800 V CoolMOS™ P7 a new benchmark in efficiency and thermal performance

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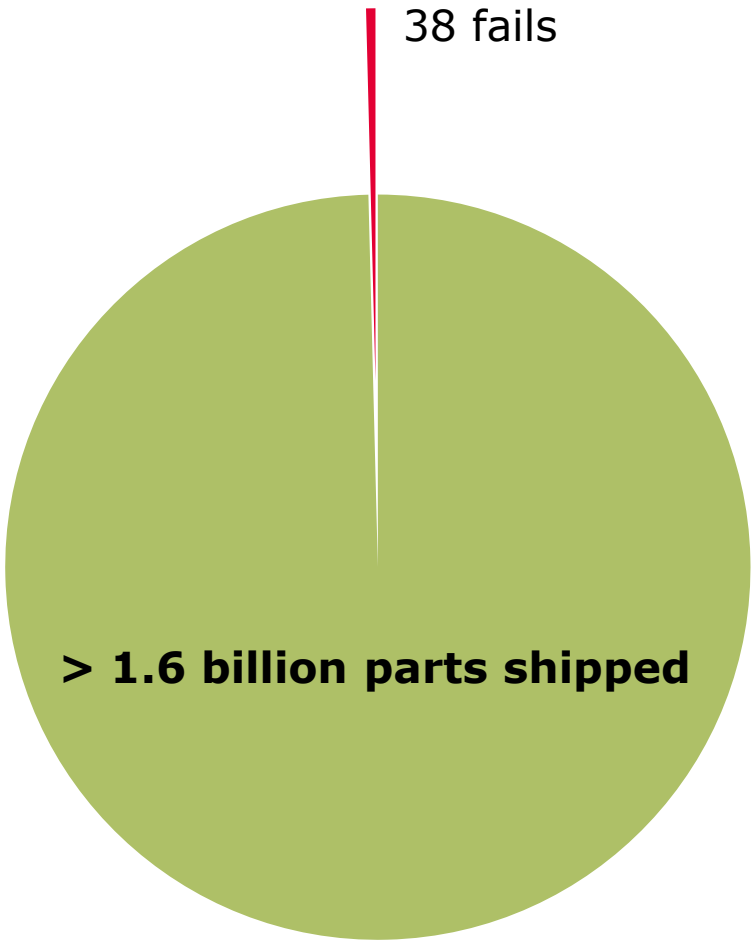
2 Highest quality and reliability – 38 fails over 1.6 billion shipped parts



All CoolMOS™ Technologies

- 0.03 DPM on average
- Over 1.6 billion parts shipped only 38 fails

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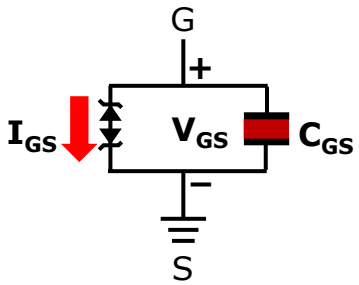
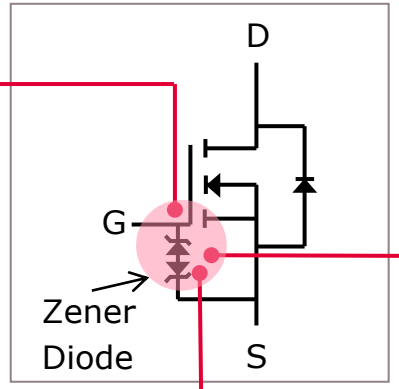
2 CoolMOS™ P7 integrated ESD protection reduces ESD related failures

ESD[a] Protection Mechanism



During ESD event:

- V_{GS} is clamped by Zener Diode
- I_{GS} flows through Zener Diode
- Thus protect gate oxide



CoolMOS™ P7 ESD Robustness

HBM[b]:

- 2 – 4.5 Ω: Class 1C (1 – 2 kV)
- 0.28 – 1.4 Ω: Class 2 (2 – 4 kV)

CDM[c]:

- Class C3 (≥1 kV)

Customer Benefits

- Better assembling yield thus less cost
- Less field failure rate
- Higher quality and better reputation

