

Small Signal Product

## SMD Zener Diode

### FEATURES

- Wide zener voltage range selection : 2.4V to 39V
- Designed for mounting on small surface
- Extremely thin / leadless package
- Packing code with suffix "G" means green compound (halogen-free)



1005



### MECHANICAL DATA

- Case: 1005
- Terminal: Gold plated, solderable per MIL-STD-750, method 2026
- Polarity : Indicated by cathode band
- Weight : 0.006 g (approximately)

| MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS (T <sub>A</sub> =25°C unless otherwise noted) |                                   |             |      |
|--|-----------------------------------|-------------|------|
| PARAMETER  | SYMBOL                            | VALUE       | UNIT |
| Power Dissipation  | P <sub>D</sub>                    | 200         | mW   |
| Forward Voltage @ I <sub>F</sub> = 10mA  | V <sub>F</sub>                    | 0.9         | V    |
| Forward Current, Surge Peak<br>8.3 ms Single Half Sine-Wave Superimposed on Rate Load        | I <sub>FSM</sub>                  | 2           | A    |
| Junction and Storage Temperature Range   | T <sub>J</sub> , T <sub>STG</sub> | -55 to +125 | °C   |

Not Recommended

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 ELECTRICAL CHARACTERISTICS (  $T_A = 25^\circ\text{C}$  unless otherwise noted )

| Device     | Device Marking Code | Zener Voltage |       |            | Operating Resistance |            | Rising Operating Resistance |            | Reverse Current         |           |
|------------|---------------------|---------------|-------|------------|----------------------|------------|-----------------------------|------------|-------------------------|-----------|
|            |                     | $V_Z$ (Volt)  |       |            | $Z_{ZT}$ (Ohm)       |            | $Z_{ZK}$ (Ohm)              |            | $I_R$ ( $\mu\text{A}$ ) |           |
|            |                     | Min           | Max   | $I_Z$ (mA) | Max                  | $I_Z$ (mA) | Max                         | $I_Z$ (mA) | Max                     | $V_R$ (V) |
| TSZL52C2V4 | Z2                  | 2.28          | 2.52  | 5          | 85                   | 5          | 600                         | 1          | 100                     | 1.0       |
| TSZL52C2V7 | Z3                  | 2.57          | 2.84  | 5          | 83                   | 5          | 500                         | 1          | 75                      | 1.0       |
| TSZL52C3V0 | Z4                  | 2.85          | 3.15  | 5          | 95                   | 5          | 500                         | 1          | 50                      | 1.0       |
| TSZL52C3V3 | Z5                  | 3.14          | 3.47  | 5          | 95                   | 5          | 500                         | 1          | 25                      | 1.0       |
| TSZL52C3V6 | Z6                  | 3.42          | 3.78  | 5          | 95                   | 5          | 500                         | 1          | 15                      | 1.0       |
| TSZL52C3V9 | Z7                  | 3.71          | 4.10  | 5          | 95                   | 5          | 500                         | 1          | 10                      | 1.0       |
| TSZL52C4V3 | Z8                  | 4.09          | 4.52  | 5          | 95                   | 5          | 500                         | 1          | 5.0                     | 1.0       |
| TSZL52C4V7 | Z9                  | 4.47          | 4.94  | 5          | 78                   | 5          | 500                         | 1          | 5.0                     | 2.0       |
| TSZL52C5V1 | ZA                  | 4.85          | 5.36  | 5          | 60                   | 5          | 480                         | 1          | 0.1                     | 0.8       |
| TSZL52C5V6 | ZB                  | 5.32          | 5.88  | 5          | 40                   | 5          | 400                         | 1          | 0.1                     | 1.0       |
| TSZL52C6V2 | ZC                  | 5.89          | 6.51  | 5          | 10                   | 5          | 200                         | 1          | 0.1                     | 2.0       |
| TSZL52C6V8 | ZE                  | 6.46          | 7.14  | 5          | 8                    | 5          | 150                         | 1          | 0.1                     | 3.0       |
| TSZL52C7V5 | ZF                  | 7.13          | 7.88  | 5          | 7                    | 5          | 50                          | 1          | 0.1                     | 5.0       |
| TSZL52C8V2 | ZG                  | 7.79          | 8.61  | 5          | 7                    | 5          | 50                          | 1          | 0.1                     | 6.0       |
| TSZL52C9V1 | ZH                  | 8.65          | 9.56  | 5          | 10                   | 5          | 50                          | 1          | 0.1                     | 7.0       |
| TSZL52C10  | ZJ                  | 9.50          | 10.50 | 5          | 15                   | 5          | 70                          | 1          | 0.1                     | 7.5       |
| TSZL52C11  | ZK                  | 10.45         | 11.55 | 5          | 20                   | 5          | 70                          | 1          | 0.1                     | 8.5       |
| TSZL52C12  | ZM                  | 11.40         | 12.60 | 5          | 20                   | 5          | 90                          | 1          | 0.1                     | 9.0       |
| TSZL52C13  | ZN                  | 12.35         | 13.65 | 5          | 25                   | 5          | 110                         | 1          | 0.1                     | 10        |
| TSZL52C15  | ZP                  | 14.25         | 15.75 | 5          | 30                   | 5          | 110                         | 1          | 0.1                     | 11        |
| TSZL52C16  | ZQ                  | 15.20         | 16.80 | 5          | 40                   | 5          | 170                         | 1          | 0.1                     | 12        |
| TSZL52C18  | ZR                  | 17.10         | 18.90 | 5          | 50                   | 5          | 170                         | 1          | 0.1                     | 14        |
| TSZL52C20  | ZS                  | 19.00         | 21.00 | 5          | 50                   | 5          | 220                         | 1          | 0.1                     | 15        |
| TSZL52C22  | ZT                  | 20.90         | 23.10 | 5          | 55                   | 5          | 220                         | 1          | 0.1                     | 17        |
| TSZL52C24  | ZU                  | 22.80         | 25.20 | 5          | 80                   | 5          | 220                         | 1          | 0.1                     | 18        |
| TSZL52C27  | ZV                  | 25.65         | 28.35 | 5          | 80                   | 5          | 250                         | 1          | 0.1                     | 20        |
| TSZL52C30  | ZW                  | 28.50         | 31.50 | 5          | 80                   | 5          | 250                         | 1          | 0.1                     | 23        |
| TSZL52C33  | ZX                  | 31.35         | 34.65 | 5          | 80                   | 5          | 250                         | 1          | 0.1                     | 25        |
| TSZL52C36  | ZY                  | 34.20         | 37.80 | 5          | 90                   | 5          | 250                         | 1          | 0.1                     | 27        |
| TSZL52C39  | ZZ                  | 37.05         | 40.95 | 5          | 90                   | 5          | 300                         | 1          | 0.1                     | 29        |

