AN98594

Migrating to Cypress S29GL-N from Numonyx™ M29W (32-64 Mb)

AN98594 details how to migrate designs from Numonyx™ 32 Mbit M29W320E and 64 Mbit M29W640G Flash Memory devices to Cypress® 32 Mbit S29GL032N and 64 Mbit S29GL064N MirrorBit® Flash Memory devices respectively. The S29GL032N and S29GL064N devices are 3.0 Volt-only Page Mode flash memory manufactured with 110 nm MirrorBit technology.

1 Introduction

This Application Note details how to migrate designs from Numonyx™ 32 Mbit M29W320E and 64 Mbit M29W640G Flash Memory devices to Cypress 32 Mbit S29GL032N and 64 Mbit S29GL064N MirrorBit® Flash Memory devices respectively. The S29GL032N and S29GL064N devices are 3.0 Volt-only Page Mode flash memory manufactured with 110 nm MirrorBit technology.

Cypress 32 Mbit and 64 Mbit S29GL-N flash family devices are compatible with the Numonyx 32 Mbit M29W320E and 64 Mbit M29W640G devices with respect to:

- sector (or block) architecture,
- package and pinout,
- JEDEC standard compliant software command set.

2 Feature Comparison

In Table 1, a feature comparison summary of the Numonyx 32 Mbit M29W320E and 64 Mbit M29W640G flash memory to the Cypress 32Mbit S29GL032N and 64 Mbit S29GL064N MirrorBit flash family devices is provided.

Table 1. Feature Comparison (Sheet 1 of 2)

Feature	M29W320E/M29W640G	S29GL032N/S29GL064N
Technology	110 nm Floating-Gate technology	110 nm MirrorBit technology
Sector Architecture	32 Mbit: Boot Block (Top or Bottom) 63x64 KB + 8x KB 64 Mbit: Boot Block (Top or Bottom) 127x64 KB, 8x KB Uniform Block 128x64 KB	32 Mbit: Model 03, 04 Boot Sector (Top or Bottom) 63x64 KB + 8x8 KB Uniform Sector 64x64 KB 64 Mbit: Boot Sector (Top or Bottom) 127x64 KB, 8x KB Uniform Sector 128x64 KB
Package Summary	TSOP48 20 x 12 mm TSOP56 20 x 14 mm TBGA64 13 x 10 mm FBGA64 13 x 11 mm TFBGA48 8 x 6 mm	TS048 20 x 12 mm TS056 20 x 14 mm LAE064 9 x 9 mm LAA064 13 x 11 mm VBK048 8.15 x 6.15 mm
Access time, supply and I/O voltage range	32 Mbit: t_{ACC} = 70, 90 ns V_{CC} = 2.7V to 3.6V 64 Mbit: t_{ACC} = 60, 70, 90 ns V_{CC} = 2.7V to 3.6V	t_{ACC} = 90 ns V_{CC} = V_{IO} = 2.7V to 3.6V t_{ACC} = 110 ns V_{CC} = 2.7V to 3.6V V_{IO} = Vcc (boot sector models) V_{IO} = 1.65V to 3.6V (uniform sector models)
Page Mode Read	32 Mbit: not supported 64 Mbit: t_{PACC} = 25 ns	t_{PACC} = 25 ns
Bus Architecture	x8 / x16	x8 / x16

Table 1. Feature Comparison (Sheet 2 of 2)

