$= $V_{GKRM}$, $V_{KA}$=0 | $T_J$=25℃ | | | -5 | μA |
| | | $T_J$=85℃ | | | -50 | μA |
| $I_{GT}$ gate trigger current | $I_T$=3A, tp(g)≥20μs,$V_{GG}$=-48V | | | | 5 | mA |
| $V_{GT}$ gate trigger voltage | $I_T$=3A, tp(g)≥20μs,$V_{GG}$=-48V | | | | 2.5 | V |
| $Q_{GS}$ gate switching charge | 1.2/50μs, $I_T$=-53A, Rs=47Ω,$V_{GG}$=-48V,$C_G$=220nF | | | 0.1 | | μC |
| $C_{AK}$ anode-cathode offstate capacitance | f=1MHz,Vd=1V,$I_G$=0 | $V_D$=-3V | | | 110 | pF |
| | | $V_D$=-48V | | | 55 | pF |

## Thermal information (Tamb=25℃)




Non-Repetitive Peak On-State Current against Duration




Typical Non-Repetitive Peak On-state Current against Duration

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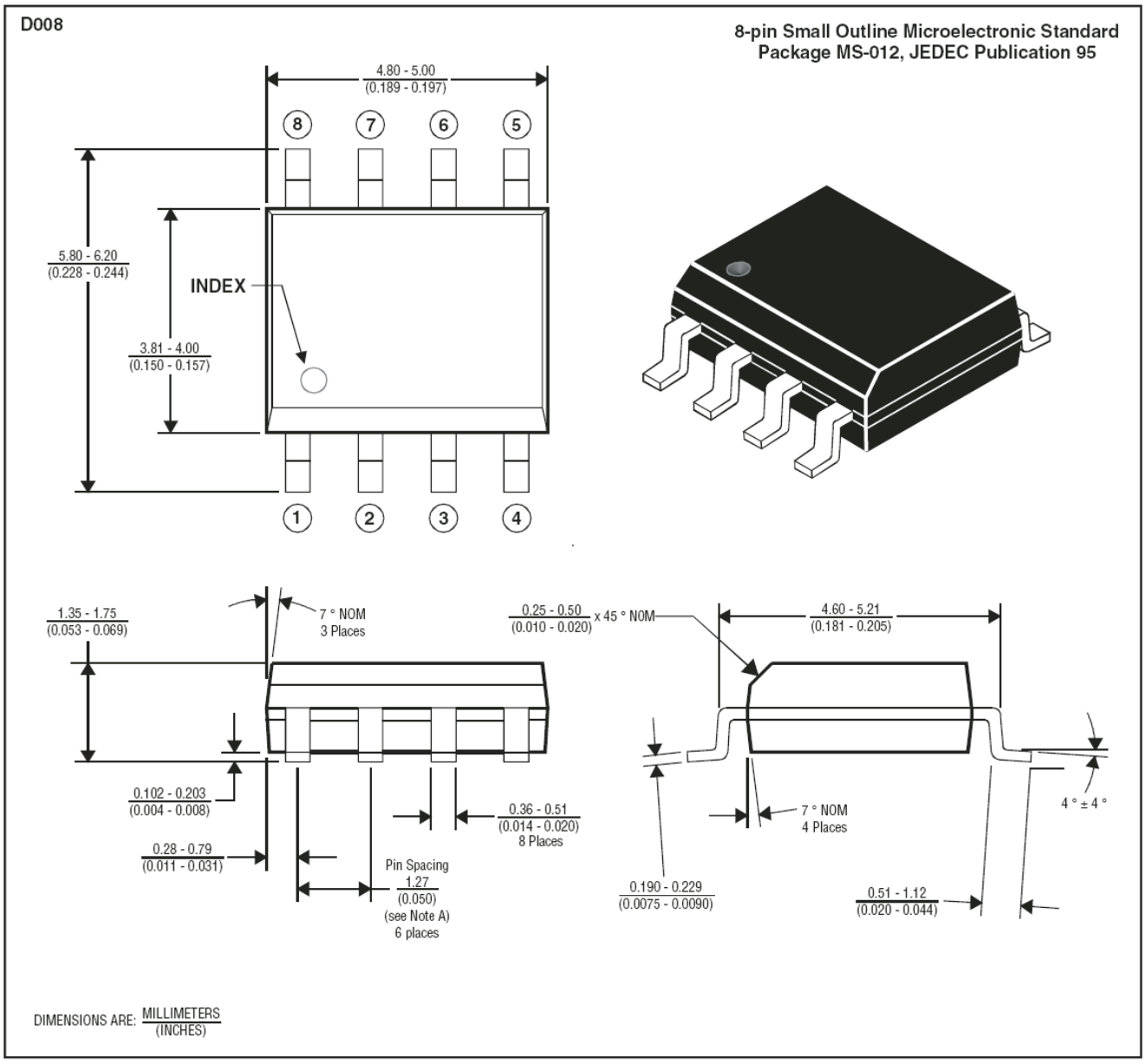
## Product Dimensions




