

# GreenPAK™

Configurable Mixed-Signal Matrix



# GreenPAK ICの利点

ルネサスのGreenPAKはアナログ混載のコスト効率に優れたプログラマブルデバイスです。

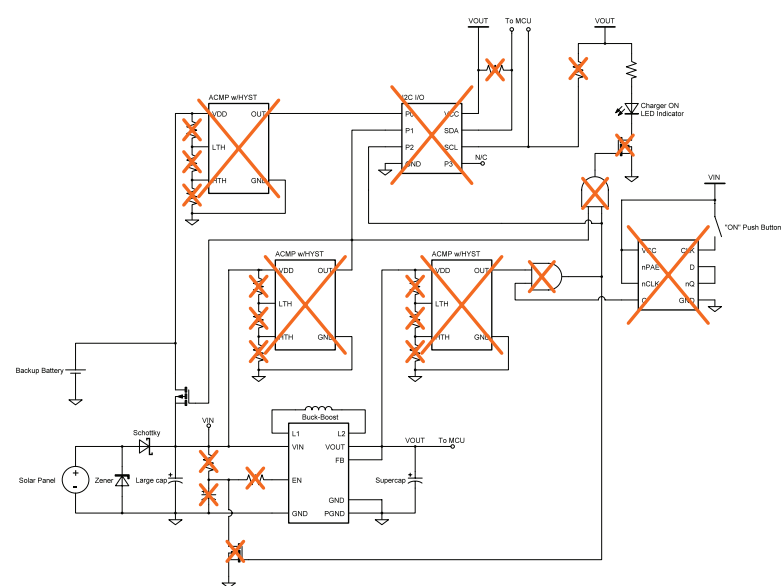
GreenPAK DesignerソフトウェアとGreenPAK Development Kitを使用することで、ユーザーは容易にカスタム回路を作成し、プログラムすることができます。

車載グレードに準拠しているラインアップもご用意があります。

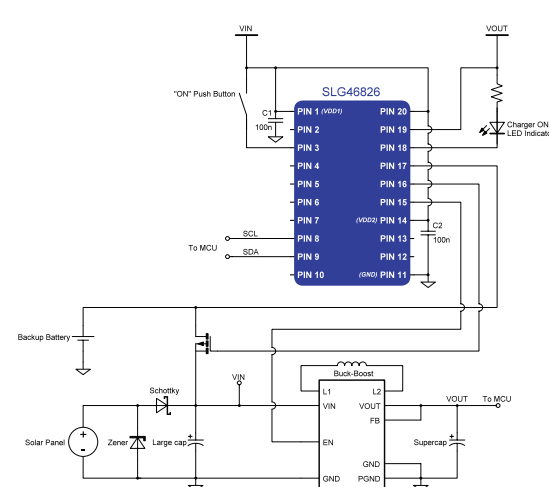
- 市場への素早い投入
- デザインの秘匿性
- 消費電力の低減
- BOMコスト&PCB実装面積の削減
- 柔軟に設計可能
- 熱性能の向上
- 設計不良の確率低下
- 製造コミットメントなし
- カスタムデータシート
- No NRE
- 低コスト

## GreenPAK による機能の統合

Original Design



Optimized GreenPAK Design



Design reduced by  
 - 5 ICs  
 - 2 NMOS transistors  
 - 14 passive components

# オリジナルの機能、特徴を一つのパッケージで実現

GreenPAKファミリを使うことで、ユーザーは一つ、もしくは複数の機能を組み合わせて一つのパッケージで実現することができます。下記は実現できる例になります。

- アナログスイッチ
- バッテリー充電表示
- アナログコンパレータ
- 電流検知
- LDO
- 低電圧検知
- ロジック (Mux, gates, etc.)
- 波形発生器
- オペアンプ
- 過熱検知
- ポテンショメーター
- 可変抵抗器
- 電圧レベル検出
- スリープ機能
- ADC
- DAC
- 制御
- 周波数検知
- 分周
- GPIO (6-28ピン)
- H/ハーフブリッジ
- I<sup>2</sup>C 拡張
- 割り込み
- LED駆動
- デジタルコンパレータ
- シリアルライズ/デシリアルイズ
- 数学演算
- レベルシフタ
- モーター駆動
- パターンジェネレータ
- PWM ジェネレータ
- 電源シーケンス
- SPI または I<sup>2</sup>C 通信
- システムリセット
- ウォッチドッグタイマ

### 提供内容:

- ACE-Q100準拠品
- 一回限り、もしくは複数回書き込み可能
- 一電源、もしくは二電源対応品



1.0 mm x 1.2 mm  
8-pin STQFN  
0.4 mm pitch



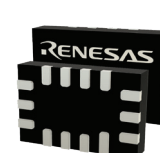
1.6 mm x 1.6 mm  
12-pin STQFN  
0.4 mm pitch



1.6 mm x 2.0 mm  
16-pin MSTQFN  
0.4 mm pitch



1.6 mm x 2.0 mm  
14-pin STQFN  
0.4 mm pitch



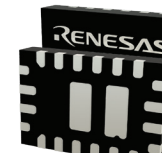
1.6 mm x 2.5 mm  
14-pin STQFN  
0.4 mm pitch