Feature	M29W320E/M29W640G	S29GL032N/S29GL064N
Temperature Range	-40°C to +85°C -40°C to 125 °C	-40°C to +85°C
Manufacturer ID	x8 20h x16 0020h	x8 01h x16 0001h
Device ID	32 Mbit Boot Block: x8 Top 56h Bottom 57h x16 Top 2256h Bottom 2257h 64 Mbit Boot Block: x8 Top 7Eh, 10h, 01h Bottom 7Eh, 10h, 00h x16 Top 227Eh, 2210h, 2201h Bottom 227Eh, 2210h, 2200h 64 Mbit Uniform Block: x8 Last 7Eh, 0Ch, 01h First 7Eh, 0Ch, 00h x16 Last 227Eh, 220Ch, 2201h First 227Eh, 220Ch, 2200h	32 Mbit Boot Sector: x8 Top 7Eh, 1Ah, 01h Bottom 7Eh, 1Ah, 00h x16 Top 22E7h, 221Ah, 2201h Bottom 22E7h, 221Ah, 2200h 64 Mbit Boot Block: x8 Top 7Eh, 10h, 01h Bottom 7Eh, 10h, 00h x16 Top 227Eh, 2210h, 2201h Bottom 227Eh, 2210h, 2200h 64 Mbit Uniform Block: x8 Highest/Lowest 7Eh, 0Ch, 01h x16 Highest/Lowest 227Eh, 220Ch, 2201h
Command interface	JEDEC Standard command set with multiple byte and word Program command extensions.	JEDEC Standard command set with ASP (Advanced Sector Protection) extensions standard.
Program operation	Single Byte/Word Programming 64 Mbit: Write Buffer programming	Single Byte/Word programming Write Buffer programming
Sector Protection/Unprotection	Block Protect and Chip Unprotect commands	Advanced Sector Protection
256 bytes One Time Programmable region	256 Byte Extended Block	256 Byte Secured Silicon Sector

Table 2. Erase and Programming Performance

Feature	M29W320E/M29W640G	S29GL032N/S29GL064N
Sector Erase Time (typical)	32 Mbit: 0.8s 64 Mbit: 0.5s	0.5s
Chip Erase Time (typical)	32 Mbit: 40s 64 Mbit: 80s	32 Mbit: 32s 64 Mbit: 64s
Total Write Buffer Program Time (typical)	32 Mbit: not supported 64 Mbit: 180 µs	240 µs
Single Word Program Time (typical)	10 µs	60 µs
Chip Program Time (typical)	32 Mbit: 20s 64 Mbit: 40s	32 Mbit: 31.5s 64 Mbit: 63s

3 Sector Architecture

The Numonyx 32 Mbit M29W320ET (top boot block) and M29W320EB (bottom boot block) devices are architecturally compatible with the Cypress S29GL032N Model 03 (top boot sector) and Model 04 (bottom boot sector) devices, respectively.

The Numonyx M29W640GT (top boot block) and M29W640GB (bottom boot block) devices are architecturally compatible with the S29GL064N Model 03 (top boot sector) and Model 04 (bottom boot sector) devices, respectively.

The Numonyx M29W640GH (uniform block with highest block protected by WP#) and M29W640GL (uniform block with lowest block protected by WP#) devices are architecturally compatible with the S29GL064N Model 01 (uniform sectors with highest sector protected by WP#) and Model 02 (uniform sectors with lowest sector protected by WP#) devices, respectively.

Recommended Numonyx to Cypress part number mappings based on Sector Architecture and WP# Write Protect pin functionality are shown in Table 3.

Table 3. Compatible Root Part Number Mapping

Density Sector Architecture	Numonyx	Cypress
32 Mbit: Boot Block (Top or Bottom) 63x64 KB + 8x8 KB	M29W320ET M29W320EB	S29GL032N Model 03 S29GL032N Model 04
64 Mbit: Boot Block (Top or Bottom) 63x64 KB, 8x8 KB	M29W640GT M29W640GB	S29GL064N Model 03 S29GL064N Model 04
Uniform Block 128x64 KB	M29W640GH M29W640GL	S29GL064N Model 01 S29GL064N Model 02

4 Pin Descriptions

This section provides a comparison between Numonyx and Cypress flash memory pin descriptions.

