



Product brief

CoolMOS™ P7 in SOT-223 package

Combining excellent performance and ease-of-use with a cost-effective package solution

Having introduced the SOT-223 package with CoolMOS™ CE in 2016, Infineon is now enabling its customers to also enjoy the benefits of CoolMOS™ P7 in combination with the cost-effective drop-in replacement for DPAK. CoolMOS™ P7 is designed to address typical challenges in the low power SMPS market, by offering excellent performance and ease-of-use, enabling improved form factors and price competitiveness. This combination makes CoolMOS™ P7 in SOT-223 a perfect fit for the target applications – charger, adapter, TV and lighting.

Key features and benefits

Best-fit performance SJ technology

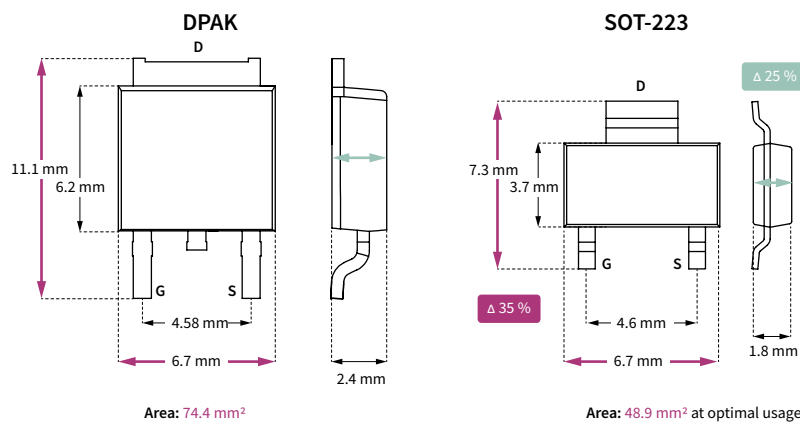
- › Enabling lower MOSFET chip temperature
- › Leading to higher efficiency compared to previous technologies
- › Allowing improved form factors and slim designs

Cost-effective package solution

- › Drop-in replacement for DPAK at competitive cost
- › Space savings in designs with low power dissipation; enabling smaller form factors
- › Comparable thermal behavior to DPAK

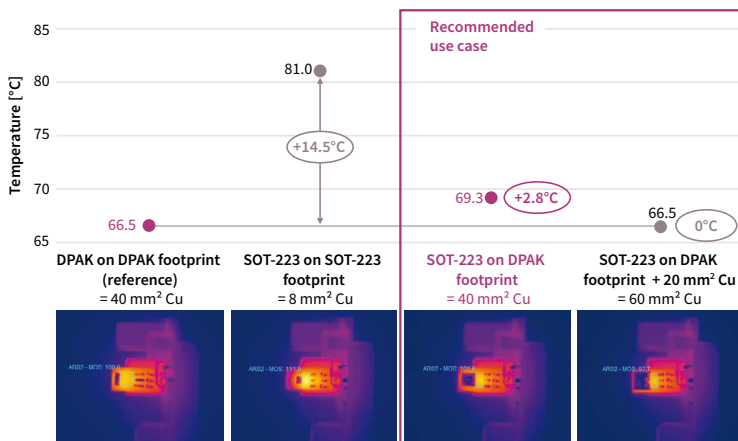
Best-in-class price/performance ratio

- › Attractive price position for high performance technology



The SOT-223 package without the middle pin is fully compatible to the footprint of a DPAK and therefore allows a one-on-one drop-in replacements and second sourcing at lower cost.

Thermal behavior similar to DPAK



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The thermal behavior of the SOT-223 depends on the layout of the board and on the power consumed. We have measured the thermals in a test environment and compared with a simulation:

- > ~2°C – 3°C temperature increase on DPAK footprint as DPAK – placed on a standard DPAK footprint, the SOT-223 package shows a temperature elevated by 2°C – 3°C. This behavior makes the SOT-223 suitable as a drop-in replacement for DPAK in designs with some margin on thermals.
- > Same temperature on footprint of DPAK + 20 mm² additional copper area – in many designs the MOSFET is mounted on a larger Cu area which serves as a heatsink embedded in the PCB. As soon as 20 mm² Cu or more is offered in addition to DPAK footprint, no temperature increase can be observed.
- > >10°C temperature increase on SOT-223 footprint – placed the SOT-223 footprint without additional Cu area around, the package leads to ≥ 10°C temperature increase compared to a DPAK. This renders the option of space savings via the SOT-223 only useful for very low power applications.

The thermal measurements in several applications were confirmed by simulation with $T_{\text{ambient}} = 70^{\circ}\text{C}$ and $P_{\text{loss}} = 250 \text{ mW}$. The simulations confirm that on a DPAK footprint a 2°C – 3°C temperature increase versus DPAK is expected, while for the copper areas of ≥ 20 mm² additional copper the temperature is equal to the DPAK temperature.

Product portfolio

$R_{\text{DS(on)}}$ [mΩ]	Standard grade		Industrial grade
	600 V	700 V	800 V
4500			IPN80R4K5P7
3300			IPN80R3K3P7
2400			IPN80R2K4P7
2000		IPN70R2K0P7S	IPN80R2K0P7
1400		IPN70R1K4P7S	IPN80R1K4P7
1200		IPN70R1K2P7S	IPN80R1K2P7
900		IPN70R900P7S	IPN80R900P7
750		IPN70R750P7S	IPN80R750P7
600	IPN60R600P7S	IPN70R600P7S	IPN80R600P7
450		IPN70R450P7S	
360	IPN60R360P7S	IPN70R360P7S	

700 V and 800 V CoolMOS™ P7 are optimized for flyback topologies. 600 V CoolMOS™ P7 is suitable for hard as well as soft switching topologies (Flyback, PFC and LLC).

Published by
Infineon Technologies Austria AG
9500 Villach, Austria

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