

Attracting Tomorrow



# CLT32 power inductors – tiny giants for ADAS/AD systems

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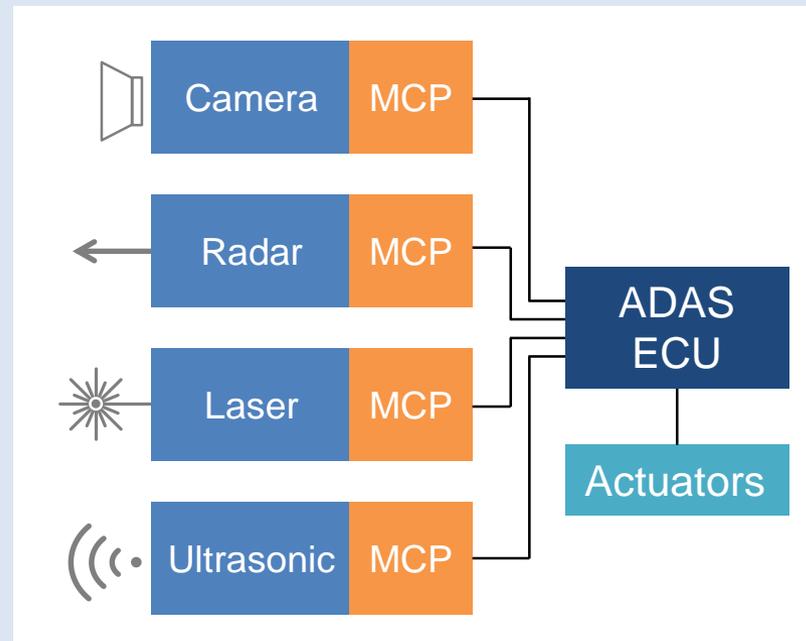