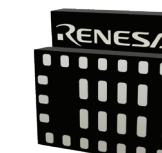
2.0 mm x 2.2 mm  
14-pin STQFN  
0.4 mm pitch



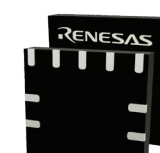
2.0 mm x 2.2 mm  
22-pin MSTQFN  
0.4 mm pitch



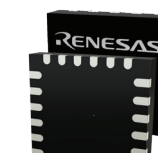
2.0 mm x 3.0 mm  
20-pin STQFN  
0.4 mm pitch



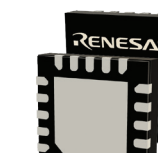
2.0 mm x 3.0 mm  
28-pin MSTQFN  
0.4 mm pitch



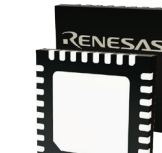
3.0 mm x 3.0 mm  
14-pin FCQFN  
0.65 mm pitch



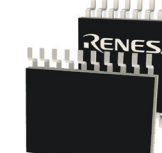
3.0 mm x 3.0 mm  
24-pin STQFN  
0.4 mm pitch



3.5 mm x 3.5 mm  
20-pin TQFN  
0.5 mm pitch



4.0 mm x 4.0 mm  
32-pin STQFN  
0.4 mm pitch



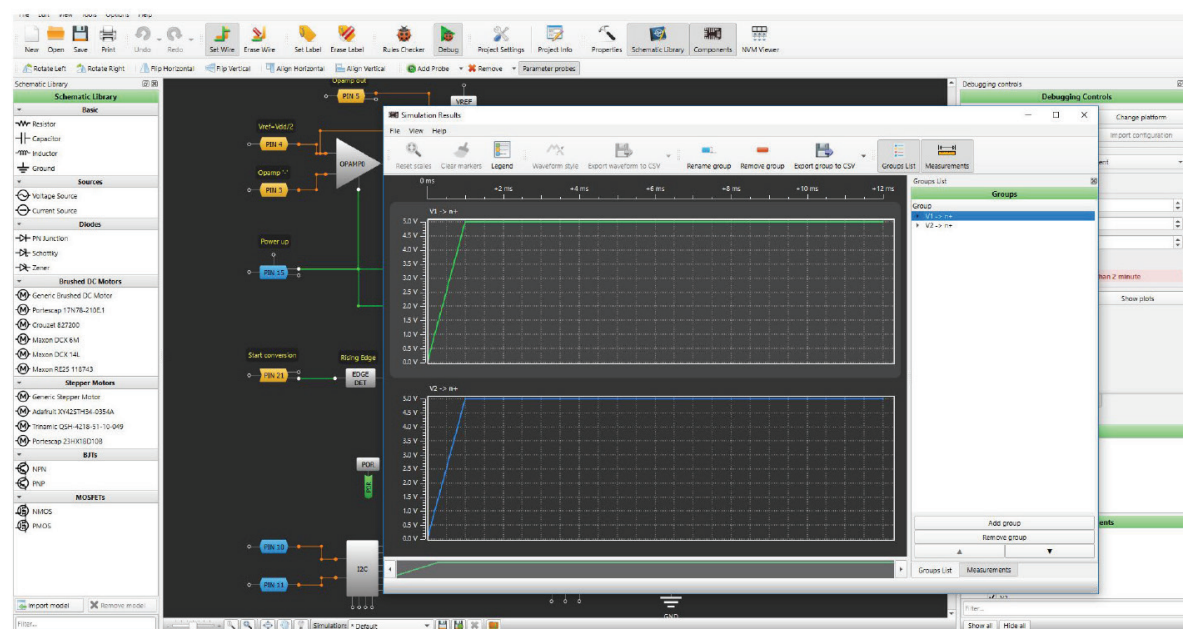
6.5 mm x 6.4 mm  
20-pin TSSOP  
0.65 mm pitch

\*more packages available

# 開発ソフトウェア

ルネサスの開発ソフトウェア Go Configure™ Software Hubはプログラミング言語やコンパイラを必要とせず、グラフィカルな設計を可能にします。設計者は短時間でデザインファイルの作成、ICへのプログラミング、実機検証を行うことができます。

- 回路図の構成や配線が一目で分かる
- 各デバイスで使用可能なリソースを一覧で確認可能
- 容易な各コンポーネントの設定
- 設計例や設計をサポートするドキュメントの準備あり
- 外部のコンポーネントを考慮したシミュレーションの実行



Download Go Configure™  
Software Hub

View the Software User Guide



# 開発ハードウェア

設計者がGreenPAKを使ってカスタム回路を開発できる開発ボードを4種類ご用意しております。一から回路の設計を始めるか、[renesas.com](https://www.renesas.com)で公開されているサンプルデザインをベースとすることでオリジナルの回路を設計することができます。

