19-4277; Rev 0; 9/08

EVALUATION KIT AVAILABLE

MAXIM

USB/AC Adapter, Li+ Linear Battery Charger with Integrated 50mΩ Battery Switch in TDFN

MAX8856

General Description

The MAX8856 complete 1-cell Li+ battery charge-management IC operates from either a USB port or AC adapter. It integrates a battery disconnect switch, current-sense circuit, PMOS pass element, and thermal-regulation circuitry, while eliminating the external reverse-blocking Schottky diode, to create a simple and small charging solution. The charging sequence initiates from power-OK indication, through prequalification, fast-charge, top-off charge, and finally charging-complete indication for single-cell Li+ batteries. Charging is controlled using constant current, constant voltage, or constant die-temperature ($CCCVCT_J$) regulation for safe operation in handhelds.

Two logic inputs ($\overline{EN1}$, $\overline{EN2}$) select suspend mode, 100mA, 500mA, or ≤ 1A input current limits to comply with USB requirements. Proprietary thermal-regulation circuitry limits the die temperature to +100°C to prevent excessive heat on the system PC board. Additional safety features include an NTC thermistor input (THM) to protect the battery. A 3.5V to 4.2V SYS output, in conjunction with the low-R_{DSON} battery switch, powers the system even when the battery is deeply discharged or not installed. The IC also offers a +3.3V/500µA output (V_L), a charging status flag ($\overline{CHG}$), and an input-supply detection flag ($\overline{POK}$). The MAX8856 operates from a +4.25V to +5.5V supply and includes undervoltage lockout below +3.4V and overvoltage protection up to +14V.

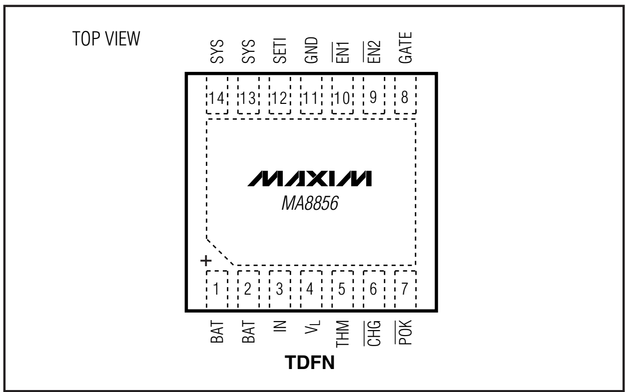
Applications

Cellular Phones, Smartphones, PDAs

Digital Cameras, MP3 Players

USB Appliances, Charging Cradles and Docks

Pin Configuration



Features

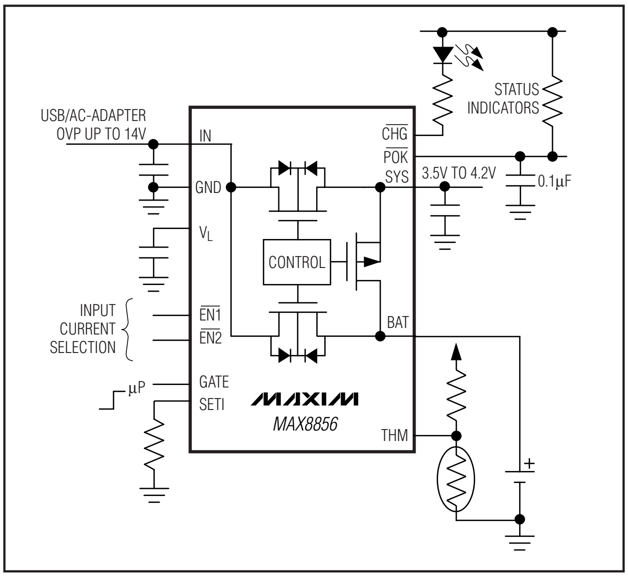
- ♦ Small, 3mm x 3mm Thermally Enhanced TDFN Package (0.8mm max height)
- ♦ USB-Compliant Suspend Mode (20µA)
- ♦ Selectable 100mA, 500mA, and Up to 1A Input Current Limits
- ♦ USB or AC Adapter Input
- ♦ +6V to +14V Input Overvoltage Protection
- ♦ Input UVLO Below +4V Rising (3.5V Falling)
- ♦ Automatic Current Sharing Between Battery Charging and System
- ♦ Die Temperature Regulation (+100°C)
- ♦ Low Dropout Voltage, 250mV at 0.5A
- ♦ NTC Thermistor Input
- ♦ Charge Status and Input-Supply Detection Flags

Ordering Information

PART	TEMP RANGE	PIN-PACKAGE	TOP MARK
MAX8856ETD+	-40°C to +85°C	14 TDFN 3mm x 3mm (T1433-1)	AEJ

+Denotes a lead-free/RoHS-compliant package.

Typical Operating Circuit



For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim's website at www.maxim-ic.com.

USB/AC Adapter, Li+ Linear Battery Charger with Integrated 50mΩ Battery Switch in TDFN

ABSOLUTE MAXIMUM RATINGS

IN to GND .... -0.3V to +16V
BAT, SYS, EN1, EN2, POK, CHG, GATE to GND.....-0.3V to +6V
V_L, SETI, THM to GND..-0.3V to +4V
SYS to BAT ....-0.3V to +6V
V_L to IN ....-16V to +0.3V
IN to BAT Current ....1.0A_{RMS}
IN to SYS Current ....1.0A_{RMS}
BAT to SYS Current ....1.0A_{RMS}
BAT Short-Circuit Duration ....Continuous

Continuous Power Dissipation (T_A = +70°C)
14-Pin 3mm x 3mm TDFN (derate 18.2mW/°C above +70°C)..1454mW
Operating Temperature Range ....-40°C to +85°C
Junction Temperature Range ....-40°C to +150°C
Storage Temperature Range ....-65°C to +150°C
Lead Temperature (soldering, 10s) ....+300°C

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

(V_{IN} = 5.0V, V_{BAT} = 3.3V, $\overline{EN1}$ = $\overline{EN2}$ = GND, R_{SETI} = 23.58kΩ, C_{VL} = 0.1µF, C_{SYS} = 4.7µF, T_A = -40°C to +85°C, unless otherwise noted. Typical values are at T_A = +25°C.) (Note 1)

PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
IN						
IN Voltage Range			0		14	V
IN Operating Voltage Range	(Note 2)		4.25		5.50	V
IN Undervoltage Threshold	V_{IN} rising, 500mV hysteresis (typ)		3.9	4.0	4.1	V
IN Overvoltage Threshold	V_{IN} rising, 150mV hysteresis (typ)		5.6	5.8	6.0	V
IN Supply Current	Charging, I_{BAT} = I_{SYS} = 0mA			1.2	3.0	mA
	Suspend, $\overline{EN1}$ = $\overline{EN2}$ = high, I_{VL} = 0mA			20	40	µA
IN to BAT Switch Leakage	V_{IN} = 14V, BAT = GND	T_A = +25°C		0.1	10	µA
		T_A = +85°C		0.5		
SYS						
SYS Regulated Voltage	I_{SYS} = 0mA, V_{BAT} = 3.3V		3.4	3.5	3.6	V
SYS Current Limit	V_{SYS} = 3.3V	$\overline{EN1}$ = low, $\overline{EN2}$ = low	90	96	100	mA
		$\overline{EN1}$ = low, $\overline{EN2}$ = high	450	475	500	
		$\overline{EN1}$ = high, $\overline{EN2}$ = low	675	712	750	
SYS Dropout Voltage (V_{IN} - V_{BAT})	I_{SYS} = 400mA, V_{SYS} = 3.3V, $\overline{EN1}$ = low, $\overline{EN2}$ = high			350	700	mV
SYS Load Regulation	I_{SYS} = 1mA to 675mA, $\overline{EN1}$ = high, $\overline{EN2}$ = low			10		mV
BAT						
BAT Regulation Voltage	I_{BAT} = 0mA	T_A = +25°C	4.18	4.20	4.22	V
		T_A = -40°C to +85°C	4.16	4.20	4.24	
Maximum Charging Current			1			A
BAT Charging Current	$\overline{EN1}$ = low, $\overline{EN2}$ = low	I_{SYS} = 0mA	87	95	100	mA
		I_{SYS} = 50mA		45		
	$\overline{EN1}$ = low, $\overline{EN2}$ = high	I_{SYS} = 0mA	450	475	500	
		I_{SYS} = 250mA		225		
	$\overline{EN1}$ = high, $\overline{EN2}$ = low	I_{SYS} = 0mA	675	712	750	
		I_{SYS} = 375mA		337		

USB/AC Adapter, Li+ Linear Battery Charger with Integrated 50mΩ Battery Switch in TDFN

ELECTRICAL CHARACTERISTICS (continued)

(V_{IN} = 5.0V, V_{BAT} = 3.3V, $\overline{EN1}$ = $\overline{EN2}$ = GND, R_{SETI} = 23.58kΩ, C_{VL} = 0.1µF, C_{SYS} = 4.7µF, T_A = -40°C to +85°C, unless otherwise noted. Typical values are at T_A = +25°C.) (Note 1)

PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
BAT Prequal Current	V_{BAT} = 2.0V	$\overline{EN1}$ = low, $\overline{EN2}$ = low, I_{SYS} = 0mA	87	95	100	mA
		$\overline{EN1}$ = low, $\overline{EN2}$ = high, I_{SYS} = 0 to 350mA		95		
		$\overline{EN1}$ = high, $\overline{EN2}$ = low, I_{SYS} = 0 to 575mA		95		
Soft-Start Time				1.5		ms
BAT Prequal Threshold	V_{BAT} rising, 150mV hysteresis (typ)		2.9	3.0	3.1	V
BAT Dropout Voltage (V_{IN} - V_{BAT})	V_{BAT} = 4.1V, I_{BAT} = 400mA			200	400	mV
BAT Short-Circuit Current Limit	BAT = GND		70	95	120	mA
BAT to SYS Switch R_{ON}	V_{BAT} = 3.5V, V_{SYS} = 3.4V, V_{IN} = 0V			50	100	mΩ
BAT to SYS Switch Threshold	BAT rising, 160mV hysteresis (typ)		3.4	3.5	3.6	V
Battery-Removal Threshold	BAT rising, 210mV hysteresis (typ)		4.5	4.75	5.0	V
BAT Leakage Current	V_{IN} = 0V	T_A = +25°C		0.1	10	µA
		T_A = +85°C		0.1		
	V_{IN} = 2.4V	T_A = +25°C		0.1	10	
		T_A = +85°C		0.1		
	$\overline{EN1}$ = high, $\overline{EN2}$ = high	T_A = +25°C	-10	0.1	+10	
		T_A = +85°C		0.1		
V_L						
V_L Output Voltage	I_{VL} = 0 to 500µA		3.1	3.3	3.5	V
V_L Shutdown Voltage	$V_{\overline{EN1}}$ = $V_{\overline{EN2}}$ = 5V			0		V
THM						
THM Threshold, Hot	10% hysteresis, V_{THM} falling	Expressed as percentage of V_L	21.5	22.5	23.5	%
THM Threshold, Cold	10% hysteresis, V_{THM} rising		53.0	54.0	55.5	
THM Threshold, Disabled	70% hysteresis, V_{THM} falling		2.5	3.0	3.5	
SETI						
SETI Servo Voltage	$\overline{EN1}$ = low, $\overline{EN2}$ = low			0.28		V
	$\overline{EN1}$ = low, $\overline{EN2}$ = high			1.4		
	$\overline{EN1}$ = high, $\overline{EN2}$ = low			2.1		
SETI Resistance Range			17.68	23.58	35.36	kΩ
$\overline{POK}$						
$\overline{POK}$ Trip Threshold (V_{IN} - V_{BAT})	4.1V < V_{IN} < 5.6V, V_{BAT} = 4.1V	V_{IN} rising	150	250	350	mV
		V_{IN} falling	5	55	125	
$\overline{POK}$ Voltage, Low	$I_{\overline{POK}}$ = 5mA			0.05	0.2	V
$\overline{POK}$ Leakage Current, High	$V_{\overline{POK}}$ = 6V	T_A = +25°C		0.01	1	µA
		T_A = +85°C		0.01		

ELECTRICAL CHARACTERISTICS (continued)

(V_{IN} = 5.0V, V_{BAT} = 3.3V, $\overline{EN1}$ = $\overline{EN2}$ = GND, R_{SETI} = 23.58kΩ, C_{VL} = 0.1µF, C_{SYS} = 4.7µF, T_A = -40°C to +85°C, unless otherwise noted. Typical values are at T_A = +25°C.) (Note 1)

PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
$\overline{CHG}$						
Full-Battery Detection Current Threshold	I_{BAT} falling		30	50	70	mA
$\overline{CHG}$ Voltage, Low	$I_{\overline{CHG}}$ = 5mA			0.05	0.2	V
$\overline{CHG}$ Leakage Current, High	$V_{\overline{CHG}}$ = 6V	T_A = +25°C		0.01	1	µA
		T_A = +85°C		0.01		
$\overline{EN1}$, $\overline{EN2}$, GATE						
Logic Input Leakage Current	V_{GATE} = $V_{\overline{EN1}}$ = $V_{\overline{EN2}}$ = 0 to 5.5V	T_A = +25°C		0.01	1	µA
		T_A = +85°C		0.01		
Logic Input Low Voltage					0.4	V
Logic Input High Voltage			1.6			V
THERMAL LIMIT						
Thermal-Regulation Threshold				+100		°C
Thermal-Regulation Gain	T_J to I_{BAT}, T_J > +100°C			-50		mA/°C

Note 1: Specifications are 100% production tested at T_A = +25°C. Limits over the operating temperature range are guaranteed by design and characterization.

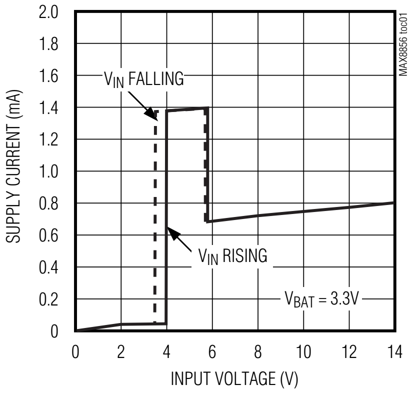
Note 2: Guaranteed by undervoltage and overvoltage threshold testing.

USB/AC Adapter, Li+ Linear Battery Charger with Integrated 50mΩ Battery Switch in TDFN

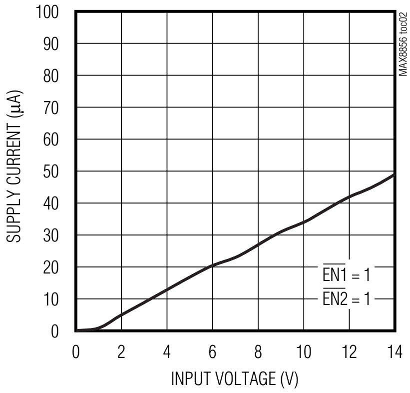
Typical Operating Characteristics

(V_{IN} = +5V, V_{BAT} = 3.6V, I_{SYS} = 0, $\overline{EN1}$ = 1, $\overline{EN2}$ = 0, circuit of Figure 3, T_A = +25°C, unless otherwise noted.)

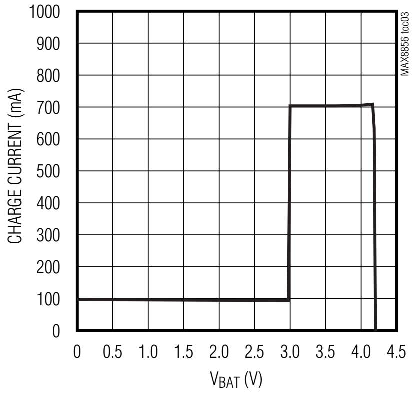
SUPPLY CURRENT vs. INPUT VOLTAGE



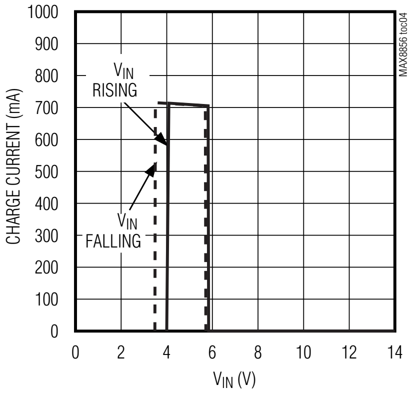
SUSPEND-MODE SUPPLY CURRENT vs. INPUT VOLTAGE



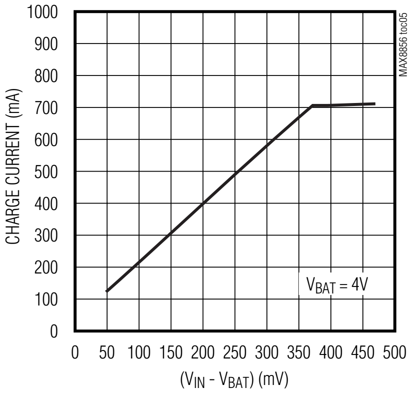
CHARGE CURRENT vs. BATTERY VOLTAGE



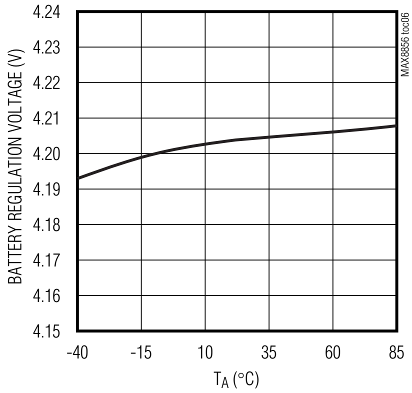
CHARGE CURRENT vs. INPUT VOLTAGE



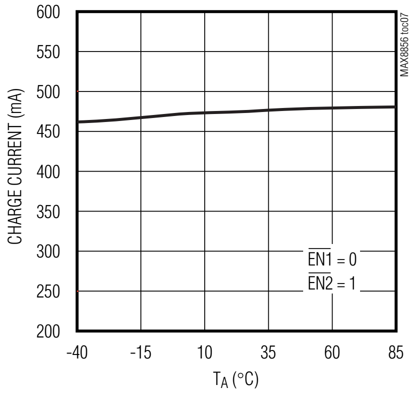
CHARGE CURRENT vs. INPUT VOLTAGE HEADROOM



