



MIC7400

Five-Channel Buck Regulator plus One-Boost with HyperLight Load[®] and I²C Control

PRELIMINARY

General Description

The MIC7400 is a powerful, highly-integrated, configurable, power management IC (PMIC) featuring five synchronous buck regulators, one boost regulator and high-speed I²C interface in both master and slave mode with EEPROM.

The device offers two distinct modes of operation “stand-by mode” and “normal mode” intended to provide energy optimize solution suitable for Portable Handheld, SSD and Infotainment applications.

In normal mode, the programmable switching converters can be configured to support variety of start-up sequencing, timing, soft-start ramp, output voltage levels, current limit levels and output discharge on each channel.

In stand-by mode, both output voltage levels and current limits are programmable. Independent wake-up of the power management can be achieved both by I²C communication or external event using GPIO.

The device has five synchronous buck regulators with high-speed adaptive on-time control supporting even the challenging ultra-fast transient requirement for Core supplies. One boost regulator provides a flash-memory programming supply that delivers up to 200mA of output current. The boost is equipped with an output disconnect switch that opens if a short-to-ground fault is detected.

An embedded EEPROM enables a single-chip solution across many platforms by allowing the designer to customize the PMIC for their design. Modifications can be made without the need to re-approve a new PMIC, saving valuable design resources and time..

All switchers provide light-load efficiency with HyperLight Load[®] mode for buck and PFM mode for boost. An additional benefit of this proprietary architecture is very-low output ripple voltage throughout the entire load range with the use of small output capacitors. The MIC7400 supplies are designed for use with a very-small inductor (down to 0.47μH for buck, 1.5μH for boost), and an output capacitor as small as 10μF for buck, enabling a total solution size of 15mm × 15mm and less than 1mm height.

The datasheet and other support documentation can be found on Micrel’s web site at: www.micrel.com.

Features

- Input voltage: 2.4V to 5.5V
- Five independent synchronous bucks up to 3A
- One independent non-synchronous boost 200mA
- 200μA quiescent current (all regulators on)
- 93% peak buck efficiency, 85% typical efficiency at 1mA
- STBY control input for stand-by low-power mode
- I²C interface up to 3.4MHz
- I²C on-the-fly EEPROM programmability, featuring:
 - Buck and boost output voltage scaling
 - Power-on-reset threshold and delay
 - Power-up sequencing/sequencing delay
 - Buck and boost current limit
 - Buck and boost pull-down when disabled
 - Individual ON, OFF, and standby modes
 - Soft-start and global power-good masking
- 23μA buck typical quiescent current
- 70μA boost typical quiescent current
- 1.5% output accuracy over temperature/line/load
- 2.0MHz boost switching frequency
- 1.3MHz buck operation in continuous mode
- Ultra-fast buck transient response
- 15mm × 15mm × 1.25mm solution size
- Thermal-shutdown and current-limit protection
- 36-pin 4.5mm × 4.5mm × 0.85mm FQFN package
- –40°C to +125°C junction temperature range

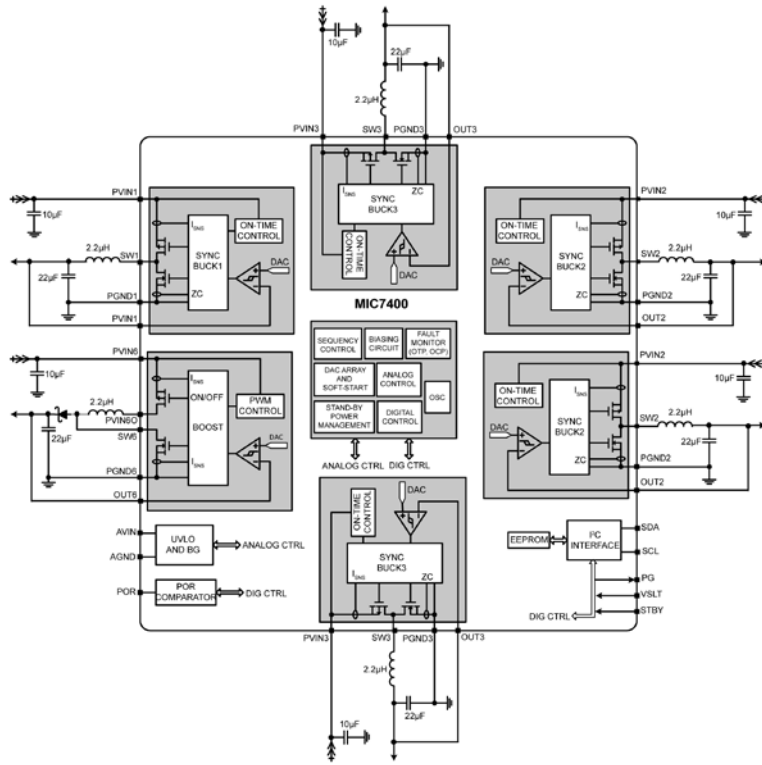
Applications

- Client and enterprise solid state drives (SSD)
- Consumer and in-vehicle infotainment devices
- Multimedia devices
- Portable handheld devices
- Security camera
- Gaming machines
- Service provider gateways

HyperLight Load is a registered trademark of Micrel, Inc.

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Typical Application



Ordering Information

Part Number ⁽¹⁾	Marking	Output Voltages	Features	Package ⁽²⁾	Lead Finish
MIC7400YFL	7400-XXXX	1.8V, 1.1V, 1.8V 1.05V, 1.25V, 12V	STBY – Active High	36-Pin 4.5mm x 4.5mm QFN	Pb-Free
MIC7400YFL	7400-XXXX	1.8V, 1.1V, 1.8V 1.05V, 1.25V, 12V	STBY - Active Low	36-Pin 4.5mm x 4.5mm QFN	Pb-Free
MIC7400XXX ⁽³⁾	7400-XXXX	Configurable	Configurable	36-Pin 4.5mm x 4.5mm QFN	Pb-Free

Notes:

1. Other options available. Contact Micrel for details.
2. GREEN, RoHS-compliant package. Lead finish is NiPdAu. Mold compound is Halogen Free.
3. Configurable options available upon request. Contact Marketing.

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