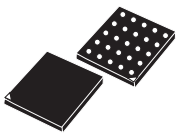
STCF04

High power white LED SuperCap driver with I²C interface

Data brief

Features

- 1.8 MHz buck-boost converter with 1.2 A peak current limiting and synchronous rectification
- Programmable current limit
- Burst mode operation when output is charged
- Selectable 200 mA / 400 mA SuperCap charging current
- Input voltage range 2.7 V to 5.5 V
- Programmable output charging voltage up to 5.5 V
- Full I²C control
- Operation modes:
  - Shutdown mode
  - Monitoring mode with NTC and SuperCap monitoring
  - Idle mode
  - Flash mode
  - Torch mode: up to 300 mA
- Controlled LED current in all modes
- Soft and hard triggering of flash, torch and picture light modes
- Torch dimming in 12 exponential steps
- Flash dimming in 8 steps
- Torch mode safety time-out
- Active balancing of SuperCap voltage
- SuperCap status flag
- Internally or externally timed flash operation
- Digitally programmable safety time-out in flash mode
- LED overtemperature detection and protection with external NTC resistor
- Shorted LED failure detection and protection
- Chip overtemperature detection and protection



TFBGA25 (3 x 3 mm.)

Applications

- Cell phones and smartphones
- Camera flash/strobe
- PDAs and digital still cameras

Description

The STCF04 is a dedicated and space optimized high efficiency solution for driving a flash LED module in camera phones, PDAs and other hand-held devices using the SuperCap technology. It is based on a DC-DC buck-boost converter, which ensures proper and efficient charging control and monitoring of the SuperCap within the entire battery voltage range. The output current control ensures good current regulation over the forward voltage spread characteristics of the flash LEDs in torch and flash mode operation. The SuperCap charging current is programmed to a defined value which avoids overload of the battery. The SuperCap discharge current flows through the LEDs and the external MOSFET which must be chosen according to the desired flash current.
See *Description (continued)*.

Table 1. Device summary

Order code	Package	Packaging
STCF04TBR	TFBGA25 (3 x 3 mm.)	3000 parts per reel

1 Description (continued)

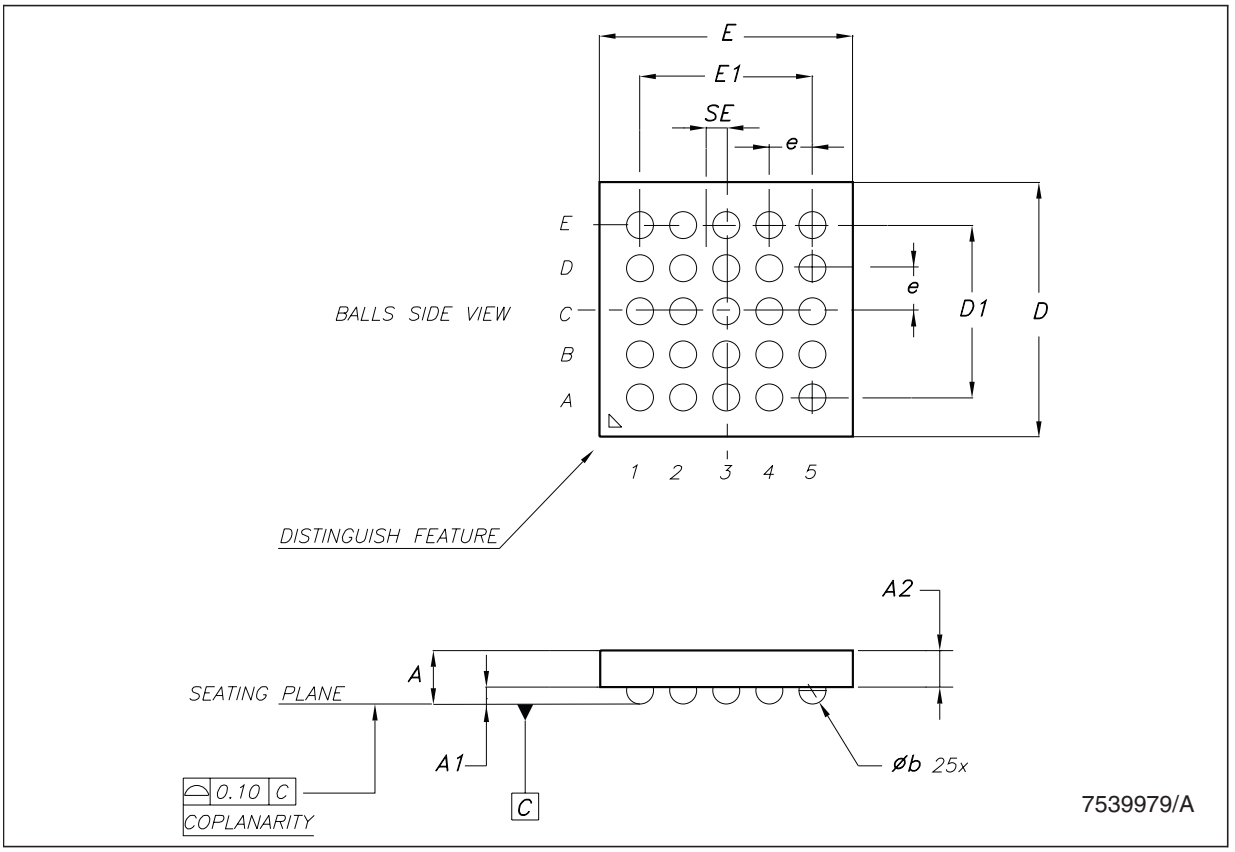
All the functions of the device are controlled through the I²C bus which reduces the number of logic pins of the package and saves PCB tracks on the application board. Hard and soft-triggering of flash and torch are both supported. The device includes many functions to protect the chip and the power LEDs. These include a soft-start control, chip over-temperature detection and protection, shorted LEDs detection and protection. In addition, a digital programmable time-out function protects the LEDs in case of a wrong command issued by the microprocessor. An optional external NTC is supported to protect the LEDs against overheating. It is possible to separately program the current intensity in flash and torch mode by I²C. In order to guarantee the proper function of flash mode, the SuperCap voltage should be monitored by the microprocessor using the READY pin feature. In case of insufficient power from the SuperCap, a warning is generated. The device is packaged in 3 x 3 mm BGA package with a 1 mm height.

