

**BUILT TO WIN**  
VISHAY EVERYDAY

AMERICAS SALES CONFERENCE

# Diodes & Silicon Carbide Diodes

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March 9 -12, 2026



The DNA of tech.®

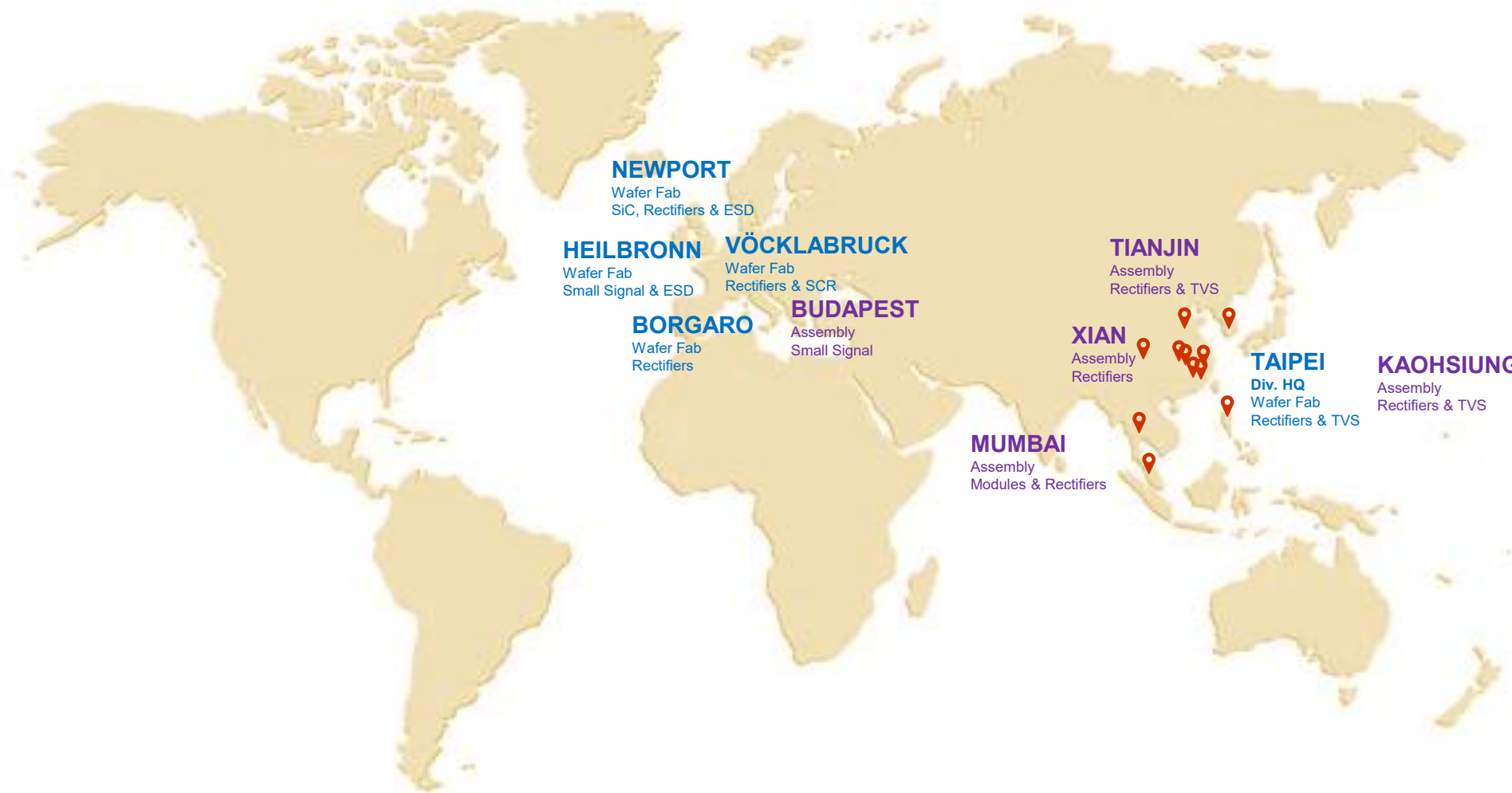


## Who we are & Fast Facts about Vishay Diodes

We are global leader in Silicon Rectifiers & TVS worldwide

Powering possibilities with Wafer technologies & Packaging evolutions

# Diodes Worldwide Manufacturing

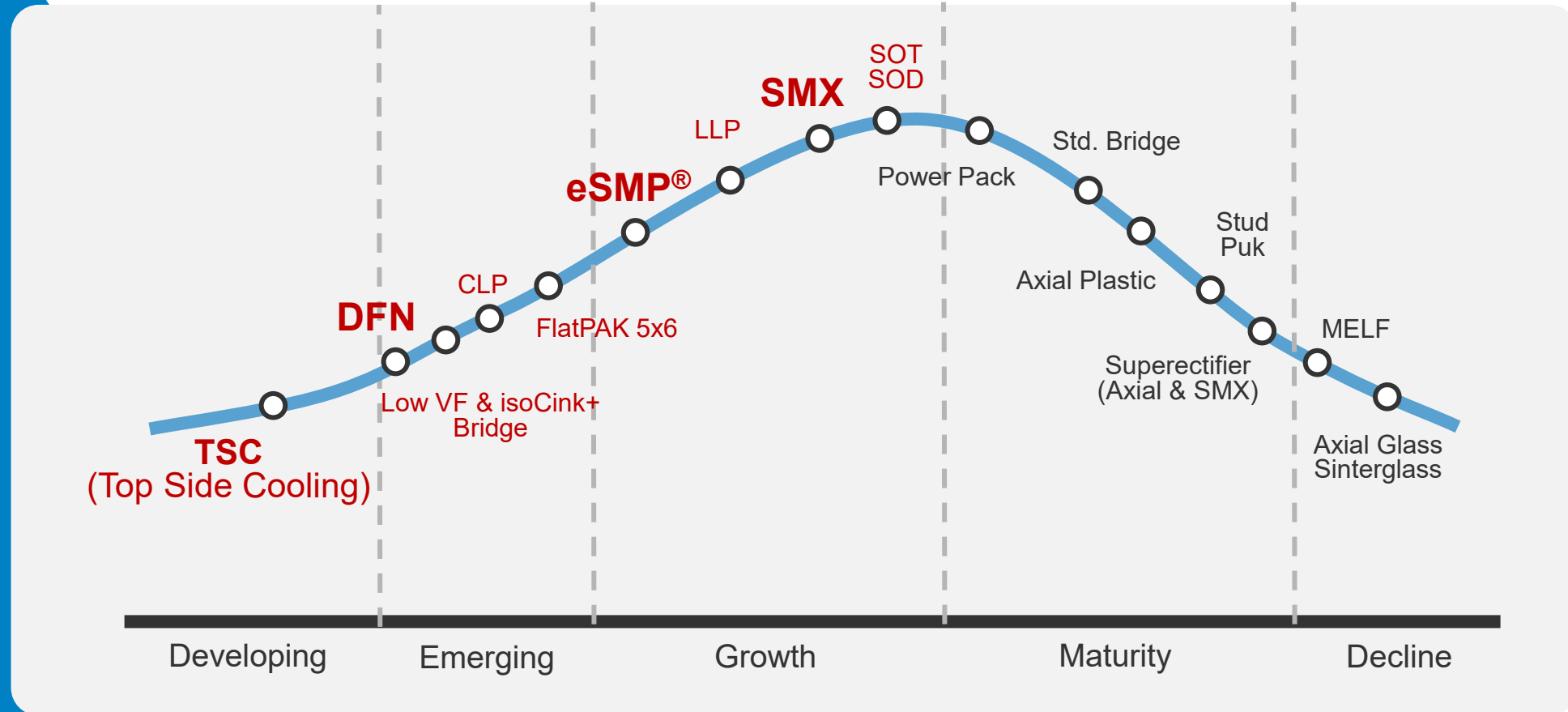
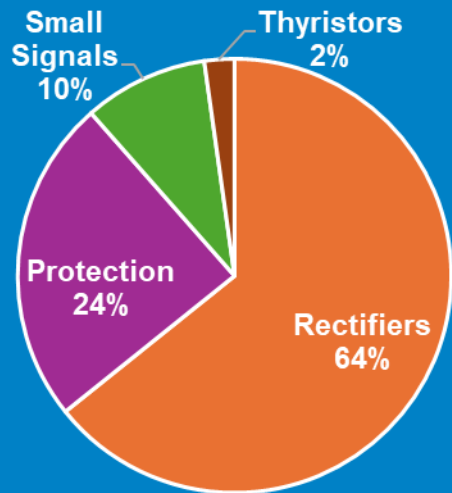