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RATINGS AND CHARACTERISTICS CURVES

(TA=25°C unless otherwise noted)

Fig. 1 Temperature Coefficients

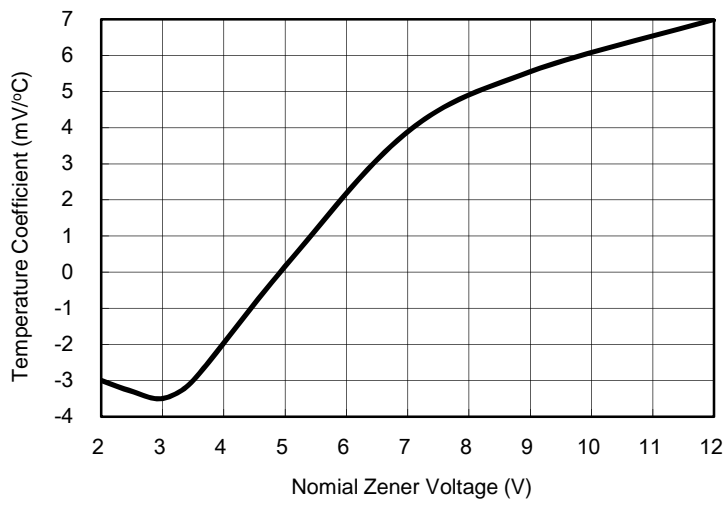


Fig. 2 Temperature Coefficient

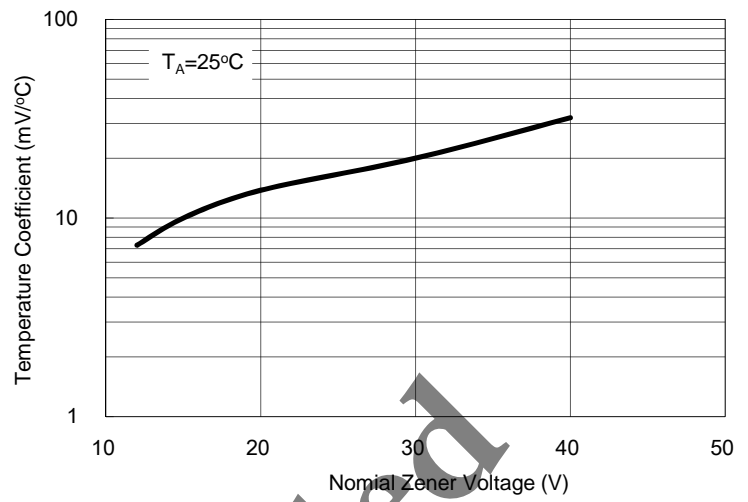


Fig. 3 Effect of Zener Voltage on Zener Impedance

