

# Automotive-grade 1200 V SCR AC/DC converter applications



## These 1200 V, high temperature automotive-grade thyristors make AC/DC converters safer by limiting the inrush current and providing functional isolation against AC line overvoltage

Available in through-hole and surface-mount packages (SMD), ST automotive-grade silicon-controlled rectifiers (SCR Thyristors), are suitable for automotive / stationary battery chargers, renewable energy generators, uninterruptible power supplies, solid-state relays, welding equipment and motor drive applications.

- The TN5050H-12WY in a TO-247 package offers superior performance in surge current handling ( $I_{TSM} = 580 \text{ A}$  at 10 ms), thermal cooling capabilities ( $R_{th(j-c)} = 0.3 \text{ }^\circ\text{C/W}$ ) and high surge voltage withstanding capability ( $V_{DSM}/V_{RSM} = 1300 \text{ V}$ ).
- The 30 A TN3050H is available in a TO-247 for high thermal cooling performance or a D<sup>2</sup>PAK SMD package for automated assembly and compact design boards.

### KEY FEATURES

- On-state RMS current: 30-50 A
- Blocking voltage: 1200 V
- High turn on robustness : 200 A/ $\mu\text{s}$
- High off-state immunity: 1000 V/ $\mu\text{s}$
- Gate trigger current: 50 mA
- ECOPACK®2 compliant

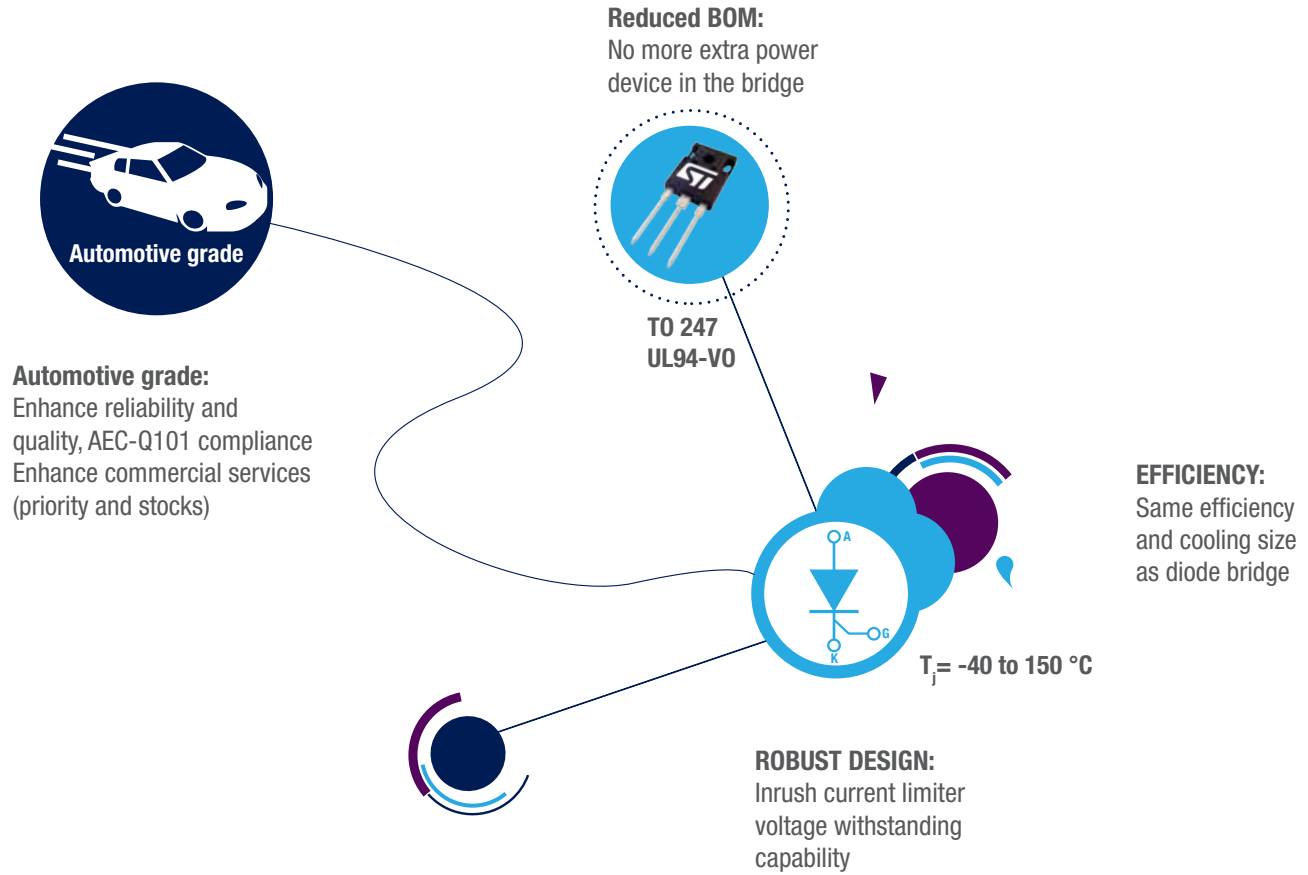
### KEY BENEFITS

- Automotive grade: reliability, quality and AEC-Q101 compliance
- Reduce BOM: extra power device no longer needed in the rectifier bridge
- Same efficiency/dissipation and cooling size as diode bridge
- High PCB creepage distance above 4mm
- Control peak current at charger power up

### TARGETED APPLICATIONS

- EV/HEV (on board, off board battery chargers)
- Industrial battery chargers
- Renewable energy inverters
- Solid state relays
- Uninterruptible power supplies (bypass)
- Motor drives (inrush current limiter, soft start)
- Industrial welding system

## AUTOMOTIVE SCR IN BRIEF



## AUTOMOTIVE SCR PRODUCT TABLE

| Part number  | Package            | Junction temperature<br>T <sub>j</sub> | Repetitive peak off-state voltage<br>V <sub>DRM</sub> , V <sub>RRM</sub> | RMS on-state current<br>I <sub>T(RMS)</sub> | Non-repetitive surge-peak on-state current (@ tp= 10 ms)<br>I <sub>TSM</sub> | Triggering gate current<br>I <sub>GT</sub> | Peak on-state voltage<br>V <sub>TM</sub> | Maximum leakage current (@T <sub>j</sub> =25°C<br>I <sub>DRM</sub> , I <sub>RRM</sub> ) | Critical rate of rise of off-state voltage<br>dV/dt | Junction-to-case thermal resistance<br>R <sub>th(j-c)</sub> |
|--------------|--------------------|--|--|---|--|--|--|---|---|---|
|              |                    | Max. (°C)                              | Max. (V)   | (A)   | Max. (A)   | Max. (mA)                                  | Max. (V)                                 | Max. (µA)   | Min. (V/µs)   | (°C/W)  |
| TN3050H-12GY | D <sup>2</sup> PAK | 150                                    | 1200   | 30  | 300  | 50   | 1.65                                     | 5   | 1000  | 0.8   |
| TN3050H-12WY | TO-247             | 150                                    | 1200   | 30  | 300  | 50   | 1.65                                     | 5   | 1000  | 0.3   |
| TN5050H-12WY | TO-247             | 150                                    | 1200   | 50  | 580  | 50   | 1.55                                     | 5   | 1000  | 0.3   |

Application note AN4606 with additional information about the inrush current limiter function in triacs and thyristors (SCR) is available on [www.st.com](http://www.st.com)



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