

blue mountain avionics

Product

Release

ALL

Subject

Original

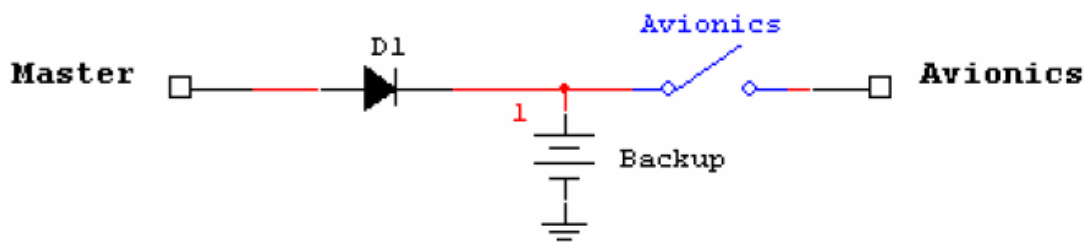
01/18/2007

Greg Richter

Common aircraft wiring practice can result in avionics buss voltages dropping to well below that required to run the EFIS or your radios during engine starts. This simple circuit provides a backup battery system to keep your EFIS/One or EFIS/Lite running during startup, and in the event of a main buss power outage.

We recommend replacing the battery at every 100 hour or annual inspection since it is so cheap, it is easier to replace it that load test it. The battery specified here will run the EFIS/One for about an hour when new. Plan on 45 minutes and check to actual available backup time for you installation.

During normal operations the Master Buss will supply power, through the diode, to the Avionics Buss. Additionally, the backup battery will be charged from the Master Buss. If power is lost on the master buss, or if it is turned off, the backup battery will automatically supply power to the avionics buss. The diode prevents any power being provided to the master buss from the backup battery. Here's the circuit:



Starting sequence for this system would be:

1. Master OFF, Avionics ON
2. Verify backup battery voltage is good
3. Master ON
4. Engine start

Parts can be purchased from <http://digikey.com> , <http://alliedelec.com> or Radio Shack. The only critical part is the diode, which needs a low forward voltage drop, Vf. Vf should be less than 1/2 of a volt. The battery can be any sealed battery with a C20 rating of 3 ampere-hours or more. The battery specified below is a 12 volt battery. For 24 volt systems use two of them connected in series.

Suggested parts from DigiKey:

Diode International Rectifier- Digikey P/N 180NQ040-ND

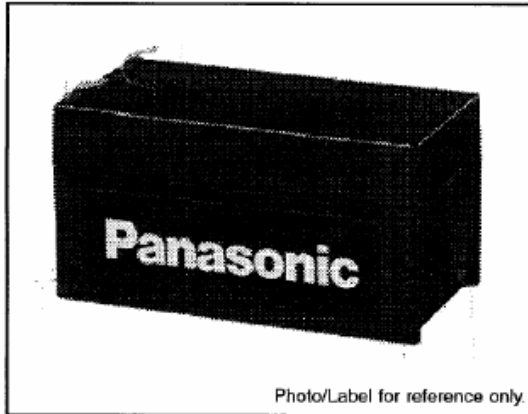
<http://www.irf.com/product-info/datasheets/data/180nq.pdf>

Battery Panasonic LC-R123R4P, Digikey P/N P172-ND

<http://rocky.digikey.com/WebLib/Panasonic/Web%20data/LC-R123R4P.pdf>

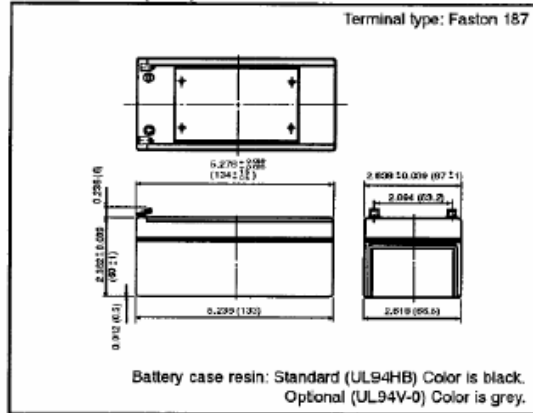
SEALED LEAD ACID BATTERIES: INDIVIDUAL DATA SHEET

LC-R123R4P



For main and standby power supplies.
Expected trickle life: 3-5 years at 25°C, Approx. 5 years at 20°C.

