

FOR ENERGY EFFICIENT INNOVATIONS

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VE-Trac™
for
Vehicle Electrification Traction

Public Information



Decades of Automotive Module Development Experience

ON Semiconductor®



Technologies & IPs

Transfer Molded

- Drive IC inside (NTC option)
- Consumer/ Industrial / Automotive

Transfer Molded + DBC

- Customer Specific
- Higher Rel. & Quality
- RC inside but No Drive IC

Ceramic technology

- Die on L/F
- Ceramic Substrate

DBC/IMS technology

- Die on L/F
- DBC Substrate

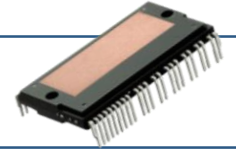
Full pack technology

- Die on LF

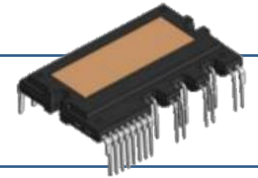
Gel Filled

- Low Power Losses
- High Speed Control
- Protection function

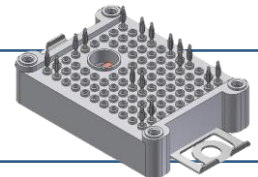
Intelligent Power Modules (IPM)
since 1991



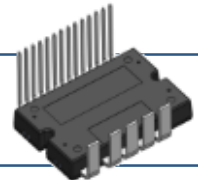
Smart Power Modules (SPM)
since 1999



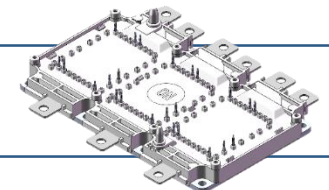
Power Integrated Modules (PIM)
since 2000



