



# LEADING AT THE EDGE

TECHNOLOGY AND MANUFACTURING DAY

# 22FFL TECHNOLOGY

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# DISCLOSURES

Intel Technology and Manufacturing Day 2017 occurs during Intel's "Quiet Period," before Intel announces its 2017 first quarter financial and operating results. Therefore, presenters will not be addressing first quarter information during this year's program.

Statements in this presentation that refer to forecasts, future plans and expectations are forward-looking statements that involve a number of risks and uncertainties. Words such as "anticipates," "expects," "intends," "goals," "plans," "believes," "seeks," "estimates," "continues," "may," "will," "would," "should," "could," and variations of such words and similar expressions are intended to identify such forward-looking statements. Statements that refer to or are based on projections, uncertain events or assumptions also identify forward-looking statements. Such statements are based on management's expectations as of March 28, 2017, and involve many risks and uncertainties that could cause actual results to differ materially from those expressed or implied in these forward-looking statements. Important factors that could cause actual results to differ materially from the company's expectations are set forth in Intel's earnings release dated January 26, 2017, which is included as an exhibit to Intel's Form 8-K furnished to the SEC on such date. Additional information regarding these and other factors that could affect Intel's results is included in Intel's SEC filings, including the company's most recent reports on Forms 10-K, 10-Q and 8-K reports may be obtained by visiting our Investor Relations website at [www.intc.com](http://www.intc.com) or the SEC's website at [www.sec.gov](http://www.sec.gov).

# INTEL'S NEW 22FFL TECHNOLOGY

## 22FFL is the world's first FinFET technology for low power IOT and mobile products

- Advanced FinFET transistors based on proven 22 nm and 14 nm features
- >100x leakage power reduction with new ultra-low leakage transistor option
- Simplified interconnects and design rules based on 22 nm technology
- New levels of design automation
- Fully RF design enabled
- Cost competitive with other industry 28/22 nm planar technologies

# 22FFL DIMENSIONS

	<u>22 nm</u>	<u>22FFL</u>	<u>14 nm</u>	
Transistor	FinFET	FinFET	FinFET	
Fin Pitch	60	45	42	nm
Gate Pitch	90	108	70	nm
Metal Pitch	80	90	52	nm
Logic Cell Ht	840	630	399	nm
Trans. Density	15.3	18.8	37.5	MTr / mm <sup>2</sup>
SRAM Cell	.092	.088	.050	um <sup>2</sup>

