

**SURFACE MOUNT ZENER DIODE**

**VOLTAGE RANGE 2.4 to 91 Volts POWER RATING 500 mWatts**

**FEATURES**

- \* Planar Die Construction
- \* 500mW Power Dissipation
- \* General Purpose, Medium Current
- \* Ideally Suited for Automated Assembly Processes
- \* ESD Rating of Class 3(> 16kV) per Human Body Model
- \* MSL: Level 1
- \* P/N suffix V means AEC-Q101 qualified, e.g:MMSZ5221BV
- \* Halogen-free

**MECHANICAL DATA**

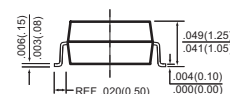
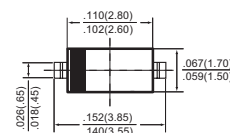
- \* Case: Molded plastic
- \* Epoxy: UL 94V-O rate flame retardant
- \* Lead: MIL-STD-202E method 208C guaranteed
- \* Mounting position: Any
- \* Weight: 0.01 gram

**MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS**

Ratings at 25 °C ambient temperature unless otherwise specified.



**SOD-123**



Dimensions in inches and (millimeters)

**MAXIMUM RATINGS** ( @ TA = 25°C unless otherwise noted )

| RATINGS                                               | SYMBOL           | VALUE       | UNITS |
|-------------------------------------------------------|------------------|-------------|-------|
| Max. Steady State Power Dissipation @TA=25°C (Note 1) | P <sub>D</sub>   | 500         | mW    |
| Max. Operating Temperature Range                      | T <sub>J</sub>   | -65 to +150 | °C    |
| Storage Temperature Range                             | T <sub>STG</sub> | -65 to +150 | °C    |

**ELECTRICAL CHARACTERISTICS** ( @ TA = 25°C unless otherwise noted )

| CHARACTERISTICS                                             | SYMBOL         | MIN. | TYP. | MAX. | UNITS |
|-------------------------------------------------------------|----------------|------|------|------|-------|
| Thermal Resistance Junction to Ambient (Note 1)             | R θJA          | -    | -    | 350  | °C/W  |
| Max. Instantaneous Forward Voltage at I <sub>F</sub> = 10mA | V <sub>F</sub> | -    | -    | 0.9  | Volts |

Note 1. Dvice mounted on ceramic PCB; 7.6mm x 9.4mm x 0.87mm with pad areas 25 mm<sup>2</sup>.