[a]ESD: Electro-Static Discharge

[b]HBM: Human Body Model

[c]CDM: Charged Device Model

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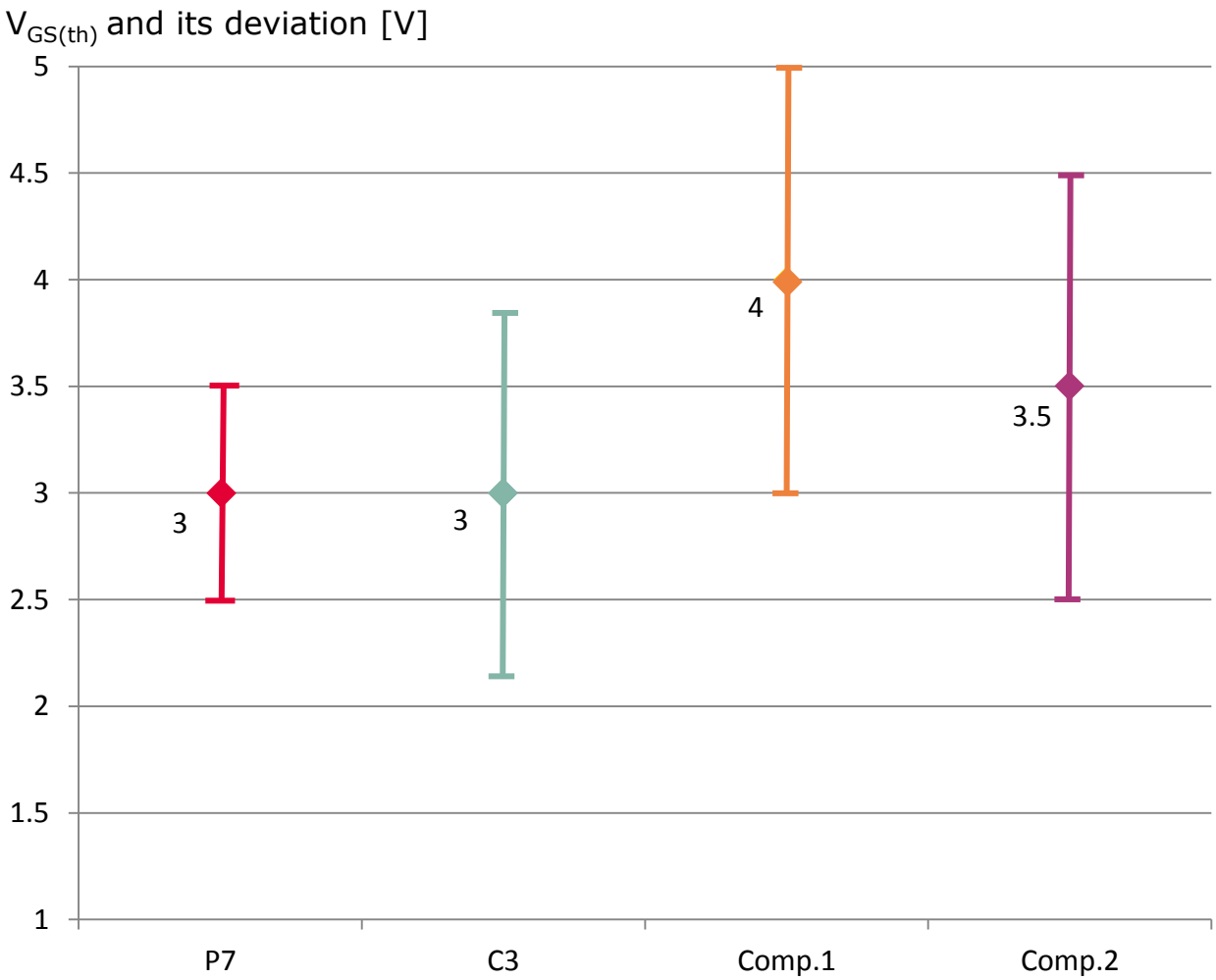
2 CoolMOS™ P7 offers lowest $V_{GS(th)}$ and smallest $V_{GS(th)}$ deviation



Customer benefits

Easy to drive

- Avoiding MOSFET linear mode operation
- Allowing lower driving voltage
- Reducing idle loss