Board	Functions/Features
<b>SLG4DVKLITE</b> GreenPAK Lite Development Board	<ul style="list-style-type: none"> <li>• DIPタイプとソケットタイプ両方に対応</li> <li>• USB Type-C対応</li> <li>• 二電源品に対応</li> <li>• ボード上のLEDの点灯によりPINの状態を確認可能, Pull-up, Pull-down, GND, VDD</li> <li>• Hi-Z, VDD2, そしてプログラマブルなソフトウェア上で設定できるボタン</li> <li>• 外部デバイスへ接続した動作確認を実現する拡張コネクタ</li> </ul> 
<b>SLG4DVKADV</b> GreenPAK Advanced Development Board	<ul style="list-style-type: none"> <li>• カスタムサンプルを数分で作成可能</li> <li>• USBインターフェース</li> <li>• MacOS, Windows, Linuxに対応</li> <li>• プログラミングとエミュレーションが可能</li> <li>• 外部デバイスへ接続した動作確認を実現する拡張コネクタ</li> <li>• シグナル/ロジックジェネレーター内蔵、ボード上のLEDにより視覚的に動作を確認可能</li> </ul> 
<b>SLG4DVKGSD</b> GreenPAK Serial Debugger Board	<ul style="list-style-type: none"> <li>• I<sup>2</sup>C通信によるシリアルデバッグを実現</li> <li>• 電源およびデバイス制御用のUSB interface</li> <li>• I<sup>2</sup>Cインターフェースのための4ピンヘッダー</li> <li>• MacOS, Windows, Linux対応</li> <li>• SLG46824, SLG46826, SLG47004へのプログラミング対応</li> </ul> 
<b>SLG47105V-DMO</b> HVPAK™ SLG47105 DC/Stepper Motor and LED Control Demonstration Board	<ul style="list-style-type: none"> <li>• DCM、ステッピングモータ、LEDを内蔵したSLG47105をベースとしたデザインをテストするために開発されたデモボード</li> </ul> 
<b>SLG47003V-DMO</b> AnalogPAK SLG47003 Demonstration Board	<ul style="list-style-type: none"> <li>• USB Type-Cポートからの外部ボード電源</li> <li>• GreenPAK Serial Debugger 対応</li> <li>• GreenPAK Advanced Development プラットフォーム対応</li> <li>• GreenPAK Light Development Board 対応</li> <li>• Go Configure Software Hub software 対応</li> <li>• 内蔵オペアンプ出力用の2つのテストポイント (TS)</li> <li>• 回路のパラメータ調整用のエンコーダ</li> </ul> 
<b>SLG47011V-USBPWR-DMO</b> AnalogPAK SLG47011V USB Power Demonstration Board	<ul style="list-style-type: none"> <li>• 電源供給対応 (最大 20V, 5A)</li> <li>• 電圧、電流、電力、温度の測定</li> <li>• 双方向の測定を実現 (プラグ、レセプタクル接続対応)</li> <li>• 128x32 有機ELモノクロ・ディスプレイ</li> <li>• 表示切替ボタン</li> </ul> 
<b>SLG51003V-EVB</b> SLG51003V Power.GreenPAK Evaluation Board	<ul style="list-style-type: none"> <li>• ケルビンセンス付LDO入出力コネクタ</li> <li>• 各LDO入出力チャンネル用RFコネクタ</li> <li>• GPIOコネクタ</li> <li>• GreenPAK Serial Debugger対応</li> <li>• Power GreenPAK Development Motherboard対応</li> </ul> 

## GreenPAK PORTFOLIO

Configurable Mixed-Signal Matrix	SLG46108	SLG46110	SLG46120	SLG46140	SLG46169
Memory Type	OTP	OTP	OTP	OTP	OTP
Temperature Range (°C)	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85
# of GPIOs	6	8	10 *	12	12
Operating Voltage (V)	1.71 to 5.5	1.71 to 5.5	1.71 to 5.5	1.71 to 5.5	1.71 to 5.5
Dual Supply (VDD2 1.8 V to VDD)	–	–	SLG46121 *	–	–
8-bit SAR ADC	–	–	–	–	–
Analog/Digital Comparators	–	2/0	2/0	2/3	2/3
Maximum Look Up Tables (LUTs)	10	10	16	16	18
Maximum Counters/Delays	4	4	4	4	7
Maximum DFF / Latch	4	4	8	6	6
PWMs	–	–	–	3	–
Pipe Delay	–	8-stage	8-stage	16-stage	16-stage
Programmable Delay	1	1	1	1	1
Internal Oscillator (Hz)	25 k / 2 M	25 k / 2 M	25 k / 2 M	1.7 k / 25 k / 2 M / 27 M	25 k / 2 M
Asynchronous State Machine	–	–	–	–	–
Communication Interface	–	–	–	SPI	–
QFN Part Number	SLG46108V	SLG46110V	SLG46120V SLG46121V	SLG46140V	SLG46169V
QFN Package Size (mm)	1.0 x 1.2 x 0.55, 0.4 pitch	1.6 x 1.6 x 0.55, 0.4 pitch	1.6 x 1.6 x 0.55, 0.4 pitch	1.6 x 2.0 x 0.55, 0.4 pitch	2.0 x 2.2 x 0.55, 0.4 pitch
Alternate Package Part Number	–	–	SLG46120P	–	–
Alternate Package Type and Size (mm)	–	–	STQFN 2.0 x 2.0 x 0.55, 0.5 pitch	–	–

