AAMS
Automotive Si MOSFET Divisional Presentation

March 9-12, 2026

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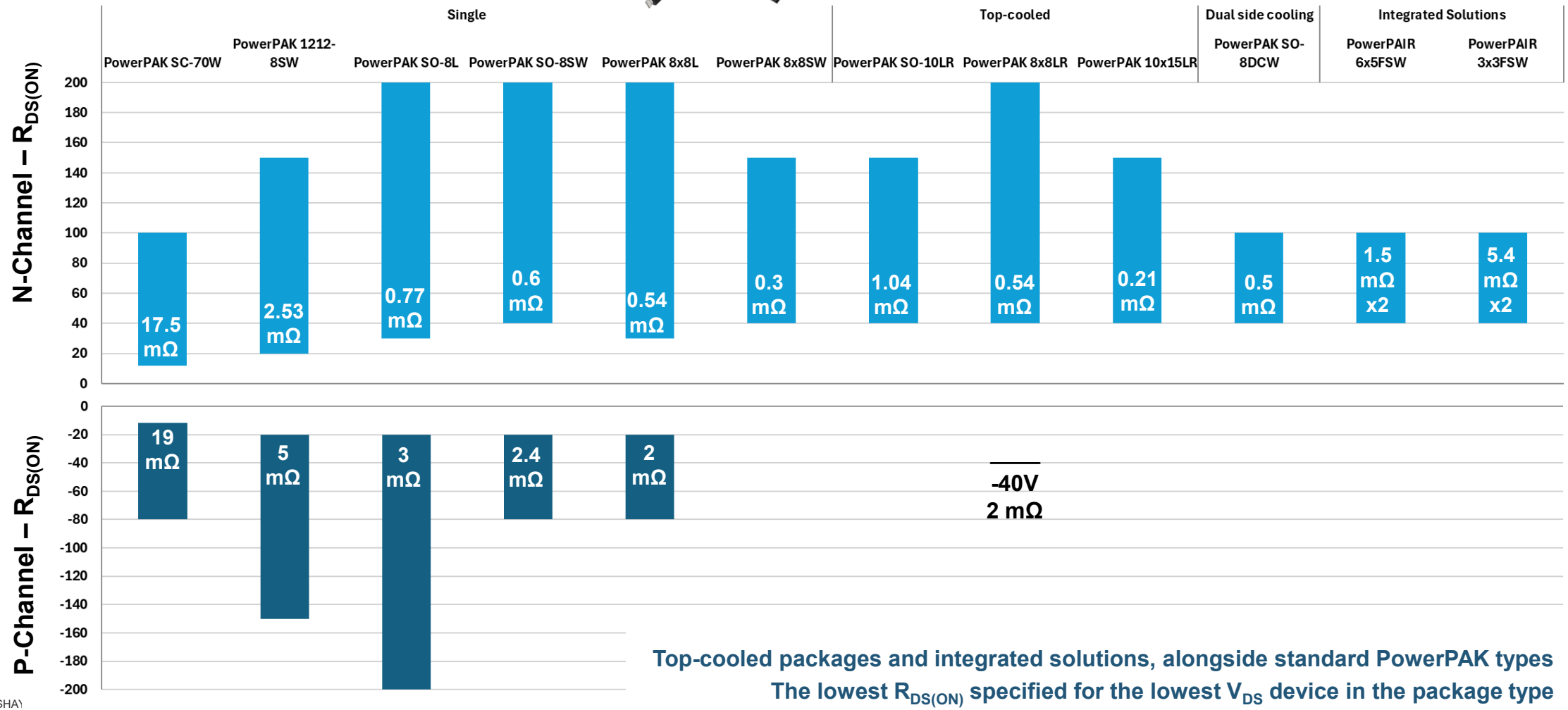
Broadline Si Portfolio – One-Stop Shop

V_{DS} and Package Types



Top-cooled packages and integrated solutions, alongside standard PowerPAK types

The lowest $R_{DS(ON)}$ specified for the lowest V_{DS} device in the package type

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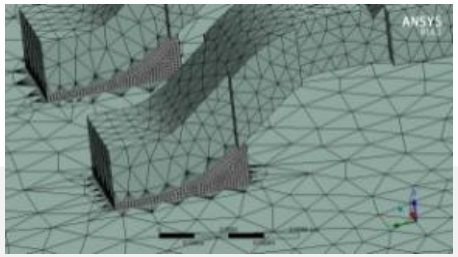
Vishay MOSFET Solutions Applications Alignment

Automotive Applications	Vishay MOSFET Technology			
	MaxSiC 750 V to 1200 V	TrenchFET 40 V to 150 V	P-Channel TrenchFET	PowerPAIR
	 TO-247 TO-247-4 TO-263-7	 8x8L 80V to 150V; 8x8LR 80V to 150V; SO-10LR 80V to 150V; SO8SW / SO8L 80V to 150V	 8x8L 80V to 150V; SO8SW / SO8L 80V to 150V	 PowerPAIR 40V to 100V
800 V OBC	✓			
Battery Management DC/DC (800 V)	✓			
Battery Management Systems	✓	✓	✓	
Traction Inverters	✓	✓		
Powertrain Electrification and E-Mobility	✓	✓	✓	✓
EPS and Steer by Wire		✓	✓	✓
Braking Systems		✓	✓	
Domain and Zonal Control		✓	✓	✓
Body Electronics, Convenience, PDU		✓	✓	✓
ADAS and Infotainment		✓	✓	✓

- 750 V and 1200 V MaxSiC devices for 400 V and 800 V applications
- 40 V to 150 V TrenchFET Gen IV and V products for 12 V to 96 V power nets
- Leading p-channel portfolio for 12 V and 48 V applications and reverse protection
- Top-cooled packages optimized for heatsink or cold plate cooling
- Integrated solutions available for increasing power density

Strategic Pillars and Technology Evolution

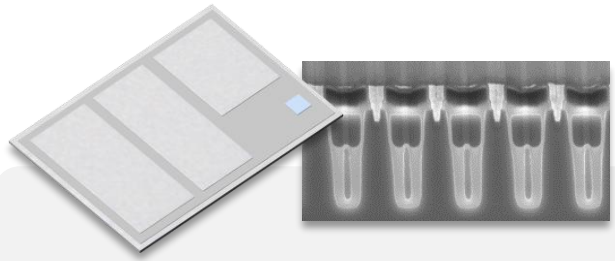
For Efficient, Compact, and More Reliable Automotive Electronic Systems