Automotive Power Module (APM)
since 2008

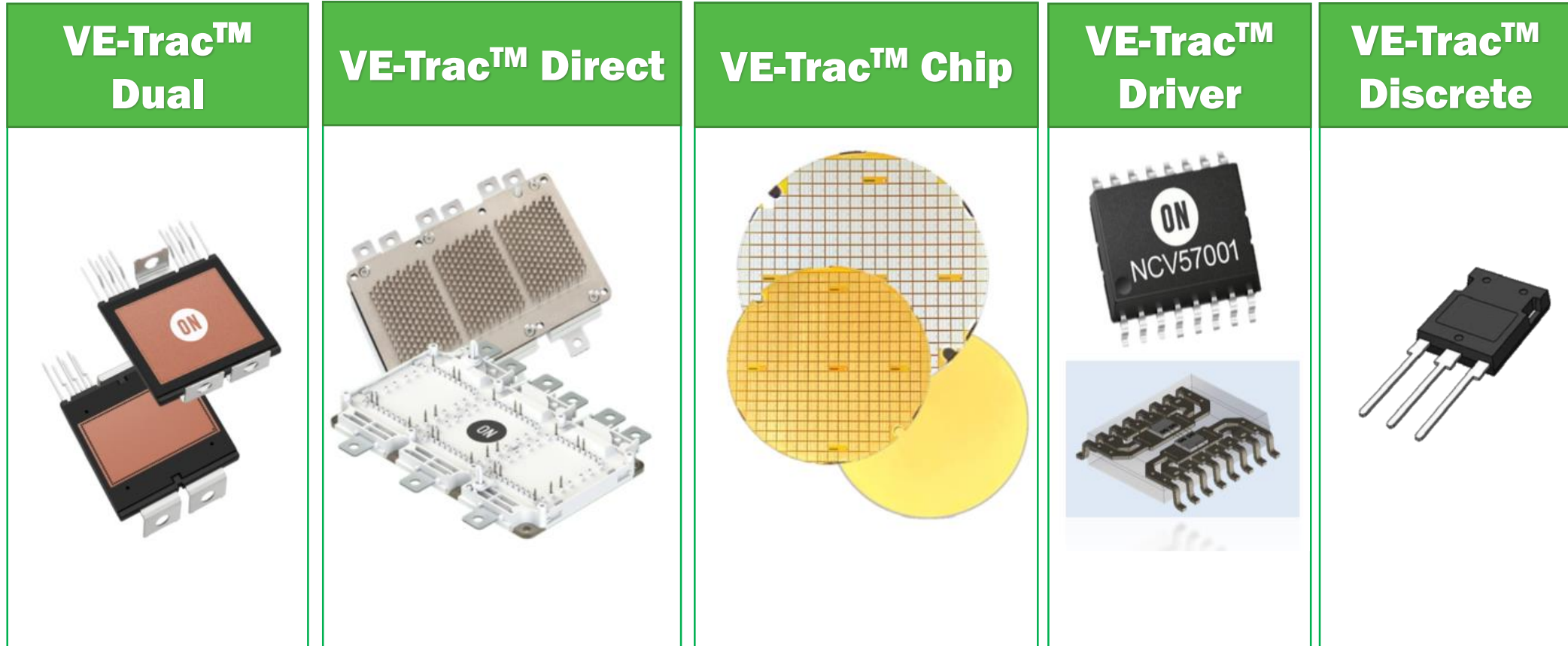


Automotive High Power Modules (AHPM)
since 2016



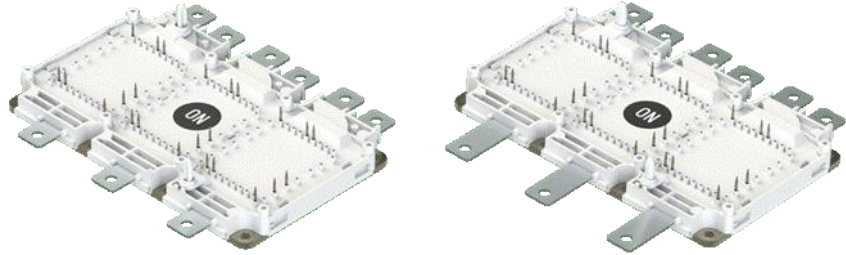
VE-Trac™ (Vehicle Electrification for Traction) Product Family

- Versatile & innovative solutions to power vehicle electrification into the future
- Uncompromised cost, quality & performance



VE-Trac™ IGBT Power Module Portfolio

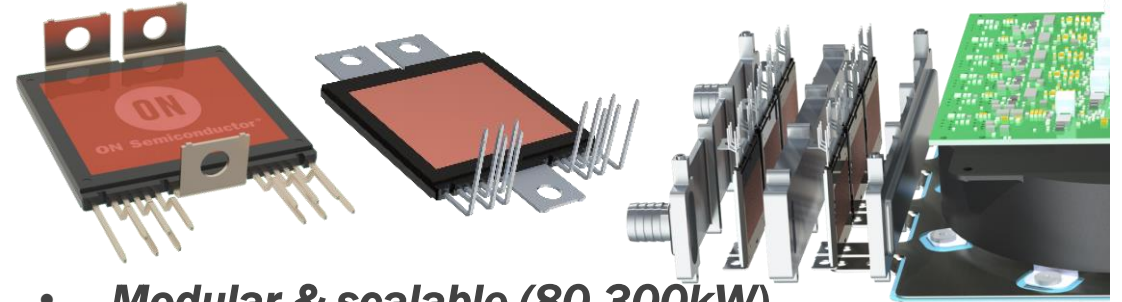
VE-Trac Direct



- **Direct cooling**
- **Industry standard pin-out**
- **Best-in-class performance**
- **Supply assurance**

Part Number	Rating	RTM	Package
NVH820S75L4SPB	750V, 820A	Released	VE-Trac™ Direct
NVH820S75L4SPC	750V, 820A	Released	VE-Trac™ Direct
NVH950S75L4SPB	750V, 950A	Released	VE-Trac™ Direct
NVH660S75L4SPFB	750V, 660A	Released	VE-Trac™ Direct
NVH640S75L4SPB	750V, 600A	Released	VE-Trac™ Direct

