

# SMD MELF SOD80, Glass Encapsulated NTC Thermistors



## FEATURES

- Small diameter down to 1.7 mm
- Quick response time down to 0.9 s
- Resistant to corrosive atmospheres and harsh environments
- Wide temperature range from -40 °C to +150 °C
- Available on tape
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
**HALOGEN**  
**FREE**

## QUICK REFERENCE DATA

| PARAMETER                          | VALUE       | UNIT |
|------------------------------------|-------------|------|
| Resistance value at 25 °C          | 10K to 100K | Ω    |
| Tolerance on $R_{25}$ -value       | ± 5         | %    |
| $B_{25/85}$ -value                 | 3977        | K    |
| Tolerance on $B_{25/85}$ -value    | ± 1.3       | %    |
| Operating temperature range        | -40 to +150 | °C   |
| Maximum power dissipation at 55 °C | 100         | mW   |
| Dissipation factor                 | 2.5         | mW/K |
| Response time                      | 0.9         | s    |
| Thermal time constant $\tau$       | 6           | s    |
| Weight                             | ≈ 0.03      | g    |

## APPLICATIONS

Temperature measurement, sensing and control:

- Domestic appliances
- Industrial process control

## DESCRIPTION

These thermistors consist of a micro chip clamped between Dumet electrodes in a glass sealing with tin plated terminations. Only available in tape and reel packaging.

## DESIGN-IN SUPPORT

For complete curve computation, please visit:  
[www.vishay.com/thermistors/ntc-curve-list/](http://www.vishay.com/thermistors/ntc-curve-list/)

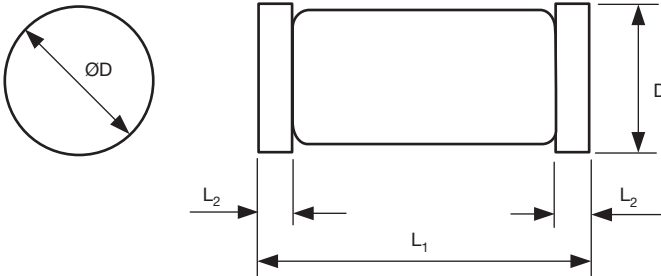
## MOUNTING

By soldering. Not intended for potting or automotive applications.

## ELECTRICAL DATA AND ORDERING INFORMATION

| $R_{25}$<br>(Ω) | $R_{25}$ -TOL.<br>(± %) | $B_{25/85}$<br>(K) | $B_{25/85}$ -TOL.<br>(± %) | SAP MATERIAL AND ORDERING NUMBER |
|-----------------|-------------------------|--------------------|----------------------------|----------------------------------|
| 10 000          | 5                       | 3977               | 1.3                        | NTCSMELFE3103JT                  |
| 20 000          | 5                       | 3977               | 1.3                        | NTCSMELFE3203JT                  |
| 30 000          | 5                       | 3977               | 1.3                        | NTCSMELFE3303JT                  |
| 100 000         | 5                       | 3977               | 1.3                        | NTCSMELFE3104JT                  |

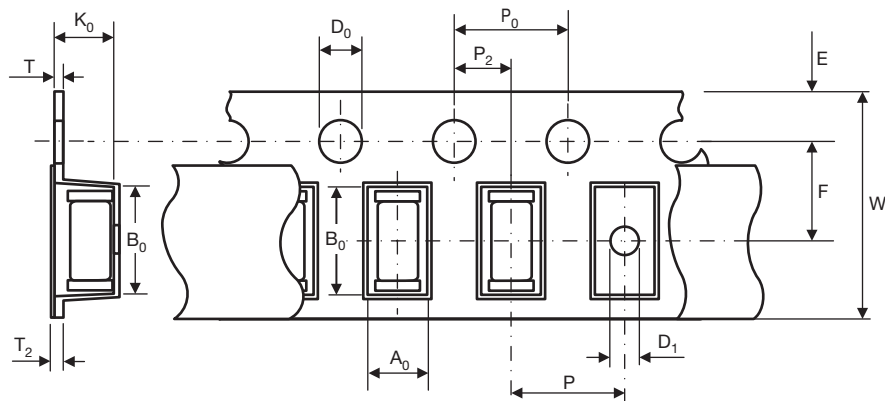
## DIMENSIONS in millimeters

|  |            |                 |
|--------------------------------------------------------------------------------------|------------|-----------------|
| $L_1$                                                                                | $L_2$      | $\varnothing D$ |
| 3.5 ± 0.35                                                                           | 0.35 ± 0.1 | 1.55 ± 0.15     |

