

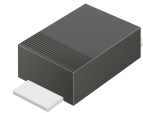
# TV02W5V0-HF Thru TV02W191-HF

**Working Peak Reverse Voltage:5.0-190 Volts**

**Peak Pulse Power:200 Watts**

**RoHS Device**

**Halogen Free**

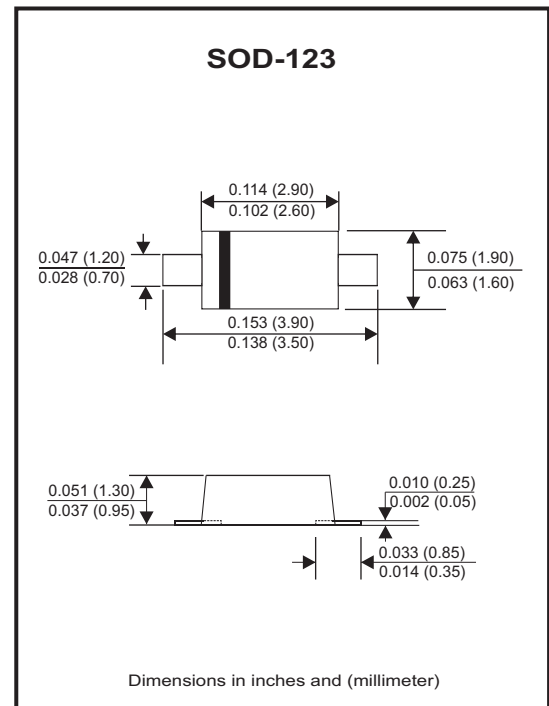


## Features

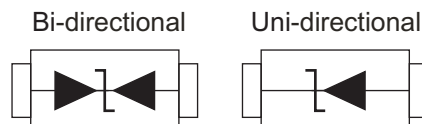
- Glass passivated chip.
- Low leakage current.
- 200W peak pulse power capility with a 10/1000us waveform,repertive rate (duty cycle):0.01%.
- Uni and bidirectional unit.
- Excellent clamping capability.
- Very fast response time.

## Mechanical data

- Case: Molded plastic.
- Epoxy: UL 94V-0 rate flame retardant.
- Lead: Solderable per MIL-STD-750, method 2026.
- Polarity: Color band denotes cathode end except bipolar.
- Mounting position: Any.
- Weight: 0.016 grams(approx.).



## Circuit Diagram



## Maximum Rating and Electrical Characteristics

Ratings at 25°C ambient temperature unless otherwise specified.  
 Single phase, half wave, 60Hz, resistive or inductive load.  
 For capacitive load, derate current by 20%.

| Parameter                                                                          | Symbol                           | Value          | Unit |
|------------------------------------------------------------------------------------|----------------------------------|----------------|------|
| Peak power dissipation at 10/1000μs waveform (Note 1)                              | P <sub>PP</sub>                  | 200            | W    |
| Peak power dissipation at 8/20μs waveform (Note 1)                                 | P <sub>PP</sub>                  | 1000           | W    |
| Peak pulse current with a 10/1000μs waveform (Note 1)                              | I <sub>PP</sub>                  | See next table | A    |
| Power dissipation on infinite heatsink at T <sub>L</sub> = 75°C                    | P <sub>D</sub>                   | 0.4            | W    |
| Peak forward surge current, 8.3ms single half sone-wave undiresional only (Note 2) | I <sub>FSM</sub>                 | 20             | A    |
| Max.instantaneous forward voltage at 25A for undiresional only                     | V <sub>F</sub>                   | 3.5            | V    |
| Operating junction and storage temperature range                                   | T <sub>J</sub> ,T <sub>STG</sub> | -55 to +150    | °C   |

Notes:

1. Non-repetitive current pulse, per Fig.3 and derated above T<sub>A</sub>=25°C per Fig.1
2. Measured on 8.3ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per minute maximum.

Company reserves the right to improve product design , functions and reliability without notice.