Designed Beyond AEC-Q101

High Reliability in Critical High Stress Applications

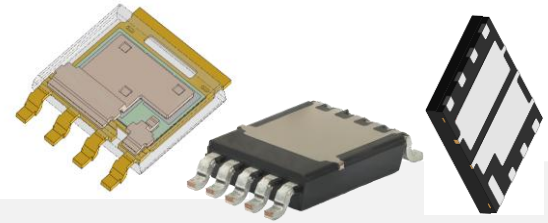
- New packages are engineered for maximum mechanical stress relief
- Comprehensive BLR testing and reporting **(vibration, bending, thermal shock, power temp cycling)**
- Continuous improvement mindset
- **~6 PPB valid annual return rate (last 5 years of data)**



High Performance Silicon

N- & P-Channel MOSFETs

- With BV_{DSS} from -200 V to 650 V
- Five generations of TrenchFET® evolution
- **Gen 5 rolling out now: 40 V, 80 V, 100 V, 150 V**
- P-channel TrenchFET with industry best $R_{DS(ON)}$
- **Gen 4 released @ -60 V, -80 V, and -100 V**
- 650V E series superjunction
- **Unique 175 ℃ rating**



Broad Package Selections

Solutions for Increasing Power Density

- PowerPAK® packages
- **Bond-wireless form factors**
- Multi-die solutions optimized for specific applications
- **PowerPAIR – dual half-bridge**
- Top-cooled packaging
- KGD (known good die) portfolio
- **Latest technologies available**

Segment, Customers, Applications

Where to Hunt and How to Win

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Customer Discovery Framework

Confirm the application type (switching behavior)

What type of application?

- Motor drive
- DC/DC
- DC/AC
- Battery management (BMS)
- Disconnection switch

Determine the system power net (V_{DS} selection)

What is the nominal input voltage?

- 12 V – 40 V FETs
- 24 V – 60 V FETs
- 27 V – 28 V – 60 V FETs
- 48 V – 80 V – 100 V FETs
- 96 V – 150 V FETs

Find out the power rating ($R_{DS(ON)}$ requirement)

What is the load current and power rating?

- Nominal / peak load current
- Output power
- Use Ohm's Law ($P = I^2*R$) to estimate the maximum $R_{DS(ON)}$

MOSFET gate drive compatibility ($V_{gs(th)}$)

What is the gate drive voltage?

- ≥ 7 V – standard level
- 4 V - 5 V – logic level 4.5V rated devices
- ≤ 3.3 V – sub-logic level 2.5 V rated devices

Mechanical / thermal constraints (package types)

Any PCB constraint?

External cooling?

- ≤ 1.6 KW – 6 mm x 5mm
- 1 KW - 2.5 KW – 8 mm x 8 mm
- ≥ 2 KW 10x12 or 10x15
- Top-cool packages for designs with heatsink

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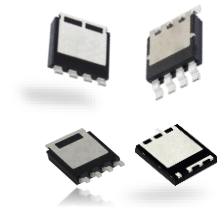
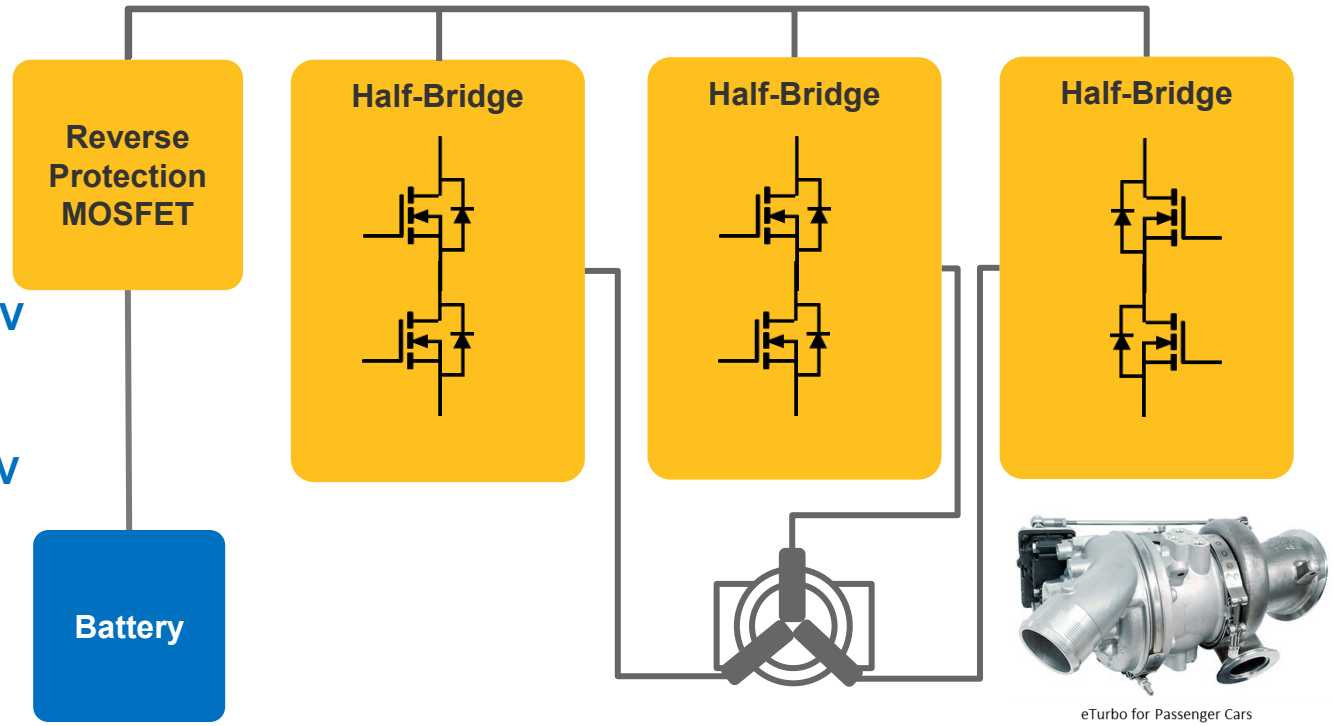
Electrification - Motor Drive Inverters / BLDC Motors



