Leveraging Open Source Designs

Creating a component search engine
for reference designs used in practice

WHOAMI

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Electronics Hobbyist

Creating PCBs

Choose Components

Create Schematics

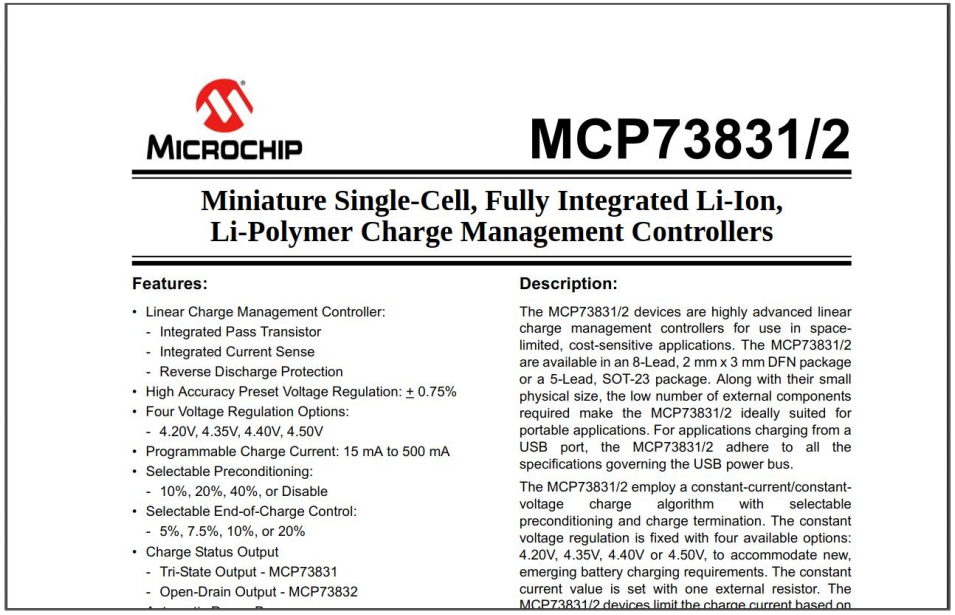
Design Layout

Manufacture

PROFIT!

Choosing Components

GitHub



MICROCHIP

MCP73831/2

Miniature Single-Cell, Fully Integrated Li-Ion, Li-Polymer Charge Management Controllers

Features:

- Linear Charge Management Controller:
  - Integrated Pass Transistor
  - Integrated Current Sense
  - Reverse Discharge Protection
- High Accuracy Preset Voltage Regulation: ± 0.75%
- Four Voltage Regulation Options:
  - 4.20V, 4.35V, 4.40V, 4.50V
- Programmable Charge Current: 15 mA to 500 mA
- Selectable Preconditioning:
  - 10%, 20%, 40%, or Disable
- Selectable End-of-Charge Control:
  - 5%, 7.5%, 10%, or 20%
- Charge Status Output
  - Tri-State Output - MCP73831
  - Open-Drain Output - MCP73832