REV:C

## Rating and Characteristic Curves (TV02W5V0-HF Thru. TV02W191-HF)

Fig. 1 - Pulse Derating Curve

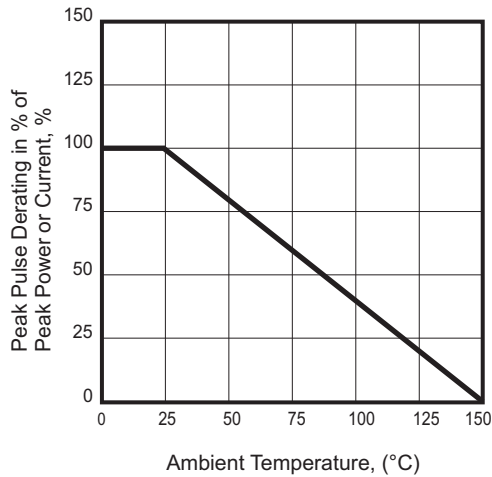


Fig.2 - Steady State Power Derating Curve

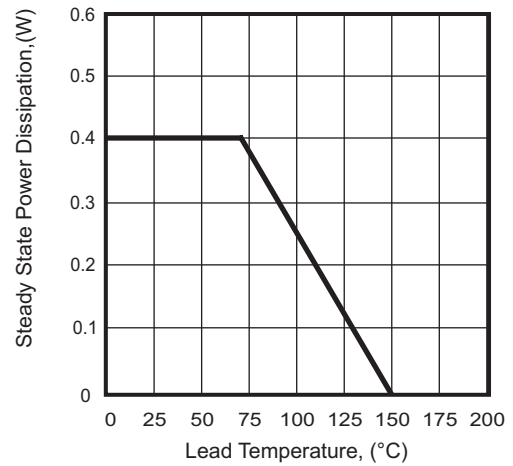


Fig. 3 - Pulse Waveform

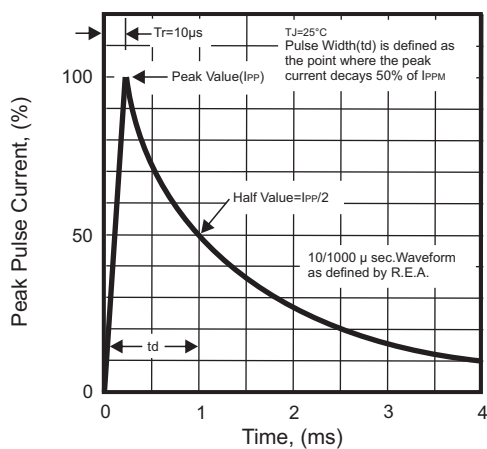


Fig. 4 - Peak Pulse Power Rating Curve

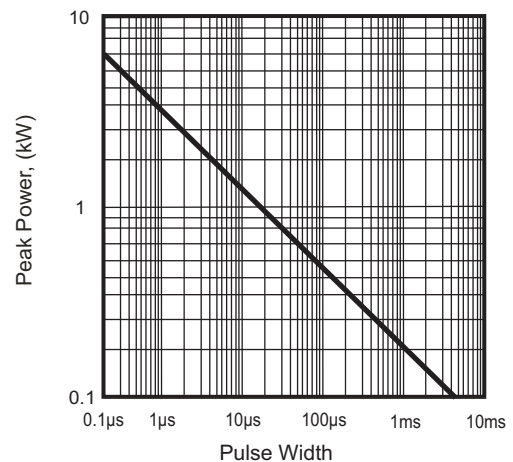


Fig. 5 - Maximum Non-Repetitive Surge Current

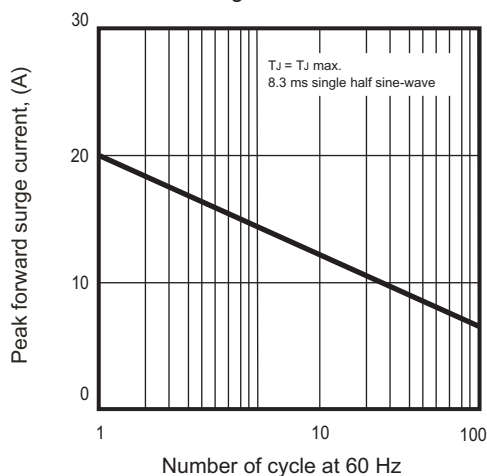
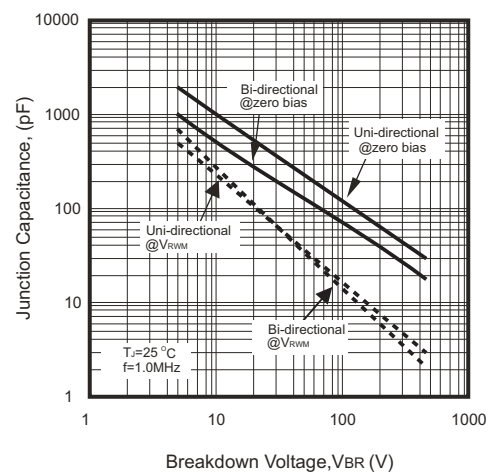