# Automotive electronics are about to fundamentally change

## Increasing numbers of autonomous driving electronics in automotive

### Precise 360° sensing with:

- Cameras
- Short / long range radars
- Laser / 3D Lidar
- Ultrasonic

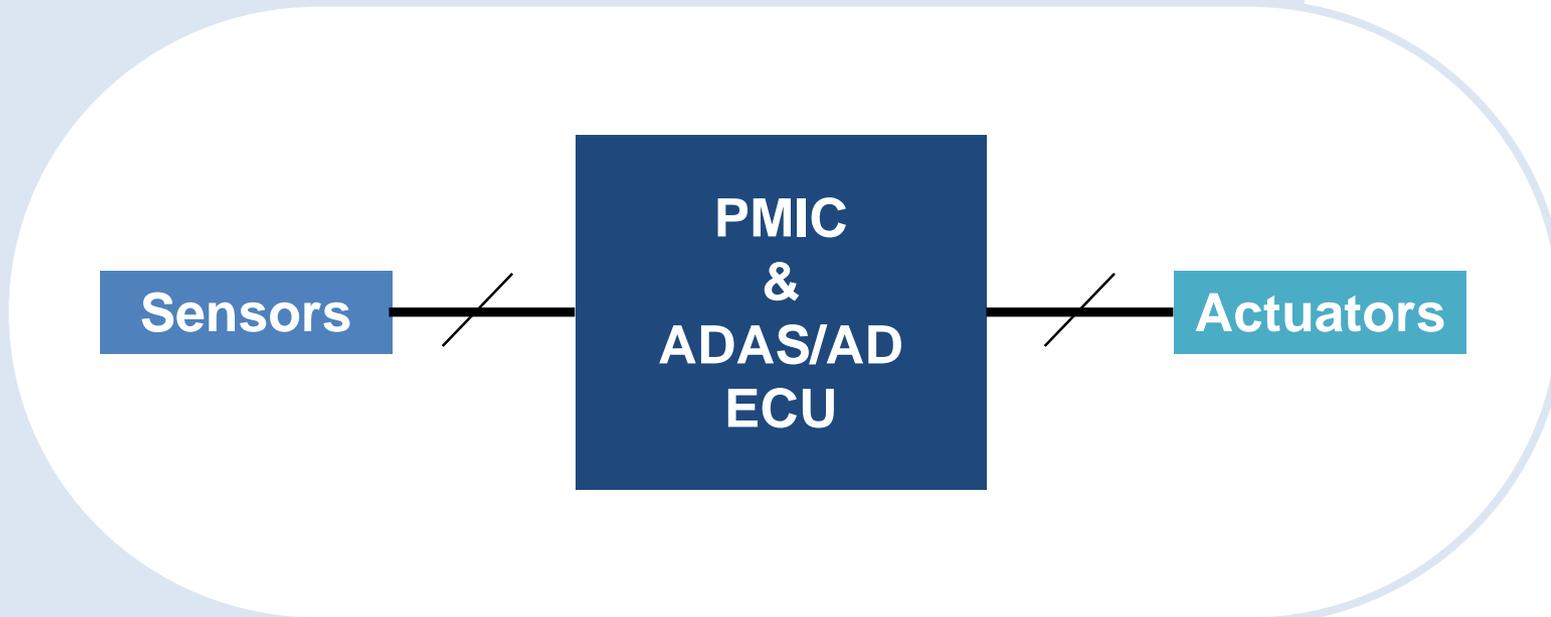


### Requirements:

- + Fast image processing
- + Reliable data processing
- + Safe decision-making

**ADAS demands highly reliable components with zero defects.**

# Inductors for power management ICs (PMICs) face numerous challenges

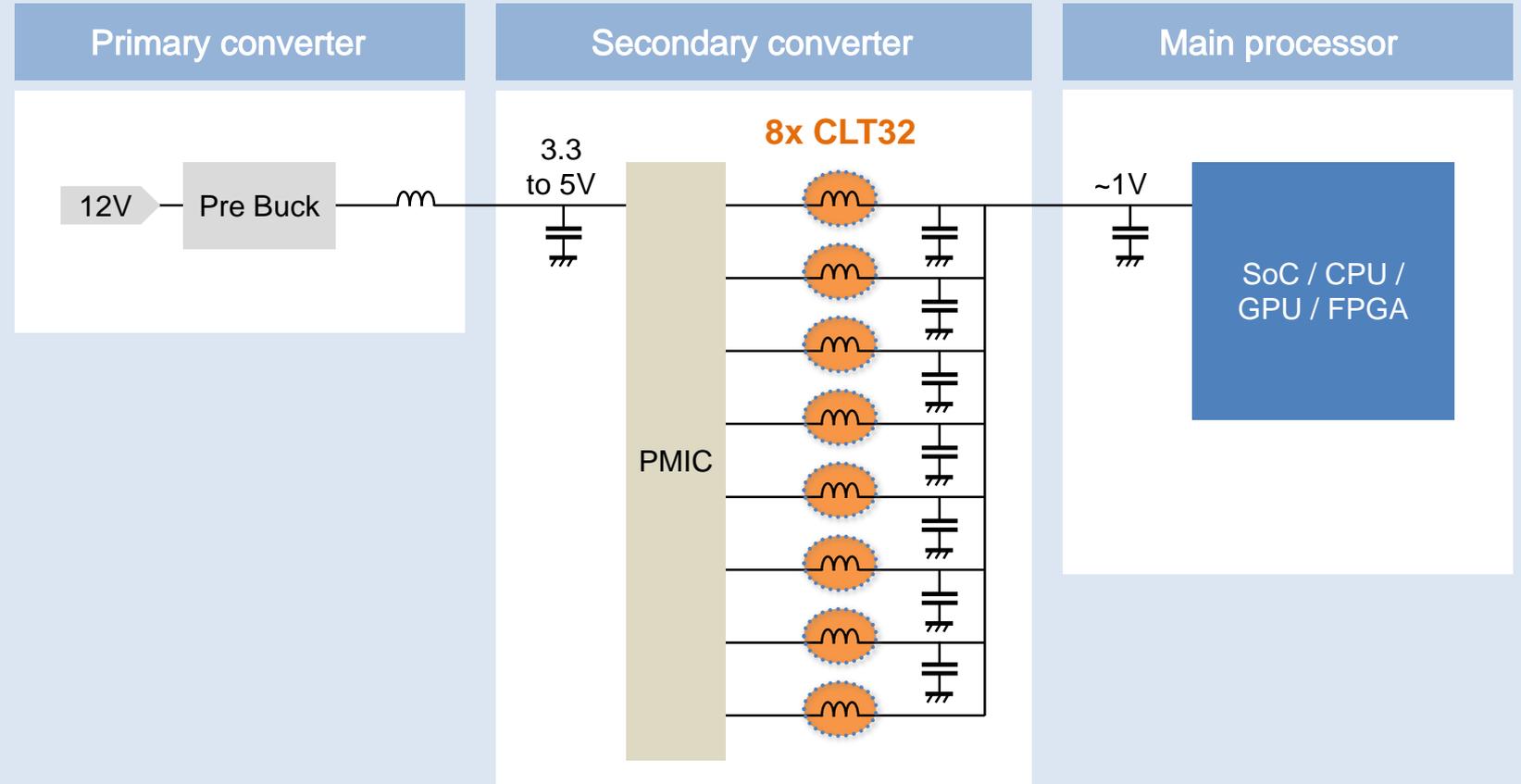


- Compact size
- High reliability
- High saturation current
- Ultra-low  $R_{DC}$
- Low losses
- Suitable for high frequency
- High operating temperatures