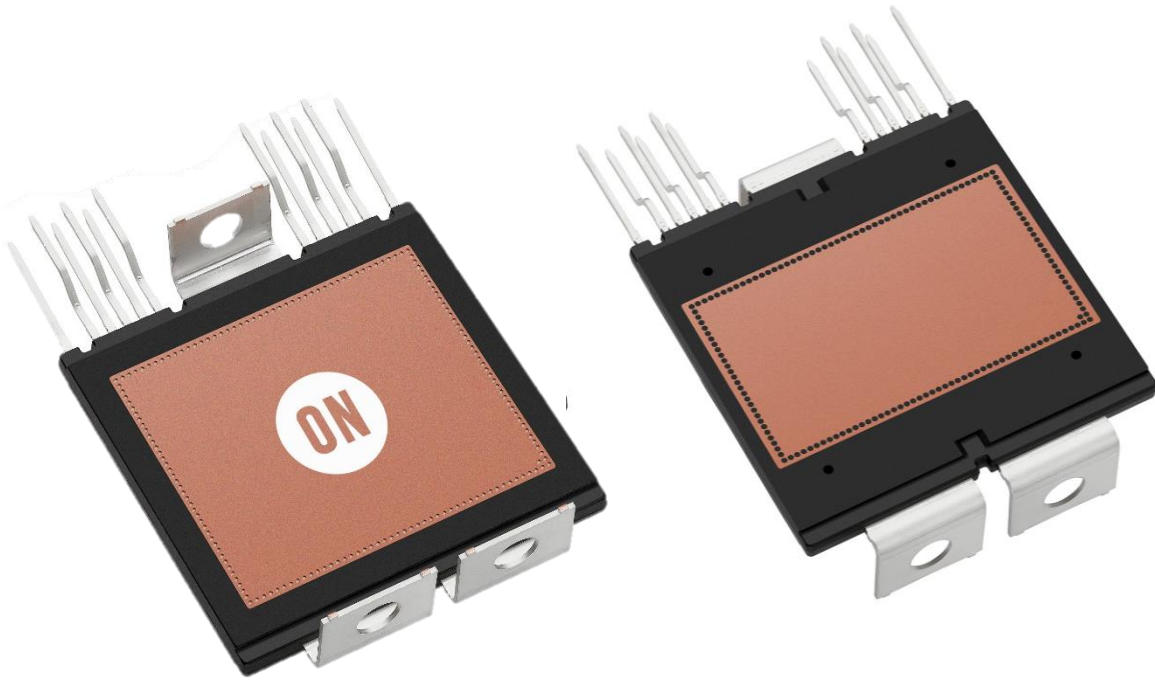
VE-Trac Dual



- **Modular & scalable (80-300kW)**
- **Best-in-class \$/kW**
- **>3x lifetime**
- **Enhanced 'SMART' protection features**

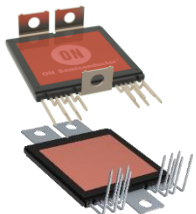
Part Number	Rating	RTM	Package
NVG800A75L4DSC	750V, 800A	Released	VE-Trac™ Dual
NVG800A75L4DSB	750V, 800A	Released	VE-Trac™ Dual

VE-Trac™ Dual



- Lowest cost \$ per kW
- $T_{jmax} = 175^{\circ}\text{C}$ continuous operation
- Scalable, modular, and compact
- 750V & 1200V voltage classes
- Wirebond-free module for high reliability
- On-chip current and temperature sense
- Ultra low stray inductance of $<7\text{nH}$

Product Status: **Released to market**



Device	Current Rating	Voltage Class
NVG800A75L4DSC	800A	750V
NVG800A75L4DSB	800A	750V

VE-Trac™ Dual Inverter Kit

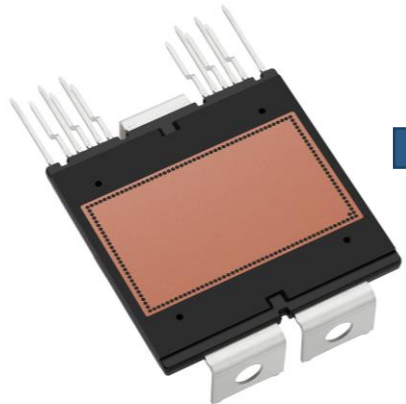
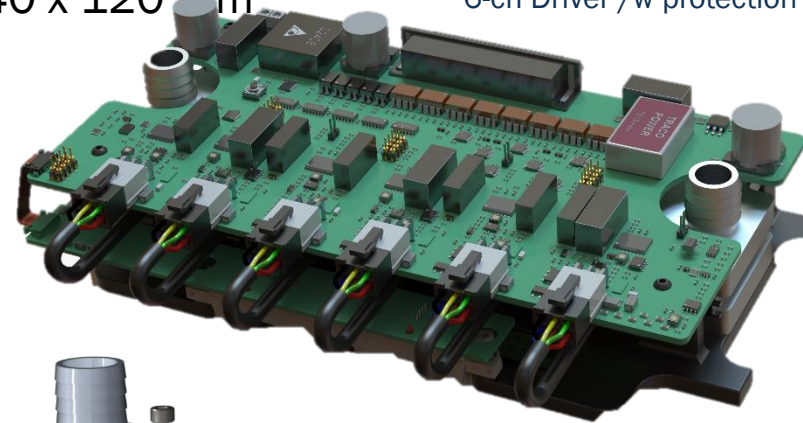
440VDC, 560Arms, up to 160kW 3-ph Inverter

