

Migrating from SST39WF16012 to S29AS016J for Bluetooth Applications

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AN201088 discusses how to replace the SST39WF16012 with the 1.8V 16-Mbit S29AS016J BGA package NOR in Bluetooth applications.

1 Introduction

Bluetooth applications need low power consumption and small package size NOR flash as a memory solution. The Cypress® S29AS016J NOR flash, 1.8V BGA package, can match this kind of portable audio application requirements.

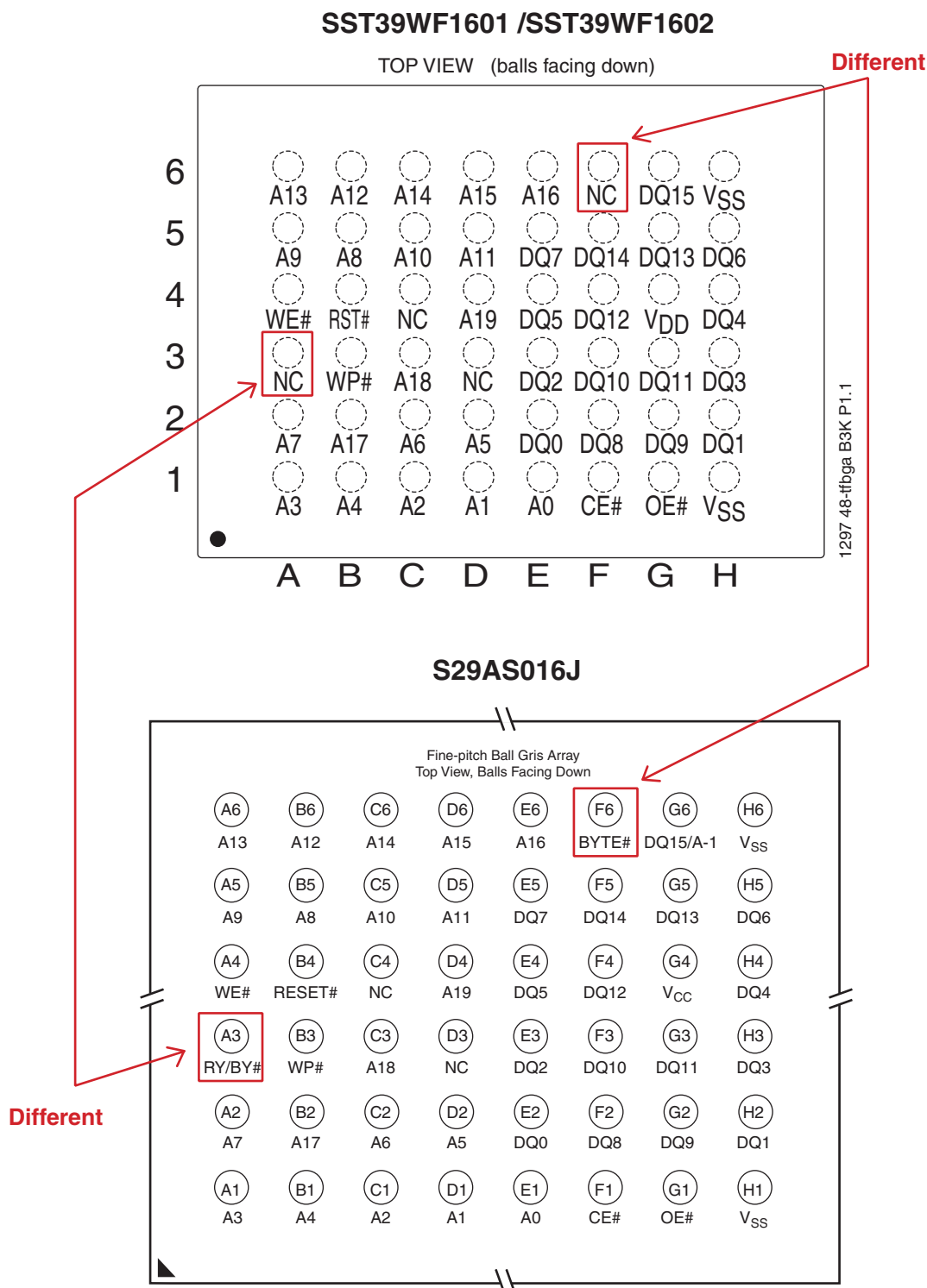
CSR chipset provider's BC03 and BC05 platforms are common Bluetooth solution. The S29AS016J has already been qualified by CSR chipset. Due to our legacy AM29SL part EOL, SST SST39WF16012 is the most common memory solution with CSR Bluetooth applications. This document discusses how to replace the SST39WF16012 with the 1.8V 16-Mbit S29AS016J BGA package NOR in Bluetooth applications.

