Power Schottky trench diodes

STPSTxH100 series
Introducing the ST trench diode series
AEC-Q101 automotive-grade qualified diodes and rectifiers

A portfolio designed to fit our customers’ needs

- A complete current/voltage range
- A wide range of technical trade-offs
- A complete portfolio of packages from space-saving to top-side cooling
- A wide variety of automotive-grade products
- New trench diodes

ST products are designed for highest performance level and benchmark quality
The new 100 V power Schottky trench diodes range
28 references | 8 $I_{F(AV)}$ current values available | 5 packages

<table>
<thead>
<tr>
<th>Technology</th>
<th>Current</th>
<th>Series</th>
<th>Breakdown voltage</th>
<th>Package</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>STx</td>
<td># #</td>
<td>x</td>
<td># #</td>
<td>x</td>
<td>Y</td>
</tr>
<tr>
<td>$I_{F(AV)}$</td>
<td>5 : 5A</td>
<td>H</td>
<td>$V_{RRM(TYP)}$</td>
<td>100 : 100V</td>
<td></td>
</tr>
<tr>
<td>Tradeoff</td>
<td>H : High Temp</td>
<td></td>
<td>Series</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Y : Automotive</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| STPST | 5 | H | 100 | AF | - | Y |
ST trench diodes increase total system efficiency

Up to 60% higher power integration vs standard power Schottky
Ideal for high-frequency switching applications

Targeted applications
- **Automotive**
  - LED lighting
  - Reverse battery protection
  - Low-voltage DC-DC
- **Industrial**
  - Auxiliary power supply
  - SMPS

Optimized portfolio
- 28 products from 1 to 15 A
- 4 SMD + DPAK package

Improved efficiency
- Efficiency η (%)
  - TRENCH DIODES: 83.65%
  - POWER SCHOTTKY: 83.15%
A wide selection of space-saving packages

Featuring leading ST packaging innovation to improve power density
Trench diodes for specific topologies

**Segment**
- Automotive
- Industrial

**Application**
- LED lighting
- SMPS
- Low-voltage DC-DC

**Topology**
- Boost + buck
- SEPIC
- Flyback
- OR ring
Electrical performances
Trench diodes for superior $V_F$

$V_F$ improved by 50 to 100mV on current and temperature conditions
Trench diodes for superior power density

Similar or better $V_F$ with trench technology in a ~50% smaller package
Switching performance comparison

Better switching performances with trench diodes vs Schottky

Conditions:
- $V_R = 60$ V
- $\frac{dI_F}{dt} = 400$ A/µs
- $I_F = 5$ A
- $T_j = 125$°C
Targeted applications
ST trench diodes for high-frequency applications

- LED lighting
- Reverse battery protection
- Low-voltage DC-DC

- Auxiliary power supply
- SMPS

- Freewheeling
- OR ring
- ST ViPer companion for flyback topology
Combining ST devices in power applications

- VIPer devices & ST trench diodes form complete kit in flyback converters
- LED lighting (35/60 W) HVLED001A
- Aux power supply in industrial, open frame (10/15 W with VIPer25, 37, 38)
- Multiple output smart metering & PLC isolated flyback (VIPer26K)
Trench diodes for automotive applications

- **Powertrain**: STPST15H100-Y
- **Infotainment**: STPST5H100-Y
- **Lighting**: STPST5H100-Y
- **Small DC-DC converters**: STPST2H100-Y
- **Reverse battery protection**: STPST1H100-Y

*Note: Part numbers listed here are examples. For an exhaustive list, please contact your sales representative.*
Design and development tools
Available tools

