

The Next Generation High Speed IGBT Family From Infineon

PCIM Europe
4th May 2010



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Infineon Power Discretetes



Infineon ... the Leader in Power Semiconductors in 2008 *



- Market leader in Power Semiconductors since 2003 !
- Technology leadership leading to ...
- ...innovative product portfolio for efficiency improvements and system miniaturization

Global Power Semiconductor Market Ranking: Market Size in 2008 USD 14.0 bn

Rank 2008	Supplier	2007	2008	Change	
1	Infineon	9.6%	10.2%	0.6%-pt	↑
2	Vishay	6.7%	6.8%	0.1%-pt	↑
3	STMicroelectronics	7.3%	6.6%	-0.7%-pt	↓
4	Fairchild	6.9%	6.5%	-0.4%-pt	↓
5	Mitsubishi (inc. Powerex)	5.5%	6.4%	0.9%-pt	↑

*Source: IMS Research, Global Market for Power Semiconductor Discretets & Modules, July 2009

Infineon Discrete IGBTs did you know?



Infineon is the #1 world wide supplier of discrete IGBTs ...
... where 1 in every 4 discrete IGBT sold comes from Infineon*

*IMS-The World Market for Power Semiconductor Discrettes & Modules 2009

How is this possible?

- ✓ High efficiency (cooler packages)
Low switching & conduction losses
- ✓ Excellent EMI behaviour
- ✓ Highest quality standards
- ✓ Logistic Management