**Wafer Fabrication**   **Assembly**   **Foundries & OSAT**

# Diodes Product Life-Cycle



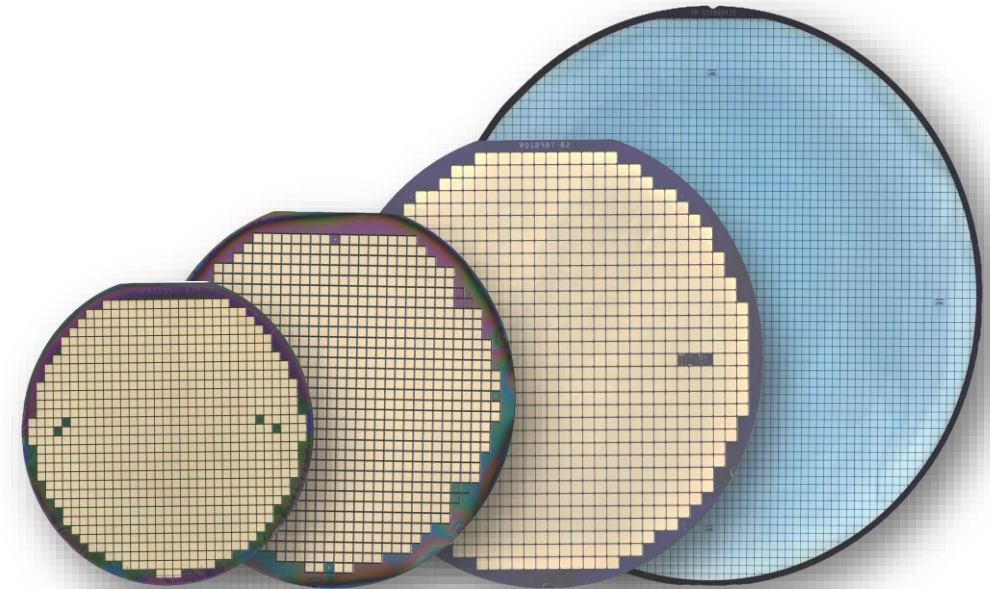
The DNA of tech:



# Innovated Wafer Technologies

Broad **Silicon** portfolio

Competitive **SiC** technology



## Standard & Fast

Open Junction

Glass Mesa

Planar  
Low Vf  
Voltage up to 1800V

## Ultrafast

Open Junction

Glass Mesa

FRED Pt®  
Best-in-class  
Qrr/Vf trade-off

## Schottky

Planar  
High surge  
immunity

TMBS®  
Low noise

## Silicon Carbide

6"  
Zero Reverse Recovery  
650V, 1200V

8"  
Further reduced Vf & Leakage  
650V, 1200V, 1700V

## TVS

TransZorb®  
150~7KW

PAR®  
7~11KW

XClampR®  
Flat clamping voltage

## ESD

Ethernet G1

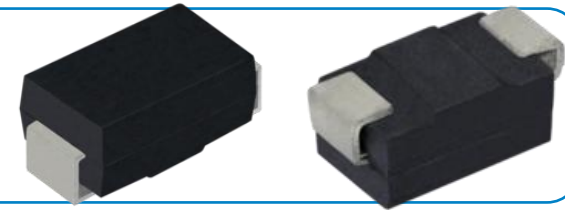
Ethernet G2

Ethernet G2.5  
Low clamping voltage  
Ultra low capacitance

# Leading Packages

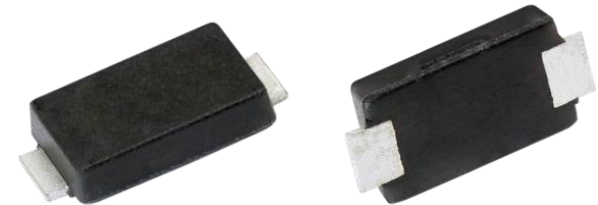
## Standard Surface Mount

- **Vishay set leadership with folded frame technology** more than 25 years ago
- Conversion for Axial Plastic & Glass



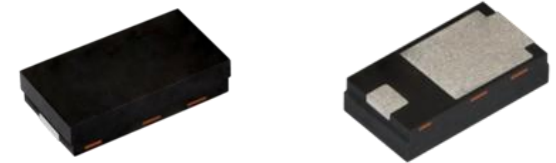
## eSMP®

- Significant reduction in profile to around 1mm
- High current/power density facilitating customer system downsizing
- **Vishay offers the broadest surface mount package portfolio**



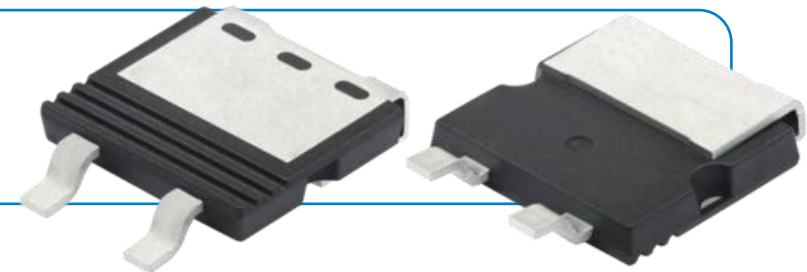
## Power DFN

- **Vishay is setting a new industry standard** for Surface mount package
- Push the limit of miniaturization through reduction of thermal resistance
- Leadless but support automotive AOI



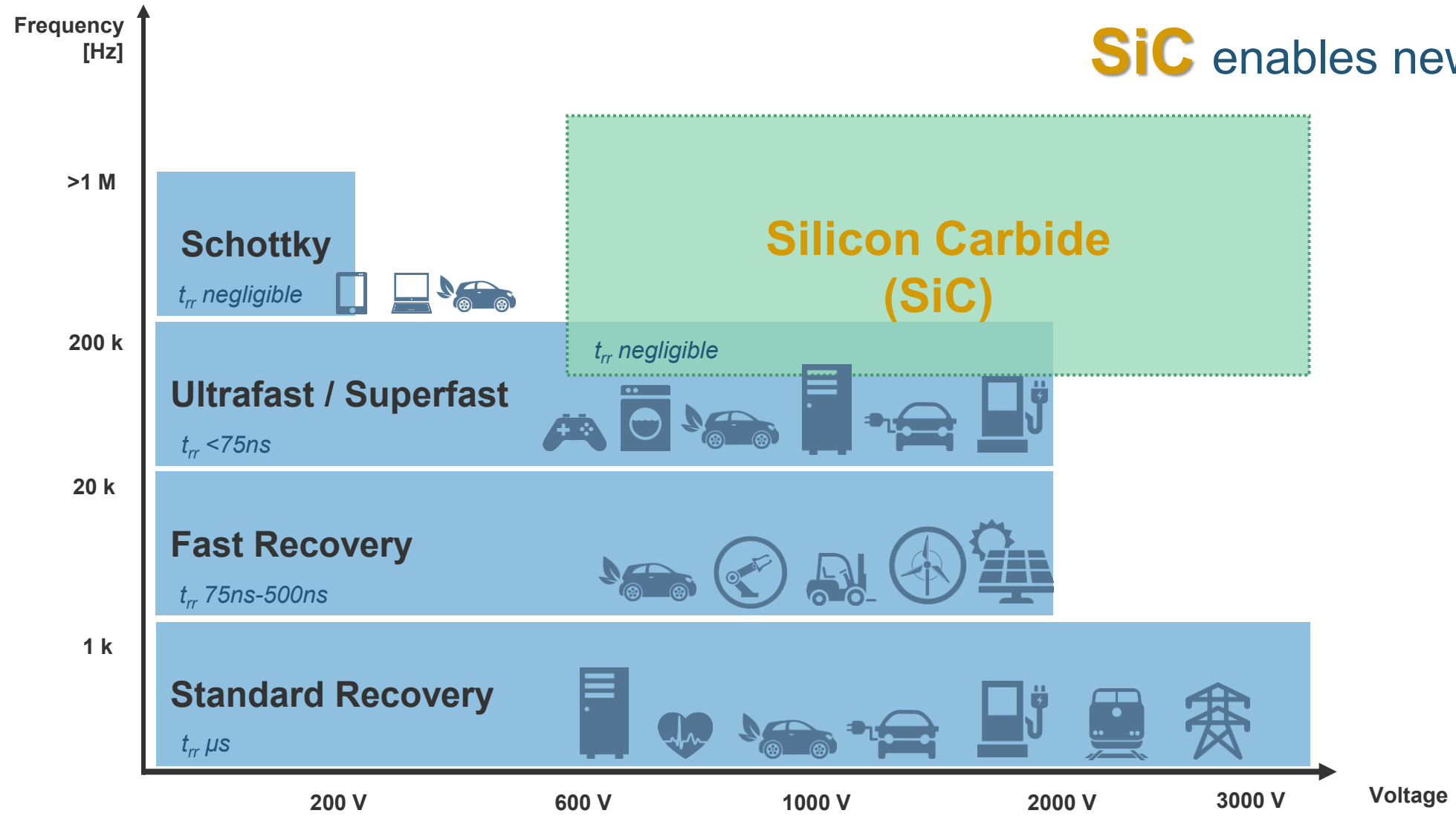
## Top Side Cooling

- Addressing higher power needs
- Increased power density & improved thermal management



# Fulfill Wide Range of Application

**Silicon** remains the mainstream  
**SiC** enables new solutions

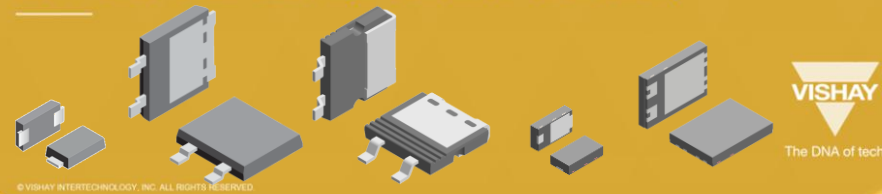




The DNA of tech.

