Solutions for Energy Storage Systems
High Voltage Discharge

- Minimize system downtime
- Quick discharge of dangerously high voltages
- Small form factor direct element liquid cooled resistors
- Air cooled resistors
- High power (KW) and High Energy (KJ) discharge

Examples of Load-Dumping Resistors

<table>
<thead>
<tr>
<th>Direct Liquid Cooled</th>
<th>Liquid Cooled</th>
<th>High Energy Disc(s)</th>
<th>Air Cooled</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.25 to 100 ohms configurations</td>
<td>0.5 to 56K ohm</td>
<td>5 – 150 Ohms</td>
<td>Many different ohmic values</td>
</tr>
<tr>
<td>50,000 watts for short time intervals</td>
<td>5,000 watts for short intervals (10s)</td>
<td>One disc up to 80KJ</td>
<td>1KW to 2MW power</td>
</tr>
<tr>
<td>Element in direct contact with coolant option</td>
<td>Non inductive option</td>
<td>Single of multiple discs</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>No heatsinks</td>
<td>Up to six resistors on one tube</td>
<td>Natural cooling</td>
<td>Natural of forced, air cooling</td>
</tr>
<tr>
<td>Small mechanical form factor</td>
<td>300 mm wide x 50mm high (mechanical size varies according to value and power)</td>
<td>21mm wide x 137mm high (single disk)</td>
<td>Mechanical size varies according to value and power</td>
</tr>
</tbody>
</table>

Contact ES Components today for more info.

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Surge and Sustainable Power Handling Capability

Applications

- Grid Storage
- Wind Farms
- Solar Farms
- Industrial
- Railroad
- Military
- Electric/Hybrid Cars and Buses

Additional Vishay Power Products:

Thick Film Modules

- 0.5 to 1M ohm
- Up to 500 watts
- Non inductive
- Thick film on ceramic construction
- 67mm wide x 40mm wide