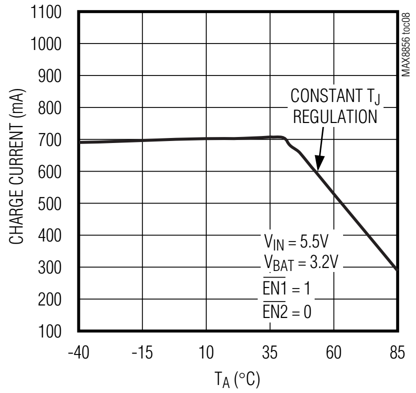
BATTERY REGULATION VOLTAGE vs. TEMPERATURE



CHARGE CURRENT vs. AMBIENT TEMPERATURE



CHARGE CURRENT vs. AMBIENT TEMPERATURE



USB/AC Adapter, Li+ Linear Battery Charger with Integrated 50mΩ Battery Switch in TDFN

Pin Description

PIN	NAME	FUNCTION
1, 2	BAT	Battery Connection. The IC delivers charging current and monitors battery voltage using BAT. Connect both BAT outputs together externally. During suspend mode, BAT is internally connected to SYS.
3	IN	Supply Voltage Input. Connect IN to a 4.25V to 5.5V supply. Charging is suspended if V_{IN} exceeds 6V. Bypass IN to GND with a 4.7µF or larger ceramic capacitor.
4	V_L	+3.3V Output Voltage and Logic Supply. V_L is regulated to +3.3V and is capable of sourcing 500µA to provide power for external circuits. Bypass V_L to GND with a 0.1µF or larger ceramic capacitor. V_L is internally pulled to GND during suspend mode.
5	THM	Thermistor Input. Connect a 47kΩ NTC thermistor from THM to GND in close proximity to the battery to monitor the battery temperature. The IC suspends charging when the temperature is outside the hot and cold limits. Connect THM to GND to disable the thermistor monitoring function. See the *THM Input* section for more details.
6	$\overline{CHG}$	Charging Status Output. $\overline{CHG}$ is an open-drain output that goes low when the battery is charging. $\overline{CHG}$ goes high impedance when the charge current drops below 50mA (typ) and the battery voltage is 4.2V (typ). $\overline{CHG}$ is high impedance when the IC is in suspend mode.
7	$\overline{POK}$	Power-OK Monitor. $\overline{POK}$ is an open-drain output that pulls low when a valid charging source is detected at IN.
8	GATE	MOSFET Enable/Disable Input. Drive GATE high to turn off the MOSFET between SYS and BAT, resulting in opening of the connection between SYS and BAT. Drive GATE low to enable automatic control of the MOSFET switch, as described in the *Gate Input and SYS Output* section.
9	$\overline{EN2}$	Charge-Current Selection Input. Drive $\overline{EN\_}$ high or low to select the charge current or to put the MAX8856 into suspend mode (see Table 1).
10	$\overline{EN1}$	Charge-Current Selection Input. Drive $\overline{EN\_}$ high or low to select the charge current or to put the MAX8856 into suspend mode (see Table 1).
11	GND	Ground. Connect directly to exposed paddle under the IC.
12	SETI	Charge-Current Programming Input. Connect a resistor from SETI to GND to set the maximum charging current. R_{SETI} must be between 17.68kΩ and 35.36kΩ.
13, 14	SYS	System Supply Output. SYS delivers up to $1A_{RMS}$ to power an external system. Bypass SYS to GND with a 4.7µF or larger ceramic capacitor. SYS is connected to BAT through an internal 50mΩ switch when V_{BAT} exceeds 3.5V or when the MAX8856 is in suspend mode.
—	EP	Exposed Paddle. Connect to GND under the IC. Connect to a large ground plane to improve power dissipation.

Detailed Description

The MAX8856 charger uses current, voltage, and thermal control loops to charge and protect a single Li+ battery cell. It can start the system even when the battery is in deep saturation. The MAX8856 provides a SYS output that supplies the external system with a minimum 3.5V at 1A.

Two active-low enable inputs ($\overline{EN1}$ and $\overline{EN2}$) are supplied to set the SYS and charging current limits. During prequal and fast-charge modes, the $\overline{CHG}$ output status flag is pulled low. As the battery voltage approaches 4.2V, the charging current is reduced. When the charging current drops below 50mA and the battery voltage equals 4.2V, the $\overline{CHG}$ output goes high impedance, signaling a full battery. At any time during charging, if both $\overline{EN1}$ and $\overline{EN2}$ are driven high, the MAX8856 enters suspend mode, charging stops, and $\overline{CHG}$ goes high impedance.

$\overline{EN1}$ and $\overline{EN2}$ Inputs

$\overline{EN1}$ and $\overline{EN2}$ are logic inputs that enable the charger and select the charging current (see Table 1). Drive $\overline{EN1}$ and $\overline{EN2}$ high to place the IC in suspend mode.

USB/AC Adapter, Li+ Linear Battery Charger with Integrated 50mΩ Battery Switch in TDFN