Configurable Mixed-Signal Matrix	SLG46170	SLG46533	SLG46534	SLG46536	SLG46537
Memory Type	OTP	OTP	OTP	OTP	OTP
Temperature Range (°C)	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85
# of GPIOs	12	18	12 *	12	18 *
Operating Voltage (V)	1.71 to 5.5	1.71 to 5.5	1.71 to 5.5	1.71 to 5.5	1.71 to 5.5
Dual Supply (VDD2 1.8 V to VDD)	–	–	SLG46535 *	–	SLG46538 *
8-bit SAR ADC	–	–	–	–	–
Analog/Digital Comparators	–	4/0	3/0	3/0	4/0
Maximum Look Up Tables (LUTs)	17	25	17	25	17
Maximum Counters/Delays	8	7	7	7	7
Maximum DFF / Latch	6	15	8	15	8
PWMs	–	–	–	–	–
Pipe Delay	16-stage	16-stage	16-stage	16-stage	16-stage
Programmable Delay	1	1	1	1	1
Internal Oscillator (Hz)	25 k / 2 M	25 k / 2 M / 25 M	25 k / 2 M / 25 M	25 k / 2 M / 25 M	25 k / 2 M / 25 M
Asynchronous State Machine	–	–	8-State	–	8-State
Communication Interface	–	I <sup>2</sup> C	I <sup>2</sup> C	I <sup>2</sup> C	I <sup>2</sup> C
QFN Part Number	SLG46170V	SLG46533V	SLG46534V SLG46535V	SLG46536V	SLG46537V SLG46538V
QFN Package Size (mm)	2.0 x 2.2 x 0.55, 0.4 pitch	2.0 x 3.0 x 0.55, 0.4 pitch	2.0 x 2.2 x 0.55, 0.4 pitch	2.0 x 2.2 x 0.55, 0.4 pitch	2.0 x 3.0 x 0.55, 0.4 pitch
Alternate Package Part Number	–	SLG46533M	–	–	SLG46537M SLG46538M
Alternate Package Type and Size (mm)	–	MSTQFN 2.0 x 2.2 x 0.55, 0.4 pitch	–	–	MSTQFN 2.0 x 2.2 x 0.55, 0.4 pitch

\*Dual Supply versions lose one GPIO for VDD2

## GreenPAK PORTFOLIO

Configurable Mixed-Signal Matrix	SLG46620	SLG46721	SLG46722	SLG46811	SLG46855
Memory Type	OTP	OTP	OTP	OTP	OTP
Temperature Range (°C)	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85
# of GPIOs	18 *	18	18	10	12
Operating Voltage (V)	1.8 to 5.5	1.8 to 5.5	1.8 to 5.5	2.3 to 5.5	2.3 to 5.5
Dual Supply (VDD2 1.8 V to VDD)	SLG46621 *	–	–	–	–
8-bit SAR ADC	1	–	–	–	–
Analog/Digital Comparators	6/3	4/0	–	1(4)/0	4/0
Maximum Look Up Tables (LUTs)	26	18	17	18	23
Maximum Counters/Delays	10	7	8	6	8
Maximum DFF / Latch	12	6	6	17	21
PWMs	3	–	–	–	–
Pipe Delay	2 x 16-stage	16-stage	16-stage	4 Shift Registers	16-stage
Programmable Delay	2	1	1	1	1
Internal Oscillator (Hz)	1.7 k / 25 k / 2 M / 27 M	25 k / 2 M	25 k / 2 M	2 k / 10 k / 25 M	2 k / 2 M / 25 M
Asynchronous State Machine	–	–	–	–	–
Communication Interface	SPI	–	–	–	I <sup>2</sup> C
QFN Part Number	SLG46620V SLG46621V	SLG46721V	SLG46722V	SLG46811V	SLG46855V
QFN Package Size (mm)	2.0 x 3.0 x 0.55, 0.4 pitch	2.0 x 3.0 x 0.55, 0.4 pitch	2.0 x 3.0 x 0.55, 0.4 pitch	1.6 x 1.6 x 0.55, 0.4 pitch	1.6 x 2.0 x 0.55, 0.4 pitch
Alternate Package Part Number	SLG46620G	–	–	–	–
Alternate Package Type and Size (mm)	TSSOP 6.5 x 6.4 x 1.2, 0.65 pitch	–	–	–	–