-40 V to -100 V P-Channel TrenchFET

40 V to -150 V TrenchFET

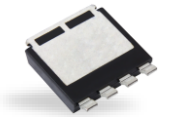


eTurbo for Passenger Cars

Benefit to Designs

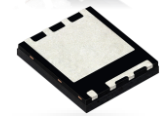
- Low $R_{DS(ON)}$ for improving efficiency in high current applications
- Top-cooled package options optimized for external heatsinks or housings
- Integrated solutions that reduce component counts and simplify designs

40 V to 200 V TrenchFET



PowerPAK 8x8L
8 x 8 mm²

PowerPAK 8x8LR
Top-cooled 8 x 8 mm²

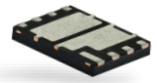


PowerPAK SO-8SW
6 x 5 mm²

PowerPAK SO-8L
6 x 5 mm² with gullwing leads

PowerPAK SO-10LR
7 x 5 mm² top-cooled package

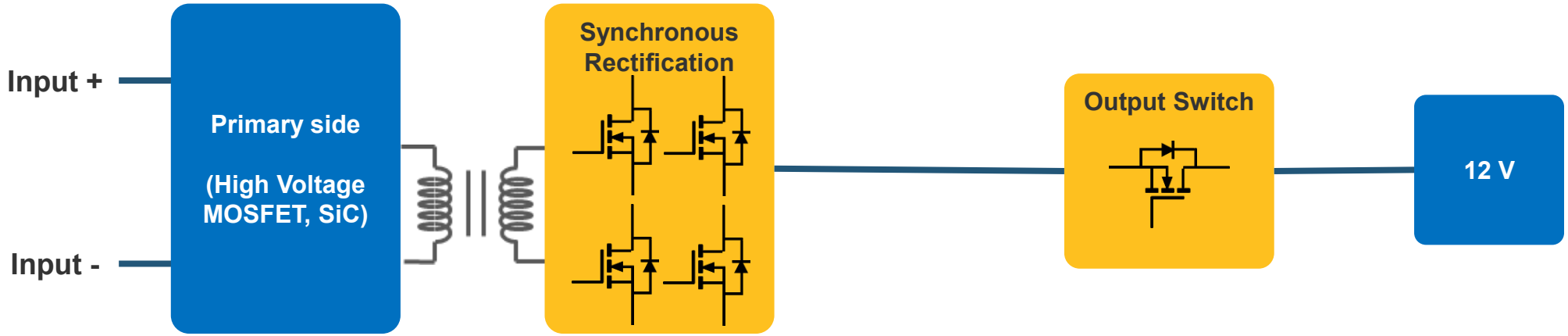
Known Good Die (KGD)
Bare die in tape and reel

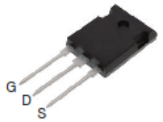


PowerPAIR 6x5FSW
6 x 5 mm²
Integrated MOSFET half-bridge

PowerPAK 1212-8SLW
3.3 x 3.3 mm²

High Power DC/DC and Synchronous Rectification





TO-247AD
Superjunction E-Series
650 V

MaxSiC 750 V – 1200 V

PowerPAK 8x8L
8 x 8 mm²
TrenchFET Gen IV & V
80 V – 150 V

PowerPAK 8x8LR
Top-cooled 8 x 8 mm²
TrenchFET Gen IV & V
80 V – 150 V

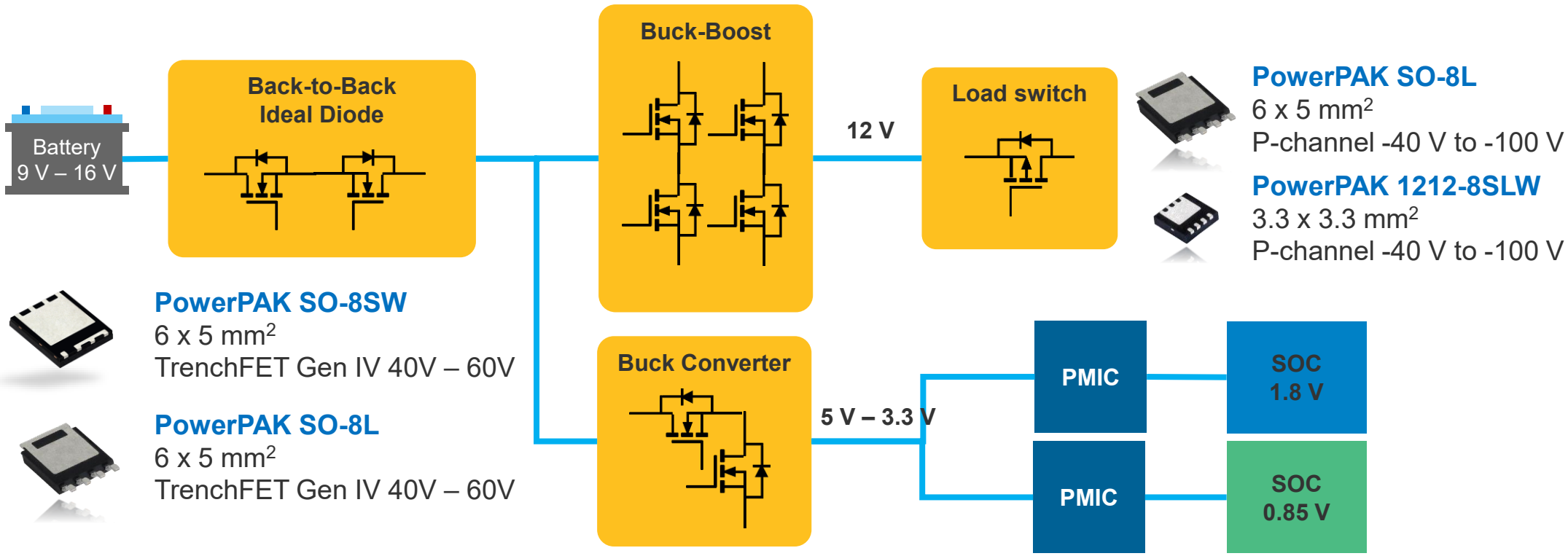
PowerPAK 8x8L
8 x 8 mm²
TrenchFET Gen IV
40 V – 80 V