2020-03/08  
REV: G

## ELECTRICAL CHARACTERISTICS (@TA=25°C unless otherwise specified)

| TYPE      | MARKING | Zener voltage Range (Note 1)<br>Vz (V) @ IZT |       |       | Test<br>current<br><br>IZT (mA) | Maximum Zener impedance |            |                   | Maximum Reverse<br>leakage current |              |
|-----------|---------|----------------------------------------------|-------|-------|---------------------------------|-------------------------|------------|-------------------|------------------------------------|--------------|
|           |         | Nom                                          | Min   | Max   |                                 | ZZT<br>at IZT<br>(Ω)    | ZZK<br>(Ω) | at<br>IZK<br>(mA) | IR<br>(μA)                         | at VR<br>(V) |
|           |         | Volts                                        | Volts | Volts |                                 |                         |            |                   |                                    |              |
| MMSZ5221B | C1      | 2.4                                          | 2.28  | 2.52  | 20                              | 30                      | 1200       | 0.25              | 100                                | 1.0          |
| MMSZ5222B | C2      | 2.5                                          | 2.38  | 2.63  | 20                              | 30                      | 1250       | 0.25              | 100                                | 1.0          |
| MMSZ5223B | C3      | 2.7                                          | 2.57  | 2.84  | 20                              | 30                      | 1300       | 0.25              | 75                                 | 1.0          |
| MMSZ5225B | C5      | 3.0                                          | 2.85  | 3.15  | 20                              | 30                      | 1600       | 0.25              | 50                                 | 1.0          |
| MMSZ5226B | G1      | 3.3                                          | 3.14  | 3.47  | 20                              | 28                      | 1600       | 0.25              | 25                                 | 1.0          |
| MMSZ5227B | G2      | 3.6                                          | 3.42  | 3.78  | 20                              | 24                      | 1700       | 0.25              | 15                                 | 1.0          |
| MMSZ5228B | G3      | 3.9                                          | 3.71  | 4.10  | 20                              | 23                      | 1900       | 0.25              | 10                                 | 1.0          |
| MMSZ5229B | G4      | 4.3                                          | 4.09  | 4.52  | 20                              | 22                      | 2000       | 0.25              | 5.0                                | 1.0          |
| MMSZ5230B | G5      | 4.7                                          | 4.47  | 4.94  | 20                              | 19                      | 1900       | 0.25              | 5.0                                | 2.0          |
| MMSZ5231B | E1      | 5.1                                          | 4.85  | 5.36  | 20                              | 17                      | 1600       | 0.25              | 5.0                                | 2.0          |
| MMSZ5232B | E2      | 5.6                                          | 5.32  | 5.88  | 20                              | 11                      | 1600       | 0.25              | 5.0                                | 3.0          |
| MMSZ5233B | E3      | 6.0                                          | 5.70  | 6.30  | 20                              | 7                       | 1600       | 0.25              | 5.0                                | 3.5          |
| MMSZ5234B | E4      | 6.2                                          | 5.89  | 6.51  | 20                              | 7                       | 1000       | 0.25              | 5.0                                | 4.0          |
| MMSZ5235B | E5      | 6.8                                          | 6.46  | 7.14  | 20                              | 5                       | 750        | 0.25              | 3.0                                | 5.0          |
| MMSZ5236B | F1      | 7.5                                          | 7.13  | 7.88  | 20                              | 6                       | 500        | 0.25              | 3.0                                | 6.0          |
| MMSZ5237B | F2      | 8.2                                          | 7.79  | 8.61  | 20                              | 8                       | 500        | 0.25              | 3.0                                | 6.5          |
| MMSZ5238B | F3      | 8.7                                          | 8.27  | 9.14  | 20                              | 8                       | 600        | 0.25              | 3.0                                | 6.5          |
| MMSZ5239B | F4      | 9.1                                          | 8.65  | 9.56  | 20                              | 10                      | 600        | 0.25              | 3.0                                | 7.0          |
| MMSZ5240B | F5      | 10                                           | 9.50  | 10.50 | 20                              | 17                      | 600        | 0.25              | 3.0                                | 8.0          |
| MMSZ5241B | H1      | 11                                           | 10.45 | 11.55 | 20                              | 22                      | 600        | 0.25              | 2.0                                | 8.4          |
| MMSZ5242B | H2      | 12                                           | 11.40 | 12.60 | 20                              | 30                      | 600        | 0.25              | 1.0                                | 9.1          |