New 3rd Generation Family for Switching Frequencies up to 100kHz

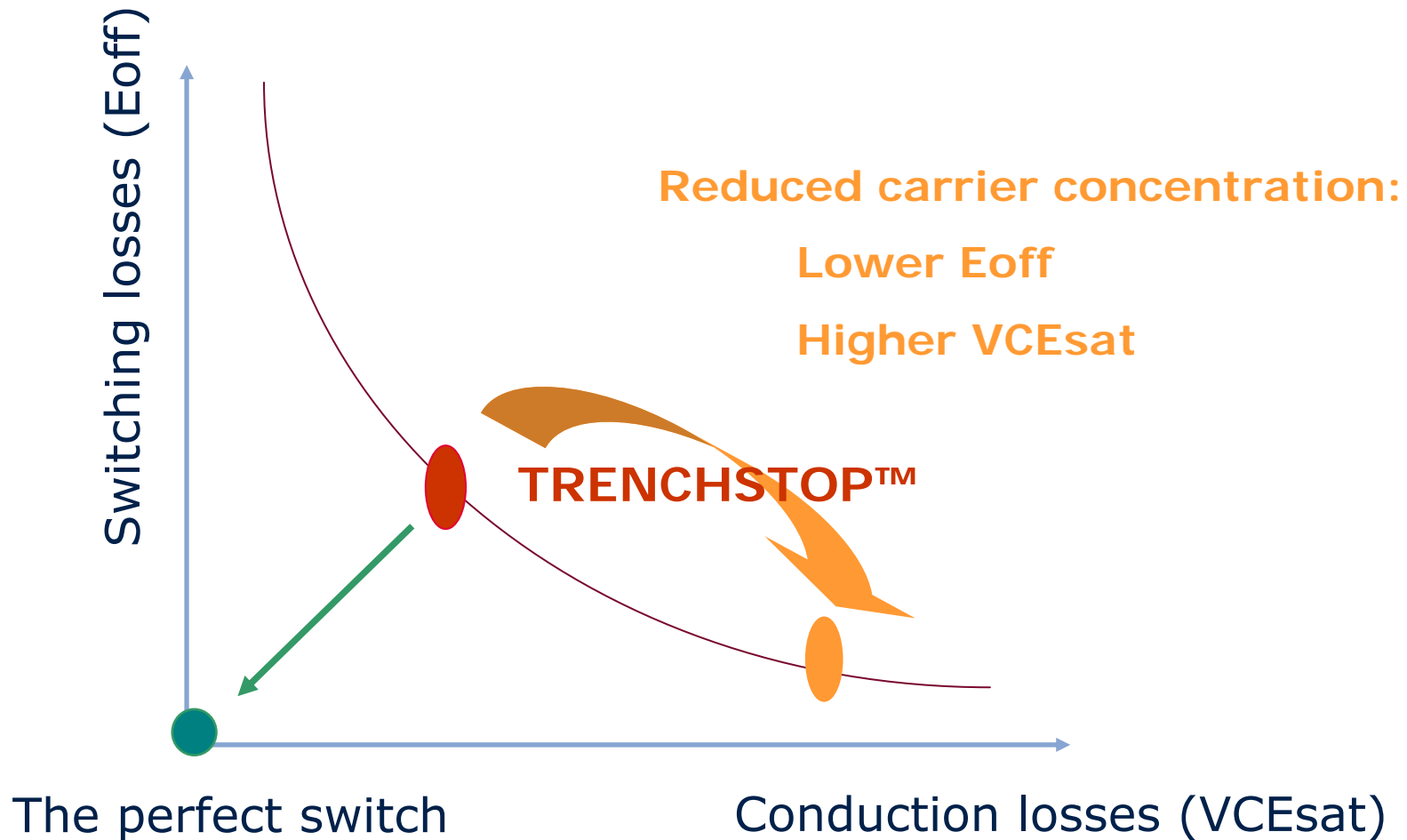


- ✓ Target applications:
 - ✓ Welding / Solar / UPS
 - ✓ PFC / SMPS
 - ✓ Lamp ballast
 - ✓ All high frequency – hard switching applications



- ✓ Lowest total losses at high speed operation
- ✓ Proven cosmic radiation robustness
- ✓ Low gate resistor selection possible (down to 5Ω) whilst maintaining excellent switching behaviour
- ✓ Excellent EMI performance