PowerPAK 8x8LR
Top-cooled 8 x 8 mm²
TrenchFET Gen IV
40 V – 80 V

Benefit to Designs

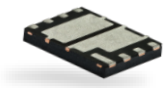
- Low $R_{DS(ON)}$ and FOM for efficiency
- Top-cooled package optimized for external heatsinking
- Low R_{DS}*footprint enabling high power density

Buck Converters for 12 V Systems

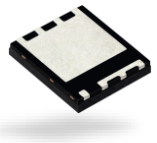


Benefit to Designs

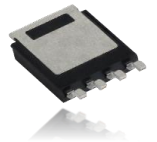
- High current solutions
- Low $R_{DS(ON)}$ and FOM for efficiency
- Component reduction with integration
- Logic-level devices



PowerPAIR 6x5FSW
6 x 5 mm²
TrenchFET Gen IV 40 V



PowerPAK SO-8SW
6 x 5 mm²
TrenchFET Gen IV 40 V – 60 V



PowerPAK SO-8L
6 x 5 mm²
TrenchFET Gen IV 40 V – 60 V

PowerPAK 1212-8SLW
3.3 x 3.3 mm²
TrenchFET Gen IV 40 V – 60 V

Emerging E-Motorcycle / E-Mobility Applications

Fun Concept

Equivalent to mid-sized ICE motorcycles with fixed battery, offering combined charging system Type 2 (CCS2) connectors

Urban Concept

Urban electric mobility, function-focused and using in-house developed (Honda and Panasonic) battery packs

Swappable Battery

48 V / 1.3 KW In production, and compatible to e-scooters manufactured by Yamaha, Kawasaki, and Suzuki

Following the launch of the e-scooter lineup in 2019, Honda revealed two new e-motorcycle models, fun concept and urban concept, at EICMA 2024 to replace mid-sized ICE motorcycles in the future and to completely electrify the two-wheel products by the 2040s.

Capacity Investment

Growth Support

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Auto MOSFET Front-End Capacity Expansion by Location

- **12 in Germany fab under construction**
  - **New 12 in fab** in Itzehoe – volume ramp up of stage 1 in 2027

- **Foundry partnership**
  - Tower Semiconductor – already in production
  - Key foundries - KF ramp up in 2025

- **Vishay acquired Newport fab in UK**
  - 8 in FE production for silicon in 2025 (n-/p- channel)

Itzehoe, Germany 8 in fab expanding to 12 in fab

8 in Newport Fab, UK (Si & SiC)

Automotive Backend Packaging Expansion Plans

- **Simconix – Shanghai (Internal BE)**

  Die sort, assembly and test, focus on legacy and advanced packages

- **Kaohsiung Taiwan**

  R&D, die sort, assembly and test for legacy and advanced packages

  Expanding capacity and qualifying additional parts to avoid tariffs

- **Manila, Philippines**

  Wafer plating, probing and final test

- **OSAT Partnership**

  ATX Malaysia - DPAK & D^2PAK transfers

  - 80+ DPAK/D^2PAK parts are being transferred to ATX with ramp-up starting H1’26

  OSAT SOT23/PPAK1212W/PPAKSC-70W – planned customer samples by Q2’26

  OSAT PPAKSO-8L, 8x8L, 1212-8SLW, SO-8SW – planned customer samples by Q3’26

  OSAT PPAK SO-8L Dual/PPAK8x8LR/SO-10LR – planned customer samples by H1’27

Design Resources and Tools

Growth Support

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Design Resources

- **Product Page**
  - Datasheet
  - Package information
  - PAD pattern
  - Tape and reel
  - FIT / reliability information

- **Sell Sheet and Infographic**

- **PSpice Model**

- **PMOS Tech Support:** pMOStechsupport@vishay.com

Product Page

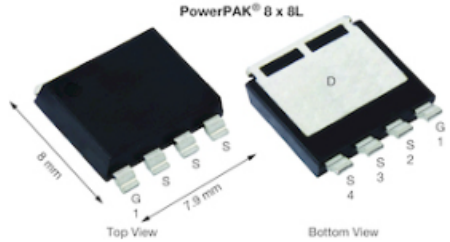
SQJQ140E PRODUCT INFORMATION

Automotive N-Channel 40 V (D-S) 175 °C MOSFET

AUTOMOTIVE GRADE

FEATURES

- TrenchFET® Gen IV power MOSFET
- AEC-Q101 qualified
- 100 % RG and UIS tested



Datasheet | Request Sample | Buy Now

ECAD Models
(Download from Ultra Librarian)

Documents | Design Tools | Quality | Technical Questions

Showing 1 to 11 of 11 entries Show 25 entries ← Previous | Next →

Document Type	Title	Description	Share
Datasheet	SQJQ140E	Automotive N-Channel 40 V (D-S) 175 °C MOSFET	
Ordering Info	SQ MOSFET Ordering Information	Ordering Code for SQ Series Automotive MOSFET	
Packaging Information	Reel Information	Reel	
Packaging Information	PAD Pattern	Recommended Land Pattern PowerPAK® 8 x 8L BWL	
Packaging Information	Device Orientation	Device Orientation for PowerPAK 8 X 8	
Packaging Information	Tape Information	PowerPAK® 8 x 8L CARRIER TAPE	
Package Drawings	Package Information	PowerPAK® 8 x 8L Case Outline 2	
Reliability Data	Product Reliability	530MC SG Process Technology	
Reliability Data	Product Reliability	Environmental and Package Testing Data for PowerPAK 8 x 8L BWL Automotive	
Sell Sheet	Sell Sheet	SQJQ140E MOSFET - CN	
Sell Sheet	Sell Sheet	SQJQ140E MOSFET	