Table 4. Pin Descriptions

Pin		Description
Numonyx	Cypress	
A21-A0		Address inputs (64 Mbit)
A20-A0		Address inputs (32 Mbit)
DQ7-DQ0		Data inputs/outputs
DQ14-DQ0		Data inputs/outputs
DQ15/A-1		DQ15 (Data input/output, word mode), A-1 (LSB Address input, byte mode)
/E	CE#	Chip Enable input
/G	OE#	Output Enable input
/W	WE#	Write Enable input
V_{PP} /WP	WP#/ACC	Hardware Write Protect input/Program Acceleration input
	ACC	Program Acceleration input
	WP#	Hardware Write Protect input
/RP	RESET#	Hardware Reset Pin input
R /B	RY/BY#	Ready/Busy output
/BYTE	BYTE#	Selects 8-bit or 16-bit mode
V_{CC}		Supply Voltage
	V_{IO}	Output Buffer Power (Cypress Uniform Sector Models only)
V_{SS}		Device Ground
NC		Pin Not Connected Internally

5 Package Matrix

Cypress 32 Mbit S29GL032N and 64 Mbit S29GL064N MirrorBit flash memory devices are fully pin compatible with equivalent package Numonyx 32 Mbit M29W320E and 64 Mbit M29W640G flash memory devices as shown in Table 5. Only Numonyx M29W640GH and M29W640GL devices with TSOP48 20 x 12 mm and TFBGA48 8 x 6 mm package options do not have direct pinout and footprint compatible Cypress equivalents.

Please refer to the S29GL-N MirrorBit flash family data sheet for package pinout, and mechanical specifications.

Table 5. Pin Compatible Package Matrix

Numonyx	Numonyx Package Offerings	Cypress	Cypress Package Offerings
M29W320ET M29W320EB	TSOP48 20 x 12 mm FBGA64 13 x 11 mm TFBGA48 8 x 6 mm	S29GL032N Model 03 S29GL032N Model 04	TS048 20 x 12 mm LAE064 9 x 9 mm LAA064 13 x 11 mm VBK048 8.15 x 6.15 mm
M29W640GT M29W640GB	TSOP48 20 x 12 mm TSOP56 20 x 14 mm TBGA64 13 x 10 mm FBGA64 13 x 11 mm TFBGA48 8 x 6 mm	S29GL064N Model 03 S29GL064N Model 04	TS048 20 x 12 mm TS056 20 x 14 mm LAE064 9 x 9 mm LAA064 13 x 11 mm VBK048 8.15 x 6.15 mm
M29W640GH	TSOP56 20 x 14mm TBGA64 13 x 10 mm FBGA64 13 x 11 mm *TSOP48 20 x 12 mm* (Note 1) *TFBGA48* 8 x 6 mm (Note 1)	S29GL064N Model 01 S29GL064N Model 02	TS056 20 x 14 mm LAE064 9 x 9 mm LAA064 13 x 11mm

Note:

1. *Numonyx packages in italics do not have feature equivalent, pin compatible Cypress products.*

6 Software Command Set

Cypress S29GL032N and S29GL064N MirrorBit share identical core JEDEC standard compliant software command sets with the Numonyx 32 Mbit M29W320E and 64 Mbit M29W640G flash memory devices as shown in Table 6.

Numonyx Fast program command extensions including M29W320E and M29W640G Double Word Program and Quadruple Byte Program plus M29W640G Quadruple Word Program and Octuple Byte Program do not have equivalent command sequences in the Cypress S29GL032N and S29GL064N. Second source designs should avoid the Fast program commands. Otherwise, the Fast program commands can be emulated using multiple Word or Byte Program commands or with a single Write Buffer sequence with the same Word or Byte Count written into the Buffer before Programming to the flash.