## eSMP<sup>®</sup>, DFN & Top Side Cooling Packages

Low Profile, Small-Size, High Current & Power density



## Automotive Ethernet ESD Protection Diode

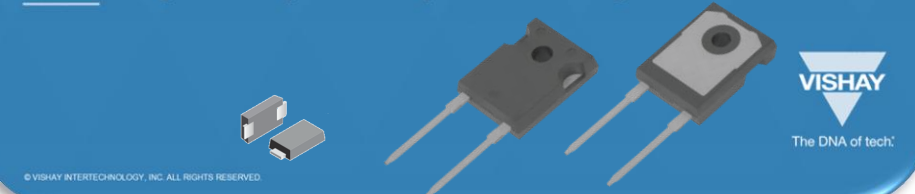
Very low clamping voltage & capacitance, Low Profile, Small-Size



# Focus Products

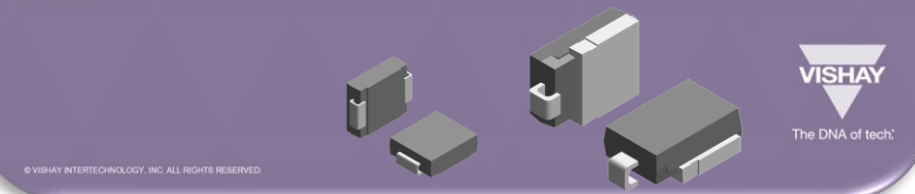
## Silicon Carbide (SiC) Diodes

Outstanding Efficiency, Extremely Fast Switching Performance



## XClampR<sup>®</sup> TVS

High Surge Power & Improved Power Density  
eXtremely low Clamping Ratio Transient Voltage Suppressor

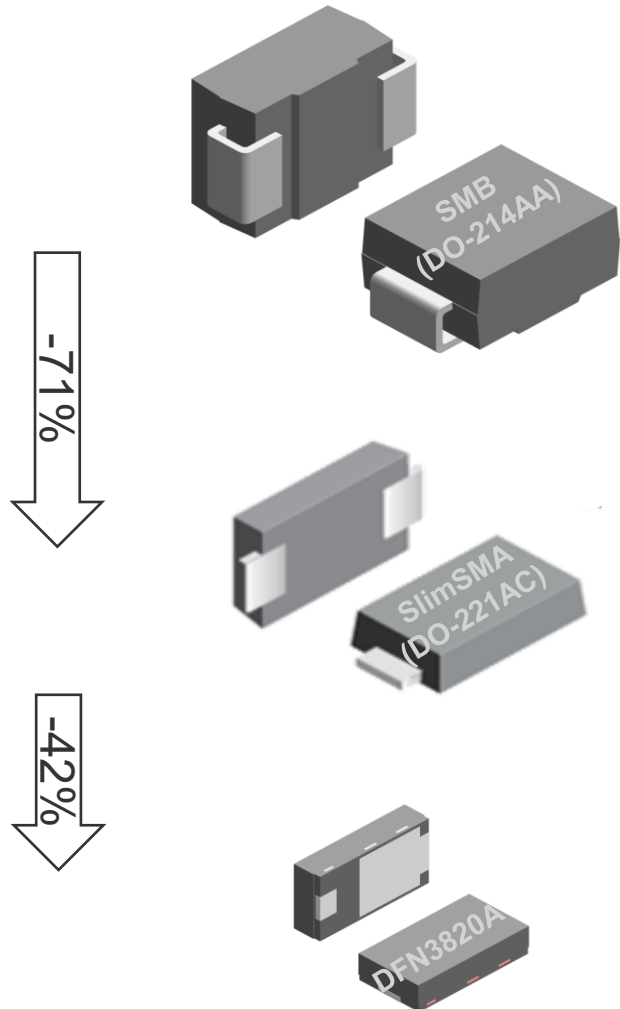


# eSMP® & DFN series Drive for a Smaller, Better & Cost-Effective Product

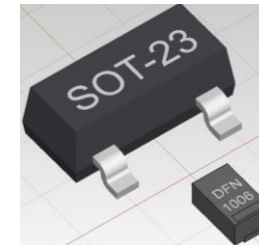
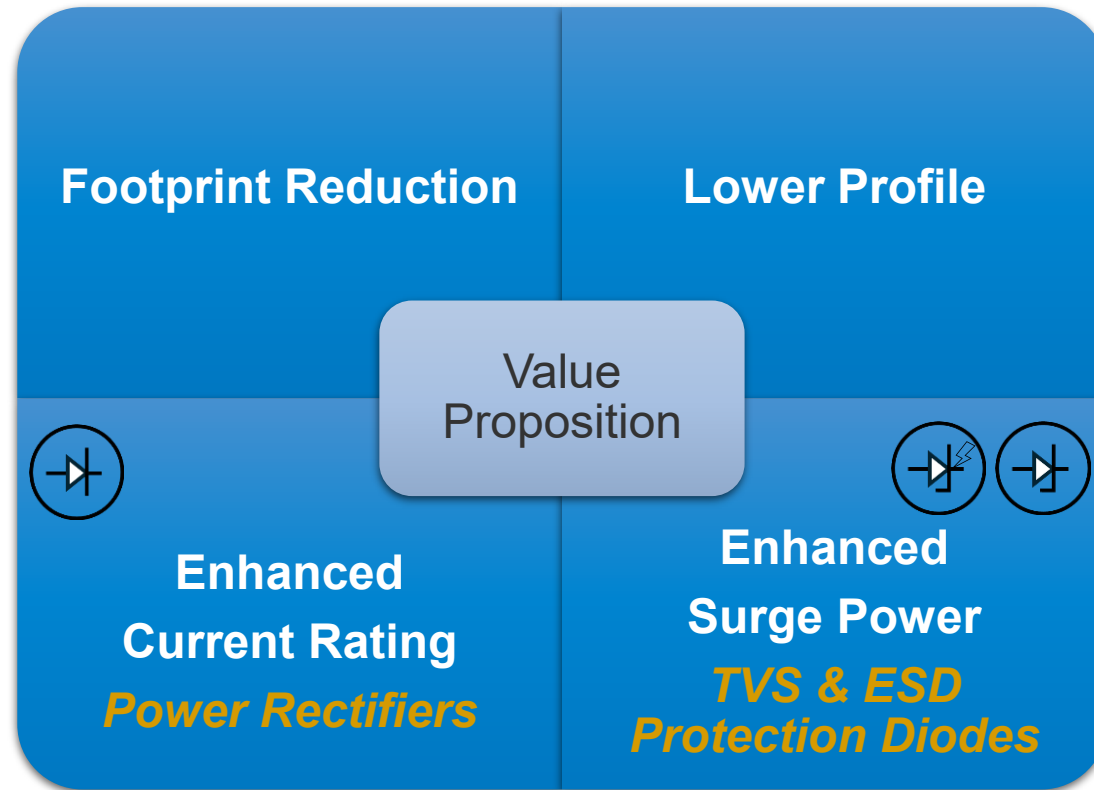


The DNA of tech.