# ADAS/AD ECU schematics with CLT32

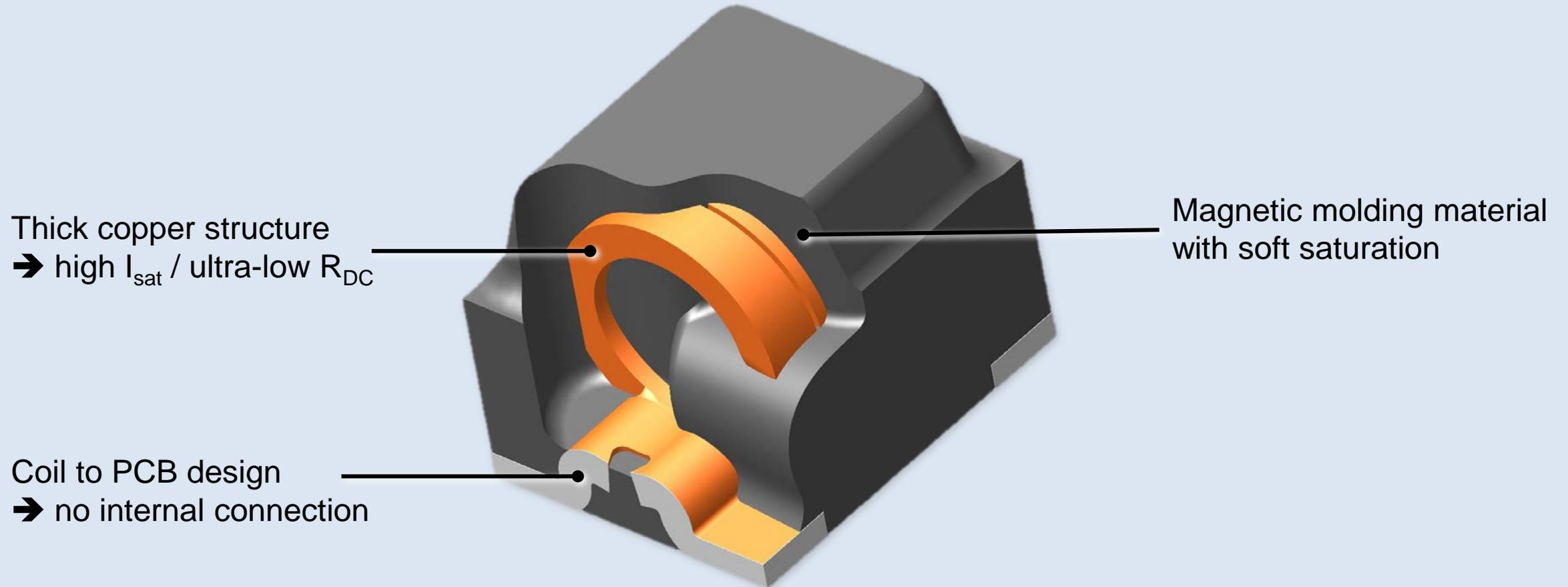
## Main applications for CLT power inductors:

- PMIC systems for secondary converters for main processors SoC / CPU / GPU / FPGA
- DC/DC converters for high frequency



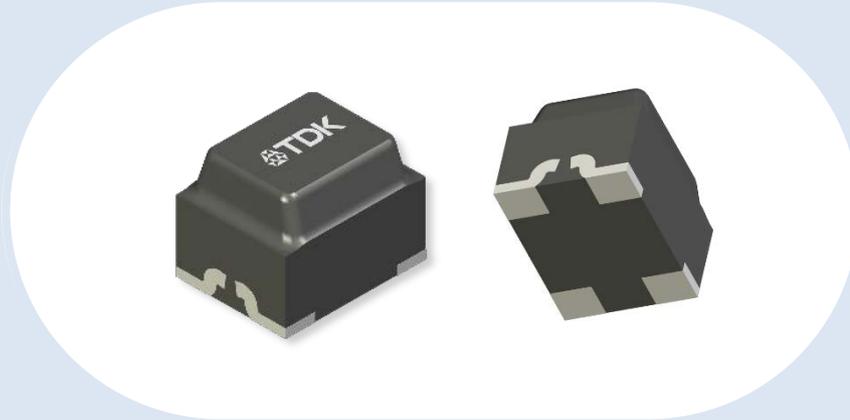
**Compact CLT32 power inductors are predestined for PMIC and DC/DC converters for high frequencies.**