Fig.6 - Typical Junction Capacitance



# SMD Transient Voltage Suppressor

## Electrical Characteristics (TV02W5V0-HF Thru. TV02W191-HF)

| Part No        | Absolute Maximum Rating (Ta=25°C) |                      |                      |                | V <sub>C</sub> (Max.) | I <sub>PP</sub> (Max.) | I <sub>R</sub> (Max.) | Marking Code |    |
|----------------|-----------------------------------|----------------------|----------------------|----------------|-----------------------|------------------------|-----------------------|--------------|----|
|                | V <sub>RWM</sub>                  | V <sub>BR</sub> Min. | V <sub>BR</sub> Max. | I <sub>T</sub> | @ IPP                 | @ 10/1000us            | @ V <sub>RWM</sub>    |              |    |
|                | (V)                               | (V)                  | (V)                  | (mA)           | (V)                   | (A)                    | (uA)                  | Uni          | Bi |
| TV02W5V0(B)-HF | 5.0                               | 6.40                 | 7.00                 | 10             | 9.20                  | 21.74                  | 400                   | FE           | KE |
| TV02W6V0(B)-HF | 6.0                               | 6.67                 | 7.37                 | 10             | 10.3                  | 19.42                  | 400                   | FG           | KG |
| TV02W6V5(B)-HF | 6.5                               | 7.22                 | 7.98                 | 10             | 11.2                  | 17.86                  | 250                   | FK           | KK |
| TV02W7V0(B)-HF | 7.0                               | 7.78                 | 8.60                 | 10             | 12.0                  | 16.67                  | 100                   | FM           | KM |
| TV02W7V5(B)-HF | 7.5                               | 8.33                 | 9.21                 | 1              | 12.9                  | 15.50                  | 50                    | FP           | KP |
| TV02W8V0(B)-HF | 8.0                               | 8.89                 | 9.83                 | 1              | 13.6                  | 14.71                  | 25                    | FR           | KR |
| TV02W8V5(B)-HF | 8.5                               | 9.44                 | 10.40                | 1              | 14.4                  | 13.89                  | 10                    | FT           | KT |
| TV02W9V0(B)-HF | 9.0                               | 10.00                | 11.10                | 1              | 15.4                  | 12.99                  | 5                     | FV           | KV |
| TV02W100(B)-HF | 10.0                              | 11.10                | 12.30                | 1              | 17.0                  | 11.76                  | 2.5                   | FX           | KX |
| TV02W110(B)-HF | 11.0                              | 12.20                | 13.50                | 1              | 18.2                  | 10.99                  | 2.5                   | FZ           | KZ |
| TV02W120(B)-HF | 12.0                              | 13.30                | 14.70                | 1              | 19.9                  | 10.05                  | 2.5                   | HE           | LE |
| TV02W130(B)-HF | 13.0                              | 14.40                | 15.90                | 1              | 21.5                  | 9.30                   | 1                     | HG           | LG |
| TV02W140(B)-HF | 14.0                              | 15.60                | 17.20                | 1              | 23.2                  | 8.62                   | 1                     | HK           | LK |
| TV02W150(B)-HF | 15.0                              | 16.70                | 18.50                | 1              | 24.4                  | 8.20                   | 1                     | HM           | LM |
| TV02W160(B)-HF | 16.0                              | 17.80                | 19.70                | 1              | 26.0                  | 7.69                   | 1                     | HP           | LP |
| TV02W170(B)-HF | 17.0                              | 18.90                | 20.90                | 1              | 27.6                  | 7.25                   | 1                     | HR           | LR |
| TV02W180(B)-HF | 18.0                              | 20.00                | 22.10                | 1              | 29.2                  | 6.85                   | 1                     | HT           | LT |
| TV02W190(B)-HF | 19.0                              | 21.10                | 23.30                | 1              | 30.6                  | 6.54                   | 1                     | HB           | LB |
| TV02W200(B)-HF | 20.0                              | 22.20                | 24.50                | 1              | 32.4                  | 6.17                   | 1                     | HV           | LV |
| TV02W220(B)-HF | 22.0                              | 24.40                | 26.90                | 1              | 35.5                  | 5.63                   | 1                     | HX           | LX |
| TV02W240(B)-HF | 24.0                              | 26.70                | 29.50                | 1              | 38.9                  | 5.14                   | 1                     | HZ           | LZ |
| TV02W260(B)-HF | 26.0                              | 28.90                | 31.90                | 1              | 42.1                  | 4.75                   | 1                     | JE           | ME |
| TV02W280(B)-HF | 28.0                              | 31.10                | 34.40                | 1              | 45.4                  | 4.41                   | 1                     | JG           | MG |