Configurable Mixed-Signal Matrix	SLG46824	SLG46826	SLG46880	SLG46881	SLG47512 SLG47513	SLG47525 SLG47528
Memory Type	MTP	MTP	OTP	OTP	OTP	OTP
Temperature Range (°C)	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85
# of GPIOs	17	17	28	28	10 (SLG47512) 14 (SLG47513)	17/11
Operating Voltage (V)	2.3 to 5.0	2.3 to 5.0	2.3 to 5.0	2.3 to 5.0	1.0 to 1.65	1.71 to 5.5
Dual Supply (VDD2 1.8 V to VDD)	1.71 to VDD	1.71 to VDD	2.3 to 5.0	0.95 to 1.98	–	0.95 to 1.98
8-bit SAR ADC	–	–	–	–	–	–
Analog/Digital Comparators	2/0	4/0	5/0	5/0	2/0	4
Maximum Look Up Tables (LUTs)	19	19	12	12	23	17
Maximum Counters/Delays	8	8	5	5	8	7
Maximum DFF / Latch	17	17	5	5	15	8
PWMs	–	–	–	–	–	–
Pipe Delay	16-stage	16-stage	16-stage	16-stage	14 Shift Registers	16-stage
Programmable Delay	1	1	1	1	1	1
Internal Oscillator (Hz)	2 k / 2 M / 25 M	2 k / 2 M / 25 M	2 k / 2 M / 25 M	2 k / 2 M / 25 M	2 k / 25 M	25 k / 2 M / 25 M
Asynchronous State Machine	–	–	12-State	12-State	–	8-State
Communication Interface	I <sup>2</sup> C	I <sup>2</sup> C	I <sup>2</sup> C	I <sup>2</sup> C	I <sup>2</sup> C	I <sup>2</sup> C
QFN Part Number	SLG46824V	SLG46826V	SLG46880V	SLG46881V	SLG47512V	SLG47525V
QFN Package Size (mm)	2.0 x 3.0 x 0.55, 0.4 pitch	2.0 x 3.0 x 0.55, 0.4 pitch	4.0 x 4.0 x 0.55, 0.4 pitch	4.0 x 4.0 x 0.55, 0.4 pitch	1.6 x 1.6 x 0.55, 0.4 mm pitch	2.0 x 2.2 x 0.55, 0.4 pitch
Alternate Package Part Number	SLG46824G	SLG46826G	–	–	SLG47513M	SLG47528V
Alternate Package Type and Size (mm)	TSSOP 6.5 x 6.4 x 1.2, 0.65 pitch	TSSOP 6.5 x 6.4 x 1.2, 0.65 pitch	–	–	MSTQFN 1.6 x 1.6 x 0.55, 0.4 mm pitch	STQFN 2.0 x 3.0 x 0.55, 0.4 pitch

\* Dual Supply versions lose one GPIO for VDD2

## GreenPAK PORTFOLIO

GreenPAK with Extended Temperature Range	SLG47105-EV	SLG47115-EV	SLG46620-EV	SLG46826-EV	SLG46855-EV	SLG46108-EV
Temperature Range	-40 to +105	-40 to +105	-40 to +105	-40 to +105	-40 to +105	-40 to +105
Memory Type	OTP	OTP	OTP	MTP	OTP	OTP
# of Pins / # of GPIOs	20/8 + 4 x HD	20/8 + 2 x HD	20/18	20/17	14/12	8/6
Operating Voltage, VDD (V)	2.3 to 5.5	2.3 to 5.5	1.8 to 5.0	2.3 to 5.5	2.3 to 5.5	1.71 to 5.5
Dual Supply, VDD2 (V)	3.0 to 13.2	4.5 to 26.4	–	1.71 to VDD	–	–
Analog/Digital Comparators	4/0	3/0	6/3	4/0	4/0	–
Voltage Reference	Trimmed	Trimmed	Trimmed	Trimmed	Trimmed	–
Combo Function Macro-cells	12 Total	12 Total	2 Total	11 Total	13 Total	6 Total
Multi-Function Macro-cells	5 Total	5 Total	–	8 Total	8 Total	–
PWMs	2	2	3	–	–	–
Special Features	HV outputs	HV outputs	8-bit ADC and 2x DAC	2-kbit I <sup>2</sup> C compatible serial EEPROM emulation	–	–
Counters/Delays	5	5	10	8	8	4
DFF / Latch	15	15	12	17	20	4
Pipe Delay	16-stage	16-stage	2x16-stage	16-stage	16-stage	8-stage
Programmable Delay	1	1	2	1	1	1
Internal Oscillator (Hz)	2 k / 25 M	2 k / 25 M	1.7k / 25 k / 2 M / 27 M	2 k / 2 M / 25 M	2 k / 2 M / 25 M	25 k / 25 M
Temp Sensor	Yes	Yes	–	Yes	Yes	–
Communication Interface	I <sup>2</sup> C	I <sup>2</sup> C	SPI	I <sup>2</sup> C	I <sup>2</sup> C	–
Package Size (mm)	2.0 x 3.0 x 0.55, 0.4 pitch	2.0 x 3.0 x 0.55, 0.4 pitch	2.0 x 3.0 x 0.55, 0.4 pitch	2.0 x 3.0 x 0.55, 0.4 pitch	1.6 x 2.0 x 0.55, 0.4 pitch	1.0 x 1.2 x 0.55, 0.4 pitch
Package Type	STQFN	STQFN	STQFN	STQFN	STQFN	STQFN