# Application requirements addressed by new inductor design



**Innovative design enables highly reliable and compact power inductors.**

# Superior characteristics of new CLT32 power inductors



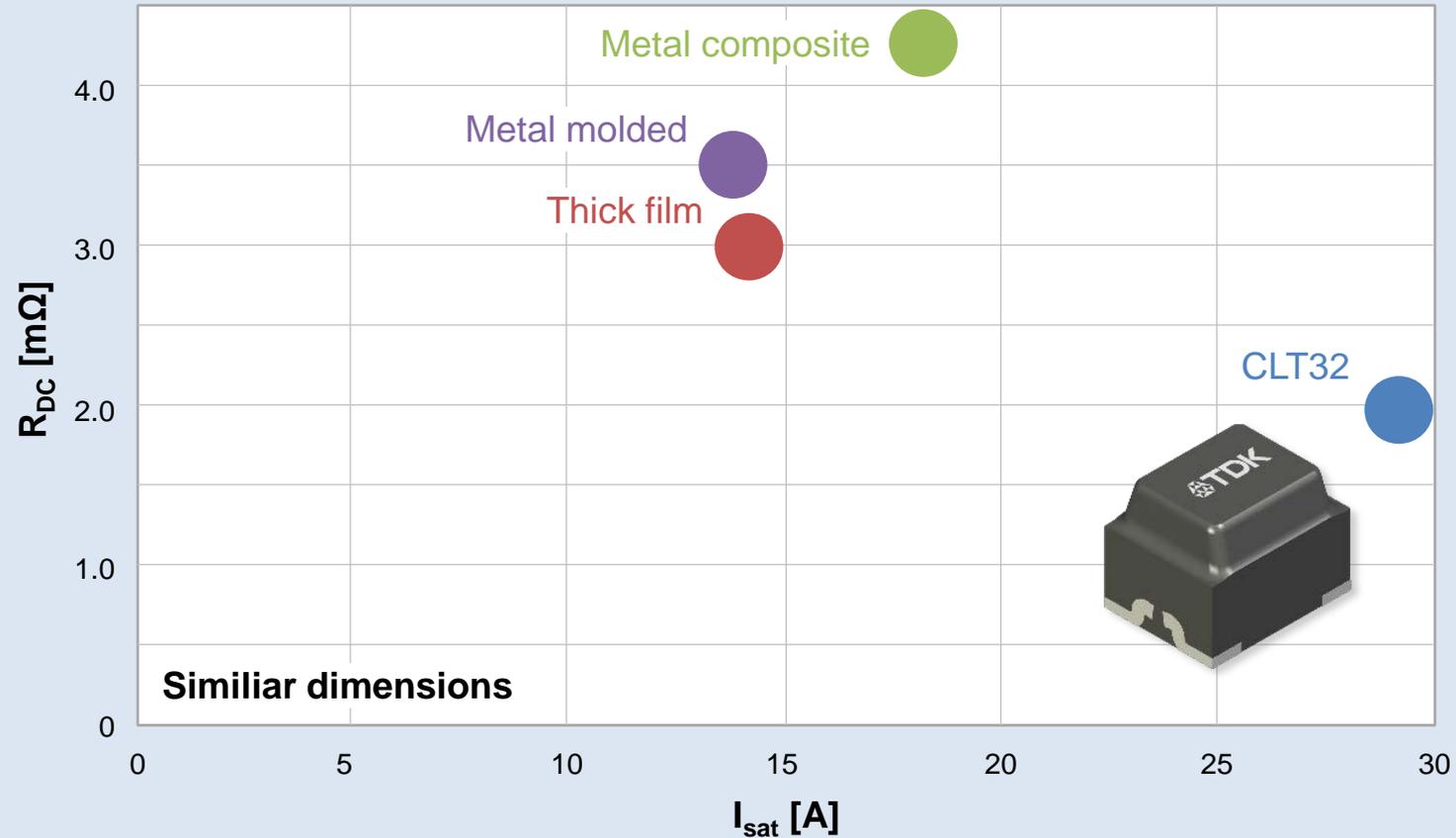
- Extremely compact size: 3.2 mm x 2.5 mm x 2.5 mm
- Inductance range: 17 nH to 440 nH
- $I_{\text{sat}}$  up to 60 A
- Very low  $R_{\text{DC}}$  down to 0.39 m $\Omega$
- Temperature range up to 165 °C
- Wide frequency range up to 10 MHz
- AEC-Q200 qualification