Easy to design-in

- Increased design flexibility due to tighter tolerance

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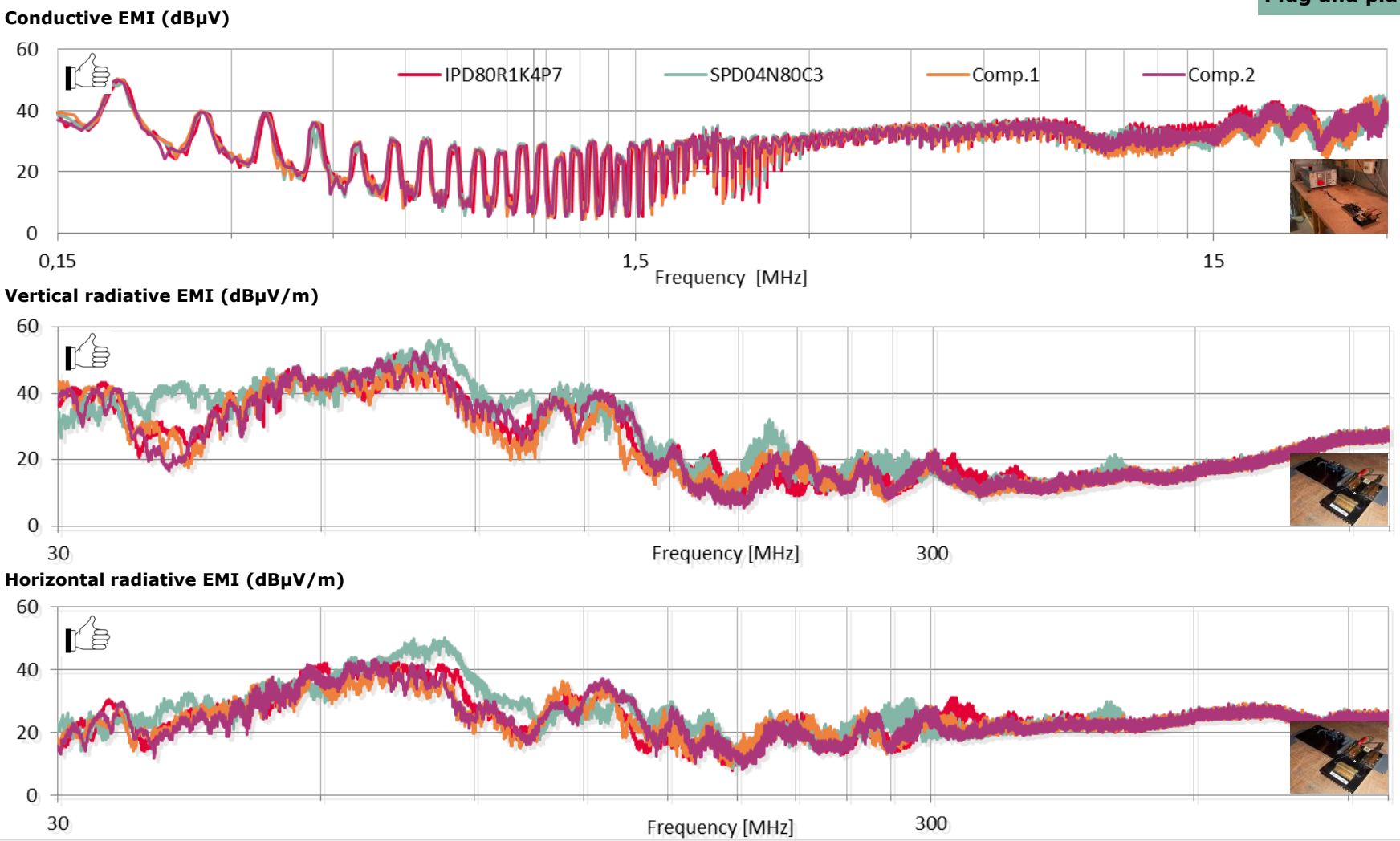
2 CoolMOS™ P7 shows similar EMI as compared to market offers tested in a IFX 45 W adapter

Plug and play



› **EMI is a system level topic and optimization needs to be done on system level**