| MMSZ5243B | H3      | 13                                           | 12.35 | 13.65 | 9.5                             | 13                      | 600        | 0.25              | 0.5                                | 9.9          |
| MMSZ5244B | H4      | 14                                           | 13.3  | 14.7  | 9.0                             | 15                      | 600        | 0.25              | 0.1                                | 10           |
| MMSZ5245B | H5      | 15                                           | 14.25 | 15.75 | 8.5                             | 16                      | 600        | 0.25              | 0.1                                | 11           |
| MMSZ5246B | J1      | 16                                           | 15.20 | 16.80 | 7.8                             | 17                      | 600        | 0.25              | 0.1                                | 12           |
| MMSZ5247B | J2      | 17                                           | 16.15 | 17.85 | 7.4                             | 19                      | 600        | 0.25              | 0.1                                | 13           |
| MMSZ5248B | J3      | 18                                           | 17.10 | 18.90 | 7.0                             | 21                      | 600        | 0.25              | 0.1                                | 14           |
| MMSZ5250B | J5      | 20                                           | 19.00 | 21.00 | 6.2                             | 25                      | 600        | 0.25              | 0.1                                | 15           |
| MMSZ5251B | K1      | 22                                           | 20.90 | 23.10 | 5.6                             | 29                      | 600        | 0.25              | 0.1                                | 17           |
| MMSZ5252B | K2      | 24                                           | 22.80 | 25.20 | 5.2                             | 33                      | 600        | 0.25              | 0.1                                | 18           |
| MMSZ5254B | K4      | 27                                           | 25.65 | 28.35 | 5.0                             | 41                      | 600        | 0.25              | 0.1                                | 21           |
| MMSZ5255B | K5      | 28                                           | 26.60 | 29.40 | 4.5                             | 44                      | 600        | 0.25              | 0.1                                | 21           |
| MMSZ5256B | M1      | 30                                           | 28.50 | 31.50 | 4.2                             | 49                      | 600        | 0.25              | 0.1                                | 23           |
| MMSZ5257B | M2      | 33                                           | 31.35 | 34.65 | 3.8                             | 58                      | 700        | 0.25              | 0.1                                | 25           |
| MMSZ5258B | M3      | 36                                           | 34.20 | 37.80 | 3.4                             | 70                      | 700        | 0.25              | 0.1                                | 27           |
| MMSZ5259B | M4      | 39                                           | 37.05 | 40.95 | 3.2                             | 80                      | 800        | 0.25              | 0.1                                | 30           |
| MMSZ5260B | M5      | 43                                           | 40.85 | 45.15 | 3.0                             | 93                      | 900        | 0.25              | 0.1                                | 33           |
| MMSZ5261B | N1      | 47                                           | 44.65 | 49.35 | 2.7                             | 105                     | 1000       | 0.25              | 0.1                                | 36           |
| MMSZ5262B | N2      | 51                                           | 48.45 | 53.55 | 2.5                             | 125                     | 1100       | 0.25              | 0.1                                | 39           |
| MMSZ5263B | N3      | 56                                           | 53.20 | 58.80 | 2.2                             | 150                     | 1300       | 0.25              | 0.1                                | 43           |
| MMSZ5264B | N4      | 60                                           | 57.00 | 63.00 | 2.1                             | 170                     | 1400       | 0.25              | 0.1                                | 46           |
| MMSZ5265B | N5      | 62                                           | 58.90 | 65.10 | 2.0                             | 185                     | 1400       | 0.25              | 0.1                                | 47           |
| MMSZ5266B | P1      | 68                                           | 64.60 | 71.40 | 1.8                             | 230                     | 1600       | 0.25              | 0.1                                | 52           |
| MMSZ5267B | P2      | 75                                           | 71.25 | 78.75 | 1.7                             | 270                     | 1700       | 0.25              | 0.1                                | 56           |
| MMSZ5268B | P3      | 82                                           | 77.90 | 86.10 | 1.5                             | 330                     | 2000       | 0.25              | 0.1                                | 62           |
| MMSZ5269B | P4      | 87                                           | 82.65 | 91.35 | 1.4                             | 370                     | 2200       | 0.25              | 0.1                                | 68           |
| MMSZ5270B | P5      | 91                                           | 86.45 | 95.55 | 1.4                             | 400                     | 2300       | 0.25              | 0.1                                | 69           |

