



ABLIC IC Used in Power Tools

Small

Smart

Simple

23 May. 2018

ABLIC Inc.

"Inheriting the
Seiko Instruments Inc.
semiconductor business
and continuing to evolve,
ABLIC Inc. is a maker of
analog semiconductors."

股份构成及公司名称变更



精工控股集团

精工电子有限公司

2015年9月分化

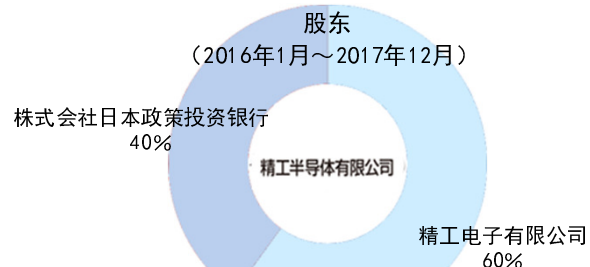
2016年1月

接受日本政策投资银行共同出资开始营业

日文社名: エスアイアイ・セミコンダクタ株式会社

英文社名: SII Semiconductor Corporation

中文社名: 精工半导体有限公司



Revolution

2018年1月

日本政策投资银行成为第一大股东，并以作为模拟半导体专业制造商进一步扩大增长的目标变更了公司名称。



日文社名: エイブリック株式会社

英文社名: ABLIC Inc.

中文社名: 艾普凌科有限公司

艾普凌科 (ABLIC) 是由 ABLE (可能) 与 IC (Integrated Circuit 的缩写) 二词组合而成，蕴含着通过半导体技术让不可能成为可能的意义。标识中向上的箭头和◆分别代表成长与IC，这一组合不仅形象地表达出公司名称的首字母 A，同时也体现了以半导体生产来实现企业成长目标的使命。