L [nH]	$R_{\text{DC}}$ [m $\Omega$ ]	$I_{\text{sat}}$ [A]	$I_{\text{rated}}$ [A]
17	0.39	60.0	45.0
55	1.00	39.5	28.0
110	1.90	29.0	20.0
200	3.30	20.5	15.4
310	5.30	17.5	12.1
440	7.60	13.5	10.1

tentative data

# CLT32 set electrical benchmarks

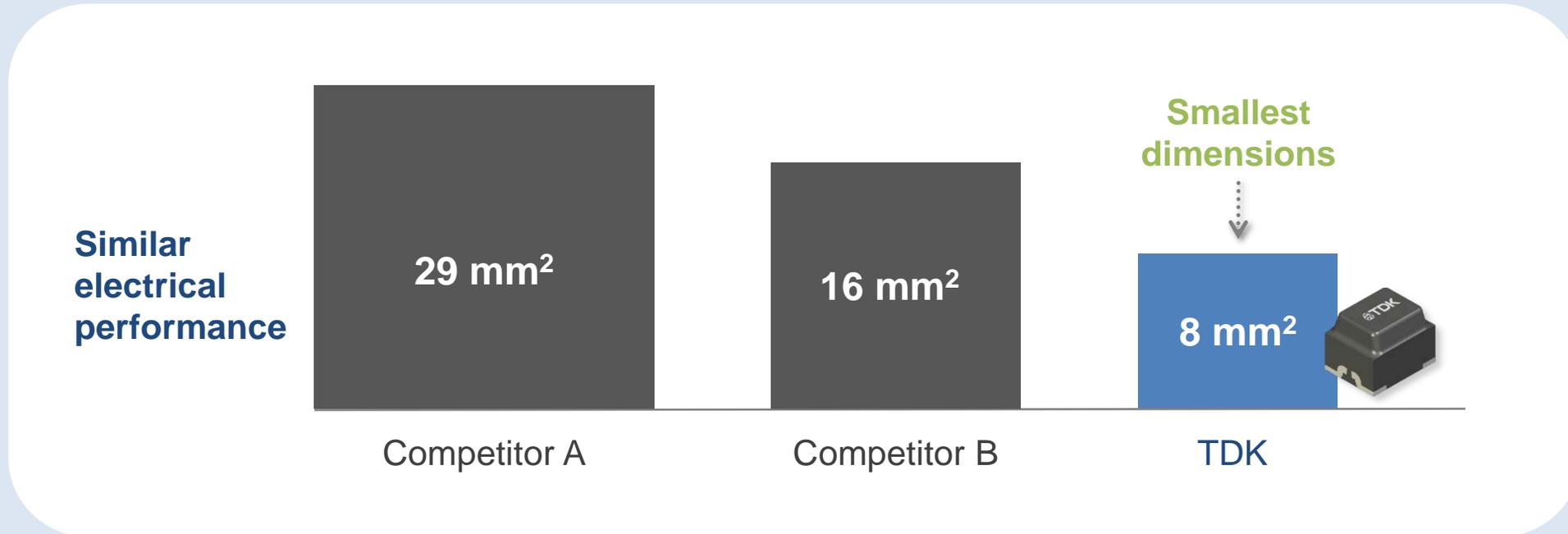
$I_{sat}$  vs  $R_{DC}$  for  
~100nH coils