Note 1. Tested with pulses,  $T_p \leq 1.0\text{ms}$ .

## RATING AND CHARACTERISTICS CURVES ( MMSZ5221B-MMSZ5270B )

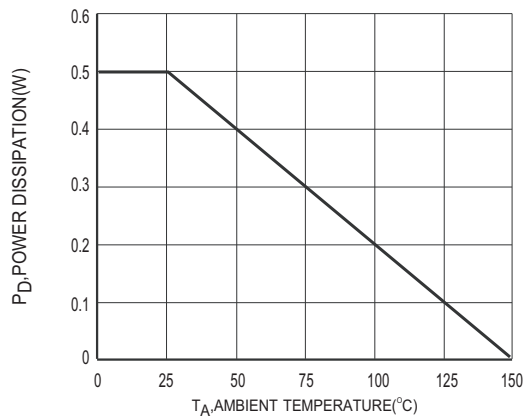


Figure 1 Power Dissipation vs Ambient Temperature

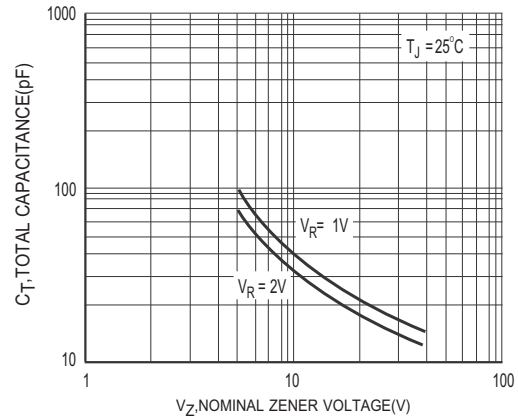


Figure 2 Typical Capacitance

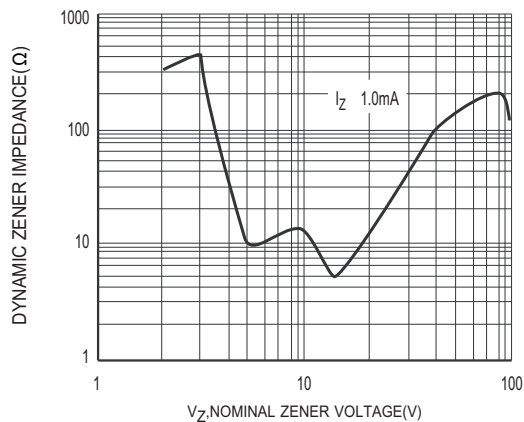


Figure 3 Zener Voltage vs Zener Impedance

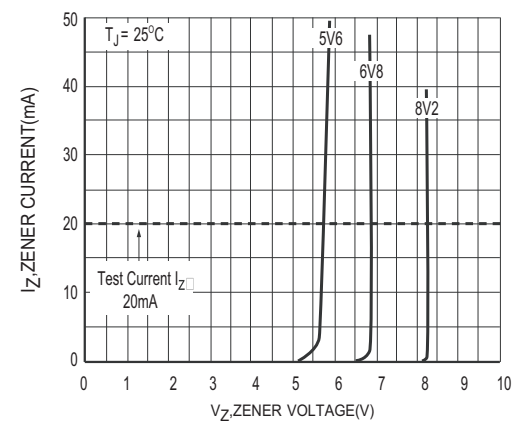


Figure 4 Zener Breakdown Characteristics

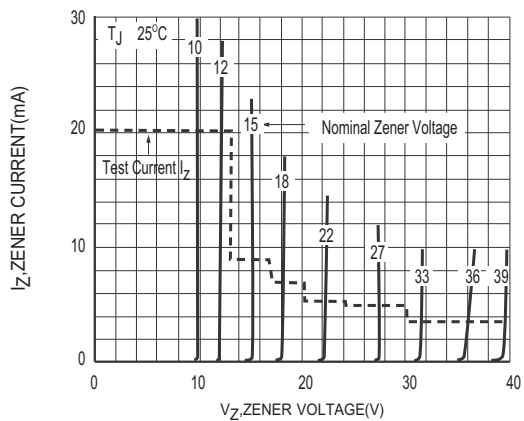


Figure 5 Zener Breakdown Characteristics

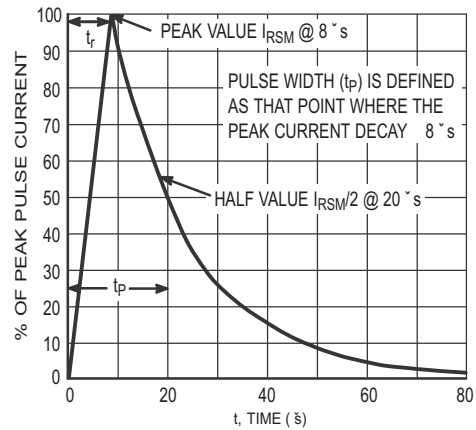


Figure 6. 8x20s Pulse Waveform

## RATING AND CHARACTERISTICS CURVES ( MMSZ5221B-MMSZ5270B )

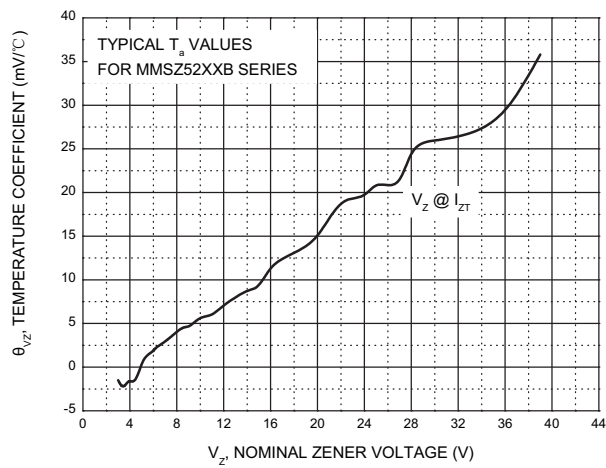


Figure 7 Typical Capacitance

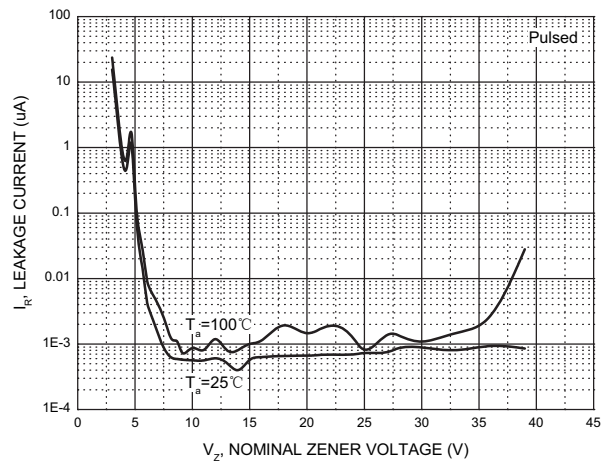


Figure 8 Effect of Zener Voltage on Zener Impedance

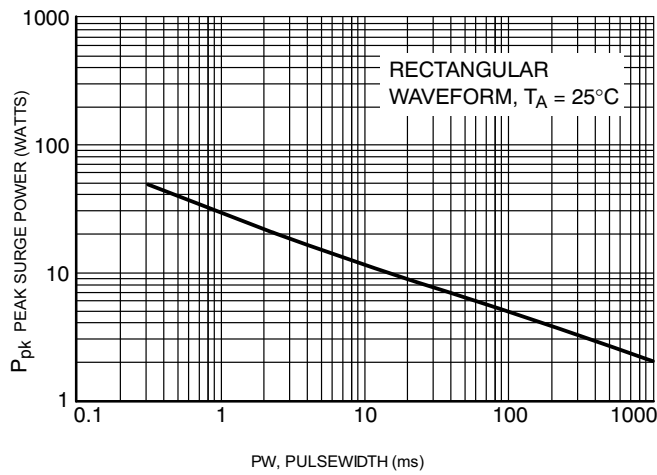


Figure 9. Maimum Nonrepetitie Surge Power

# REEL TAPING SPECIFICATIONS FOR SURFACE MOUNT DEVICES-SOD-123

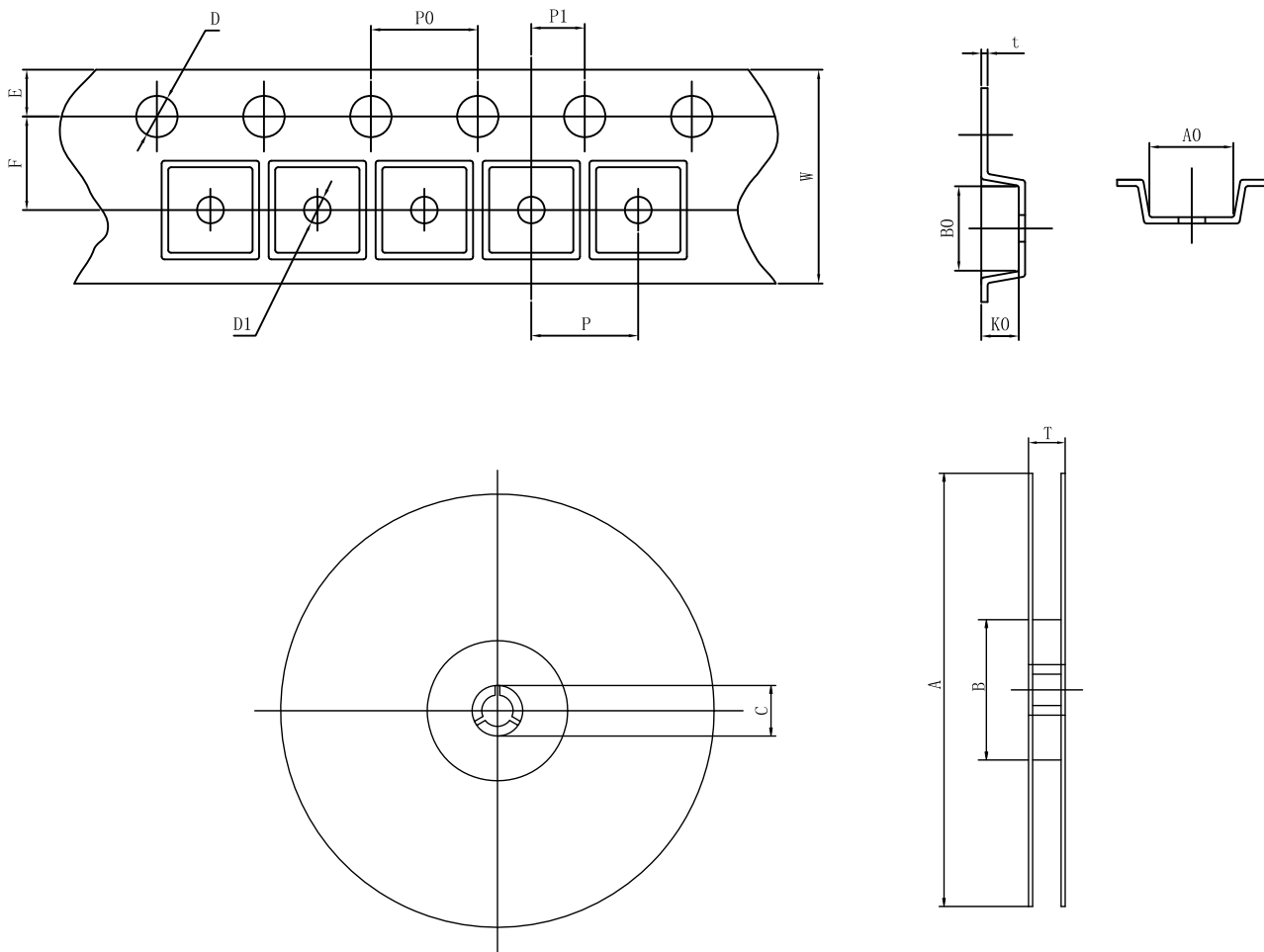


Fig.: Configuration of SOD-123 TAPING

