



life.augmented



Automotive grade SCR Thyristor

Portfolio & Application

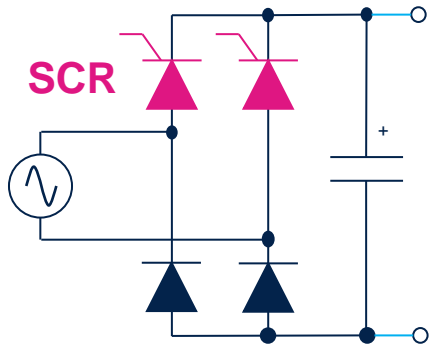
Discrete & Filter Division

Analog, Power & Discrete, MEMS et Sensors





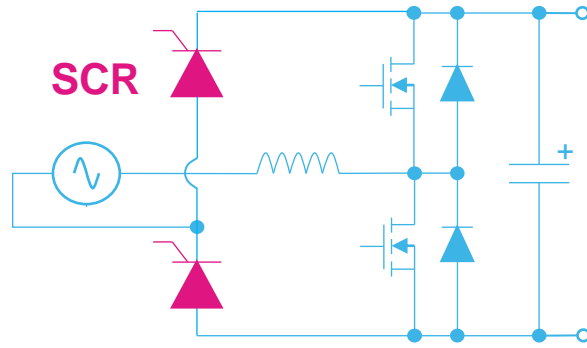
The Thyristor functions in Electrical Vehicle



OBC

Mixed SCR bridge

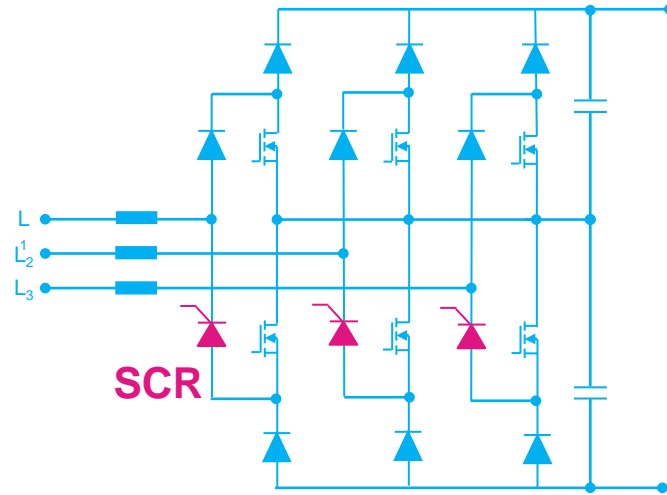
Inrush Current Limitation
Up to 15 kW



OBC

Single phase Totem Pole

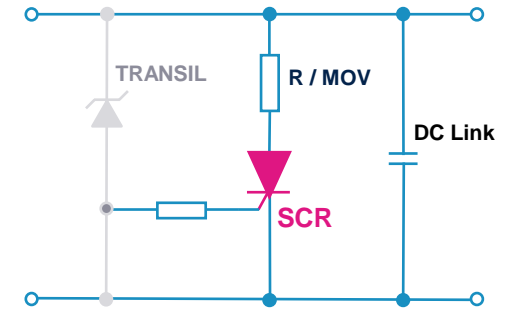
Inrush Current Limitation
Up to 8 kW per phase