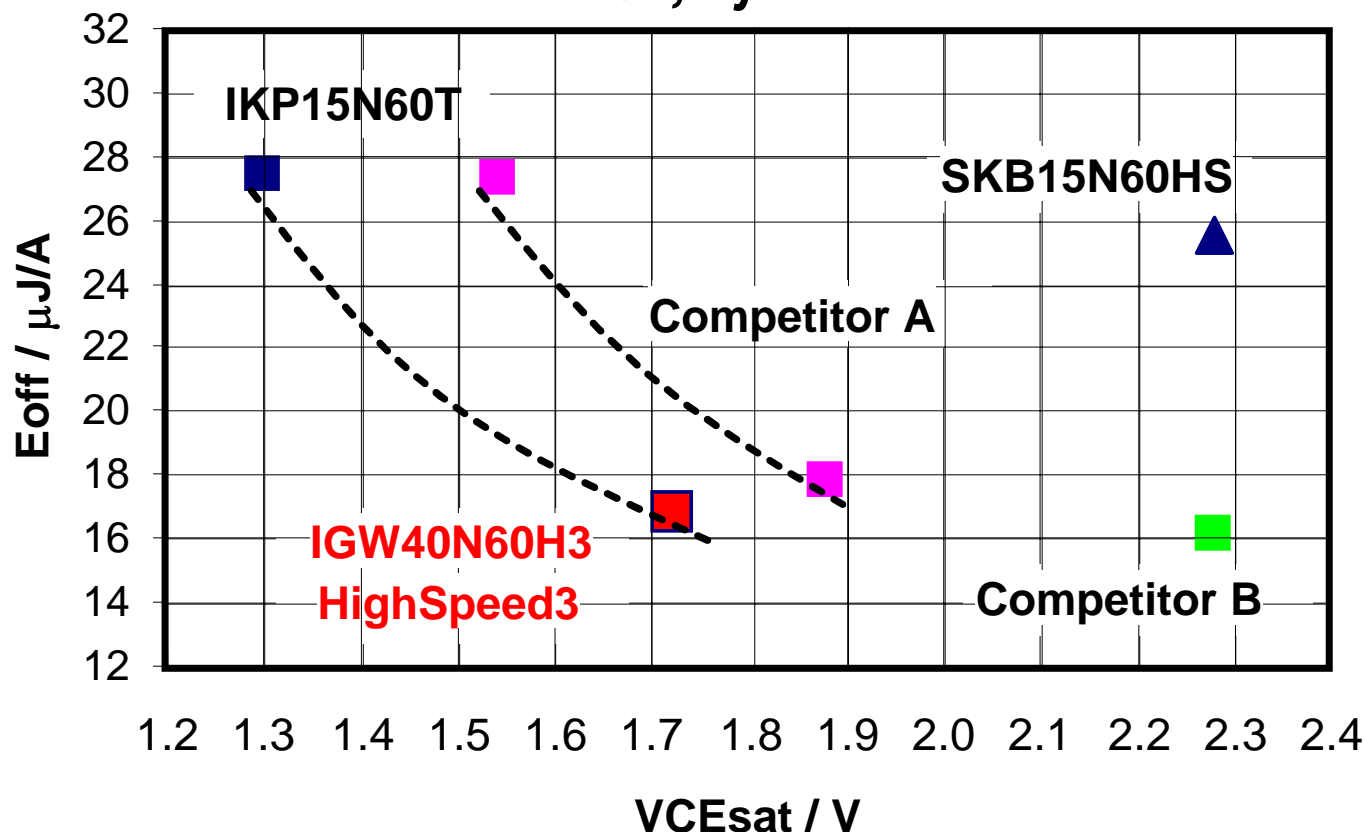
IGBT Performance Tuning for High Speed



There is trade-off - but we haven't given up!