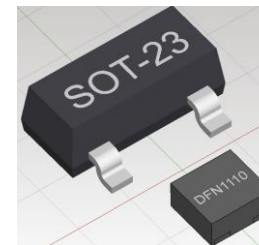
## Power Rectifiers & TVS



## ESD Protection & Zener



**-92%**



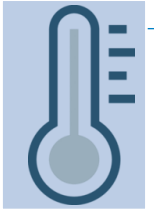
**-85%**

# eSMP<sup>®</sup> Package portfolio

## enhanced Surface-Mount Power packages



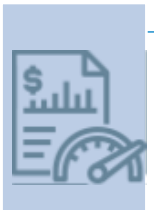
**Increase Power Density**



**Improve Thermal Management**



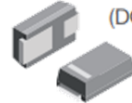
**Higher Efficiency**



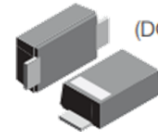
**Weight Reduction**



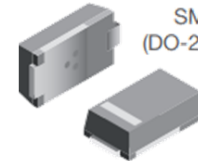
MicroSMF  
(DO-219AC)



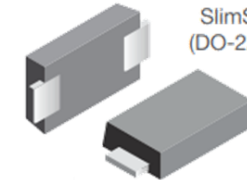
MicroSMP  
(DO-219AD)



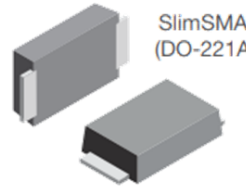
SMF  
(DO-219AB)



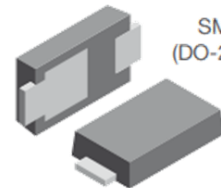
SMP  
(DO-220AA)



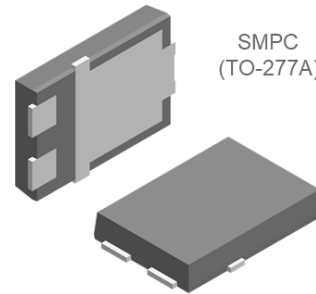
SlimSMA  
(DO-221AC)



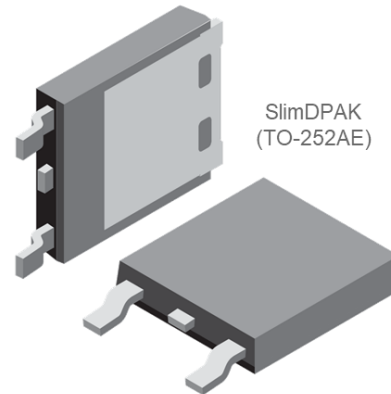
SlimSMAW  
(DO-221AD)



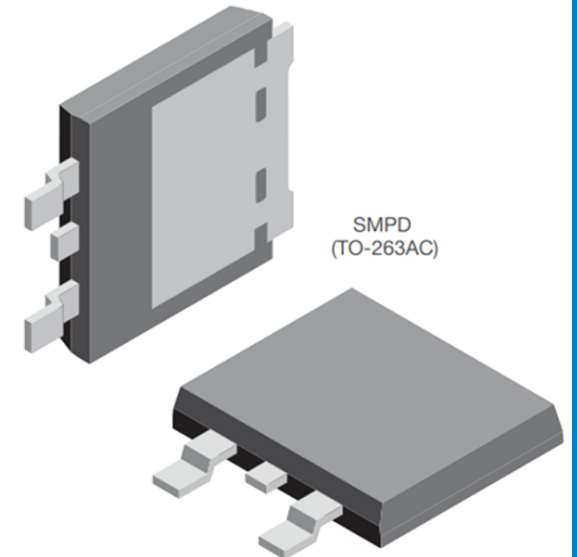
SMPA  
(DO-221BC)



SMPC  
(TO-277A)



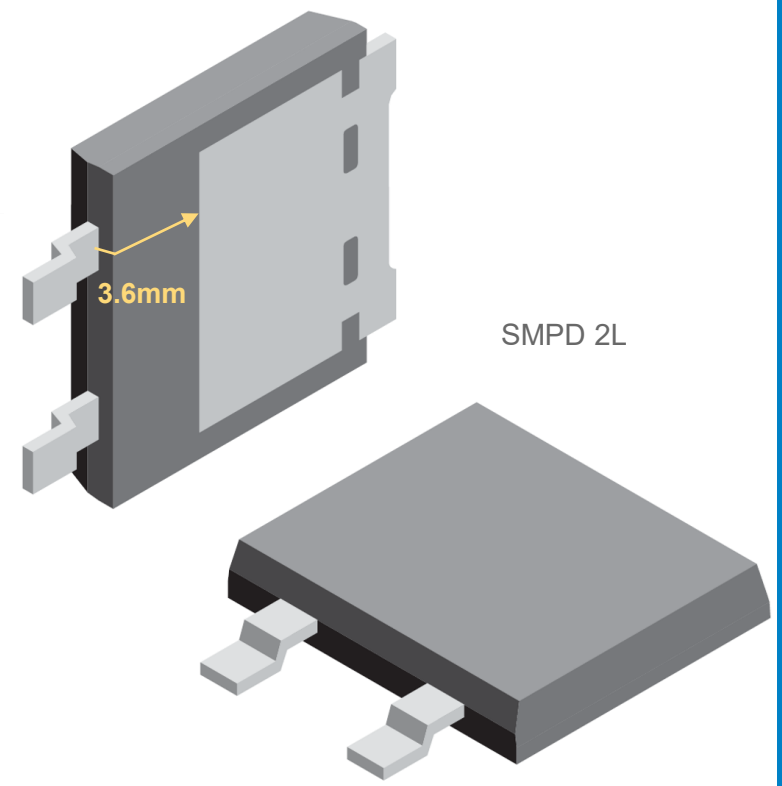
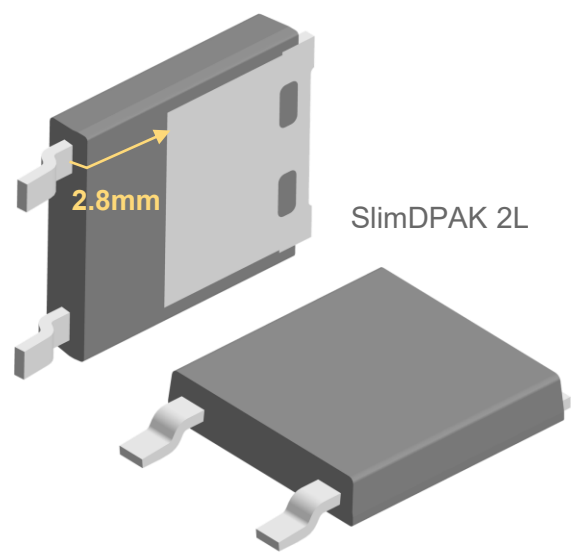
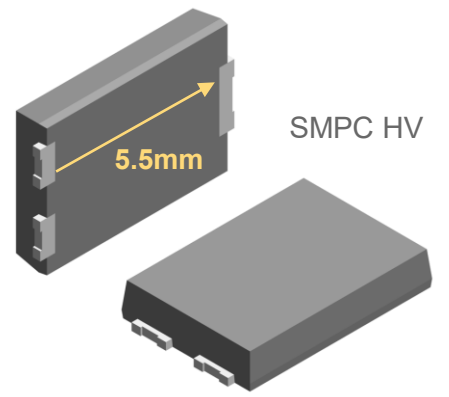
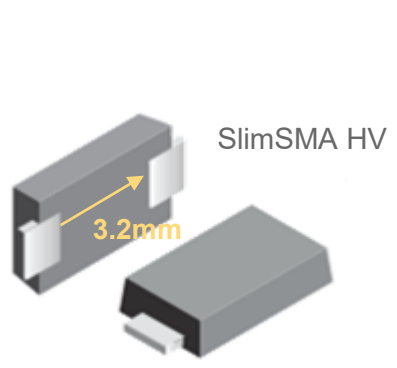
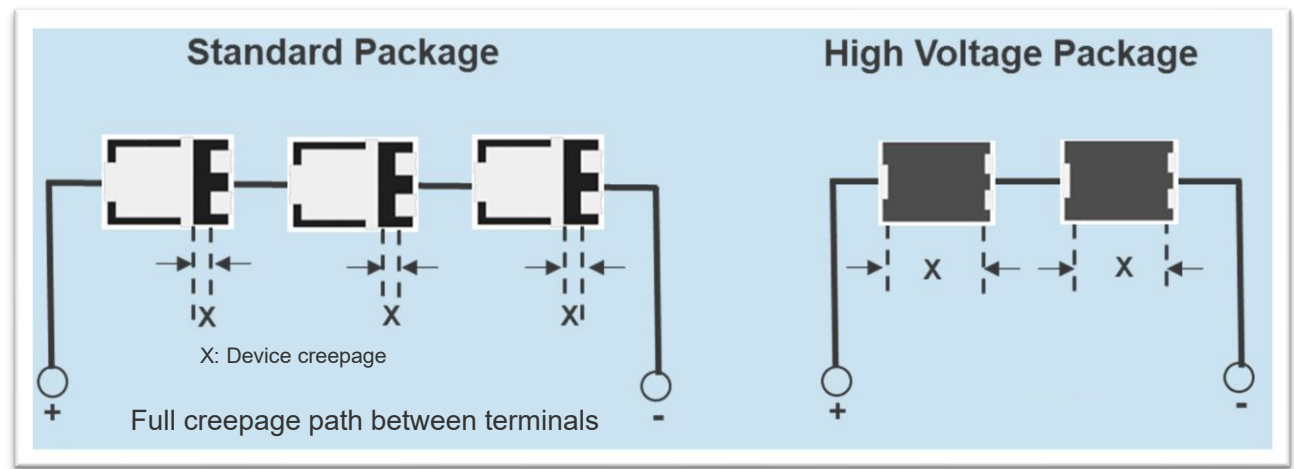
SlimDPAK  
(TO-252AE)