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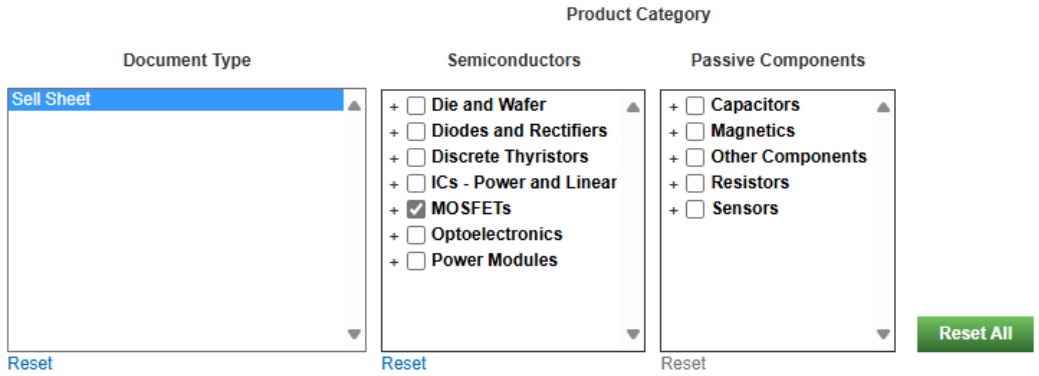
Sell Sheets

Link: Document Library | Vishay

Select Sell Sheet Select MOSFET



Showing 1 to 13 of 13 entries Show 25 entries ← Previous | Next →

Title ▲▼	Product Category ▲▼	Document Type ▲▼	Date ▲▼	Share
SQJ182ER Top-Cooled Automotive MOSFET	MOSFETs, Automotive	Sell Sheet	September 11, 2025	✉
SQJ590EP Best in Class Automotive MOSFET	MOSFETs, Automotive	Sell Sheet	September 5, 2025	✉
SQJ211ELP Best in Class Automotive MOSFET (CN)	MOSFETs, Automotive	Sell Sheet	September 2, 2025	✉
SQJ211ELP Best in Class Automotive MOSFET	MOSFETs, Automotive	Sell Sheet	September 2, 2025	✉
SQZF140ELPW Integrated 40 V Half-Bridge MOSFETs (JP)	MOSFETs, Automotive	Sell Sheet	June 11, 2025	✉
SQJQ184ER Top-Side Cooled Automotive N-Channel 80 V MOSFET (CN)	MOSFETs, Automotive	Sell Sheet	April 8, 2025	✉
SQZF140ELPW Integrated 40 V Half-Bridge MOSFETs	MOSFETs, Automotive	Sell Sheet	April 2, 2025	✉
SQJQ140ER Top-Side Cooled Automotive 40 V MOSFET (JP)	MOSFETs, Automotive	Sell Sheet	March 31, 2025	✉
SQJQ140E MOSFET - CN	MOSFETs, Automotive	Sell Sheet	June 4, 2024	✉
SQJQ140E MOSFET	MOSFETs, Automotive	Sell Sheet	May 22, 2024	✉
SiZF640DT Symmetric Dual N-Channel 40 V MOSFET	MOSFETs	Sell Sheet	May 22, 2024	✉
SQJQ140ER Top-Side Cooled Automotive 40 V MOSFET	MOSFETs, Automotive	Sell Sheet	May 22, 2024	✉
SQJQ184ER Top-Side Cooled Automotive N-Channel 80 V MOSFET	MOSFETs, Automotive	Sell Sheet	May 22, 2024	✉

Sell Sheet Example – SQZF140ELPW

ADVANTAGE

The SQZF140ELPW reduces component counts and enables higher switching frequencies and power density for DC/DC converter designs.

KEY PRODUCT FEATURES

- ✓ AEC-Q101 qualified, T_J = +175 °C
- ✓ Two internally connected MOSFETs in a half-bridge configuration
- ✓ Internally formed switch node reduces external PCB traces and associated parasitics
- ✓ Optimized pin configuration for synchronous buck and buck-boost converters
- ✓ Wettable flanks promote solder fillet formation and enables AOI

2 discrete packages ~62 mm²

PowerPAIR integrated solution ~31 mm²

MARKETS AND APPLICATIONS

MOBILITY

- Automotive
- 12 V systems
- Battery management
- DC/DC converters, including synchronous buck
- Motor drive control

Key Product Benefits

On-resistance	↓
R_{DS}-Q_g FOM	↓
Power losses	↓
Component count	↓
PCB real estate requirement for MOSFETs	↓
Passive and magnetic component size	↓
Energy efficiency	↑
Current output	↑
Power density	↑
Board-level reliability	↑

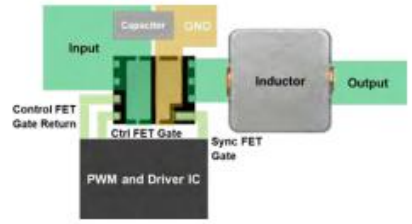
RESOURCES

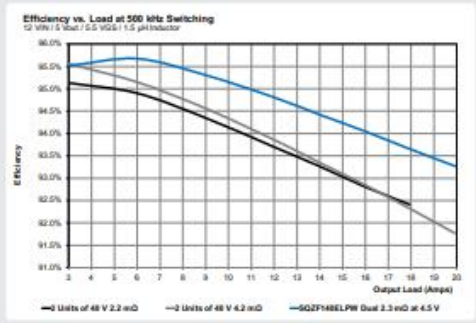
Product Page | Related Documents | @ Contact Us

ADDITIONAL BENEFITS

- Integration reduces component count - combining high side "control" FET and low side "synchronous" FET in a single package
- Achieves higher efficiency at higher switching frequencies than discrete components, allows use of smaller capacitors and magnetic components
- Simplifies PCB designs
- Low $R_{DS(ON)}$ reduces power loss
- Logic level operation

