Powerex has expanded its discrete thyristor product line with the addition of new devices which increase the available blocking voltages to 6500V. The 6500V SCRs are high voltage, high-current disc package devices with a gate design that allows the SCR to be reliably operated at high di/dt and dv/dt conditions in various phase control applications.

**Features**

- Low on-state voltage
- Gate design and large active conduction area results in high current ratings.
- Distributed gate structure provides a high di/dt capability greater than 150 A/μsec and reliability in the field with in-house developed di/dt testing.
- Turn-on gate periphery length not as susceptible to mechanical fatigue caused by stress as compared to the gate architectures of other manufacturers.
- High dv/dt capability
- Hermetic ceramic package assures optimized thermal impedance to allow $T_j = 125^\circ$C. Contact factory for 140$^\circ$C $T_j$ conditions and for optimized thermal resistance packaging in slim styles, such as TBSC651402DH (27.2 mm height).
- Alloyed construction employs eutectic aluminum-silicon fusions for proven greater reliability than floating silicon construction. Floating silicon promotes thermal runaway and significantly higher total costs due to greater clamping force requirements.
- Serialized data available by special request to allow user to match devices on reverse recovery current ($IR_{rec}$) for series connections in pairs, or strings of 3, 4 or 6 SCRs. Automated test sequence employs barcode scanners as shown to capture parametric data for storage, record retention and report generation.

### Line-up Table

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Voltage*1 (V)</th>
<th>Current Rating*2 (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TBKC—3203DH</td>
<td>6000-6500</td>
<td>325</td>
</tr>
<tr>
<td>T9KC—0603DH</td>
<td>6000-6500</td>
<td>600</td>
</tr>
<tr>
<td>TAKC—1103DH</td>
<td>6000-6500</td>
<td>1100</td>
</tr>
<tr>
<td>TBKC—1203DH</td>
<td>6000-6500</td>
<td>1250</td>
</tr>
<tr>
<td>TBSC—1402DH</td>
<td>5500-6500</td>
<td>1400</td>
</tr>
</tbody>
</table>

*1 5500V devices available by special request
*2 Selected devices available with up to 15% increased current ratings. Please contact GlobalSales@pwrx.com.
Series Connection Matching

**Why Match SCRs?**

Powerex has demonstrated success with multiple customers for matching SCRs in a series connection. Series connected SCRs are matched to turn off at the same time with similar reverse recovery current. Series connection matching, measured by Powerex, avoids $Q_{rr}$ or $I_{rm}$ estimation and inaccuracy. Matching also allows for the use of similar and more cost-effective snubber components.

Turn-on matching allows SCRs to turn on normally within 1 to 1.5 μsec. Powerex has in-house full di/dt testing capability to JEDEC standards.

SCR PIV voltage rating requires a 2.25 / 2.5X line-to-line ratio along with appropriate sized snubbers and a typical motor load.

- 4160V needs to be $\geq 10.4kV$ total (or 3 SCRs $\geq 3500V$ PIV).
- Must consider input voltage tolerances, such as +10%, (typically more of a concern with low voltage than medium voltage).
- By using a higher voltage rated device, one can have more margin for reliability by allowing SCRs to run hotter and trading off blocking voltage for more current capability or using smaller snubbers and allowing a higher ring-up voltage.
- Larger SCRs should be considered if there is a short-circuit withstand requirement.
- Powerex expertise in soft starter applications extends to low voltage 480V/600V/690V line-to-line voltages.
- HV 6500 mating diodes available from Powerex.
- Rupture-proof resistant robust designs available upon request.

**Reverse Recovery Waveform and Parameter Definitions**

$\Delta = 2A$ for 8-size SCRs

$4A$ for 9-size SCRs

$5A$ for B-size SCRs

For more information:


e-mail: globalsales@pwrx.com

phone: 724-925-7272, Option 3 (Applications Engineering Assistance)