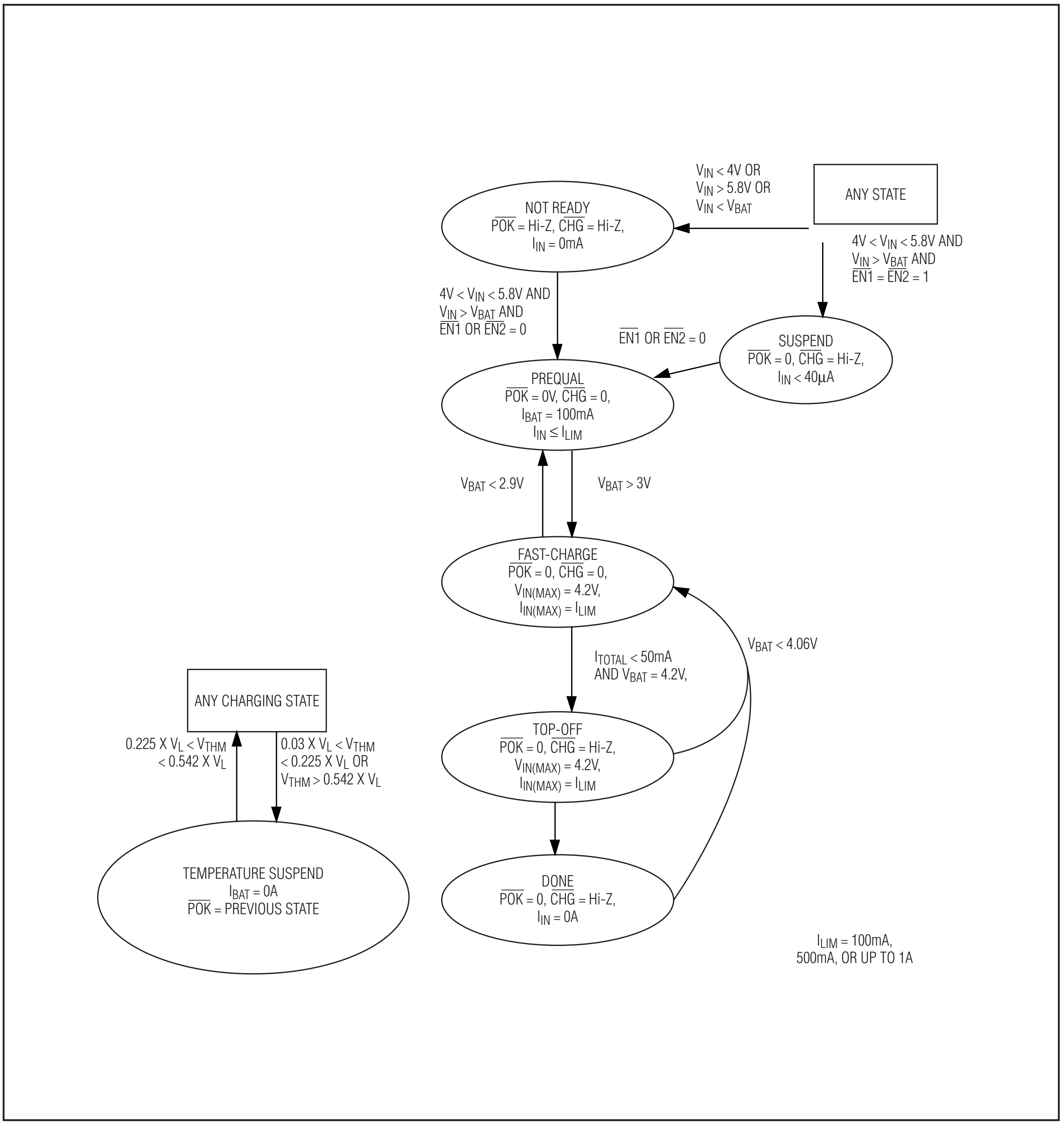


Figure 1. MAX8856 State Diagram

USB/AC Adapter, Li+ Linear Battery Charger with Integrated 50mΩ Battery Switch in TDFN

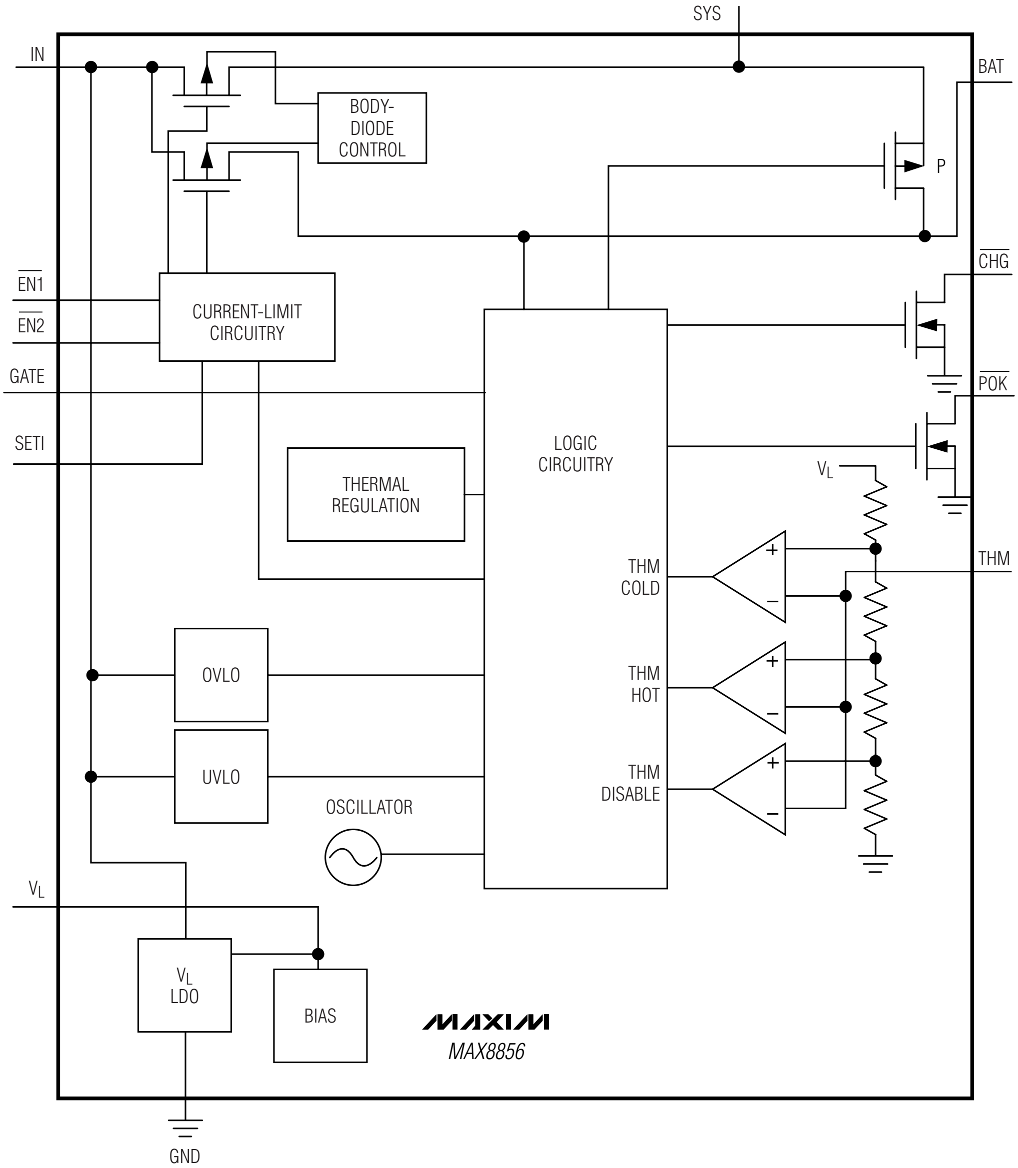


Figure 2. MAX8856 Block Diagram

USB/AC Adapter, Li+ Linear Battery Charger with Integrated 50mΩ Battery Switch in TDFN

Table 1. Logic Controls

$\overline{EN1}$	$\overline{EN2}$	MODE
0	0	100mA
0	1	500mA
1	0	8000 x 2.1V / R_{SET}
1	1	Suspend

V_L Internal Voltage Regulator

The MAX8856 linear charger contains an internal linear regulator to supply the power for the IC. Bypass V_L to GND with a 0.1µF ceramic capacitor. V_L is regulated to 3.3V whenever the input voltage is above the battery voltage and can source up to 500µA for external loads.

