# Tantalum Capacitors and Moisture Sensitivity

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Vishay supplies surface mount molded and conformal coated solid tantalum capacitors with $MnO_2$ and polymer cathode constructions.

The conformal coated devices meet moisture sensitivity level rating (MSL) of **2a** as specified in IPC / JEDEC® J-STD-020 and are dry packaged in moisture barrier bags (MBB) per J-STD-033. Level 2a specifies a floor life of 4 weeks at 30 °C and 60 % relative humidity (RH). Unused capacitors should be re-sealed in the MBB with fresh desiccant. A moisture strip (Humidity Indicator Card) is included in the bag to assure dryness. To remove excess moisture, capacitors can be dried at 40 °C for 168 h (standard “dry box” conditions).

For detailed recommendations, please refer to J-STD-033.

Conformal coated series: 591D, 592D, 592W, 195D, 695D, 594D, 595D, 597D, T95, T96, T97, T98, DLA 13008, and DLA 14002.

**Note**

- The following conformal coated devices (with metal end caps) meet moisture sensitivity level rating MSL 1: 194D, CWR06, CWR16, and CWR26

The molded series devices with the $MnO_2$ cathode construction meet **MSL 1**, are not considered moisture sensitive and are not stored or shipped in moisture protective packaging (unless required by customer).

These series do not require any special handling provided the storage and manufacturing environment is nominally at 30 °C and 60 % RH.

Molded series with the $MnO_2$ cathode construction: 293D, 593D, TR3, TP3, TL3, TX3, TH3, TH4, TH5, T83, TM3, 793DX, CTC3, CTC4, CWR11, DLA 95158, 298D, 298W, TM8, TL8, TR8, TP8, DLA 11020, TMCJ, TMCP, TMCM, TMCS, TMCU (case UA) (1), TMCR, TMCH, TMCTX, and THC.

**Note**

(1) TMCU case UB molded series devices meet moisture sensitivity level rating MSL 3

Molded series devices with the polymer cathode construction and TMCU case UB with the $MnO_2$ cathode construction meet **MSL 3** as specified in IPC / JEDEC J-STD-020 and are dry packaged in MBB per J-STD-033. Level 3 testing specifies a floor life of 168 hours at 30 °C and 60 % RH. Unused capacitors should be re-sealed in the MBB with fresh desiccant. A moisture strip (humidity indicator card) is included in the bag to assure dryness. To remove excess moisture, capacitors can be dried at 40 °C for 168 h (standard “dry box” conditions).

For detailed recommendations, please refer to J-STD-033.

Molded series devices with the polymer cathode construction: T50, T51, T55, T56, T52, T54, T58, T59, DLA 04051, and DLA 20021.

Moisture sensitivity levels and test conditions were developed for the semiconductor industry to prevent the “popcorning” effect, particularly in high-temperature lead (Pb)-free processing environments. Passive components, including solid tantalum capacitors, are typically not subject to this kind of failure mode but can be affected if exposed to high levels of humidity for long periods of time.

TECHNICAL NOTE