| ITEM                   | SYMBOL | SPECIFICATIONS (mm) | SPECIFICATIONS (inch) |
|------------------------|--------|---------------------|-----------------------|
| Carrier width          | A0     | 1.95 Max.           | 0.077 Max.            |
| Carrier length         | B0     | 4.04 Max.           | 0.159 Max.            |
| Carrier depth          | K0     | 1.67 Max.           | 0.066 Max.            |
| Sprocket hole          | D      | 1.55±0.05           | 0.061±0.002           |
| Reel outside diameter  | A      | 178±1.0             | 7.009±0.039           |
| Reel inner diameter    | B      | 54 Min.             | 2.126 Min.            |
| Feed hole diameter     | C      | 13.0±0.20           | 0.512±0.008           |
| Strocket hole position | E      | 1.75±0.10           | 0.069±0.004           |
| Punch hole position    | F      | 3.5±0.05            | 0.138±0.002           |
| Punch hole pitch       | P      | 4.0±0.10            | 0.158±0.004           |
| Sprocket hole pitch    | P0     | 4.0±0.10            | 0.158±0.004           |
| Embossment center      | P1     | 2.0±0.05            | 0.079±0.002           |
| Overall tape thickness | t      | 0.216 Max.          | 0.009 Max.            |
| Tape width             | W      | 8.0+0.2/-0.1        | 0.315+0.008/-0.004    |
| Reel width             | T      | 12.5 Max.           | 0.492 Max.            |
| Punch hole diameter    | D1     | 1.25 Max.           | 0.049 Max.            |

Note : Devices are packed in accordance with EIA standard RS-481-D and specification given above. Available only for SOD-123 devices.

## PACKAGING OF DIODE

### REEL PACK

| PACKAGE | PACKING<br>CODE | REEL<br>( EA ) | COMPONENT<br>SPACE(mm) | TAPE SPACE<br>(mm) | REEL DIA<br>(mm) | CARTON SIZE<br>(mm) | EA PER<br>CARTON | GROSS<br>WEIGHT(Kg) |
|---------|-----------------|----------------|------------------------|--------------------|------------------|---------------------|------------------|---------------------|
| SOD-123 | -T              | 3,000          | ---                    | ---                | 178              | 390*205*310         | 120,000          | 5.29                |

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