L652x: the most reliable solution for fluorescent lamps

STMicroelectronics

Highly-integrated ballast controller for TL and CFL

STMicroelectronics' L652x is the first ballast controller family in the market capable of safely driving bipolar transistors.

All the necessary protection functions are embedded in the small SO8 package, ensuring maximum application reliability in compliance with major safety and power consumption regulations.

Bipolar-transistor driving capability significantly reduces system costs versus MOSFET solutions and improves ballast reliability versus self-oscillating topologies.

Key features

- BJT and MOSFET driving capability
- Accurate and programmable preheating
- BJT storage time compensation
- Tight oscillator accuracy over wide temperature range
- Overcurrent and overvoltage protection
- Choke saturation control
- Hard switching protection
- End-of-life protection
- Programmable without capacitors
- SO8 package
- Available in 1.5 s (L6520) and 0.8 s (L6521) preheating time

Main applications

- Electronic ballasts (TL, industrial CFL)
- Integrated CFLs

Key benefits

- High integration enables fast design time, compactness and reduced BOM cost
- Full set of protection features guarantees maximum reliability under any conditions
- Precise preheating allows very long lamp life
- Support for any type of lamp power and ballast topology
- Designed for many applications characterized by different performances, allowing simplified market segmentation with very limited component changes

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The L652x family is designed using ST's proprietary low-voltage BCD technology and housed in the small SO8 package.

The IC embeds a digital core, allowing multifunction pin capability and a full set of features and protection functions with limited pin count, strongly reducing development time. This approach allows the ballast controller to be programmed by resistors only, increasing the reliability and allowing very cost-effective solutions.

The L652x, first in the market, can drive both BJTs and MOSFETs without significant BOM changes, giving a greater flexibility to the ballast designer.

By adopting BJTs, the L652x replaces more expensive MOSFETs, significantly reducing the system cost without compromises. In fact, a variable deadtime compensates for the bipolar transistor's storage time, ensuring the correct base discharge time and avoiding cross conduction phenomena.

The IC also represents the best solution to replace self oscillating solutions when the key requirement is the reliability of the ballast. In this case, the benefits are an increased MTBF and a reduced cost due to the return from the field.

The high level of flexibility and integration of the IC enables quick design of the ballast for any type of lamp topology/size/power. Depending on the power factor requirements, the IC can work either without PFC, with passive PFC or with active PFC. In the latter case, the L6562A represents the most effective solution.

The IC offers an advanced digital-current control circuit providing overcurrent/voltage protection and choke saturation control, allowing the use of small resonant inductors and contributing to lower BOM costs. Moreover, the hard-switching protection prevents the risks of working in capacitive mode and, finally, the end-of-life protection prevents sudden failure of the lamp due to ageing

The characteristics of the L652x allow the design of applications in compliance with major safety and power consumption regulations.

STMicroelectronics also offers a wide portfolio of BJTs and MOSFETs suitable for the full range of ballast powers.

Application diagram
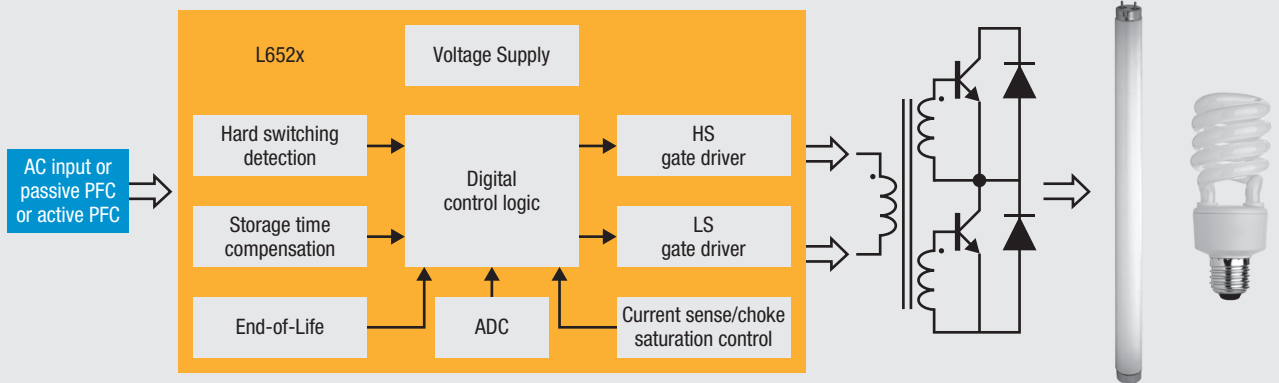
Evaluation boards

Order code	Description
EVAL6520-1421	14 W to 21 W T5 lamp with STT13005D bipolars
EVAL6520-258*	Wide range 2 x 58 W T8 parallel lamps with L6562A PFC

Note:
* in development

Order code: FLL652X200511

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