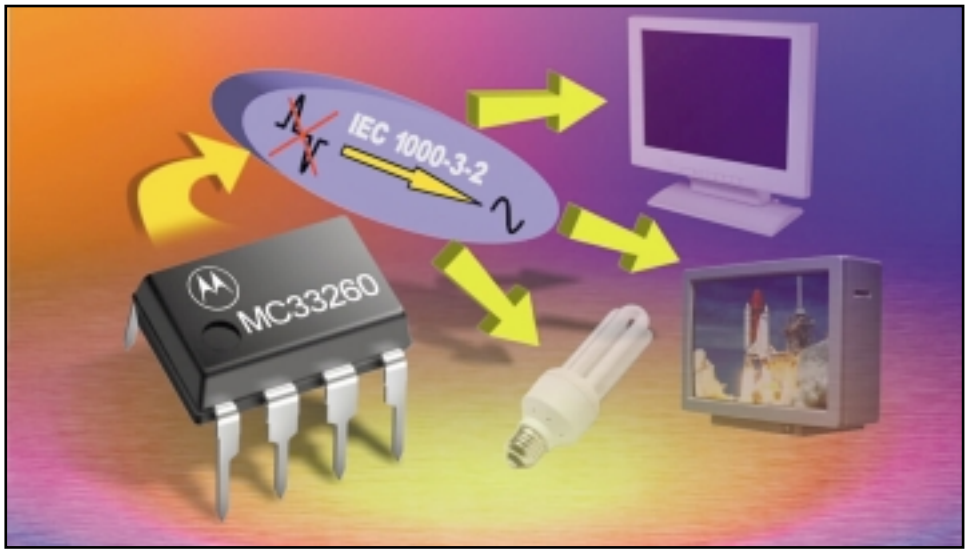
Order this publication as PBMC33260/D

Semiconductor Components Group

Analog, Logic and Discretes

15-June-1999

World's First Multiple Mode Power Factor Controller Circuit



Introduction

The MC33260 is a Power Factor Controller (PFC) IC developed to control Power Factor Active Solutions. Most off-line appliances use a bridge rectifier connected to a huge bulk capacitor to draw raw DC voltage from the utility AC line. This process can result in high current spikes and poor power factor ratios, both of which can force the energy manufacturers to expand their distribution network. To control and minimize this expansion and to limit the mains harmonic pollution generated, the IEC1000-3-2 standard was created. All appliance manufacturers must comply to this standard by the year 2001.

Active Solutions are the most effective and easily implemented methods to comply with the IEC1000-3-2 legislative requirement. They consist of inserting a Power Factor Correction pre-regulator between the rectifier bridge and bulk capacitor. This interface is in essence a Step-Up converter that outputs a constant voltage while drawing a sinusoidal current from the mains. The MC33260 is equipped with important safety features such as over-voltage, undervoltage and over current protection, and zero current

detection that increase the reliability of the pre-regulation operation. The MC33260 also detects any direct uncontrolled charges of the output capacitor from the mains which occur when the output voltage is lower than the input voltage (start-up, overload, etc). Furthermore, fewer external components are required for the pre-regulation operation. Most importantly, the MC33260 features an innovative mode called the 'Follower Boost' mode where the voltage output from the PFC pre-converter is not forced to a constant regulation level, but to a value dependent on the AC line amplitude. Use of this new technique leads to a significant reduction in the size of both the power MOSFET and the inductor which ultimately leads to a significant system cost reduction. As an example, in a 200W universal mains application, the MOSFET conduction losses and the inductor ferrite size can be halved. That is why the MC33260 is the controller for a simple, robust and cost effective PFC solution. The MC33260 is the only PFC IC in the industry that works in both the Traditional and Follower Boost modes.