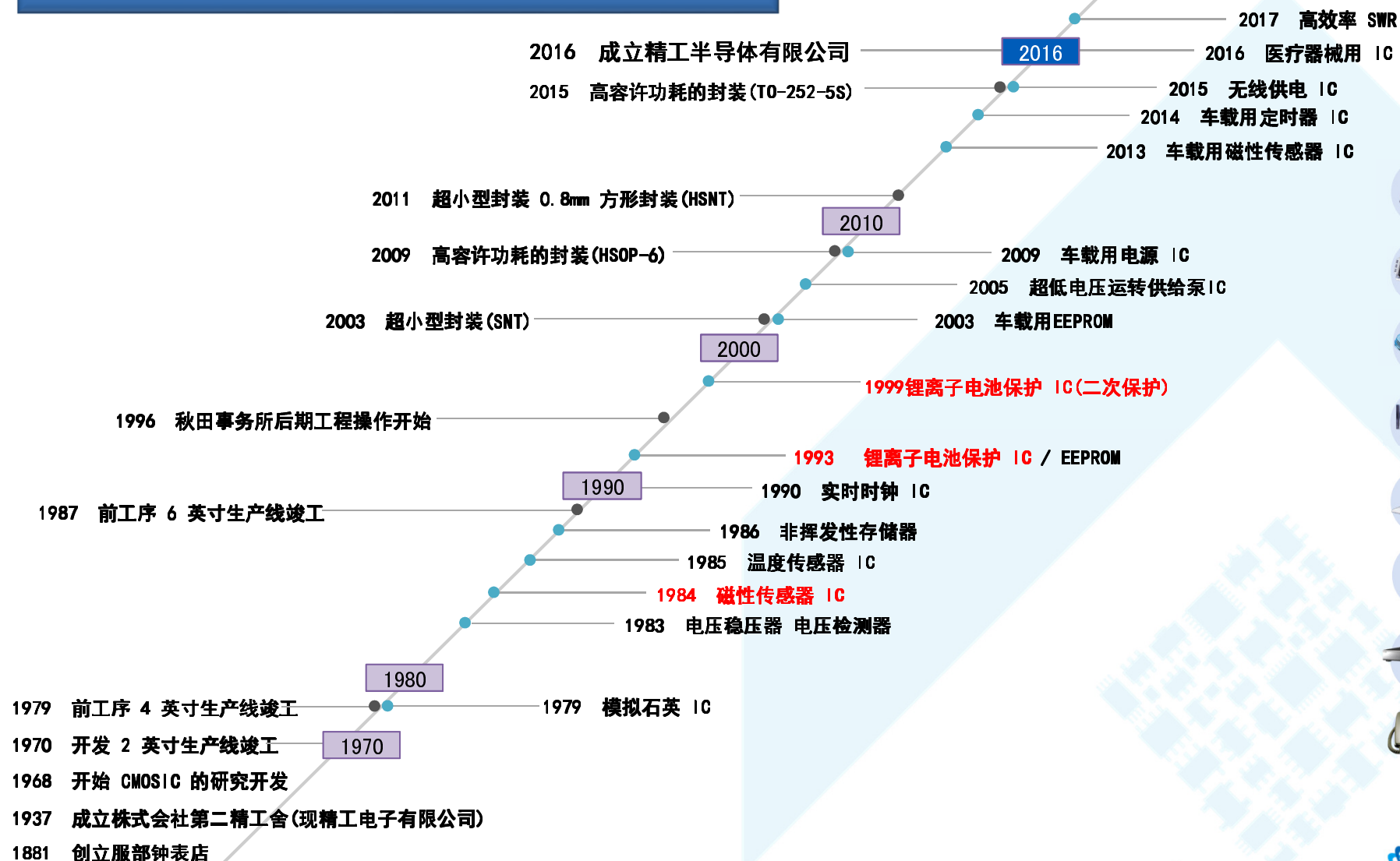


ABLIC Inc.



