

## ADVANCE INFORMATION

All information in this data sheet is preliminary and subject to change.

8/97



# High-Efficiency, PWM, Step-Down DC-DC Controllers in QSOP Packages

## General Description

The MAX1652-MAX1655 are high-efficiency, pulse-width-modulated (PWM), step-down DC-DC controllers in small QSOP packages. The MAX1653/MAX1655 also come in 16-pin narrow SO packages that are pin-compatible upgrades to the popular MAX797. Improvements include higher duty-cycle operation for better dropout, lower quiescent supply currents for better light-load efficiency, and a lower output voltage range.

The MAX1652-MAX1655 achieve up to 96% efficiency and deliver up to 10A using a unique Idle Mode™ synchronous-rectified PWM control scheme. These devices automatically switch between PWM operation at heavy loads and pulse-frequency-modulated (PFM) operation at light loads to optimize efficiency over the entire output current range. Both external power switches are inexpensive n-channel MOSFETs, which provide low resistance while saving space and reducing cost.

The MAX1653/MAX1655 permit the user to override the automatic PWM/PFM setting with a logic signal for noise-sensitive applications. All devices operate with a selectable 150kHz/300kHz switching frequency, which can also be adjusted from 190kHz to 340kHz with an external clock signal.

The MAX1652/MAX1654 have an additional feedback pin, which permits regulation of a low-cost second output tapped from a transformer winding. The MAX1652 provides an additional positive output. The MAX1654 provides an additional negative output.

The MAX1652-MAX1654 have a 4.5V to 28V input range. The MAX1652/MAX1653/MAX1654's output range is 2.5V to 5.5V. The MAX1655's output range extends down to 1V. The MAX1653EVKIT is available to speed designs.

## Applications

Notebook Computers  
PDAs  
Cellular Phones  
Hand-Held Computers  
Handy-Terminals  
Mobile Communicators  
Distributed Power

## Features

- ♦ 96% Efficiency
- ♦ Small, 16-Pin QSOP Package (half the size of a 16-pin narrow SO)
- ♦ Pin-Compatible with MAX797 (MAX1653/MAX1655)
- ♦ Output Voltage Down to 1V (MAX1655)
- ♦ 4.5V to 28V Input Range
- ♦ 98% Duty Cycle for Lower Dropout
- ♦ 170µA Quiescent Supply Current
- ♦ 3µA Logic-Controlled Shutdown
- ♦ Dual, N-Channel, Synchronous-Rectified Control
- ♦ Fixed 150kHz/300kHz PWM Switching (or synched from 190kHz to 340kHz)
- ♦ Programmable Soft Start
- ♦ Low-Cost Secondary Outputs (MAX1652/MAX1654)

## Ordering Information

PART	TEMP. RANGE	PIN-PACKAGE
<b>MAX1652</b> C/D	0°C to +70°C	Dice*
MAX1652EEE	-40°C to +85°C	16 QSOP
<b>MAX1653</b> C/D	0°C to +70°C	Dice*
MAX1653ESE	-40°C to +85°C	16 Narrow SO
MAX1653EEE	-40°C to +85°C	16 QSOP
<b>MAX1654</b> C/D	0°C to +70°C	Dice*
MAX1654EEE	-40°C to +85°C	16 QSOP
<b>MAX1655</b> C/D	0°C to +70°C	Dice*
MAX1655ESE	-40°C to +85°C	16 Narrow SO
MAX1655EEE	-40°C to +85°C	16 QSOP

\*Contact factory for dice specifications.

MAX1652-MAX1655

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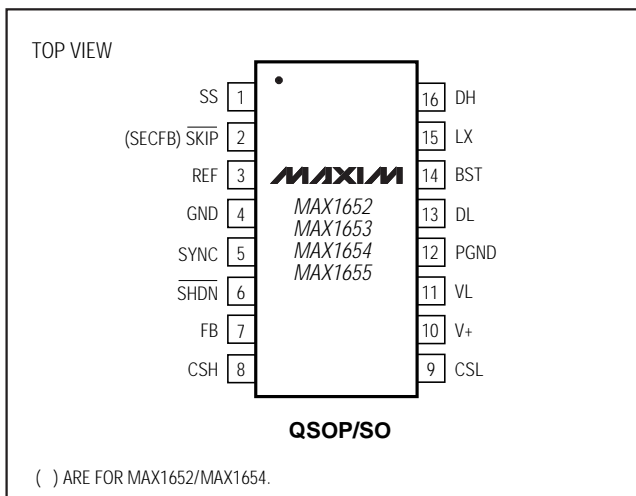


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For small orders, phone 408-737-7600 ext. 3468.

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## Pin Configuration



## Typical Operating Circuit