2 Feature Comparison

Cypress's S29AS-J product family is a new 110 nm die shrink version, that replaces our legacy 230 nm/320 nm AM29SL product family.

The S29AS-J product family BGA package only differs from the SST SST39WF product family by two balls as shown in [Figure 1](#).

Figure 1. SST39WF1601 vs. S29AS016J Ball Grid Array



Cypress's S29AS-J uses pin F6 as the BYTE# pin to select between an 8-bit or 16-bit mode. The BYTE# pin controls whether the device data I/O pins DQ15–DQ0 operate in the byte or word configuration. If the BYTE# pin is set at logic 1, the device is in word configuration, DQ15–DQ0 are active and controlled by CE# and OE#. If the BYTE# pin is set at logic 0, the device is in byte configuration and pin F6 is the lowest order address line, A-1.

Pin A3 is the RY/BY# pin, which is the Ready/Busy output. If the output is low (Busy), the device is actively erasing or programming. (This includes programming in the Erase Suspend mode.) If the output is high (Ready), the device is ready to read array data (including during the Erase Suspend mode), or is in the standby mode.

These two pins on the SST part are both Not Connected (NC). SST39WF is a 16-bit interface device. Therefore, the F6 BYTE# pin needs to be pulled high to set the chip to 16-bit interface. If pin A3, is not used, and left NC, the Cypress S29AS016J is hardware compatible to the SST part.

S29AS-J can support x8/x16 bit interface, fast access times (70 ns) and fast programming times. While SST39WF supports small 2 kword uniform sectors, it can also support fast erase times. Others pins are all compatible with Cypress AS-J part.

Table 1 shows the feature comparison.

Table 1. Feature Comparison

Parameter	S29AS016J	SST39WF16012
Process Technology	110 nm	180 nm
Operating Voltage Range	$V_{CC} = 1.65 - 1.95V$	$V_{CC} = 1.65 - 1.95V$
Databus	x8 / x16	x16
Access Time	70 ns	90 ns
Sector Architecture	<ul style="list-style-type: none"> • Eight 8 kbyte and thirty-one 64 kbyte sectors (byte model) • Eight 4 kword and thirty-one 32 kword sectors (word model) 	Uniform 2 kword sectors
Write Protect	Top or Bottom	Top or Bottom
Sector-Erase Time	0.5s	36 ms (typical)
Program Time (Word)	6 μ s	28 μ s (typical)
Pinout	48 pin (TSOP) / 48 Ball (BGA)	48-ball TFBGA (6 mm x 8 mm) 48-ball WFBGA (5 mm x 6 mm)

3 Replacing Actions

Based on the differences between the SST39WF16012 and S29AS016J devices, there are two modifications that are required.

- **Hardware:** The S29AS016J part supports x8/x16 bit mode using pin F6 (BYTE#). So, if the existing system uses SST39WF16012, then pin F6 needs to be pulled high.
- **Software:** Based on the two devices different sector architectures, the erase area is different. So, software needs to take care of any erase issue. The two devices have different Erase times. We strongly recommend that software be used for data polling rather than just time delay to avoid any operation conflict issue.

