



ACE40549RT

Linear Li-Ion Battery Charger

Description

The ACE40549RT is a complete constant-current/constant-voltage linear charger for single cell lithium-ion batteries. Its SOT package and low external component count make the ACE40549RT ideally suited for portable applications.

Furthermore, the ACE40549RT is specifically designed to work within USB power specifications.

No external sense resistor is needed, and no blocking diode is required due to the internal MOSFET architecture. Thermal feedback regulates the charge current to limit the die temperature during high power operation or high ambient temperature. The charge voltage is fixed at 4.2V, and the charge current can be programmed externally with a single resistor. The ACE40549RT automatically terminates the charge cycle when the charge current drops to 1/10th the programmed value after the final float voltage is reached.

When the input supply (wall adapter or USB supply) is removed, the ACE40549RT automatically enters a low current state, dropping the battery drain current to less than 2 μ A. The ACE40549RT can be put into shutdown mode, reducing the supply current to 25 μ A. Other features include charge current monitor, undervoltage lockout, automatic recharge and a status pin to indicate charge termination and the presence of an input voltage.

Features

- Constant-Current/Constant-Voltage Operation with Thermal Regulation to Maximize Charge Rate Without Risk of Overheating
- No MOSFET, Sense Resistor or Blocking Diode Required
- Complete Linear Charger in SOT Package for Single Cell Lithium-Ion Batteries
- Charges Single Cell Li-Ion Batteries Directly from USB Port
- Charge Current Monitor Output for Gas Gauging
- Automatic Recharge
- Charge Status Output Pin
- C/10 Charge Termination
- Programmable Charge Current Up to 500mA
- Preset 4.2V Charge Voltage with $\pm 2\%$ Accuracy
- 25 μ A Supply Current in Shutdown
- 2.9V Trickle Charge Threshold
- Soft-Start Limits Inrush Current

Application

- Cellular Telephones
- Charging Docks and Cradles
- Bluetooth Application
- Wearable Application



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Absolute Maximum Ratings ⁽¹⁾⁽²⁾

Item	Min	Max	Unit
VCC Supply Voltage	-0.3	10	V
PROG Voltage	-0.3	VCC+0.3	V
BAT Voltage	-0.3	7	V
CHRG Voltage	-0.3	10	V
Power dissipation	Internally Limited		
Operating Junction Temperature, T _J	-40	150	°C
Storage Temperature, T _{stg}	-65	125	°C
Operating Temperature Range	-40	85	°C
Lead Temperature (Soldering, 10sec.)		260	°C

Note (1): Exceeding these ratings may damage the device.

Note (2): The device is not guaranteed to function outside of its operating conditions.

ESD Ratings

Item	Description	Value	Unit
V _(ESD-HBM)	Human Body Model (HBM) ANSI/ ESDA/JEDEC JS-001-2014 Classification, Class: 2	±2000	V
V _(ESD-CDM)	Charged Device Model (CDM) ANSI/ESDA/JEDEC JS-002-2014 Classification, Class: C0b	±200	V
I _{LATCH-UP}	JEDEC STANDARD NO.78E APRIL 2016 Temperature Classification, Class: I	±150	mA

Recommended Operating

Item	Min	Max	Unit
Operating junction temperature ⁽¹⁾	-40	125	°C
Operating temperature range	-40	85	°C

Note (1): All limits specified at room temperature (T_A = 25°C) unless otherwise specified. All room temperature limits are 100% production tested. All limits at temperature extremes are ensured through correlation using standard Statistical Quality Control (SQC) methods. All limits are used to calculate Average Outgoing Quality Level (AOQL).



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Thermal Information

Item	Description	Value	Unit
$R_{\theta JA}$	Junction-to-ambient thermal resistance ⁽¹⁾⁽²⁾	180	°C/W
$R_{\theta JC(top)}$	Junction-to-case (top) thermal resistance	130	°C/W
$R_{\theta JB}$	Junction-to-board thermal resistance	45	°C/W
ψ_{JT}	Junction-to-top characterization parameter	35	°C/W
ψ_{JB}	Junction-to-board characterization parameter	45	°C/W

Note (1): The package thermal impedance is calculated in accordance to JESD 51-7.

Note (2): Thermal Resistances were simulated on a 4-layer, JEDEC board.

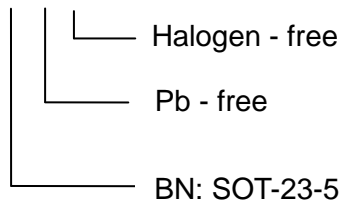


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Ordering Information

ACE40549RT XX+ H





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Notes

ACE does not assume any responsibility for use as critical components in life support devices or systems without the express written approval of the president and general counsel of ACE Technology Co., LTD. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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