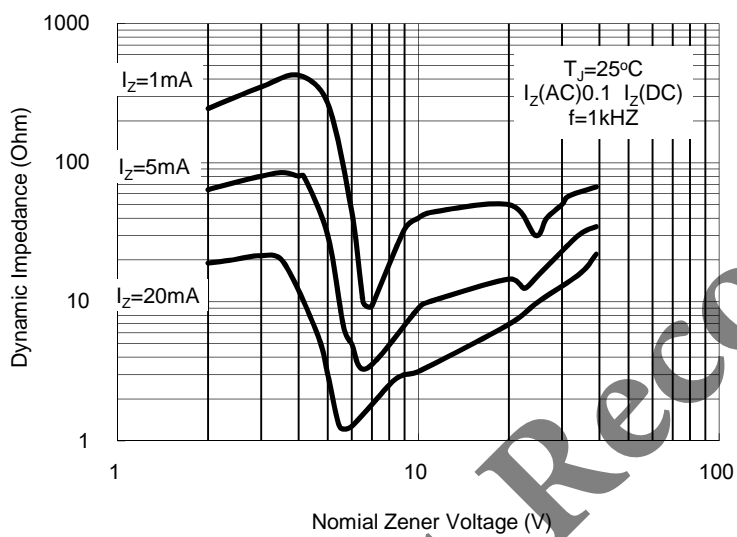


Fig. 4 Typical Forward Voltage

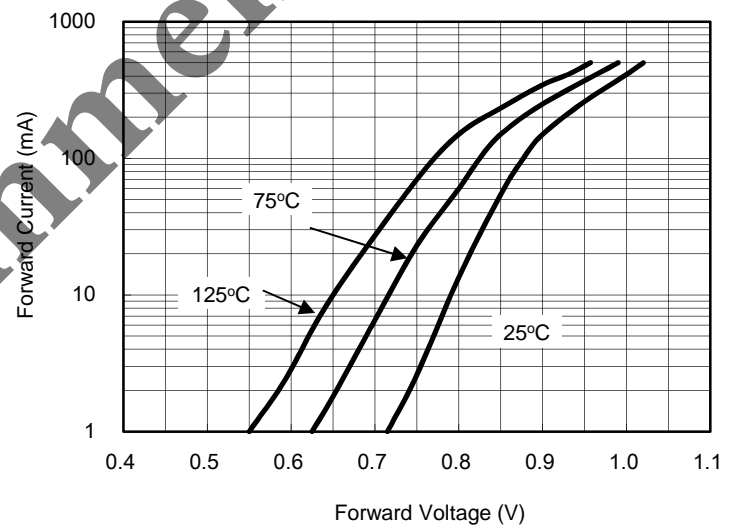


Fig. 5 Typical Leakage Current

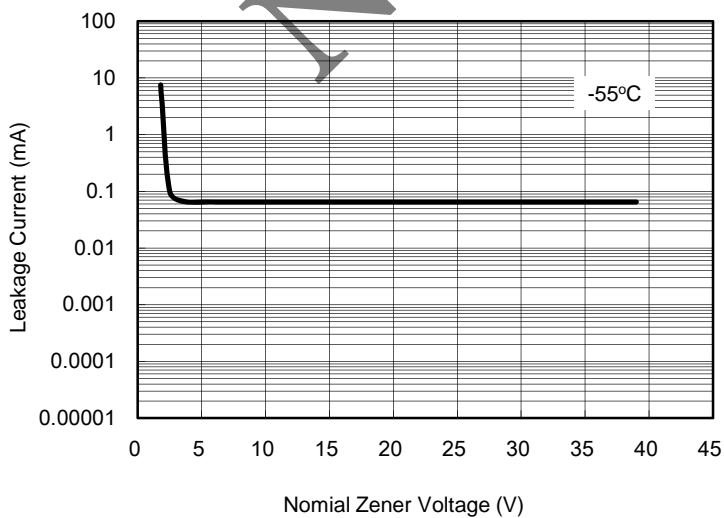
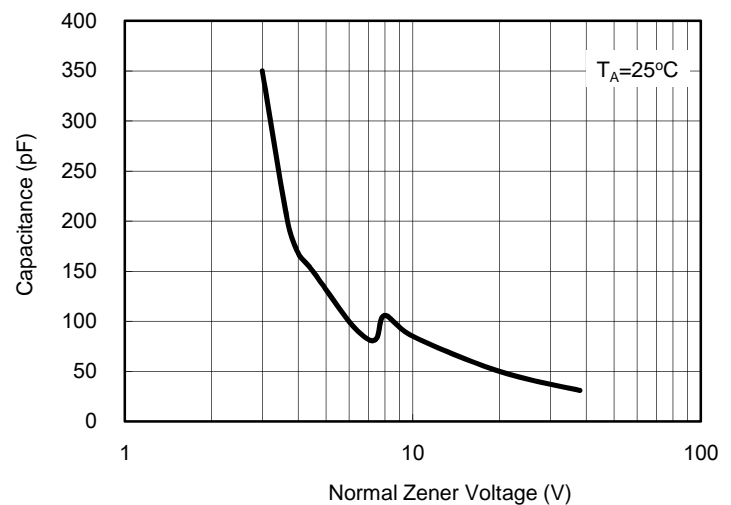


Fig. 6 Typical Capacitance



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Fig. 7 Zener Voltage VS. Zener Current

