

Product brief

600 V CoolMOS™ S7

The best price/performance SJ MOSFET for low frequency switching applications

The 600 V CoolMOS™ S7 superjunction MOSFET is the perfect fit for applications where MOSFETs are switched at low frequency, such as active bridge rectification, inverter stages, in-rush relays, PLCs, power solid state relay and solid state circuit breakers.

The new MOSFET design, not being focused on switching losses, allows the CoolMOS™ S7 to offer cost-optimized, distinctively low on-resistance ($R_{DS(on)}$) values, ideally suited for applications looking to minimize conduction losses at the best price.

The CoolMOS™ S7 family boasts a record-breaking low $R_{DS(on)}$ of 10 mΩ in an innovative top-side cooled QPAK SMD package, as well as a power density leading device of 22 mΩ $R_{DS(on)}$ chip in a small TO-leadless (TOLL) SMD package.

Key features

- > Lowest $R_{DS(on)}$: 10 mΩ
- > Smallest $R_{DS(on)}$ in SMD packages
- > Optimized for conduction performance
- > Improved thermal resistance
- > High pulse current capability

Key benefits

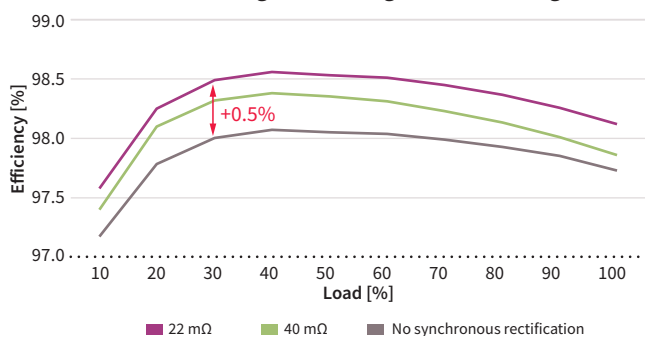
- > Minimized conduction losses
- > Increased energy efficiency
- > More compact and easier designs
- > Eliminated or reduced heat sink in solid state design
- > Lower TCO cost or BOM cost

Key applications

- > SMPS
- > Solid state relays (SSR) and solid state circuit breakers (SSCB)
- > PLC
- > Solar energy systems
- > Battery and equipment protection
- > UPS
- > LSEV

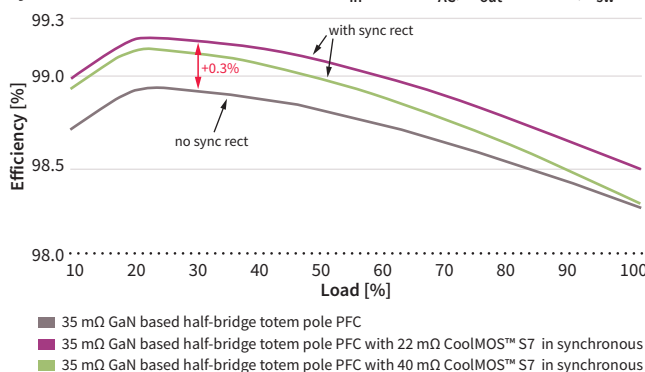
Efficiency in 2400 W PFC at $V_{in} = 230 V_{AC}$

Difference between using or not using the active bridge rectification



CoolMOS™ S7 brings more efficiency to power supplies when used in an active rectification bridge.

3 kW GaN based totem pole PFC efficiency calculation with and without synchronous rectification when $V_{in} = 230 V_{AC}$, $V_{out} = 400 V$, $f_{sw} = 65 kHz$

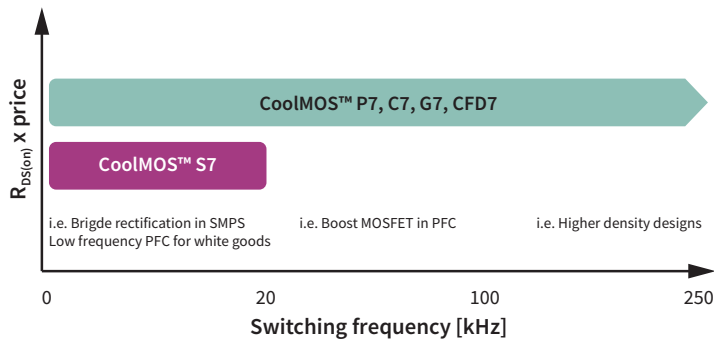


CoolMOS™ S7 is the perfect complement for CoolSiC™ MOSFETs and CoolGaN™ e-mode HEMTs in totem pole PFC topologies.



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The CoolMOS™ S7 family is built on a successful technical optimization of the renowned CoolMOS™ 7 technology that removes from the device redundant features related to switching performance, as they are not needed in low-frequency switching applications. Thus, this new Infineon technology is cost-optimized, without neglecting quality or performance, and can support the lowest $R_{DS(on)}$ available in small SMD packages. The CoolMOS™ S7 technology features a 10 mΩ chip in a top-side cooled QDPAK package, obtaining a surface mount device (SMD) with excellent thermals, which makes it a smaller alternative to THD devices, such as TO-247.

Active rectification bridge for the easiest efficiency gain

In active rectification bridges, where diodes are replaced or paralleled with MOSFETs, the CoolMOS™ S7 increases the efficiency without the need for extensive system redesign. For instance, in a SMPS, the insertion of a CoolMOS™ S7 based rectification bridge, possible also by using a convenient daughter card, enhances the PFC efficiency at high-line by 0.5 percent, giving the possibility to quickly and easily get to Titanium level efficiency. Likewise, adding the CoolMOS™ S7 in a totem pole PFC design allows an immediate jump to more than 99 percent PFC efficiency, providing the best available complement to high performing devices such as CoolSiC™ MOSFETs and CoolGaN™ HEMTs.

Solid state relay and circuit breaker designs

The CoolMOS™ S7 delivers a breakthrough technology to solid state relay (SSR) and solid state circuit breaker (SSCB) design, by eventually bringing the superjunction MOSFET advantages to a system level cost comparable to silicon alternatives. Designers can rely on the CoolMOS™ S7 low conduction losses to limit the size of heat sinks up to 80 percent, extend the current and voltage ratings without altering the form factor, design new high power products and benefit from the speed and superior quality of a high performing CoolMOS™ device.

CoolMOS™ S7 product portfolio

$R_{DS(on) \max}$ [Ω]	HDSOP-22-1 (QDPAK)	TO-220	HSOF-8 TO-leadless (TOLL)
10	IPDQ60R010S7		
22		IPP60R022S7	IPT60R022S7
40			IPT60R040S7
65			IPT60R065S7

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