ST eDesign suite

Diodes (Schottky and FERD) simulator, footprints, and 3D models

SPICE models

For simulation
Sample program
Scan To Order
## ST trench diode portfolio

### 28 references, 8 $I_{F(AV)}$ current values available, 5 packages

<table>
<thead>
<tr>
<th>Trade off</th>
<th>CP</th>
<th>Package</th>
<th>Industrial/Auto</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A/100V</td>
<td>STPST1H100AF</td>
<td>SOD128 Flat</td>
<td>Industrial</td>
</tr>
<tr>
<td></td>
<td>STPST1H100AFY</td>
<td>SOD128 Flat</td>
<td>Auto</td>
</tr>
<tr>
<td></td>
<td>STPST1H100ZF</td>
<td>SOD123 Flat</td>
<td>Industrial</td>
</tr>
<tr>
<td></td>
<td>STPST1H100ZFY</td>
<td>SOD123 Flat</td>
<td>Auto</td>
</tr>
<tr>
<td>2A/100V</td>
<td>STPST2H100AF</td>
<td>SOD128 Flat</td>
<td>Industrial</td>
</tr>
<tr>
<td></td>
<td>STPST2H100AFY</td>
<td>SOD128 Flat</td>
<td>Auto</td>
</tr>
<tr>
<td></td>
<td>STPST2H100UF</td>
<td>SMB Flat</td>
<td>Industrial</td>
</tr>
<tr>
<td></td>
<td>STPST2H100ZF</td>
<td>SOD123 Flat</td>
<td>Industrial</td>
</tr>
<tr>
<td></td>
<td>STPST2H100ZFY</td>
<td>SOD123 Flat</td>
<td>Auto</td>
</tr>
<tr>
<td>3A/100V</td>
<td>STPST3H100AF</td>
<td>SOD128 Flat</td>
<td>Industrial</td>
</tr>
<tr>
<td></td>
<td>STPST3H100AFY</td>
<td>SOD128 Flat</td>
<td>Auto</td>
</tr>
<tr>
<td></td>
<td>STPST3H100UF</td>
<td>SMB Flat</td>
<td>Industrial</td>
</tr>
</tbody>
</table>

### Trade off | CP | Package | Industrial/Auto
---|-----|---------|-----------------|
5A/100V | STPST5H100AF | SOD128 Flat | Industrial |
|        | STPST5H100AFY | SOD128 Flat | Auto        |
|        | STPST5H100SB-TR | DPAK | Industrial |
|        | STPST5H100SBY-TR | DPAK | Auto        |
|        | STPST5H100SF  | PSMC | Industrial |
|        | STPST5H100SFY | PSMC | Auto        |
|        | STPST5H100UF  | SMB Flat | Industrial |
8A/100V | STPST8H100SF | PSMC | Industrial |
|        | STPST8H100SFY | PSMC | Auto        |
10A/100V | STPST10H100SB-TR | DPAK | Industrial |
|         | STPST10H100SBYTR | DPAK | Auto        |
|         | STPST10H100SF  | PSMC | Industrial |
|         | STPST10H100SFY | PSMC | Auto        |
12A/100V | STPST12H100SF | PSMC | Industrial |
15A/100V | STPST15H100BYTR | DPAK | Auto        |
|         | STPST15H100SB-TR | DPAK | Industrial |
STPST1H100x trench 1 A 100 V diodes
**STPST2H100x trench 2 A 100 V diodes**

<table>
<thead>
<tr>
<th>Model</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>STPST2H100AF</td>
<td>SOD128 Flat</td>
</tr>
<tr>
<td>STPST2H100AFY</td>
<td>SOD128 Flat</td>
</tr>
<tr>
<td>STPST2H100UF</td>
<td>SMB Flat</td>
</tr>
<tr>
<td>STPST2H100ZF</td>
<td>SOD123 Flat</td>
</tr>
<tr>
<td>STPST2H100ZFY</td>
<td>SOD123 Flat</td>
</tr>
</tbody>
</table>
STPST3H100x trench 3 A 100 V diodes

STPST3H100AF
SOD128 Flat

STPST3H100UF
SMB Flat
STPST5H100x trench 5 A 100 V diodes

- **STPST5H100AF**
  - SOD128 Flat

- **STPST5H100AFY**
  - SOD128 Flat

- **STPST5H100SF**
  - PSMC

- **STPST5H100SFY**
  - PSMC

- **STPST5H100UF**
  - SMB Flat

- **STPST5H100SB-TR**
  - DPAK

- **STPST5H100SBY-TR**
  - DPAK
STPST8H100x trench 8 A 100 V diodes
STPST10H100x trench 10 A 100 V diodes
STPST12H100x trench 12 A 100 V diodes
STPST15H100x trench 15 A 100 V diodes

STPST15H100SB-TR

STPST15H100SBYTR

DPAK DPAK
Our technology starts with You

Find out more at www.st.com