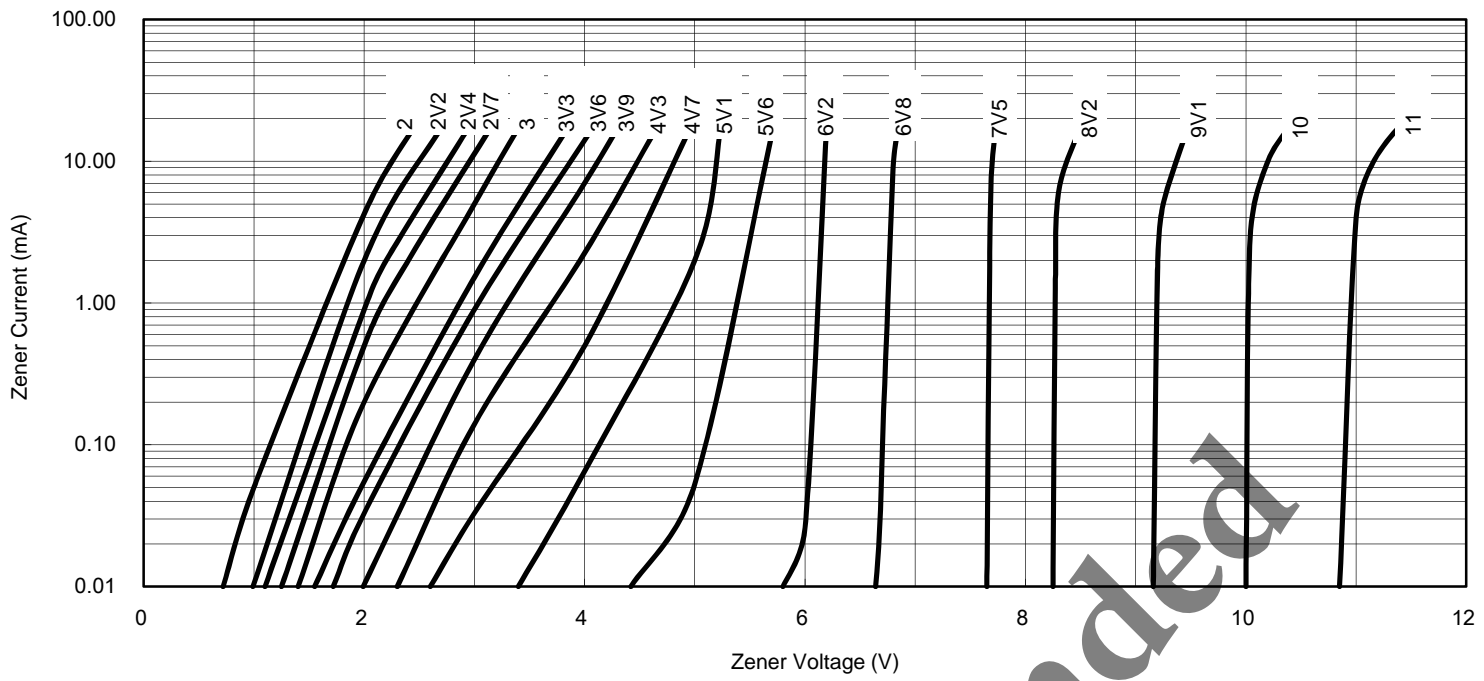


Fig. 8 Zener Voltage vs. Zener Current