$\overline{CHG}$ Charge Indicator Output

$\overline{CHG}$ is an open-drain output that indicates charger status and can be used with an LED. $\overline{CHG}$ goes low during charging. $\overline{CHG}$ goes high impedance when V_{BAT} equals 4.2V and the charging current drops below 50mA, or when the MAX8856 is in suspend mode. When the MAX8856 is used in conjunction with a microprocessor (µP), connect a pullup resistor between $\overline{CHG}$ and the logic I/O voltage to indicate charge status to the µP.

Soft-Start

To prevent input transients, the rate of change of the charge current is limited when the charger is turned on or changes its current compliance. It takes approximately 1ms for the charger to go from 0mA to the maximum fast-charge current.

THM Input

The MAX8856 monitors the battery temperature with an external NTC thermistor that is in close thermal contact with the battery. Select a thermistor resistance that is 47kΩ at +25°C and has a beta of 3400 Kelvins. The IC compares the voltage at THM to an internal reference voltage generated from V_L and suspends charging when it is greater than 0.542 x V_L or less than 0.225 x V_L. Connect THM to GND to disable the temperature control function.

GATE Input and SYS Output

The MAX8856 contains a SYS output that delivers up to $1A_{RMS}$ at 3.5V to 4.2V to power an external system. Bypass SYS to GND with a 4.7µF or larger ceramic capacitor. When V_{BAT} exceeds 3.5V or when the MAX8856 is in suspend mode, and the GATE signal is low, the MAX8856 internally connects SYS to BAT through a 50mΩ switch. When the GATE signal is driven HIGH, the SYS to BAT switch is held open, regardless of operating condition. See Tables 1 and 2 for more information.

Table 2. Charger Operation Truth Table

GATE	SUSPEND MODE	CHARGER PRESENT	V_{BAT} > 3.5V	MOSFET SWITCH
Low	No	No	No	Closed
Low	No	No	Yes	Closed
Low	No	Yes	No	Open
Low	No	Yes	Yes	Closed
Low	Yes	Yes	No	Closed
Low	Yes	Yes	Yes	Closed
High	X	X	X	Open

When charging a battery, the load on SYS is serviced first and the remaining available current goes to charge the battery. SYS is connected to BAT when V_{IN} is not valid.

$\overline{POK}$

The MAX8856 contains an open-drain $\overline{POK}$ output that goes low when a valid input source is detected at IN. A valid input source is one whose voltage is between 4V and 5.8V and exceeds the battery voltage by 250mV. After a valid input has been established, charging is sustained with inputs as low as 3.5V as long as the input voltage remains above the battery voltage by at least 55mV. $\overline{POK}$ is high impedance otherwise.

Applications Information

Charge-Current Selection

For USB applications, the charging current is internally limited to 100mA or 500mA. For wall-cube applications requiring a different current requirement, set the charging current with an external resistor from SETI to GND (R_{SETI}). Calculate R_{SETI} as follows:

$$R_{SETI} = 8000 \times 2.1V/(I_{BAT} + I_{SYS})$$

where $\overline{EN1}$ = high and $\overline{EN2}$ = low.

The SETI input also enables the user to monitor the charging current. Under fast-charge operation, the SETI voltage regulates to 1.4V ($\overline{EN1}$ low and $\overline{EN2}$ high) or 2.1V ($\overline{EN1}$ high and $\overline{EN2}$ low). As the charging current decreases, V_{SETI} decreases. This is due to either the thermal regulation control or voltage regulation control (4.2V) of the MAX8856. V_{SETI} is calculated using the following equation:

$$V_{SETI} = (I_{BAT} + I_{SYS}) \times R_{SETI}/8000$$

Thermal Regulation

The MAX8856 features a thermal limit that reduces the charge current when the die temperature exceeds +100°C. As the temperature increases, the IC lowers the charge current by 50mA/°C above +100°C.

Capacitor Selection

Connect a ceramic capacitor from SYS to GND as close to the IC as possible for proper stability. Use a 4.7µF X5R ceramic capacitor for most applications.

Connect a 4.7µF ceramic capacitor from IN to GND as close to the IC as possible. Use a larger input bypass capacitor to reduce supply noise.

Thermal Considerations

The MAX8856 is available in a thermally enhanced TDFN package with exposed paddle. Connect the exposed paddle to a large copper ground plane to provide a good thermal contact between the device and the circuit board. The exposed paddle transfers heat away from the device, allowing the MAX8856 to charge the battery with maximum current while minimizing the increase in die temperature.

DC Input Sources

The MAX8856 operates from well-regulated DC sources. The full-charging input voltage range is 4.25V to 5.8V. The device survives input voltages up to 14V without damage to the IC. If V_{IN} is greater than 5.8V (typ), the IC stops charging. An appropriate power supply must provide at least 4.25V when sourcing the desired peak charging current. It also must stay below 5.8V when unloaded.