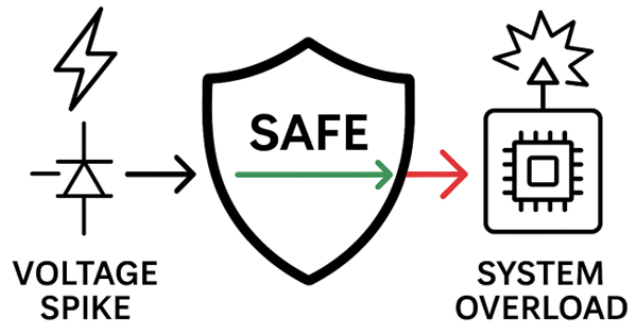
SMPD  
(TO-263AC)

# eSMP<sup>®</sup> High Voltage package portfolio

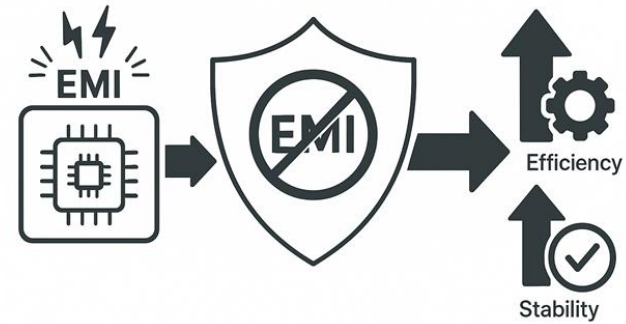
Customers can build safer, more compact, and cost-effective systems



# High voltage platforms are the trend enabling system Efficiency & Safety improvement



Prevents damage from voltage spikes and system overloads



Enhancing System Efficiency and Stability from minimizing electromagnetic interference (EMI)



# DFN

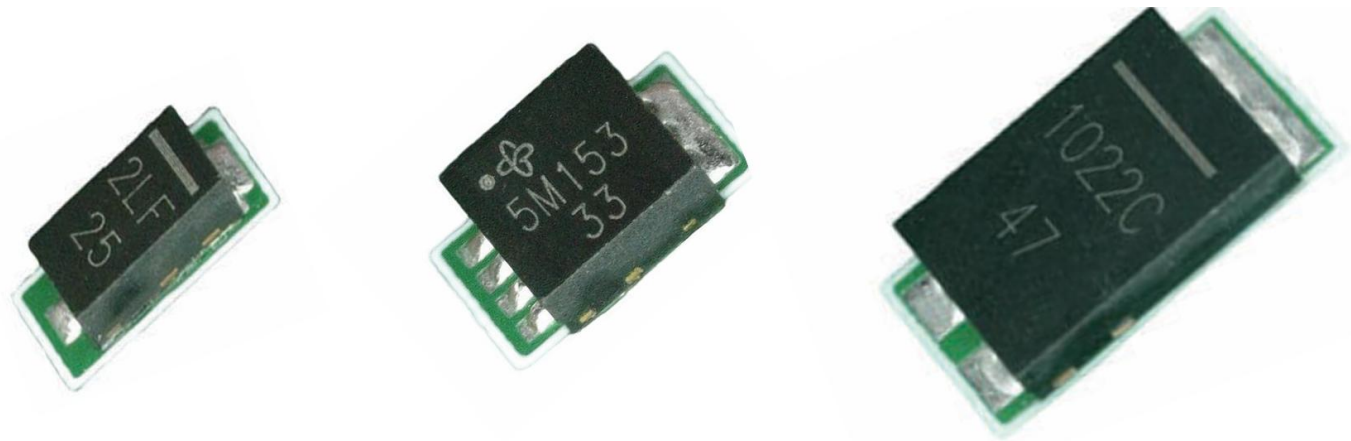
## Dual Flat No-Lead packages



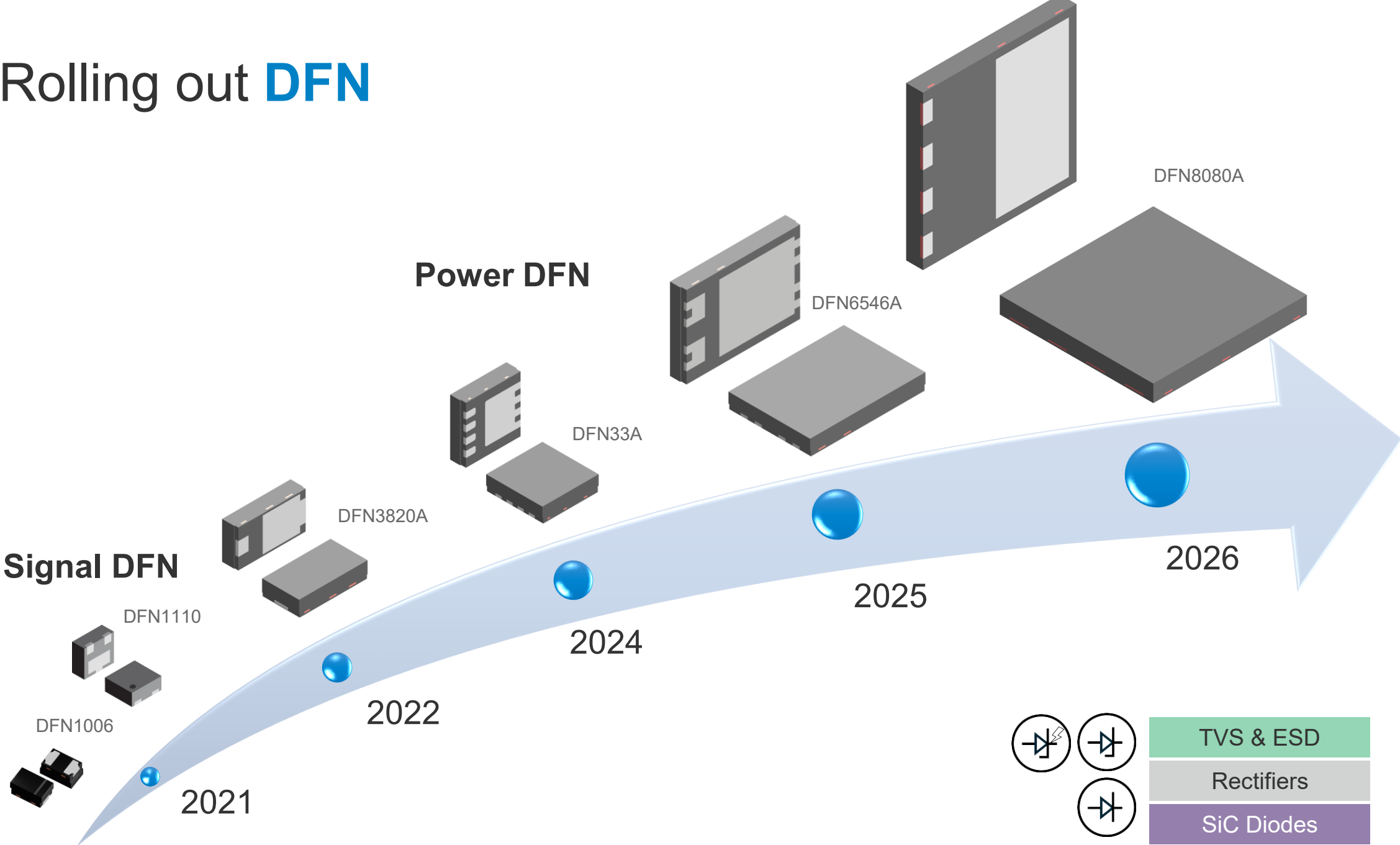
- **Ultra-Compact** design for utility enhancement of PCB space
- **Optimized thermal paths** enabling better heat dissipation & reliability of system
- **Solderable sidewall** design enable Automated assembly and Optical Inspection (AOI). Benefits in reducing system production costs & better in quality.