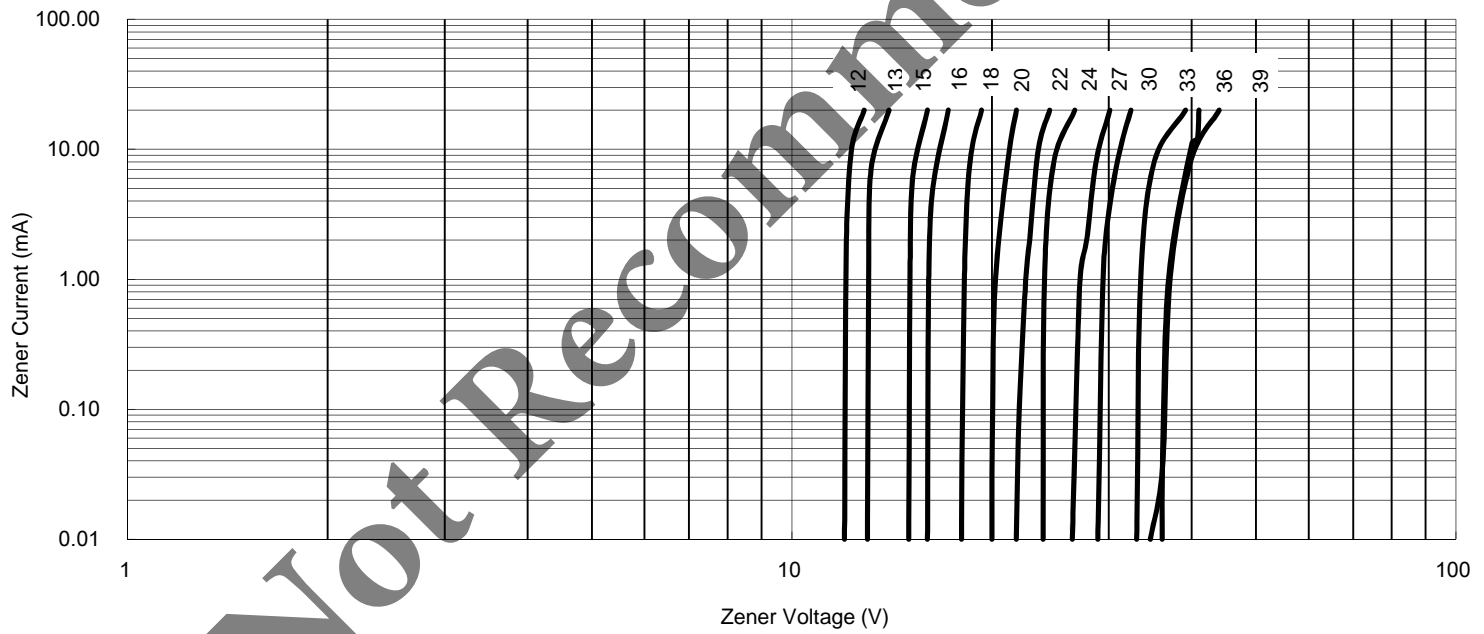
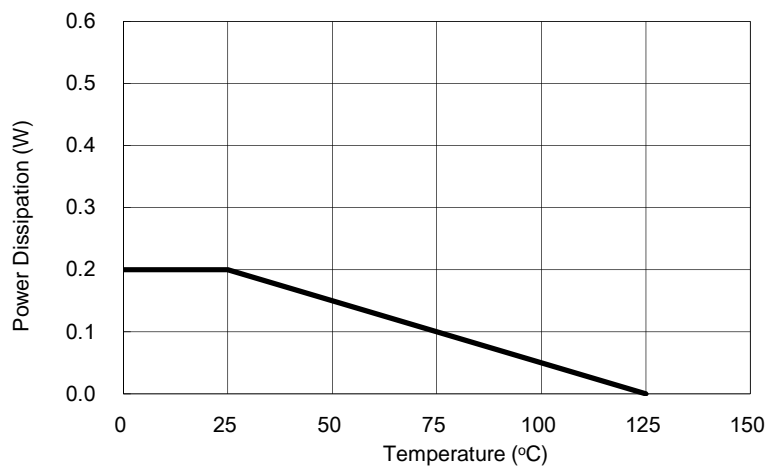