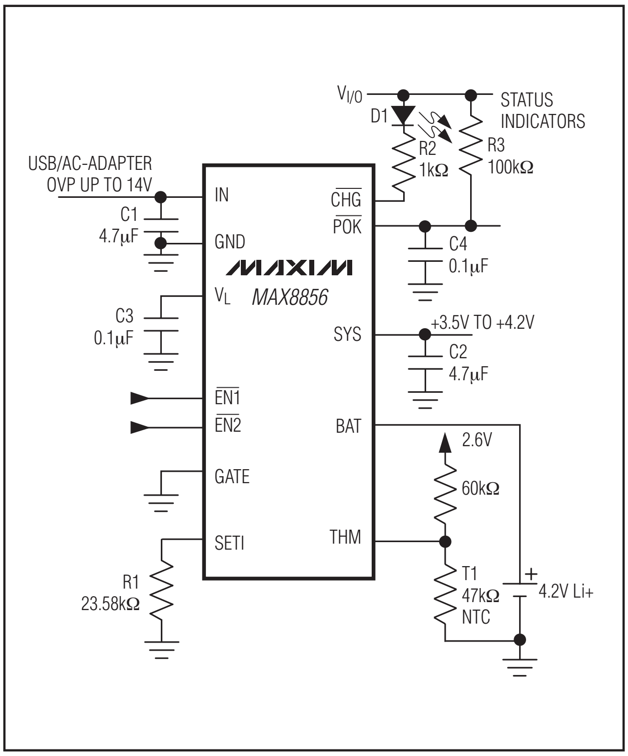


Figure 3. Stand-Alone Application

Application Circuits

Stand-Alone Li+ Charger

The MAX8856 provides a complete Li+ charging solution. Figure 3 shows the MAX8856 as a stand-alone Li+ battery charger. The 23.58kΩ resistor connected to SETI sets a charging current of 712mA (typ). The LED indicates when either prequal or fast-charging has begun. When the battery is charged the LED turns off.

USB Application with AC Adapter

The MAX8856 can be configured for USB applications with an optional AC-adapter input (Figure 4). The p-channel MOSFET disconnects the USB port when the AC adapter is installed. Alternately, the USB port and AC adapter may be excluded from each other by mechanical means, such as using a single connector.

USB-Powered Li+ Charger

The universal serial bus (USB) provides a high-speed serial communication port, as well as power for the remote device. The MAX8856 can be configured to charge a battery at the highest current possible from the host port. Figure 5 shows the MAX8856 as a USB battery charger. To make the circuit compatible with either 100mA or 500mA USB ports, the system software begins at 100mA charging current. The microprocessor then enumerates with the host to determine its current capability. If the host port is capable, the charging current is increased to 475mA to avoid exceeding the 500mA USB specification.

Layout and Bypassing

Place the input capacitor as close to the device as possible. Provide a large copper ground plane to allow the exposed paddle to sink heat away from the device. Connect the battery to BAT as close to the device as possible to provide accurate battery voltage sensing. Make all high-current traces short and wide to minimize voltage drops. A sample layout is available in the MAX8856 evaluation kit to help speed designs.

Chip Information

PROCESS: BiCMOS

USB/AC Adapter, Li+ Linear Battery Charger with Integrated 50mΩ Battery Switch in TDFN