Table 6. Software Commands (Sheet 1 of 2)

Command	Numonyx M29W320E	Cypress S29GL032N	Numonyx M29W640G	Cypress S29GL064N
Read	√	√	√	√
Reset	√	√	√	√
Autoselect	√	√	√	√
Program	√	√	√	√
Double Word Program	√	– (Note 1)	√	– (Note 1)
Quadruple Byte Program	√	– (Note 1)	√	– (Note 1)
Quadruple Word Program	–	–	√	– (Note 1)
Octuple Byte Program	–	–	√	– (Note 1)
Unlock Bypass	√	√	√	√
Unlock Bypass Program	√	√	√	√
Unlock Bypass Reset	√	√	√	√
Write to Buffer	–	√	√	√
Program Buffer to Flash	–	√	√	√
Write to Buffer Abort Reset	–	√	√	√
Chip Erase	√	√	√	√
Sector Erase	√	√	√	√
Program/Erase Suspend	Erase Suspend	√	√	√
Program/Erase Resume	Erase Resume	√	√	√

Table 6. Software Commands (Sheet 2 of 2)

Command	Numonyx M29W320E	Cypress S29GL032N	Numonyx M29W640G	Cypress S29GL064N
CFI Query	√	√	√	√
Enter Secure Silicon Sector Region	√	√	√	√
Exit Secure Silicon Sector Region	√	√	√	√

Note:

1. *Numonyx Fast program commands can be emulated by using multiple Word or Byte program commands or via a single Write Buffer program command sequence*

6.1 Manufacturer and Device Identification

The M29W320E and M29W640G have a different Manufacturer ID than the S29GL032N and S29GL064N as shown in Table 1, . *Feature Comparison* on page 1.

The M29W320E also has a different Device ID than the S29GL032N while the M29W640G Boot Block and Uniform versions have the same three cycle Device ID as the S29GL064N Boot Sector and Uniform Sector devices, respectively, as shown in Table 1, . *Feature Comparison* on page 1.

6.2 Common Flash Memory Interface (CFI)

This section provides a comparison between Numonyx and Cypress Common Flash Interface register space values impacting software configuration.

Table 7. CFI Differences (Sheet 1 of 2)

Address (x8)	Description	Numonyx M29W320E	Numonyx M29W640G	Cypress S29GL032N / S29GL064N
3Ah	V_{PP} Min. voltage (00h = no V_{PP} pin present)	00B5h	00B5h	0000h
3Ch	V_{PP} Max. voltage (00h = no V_{PP} pin present)	00C5h	00C5h	0000h
3Eh	Reserved for future use	0004h	0004h	0007h
40h	Typical timeout for Min. size buffer write 2^N µs (00h = not supported)	0000h	0004h	0007h
46h	Max. timeout for byte/word program 2^N times typical.	0004h	0004h	0003h
48h	Max. timeout for buffer write 2^N times typical	0000h	0004h	0005h
4Ah	Max. timeout per individual block erase 2^N times typical	0003h	0003h	0004h
50h	Flash Device Interface description (refer to CFI publication 100) 0001h = x16-only bus devices 0002h = x8/x16 bus devices	0002h	0002h	0001h = 64 Mb (06, 07, V6, V7) 0002h = 32 Mb and 64 Mb (01, 02, 06, 07, V1, V2)
54h	Max. number of byte in multi-byte write = 2^N (00h = not supported)	0000h	0005h	0005h
5Ah 5Ch 5Eh 60h	Erase Block Region 1 Information (refer to the CFI specification or CFI publication 100)	0007h, 0000h, 0020h, 0000h	007Fh, 0000h, 0000h, 0001h = (GH,GL) 0007h, 0000h, 0020h, 0000h = (GT,GB)	007Fh, 0000h, 0000h, 0001h = 64 Mb (01, 02, 06, 07, V1, V2, V6, V7) 0007h, 0000h, 0020h, 0000h = 64 Mb (03, 04) 003Fh, 0000h, 0000h, 0001h = 32 Mb (01, 02, V1, V2) 0007h, 0000h, 0020h, 0000h = 32 Mb (03, 04)

Table 7. CFI Differences (Sheet 2 of 2)

