S29GL-N to S29GL-P Migration

AN98498 guides customers currently using the S29GL-N 110nm MirrorBit products to migrate to the S29GL-P 90nm MirrorBit products.

1 Introduction

This application note has been developed to guide customers currently using the S29GL-N 110nm MirrorBit products to migrate to the S29GL-P 90nm MirrorBit products. This document outlines some of the similarities and differences between the products in order to make the migration as seamless as possible.

The S29GL-N and S29GL-P are basically identical devices maintaining the same Device ID. The process technology migrated from 110 nm to 90 nm so migration should be easy and seamless. However, there is a minor change in the Hardware reset procedure that customers may need to be aware of depending on their system. In addition, the S29GL-P introduces 32 word write buffer size for the customers who want better programming performance while keeping backward software compatibility with 16 word write buffer size. Finally, the S29GL-P family provides a monolithic 1 Gigabit NOR device so that very high density code/data storage applications can take advantage of reliable and fast random read features of NOR flash.

2 Distinctive Characteristics Comparison

All models of S29GL-N family have equivalent counterparts in the S29GL-P family. Note that the S29GL-P family adds a 1 Gb option.

Table 1. S29GL-N & S29GL-P Valid Combinations

Base Part Number	Density	Model Number(1)	Random Access Time (t_{ACC})(3)	S29GL-N	S29GL-P	Package Options(3)
S29GL128 S29GL256	128 & 256 Mbit	R1, R2(2)	90	Yes	Yes	56-pin TSOP 64-ball FBGA
		01, 02	100/110	Yes	Yes	
		V1, V2	110	Yes	Yes	
S29GL512	512 Mbit	R1, R2(2)	100	No	Yes	56-pin TSOP 64-ball FBGA
		01, 02	110	Yes	Yes	
		V1, V2	120	Yes	Yes	
S29GL01G	1 Gbit	R1, R2(2)	110	No	Yes	56-pin TSOP 64-ball FBGA
		01, 02	120	No	Yes	
		V1, V2	130	No	Yes	

Note

1. *Model Number vs. Voltage range:*
   R1, R2 (regulated voltage) = 3.0 to 3.6V
   01, 02 (full voltage) = 2.7 to 3.6V
   V1, V2 (versatile IO) = 1.65 to 3.6V
2. *S29GL-P family in R1 & R2 models are available in commercial (0°C to +85°C) and Industrial (-40°C to +85°C) temperature ranges*
3. *Check S29GL-P datasheet for a complete list of valid combinations & ordering options.*

The Autoselect information is very similar between S29GL-N and S29GL-P and the only difference is due to the indicator bits. Please see Table 2 for details.

Table 2. Comparisons of Autoselect Addresses in System

Description	Address	Read Data (word/byte mode) S29GL-N	Read Data (word/byte mode) S29GL-P
Manufacturer ID	(Base) + 00h	xx01h/01h	xx01h/01h
Device ID, Word 1	(Base) + 01h	227Eh/7Eh	227Eh/7Eh
Device ID, Word 2	(Base) + 0Eh	2223h/23h(GL512P) 2222h/22h(GL256P) 2221h/21h(GL128P)	**2228h/28h (GL01GP)** 2223h/23h(GL512P) 2222h/22h(GL256P) 2221h/21h(GL128P)
Device ID, Word 3	(Base) + 0Fh	2201h/01h	2201h/01h
Secured Silicon Sector Indicator Bit(DQ7), WP# protects highest address sector	(Base) + 03h	98h(factory locked), 18h(not factory locked)	**99h(factory locked)**, **19h(not factory locked)**
Secured Silicon Sector Indicator Bit(DQ7), WP# protects lowest address sector	(Base) + 03h	88h(factory locked), 08h(not factory locked)	**89h(factory locked),** **09h(not factory locked)**
Sector Group protection verification	(Base) + 02h	00h(unprotected) 01h(protected)	00h(unprotected) 01h(protected)

3 Package Comparison

The S29GL-N and S29GL-P maintain Cypress's Universal Footprint. These products have identical footprints in both TSOP and BGA packages for similar densities. Please refer to the data sheet for the package details.