2018年 公司更名为艾普凌科有限公司

2018



艾普凌科股份公司
在世界各地设置营业点，
开展全球化事业。

● 总公司 ● 营业 ● 开发・设计 ● 制造



幕张总公司

艾普凌科有限公司

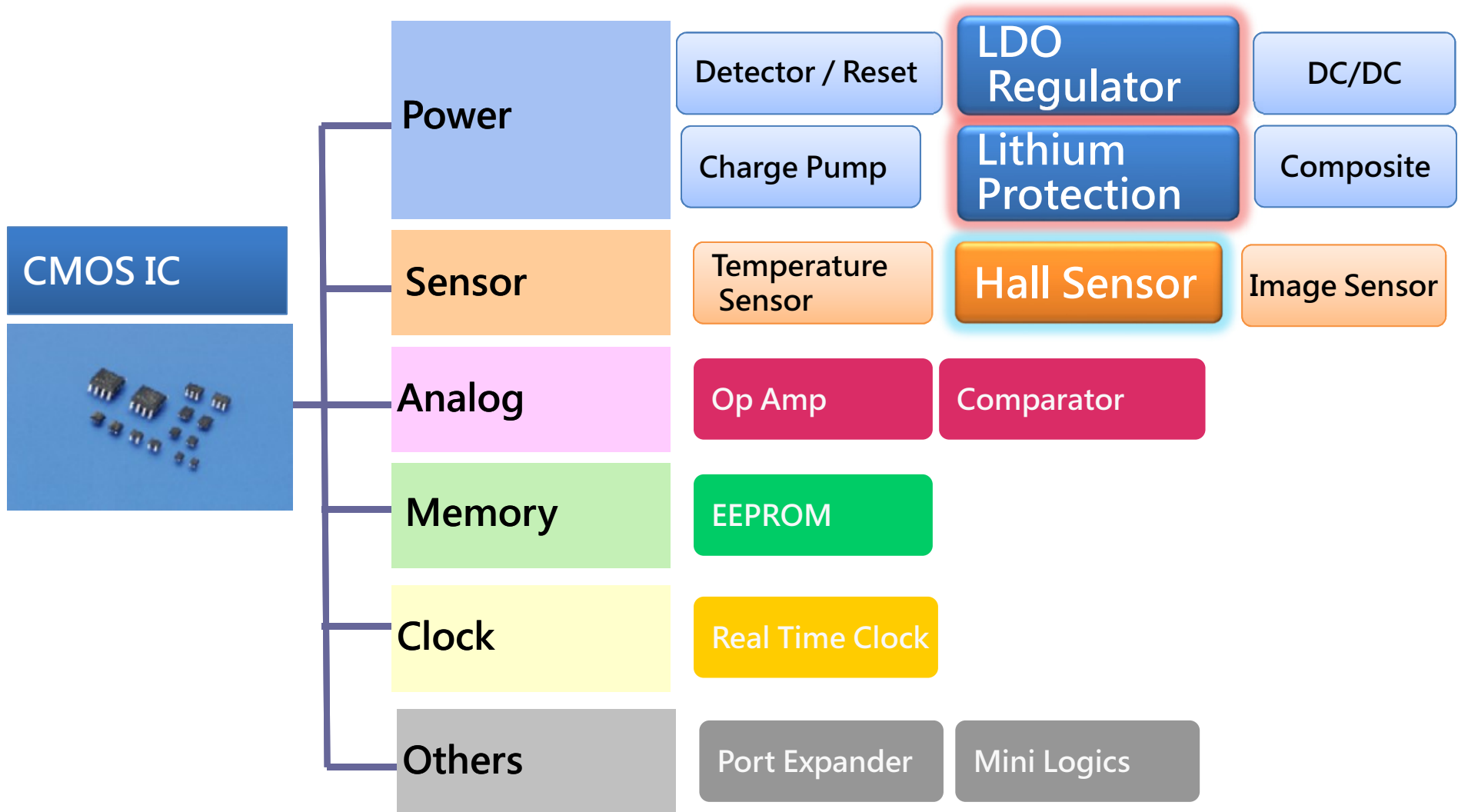


高塚事务所



秋田事务所

CMOS IC Product Line Up



Advantages of ABLIC Protection IC



- ✓ High precision Over charge detection voltage: 20mV(S-8245)
- ✓ High precision Over charge detection voltage: 10mV(S-8245)

→ This performance works for battery pack safety.

- ✓ Less than 3 PPM failure (more than 1B pcs shipment)

→ This result proves high reliability products by our own design technology & accurate testing method.

High Accuracy

ABLIC Protection IC

High Reliability

Low Current Consumption

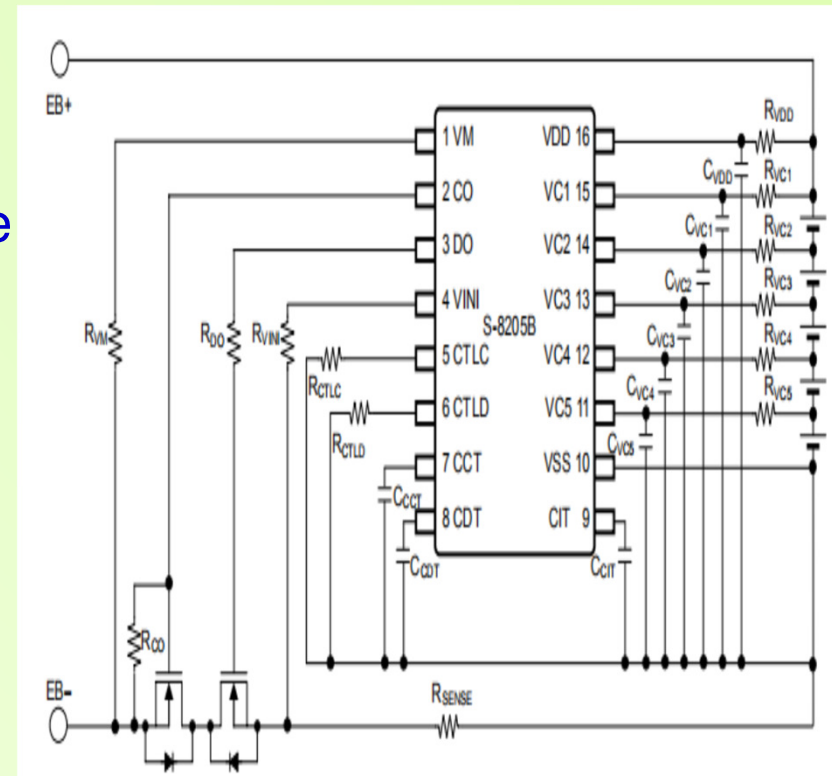
- ✓ At normal status : 0.25 μ A typ. (S-8223)
- ✓ During power-down: 0.1 μ A max (S-8245)

→ This support battery for long time storage.

- Over charge detection voltage:	3.55V to 4.4V	Accuracy $\pm 25\text{mV}$ (+25°C)
- Over discharge detection voltage:	2.0V to 3.2V	Accuracy $\pm 80\text{mV}$
- Discharge overcurrent detection voltage:	0.02V to 0.3V	Accuracy $\pm 15\text{mV}$
- Charge overcurrent detection voltage:	-0.02V to -0.3V	Accuracy $\pm 30\text{mV}$

- During operation: 40μA max.
- During power-down: 0.1μA max.

