Keywords: source-current loop, input-current loop, Li+ battery charger

APPLICATION NOTE 1817

Reduce Component Count and Cut Costs by Disabling the MAX1737 Source-Current Loop

Dec 16, 2002

Abstract: The MAX1737 source-current loop protects low-power sources from being overloaded, however, this source-current loop can be disabled when using high-power sources. Disabling the source-current loop reduces component count and cuts system cost.

The MAX1737 switch-mode lithium-ion (Li+) battery charger includes a source-current loop that regulates the total current drawn from the power source. Although this control loop is useful in many applications, it is unnecessary if the power source can provide the maximum required system current plus the maximum required charger current. Disabling the source-current loop reduces component count and cuts cost.

Figure 1 illustrates the standard implementation of the MAX1737. This typical application of the MAX1737 uses the components found within the MAX1737EVKIT. In this application, power is derived from a 12V, 1A source, and the source-current loop ensures that no more than 1A is drawn.
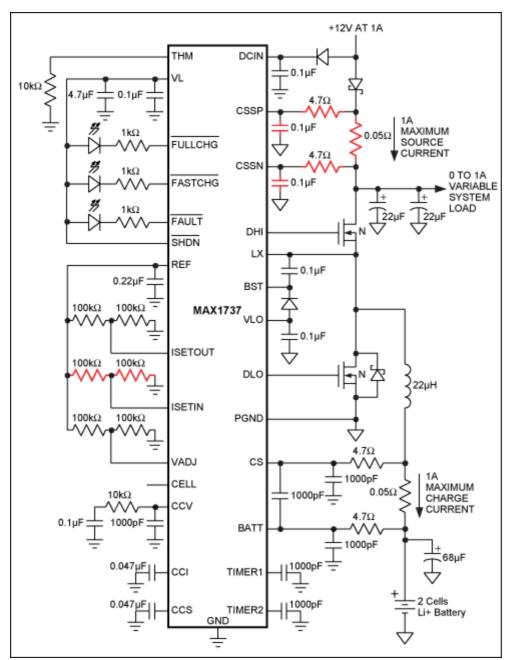
Figure 1. To limit the power drawn from the source, the standard implementation of the MAX1737 decreases the battery charge current as the system load increases.

The circuit of **Figure 2** is similar to the circuit of Figure 1, but with the source-current loop disabled. Disabling the source-current loop eliminates seven components. To disable the source-current loop, connect ISETIN to REF and connect CSSP and CSSN to DCIN. The compensation capacitor at CCS is still recommended.
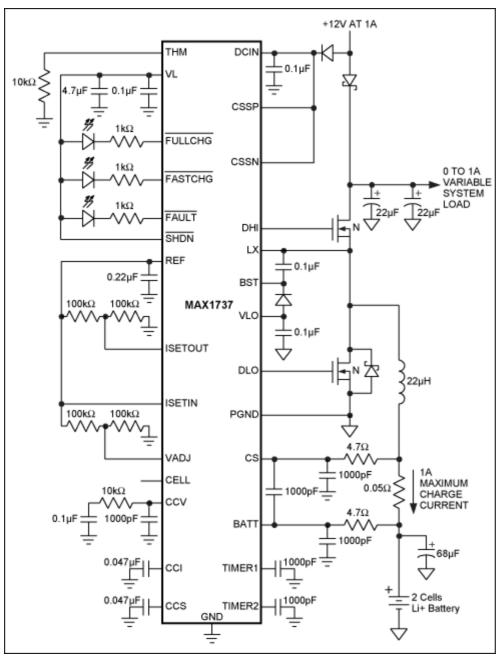
Figure 2. Disabling the source-current loop of the MAX1737 reduces cost and size by eliminating seven components. With the source-current loop disabled, the power source must be able to supply the maximum battery charging current and the maximum system load current.

Table 1 compares the characteristics of Figure 1 and Figure 2 at different system loads. Download Excel file of Table 1.

Table 1. Figure 1 and Figure 2 Characteristics

	Current Delivered by the	Source Voltage (V)	Energy Delivered by the	Current Consumed by the	System Load Voltage	Energy Delivered to the	Current Consumed by the	Battery Voltage (V)	Energy Delivered to the	Efficiency (%)

	Source (A)		Source (W)	System Load (A)	(V)	System Load (W)	Battery (A)		Battery (W)	
Figure 1	0.57	12	6.8	0.0	11.68	0.0	1.01	6.0	6.06	88.6
	0.75	12	9.0	0.2	11.65	2.3	1.01	6.0	6.06	93.2
	0.95	12	11.4	0.4	11.64	4.7	1.01	6.0	6.06	94.0
	1.13	12	13.6	0.6	11.62	7.0	0.99	6.0	5.94	95.2
	1.13	12	13.6	0.8	11.61	9.3	0.62	6.0	3.72	95.9
	1.08	12	13.0	1.0	11.6	11.6	0.15	6.0	0.90	96.5
Figure 2	0.57	12	6.8	0	11.7	0.0	1.01	6.0	6.06	88.6
	0.74	12	8.9	0.2	11.7	2.3	1.01	6.0	6.06	94.6
	0.95	12	11.4	0.4	11.68	4.7	1.01	6.0	6.06	94.1
	1.14	12	13.7	0.6	11.67	7.0	1.01	6.0	6.06	95.5
	1.34	12	16.1	0.8	11.67	9.3	1.01	6.0	6.06	95.7
	1.54	12	18.5	1	11.65	11.7	1.01	6.0	6.06	95.8

Thus, if the power source can provide the maximum system current plus the maximum charger current, disabling the MAX1737 source-current loop provides cost and size benefits by eliminating seven components.

Related Parts

MAX1737	Stand-Alone Switch-Mode Lithium-Ion Battery-Charger Controller	Free Samples

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