OBC / Station

3-Φ Vienna modified

Inrush Current Limitation
Up to 25 kW



OBC / BMS

Over Voltage / Bus Discharge

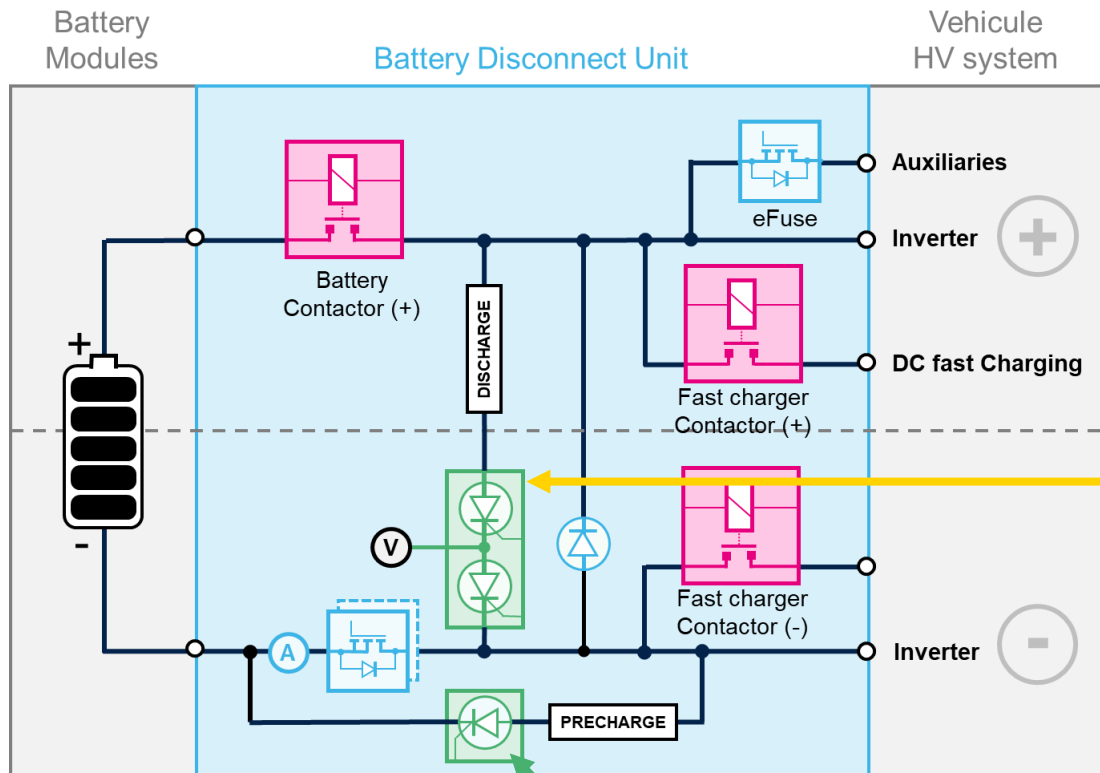
Energy absorber
Up to 2800 A / 0.5 ms surge



life.augmented

Power Distribution Unit upgrade with ST SCRs

Enhance your EV safety and performances with dedicated Automotive Grade Thyristors



Fast Discharge
1000 faster than
slow discharge

- Short Circuit discharge
- Overvoltage clamp during disconnection

Capacitance DISCHARGE

Fast Discharge with High Current capability

Improved reliability thanks to Redundancy & diagnostic options

Compatibility with Fuel cell & BEV cars

PRECHARGE

Current fault detection solution

Low power insulated gate control

Sustainable alternative to mechanical relays



Automotive SCR Thyristors range

Power up your EV with AEC-Q101 qualified SCRs for Inrush Current Limitation 

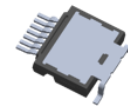
| Part Number | I_{TRMS} | V_{DRM} | I_{TSM} | Package | | | | $I_{DC\ OUT}$ |
|------------------------|------------|-----------|-----------|---------|--------------------|--------|--------|---------------|
| | (A) | (V) | (A) | TO-247 | D ² PAK | HU3PAK | A-SMIT | (A) |
| TN3050H-12x | 30 | 1200 | 300 | ● | ● | | | 38 |
| TN3050HP-12L2Y | 30 | 1200 | 300 | | | ● | | 38 |
| TN4050HP-12x | 40 | 1200 | 400 | ● | ● | ● | | 50 |
| TN4050HP-12G2Y | | | | | ● HV | | | |
| <u>TN6050HP-12WY</u> | 60 | 1200 | 600 | ● | | | | 75 |
| <u>STTD6050H-12M2Y</u> | 60 | 1200 | 500 | | | | ● | 75 |
| <u>STTN6050H-12M1Y</u> | 60 | 1200 | 600 | | | | ● | 75 |