NOTES: A. Leads are within 0.25 (0.010) radius of true position at maximum material condition.

B. Body dimensions do not include mold flash or protrusion.

C. Mold flash or protrusion shall not exceed 0.15 (0.006).

D. Lead tips to be planar within ±0.051 (0.002).

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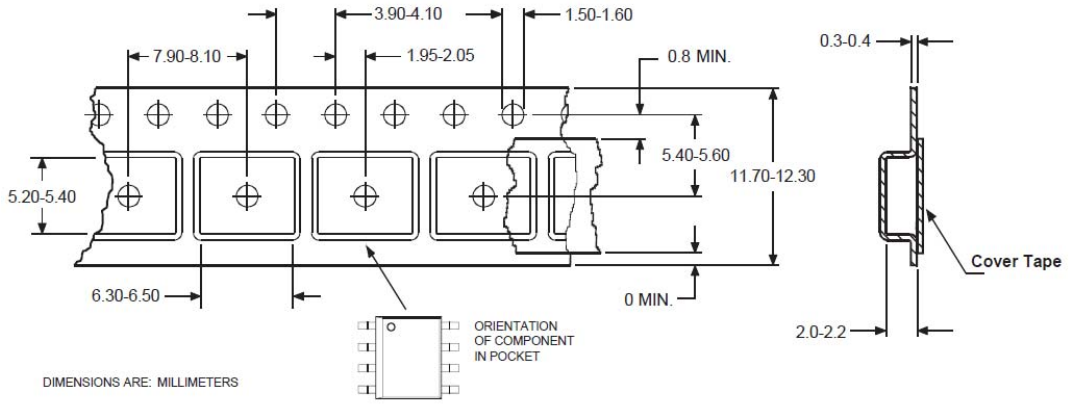
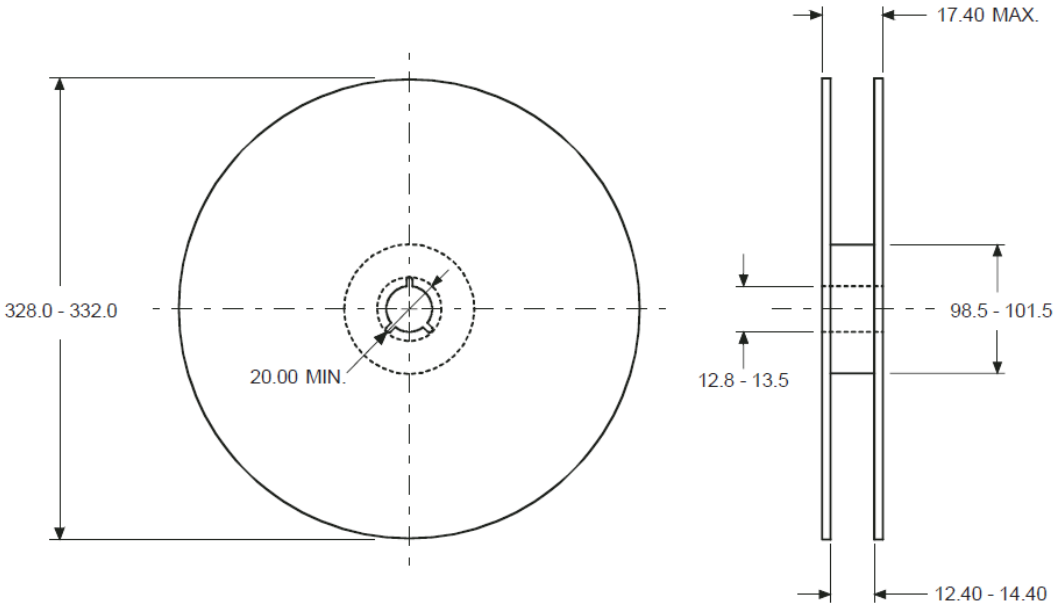
## Package Information