| TV02W300(B)-HF | 30.0                              | 33.30                | 36.80                | 1              | 48.4                  | 4.13                   | 1                     | JK           | MK |
| TV02W330(B)-HF | 33.0                              | 36.70                | 40.60                | 1              | 53.3                  | 3.75                   | 1                     | JM           | MM |
| TV02W360(B)-HF | 36.0                              | 40.00                | 44.20                | 1              | 58.1                  | 3.44                   | 1                     | JP           | MP |
| TV02W400(B)-HF | 40.0                              | 44.40                | 49.10                | 1              | 64.5                  | 3.10                   | 1                     | JR           | MR |
| TV02W430(B)-HF | 43.0                              | 47.80                | 52.80                | 1              | 69.4                  | 2.88                   | 1                     | JT           | MT |
| TV02W450(B)-HF | 45.0                              | 50.00                | 55.30                | 1              | 72.7                  | 2.75                   | 1                     | JV           | MV |
| TV02W480(B)-HF | 48.0                              | 53.30                | 58.90                | 1              | 77.4                  | 2.58                   | 1                     | JX           | MX |
| TV02W510(B)-HF | 51.0                              | 56.70                | 62.70                | 1              | 82.4                  | 2.43                   | 1                     | JZ           | MZ |
| TV02W540(B)-HF | 54.0                              | 60.00                | 66.30                | 1              | 87.1                  | 2.30                   | 1                     | XE           | NE |
| TV02W580(B)-HF | 58.0                              | 64.40                | 71.20                | 1              | 93.6                  | 2.14                   | 1                     | XG           | NG |
| TV02W600(B)-HF | 60.0                              | 66.70                | 73.70                | 1              | 96.8                  | 2.07                   | 1                     | XK           | NK |
| TV02W640(B)-HF | 64.0                              | 71.10                | 78.60                | 1              | 103.0                 | 1.94                   | 1                     | XM           | NM |
| TV02W700(B)-HF | 70.0                              | 77.80                | 86.00                | 1              | 113.0                 | 1.77                   | 1                     | XP           | NP |
| TV02W750(B)-HF | 75.0                              | 83.30                | 92.10                | 1              | 121.0                 | 1.65                   | 1                     | XR           | NR |
| TV02W780(B)-HF | 78.0                              | 86.70                | 95.80                | 1              | 126.0                 | 1.59                   | 1                     | XT           | NT |
| TV02W800(B)-HF | 80.0                              | 88.80                | 97.60                | 1              | 129.0                 | 1.55                   | 1                     | XB           | NB |
| TV02W850(B)-HF | 85.0                              | 94.40                | 104.00               | 1              | 137.0                 | 1.46                   | 1                     | XV           | NV |
| TV02W900(B)-HF | 90.0                              | 100.00               | 111.00               | 1              | 146.0                 | 1.37                   | 1                     | XX           | NX |
| TV02W101(B)-HF | 100.0                             | 111.00               | 123.00               | 1              | 162.0                 | 1.23                   | 1                     | XZ           | NZ |
| TV02W111(B)-HF | 110.0                             | 122.00               | 135.00               | 1              | 177.0                 | 1.13                   | 1                     | TE           | PE |
| TV02W121(B)-HF | 120.0                             | 133.00               | 147.00               | 1              | 193.0                 | 1.04                   | 1                     | TG           | PG |
| TV02W131(B)-HF | 130.0                             | 144.00               | 159.00               | 1              | 209.0                 | 0.96                   | 1                     | TK           | PK |
| TV02W141(B)-HF | 140.0                             | 155.00               | 171.00               | 1              | 224.0                 | 0.89                   | 1                     | TB           | PB |
| TV02W151(B)-HF | 150.0                             | 167.00               | 185.00               | 1              | 243.0                 | 0.82                   | 1                     | TM           | PM |
| TV02W161(B)-HF | 160.0                             | 178.00               | 197.00               | 1              | 259.0                 | 0.77                   | 1                     | TP           | PP |
| TV02W171(B)-HF | 170.0                             | 189.00               | 209.00               | 1              | 275.0                 | 0.73                   | 1                     | TR           | PR |
| TV02W181(B)-HF | 180.0                             | 200.00               | 220.00               | 1              | 292.0                 | 0.68                   | 1                     | TT           | PT |
| TV02W191(B)-HF | 190.0                             | 211.00               | 232.00               | 1              | 308.0                 | 0.65                   | 1                     | TV           | PV |