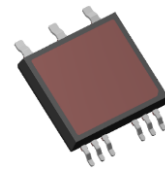
TO-247



D²PAK



HU3PAK



ACEPACK SMIT

Cost effective based solution

Application lifetime enhanced

Robust Inrush Current Limitation

Fast power up & line drop recovery

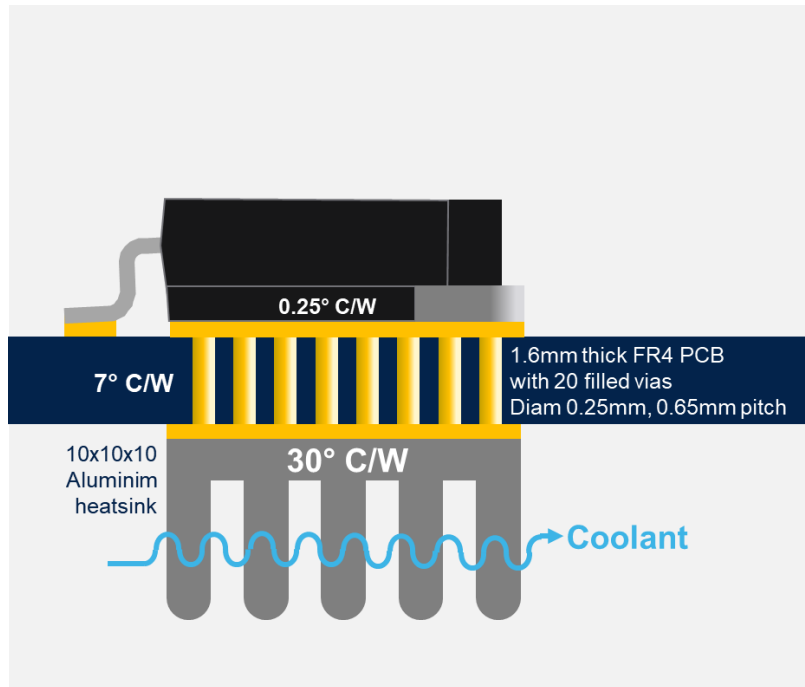




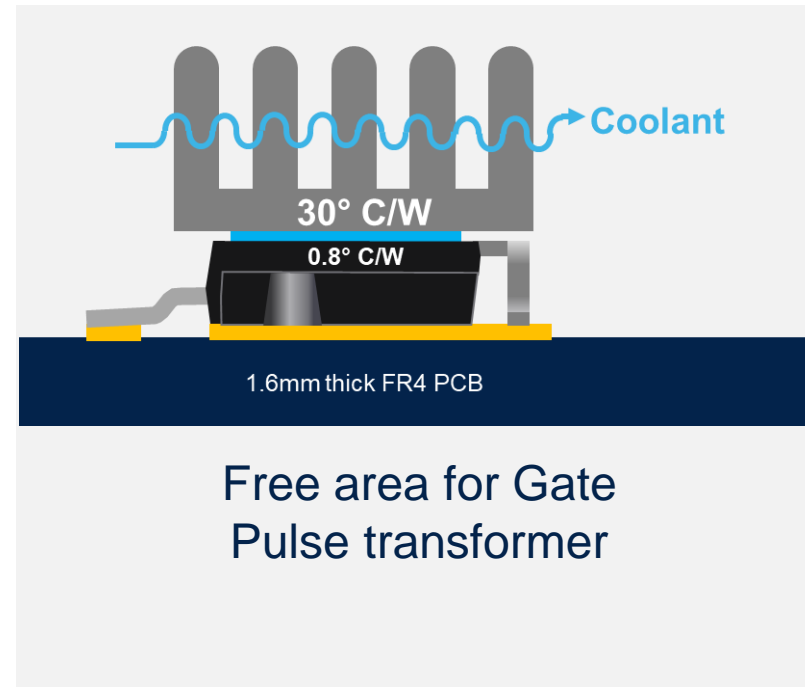
Innovative Top side cooling Package



D3PAK



HU3PAK



POWER

+20%

Auto Grade Thyristor and its EV Challenge

CHALLENGE

SOLUTION

BENEFIT

Vibrations in Vehicle

No Moving Part

Improved Reliability

**Inrush Current Limitation
IEC61000-3-3 compliant**

SCR in Phase Control

Smart Control, Fast Startup