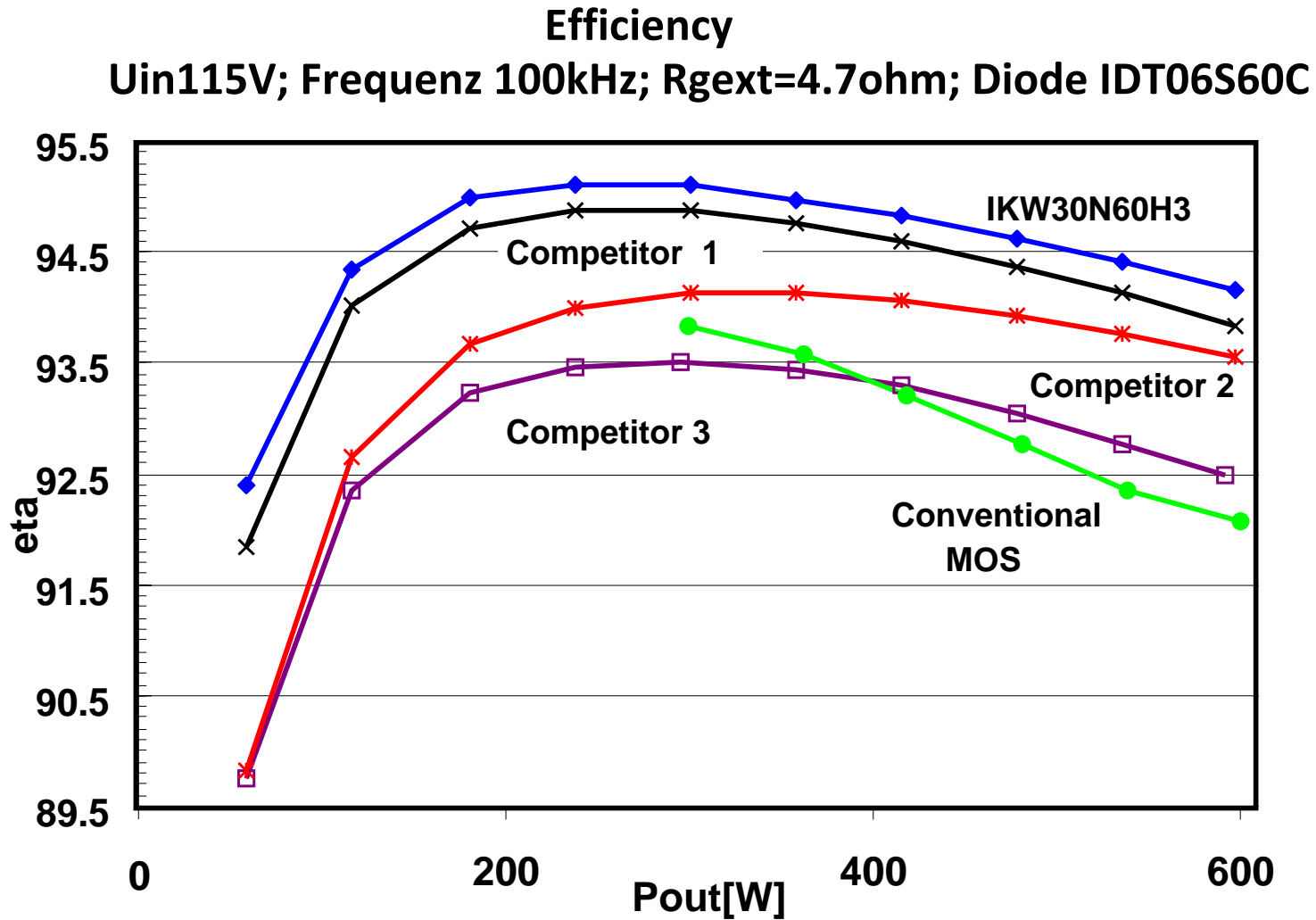
High Speed IGBT Competitor Landscape

Trade-off diagram
 $I_c = I_n/2, T_j = 150^\circ\text{C}$



HighSpeed3 family optimised for high switching frequencies

Application test – PFC at 100kHz



HighSpeed3 IGBT provides ~ 1% better efficiency than conventional MOSFETs at 100 kHz!!

