1. Applications

- ESD Protection

Note: This product is designed for protection against electrostatic discharge (ESD) and is not intended for any other purpose, including, but not limited to, voltage regulation.

2. Packaging and Internal Circuit

![Diagram of CST2 package and pin layout]

3. Absolute Maximum Ratings (Note) (Unless otherwise specified, \(T_a = 25^\circ\text{C}\))

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Symbol</th>
<th>Rating</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrostatic discharge voltage (IEC61000-4-2)(Contact)</td>
<td>(V_{ESD})</td>
<td>±30</td>
<td>kV</td>
</tr>
<tr>
<td>Junction temperature</td>
<td>(T_J)</td>
<td>150</td>
<td>(^\circ\text{C})</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>(T_{stg})</td>
<td>-55 to 150</td>
<td>(^\circ\text{C})</td>
</tr>
</tbody>
</table>

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).
4. Electrical Characteristics (Unless otherwise specified, $T_a = 25^\circ$C)

$V_{RWM}$: Working peak reverse voltage
$V_{BR}$: Reverse breakdown voltage
$I_{BR}$: Reverse breakdown current
$I_{R}$: Reverse current
$V_C$: Clamp voltage
$I_{PP}$: Peak pulse current
$R_{DYN}$: Dynamic resistance

![Fig. 4.1 Definitions of Electrical Characteristics](image)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Symbol</th>
<th>Note</th>
<th>Test Condition</th>
<th>Min</th>
<th>Typ.</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working peak reverse voltage</td>
<td>$V_{RWM}$</td>
<td>—</td>
<td>—</td>
<td>5.0</td>
<td>—</td>
<td>—</td>
<td>V</td>
</tr>
<tr>
<td>Reverse breakdown voltage</td>
<td>$V_{BR}$</td>
<td>$I_{BR} = 1$ mA</td>
<td>$V_{RWM} = 5$ V</td>
<td>5.8</td>
<td>6.8</td>
<td>7.8</td>
<td>V</td>
</tr>
<tr>
<td>Reverse current</td>
<td>$I_{R}$</td>
<td>$V_{RWM} = 5$ V</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.5</td>
<td>$\mu$A</td>
</tr>
<tr>
<td>Clamp voltage</td>
<td>$V_C$</td>
<td>(Note 1) $I_{PP} = 1$ A</td>
<td>—</td>
<td>—</td>
<td>7</td>
<td>—</td>
<td>V</td>
</tr>
<tr>
<td>Dynamic resistance</td>
<td>$R_{DYN}$</td>
<td>(Note 2)</td>
<td>—</td>
<td>0.3</td>
<td>—</td>
<td>—</td>
<td>$\Omega$</td>
</tr>
<tr>
<td>Total capacitance</td>
<td>$C_t$</td>
<td>$V_{W} = 0$ V, $f = 1$ MHz</td>
<td>—</td>
<td>9</td>
<td>13</td>
<td>—</td>
<td>pF</td>
</tr>
</tbody>
</table>

Note 1: Based on IEC61000-4-5 8/20 $\mu$s pulse.
Note 2: TLP parameter: $Z_0 = 50 \, \Omega$, $t_p = 100$ ns, $t_r = 300$ ps, averaging window: $t_1 = 30$ ns to $t_2 = 60$ ns, extraction of dynamic resistance using a least-squares fit of TLP characteristics at $I_{PP}$ between 3 A to 8 A.

5. Guaranteed ESD Protection (Note)

<table>
<thead>
<tr>
<th>Test Condition</th>
<th>ESD Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC61000-4-2 (Contact discharge)</td>
<td>$\pm 30$ kV</td>
</tr>
</tbody>
</table>

Note: Criterion: No damage to devices.
6. **Marking**

![Marking Diagram](image)

**Fig. 6.1** Marking

7. **Land Pattern Dimensions (for reference only)**

![Land Pattern Dimensions Diagram](image)

**Fig. 7.1** Land Pattern Dimensions (Unit: mm)
8. Characteristics Curves (Note)

Note: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.
9. Clamp Voltage $V_C$ - Peak Pulse Current ($I_{PP}$) (Note)

![Graph of $V_C$ vs. $I_{PP}$](image)

**Fig. 9.1** $V_C$ - $I_{PP}$

Note: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

10. Insertion Loss ($S_{21}$) (Note)

![Graph of $S_{21}$ vs. Frequency](image)

**Fig. 10.1** $S_{21}$ - $f$

Note: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.
11. ESD Clamp Waveform (Note)

Fig. 11.1 +8 kV

Fig. 11.2 -8 kV

Fig. 11.3 IEC61000-4-2 (Contact)

Note: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.
Weight: 0.7 mg (typ.)

<table>
<thead>
<tr>
<th>Package Name(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOSHIBA: 1-1P1S</td>
</tr>
<tr>
<td>Nickname: CST2</td>
</tr>
</tbody>
</table>
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