125 °C Ambient

T_J Max 150°C @1200V

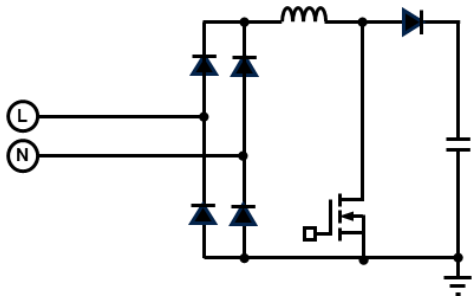
AEC-Q101 Qualified

High current conduction

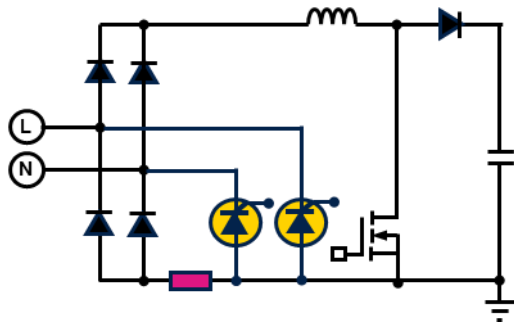
**High current I_{TSM}
capability**

Enhanced robustness

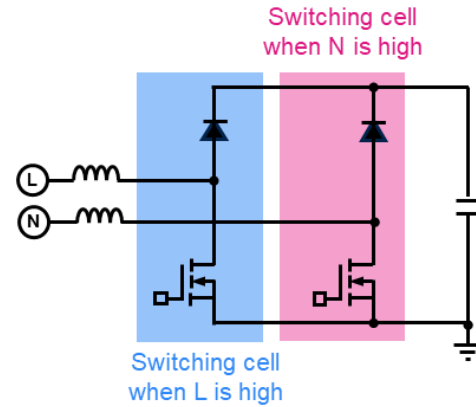
Conventional PFC



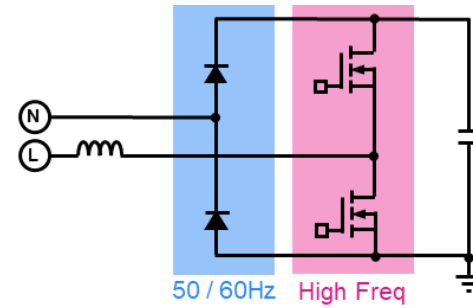
SCR to bypass NTC connected to input Bridge



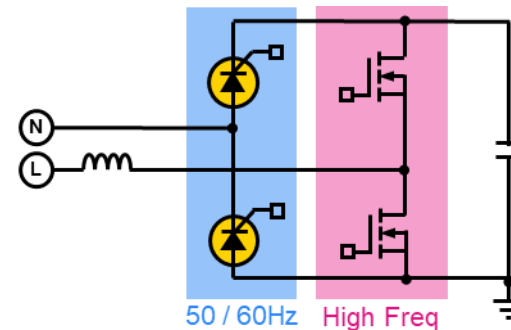
Bridgeless PFC



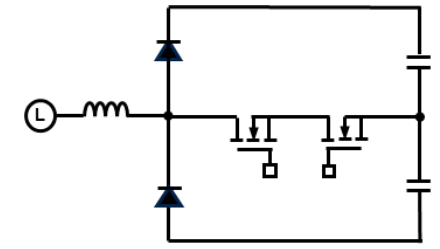
Totem Pole PFC



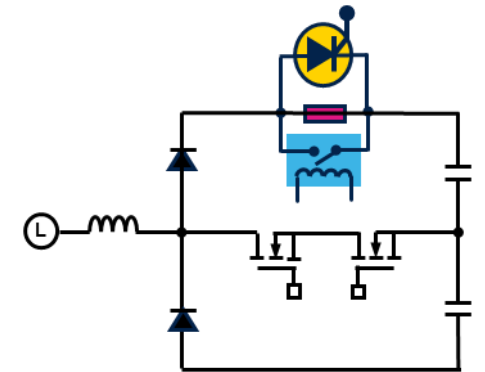
Soft control of the inrush current with phase-controlled SCRs