4) 16PIN TSSOP Package



Features of S-8245A/B/C/D Series

New



1) High-Accuracy Voltage Detection Circuit

- | | | |
|--|-----------------|--|
| - Over charge detection voltage: | 3.55V to 4.6V | Accuracy $\pm 20\text{mV}$ ($+25^\circ\text{C}$) |
| - Over discharge detection voltage: | 2.0V to 3.2V | Accuracy $\pm 80\text{mV}$ |
| - Discharge overcurrent detection voltage: | 0.02V to 0.3V | Accuracy $\pm 10\text{mV}$ |
| - Charge overcurrent detection voltage: | -0.02V to -0.3V | Accuracy $\pm 10\text{mV}$ |

2) Low Current Consumption

- During operation: $20\mu\text{A}$ max.
- During power-down: $0.1\mu\text{A}$ max.

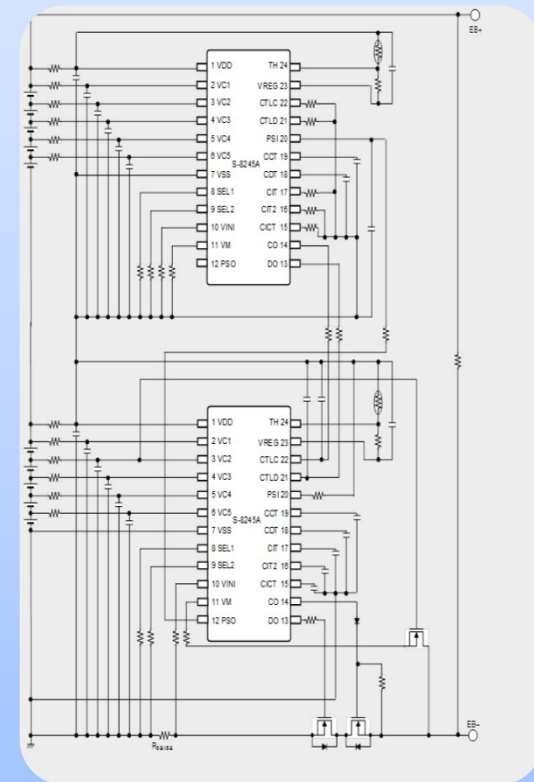
3) Cascade connection for multiple serial-cell battery Pack

- A/C Series

4) Temperature detection is possible by adding NTC thermistor externally

- High/Low temperature protection during charging and discharging

5) SSOP-24pin Package



Features of S-8223A/B Series

New



1) High-Accuracy Voltage Detection Circuit

- Over charge detection voltage: 3.60V to 4.70V

Accuracy $\pm 20\text{mV}$ (25°C)

Accuracy $\pm 25\text{mV}$ (0°C to $+60^\circ\text{C}$)

2) Output form is selectable

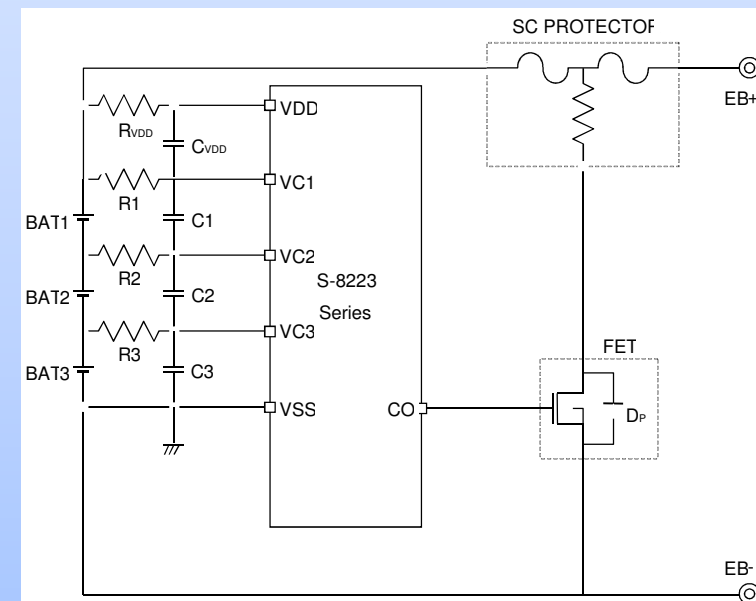
- A Series : CMOS output, Nch open-drain output
- B Series : **Output voltage is limited to 11.5V max.**

3) Low Current Consumption

- At normal status : **$0.25\mu\text{A}$ typ. $0.5\mu\text{A}$ max.**

4) Small Package

- SNT-6A



Features of S-8215A/B Series



1) High-Accuracy Voltage Detection Circuit

- Over charge detection voltage:

3.6V to 4.7V Accuracy $\pm 20\text{mV}$ ($+25^\circ\text{C}$)
 $\pm 30\text{mV}$ ($T_a = 0^\circ\text{C} \sim +60^\circ\text{C}$)