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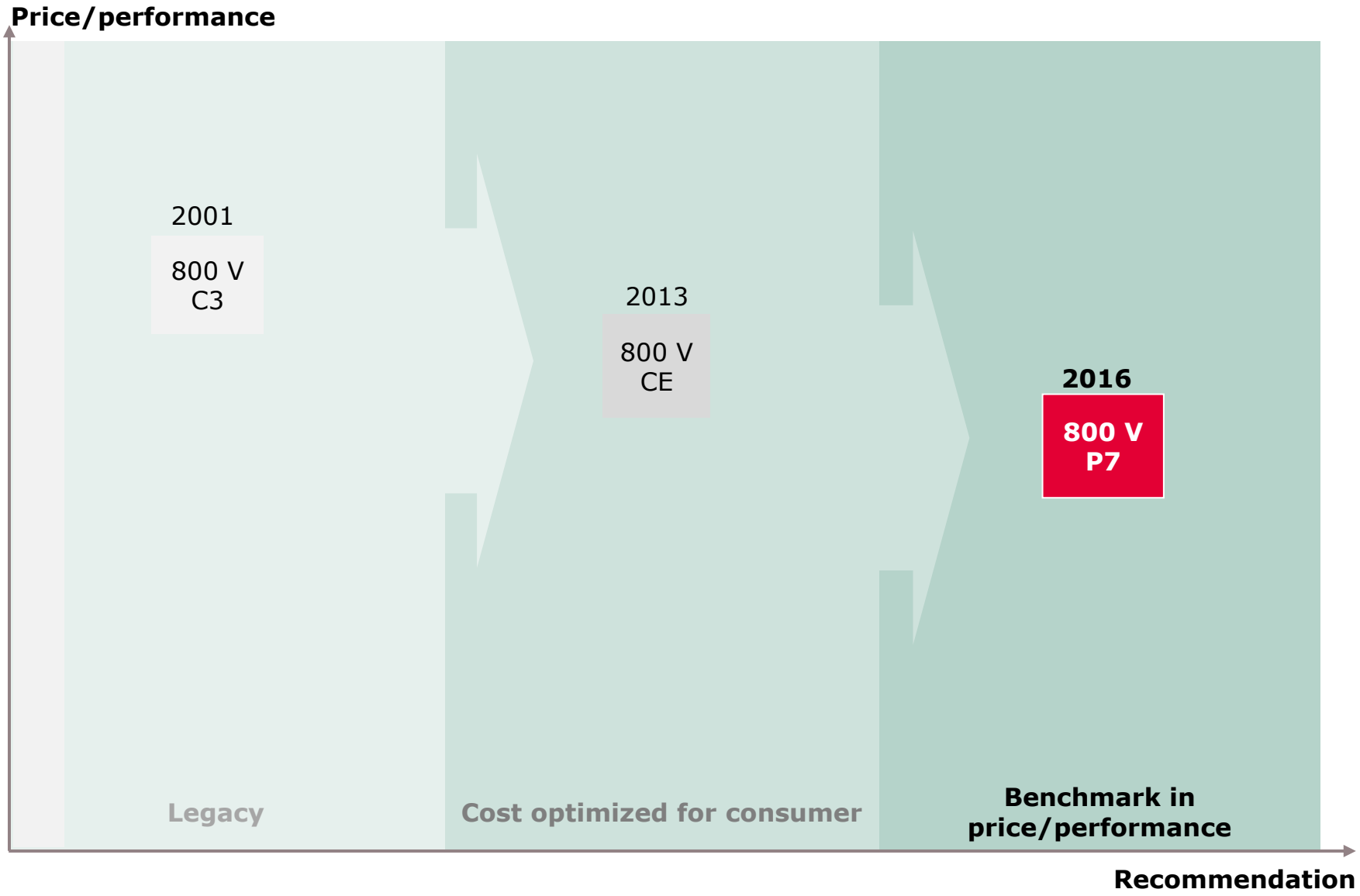
3 CoolMOS™ P7 combines best-in-class performance with state-of-the-art ease-of-use at best price/performance



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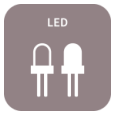
CoolMOS™ P7 offers fully optimized portfolio for target applications

In production | QS in Q2 cy17

800 V SJ MOSFET fully optimized portfolio with 12 different $R_{DS(on)}$s and 7 packages

ESD class	$R_{DS(on)}$ [mΩ]	TO-220 FP	TO-220 FP Narrow Lead	TO-252 DPAK	TO-220	TO-247	TO-251 IPAK LL	TO-251 IPAK SL
1C	4500			IPD80R4K5P7			IPU80R4K5P7	
	3300			IPD80R3K3P7			IPU80R3K3P7	
	2400			IPD80R2K4P7			IPU80R2K4P7	IPS80R2K4P7
	2000			IPD80R2K0P7			IPU80R2K0P7	IPS80R2K0P7
2	1400	IPA80R1K4P7		IPD80R1K4P7	IPP80R1K4P7		IPU80R1K4P7	IPS80R1K4P7
	1200	IPA80R1K2P7		IPD80R1K2P7	IPP80R1K2P7		IPU80R1K2P7	IPS80R1K2P7
	900	IPA80R900P7		IPD80R900P7	IPP80R900P7		IPU80R900P7	IPS80R900P7
	750	IPA80R750P7		IPD80R750P7	IPP80R750P7		IPU80R750P7	IPS80R750P7
	600	IPA80R600P7	IPAN80R600P7	IPD80R600P7	IPP80R600P7		IPU80R600P7	IPS80R600P7
	450	IPA80R450P7	IPAN80R450P7	IPD80R450P7	IPP80R450P7			
	360	IPA80R360P7	IPAN80R360P7	IPD80R360P7	IPP80R360P7	IPW80R360P7		
	280	IPA80R280P7	IPAN80R280P7	IPD80R280P7	IPP80R280P7	IPW80R280P7		