Vienna PFC



SCR to accelerate pre-charge and avoid Relay hot switching





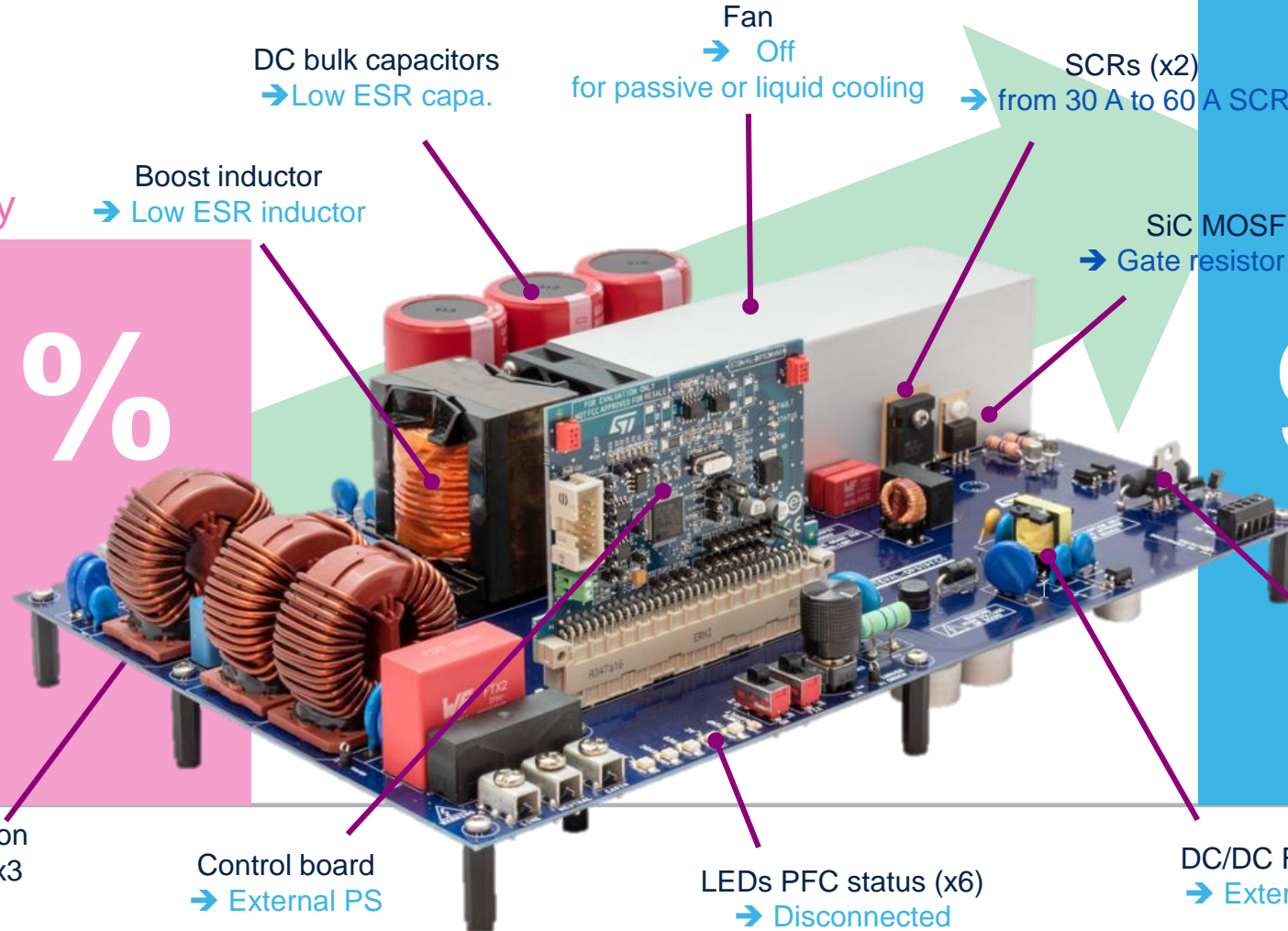
Bridgeless TOTEM POLE PFC STEVAL-DPSPFC01 Efficiency Optimization