## GreenPAK PORTFOLIO

Automotive Configurable Mixed-Signal Matrix	SLG46620-A	SLG46625-A	SLG46827-A	SLG46855-A	SLG46857-A	SLG46880-A	SLG47004-A
Memory Type	OTP	OTP	MTP	OTP	OTP	OTP	MTP
Temperature Range (°C)	-40 to +105	-40 to +125	-40 to +105	-40 to +105	-40 to +125	-40 to +125	-40 to +125
# of GPIOs	20/18	20/18	20/17	14/12	14/12	32/28	24/8
Operating Voltage (V)	1.71 to 3.6	1.71 to 5.0	2.3 to 5.5	2.3 to 5.5	2.3 to 5.5	2.3 to 5.5	2.4 to 5.5
Dual Supply	–	–	1.71 to VDD	–	–	2.3 to VDD	–
8-bit SAR ADC	1	1	–	–	–	–	–
Analog/Digital Comparators	6/3	6/3	4/0	4/0	4/0	5/0	3
Maximum Look Up Tables (LUTs)	26	26	19	23	23	12	20
Maximum Counters / Delays	10	10	8	8	8	5	7
Maximum DFF / Latch	12	12	17	21	21	5	18
PWMs	3	3	–	–	–	–	–
Pipe Delay	2 x 16-stage	2 x 16-stage	16-stage	16-stage	16-stage	16-stage	16-stage
Programmable Delay	2	2	1	1	1	1	1
Internal Oscillator (Hz)	1.7 k / 25 k / 2 M / 27 M	1.7 k / 25 k / 2 M / 27 M	2 k / 2 M / 25 M	2 k / 2 M / 25 M	2 k / 2 M / 25 M	2 k / 2 M / 25 M	2 k / 2 M / 25 M
Asynchronous State Machine	–	–	–	–	–	12-State	–
Special Features	2 x DAC	2 x DAC	–	–	–	–	2 x Op-AMP or 1 x In-AMP; 2 x Rheostat; 2 x An Switch; 2-Ch Auto-Trim
Communication Interface	SPI	SPI	I <sup>2</sup> C	I <sup>2</sup> C	I <sup>2</sup> C	I <sup>2</sup> C	I <sup>2</sup> C
QFN Part Number	–	SLG46625-AP	–	SLG46855-AP	SLG45857-AP	SLG46880-AP	SLG47004-AP
QFN Package Size (mm)	–	3.5 x 3.5 x 0.75, 0.5 pitch	–	3 x 3 x 0.55, 0.65 pitch	3 x 3.1 x 0.75, 0.65 pitch	5 x 5 x 0.75, 0.5 pitch	4 x 4 x 0.75, 0.5 pitch
Alternate Package Type and Size (mm)	TSSOP 6.4 x 6.5 x 1.2, 0.65 pitch	–	TSSOP 6.5 x 6.4 x 1.2, 0.65 pitch	–	–	–	–

## GreenPAK PORTFOLIO

Configurable Mixed-Signal Matrix	Power GreenPAK with Load Switches							
	SLG51000	SLG51001	SLG51002	SLG51003	SLG46116/7	SLG46127	SLG46517	SLG46867
<b>General Parameters</b>								
Memory Type	OTP	OTP	OTP	OTP	OTP	OTP	OTP	OTP
# of Pins / # of GPIOs	20 / 6	16 / 4	25 / 6	14 / 5	14 / 7	16 / 6	28 / 16	20 / 12
Operating Voltage (V)	2.8 to 5	2.8 to 5	2.8 to 5	2.8 to 5	1.71 to 5.5	1.71 to 5.5	1.71 to 5.5	2.3 to 5.5
Communication Interface Type	I <sup>2</sup> C	I <sup>2</sup> C	I <sup>2</sup> C	I <sup>2</sup> C	–	–	I <sup>2</sup> C	I <sup>2</sup> C
Communication Interface Voltage	1.2 V - 1.8 V	1.2 V - 1.8 V	1.2 V - 1.8 V	1.2 V - 5 V	–	–	1.2 V - 5 V	1.2 V - 5 V
GPIO Voltage	1.2 V to 1.8 V	1.2 V to 1.8 V	1.2 V to 5.0 V	1.2 V to 5.0 V	1.71 to 5.5 V	1.2 V to 5.0 V	1.2 V to 5 V	1.2 V to 5 V
Package Type	WLCSP	WLCSP	WLCSP	TQFN	TQFN	TQFN	TQFN	TQFN
Package Size (mm)	1.675 x 2.075 x 0.465, 0.4 pitch	1.675 x 1.675 x 0.465, 0.4 pitch	1.992 x 1.992 x 0.44, 0.35 pitch	2.0 x 2.2 x 0.55, 0.4 pitch	1.6 x 2.5 x 0.55, 0.4 pitch	1.6 x 2.0 x 0.55, 0.4 pitch	2.0 x 3.0 x 0.55, 0.4 pitch	1.6 x 3.0 x 0.4, 0.4 pitch
Operating temperature (°C)	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85
<b>Combinatorial logic</b>								
Analog Comparators	–	–	–	–	2	2	4	4
Max. Look Up Tables (LUTs) / DFF	12 / -	12 / -	8 / 8	8 / 8	10 / 4	10 / 4	17 / 8	23 / 21
Pipe Delay	–	–	–	–	8-stage	8-stage	16-stage	16-stage
Internal Oscillator (Hz)	8 M	8 M	8 M	8 M	25 k / 2 M	25 k / 2 M	25 k / 2 M / 25 M	25 k / 2 M / 25 M
Max. Counters/Delays	–	–	1 / 4	1 / 4	4	4	7	8
Combination Function Macro-cells	–	–	7	7	6	6	17	15
State Machine	Power Sequencer	Power Sequencer	Power Sequencer	–	–	–	8-state ASM	–
<b>Power Parameters</b>								
# of Load Switches	2	1	5	1	1 Total	2 Total	2 Total	2 x PFET
Load Switch Type (PMOS / NMOS)	2 x NMOS	1 x NMOS	3 x NMOS, 2 x PMOS	1 x NMOS	1 x PMOS	2 x PMOS	2 x PMOS	2 x PMOS
Max Iout	0.8 A	1 A	1.3 A	0.8 A	1.25 A	2 A	2 A	2 A
RON	40 mOhm	40 mOhm	40 mOhm	40 mOhm	28.5 mOhm	44 mOhm	44 mOhm	44 mOhm
Programmable Current Limit	Yes	Yes	Yes	Yes	–	–	–	–
Slew Rate	Yes	Yes	Yes	Yes	Fixed	–	–	–
# of LDOs	7	6	8	3	–	–	–	–
Protection Features	ESD, OCP, OTP, UVLO	ESD, OCP, OTP, UVLO	ESD, OCP, OTP, UVLO	ESD, OCP, OTP, UVLO	ESD, Read Lock	ESD, Read Lock	ESD, Read Lock	ESD, Read Lock
Discharge Resistance	Fixed	Fixed	Programmable	Programmable	W/O Fixed	–	–	–