- **Fine $R_{DS(on)}$ granularity**
- **Easy to choose right parts for fine tuning of designs**

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CoolMOS™ P7 800V

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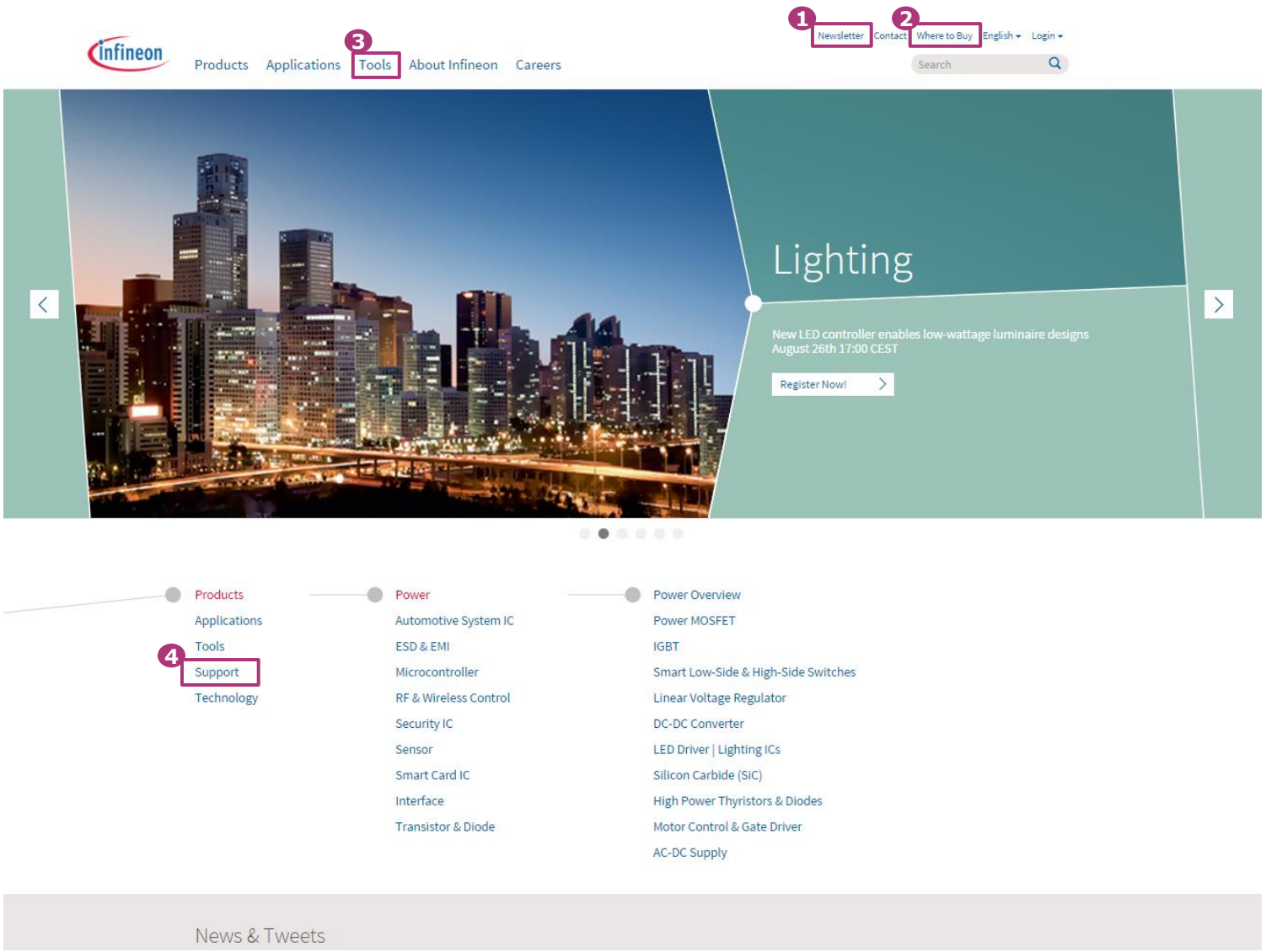

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