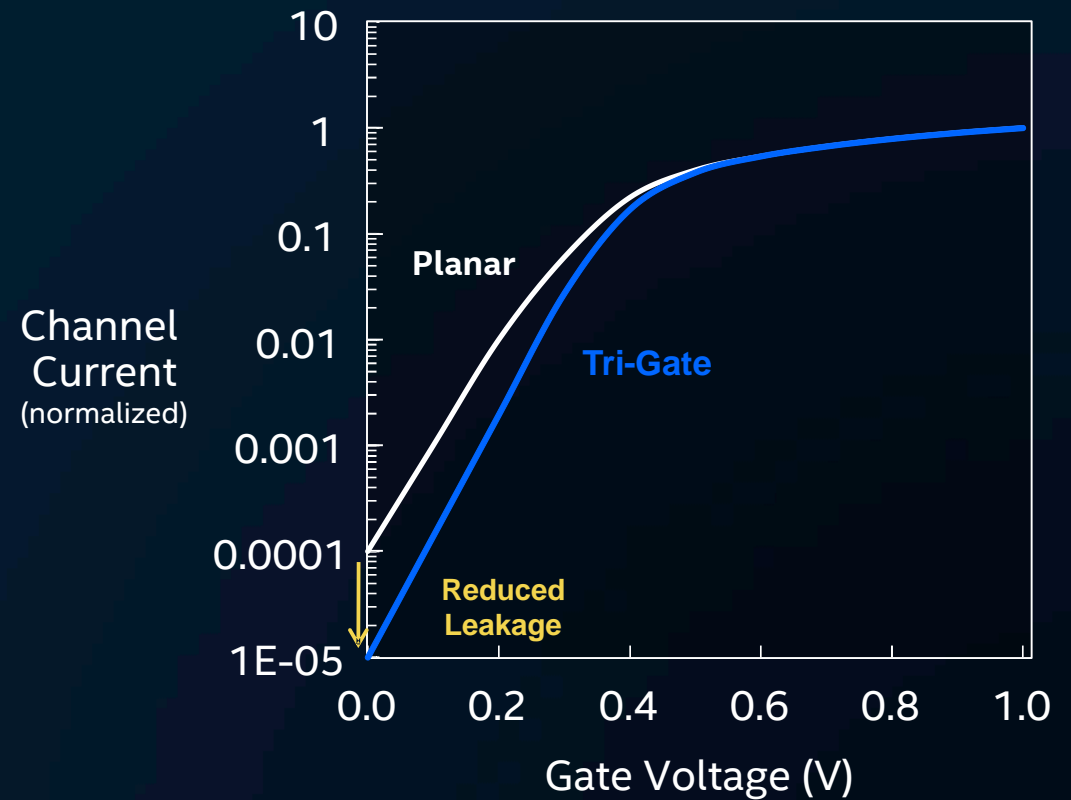
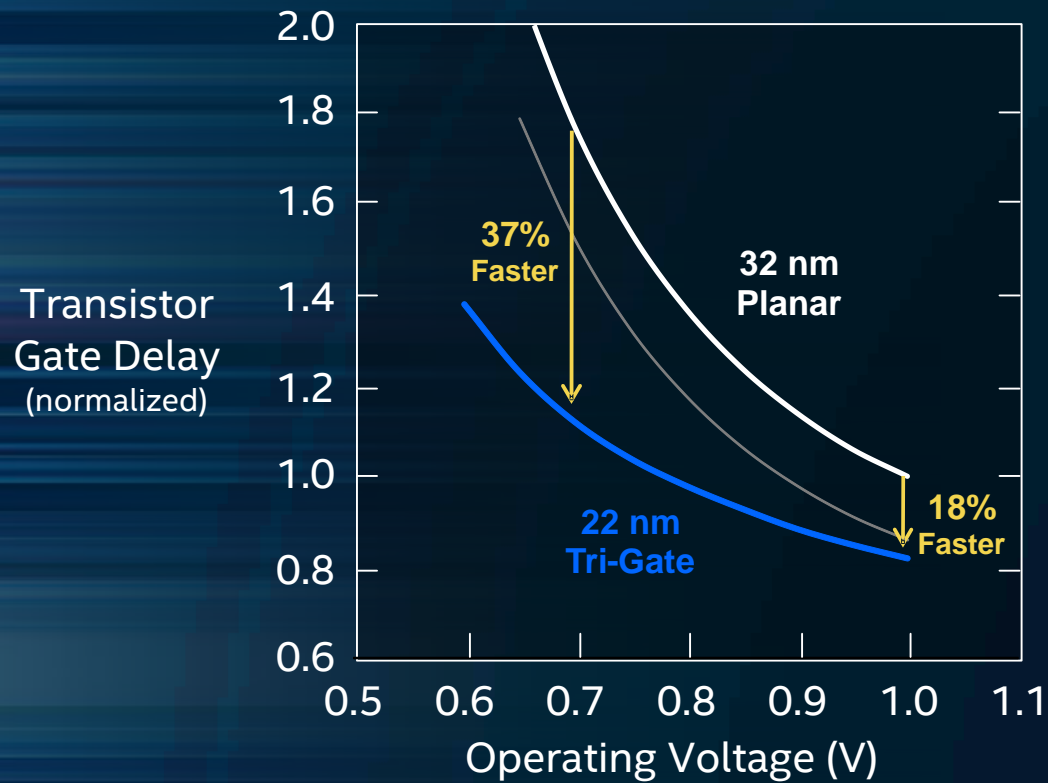
**22FFL is based on proven 22 nm and 14 nm features**

# 22FFL DEVICES

- ✓ High performance transistors
- ✓ Ultra low leakage transistors
- ✓ Analog transistors
- ✓ High voltage I/O transistors
- ✓ High voltage power transistors
- ✓ Good device matching
- ✓ Low 1/f noise
- ✓ Deep N-well isolation
- ✓ Precision resistor
- ✓ MIM capacitor
- ✓ High resistance substrate
- ✓ High-Q inductors