## GreenPAK PORTFOLIO

## Configurable Mixed-Signal Matrix

## Power GreenPAK with LDOs

Part Number	SLG51000	SLG51001	SLG51002	SLG51003	SLG46580	SLG46582	SLG46583	SLG46585
<b>General Parameters</b>								
Memory Type	OTP	OTP	OTP	OTP	OTP	OTP	OTP	OTP
# of Pins / # of GPIOs	20 / 6	16 / 4	25 / 6	14 / 5	20 / 9	20 / 9	20 / 9	29 / 7
Operating Voltage (V)	2.8 - 5.0	2.8 - 5.0	2.8 - 5.0	2.8 - 5.0	2.3 - 5.5	2.3 - 5.5	2.3 - 5.5	2.5 - 5.5
Communication Interface Type	I <sup>2</sup> C	I <sup>2</sup> C	I <sup>2</sup> C	I <sup>2</sup> C	I <sup>2</sup> C	I <sup>2</sup> C	I <sup>2</sup> C	I <sup>2</sup> C
Communication Interface Voltage	1.2 V - 1.8 V	1.2 V - 1.8 V	1.2 V - 1.8 V	1.2 V - 5.0 V	1.2 V - 5.5 V	1.2 V - 5.5 V	1.2 V - 5.5 V	1.2 V - 5.5 V
GPIO Voltage	1.2 V to 1.8 V	1.2 V to 1.8 V	1.2 V to 5.0 V	1.2 V - 5.0 V	1.2 V to 5.5 V	1.2 V to 5.5 V	1.2 V to 5.5 V	1.2 V to 5.5 V
Package Type	WLCSP	WLCSP	WLCSP	TQFN	TQFN	TQFN	TQFN	TQFN
Package Size (mm)	1.675 x 2.075 x 0.465, 0.4 pitch	1.675 x 1.675 x 0.465, 0.4 pitch	1.992 x 1.992 x 0.44, 0.35 pitch	2.0 x 2.2 x 0.55, 0.4 pitch	2 x 3 x 0.55, 0.4 pitch	2 x 3 x 0.55, 0.4 pitch	2 x 3 x 0.55, 0.4 pitch	3 x 3 x 0.55, 0.4 pitch
Operating temperature (°C)	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85
<b>Power Parameters</b>								
Analog Comparators	–	–	–	–	4	4	4	4
Max. Look Up Tables (LUTs) / DFF	12 / -	12 / -	8 / 8	8 / 8	15 / 9	15 / 9	15 / 9	16 / 9
Pipe Delay	–	–	–	–	16 - stage	16 - stage	16 - stage	16 - stage
Internal Oscillator (Hz)	8 M	8 M	8 M	8 M	1.73 k / 25 k / 2 M	25 k / 2 M	25 k / 2 M	25 k / 2 M
Max. Counters/Delays	–	–	1 / 4	1 / 4	5	5	5	5
Combination Function Macro-cells	–	–	8	7	15	15	15	15
State Machine	Power Sequencer	Power Sequencer	Power Sequencer	–	8-state ASM	8-state ASM	8-state ASM	8-state ASM
Flexible Timing & Event-Triggered Sequencer	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# LDOs	7	6	8	3	4	2	2	4
VIN total range	0.8 V - 5.0 V	0.8 V - 5.0 V	0.8 V - 5.0 V	0.8 V - 5.0 V	2.3 V - 5.5 V	2.3 V - 5.5 V	2.3 V - 5.5 V	2.5 V - 5.5 V
VOU total range	0.5 V - 3.75 V	0.5 V - 3.75 V	0.5 V - 3.75 V	0.5 V - 3.75 V	0.9 V to 4.35 V	0.9 V to 4.35 V	0.9 V to 4.35 V	0.9 V to 4.2 V
Output Current Max (A)	0.8	1	1.3	0.8	0.15	0.3	0.6	0.15
Max Iout_LDO1 (mA)	475 (High PSRR)	475 (High PSRR)	500	475 (High PSRR)	150	300	600	150
Max Iout_LDO2 (mA)	475 (High PSRR)	500	500	500	150	300	–	150
Max Iout_LDO3 (mA)	500	500	500	800	150	–	–	150
Max Iout_LDO4 (mA)	500	500	500	–	150	–	–	150
Max Iout_LDO5 (mA)	800	500	500	–	–	–	–	–
Max Iout_LDO6 (mA)	800	1000	1A	–	–	–	–	–
Max Iout_LDO7 (mA)	500	–	1 A	–	–	–	–	–
Max Iout_LDO8 (mA)	–	–	1.3 A	–	–	–	–	–
# of Load Switches	2	1	5	1	4	2	1	1
Vdropout	80 mV @ 0.8A (LV LDO)	100 mV @ 1 A (LV LDO)	130 mV @ 1.3 A (LV LDO)	100 mV @ 0.8 A (LV LDO)	250 mV	250 mV	250 mV	250 mV
PSRR	87 dB @ 100 kHz (HP LDO)	87 dB @ 100 kHz (HP LDO)	65 dB @ 100 kHz (HV LDO)	87 dB @ 100 kHz (HP LDO)	50 dB @ 100 Hz to 100k Hz	50 dB @ 100 Hz to 100k Hz	50 dB @ 100 Hz to 100k Hz	50 dB @ 100 Hz to 100k Hz
Output Noise	13 uV @ 10 Hz to 100 kHz (HP LDO)	13 uV @ 10 Hz to 100 kHz (HP LDO)	152 uV @ 10 Hz to 100 kHz (HV LDO)	18 uV @ 10 Hz to 100 kHz (HP LDO)	75 uV @ 10 Hz to 100 kHz	75 uV @ 10 Hz to 100 kHz	75 uV @ 10 Hz to 100 kHz	75 uV @ 10 Hz to 100 kHz
Current limit	Startup & Functional (Programmable)	Startup & Functional (Programmable)	Startup & Functional (Programmable)	Startup & Functional (Programmable)	Over-current & Short-Circuit Detection Current Limit	Over-current & Short-Circuit Detection Current Limit	Over-current & Short-Circuit Detection Current Limit	Over-current & Short-Circuit Detection Current Limit
Protection Features	ESD, OCL, OTP, UVLO	ESD, OCL, OTP, UVLO	ESD, OCL, OTP, UVLO	ESD, OCL, OTP, UVLO	ESD, OCL, SCD, OTP, Read Lock	ESD, OCL, SCD, OTP, Read Lock	ESD, OCL, SCD, OTP, Read Lock	ESD, OCL, SCD, OTP, Read Lock

