MAX20037

Automotive High-Current Step-Down Converter with USB Protection/Host Charger Adapter Emulation

Industry's first Synchronous USB Buck Converter with I²C and Protection/Host Charge Emulator

📄 NDA Required. Request Full Data Sheet and Software

Description

The MAX20037/MAX20038 ICs combine a 3.5A automotive- grade step-down converter, USB host charger adapter emulator, and USB protection switches for automotive USB host applications. The device family also includes a USB load current-sense amplifier and configurable feedback-adjustment circuit, designed to provide automatic USB voltage compensation for voltage drops in captive cables often found in automotive applications. The ICs limit the USB load current using both a fixed internal peak-current threshold of the DC-DC converter and a user-configurable external USB load current-sense amplifier threshold.

The ICs allow flexible configuration options for both stand-alone and supervised applications, and can be programmed for desired operation using both external programming resistors and/or internal I²C registers through the I²C bus.

The ICs are optimized for high-frequency operation and include programmable frequency selection from 310kHz to 2.2MHz, allowing optimization of efficiency, noise, and board space based on application requirements. The fully synchronous DC-DC converters feature integrated high-side and low-side MOSFETs, an external SYNC input/output, and can be configured for spread-spectrum operation.

The MAX20037/MAX20038 are are available in a small (5mm x 5mm) 28-pin TQFN package designed to minimize required components and layout area.

Key Features

- One-Chip Solution Directly from Car Battery to Portable Device
  - 4.5V to 28V (40V Load Dump) Input Voltage
  - 5V, 3.5A Output Current Capability
  - Device-Attach Detection Output
  - Low-Q Current Skip and Shutdown Modes
- Low-Noise Features Prevent Interference with AM Band and Portable Devices
  - Fixed-Frequency 275kHz to 2.2MHz Operation
  - Fixed-PWM Option at No Load
  - Spread Spectrum for EMI Reduction
  - SYNC Input/Output for Frequency Parking
- Optimal USB Power and Communication for Portable Devices
  - User-Programmable Voltage Gain Adjusts Output for Up to 600mΩ Cable Resistance
  - User-Programmable USB Current Limit
  - USB 480Mbps/12Mbps/1.5Mbps Data Switches
  - Integrated iPod®/iPhone®/iPad® and Samsung® Charge-Detection Termination Resistors
  - Supports USB BC1.2 CDP and DCP Modes
  - Supports China YD/T 1591-2009
  - Compatible with USB On-the-Go Specification
- Robust Design Keeps Vehicle System and Portable Devices Safe in Automotive Environment
  - Short-to-Battery Protection on DC-DC Converter Pins
  - Short-to-VBUS Protection on USB Pins (MAX20037)
  - Short-to-Battery Protection on USB Pins (MAX20038)
  - ± 15kV Air/±8kV Contact ISO 10605*
  - ± 15kV Air/±8kV Contact IEC 61000-4-2*
  - Reduced Inrush Current with Soft-Start
  - Overtemperature Protection
  - -40°C to +125°C Operating Temperature Range

Design Resources

- MAX20037EVKIT: Evaluation Kit for the MAX20037

Quality and Environmental Data

- Request Reliability Report for: MAX20037
  Lead-Free Package Tin (Sn) Whisker Reports

Key Specs

Part Number	Supported Charging Configurations	Supported USB Battery Charging Specification	Charging Modes	Current Limit Switch Control	CDP Emulation	Remote Wake-Up Support	V_{BUS} Reset Time (sec)	Package/Pins	Budgetary Price
							typ		*See Notes*
MAX20037 NEW!	Apple 1.0A Apple 2.1A China YD/T 1591-2009 Samsung Galaxy Tablet 2A USB CDP USB Dedicated Charger USB SDP	1.2	Auto Detection Auto Detection with Apple 1A Auto Detection with Apple 2A CDP Emulation Pass-Through Forced Dedicated Charger Pass-Through Samsung Galaxy Tablet 2A	CEN	Yes	No	0.016	TQFN-CU/28	

See All USB Host Adapter Emulator (22)

Quality and Environmental

Device	Fab Process	Technology	Sample size	Rejects	FIT at 25°C	FIT at 55°C
MAX20037ATIC/V+T*	Contact reliability engineer for information					
MAX20037ATID/V+T*	Contact reliability engineer for information					
MAX20037ATIE/V+*	Contact reliability engineer for information					
MAX20037ATIA/V+*	Contact reliability engineer for information					
MAX20037ATIA/V+T*	Contact reliability engineer for information					
MAX20037ATIB/V+W*	Contact reliability engineer for information					
MAX20037ATIC/V+*	Contact reliability engineer for information					
MAX20037ATIB/V+*	Contact reliability engineer for information					
MAX20037ATID/V+*	Contact reliability engineer for information					
MAX20037ATIE/V+T*	Contact reliability engineer for information					
MAX20037ATIB/V+T*	Contact reliability engineer for information					
MAX20037ATIB/V+TW*	Contact reliability engineer for information					

Note : The failure rates are summarized by technology and mapped to the associated material part numbers. The failure rates are highly dependent on the number of units tested.

Quality Management System >
Environmental Management System >