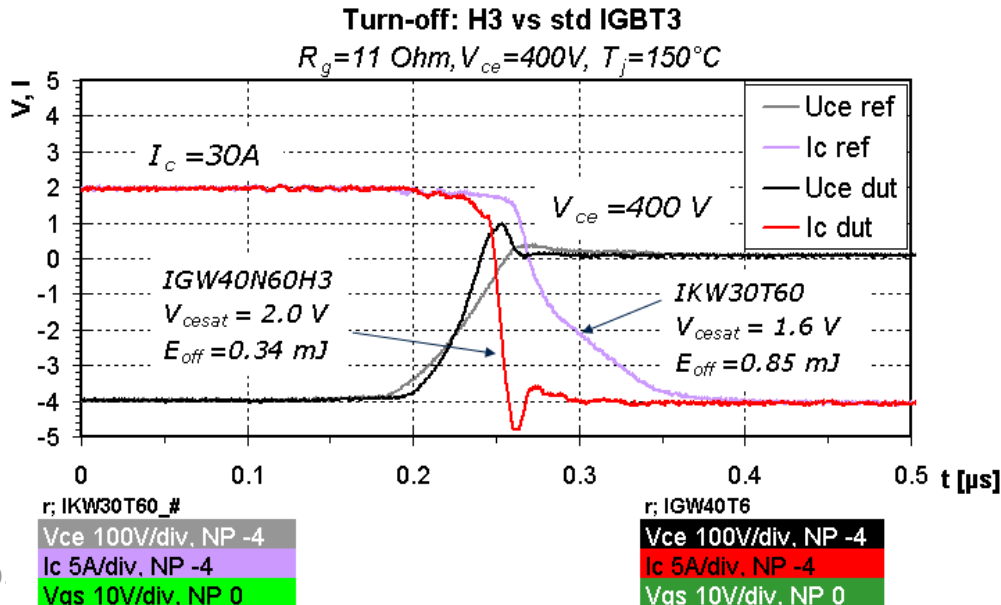
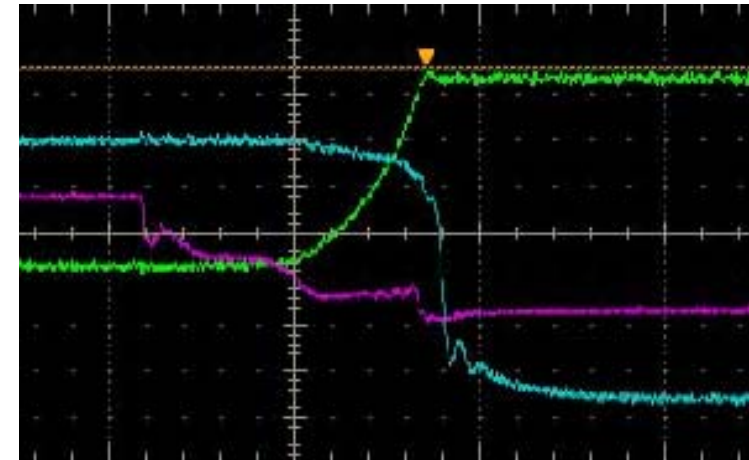
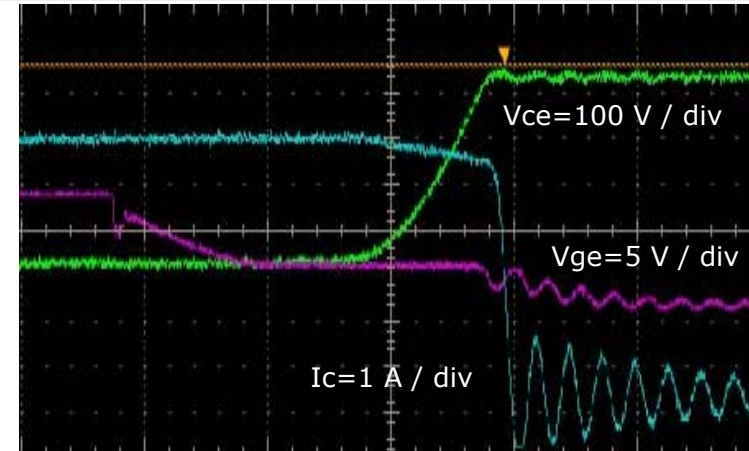
PFC Application Test at 100kHz

Guess Which Waveform is that of an IGBT?



EMI – What EMI?

- Smooth switching waveforms in application
- No Current oscillations
- No overvoltage
- Gate resistor selection
- Go low for high performance



Infineon's High Speed 3 IGBT Portfolio

600V and 1200V Product Family



		600V		1200V
		TO-220	TO-247	TO-247
Continuous collector current at $T_c = 100^\circ\text{C}$				
Single IGBT	15A			IGP15N120H3 ✓
	20A	IGP20N60H3 ✓		
	25A			IGP25N120H3 ✓
	30A	IGP30N60H3 ✓		
	40A		IGW40N60H3 ✓ IGW50N60H3 ✓	IGP40N120H3 ✓
50A				
DuoPack™	15A			IKW15N120H3 ✓
	20A		IKW20N60H3 ✓	
	25A			IKW25N120H3 ✓
	30A		IKW30N60H3 ✓	
40A		IKW40N60H3 ✓	IKW40N120H3 ✓	

All devices are fully released

Summary

- Infineon's new 600V and 1200V High Speed3 IGBT family has been developed for operation up to 100kHz
 - Offering
 - ~1% efficiency improvement over all load conditions compared to conventional planar MOSFETS
 - Best class IGBT in PFC stage
 - EMI and RF filtering requirements significantly reduced
 - Temperature stable behaviour
 - Smaller die sizes → smaller packages
 - Excellent price / performance behaviour

Thank you for your attention

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