Address (x8)	Description	Numonyx M29W320E	Numonyx M29W640G	Cypress S29GL032N / S29GL064N
62h 64h 66h 68h	Erase Block Region 2 Information (refer to the CFI specification or CFI publication 100)	003Eh, 0000h, 0000h, 0001h	007Eh, 0000h, 0000h, 0001h	0000h, 0000h, 0000h, 0000h = 64 Mb (01, 02, 06, 07, V1, V2, V6, V7) 007Eh, 0000h, 0000h, 0001h = 64 Mb (03, 04) 003Fh, 0000h, 0000h, 0001h = 32 Mb (01, 02, V1, V2) 0007h, 0000h, 0020h, 0000h = 32 Mb (03, 04)
88h	Minor version number, ASCII	0031h	0033h	0033h
8Ah	Address Sensitive Unlock (Bits 1-0) 0 = Required, 1 = Not Required Process Technology (Bits 7-2)	0000h	0000h	00XXh 0100b = 110 nm MirrorBit 0011h = x8-only bus devices 0010h = all other devices
8Eh	Sector Protect 0 = Not Supported, X = Number of sectors in smallest sector	0001h	0004h	0001h
90h	Sector Temporary Unprotect 00 = Not Supported, 01 = Supported	0001h	0001h	0000h
92h	Sector Protect/Unprotect scheme 0008h = Advanced sector Protection	0004h	0004h	0008h
98h	Page Mode Type 02 = 8 Word Page	0000h	0001h	0002h
9Eh	Top/Bottom Boot Sector Flag 02h = Bottom Boot Device 03h = Top Boot Device 04h = Uniform sectors bottom WP# protect 05h = Uniform sectors top WP# protect	0002h EB 0003h ET	0002h GB 0003h GT 0004h GL 0005h GH	0002H = (04) 0003H = (03) 0004H = (02,07,V2,V7) 0005H = (01,06,V1,V6)

6.2.1 Numonyx CFI Exit Sequence

The S29GL032N and S29GL064N tolerate the need of M29W320E and M29W640G to issue the Reset command (F0h) twice to return to Read mode from CFI mode.

7 DC Characteristics and AC Parameter Comparison

The M29W320E and M29W640G and the S29GL032N and S29GL064N have primarily compatible DC and AC specifications. For designs which require dual sourcing, it is recommended that designs utilize devices with Access Time t_{ACC} = 90 ns. Differences in DC Characteristics and AC timing parameters between the devices are highlighted via side-by-side comparisons in Table 8, Table 9, and Table 10 below. The potential impact of any parameter specification differences should be evaluated and validated.

Please refer to the respective Numonyx M29W320E and M29W640G and Cypress S29GL-N S29GL032N and S29GL064N data sheets to verify the most up to date specifications.

7.1 Absolute Maximum Ratings and DC Parameters

Table 8. Absolute Maximum Ratings Comparison

Parameter	Description	M29W320E M29W640G	S29GL032N S29GL064N
V_{PP}, V_{ID}	Identification Voltage, Program Voltage	-0.6V to +13.5V	-0.5V to +12.5V A_{CC}, A9, RESET#

Table 9. DC Characteristics

Parameter	Description	M29W320E M29W640G	S29GL032N S29GL064N
I_{LI}	Input Load Current (Max)	±1 µA	WP#/ACC: ±2.0 µA
I_{LIT}	A9 Input Load Current (Max)		35 µA
I_{CC1}	V_{CC} Initial Read Current (Max)	10 mA @ 6 MHz	30 mA @ 5 MHz
I_{CC3}	V_{CC} Active Erase/Program Current (Max)	20 mA	60 mA
I_{CC4}	V_{CC} Standby Current	100 µA	5 µA
I_{ACC}	ACC Accelerated Program Current	15 mA	WP#/ACC: 20 mA
V_{LKO}	Low V_{CC} Lock-Out Voltage	1.8V Min, 2.3V Max	2.3V Min, 2.5V Max