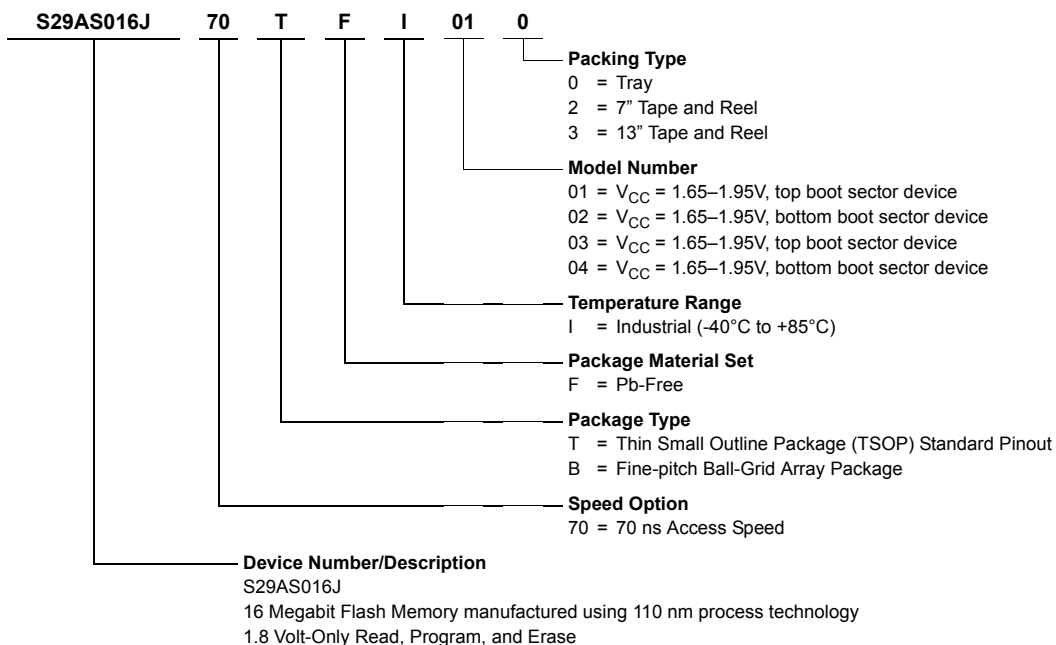
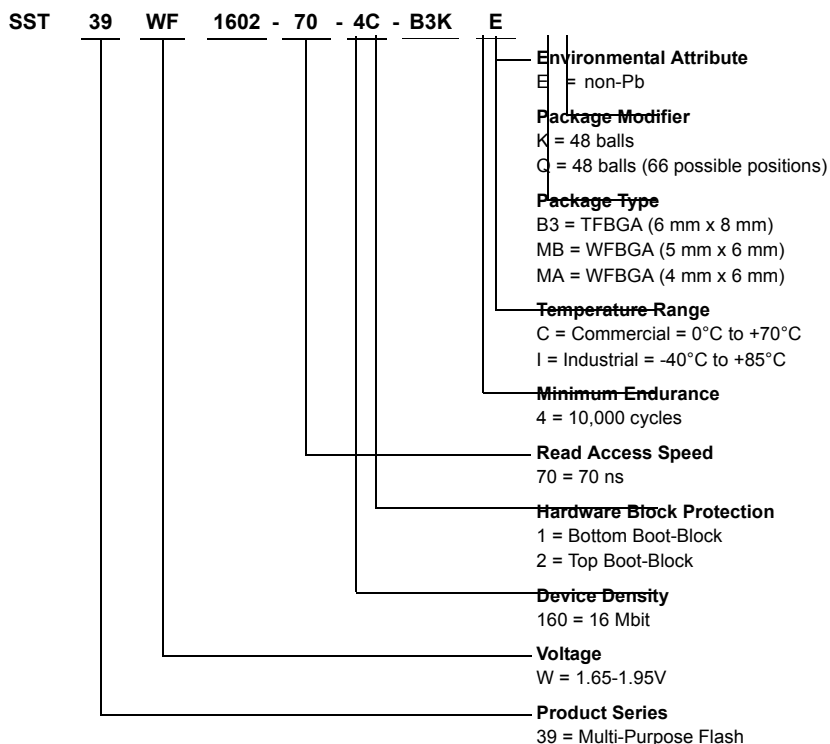
4 Recommended Replacement Part Number

Cypress replacement parts are shown below, using VBK048 package.

SST39WF1601-90-4C-B3K -> S29AS016J70BFI040

SST39WF1602-90-4C-B3K -> S29AS016J70BFI030

5 Appendix – SST and Cypress Part Number Ordering Information



Document History Page

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Rev.	ECN No.	Orig. of Change	Submission Date	Description of Change
**	—	—	09/07/2011	Initial version
*A	5008969	MSWI	11/10/2015	Updated in Cypress template
*B	5870054	AESATMP8	09/01/2017	Updated logo and Copyright.

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