Compact size: 110 x 240 x 120 mm

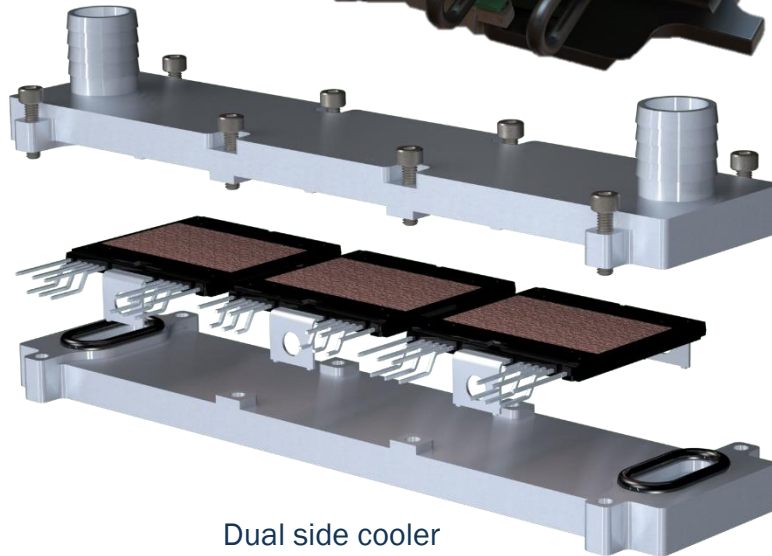
2-ch Isolated Driver



6-ch Driver /w protection



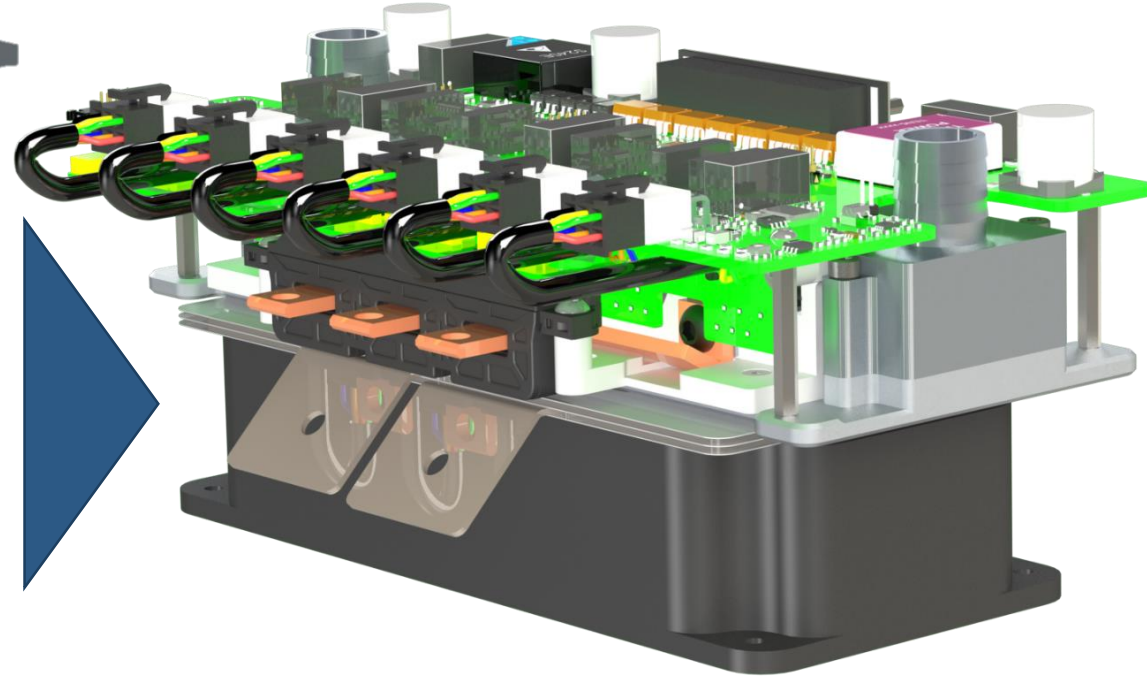
VE-Trac Dual HB Module



Dual side cooler



Design kit makes it easy to test performance



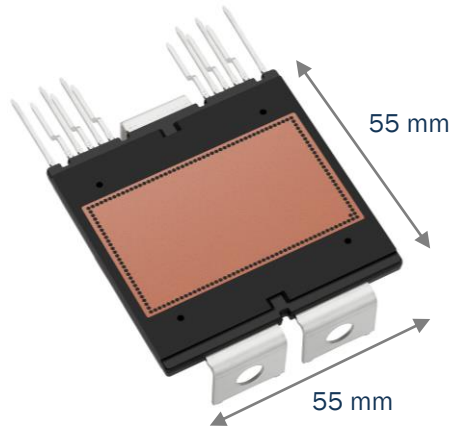
▲ Complete Inverter Kit

Public Information

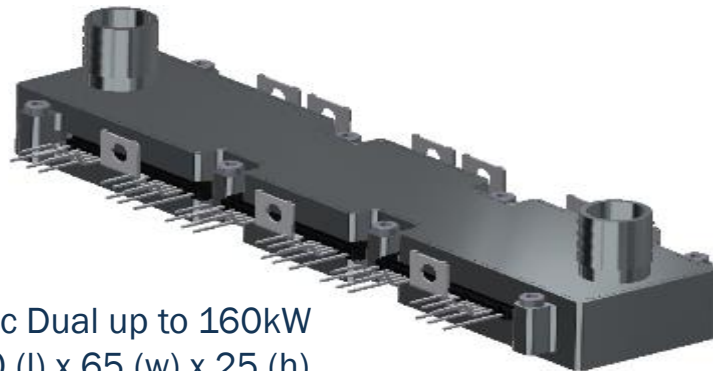


One Power Module – Many power levels

200% Increase in Output Power
/w only a 50% increase in volume



3x VE-Trac Dual up to 300kW
Size: 230 (l) x 65 (w) x 39 (h)



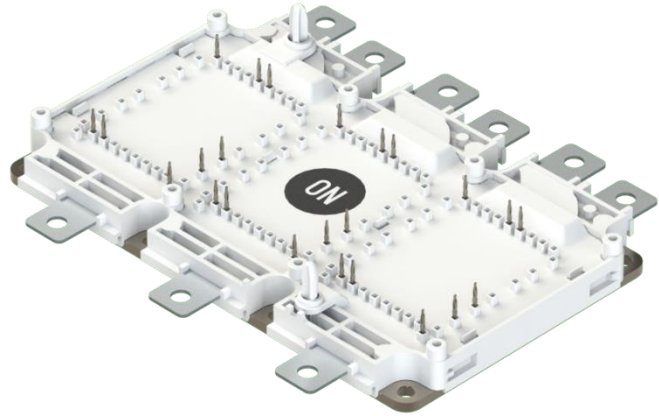