7.2 AC Parameters

Table 10. AC Characteristics

Parameter	Description	M29W320E M29W640G	S29GL032N S29GL064N	Notes
t_{ACC}	Address to Output Delay	32 Mbit: 70, 90 ns 64 Mbit: 60, 70, 90 ns	90, 110 ns	Also t_{RC}, t_{CE}
t_{PACC}	Page Access Time (Max)	32 Mbit: not supported 64 Mbit: 30 ns	25 ns	t_{ACC} = 90 ns
t_{OE}	Output Enable to Output Delay (Max)	32 Mbit: 35 ns 64 Mbit: 30 ns	25 ns	t_{ACC} = 90 ns
t_{EHQZ} (t_{DF})	Chip Enable to Output High-Z (Max)	32 Mbit: 35 ns 64 Mbit: 30 ns	20 ns	t_{ACC} = 90 ns
t_{GHQZ} (t_{DF})	Output Enable to Output High-Z (Max)	30 ns	20 ns	t_{ACC} = 90 ns
t_{Ready}	RESET# Pin Low (During Embedded Algorithms) to Read Mode (Max)		20 µs	
t_{WC}	Write Cycle Time (Min)	32 Mbit: 70, 90 ns 64 Mbit: 60, 70, 90 ns	90, 110 ns	
t_{AH}	Address Hold Time (Min)	32Mbit: 50 ns	45 ns	t_{ACC} = 90 ns
t_{DS}	Data Setup Time (Min)	32 Mbit: 50 ns 64 Mbit: 30 ns	35 ns	t_{ACC} = 90 ns
t_{WPH}	Write Pulse Width High (Min)	32 Mbit: 30 ns 64 Mbit: 25 ns	30 ns	t_{ACC} = 90 ns
t_{BUSY}	WE# High to RY/BY# Low (Min)	32 Mbit: 35 ns 64 Mbit: 0 ns	90 ns	t_{ACC} = 90 ns
t_{CP}	CE# Pulse Width (Min)	32 Mbit: 50 ns	35 ns	t_{ACC} = 90 ns
t_{CPH}	CE# Pulse Width High (Min)	32 Mbit: 30 ns	25 ns	t_{ACC} = 90 ns

8 Sector Protection

8.1 Hardware Sector Protection

8.1.1 Write Protect

The M29W320E and M29W640G boot block devices and the S29GL032N and S29GL064N Model 03 and Model 04 boot sector devices support a WP# Write Protect pin multiplexed with V_{PP} (external high voltage power supply). When WP# ≤ V_{IL}, program and erase functions are disabled in the two outermost boot sectors.

The M29W640GH and M29W640GL uniform block devices and the S29GL064N Model 01 and Model 02 uniform sector devices support a WP# Write Protect pin multiplexed with V_{PP} (external high voltage power supply) where program and erase functions are disabled in the highest or lowest sector, respectively, when WP# ≤ V_{IL}.

The $V_{PP}/\overline{WP}$ pin on the M29W320E cannot be left floating or unconnected unlike the S29GL032N WP#/ACC pin which has an internal pull-up and can be left unconnected as WP#/ACC will be internally pulled > V_{IH}.

8.1.2 Sector Group / Sector Protection

A high voltage V_{ID} (12V) is applied to the M29W320E and M29W640G RP pin to protect or unprotect sector groups and a limited number of individual sectors unlike the S29GL032N and S29GL064N which utilize software based ASP (Advanced Sector Protection) to protect any sector or combination of sectors.

Please see Software Sector Protection for a recommendation on how to use ASP (Advanced Sector Protection) to protect sectors in a functionally equivalent way to the Numonyx V_{ID} hardware method in system.

8.1.2.1 Sector Group / Sector Protection in Programming Equipment

If a Sector Protection Scheme is implemented using programming equipment, Cypress Advanced Sector Protection can also provide sector protection equivalent to the Numonyx 12V method. Similar to the Numonyx 12V Sector Group / Sector Protection Emulation in System recommendation, the Persistent Protection Mode is selected and non-volatile Persistent Protection Bit (PPB) is set for each sector requiring protection.