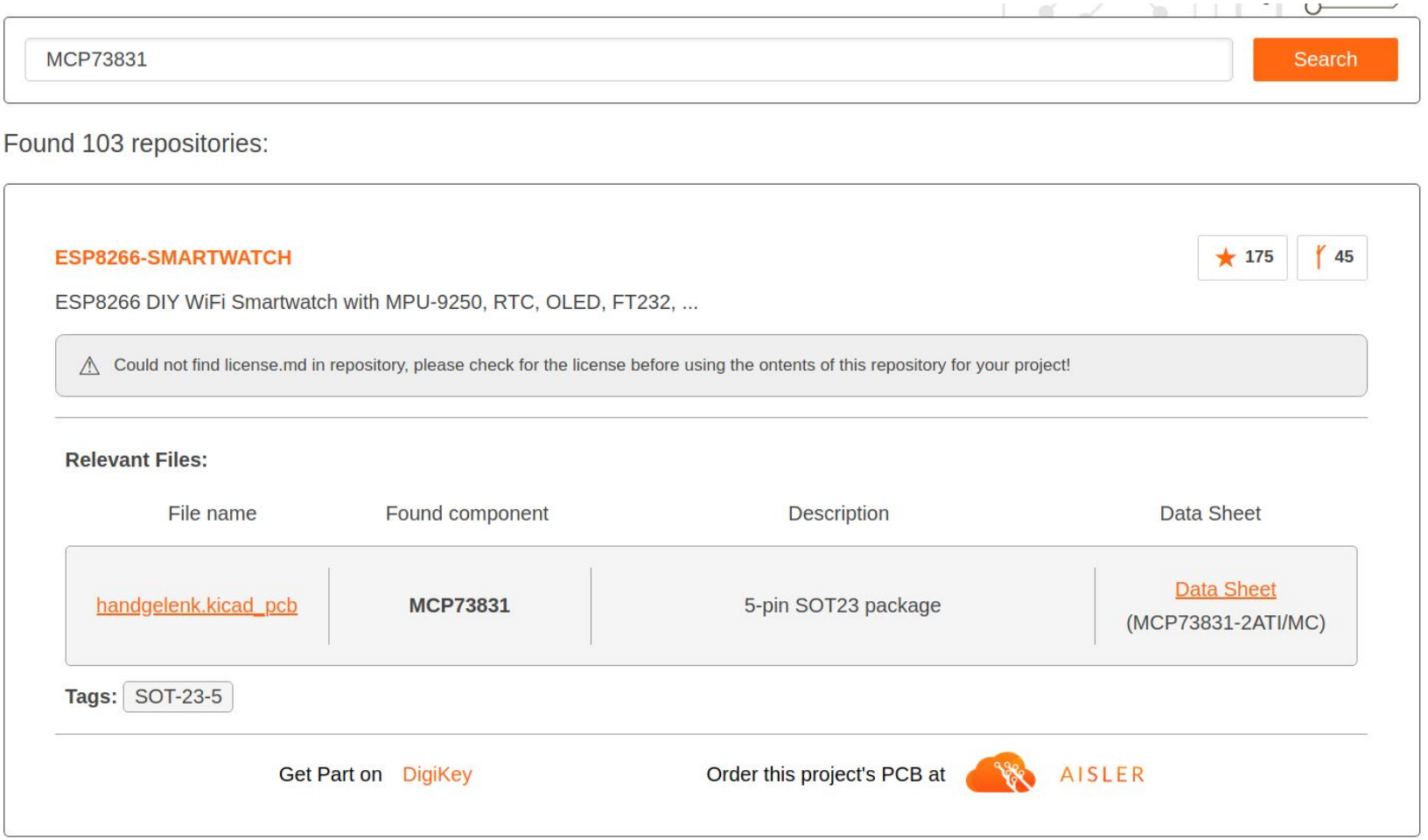
Description:

The MCP73831/2 devices are highly advanced linear charge management controllers for use in space-limited, cost-sensitive applications. The MCP73831/2 are available in an 8-Lead, 2 mm x 3 mm DFN package or a 5-Lead, SOT-23 package. Along with their small physical size, the low number of external components required make the MCP73831/2 ideally suited for portable applications. For applications charging from a USB port, the MCP73831/2 adhere to all the specifications governing the USB power bus.