### Tape Dimension




### Reel Dimension

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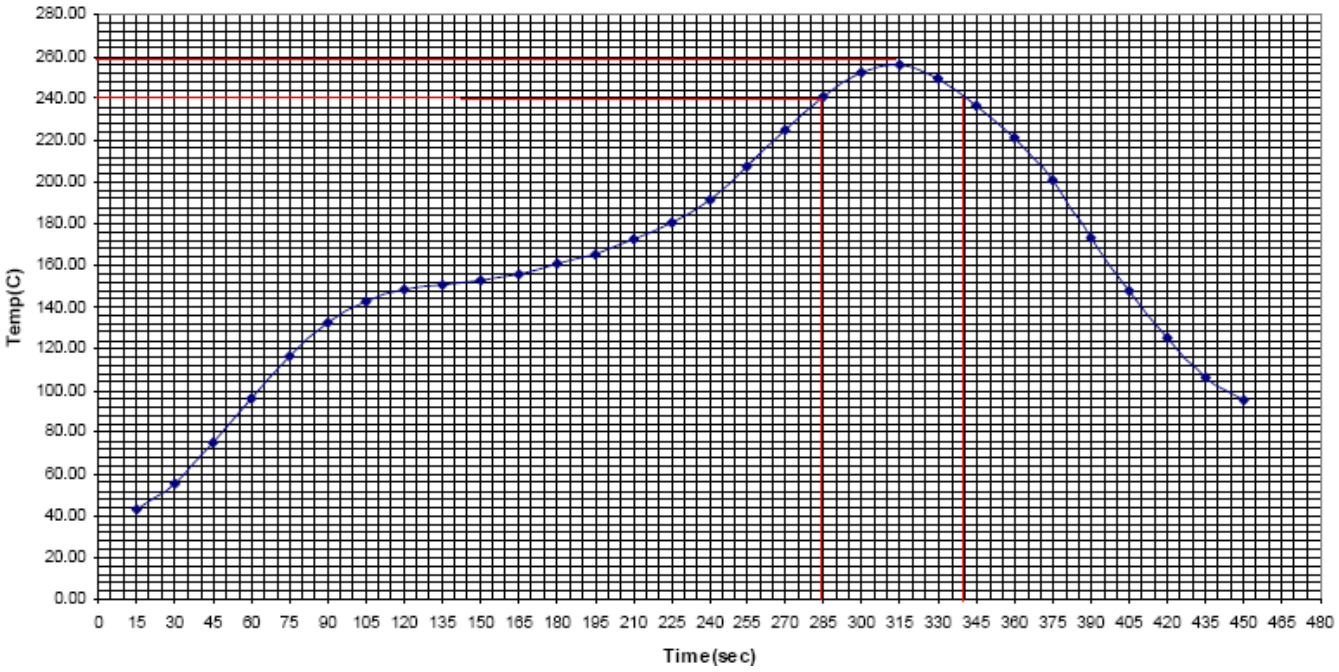
## Reflow Soldering and Rework Recommendations

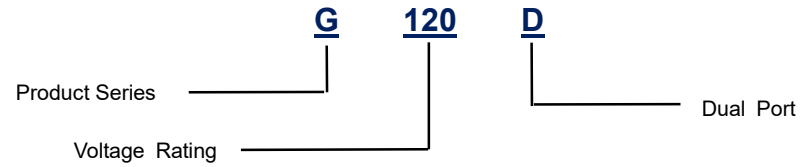
- Recommended reflow methods, Recommended reflow methods: IR, Vapor phase oven, hot air oven, wave solder.
- Devices can be cleaned using standard industry methods and solvents.
- If a device is removed from the board, it should be discarded and replaced with a new device.
- Leaded devices are not designed to be compatible with wave soldering manufacturing operations.
- Lead free reflow curve.

**Peak Temp=257C, Ramp Rate=0.802deg.C/sec.**




## Marking and Order Information

**Part Number System**




**Order Information**

| Device | Package | Net Weight | Carrier | Quantity | HSF Status |
|---|---|---|---|---|---|
| G120D | SOP-8 | 0.0080g | Tape & Reel | 2,500pcs/reel | RoHS compliant |

**Marking**


**YYWW = Date Code**

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