Product Brief

650V TRENCHSTOP™ 5

Infineon Once Again Redefines Best-in-Class IGBT

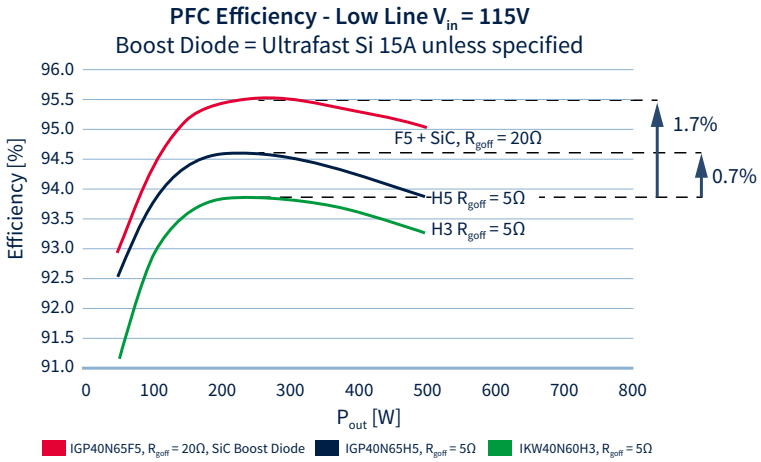
In terms of switching and conduction losses, there is no other IGBT on the market that can match the performance of the TRENCHSTOP™ 5.

TRENCHSTOP™ 5 is the next generation of thin wafer technology for applications switching >10kHz. Wafer thickness has been reduced by >25%, which enables a dramatic improvement in both switching and conduction losses, whilst providing a breakthrough voltage of 650V.

Translating this best-in-class efficiency application tests show >25% reduction in package temperature when performing a plug and play approach with Infineon's previous best-in-class IGBT, the "HighSpeed 3". Even more revolutionary, when replacing a TO-247 HighSpeed 3 IGBT with the TRENCHSTOP™ 5 in a TO-220, case temperatures are >10% lower for the TRENCHSTOP™ 5.

The quantum leap of efficiency improvement provided by the TRENCHSTOP™ 5 opens up new opportunities for designers to explore.

Staggering 1.7% efficiency improvement with SiC as boost diode



Features

- 650V breakthrough voltage
- Compared to Infineon's best-in-class "HighSpeed 3" family
  - Factor 2.5 lower Q_g
  - Factor 2 reduction in switching losses
  - 200mV reduction in $V_{CE(sat)}$
- Co-packed with Infineon's new "Rapid" Si-diode technology
- Low C_{oss}/E_{oss}
- Mild positive temperature coefficient $V_{CE(sat)}$
- Temperature stability of V_F

Benefits

- Best-in-class efficiency, resulting in lower junction and case temperature leading to higher device reliability
- 50V increase in the bus voltage possible without compromising reliability
- Higher power density designs

Applications

- PFC + PWM topologies in
  - Welding
  - UPS

www.infineon.com/trenchstop5

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For the target applications, there are three major benefits the new TRENCHSTOP™ 5 offers:

- 650V breakthrough voltage offered as standard. This allows designers more safety margin or the possibility to increase the bus voltage, thus increase power density
- Increased efficiency thanks to the significant reduction in $V_{CE(sat)}$ and total switching losses
- Gate charge (Q_g) has been reduced by a factor of 2.5 compared to HighSpeed 3, which results in an IGBT that is easy to drive, so driver costs can be reduced

TRENCHSTOP™ 5 is available in two variants

Variant 1: HighSpeed 5 - H5/High speed variant	Variant 2: HighSpeed 5 Fast - F5/Highest efficiency
H5 has been designed as a plug and play IGBT. That means, without having to change the driver circuit or gate resistors, a designer will immediately see the benefits the IGBT has to offer. For highest efficiency the H5 can be driven with a single turn-on/-off gate resistor down to 5Ω.	F5 is released for designers where efficiency really is the focus of the design. In combination with a silicon carbide diode (SiC), application measurements have seen a 0.5% system efficiency improvement over the H5. What is important to note, the F5 must be driven with a split turn-on/-off gate resistor and be implemented in a low inductance design.

The TRENCHSTOP™ 5 compared to HighSpeed 3 – datasheet comparison*

R_g=15Ω	40A HS3	40A H5	40A F5	Unit	Benefit
$V_{CE(sat)}$	1.95	1.7	1.7	V	-200mV lower
$V_{(br)}$	600	650	650	V	+50V higher
Q_g	223	84	90	nC	Factor 2.5 lower
E_{on}	0.61	0.27	0.29	mJ	
E_{off}	0.29	0.16	0.13	mJ	

* Characterization measurements

TRENCHSTOP™ 5 Product Spectrum

Continous collector current @ T_C = 100°C		TO-220 	TO-220 FullPAK 	TO-247-3 	TO-247-4 
Single IGBT	20	IGP20N65F5 / H5			
	30	IGP30N65F5 / H5			
	40	IGP40N65F5 / H5		IGW40N65F5 / H5	
	50			IGW50N65F5 / H5	IGZ50N65H5
	75			IGW75N65H5	IGZ75N65H5
	100				IGZ100N65H5
DuoPack	8	IKP08N65F5 / H5	IKA08N65F5 / H5		
	15	IKP15N65F5 / H5	IKA15N65F5 / H5		
	20	IKP20N65F5 / H5			
	30	IKP30N65F5 / H5		IKW30N65H5	
	40	IKP40N65F5 / H5		IKW40N65F5 / H5	
	50			IKW50N65F5 / H5/ EH5	IKZ50N65EH5 / IKZ50N65NH5
	75			IKW75N65EH5	IKZ75N65EH5 / IKZ75N65NH5

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