Improved Totem-Pole efficiency

Overall board efficiency

97.7 %

*at peak efficiency



98.7 %

*at peak efficiency



life.augmented



EV & PHEV - ST Thyristors Augmented

STMicroelectronics Thyristors functions upgrading EV & PHEV

On-board Charger

AEC-Q101
TN6050HP-12WY



Pre-Charge - PDU

Fast charge
TN4050HA-12G2Y



Voltage Regulator

High Temperature
TM8050H-8D3



Fast Charging

Current Surge
STTN6050H-12M1Y



BMS Bus Discharge

Turn-on performance
TN4050HP-12WY



Belt Starter Generator

1200V SCR
TN3050H-12WY

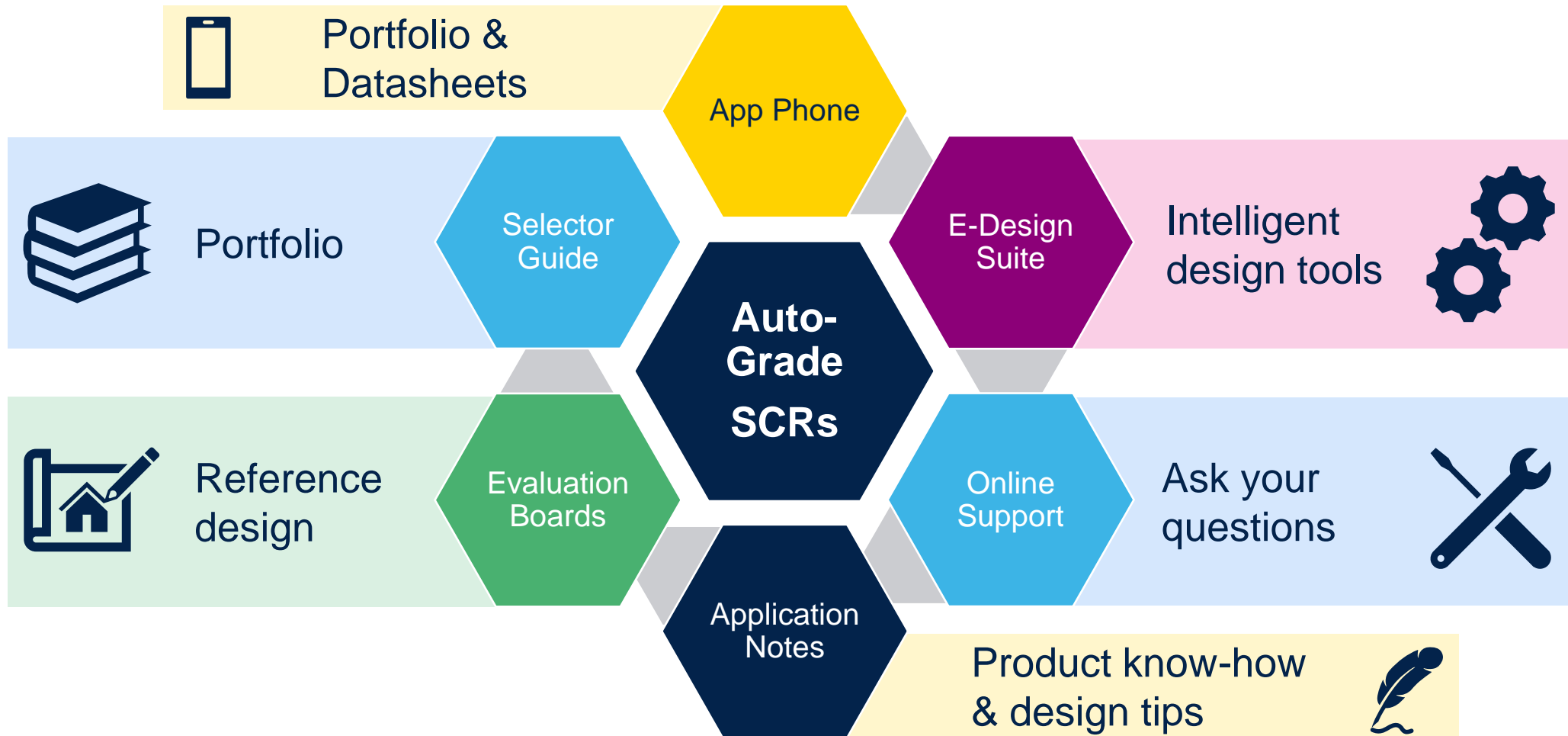


life.augmented

STMicroelectronics, Thyristors and AC Switches



Want to know more ?



Our technology starts with You



Find out more at www.st.com/en/thyristor-scr-ac-switches.html

© STMicroelectronics - All rights reserved.

ST logo is a trademark or a registered trademark of STMicroelectronics International NV or its affiliates in the EU and/or other countries.

For additional information about ST trademarks, please refer to www.st.com/trademarks.

All other product or service names are the property of their respective owners.



life.augmented