**60% higher  $I_{sat}$  compared with competitor solutions in metal composite technology**

**35% less  $R_{DC}$  than competitor solutions in thick film technology**

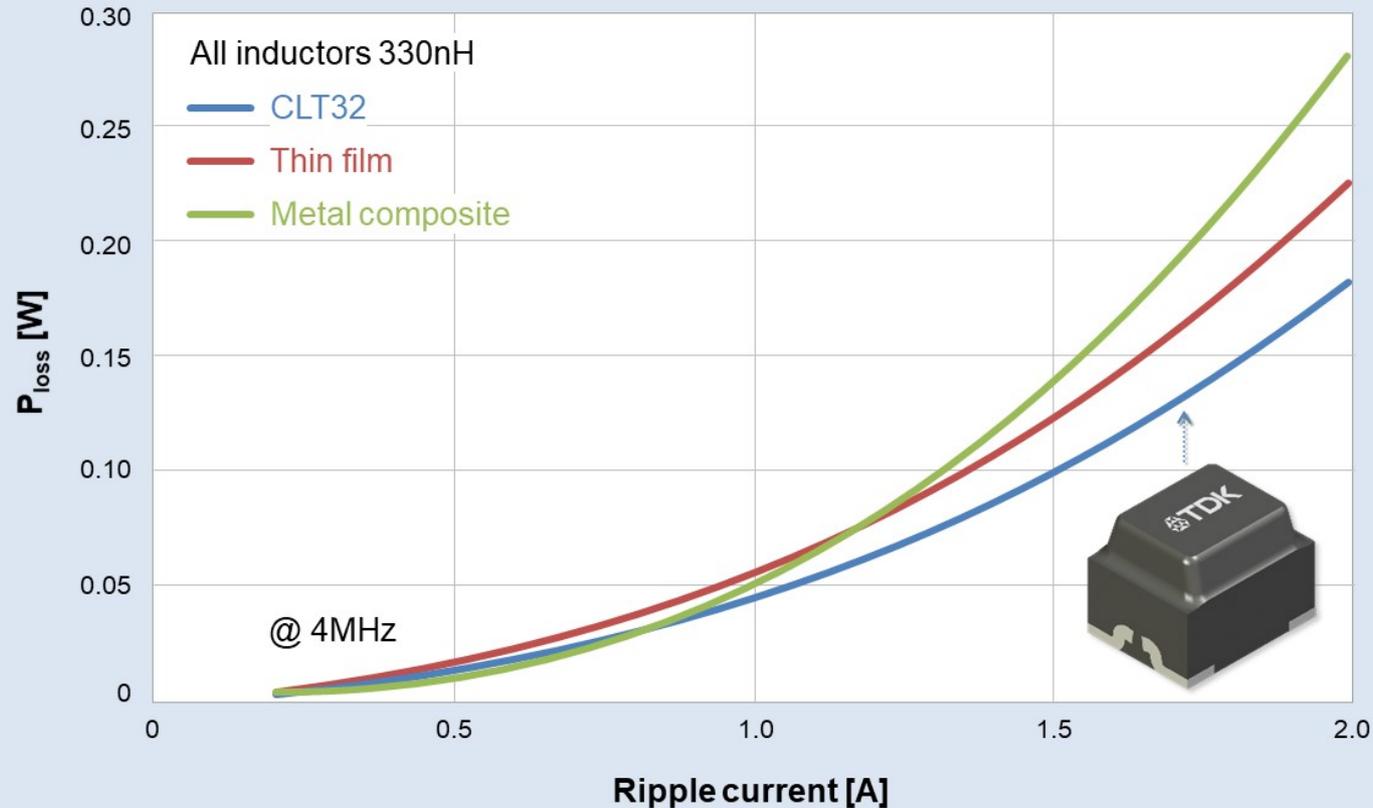
# CLT32 dimensional benchmark



**Conventional competitor solutions have 2 to nearly 4 times larger footprints.**

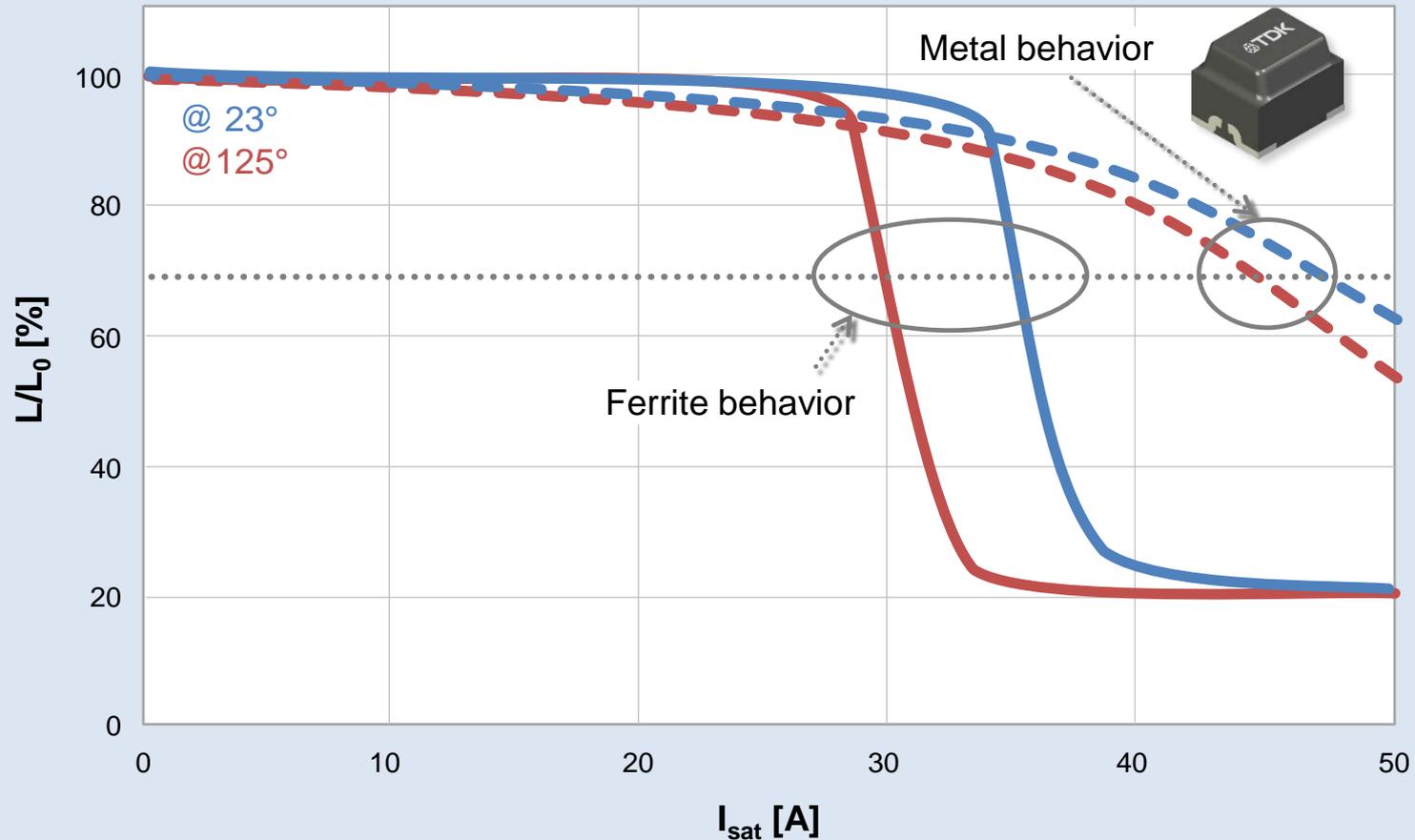
**Up to 8 power inductors per PMIC system → CLT32 offers significant PCB space and cost saving potential.**