Features / Benefits

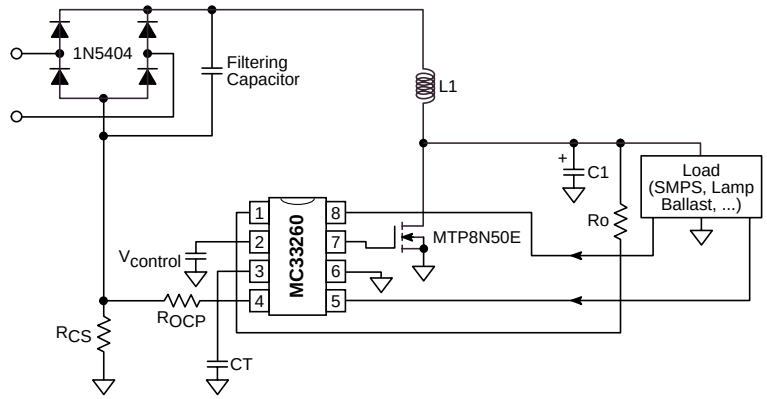
- Multiple Mode Operation
  - Traditional & 'Follower Boost' mode
  - Critical Conduction & Synchronized Voltage mode
- Meets IEC1000-3-2 Standard
- Zero Current Detection
- Over Current Protection
- Undervoltage Protection
- Output Overvoltage Detection
- Vcc Undervoltage Lockout with Hysteresis
- ESD Protection on each pin
- Accurate and Adjustable Maximum On-Time Limitation
- Low Gain Regulation
- Protection Against Direct Conduction (e.g. Inrush, Overload)
- Negative Current Sensing
- Synchronization Capability for EMI reduction
- DIP 8 Packaging

Types of Applications

- Televisions
- Monitors
- Light Ballasts
- Other Off-line Appliances up to 400W

Typical Application

PFC in SMPS Application



Customer Benefits

- Operational Flexibility
  - MC33260 is operational in Traditional and 'Follower Boost' mode
  - MC33260 is operational in synchronized and free running discontinuous mode
- IEC1000-3-2 compliant
- System Cost Savings
  - fewer external components required
  - up to 2X less cost if used in 'Follower Boost' mode
  - transformer in pre-regulator can be replaced by a simple coil
- High Reliability level ensured with integrated Safety Features

Literature

Data sheets containing full specifications and pin descriptions are available under the respective part numbers, follwed by a "**/D**". See the last page for detailed information on how to obtain technical literature.

Ordering / Lead Time Information

- Samples and production quantities are currently available. Pricing for the MC33260 Power Factor Controller IC is suggested at $0.60 for quantities of 10K.

How to Obtain Technical Literature

There are several ways to obtain Motorola Technical Literature and Publications. If you need any assistance, or if you are having difficulty, please email us at: SCGMKTG1@email.sps.mot.com or call us at (602) 244-3882. You can order hardcopies of this product bulletin from LDC - refer to document number PBMC33260/D.

- Motorola Semiconductor Literature Search Website **http://sps.motorola.com/cgi-bin/dlsrch**
- Motorola Literature Distribution Center, Americas
  - CD-ON-DEMAND, Literature Ordering **http://ldcformotorola.com/mtrl** (Motorolans, Distributors & Partners)
  - From US & Canada Only (Toll free) **1-800-441-2447, email:** ldcformotorola@hibbertco.com
  - From All Other Global Locations **1-303-675-2140**
- Northern Europe **44-1354-688040, email:** ldcformotorola@response-service.co.uk
- Central & Southern Europe **49-89-92103-559, email:** ldcformotorola@ihw.com
- Asia/Pacific **852-2662-9298, email:** ldcformotorola-asia@hibbertco.com
  (US Based Support for A/P) **1-303-675-2130** (Tue-Fri 9:00am to 1:00pm, Hong Kong Time)
- Japan (Toll free within Japan) **0120-191014, email:** w3spd-tech@www.mot.co.jp
- Motorola Mfax™ Fax-Back System
  - From US & Canada Only (Toll free) **1-800-774-1848, email:** RMFAX0@email.sps.mot.com
  - From All Other Global Locations **1-602-244-6609**
- Motorola SPS Home Page **http://sps.motorola.com/cgi-bin/my-mot/moto.cgi/**
- SPS Sales and Support **http://sps.motorola.com/sps/General/sales.html/**
- SCG Home Page **http://sps.motorola.com/scg/**

Mfax is a trademark of Motorola, Inc.

How to reach us:

USA/EUROPE/Locations Not Listed: Motorola Literature Distribution;
P.O. Box 5405, Denver, Colorado 80217. 1-303-675-2140 or 1-800-441-2447

Customer Focus Center: 1-800-521-6274

Mfax™: RMFAX0@email.sps.mot.com - TOUCHTONE 1-602-244-6609
Motorola Fax Back System - US & Canada ONLY 1-800-774-1848
- http://sps.motorola.com/mfax/

JAPAN: Nippon Motorola Ltd.: SPD, Strategic Planning Office, 141,
4-31-1 Nishi-Gotanda, Shinagawa-ku, Tokyo, Japan. 81-3-5487-8488

ASIA/PACIFIC: Motorola Semiconductors H.K. Ltd.; Silicon Harbour Centre,
2, Dai King Street, Tai Po Industrial Estate, Tai Po, New Territories, Hong Kong.
852-26629298

HOME PAGE: http://motorola.com/sps/