# GreenPAK PORTFOLIO

	HVPAK™	
Configurable Mixed-Signal Matrix	SLG47105	SLG47115
Memory Type	OTP	OTP
Temperature Range (°C)	-40 to +85	-40 to +85
# of GPIOs	8	8
High Voltage High Current Output (HV_GPO_HD)	4 x 1.5 A RMS (2 A Peak) HV_GPO_HD	2 x 1.5 A RMS (3 A Peak) HV_GPO_HD
Operating Voltage (V)	2.3 to 5.5	2.3 to 5.5
Dual Supply (VDD2, V)	3.0 to 13.2	4.5 to 26.4
Abs Max (VDD2, V)	18	32
Analog / Current Sense Comparators / Differential Amplifier	2/2/1	2/1/1
Maximum Look Up Tables (LUTs)	17	17
Maximum Counters/Delays	5	5
Maximum DFF / Latch	15	15
PWMs	2	2
Pipe Delay	16-stage	16-stage
Programmable Delay	1	1
Internal Oscillator (Hz)	2 k / 25 M	2 k / 25 M
Communication Interface	I <sup>2</sup> C	I <sup>2</sup> C
QFN Package Size (mm)	20-pin, 2.0 x 3.0 x 0.55, 0.4 pitch	20-pin, 2.0 x 3.0 x 0.55, 0.4 pitch

	AnalogPAK™		
Configurable Mixed-Signal Matrix	SLG47001/SLG47003	SLG47004	SLG47011
Memory Type	OTP	MTP	OTP
Temperature Range (°C)	-40 to +85	-40 to +85	-40 to +85
# of GPIOs	6/10	8	13
Operating Voltage (V)	2.3 to 5.5	2.4 to 5.5	1.71 to 3.60
Operational Amplifiers	2	3	–
Digital Rheostats (1024 Position), resistance	2 x 100 kΩ	2 x 100 kΩ	–
Analog Switch	1	2	–
Analog / Current Sense Comparators / Differential Amplifier	6 (1 multi-channel)/0/0	3/0/0	1/0/0
Width Converter	1 x 8-bit	–	1 x 12-bit
Memory Table	–	–	4096 x 12-bit words
ADC	–	–	1 x 14-bit
DAC	–	–	1 x 12-bit
Data Buffer	–	–	4 x 16-bit
MathCore	–	–	4 math operations (+, -, x, /)
Maximum Look Up Tables (LUTs)	16	20	31
Maximum Counters/Delays	5	7	13
Maximum DFF / Latch	16	18	31
PWMs	–	–	1
Pipe Delay	–	16-stage	–
Programmable Delay	1	1	1
Internal Oscillator (Hz)	2 k or 10 k / 25 M	2.048 k / 2.048 M / 25 M	2 k or 10 k / 20 M or 40 M
Communication Interface	I <sup>2</sup> C	I <sup>2</sup> C	I <sup>2</sup> C/SPI
QFN Package Size (mm)	20-pin 2.0 x 3.0 x 0.55, 0.4 pitch/ 24-pin 3.0 x 3.0 x 0.55, 0.4 pitch	24-pin, 3.0 x 3.0 x 0.55, 0.4 pitch	16-pin 2.0 x 2.0 x 0.55, 0.4 pitch

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