# CLT32 – low AC losses at high frequencies



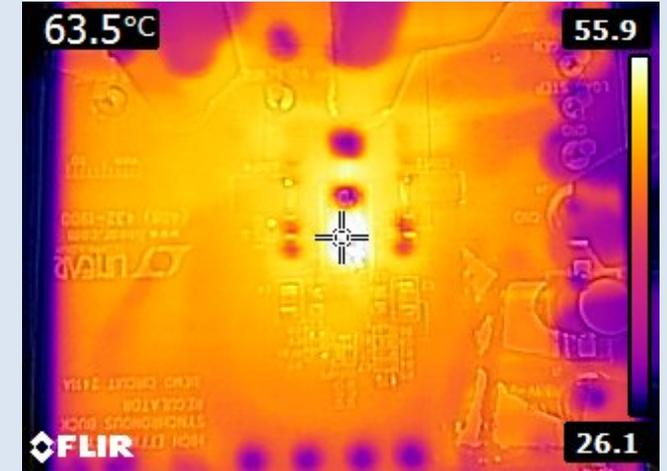
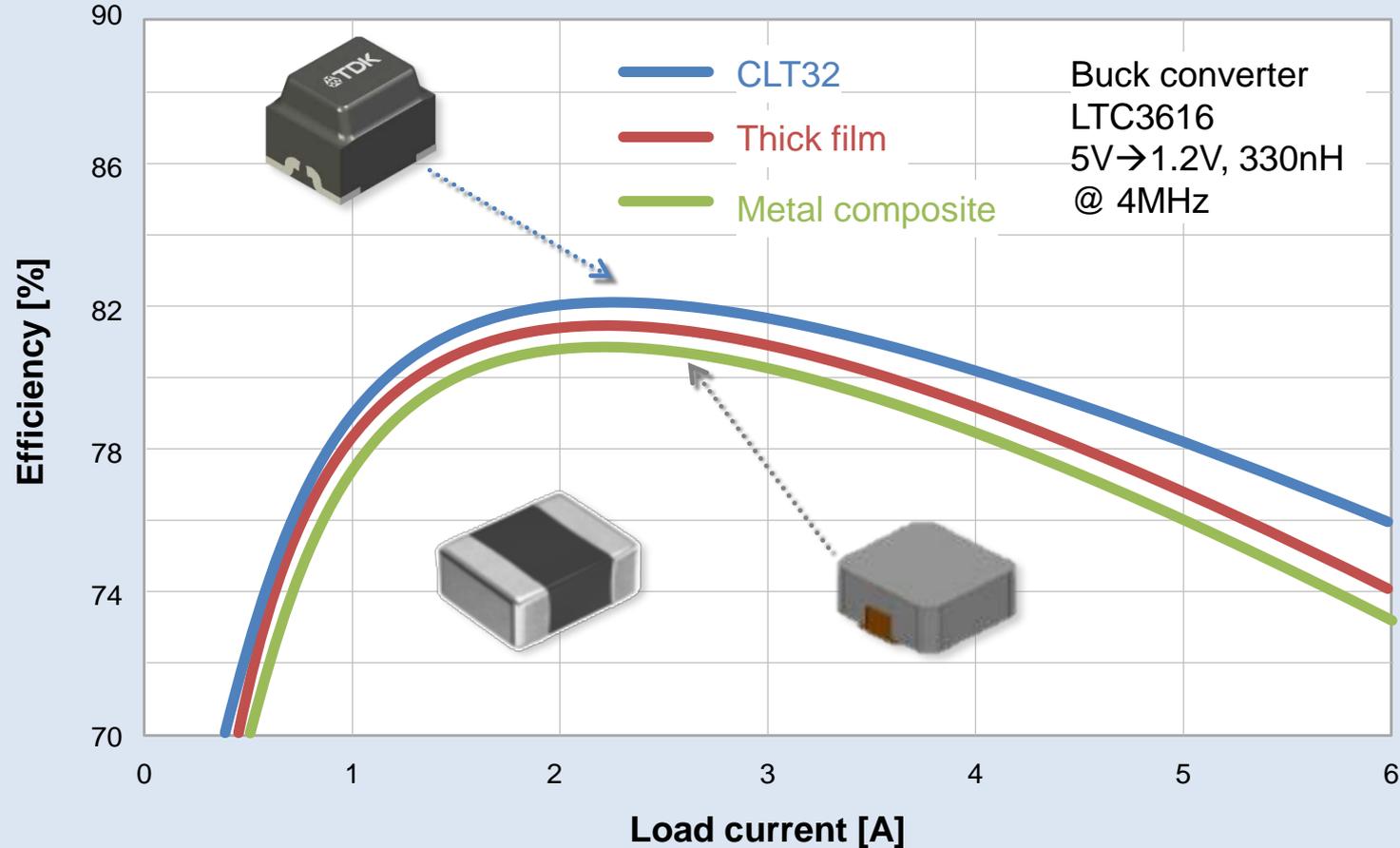
**Best magnetic material composition provides superior low loss performance at high frequency.**

