Thyristor Surge Suppressors(TSS): Introduction

- **Introduction**

Thyristor Surge Suppressors (TSS) is a new type of protection device, and it is with accuracy, quick response (ns level response time), high surge absorptive capacity, bidirectional symmetry, and reliability. Its flow capability is better than that of the same sized TVS diode. Therefore, it can replace TVS diode in passive circuit. However, its conduction properties are close to short circuit, and cannot be used alone in active circuit. In this circumstance, it combines with current limiting elements in the circuit to limit continuous current lower than minimum holding current.

- **V-I Characteristics Curves**

The working principle is as below,

◆ When applied voltage is lower than V_{DRM}, I_{DRM} is extremely low, and the situation is as open circuit.

◆ Breakdown caused by increased applied voltage (similar with diode): When applied voltage is increased to V_S, TSS conducts thoroughly and is with extremely low resistance. V_T immediately decreases to a very low value (usually 5V), and two ends of the device conduct, and the situation is as short circuit. Therefore, high current flows through the device.

◆ When applied voltage is taken away, the device recovers to off state. In other words, the device can be repetitively used with the same bidirectional structures and electrical characteristics.

Fig 1 V-I Curve