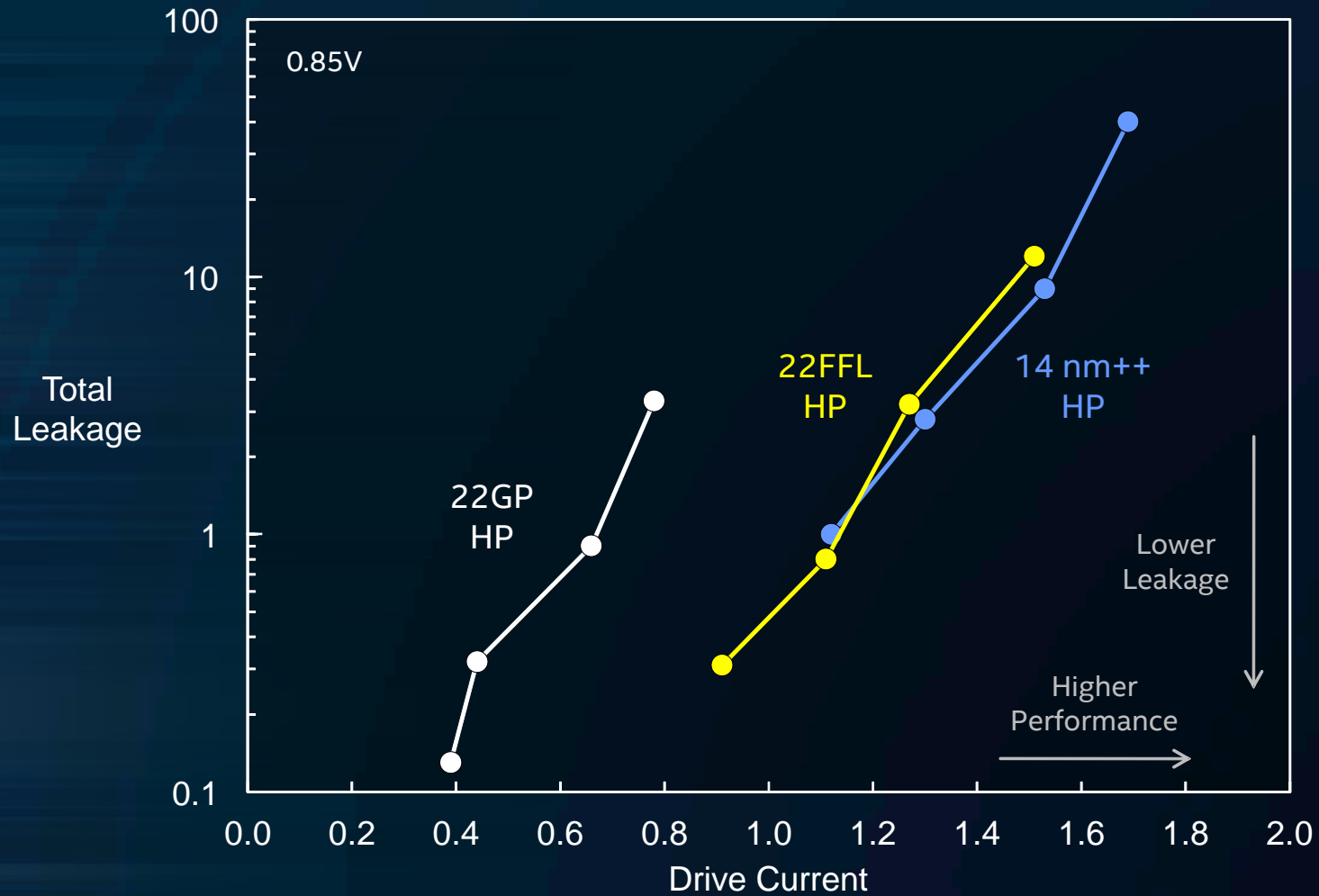
**22FFL offers a wide range of devices for digital and analog/RF design**

