PRELIMINARY | Data Sheet | September 2004 | FN9165

ISL6597 Integrated Power Stage

The ISL6597 is a high performance power stage for the highest power density server and workstation buck regulation solutions. The ISL6597 combined with the ISL6592 Digital Multiphase Controller offers a complete high current, small form factor solution with superior accuracy, transient response, and protection features.

The ISL6597 integrates a low $r_{(DSON)}$ high-side P-Channel MOSFET together with both high-side and low-side MOSFET drivers. The integration of the high-side power FET with high- and low-side drivers minimizes switching losses while providing industry leading power density. A maximum peak output current of 30A per phase is supported in an area less than $16mm^2$, smaller than most discrete power MOSFETs. The ISL6597 low-side driver supply (VDRIVE) may be biased separately from the VCC supply from 5V to 12V to optimize the system efficiency.

The ISL6597 has a patent pending lossless current sensor which accurately senses the current in the high-side FET independent of VID, inductor value, supply, temperature, and switching frequencies. This integrated current sense method provides the accuracy of precision resistor based sensing with no efficiency loss.

The ISL6597 has an integrated high-side FET short detector which reacts rapidly on startup to protect the processor before the controller is powered up. The output high-side short pins from each phase can drive a single external crowbar circuitry for rapid protection from a high-side short on any phase of a multiphase solution. The high-side short pin also acts as an input, detecting alert signals from every ISL6597 power stage in the system and protecting each power stage internally as well.

The ISL6597 also has an integrated junction temperature sensor which provides an on-die measurement of the high-side FET temperature. When used with the ISL6592 controller, this feature provides very accurate, programmable over-temperature protection.

The ISL6597 uses CSP packaging to provide the lowest thermal resistance and smallest footprint. A relaxed 0.65mm ball pitch allows for easy assembly.

Features

- Highest power density solution available when combined with the PowerCode™ ISL6592 Digital Multiphase Controller
- Integrated P-channel high-side FET
- Integrated high and low side drivers
- 30A per power stage capability
- Discrete low-side FET for best efficiency
- Process and temperature independent lossless integrated current sense for accurate loadlines and overcurrent protection
- Integrated high-side short detection protects processor from over-voltage due to any shorted high-side FET in the system
- High-side short detect can be used with optional external SCR crowbar circuit to further protect the processor from shorted high-side FETs
- On-die temperature sense works in conjunction with the ISL6592 Digital Multiphase Controller to provide accurate programmable thermal shutdown protection
- Low-side driver supply (VDRIVE) may be separately biased from 5V to 12V to optimize efficiency
- 35-ball small form factor CSP package (3.185mm x 4.835mm) provides ultra low thermal resistance

Applications

- Core power regulation for Intel® and AMD® processors
- Small form factor point-of-load applications

Ordering Information

PART NUMBER	TEMP (°C)	PACKAGE	PKG. DWG. #
ISL6597		35 BALL CSP	

Pinout

ISL6597
(35 BALL CSP)
BOTTOM VIEW