

# MAX14640–MAX14644/MAX14651

## USB Host Adapter Emulators

### General Description

The MAX14640–MAX14644/MAX14651 are next-generation USB 2.0 host charger adapter emulators that combine USB Hi-Speed analog switches with a USB adapter emulator circuit.

The MAX14640/MAX14651 feature an I<sup>2</sup>C interface to fully configure the charging behavior with different address options. The MAX14641–MAX14644 are controlled by two GPIO inputs (CB1/CB0) and support USB data and automatic charger mode. In charging downstream port (CDP) pass-through mode, the devices emulate the CDP function while supporting normal USB traffic. The MAX14641/MAX14642/MAX14643 have a CEN output for an active-high CLS enable input, and the MAX14644 has a CEN output for an active-low CLS enable input to restart the peripheral connected to the USB host.

The MAX14640–MAX14644/MAX14651 feature 2A high-current autodetect mode. The MAX14641 features 1A high-current forced mode instead of regular DCP mode. The MAX14640/MAX14651 can be configured through I<sup>2</sup>C to support various dedicated charger modes such as DCP, Apple® 1A/2A forced, or Apple 1A/2A automatic mode.

All the devices support CDP and standard downstream port (SDP) charging while in the active state (S0) and support the dedicated charging port (DCP) charging while in the standby state (S3/S4/S5). All devices support low-speed remote wake-up by monitoring DM, and the MAX14642 also supports remote wake-up in sleep mode (S3).

The MAX14640–MAX14644/MAX14651 are available in an 8-pin (2mm x 2mm) TDFN-EP package and are specified over the -40°C to +85°C extended temperature range.

**Ordering Information and Typical Operating Circuit appear at end of data sheet.**

### Benefits and Features

- ◆ **Improved Charger Interoperability**
  - ◇ **USB (CDP) Emulation**
    - Smart CDP
    - Foolproof CDP
    - Meets New USB Battery Charging (BC) Revision 1.2 Specification
  - ◇ **Backward Compatible with Previous USB BC Revisions**
  - ◇ **Meets China YD/T1591-2009 Charging Specification**
  - ◇ **Supports Standby-Mode Charging for Apple BC Revision 1.2 Compatible Devices**
- ◆ **Provide Greater Application Flexibility**
  - ◇ **I<sup>2</sup>C Controls Multiple Modes (MAX14640/MAX14651)**
  - ◇ **CB0 and CB1 Pins Control Multiple Automatic and Manual Charger States**
- ◆ **Enhance Performance with High Level of Integrated Features**
  - ◇ **Supports Remote Wake-Up**
  - ◇ **Low-Capacitance USB 2.0 Hi-Speed Switch to Change Charging Modes**
  - ◇ **Automatic Current-Limit Switch Control**
  - ◇ **±15kV ESD Protection on DP/DM**
- ◆ **Minimize PCB Area**
  - ◇ **2mm x 2mm, 8-Pin TDFN Package**

### Applications

Laptop/Desktop Computers

USB Hubs

Universal Chargers Including iPod®/iPhone®/iPad®

### Selector Guide

| PART NUMBER | I/O MODE                | CEN POLARITY | REMOTE WAKE-UP IN AM | FORCED CHARGER MODE | BIAS IN FM  |
|-------------|-------------------------|--------------|----------------------|---------------------|-------------|
| MAX14640    | I <sup>2</sup> C (0x35) | N/A          | Optional             | Yes                 | DP/DM short |
| MAX14651    | I <sup>2</sup> C (0x15) | N/A          | Optional             | Yes                 | DP/DM short |
| MAX14641    | GPIO                    | CEN          | No                   | No                  | Apple 1A    |
| MAX14642    | GPIO                    | CEN          | Yes                  | Yes                 | DP/DM short |
| MAX14643    | GPIO                    | CEN          | No                   | Yes                 | DP/DM short |
| MAX14644    | GPIO                    | CEN          | No                   | Yes                 | DP/DM short |

Apple, iPad, iPod, and iPhone are registered trademarks of Apple, Inc.