Wettable side wall plated solder pads



# Rolling out DFN



# Automotive Ethernet ESD Protection Diode



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**VISHAY**  
The DNA of tech.™

ESD Protection Diode For Automotive Ethernet Networks  
**Device Features Space-Saving DFN1006-2B Package With Wettable Flanks**

**ADVANTAGE**

Optimized for automotive ethernet networks in compliance with OPEN Alliance 10Base-T1S, 100Base-T1 and 1000Base-T1 specifications

- KEY PRODUCT FEATURES**
- ✓ 1-line bidirectional ESD protection
  - ✓ ± 24 V working voltage and > 100 V trigger voltage
  - ✓ Very low clamping voltage of 31 V typical at 1 A
  - ✓ Low dynamic resistance of 0.4 Ω typical
  - ✓ Low maximum capacitance of 2 pF
  - ✓ Low maximum capacitance of 1pF with two devices in series according to OPEN Alliance 10Base-T1S
  - ✓ AEC-Q101 qualified available



**MARKETS AND APPLICATIONS**

- CONNECTIVITY**
  - Fixed infrastructure
- CONSUMER**
  - Entertainment and appliances
- MOBILITY**
  - Automotive
  - Automotive electrification (e-Powertrain)
  - Automotive intelligence (smart vehicles)
  - Micro mobility
  - Transportation
- INDUSTRIAL**
  - Automation
  - Industrial infrastructure
  - Home and building controls
- MEDICAL**
  - Medical instrumentation, monitoring, therapeutics

**FTZ FORSCHUNGS- UND TRANSFERZENTRUM E.V.**  
EMC Test report

**VETH100A1DD1**  
Single-Line Bidirectional ESD-Protection Diode in DFN1006-2B

**OPEN ALLIANCE**

**IEEE 10BASE-T1S EMC Test Specification for ESD Suppression Devices**

**Pass**

Single test	Result	Comment / Resulting class
Parasitic capacitance	Pass	
S-Parameter	Pass	
Damage ESD	Pass	
ESD Discharge Current Measurement / CMC Saturation class I	Pass	± 3 kV: class III ± 5 kV: class III ± 6 kV: class III ± 7 kV: class III ± 15 kV: class III
RF Clamping	Pass	Class III

Comment:  
 1) There is no Pass / Fail evaluation done for these tests because of the required class for the ESD protection device depends on customer requirements for ESD robustness of the complete 10BASE-T1S interface and the ESD robustness of 10BASE-T1S interface to be protected from ESD damage.  
 2) Result is Pass because of the maximum defined test class is fulfilled by the ESD suppression device.  
 3) Result is Fail because of no defined test class is reached for test.

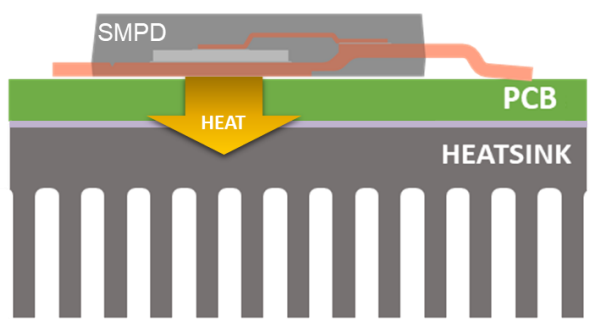
FTZ EMC Test Laboratory Page 2 of 44

# Why Top Side Cooling Packages?

## Surface Mount



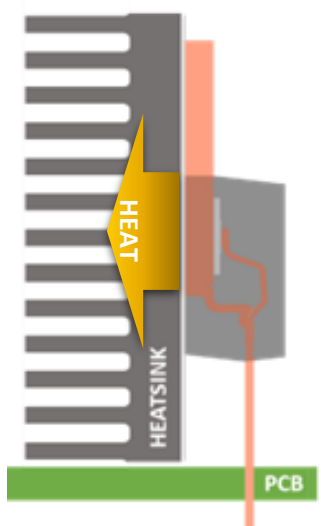
- Heat dissipate thru PCB to heatsink
- Automatic handling



## Through Hole



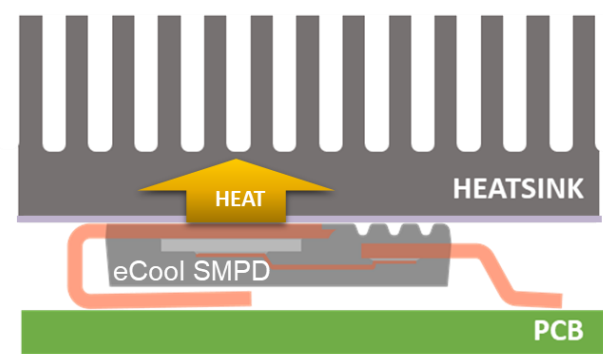
- Heat dissipate directs by heatsink
- Manual handling
- Through holes on PCB – Requires space in height



## Top Side Cooling


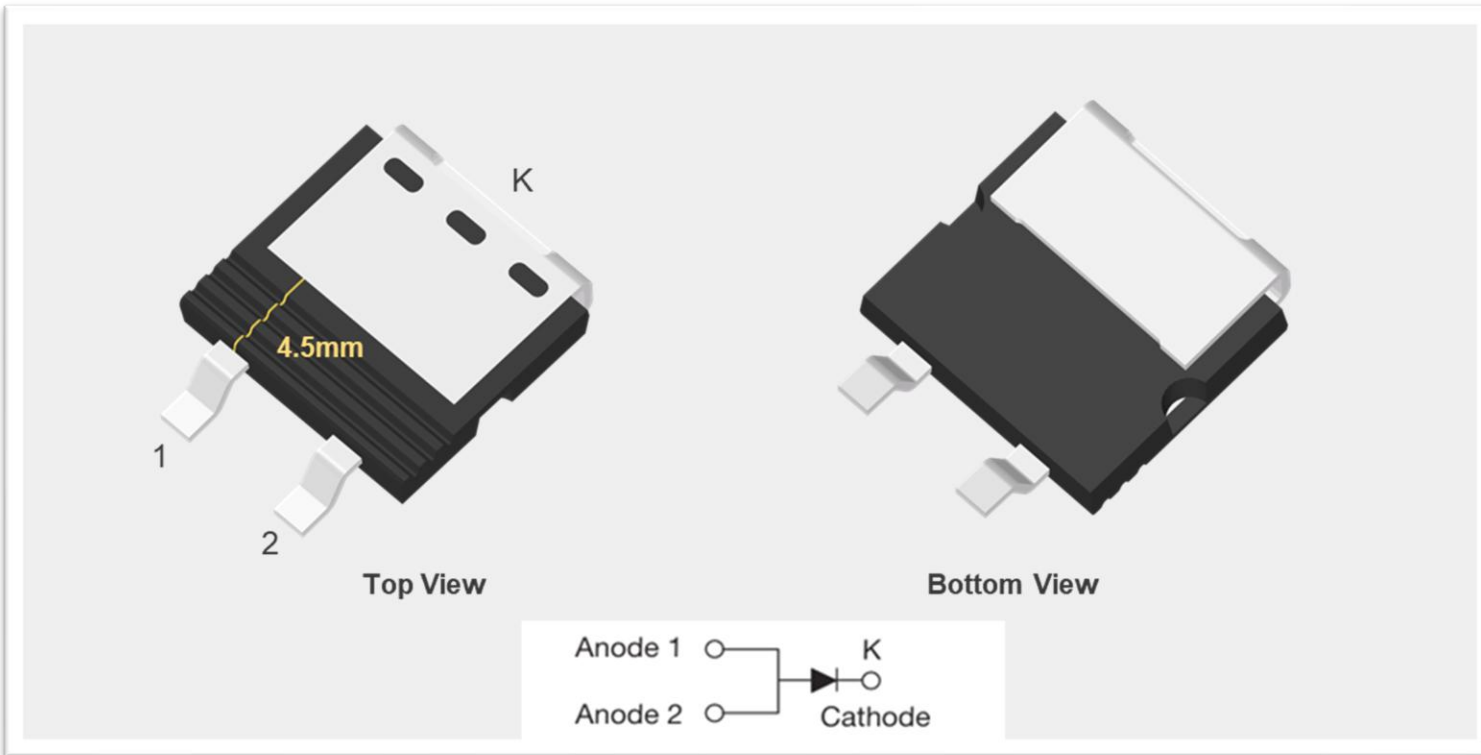


- Heat dissipate directs by heatsink
- Automatic handling
- Optimize PCB layout – allow double side placing device