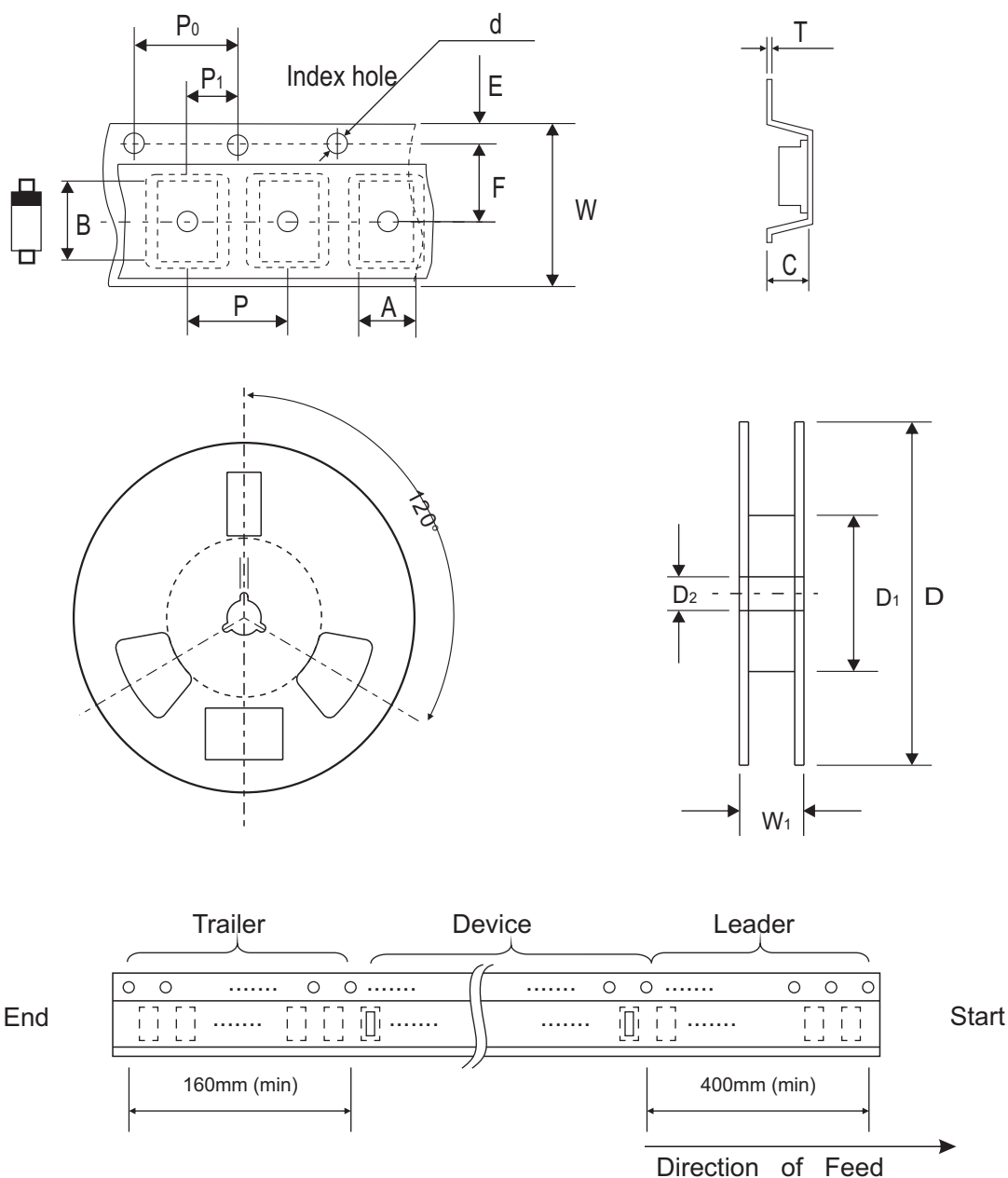
**Notes:**

1. Suffix B after part number to specify bi-directional devices.
2. For Bi-Directional devices having V<sub>R</sub> of 10 volts and under, the I<sub>R</sub> limit is double.

Company reserves the right to improve product design , functions and reliability without notice.

REV:C

## Reel Taping Specification

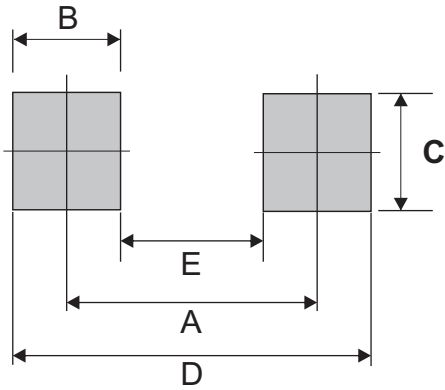


| SOD-123 | SYMBOL | A                 | B                 | C                 | d                 | D                 | D1         | D2                |
|---------|--------|-------------------|-------------------|-------------------|-------------------|-------------------|------------|-------------------|
|         | (mm)   | $1.85 \pm 0.10$   | $3.94 \pm 0.10$   | $1.57 \pm 0.10$   | $1.55 \pm 0.05$   | $178.00 \pm 1.00$ | 50.00 Min. | $13.00 \pm 0.20$  |
|         | (inch) | $0.073 \pm 0.004$ | $0.155 \pm 0.004$ | $0.062 \pm 0.004$ | $0.061 \pm 0.002$ | $7.008 \pm 0.039$ | 1.969 Min. | $0.512 \pm 0.008$ |