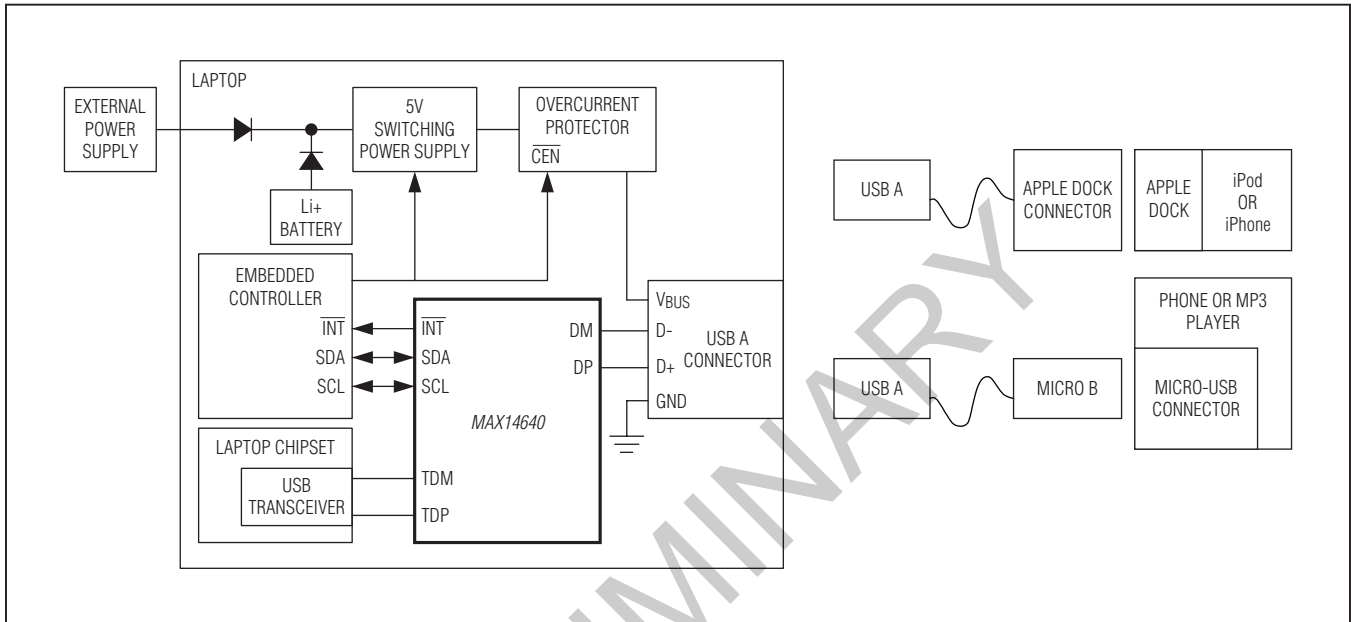
For related parts and recommended products to use with this part, refer to: [www.maximintegrated.com/MAX14640.related](http://www.maximintegrated.com/MAX14640.related)

**For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim's website at [www.maximintegrated.com](http://www.maximintegrated.com).**

# MAX14640–MAX14644/MAX14651

## USB Host Adapter Emulators

### Typical Operating Circuit



### Ordering Information

| PART          | TEMP RANGE     | PIN-PACKAGE |
|---------------|----------------|-------------|
| MAX14640ETA+T | -40°C to +85°C | 8 TDFN-EP*  |
| MAX14941ETA+T | -40°C to +85°C | 8 TDFN-EP*  |
| MAX14942ETA+T | -40°C to +85°C | 8 TDFN-EP*  |
| MAX14943ETA+T | -40°C to +85°C | 8 TDFN-EP*  |
| MAX14944ETA+T | -40°C to +85°C | 8 TDFN-EP*  |
| MAX14651ETA+T | -40°C to +85°C | 8 TDFN-EP*  |

+ Denotes a lead(Pb)-free/RoHS-compliant package.

\*EP = Exposed pad.

T = Tape and reel.

### Chip Information

PROCESS: BiCMOS

### Package Information

For the latest package outline information and land patterns (footprints), go to [www.maximintegrated.com/packages](http://www.maximintegrated.com/packages). Note that a "+", "#", or "-" in the package code indicates RoHS status only. Package drawings may show a different suffix character, but the drawing pertains to the package regardless of RoHS status.

| PACKAGE TYPE | PACKAGE CODE | OUTLINE NO.             | LAND PATTERN NO.        |
|--------------|--------------|-------------------------|-------------------------|
| 8 TDFN       | T822+2       | <a href="#">21-0168</a> | <a href="#">90-0065</a> |



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.