# Top side enhanced Cooling SMPD package


## eCool SMPD



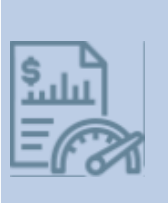
**Address higher power needs**



**Improve Thermal Management**

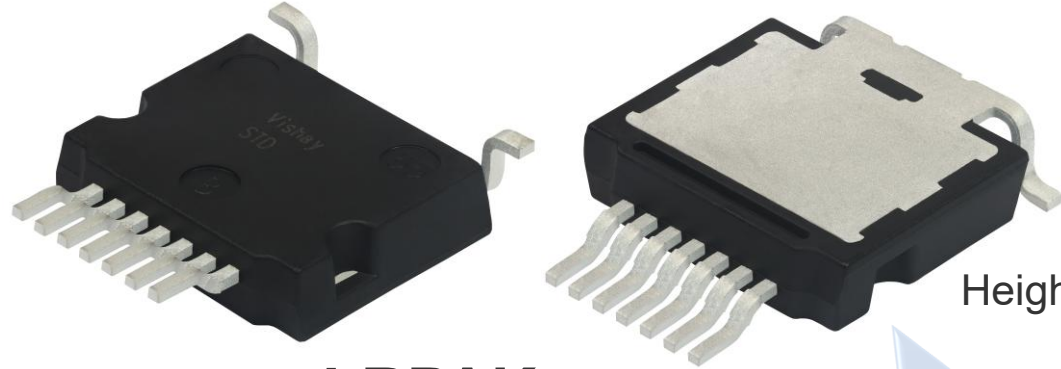


**Higher Efficiency**



**Weight Reduction**

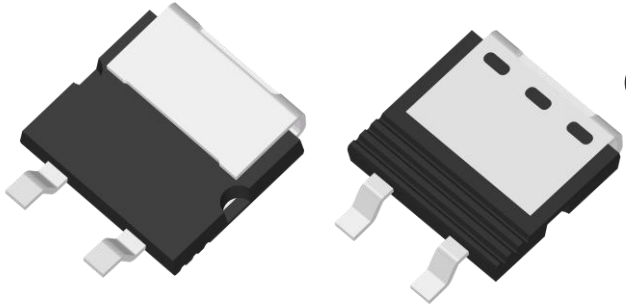
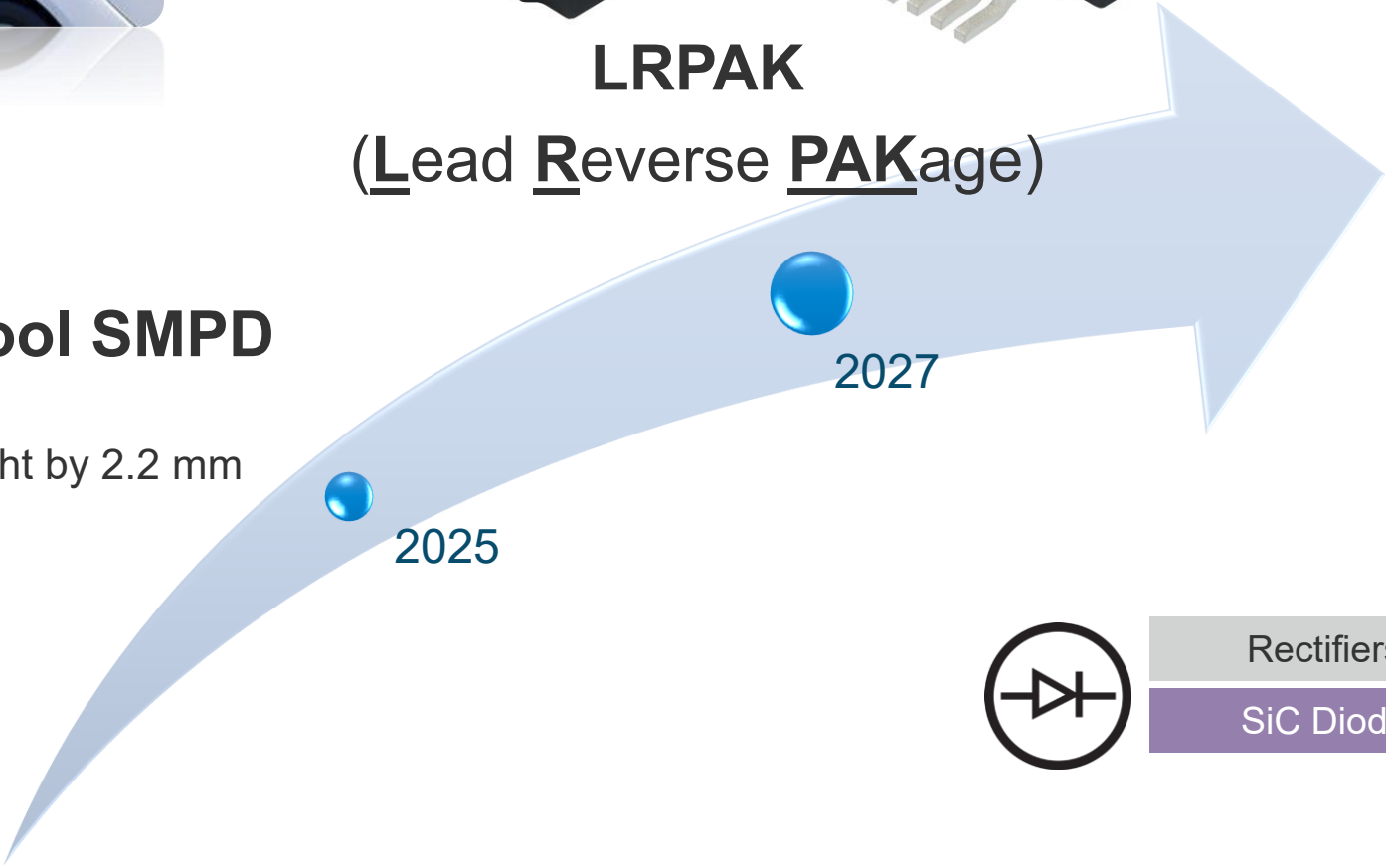
# Top Side Cooling Products Roadmap



Height by 3.5 mm

**LRPAK**

(Lead Reverse PAKage)



**eCool SMPD**

Height by 2.2 mm

2025

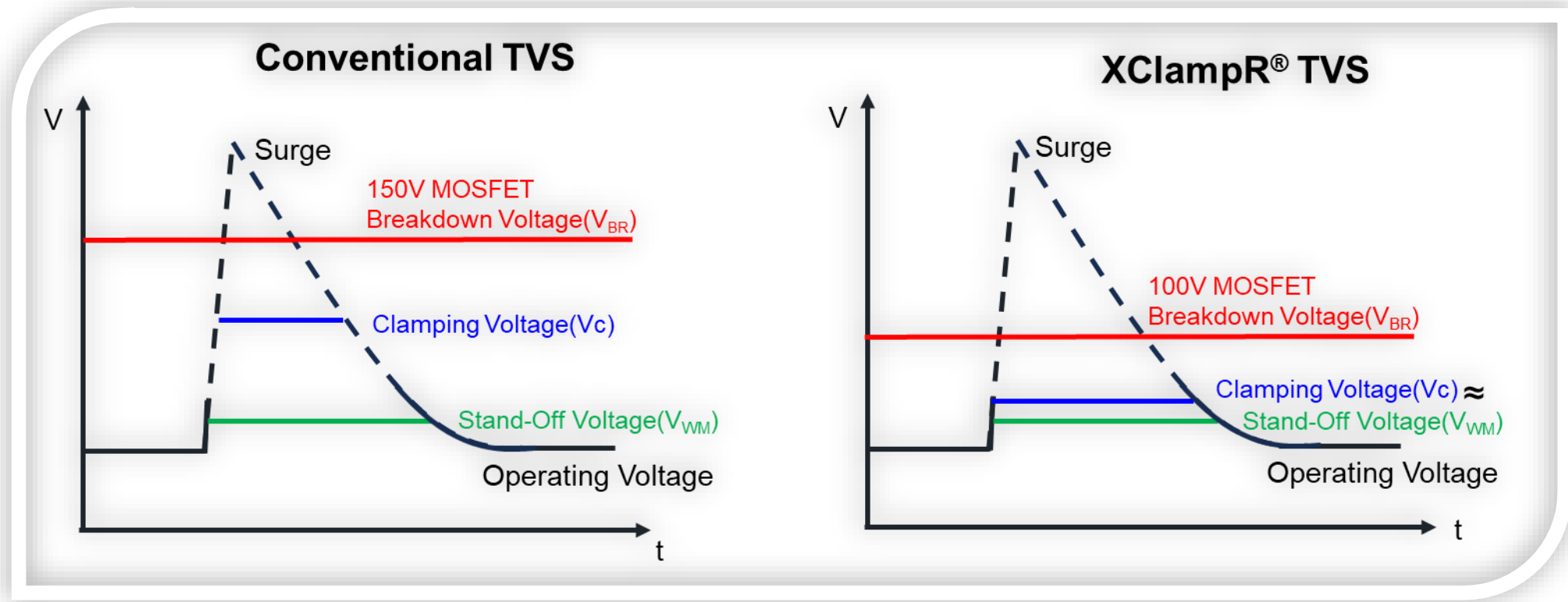
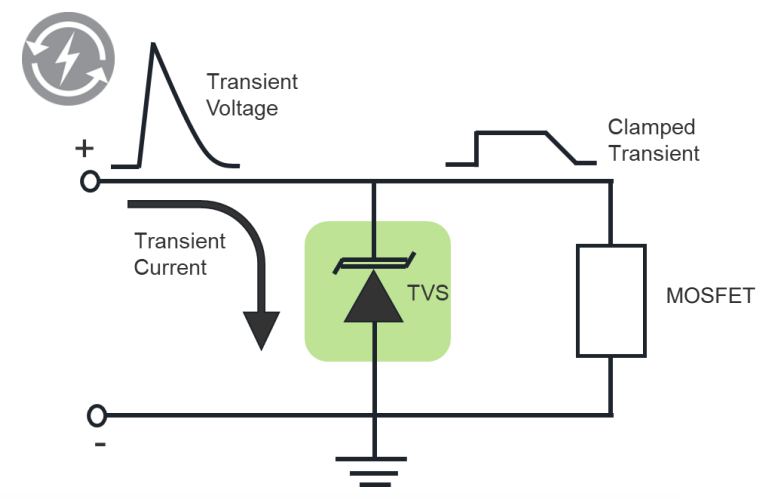
2027