8.1.3 Temporary Sector Unprotect

When the M29W320E pin RP = V_{ID} or $V_{PP}/WP = V_{ID}$, all the blocks are temporarily unprotected unlike the S29GL032N which uses software based ASP (Advanced Sector Protection) to achieve equivalent functionality.

Upon customer request, when the M29W640G pin RP = V_{ID}, all the previously protected blocks are temporarily unprotected except the lowest or highest block protected with $V_{PP}/WP = V_{IL}$ unlike the S29GL064N which can use software based ASP to achieve equivalent functionality.

8.2 Software Sector Protection

The M29W320E and M29W640G do not support software sector protection unlike the S29GL032N and S29GL064N which include Cypress Advanced Sector Protection (ASP) as a standard feature with several levels of software sector protection to disable both the program and erase operations on a sector by sector basis.

The special order Numonyx M29W640GS Secure Flash memory includes a software protection scheme similar to the S29GL064N. The M29W640GS Standard Protection Mode and Password Protection Mode roughly correspond to S29GL064N Persistent Sector Protection Mode and Password Sector Protection mode respectively. However, the M29W640GS can only protect up to four main blocks or four parameter blocks in boot sector using software protection.

Software Advanced Sector Protection is implemented using Sector Protection Command sequence extensions as documented in the S29GL-N MirrorBit flash family data sheet.

8.2.1 Numonyx 12V Sector Group / Sector Protection Emulation in System

The S29GL032N and S29GL064N support two Sector Protection modes, Persistent Sector Protection and Password Sector Protection.

The devices default to Persistent Sector Protection mode, and this mode is recommended for Numonyx Hardware Sector Protection Emulation in System.

First, the non-volatile Persistent Sector Protection Mode Locking Bit in Lock Register must be set to permanently operate the device using only Persistent Sector Protection.

A Persistent (non-volatile) Protection Bit (PPB) is assigned to each sector in the S29GL032N and S29GL064N. When a PPB is programmed to the protected state through the “PPB Program” command, that sector is protected from program or erase operations and is read-only. Since PPBs provide sector level protection control, these must be mapped to the Numonyx Protection Block Group scheme if the application requires strict equivalence.

For example, the M29W320E provides independent sector protection of Boot Blocks while grouping the sector protection of the remaining sectors into Protection groups of four (4) sectors except for a three (3) sector grouping adjacent to the Boot Blocks.

PPBs can be set using the same groupings to emulate the less flexible Numonyx 12V Protection groups.

8.2.2 V_{ID} (12V) Connection to RP

The M29W320E and M29W640G require the routing of V_{ID} (12V) to RP and RP hardware control circuitry to support Sector Group / Sector Protection and Temporary Sector Unprotect in system.

By using S29GL032N and S29GL064N Advanced Sector Protection in system, V_{ID} (12V) does not need to be routed to RP and RP hardware control circuitry can be eliminated from an in system sector protection perspective.

8.3 ASP Software support

The Low Level Driver (LLD) is a production-grade driver toolbox that manages command initiation and polling operations for the full range of Cypress memory devices including the S29GL032N and S29GL064N MirrorBit flash memories.

The LLD interface includes support for Advanced Sector Protection as well as write buffer programming, suspend/resume functions for program and erase, and general purpose polling logic. The LLD can be used as a package or as a reference standard for implementation of ASP and other Cypress flash capabilities.

Cypress LLD software is available free of charge and comes with a no-hassle click-thru license. Documentation and user's manuals are included in the LLD download *.zip file.

9 References

- S29GL-N MirrorBit Flash Family Data Sheet (Publication Identification Number S29GL-N_01)
- M29W320ET, M29W320EB Data Sheet (May 2009 Rev 9)
- M29W640GH, M29W640GL, M29W640GT, M29W640GB Data Sheet (October 2009 Rev 11)
- AN309009 Migration Guide: How to Migrate to Numonyx M29W640G from Cypress* S29GL064N Flash Memory (Rev 1)
- AN309010 Migration Guide: How to Migrate to Numonyx M29W320E from Cypress* S29GL032N Flash Memory (Rev 1)

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