System Block Diagram

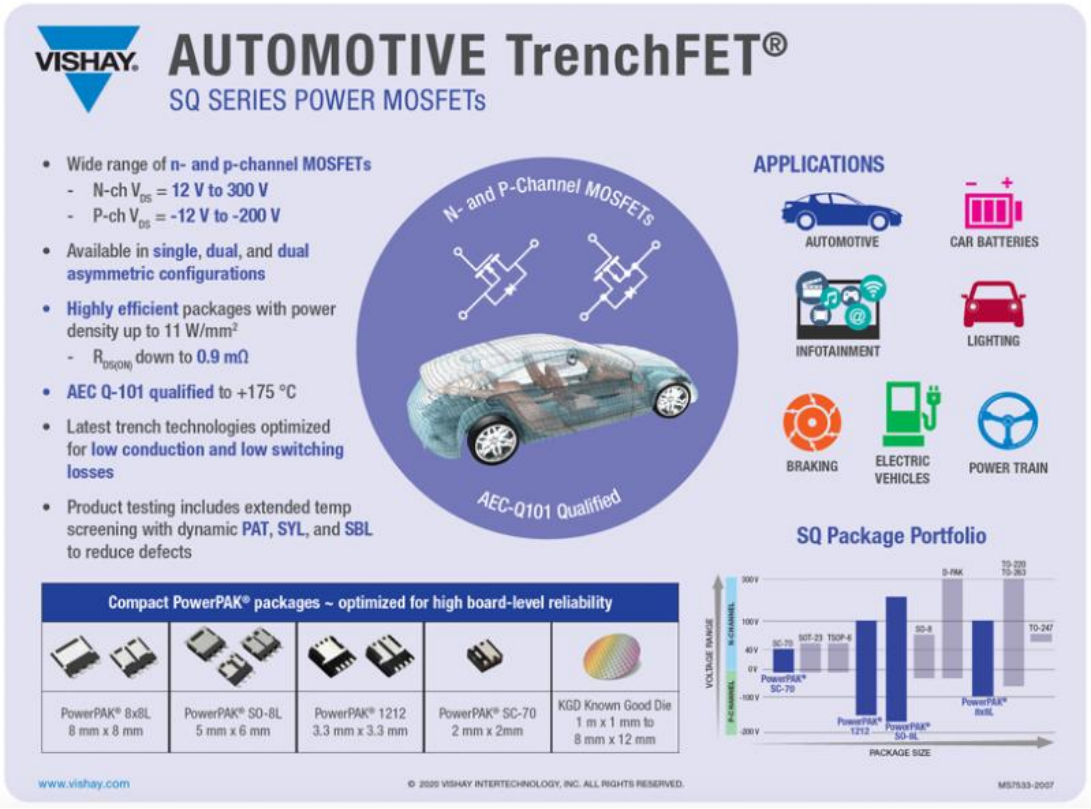


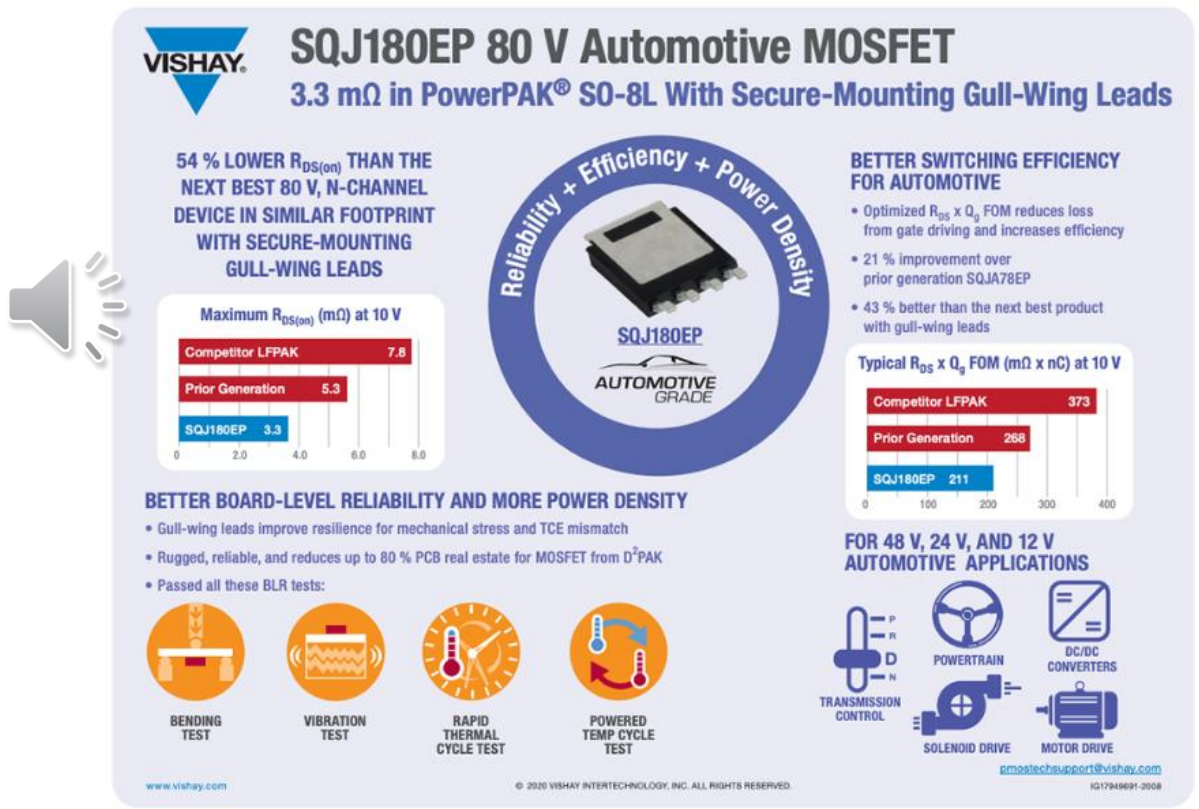


Our internal test compared the SQZF140ELPW with two discrete MOSFETs with similar $R_{DS(ON)}$ in a synchronous buck converter for the conversion of a 12 V input to a 5 V output. While switching at 500 kHz, the converter circuit using the SQZF140ELPW demonstrated 1.5 % higher efficiency than the discrete solutions, and reduced power losses. The PowerPAIR® 6 x 5FSW also utilizes a 50 % smaller PCB real estate area for the MOSFETs. The increased frequencies and faster transient response allow for the use of smaller magnetic and passive components, enabling higher power density.