The MCP73831/2 employ a constant-current/constant-voltage charge algorithm with selectable preconditioning and charge termination. The constant voltage regulation is fixed with four available options: 4.20V, 4.35V, 4.40V or 4.50V, to accommodate new, emerging battery charging requirements. The constant current value is set with one external resistor. The MCP73831/2 devices limit the charge current based on

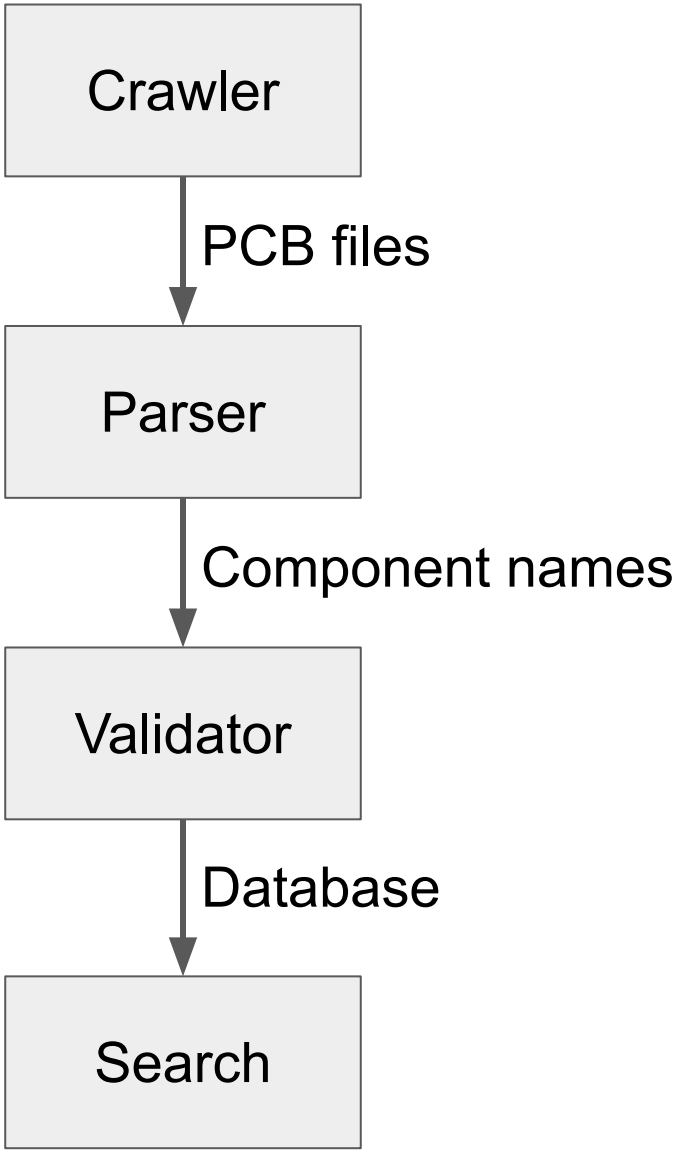
LEOPART

The Electronic Components Search Engine



https://leopart.org

Conceptual Design



Crawler

Theory

Search GitHub for KiCad files

Save repository metadata and file urls

Practice

GitHub has (hidden) rate limits

GitHub search API limited to 1000 results per query

Workaround

Search only repo readme and description, avoid excessive code search

Parser

Theory

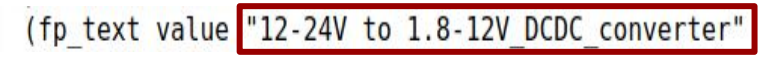
Download .kicad_pcb files

Extract components

Save to database

Practice

Component names are freetext fields



Workaround

Validate components

Validator

Theory

Search for provided component name at distributors

Accept as valid component if 0<n<10 results

Practice

Component search API rate limits very low

Workaround

Piggyback on AISLER Component Search API cache

Future Work

Good First Issues

Move infrastructure to GitLab.com
-> CI/CD
-> Split monolithic repo into modular repos

Improve search
-> Responsive design
-> Searching repo description and readme
-> Ranking search results

Support other formats than KiCad
-> Fritzing, Eagle, LibrePCB, HorizonEDA, ...

Support other platforms than GitHub
-> GitLab, BitBucket, fritzing.org, ...

Questions & Contact

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