## PACKAGING

### BLISTER TAPE ON REEL

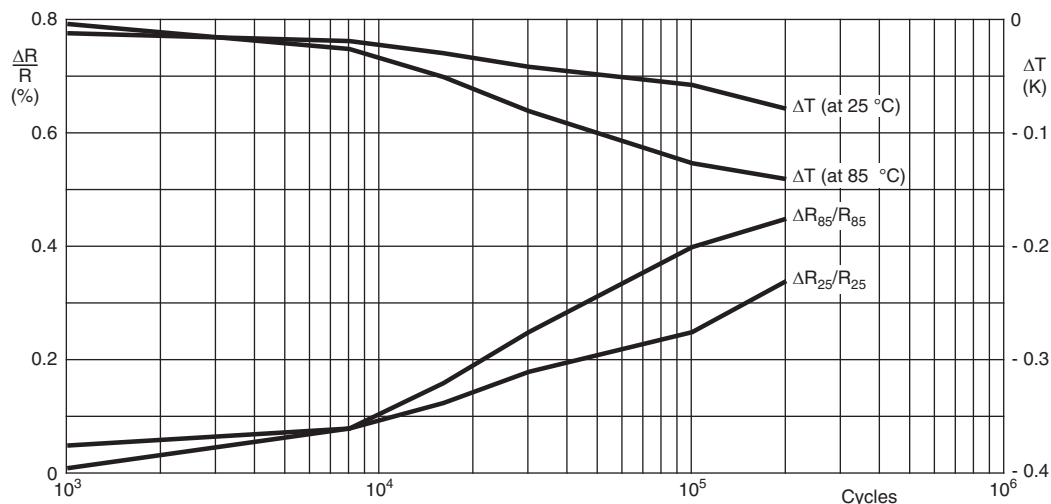
Packed in an 8 mm wide blister tape on a 180 mm reel, according to IEC 60286-3



| DIMENSIONS in millimeters |                   |
|---------------------------|-------------------|
| PARAMETER                 | VALUE             |
| A <sub>0</sub>            | 2.1 + 0.3 / - 0.0 |
| B <sub>0</sub> min.       | 3.8               |
| K <sub>0</sub>            | 2.1 + 0.3 / - 0.0 |
| W                         | 8 ± 0.2           |
| F                         | 3.5 ± 0.1         |
| E                         | 1.75 ± 0.1        |
| P                         | 4.0 ± 0.1         |
| P <sub>0</sub>            | 4.0 ± 0.1         |
| P <sub>2</sub>            | 2.0 ± 0.05        |
| D <sub>0</sub>            | 1.5 ± 0.1         |
| D <sub>1</sub>            | 1.0 ± 0.1         |
| T max.                    | 0.4               |
| T <sub>2</sub> max.       | 0.5               |

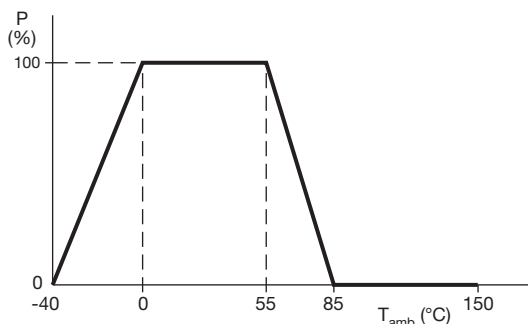
## STABILITY CHARACTERISTICS

Stability of glass encapsulated NTCs in thermal shock test (200 000 cycles -40 °C / +200 °C). Tested on non-soldered parts.



**DERATING**

Power derating curve

**Note**

- Zero power is considered as measuring power max. 1 % of max. power

For complete curve computation, visit: [www.vishay.com/thermistors/ntc-curve-list/](http://www.vishay.com/thermistors/ntc-curve-list/).

| RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES FOR NTCSMELFE3 |              |                       |                       |                       |                        |                         |                   |                       |
|---------------------------------------------------------------|--------------|-----------------------|-----------------------|-----------------------|------------------------|-------------------------|-------------------|-----------------------|
| TEMPERATURE<br>(°C)                                           | $R_T/R_{25}$ | $R$ for 10 k $\Omega$ | $R$ for 20 k $\Omega$ | $R$ for 30 k $\Omega$ | $R$ for 100 k $\Omega$ | $R$ -TOL.<br>( $\pm$ %) | $\alpha$<br>(%/K) | T-TOL.<br>( $\pm$ °C) |
| -40                                                           | 33.21        | 332 094               | 664 187               | 996 281               | 3 320 936              | 10.08                   | -6.62             | 1.52                  |
| -35                                                           | 23.99        | 239 900               | 479 799               | 719 699               | 2 398 996              | 9.59                    | -6.39             | 1.50                  |
| -30                                                           | 17.52        | 175 200               | 350 399               | 525 599               | 1 751 996              | 9.12                    | -6.18             | 1.48                  |
| -25                                                           | 12.93        | 129 287               | 258 574               | 387 861               | 1 292 869              | 8.67                    | -5.98             | 1.45                  |
| -20                                                           | 9.636        | 96 358                | 192 716               | 289 074               | 963 582                | 8.24                    | -5.78             | 1.42                  |
| -15                                                           | 7.250        | 72 500                | 145 001               | 217 501               | 725 004                | 7.82                    | -5.60             | 1.40                  |
| -10                                                           | 5.505        | 55 046                | 110 092               | 165 138               | 550 459                | 7.42                    | -5.42             | 1.37                  |
| -5                                                            | 4.216        | 42 157                | 84 314                | 126 471               | 421 570                | 7.04                    | -5.25             | 1.34                  |
| 0                                                             | 3.255        | 32 554                | 65 108                | 97 663                | 325 542                | 6.67                    | -5.09             | 1.31                  |
| 5                                                             | 2.534        | 25 339                | 50 677                | 76 016                | 253 386                | 6.31                    | -4.93             | 1.28                  |
| 10                                                            | 1.987        | 19 872                | 39 744                | 59 617                | 198 722                | 5.96                    | -4.79             | 1.25                  |
| 15                                                            | 1.570        | 15 698                | 31 397                | 47 095                | 156 985                | 5.63                    | -4.64             | 1.21                  |
| 20                                                            | 1.249        | 12 488                | 24 975                | 37 463                | 124 877                | 5.31                    | -4.51             | 1.18                  |
| 25                                                            | 1.000        | 10 000                | 20 000                | 30 000                | 100 000                | 5.00                    | -4.38             | 1.14                  |
| 30                                                            | 0.8059       | 8059                  | 16118                 | 24 177                | 80 591                 | 5.30                    | -4.25             | 1.25                  |
| 35                                                            | 0.6535       | 6535                  | 13069                 | 19 604                | 65 347                 | 5.59                    | -4.13             | 1.35                  |
| 40                                                            | 0.5330       | 5330                  | 10660                 | 15 990                | 53 299                 | 5.87                    | -4.02             | 1.46                  |
| 45                                                            | 0.4372       | 4372                  | 8743                  | 13 115                | 43 717                 | 6.14                    | -3.91             | 1.57                  |
| 50                                                            | 0.3605       | 3605                  | 7211                  | 10 816                | 36 053                 | 6.41                    | -3.80             | 1.69                  |
| 55                                                            | 0.2989       | 2989                  | 5977                  | 8966                  | 29887                  | 6.66                    | -3.70             | 1.80                  |
| 60                                                            | 0.2490       | 2490                  | 4980                  | 7470                  | 24900                  | 6.91                    | -3.60             | 1.92                  |
| 65                                                            | 0.2084       | 2084                  | 4169                  | 6253                  | 20844                  | 7.15                    | -3.51             | 2.04                  |
| 70                                                            | 0.1753       | 1753                  | 3506                  | 5259                  | 17530                  | 7.39                    | -3.42             | 2.16                  |
| 75                                                            | 0.1481       | 1481                  | 2962                  | 4443                  | 14809                  | 7.61                    | -3.33             | 2.29                  |
| 80                                                            | 0.1256       | 1256                  | 2513                  | 3769                  | 12564                  | 7.84                    | -3.25             | 2.41                  |
| 85                                                            | 0.1070       | 1070                  | 2141                  | 3211                  | 10703                  | 8.05                    | -3.17             | 2.54                  |
| 90                                                            | 0.09154      | 915.4                 | 1831                  | 2746                  | 9154                   | 8.26                    | -3.09             | 2.67                  |
| 95                                                            | 0.07860      | 786.0                 | 1572                  | 2358                  | 7860                   | 8.46                    | -3.01             | 2.81                  |
| 100                                                           | 0.06773      | 677.3                 | 1355                  | 2032                  | 6773                   | 8.66                    | -2.94             | 2.95                  |
| 105                                                           | 0.05857      | 585.7                 | 1171                  | 1757                  | 5857                   | 8.85                    | -2.87             | 3.08                  |
| 110                                                           | 0.05083      | 508.3                 | 1017                  | 1525                  | 5083                   | 9.04                    | -2.80             | 3.23                  |
| 115                                                           | 0.04426      | 442.6                 | 885.2                 | 1328                  | 4426                   | 9.22                    | -2.74             | 3.37                  |
| 120                                                           | 0.03866      | 386.6                 | 773.2                 | 1160                  | 3866                   | 9.40                    | -2.67             | 3.52                  |
| 125                                                           | 0.03387      | 338.7                 | 677.5                 | 1016                  | 3387                   | 9.57                    | -2.61             | 3.66                  |
| 130                                                           | 0.02977      | 297.7                 | 595.4                 | 893.1                 | 2977                   | 9.74                    | -2.55             | 3.81                  |
| 135                                                           | 0.02624      | 262.4                 | 524.8                 | 787.2                 | 2624                   | 9.91                    | -2.50             | 3.97                  |
| 140                                                           | 0.02319      | 231.9                 | 463.8                 | 695.7                 | 2319                   | 10.07                   | -2.44             | 4.12                  |
| 145                                                           | 0.02055      | 205.5                 | 411.1                 | 616.6                 | 2055                   | 10.23                   | -2.39             | 4.28                  |
| 150                                                           | 0.01826      | 182.6                 | 365.3                 | 547.9                 | 1826                   | 10.38                   | -2.34             | 4.44                  |



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