Infographics

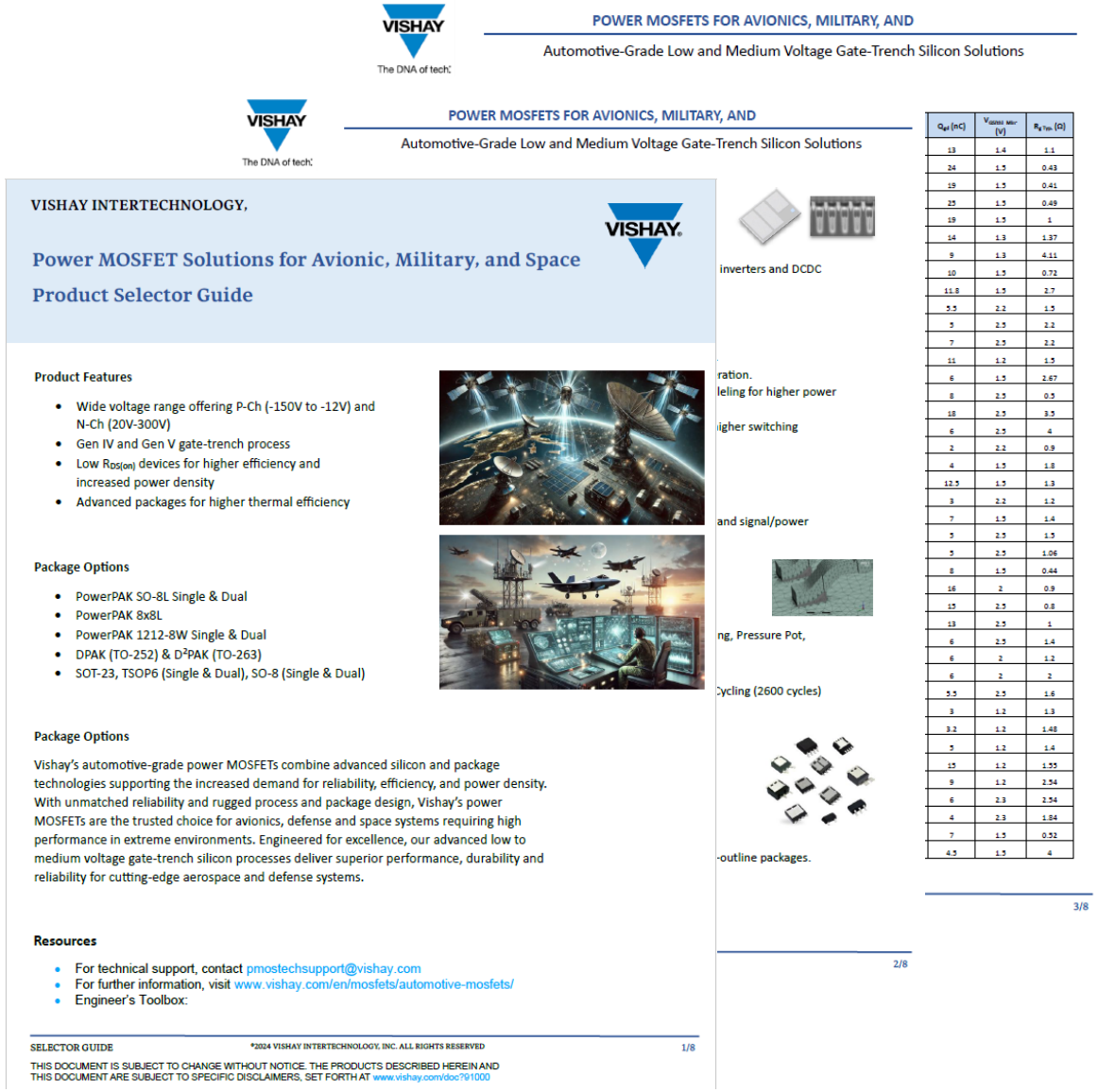
Link: [Infographics, MOSFETs | Vishay]





Automotive / AEC-Q101 MOSFETs for Aerospace and Defense Applications

- > 200 auto MOSFET part numbers selected to support aerospace and defense customer programs
- Package types supported in Taiwan
  - SOT-23, TSOP6, PPAK 1212-8W, PPAK SO-8L (single / dual), PPAK 8x8L, SO-8, DPAK/D²PAK
- Selector guide / brochure available to review with MarCom
- Customers targeted for initial visits
  - US – Lockheed, L3Harris, Honeywell, DRS
  - EU – Leonardo, Thales (Pure consortium)
  - Israel – Rafael, IAI Elta, Kratos, Elbit



POWER MOSFETS FOR AVIONICS, MILITARY, AND

Automotive-Grade Low and Medium Voltage Gate-Trench Silicon Solutions

VISHAY INTERTECHNOLOGY,

Power MOSFET Solutions for Avionic, Military, and Space

Product Selector Guide

Product Features

- Wide voltage range offering P-Ch (-150V to -12V) and N-Ch (20V-300V)
- Gen IV and Gen V gate-trench process
- Low $R_{DS(on)}$ devices for higher efficiency and increased power density
- Advanced packages for higher thermal efficiency

Package Options

- PowerPAK SO-8L Single & Dual
- PowerPAK 8x8L
- PowerPAK 1212-8W Single & Dual
- DPAK (TO-252) & D²PAK (TO-263)
- SOT-23, TSOP6 (Single & Dual), SO-8 (Single & Dual)

Package Options

Vishay's automotive-grade power MOSFETs combine advanced silicon and package technologies supporting the increased demand for reliability, efficiency, and power density. With unmatched reliability and rugged process and package design, Vishay's power MOSFETs are the trusted choice for avionics, defense and space systems requiring high performance in extreme environments. Engineered for excellence, our advanced low to medium voltage gate-trench silicon processes deliver superior performance, durability and reliability for cutting-edge aerospace and defense systems.

Resources

- For technical support, contact pmostechsupport@vishay.com
- For further information, visit www.vishay.com/en/mosfets/automotive-mosfets/
- Engineer's Toolbox:

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inverters and DCDC

ration.
leling for higher power

igher switching

and signal/power

ng, Pressure Pot,

Cycling (2600 cycles)

-outline packages.