# CLT32 – low saturation drift at high temperature



**Soft saturation enables superior temperature behavior in comparison to conventional ferrite technology.**

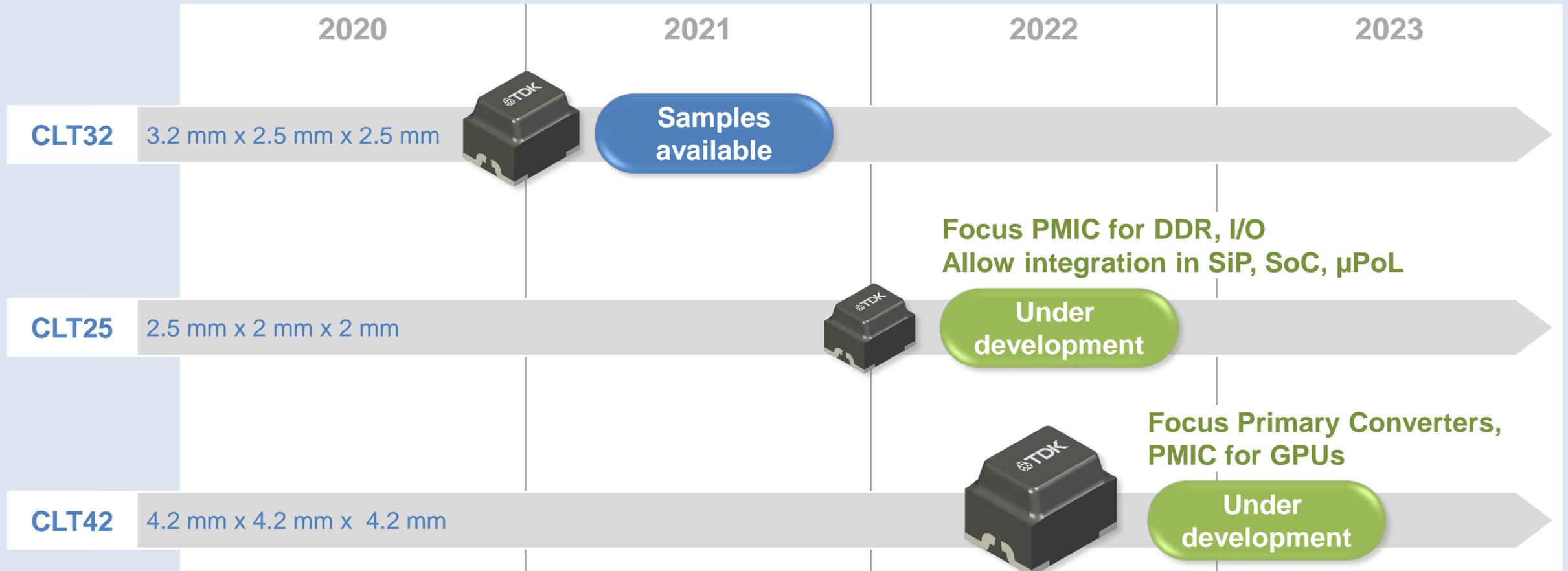
# CLT32 boosting efficiency



Thermal picture of the CLT32:  
 Due to the higher efficiency the CLT32 is around 4 K cooler than the compared technologies!

**Low  $R_{DC}$  and low loss material enable high efficiency in comparison to existing technologies.**

# CLT power inductors roadmap



**TDK drives enhanced performance and miniaturization of automotive power systems!**



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