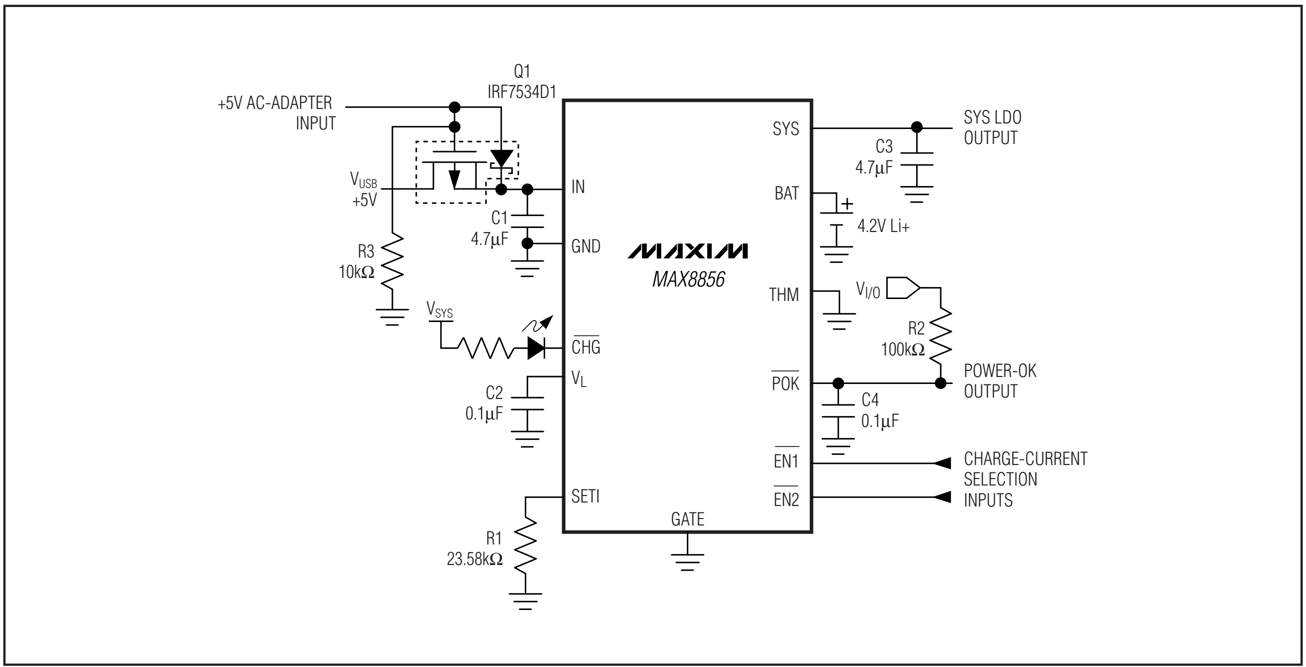


Figure 4. USB Application with AC Adapter

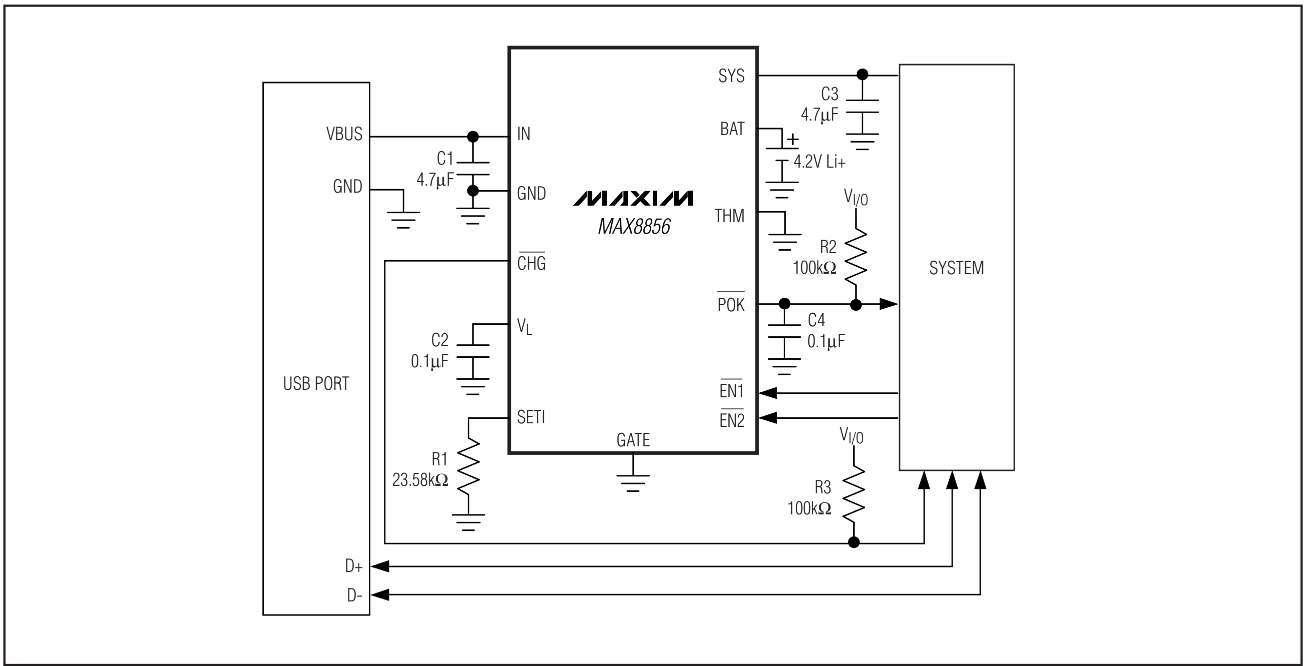


Figure 5. USB Charger Application

USB/AC Adapter, Li+ Linear Battery Charger with Integrated 50mΩ Battery Switch in TDFN

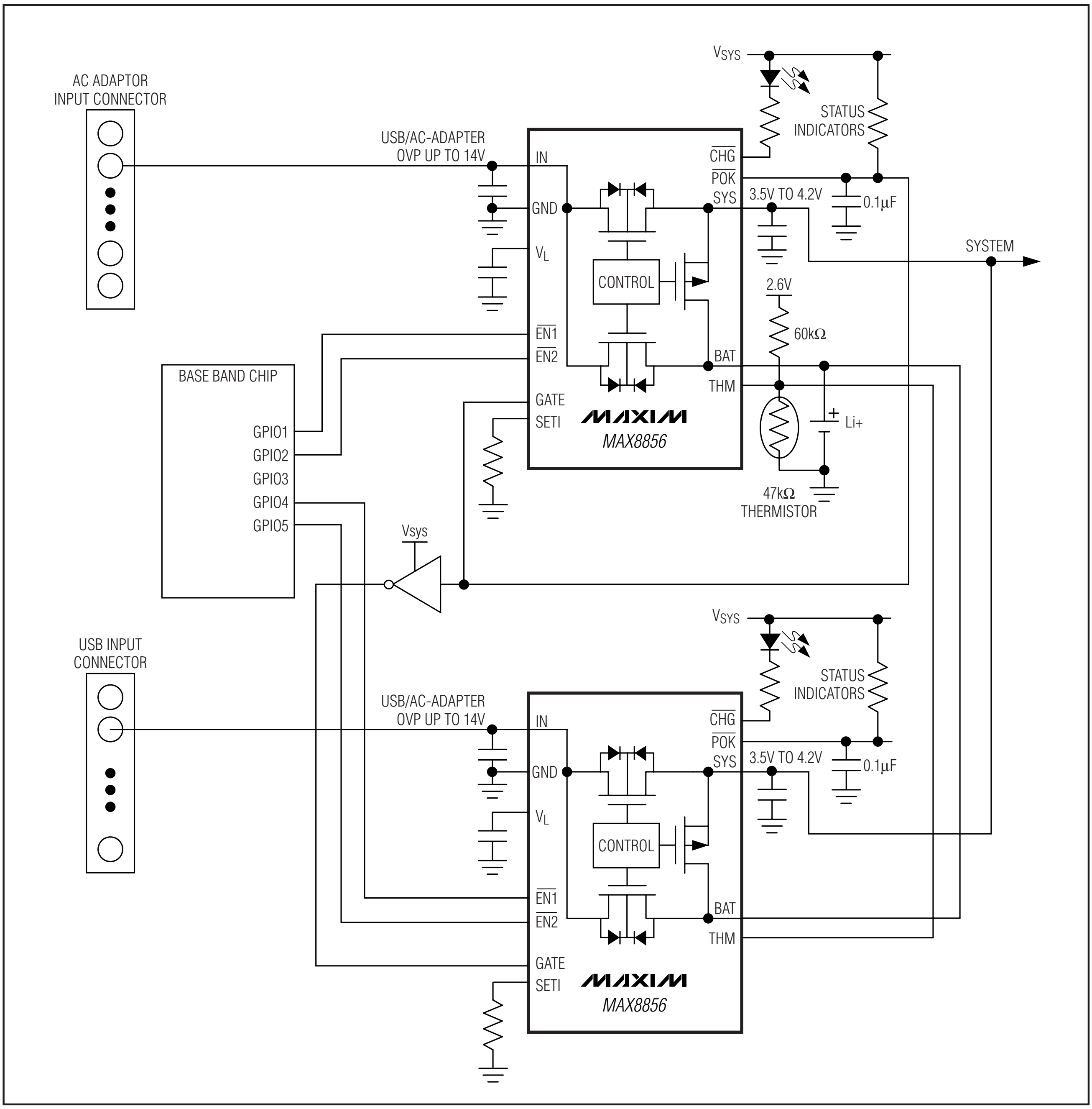


Figure 6. Dual Charger Application

Package Information

For the latest package outline information, go to **www.maxim-ic.com/packages**.

PACKAGE TYPE	PACKAGE CODE	DOCUMENT NO.
14 TDFN-EP	T1433-2	21-0137