2/8

3/8

Pspice

- Our PSpice models are compatible with
  - Synopsis HSpice
  - Cadence / Orcad PSpice
  - Analog Devices / LTSpice

- SPICE models are derived from the physical characteristics of MOSFETs as measured and guaranteed in the datasheet. Models are verified to represent device properties at release and to be free of syntax errors

- Models are available upon request - pMOStechsupport@vishay.com

Nomenclature for Surface-Mount Packages

SQ	J	X	XX	XXXX
Product Grade	Package	V_{DS}	Polarity	Features
SQ: Automotive Si: Commercial	JK PPAK 10x15 JQ PPAK 8x8L RQ PPAK 8x8SW RS PPAK SO-8SW ZF or ZF3 ZF – PPAIR 6x5FSW ZF3 – PPAIR 3x3FSW 4 or 9 SO-8 4 – Single 9 – Dual S or 7 PPAK 1212-8W PPAK 1212-8SLW 34 / 35 TSSOP6 23 SOT23 1 or A PPAK SC70	X: Al wire A: Al wire 1: Clip / BWL 5: Gen V 6: Gen VI	N-channel: even 3-4-5x: 40 v 6x: 60 v 8x: 80 v 1x: 100 V 9x: 150 V & 200 V P-channel: odd 4x: -40 v 6x: -60 v 8x: -80 v	A, B, C, F: revisions or cost reduced E: T_J max = 175 °C EJW: 2x2 + wettable flanks ENW: 3x3 + wettable flanks EPW: 6x5 + wettable flanks EP: T_J max = 175 °C ER: reversed leads & 175 °C EL: logic level ELNW: logic level + wettable flanks ELPW: logic level + wettable flanks ELR: logic level + reverse leads

AUTOMOTIVE GRADE

AEQ-101 qualified part numbers begin with SQ prefix

Nomenclature for Transistor-Outline Packages

SQ
Product Grade

SU: Commercial
SQ: Automotive

M D2PAK
Package

D DPAK

P TO-220

U IPAK

W TO-247AC

X
V_{DS}

2: ≤ 25 V
3: 30 V
4: 40 V
5: 60 V
6: 80 V
7: 100 V
8: 150 V
9: 200 V
1: ≥ 250 V

XXX
$R_{DS(ON)}$

001
(1 mΩ)

010
(10 mΩ)

100
(100 mΩ)

X
Polarity

N	P
0	1
2	3
4	5
6	7
8	9

XX
Features

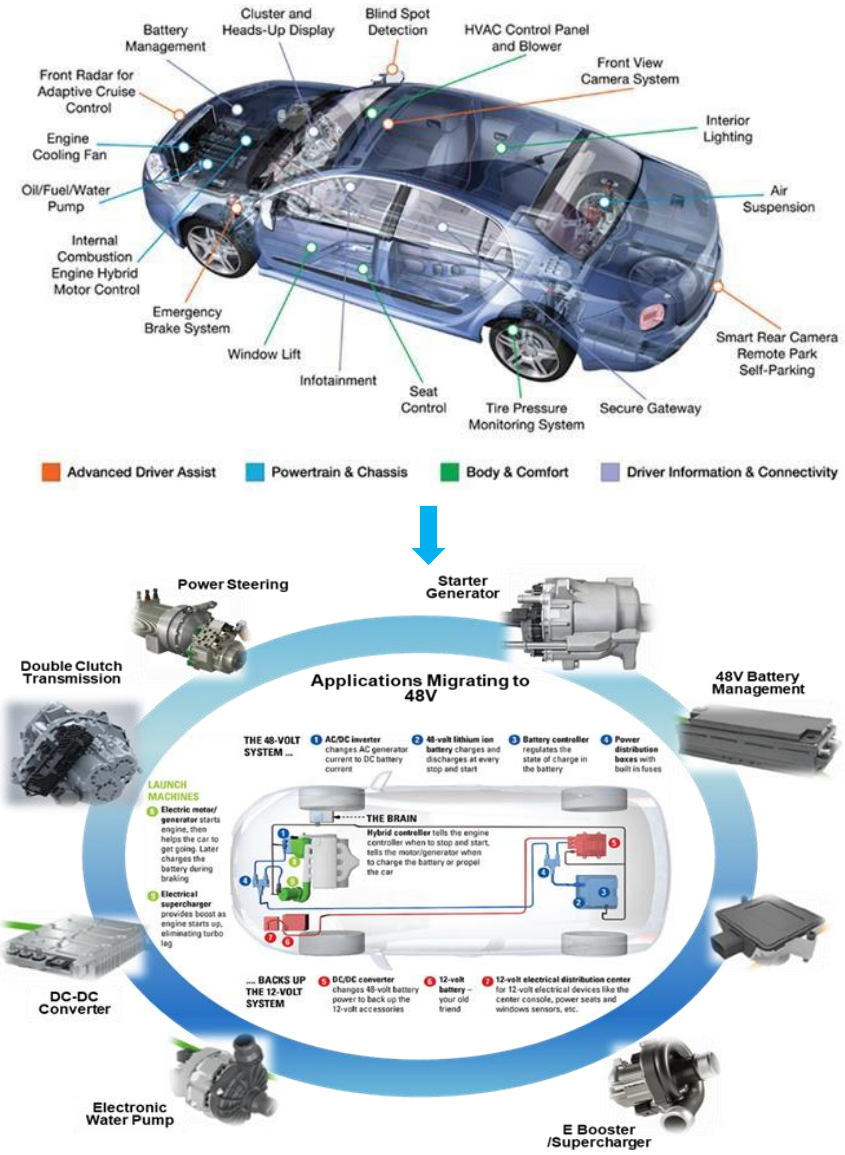
E: T_J max = 175 °C
L: logic level
M: D^2PAK-7L, 175 °C

EL: 175 °C & logic level

New nomenclature applies to new TO devices featuring ThunderFET® and TrenchFET® Gen IV

Summary of 2026 Strategic Objectives

- **Focus on print position at selected growth customers**
  - New product releases and roadmaps are well aligned to the key electrification applications and also support traditional ICE engine management systems
- **Aggressively close the loop on PCNs / PTNs**
  - Transfers to Newport and Key foundries
  - Cost reductions to copper wire “C” suffix
- **Identify customers and define marketing actions to grow POS share**
- **Relaunch MaxSiC product family with refreshed roadmap**
  - First 1200 V Gen 2 products available
  - Initial releases aligned to power supplies / renewables
  - Top-side cooled packages for automotive in development
- **Identify and follow up with aerospace and defense customers where AEC-Q101 qualification is a competitive advantage**
- **Close outstanding quality / application issues with key customers, including Denso and Valeo**



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Think Customer First