Fig. 9 Steady State Power Derating



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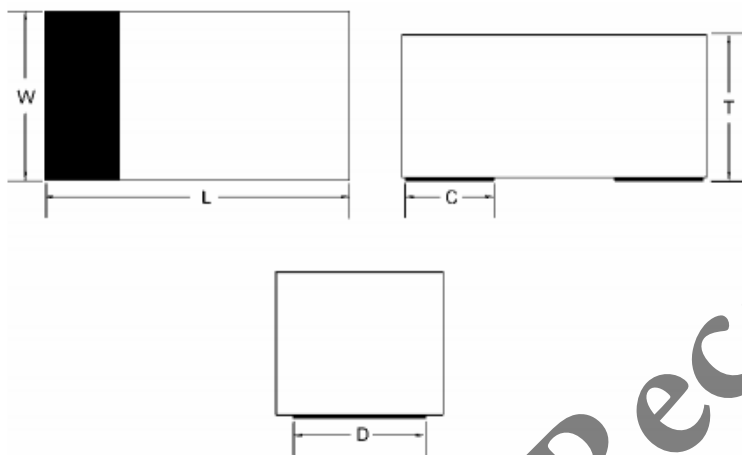
| ORDERING INFORMATION |                          |              |                     |         |              |
|----------------------|--------------------------|--------------|---------------------|---------|--------------|
| PART NO.             | PART NO. SUFFIX (Note 2) | PACKING CODE | PACKING CODE SUFFIX | PACKAGE | PACKING      |
| TSZL52Cxxx (Note1)   | -xx                      | RW           | G                   | 1005    | 4K / 7" Reel |

Note 1: "xxx" defines voltage from 2.4V (TSZL52C2V4) to 39V (TSZL52C39)

Note 2: Part No. Suffix „-xx “ would be used for special requirement

| EXAMPLE          |           |                 |              |                     |   |
|------------------|-----------|-----------------|--------------|---------------------|---|
| PREFERRED P/N    | PART NO.  | PART NO. SUFFIX | PACKING CODE | PACKING CODE SUFFIX | DESCRIPTION                                   |
| TSZL52C39 RWG    | TSZL52C39 |                 | RW           | G                   | Multiple manufacture source<br>Green compound |
| TSZL52C39-F0 RWG | TSZL52C39 | -F0             | RW           | G                   | Define manufacture source<br>Green compound   |

## PACKAGE OUTLINE DIMENSION

**1005**


| DIM. | Unit (mm) |     |     | Unit (inch) |       |       |
|------|-----------|-----|-----|-------------|-------|-------|
|      | Min       | Typ | Max | Min         | Typ   | Max   |
| L    | 2.4       | -   | 2.6 | 0.094       | -     | 0.102 |
| W    | 1.1       | -   | 1.3 | 0.043       | -     | 0.051 |
| T    | 0.7       | -   | 0.9 | 0.028       | -     | 0.035 |
| C    | -         | 0.5 | -   | -           | 0.020 | -     |
| D    | -         | 1.0 | -   | -           | 0.039 | -     |