Dimensions (mm)

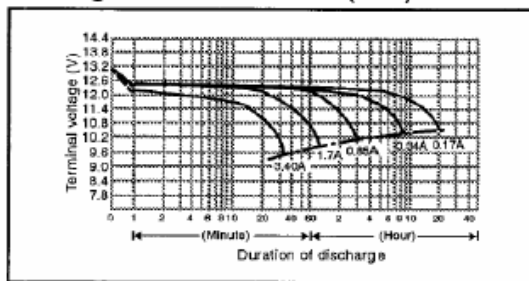


Specifications

Nominal voltage		12V
Rated capacity (20 hour rate)		3.4Ah
Dimensions	Length	5.276 inches (134.0 mm)
	Width	2.638 inches (67.0 mm)
	Height	2.362 inches (60.0 mm)
	Total Height	2.598 inches (66.0 mm)
Approx. mass		2.65 inches (1.20 kg)
Standard Terminals and Resin	UL94HB Faston 187	LC-R123R4P
Optional Terminals and Resin	UL94V-0 Faston 187	♦ LC-R123R4P

♦ Please contact Panasonic for availability on optional items. Optional items may be subject to minimum order quantities.

Discharge characteristics 77°F (25°C) (Note)

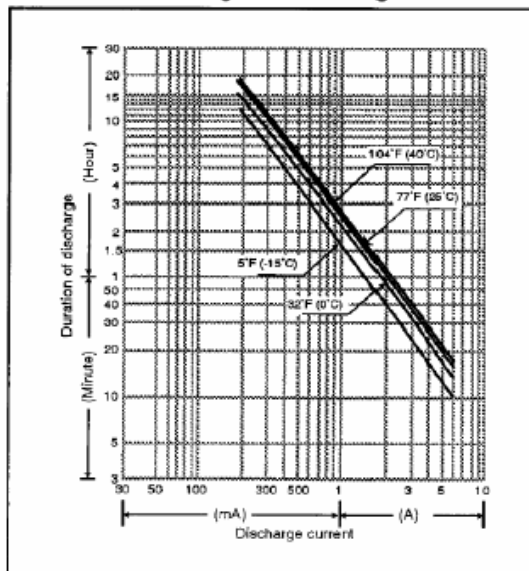


Characteristics

Capacity ⁽¹⁾⁽²⁾⁽³⁾ 77°F (25°C)	20 hour rate (170mA)	3.4Ah	
	10 hour rate (300mA)	3Ah	
	5 hour rate (540mA)	2.7Ah	
	1 hour rate (2100mA)	2.1Ah	
1.5 hour rate discharge Cut-off voltage 10.5 V		1.5A	
Internal resistance	Fully charged battery 77°F (25°C)	Approx. 60mΩ	
Temperature dependency of capacity (20 hour rate)	104°F (40°C)	102%	
	77°F (25°C)	100%	
	32°F (0°C)	85%	
Self discharge 77°F (25°C)	Residual capacity after standing 3 months	91%	
	Residual capacity after standing 6 months	82%	
	Residual capacity after standing 12 months	64%	
Charge Method (Constant Voltage)	Cycle use (Repeating use)	Initial current	1.36 A or smaller
		Control voltage	14.5V to 14.9 V (per 12V cell 25°C)
	Trickle use	Initial current	0.51 A or smaller
		Control voltage	13.6V to 13.8V (per 12V cell 25°C)

(Note) The above characteristics data are average values obtained within three charge/discharge. Cycles not the minimum values.

Duration of discharge vs. Discharge current (Note)



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FEBRUARY 2002