3x VE-Trac Dual up to 160kW
Size: 230 (l) x 65 (w) x 25 (h)

SCALABILITY

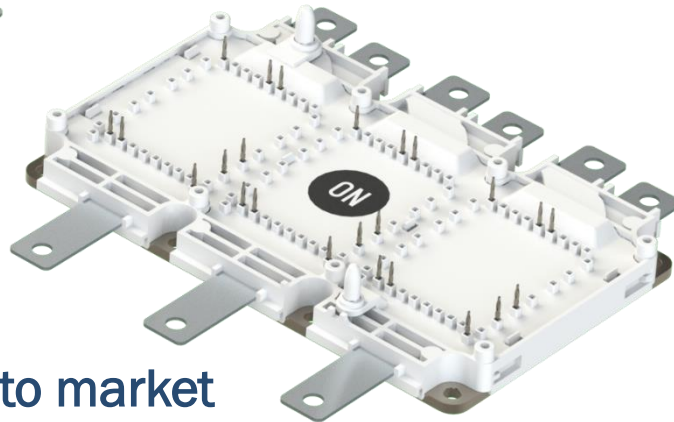


VE-Trac™ Direct

VE-Trac™ Direct SPB



VE-Trac™ Direct SPC



- High reliability press-fit pin design
- Optimized Pin FIN with lower R_{th-jf}
- Short term operation up to 175 °C

Product Status: **Released to market**

Device	Current Rating	Voltage Class
NVH820S75L4SPA NVH820S75L4SPB NVH820S75L4SPC	820A	750V
NVH950S75L4SPB NVH950S75L4SPC	950A	750V
NVH660S75L4SPFB (Flat base plate) NVH660S75L4SPFB (Flat base plate)	660A	750V
NVH640S75L4SPB NVH640S75L4SPC	640A	750V