SHARP®

**APPLICATIONS:**
Pager
Notebook PC
POS
Set Top Box
DVD

Integrated Circuits Group

# LH28F400BG 4M (256K × 16) SmartVoltage Flash Memory

## FEATURES

- SmartVoltage technology
  - 2.7 V, 3.3 V or 5 V $V_{CC}$
  - 2.7 V, 3.3 V, 5 V or 12 V $V_{PP}$
- High-performance access time
  - 85 ns (5 V ±025 V), 90 ns (5 V ±0.5 V), 100 ns (3.3 V ±0.3 V), 120 ns (2.7 V – 3.6 V)
  - 120 ns (5 V ±0.5 V), 130 ns (3.3 V ±0.3 V), 150 ns (2.7 V – 3.6 V)
- Operating temperature
  - Commerical 0°C – +70°C
  - Industrial -40°C – +85°C
- Enhanced data protection features
  - Absolute protection with $V_{PP}$ = GND
  - Block erase/word write lockout during power transitions
  - Boot blocks protection with $\overline{WP}$ = $V_{IL}$
- Optimized array blocking architecture
  - Two 4K-word boot blocks
  - Six 4K-word parameter blocks
  - Seven 32K-word main blocks
  - Top or bottom boot locations
- Automated word write and block erase
  - Command user interface
  - Status register
- Extended cycling capability
  - 100,000 block erase cycles
- Enhanced automated suspend options
  - word write suspend to read
  - block erase suspend to word write
  - block erase suspend to read
- Low power management
  - deep power-down mode
  - automatic power savings mode
  - Decreases $I_{CC}$ in static mode
- Industry-standard packaging
  - 48-pin TSOP
  - 44-pin PSOP
- Chip size packaging
  - 48-ball CSP
- SRAM-compatible write interface
- ETOX™ V nonvolatile flash technology
- Not designed or rated as radiation hardened

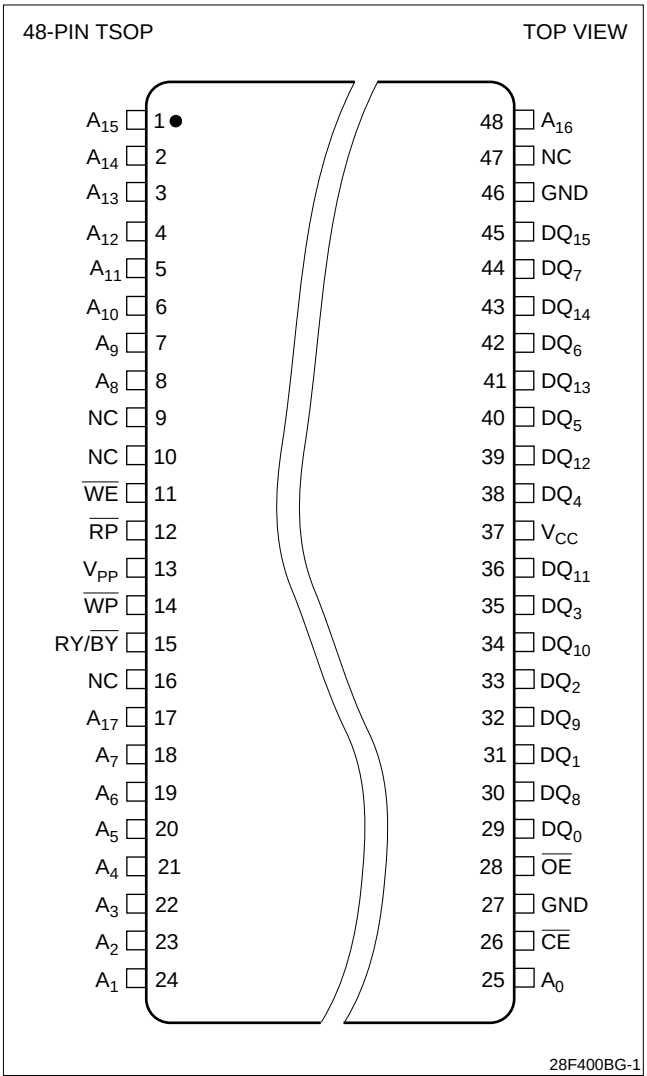
## DESCRIPTION

SHARP's LH28F400BG Flash memory with SmartVoltage technology is a high-density, low-cost, nonvolatile, read/write storage solution for a wide range of applications. LH28F400BG can operate at $V_{CC}$ = 2.7 V and $V_{PP}$ = 2.7 V. Its low voltage operation capability realize battery life and suits for cellular phone application.

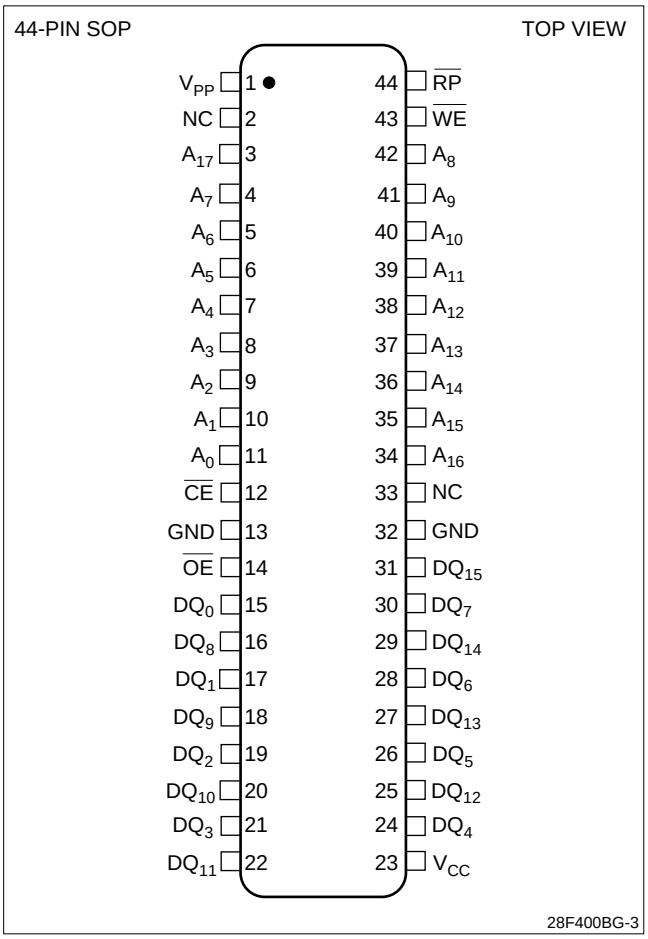
Its boot, parameter and main-blocked architecture, flexible voltage and extended cycling provide for highly flexible component suitable for portable terminals and personal computers. Its enhanced suspend capabilities provide for an ideal solution for code and data storage applications. For secure code storage appli-cations, such as networking, where code is either directly executed out of flash or downloaded to DRAM, the LH28F400BG offers two levels of protection: absolute protection with $V_{PP}$ at GND, selective hardware boot block locking. These alternatives give designers ultimate control of their code security needs.

The information for this document is from the LH28F400BG-L85/12 Product Preview, Rev. 0.95.

## 48-PIN TSOP PINOUT




## 44-PIN SOP PINOUT




## 48-BALL CSP PINOUT