| SOD-123 | SYMBOL | E                 | F                 | P                 | $P_0$             | $P_1$             | W                 | $W_1$      |
|---------|--------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------|
|         | (mm)   | $1.75 \pm 0.10$   | $3.50 \pm 0.05$   | $4.00 \pm 0.10$   | $4.00 \pm 0.10$   | $2.00 \pm 0.05$   | $8.00 \pm 0.10$   | 11.40 Max. |
|         | (inch) | $0.069 \pm 0.004$ | $0.138 \pm 0.002$ | $0.157 \pm 0.004$ | $0.157 \pm 0.004$ | $0.079 \pm 0.002$ | $0.315 \pm 0.004$ | 0.449 Max. |

## Suggested PAD Layout

| SIZE | SOD-123 |        |
|------|---------|--------|
|      | (mm)    | (inch) |
| A    | 2.90    | 0.114  |
| B    | 1.30    | 0.051  |
| C    | 1.40    | 0.055  |
| D    | 4.20    | 0.165  |
| E    | 1.60    | 0.063  |



## Standard Packaging

| Case Type | REEL PACK       |                     |
|-----------|-----------------|---------------------|
|           | REEL<br>( pcs ) | Reel Size<br>(inch) |
| SOD-123   | 3,000           | 7                   |

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