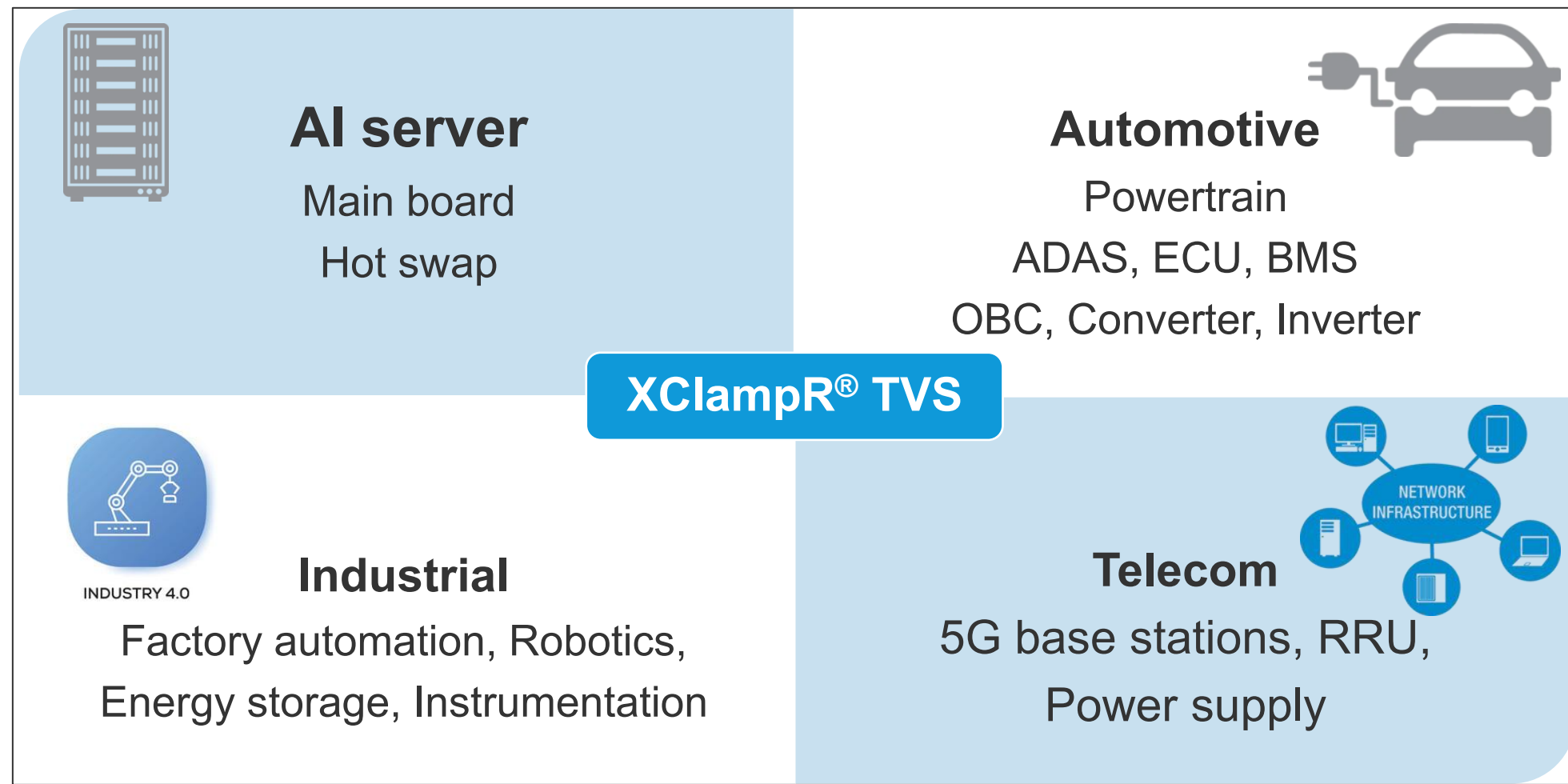
- Rectifiers
- SiC Diode

# Why XClampR<sup>®</sup> TVS

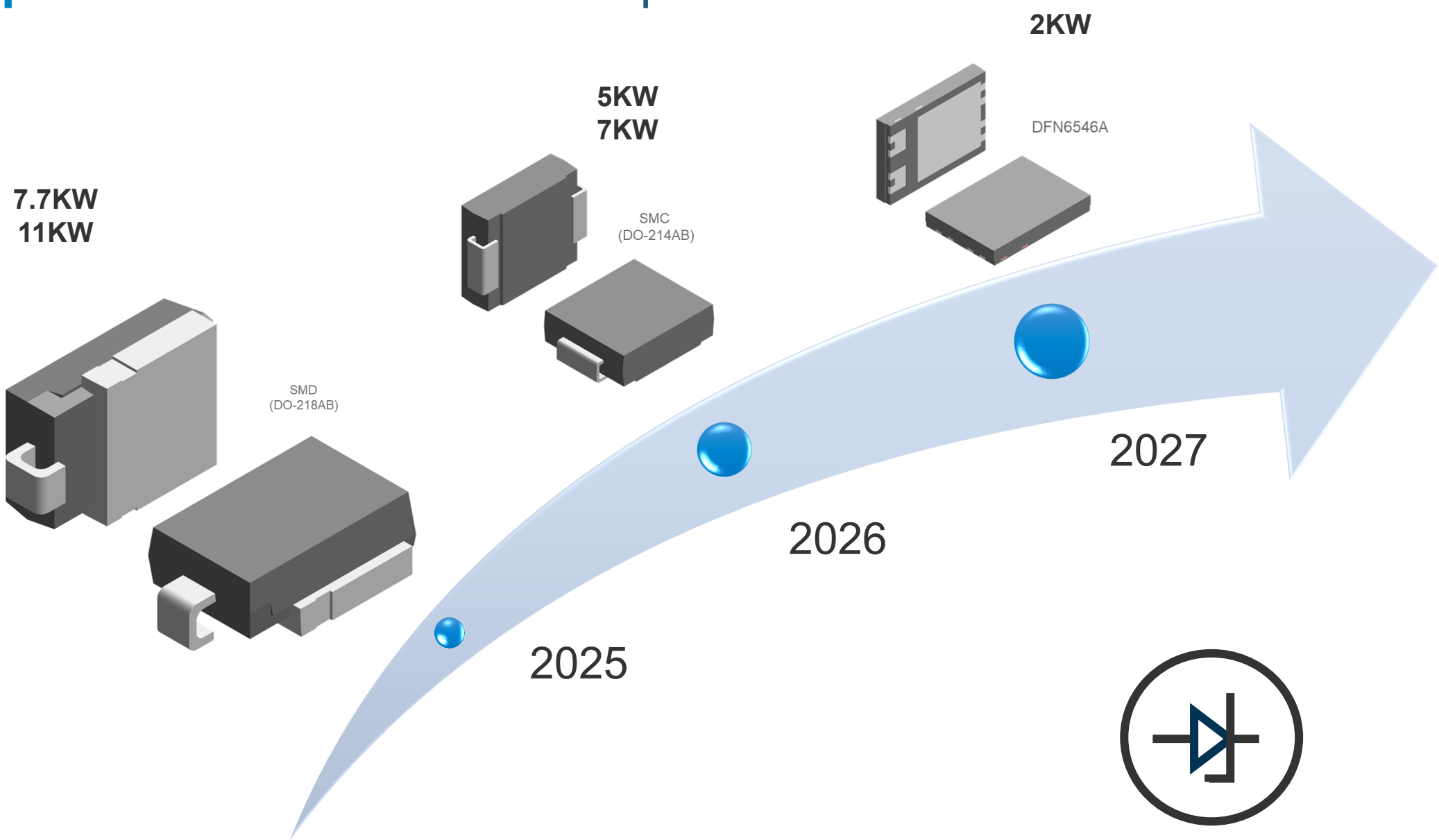
Ideal for wider safety operating ranges, high surge power & improve power density



# Where to Use **XClampR<sup>®</sup> TVS** ?



# XClampR<sup>®</sup> TVS Products Roadmap



# Design Resources & Selling Tools

## Diodes



Infographics



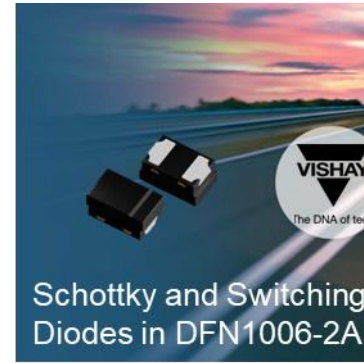
Application Notes



eSMP® Series



Standard Rectifiers in DFN3820A Package



Schottky and Switching Diodes in DFN1006-2A



FRED Pt® Gen 7 Hyperfast Rectifiers



650 V and 1200 V Gen 3 (SiC) Schottky



XClampR® TVS



Soldering Recommendations for Power DFN Packages



XClampR® TVS Application Note



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