4 Architectural / Functional Feature Comparison

Table 3. Architectural / Functional feature comparison

Feature	S29GL-N	S29GL-P
Technology	MirrorBit	MirrorBit
Process Technology	110 nm	90 nm
V_{CC}	2.7 V ~ 3.6 V	2.7 V ~ 3.6 V
Max Density (monolithic)	512 Mb	1 Gb
Number of Banks	1	1
Sector Architecture	Uniform 128 KB	Uniform 128 KB
Simultaneous Read/Write Operation	No	No
Page Read Size	8 Words	8 Words
Write Buffer Size	16 Words (1)	32 Words (1)
Secure Silicon Sector of 256 words	Yes	Yes
Data retention (Typ)	20 years	20 years
Operation Temp. range	-40C to +85C	0C to +85C -40C to +85C
Hardware protection of Top & Bottom sectors	Yes	Yes
Cycling endurance (Typ)	100,000	100,000
Low V_{CC} write inhibit	Yes	Yes
Advanced Sector Protection	Yes	Yes
Write Operation Status bits for program or erase status	Yes	Yes

Table 3. Architectural / Functional feature comparison (Continued)

Feature	S29GL-N	S29GL-P
Program Suspend/Resume command	Yes	Yes
Erase Suspend/Resume command	Yes	Yes
Unlock Bypass Mode	Yes	Yes
ACC input to reduce Factory program time	Yes	Yes
Support for Common Flash Interface	Yes	Yes

Note

1. *32 word write buffer programming has backward compatibility with 16 word write buffer programming, so customers using 16 word write buffer programming can maintain their existing software if they want to.*

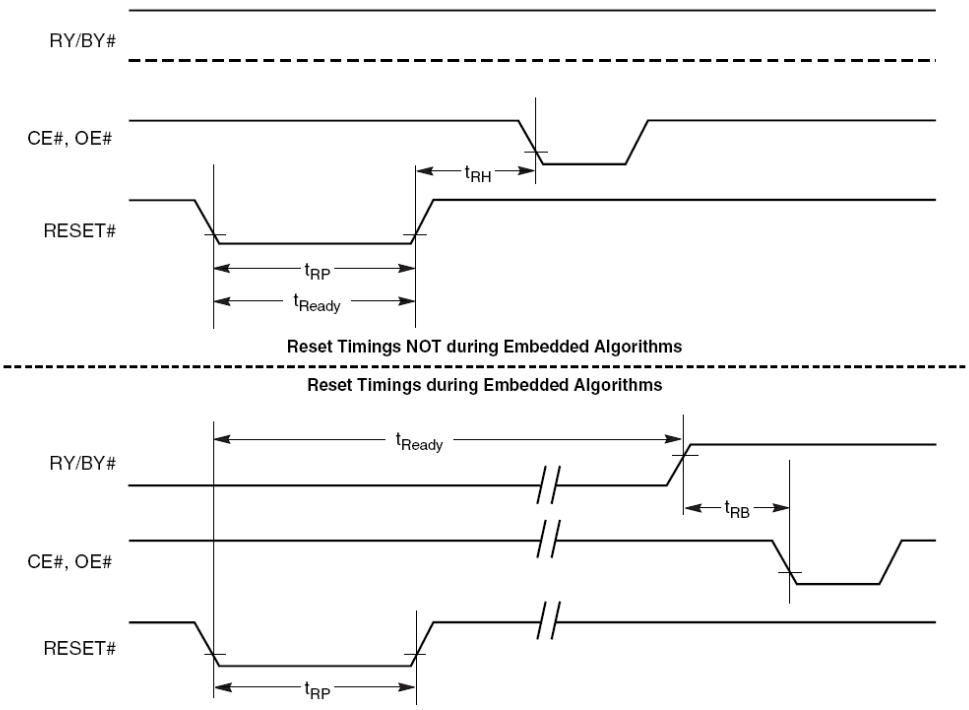
5 Hardware Reset

The specification for hardware reset timing and reset current has changed. However, this change has been proven to be of minimal impact on the customers, since many common processors support these parameters. See Table 4 and Figure 1 for the detailed parameter change. Also, consult S29GL-P data sheet for advanced information on Hardware Reset Timing for future 65 nm S29GL-R family of products.

