Application Report
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Differences Between the bq20z70/z75/z80/z90/z95 Impedance Track™ Gas Gauges

Battery Management

ABSTRACT

There are five TI advanced fuel gauges that utilize the Impedance Track algorithm. This application report is intended to help potential customers make the best selection for a particular application, based on feature differences and ease of design.

Introduction

The family of advanced Impedance Track™ fuel gauges includes five different products. The following tables should assist in making the best selection, based on feature differences and ease of design.

bq20zXX Selection Guide

The bq20z80 was the first in the family of advanced Impedance Track fuel gauges from Texas Instruments. That product was followed in 2006 with the bq20z70 and bq20z90. bq20z75 and bq20z95 are being introduced in mid 2007.

The bq20z80 is used with the bq29312A AFE, which uses P-channel protection FETs. The bq20z90 is similar in performance and features, but operates with the bq29330 AFE, which uses N-channel protection FETs and offers simplified layout and reduced external components. The bq20z70 also uses the bq29330, but has a reduced feature set and a smaller package.

The newer bq20z75 and bq20z95 gauges are similar to the bq20z70 and bq20z90, respectively, but integrate the AFE into the package as a separate die, retaining the advantage of separate die as an important redundant safety feature. Table 1 and Table 2 show the hardware and firmware differences between these products.

Table 1. Hardware Feature Differences

	bq20z80	bq20z90	bq20z70	bq20z95	bq20z75
Protection FETs	P-channel MOSFET	N-channel MOSFET	N-channel MOSFET	N-channel MOSFET	N-channel MOSFET
Separate AFE required	Yes, bq29312A (24-pin TSSOP)	Yes, bq29330 (30-pin TSSOP)	Yes, bq29330 (30-pin TSSOP)	No	No
Simplified IC interconnection	No	Yes	Yes	N/A	N/A
Simplified grounding scheme	No	Yes	Yes	Yes	Yes
Typical PCB layers	4	2	2	2	2
IC package	38-pin TSSOP	30-pin TSSOP	20-pin TSSOP	44-pin TSSOP	38-pin TSSOP
LED support	Yes	Yes	No	Yes	No
Programmable LED drive current	No	Yes	N/A	Yes	N/A
Internal clock components	No	Yes	Yes	Yes	Yes
bqMtester support	Yes	Yes	Yes	Yes	Yes

Table 2. Firmware Feature Differences

	bq20z80	bq20z90	bq20z70	bq20z95	bq20z75
Pulse charging	Yes	Yes	No	Yes	No
Lifetime data recording	Yes	Yes	No	Yes	No
Manufacturer data	Yes	Yes	No	Yes	No
LED support	Yes	Yes	No	Yes	No
Permanent fail status	Yes	Yes	No	Yes	No
Average current/power recording	Yes	Yes	No	Yes	No
Full-featured charge faults	Yes	Yes	No	Yes	No
Open thermistor detection	Yes	Yes	No	Yes	No
2nd-tier overcurrent detect	Yes	Yes	No	Yes	No
Pack overvoltage detect	Yes	Yes	No	Yes	No
Pack undervoltage detect	Yes	Yes	No	Yes	No
Remaining energy alarm	No	Yes	Yes	Yes	Yes
Programmable LED current	No	Yes	N/A	Yes	N/A
Wake current detection	No	Yes	Yes	Yes	Yes

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Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265