2 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK is an ST trademark.

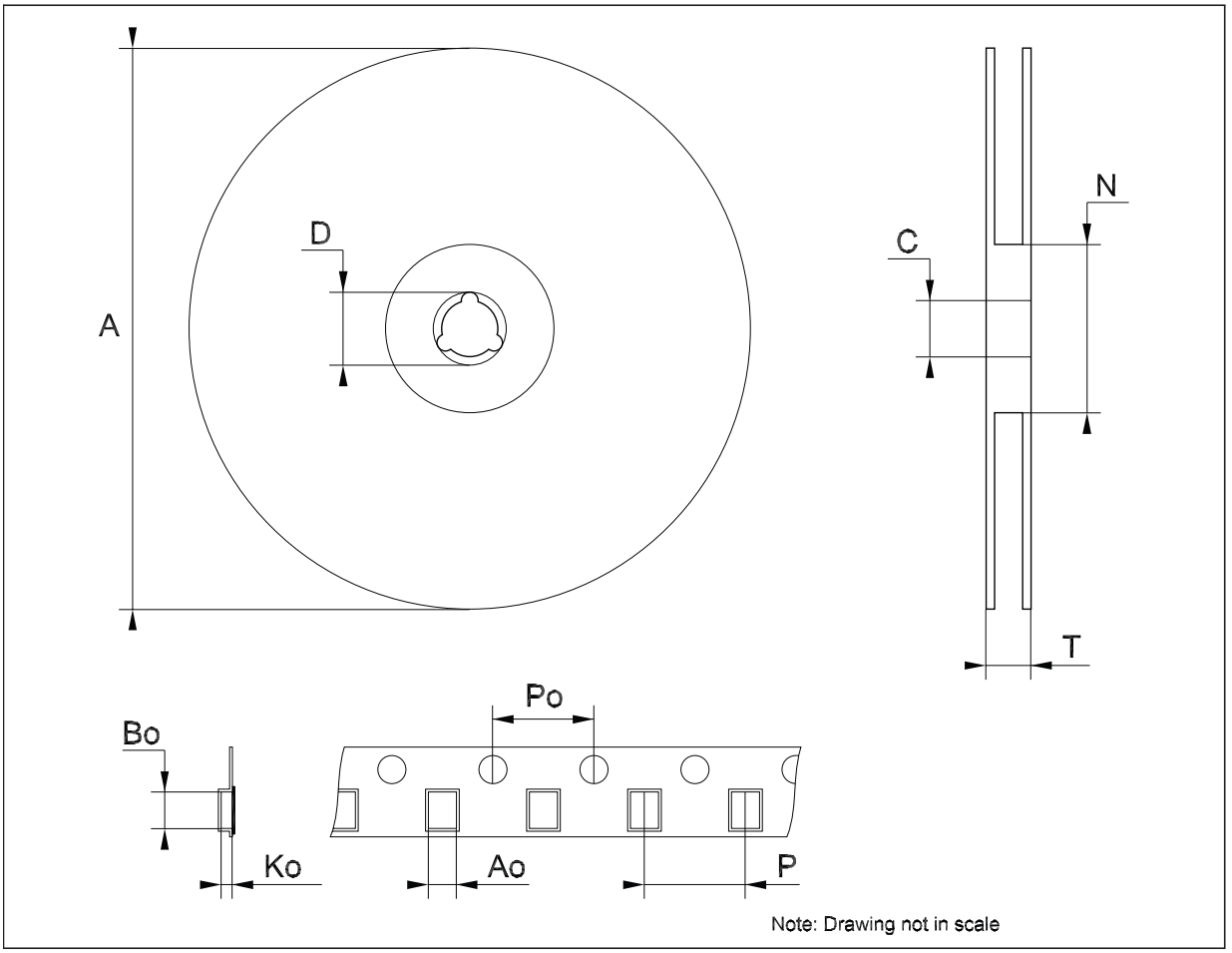
TFBGA25 mechanical data

Dim.	mm.			mils.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	1.0	1.1	1.16	39.4	43.3	45.7
A1			0.25			9.8
A2	0.78		0.86	30.7		33.9
b	0.25	0.30	0.35	9.8	11.8	13.8
D	2.9	3.0	3.1	114.2	118.1	122.0
D1		2			78.8	
E	2.9	3.0	3.1	114.2	118.1	122.0
E1		2			78.8	
e		0.5			19.7	
SE		0.25			9.8	



Tape & reel TFBGA25 mechanical data

Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			330			12.992
C	12.8		13.2	0.504		0.519
D	20.2			0.795		
N	60			2.362		
T			14.4			0.567
Ao		3.3			0.130	
Bo		3.3			0.130	
Ko		1.60			0.063	
Po	3.9		4.1	0.153		0.161
P	7.9		8.1	0.311		0.319



Note: Drawing not in scale

3 Revision history

Table 2. Document revision history

Date	Revision	Changes
24-Mar-2009	1	Initial release.

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