Table 4. Comparison of Hardware Reset Timings

			S29GL-N		S29GL-P	
Parameter		Description	Figure	Unit	Figure	Unit
JEDEC	Std.					
	t_{READY}	RESET# Pin Low (During Embedded Algorithms) to Read or Write mode	20	ns	35	µs
	t_{READY}	RESET# Pin Low (NOT During Embedded Algorithms) to Read or Write mode	500	ns	35	µs
	t_{RP}	RESET# Pulse Width	500	ns	35	µs
	t_{RH}	RESET# High Time Before Read	50	ns	200	ns
	t_{RB}	RY/BY# Recovery Time	0		0	ns
	I_{CC5}	V_{CC} RESET current	1 (Typ) 5 (Max)	µA	250 (Typ)	µA

Figure 1. Hardware Reset Timings



6 Erase and Programming Performance

S29GL-N and S29GL-P have identical specification for erase and programming performance. Please see Table 5 for details.

Table 5. Comparison of Erase/Programming Performance

		S29GL-N		S29GL-P		
Parameter	**Density**	**Typ**	**Max**	**Typ**	**Max**	**Unit**
Chip Erase Time	128 Mb	64	256	64	256	sec
	256 Mb	128	512	128	512	
	512 Mb	256	1024	256	1024	
	1 Gb	NA	NA	512	2048	
Total Write Buffer Programming Time		240 (1)		480 (2)		µs
Total Accelerated Effective Write Buffer Programming Time		200 (1)		432 (2)		µs
Chip Program Time	128 Mb	123		123		sec
	256 Mb	246		246		
	512 Mb	492		492		
	1 Gb	NA	NA	984		
Sector Erase Time	All densities	0.5	3.5	0.5	3.5	sec

Notes

1. *Total write buffer specification is based upon a 16-word write buffer operation.*
2. *Total write buffer specification is based upon a 32-word write buffer operation.*

7 DC Characteristics

There are minor differences between S29GL-N and S29GL-P DC characteristics. These differences are not detailed in the migration guide due to the numerous parameters. Please refer to the respective data sheet.

8 AC Characteristics

Three parameters have improved in the course of migrating to S29GL-P. They will have no adverse impact on device migration. Specifically, Max. t_{PACC} of S29GL-P falls within 25 ns uniformly while that of S29GL-N varied from 25 ns to 30 ns depending on the speed options. Likewise, Max. t_{OE} of S29GL-P falls within 25 ns uniformly while that of S29GL-N varied from 25 ns to 35 ns depending on the speed options. Finally, Min. t_{DS} has been decreased to 30 ns from 45 ns. Please refer to the respective data sheet for the details.

9 Command Definitions

The S29GL-N and S29GL-P command definitions are completely compatible. Please refer to the data sheet for details.

Document History Page

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Rev.	**ECN No.**	**Orig. of Change**	**Submission Date**	**Description of Change**
**	–	–	12/10/2007	Initial version
*A	–	–	08/15/2008	Section 1 — Modified Introduction Section 2 — Changed Title Table 2.1 — Modified comments/notes Section 3 — Modified description of Package Comparison Section 4 — Added Commercial Temperature range Section 9 — Removed differences in command definitions
*B	4977244	MSWI	10/20/2015	Updated to Cypress template.
*C	5823079	AESATMP8	07/18/2017	Updated logo and Copyright.
*D	6161480	BACD	04/30/2018	Updated to new template. Completing Sunset Review.

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