# FINFET PERFORMANCE AND LEAKAGE ADVANTAGE



**FinFETs provide a significant performance and leakage advantage over any planar transistor**

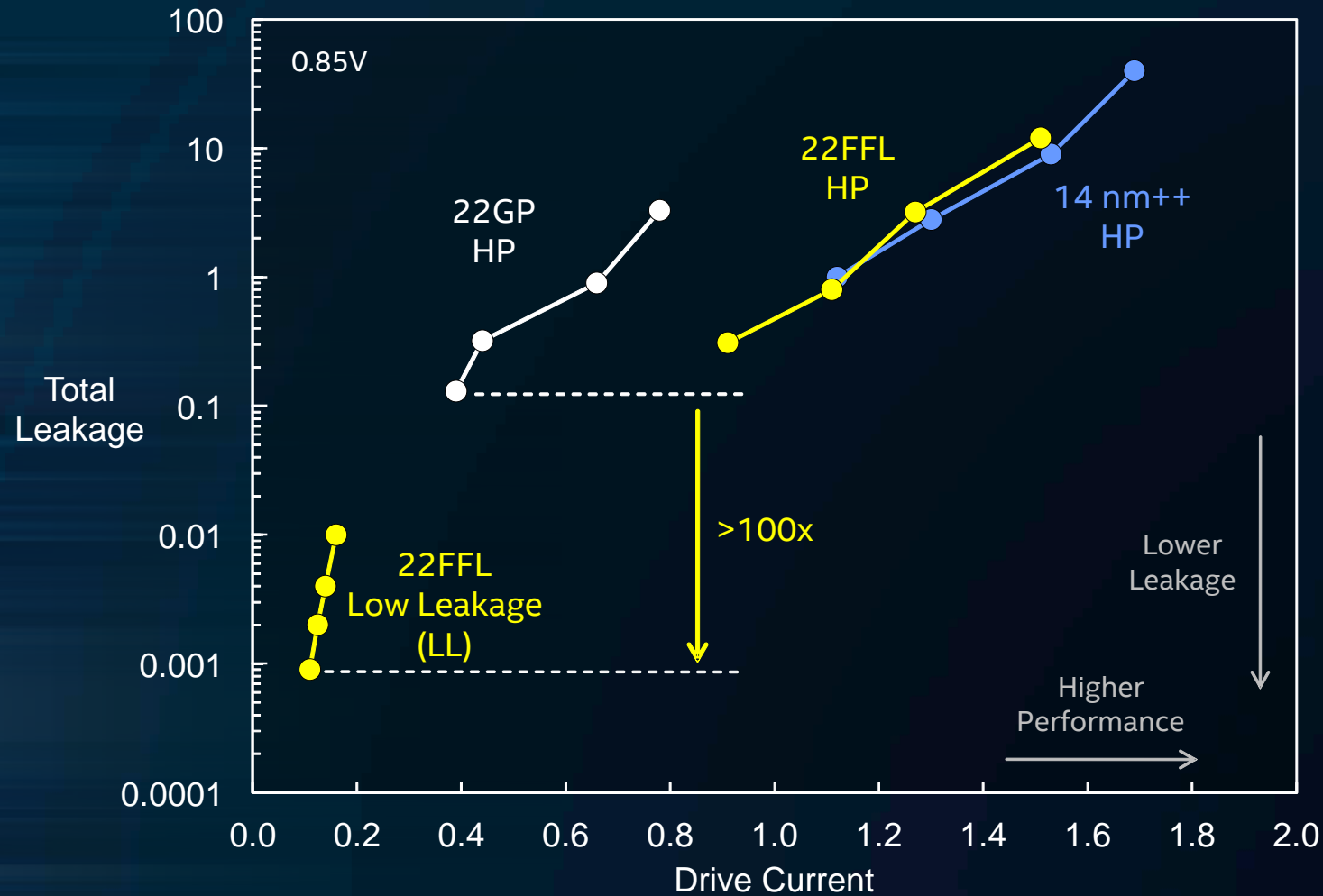
# 22FFL HIGH PERFORMANCE TRANSISTORS



**22FFL provides high performance transistors with drive currents similar to 14nm++**

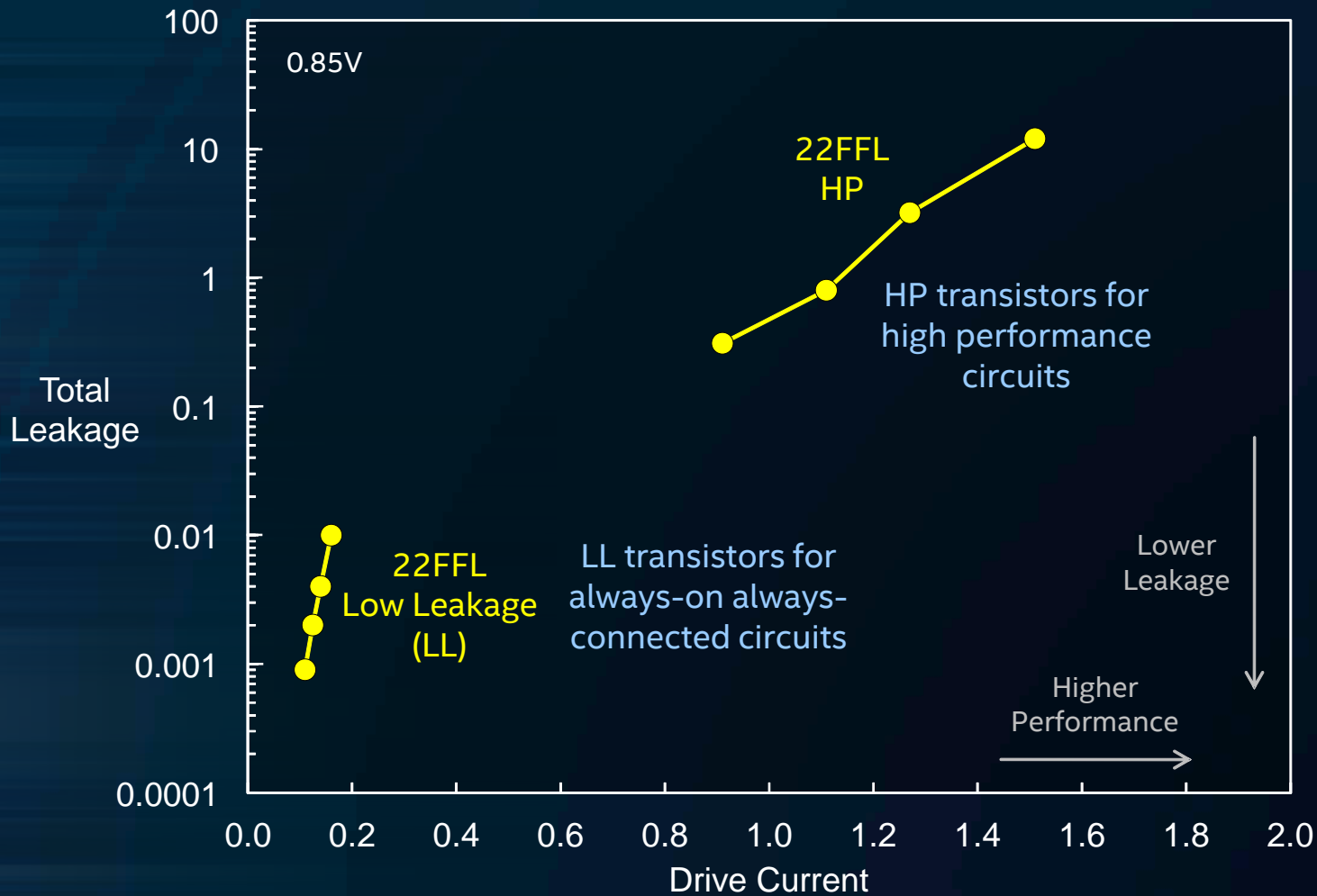


# 22FFL LOW LEAKAGE TRANSISTORS



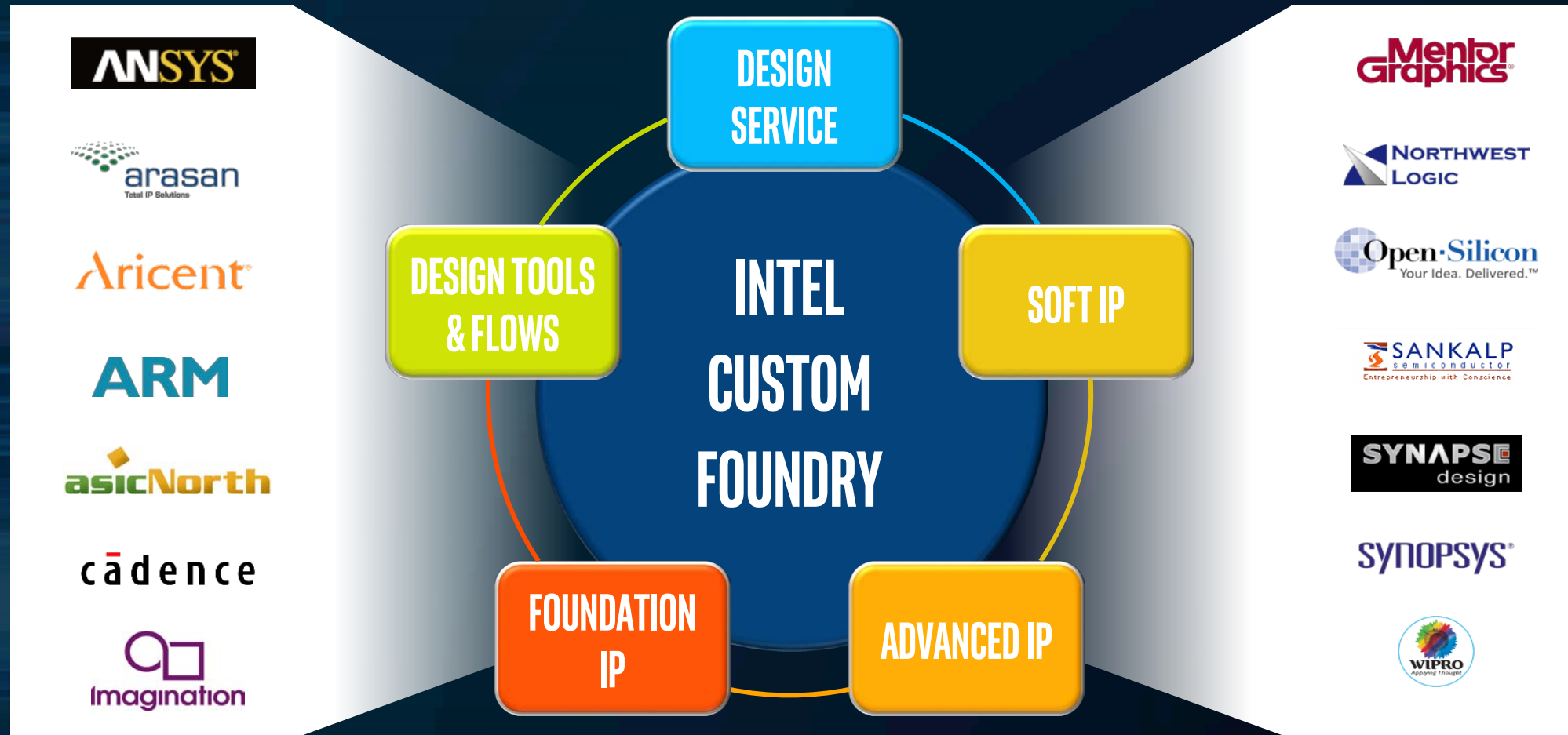
**22FFL provides the lowest leakage transistors for any mainstream technology**

# 22FFL TRANSISTOR OPTIONS



**High performance and low leakage transistors co-exist on the same die**

# INTEL CUSTOM FOUNDRY'S ROBUST ECOSYSTEM



**22FFL is fully supported by a robust design ecosystem**

# 22FFL TECHNOLOGY

- ✓ High transistor drive currents similar to Intel 14 nm
- ✓ Low leakage transistors with >100x lower total leakage than 22GP
- ✓ Die area scaling better than industry 28/22 nm technologies
- ✓ Wide range of advanced analog/RF devices
- ✓ Extensive use of single patterning for affordable ease-of-design
- ✓ Mature die yield with use of proven 22/14 nm features
- ✓ Cost competitive with other 28/22 nm planar technologies
- ✓ Industry standard PDK0.5 available now, PDK1.0 in Q2 '17\*
- ✓ Production readiness in Q4 2017\*

**22FFL is an exciting new technology that provides a compelling combination of performance, power, density and ease-of-design for low power IOT and mobile products**



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