2) Low Current Consumption

At $V_{CUn} - 1.0\text{V}$ for each cell: $3.0\text{ }\mu\text{A}$ max. ($T_a = 25^\circ\text{C}$)

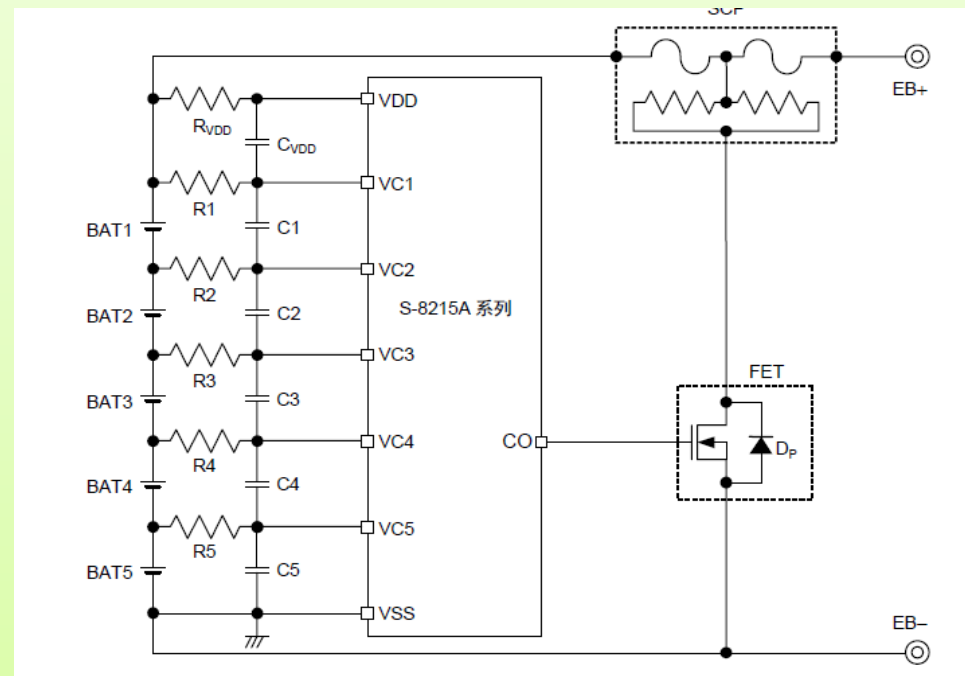
At 2.3V for each cell: $1.7\text{ }\mu\text{A}$ max. ($T_a = 25^\circ\text{C}$)

3) Small package

SNT-8A
TSSOP-8

4) Break detection

S-8215B with Break detection function



多节一次保护芯片



項目	S-8252/62	S-8254A	S-8204B	S-8203/05	S-8225A/B	S-8245A
串数	2	3~4	3~4	3,4~5	3~5	3~5
级联功能	无	无	有	无	有	有
過充電 検出精度	±20mV	±25mV	±25mV	±25mV	±20mV	±20mV
過放電 検出精度	±50mV	±80mV	±50mV	±50mV	±80mV	±80mV
放電過電 流 検出精度	±10mV	±25mV	±15mV	±15mV	-	±10mV
負荷短絡 検出電圧 精度	±100mV	±300mV	±300mV	±100mV	-	±50mV
充電過電 流 検出電圧 精度	±20mV	-	-	±30mV	-	±10mV
通常時	8.0uA	30uA	33uA	40uA	22uA	20uA
消費電流	Max	Max	Max	Max	Max	Max
PD時	0.1uA	0.1uA	0.1uA	0.1uA	4.5uA	0.5uA
消費電流	Max	Max	Max	Max	Max	Max
温度保护	无	通过温度开关 控制	通过温度开关 控制	温度开关或PTC	温度开关	NTC
PKG	SOT-23-6 SNT6A SNT8A(S-8262)	16-Pin TSSOP	16-Pin TSSOP	16-Pin TSSOP	16-Pin TSSOP	24-Pin SSOP

項目	S-8244	S-8264	S-8223	S-8224	S-8215A/B
串数	1~4	2~4	2~3	2~4	3~5
過充電検出 精度	±25mV	±25mV	±20mV	±25mV	±25mV
消費電流	3uA Max	5uA Max	0.5uA Max	0.6uA Max	3uA Max
PKG	SNT-8A 8 PIN MSOP TSSOP-8	SNT-8A TSSOP-8	SNT-6A	SNT-8A	SNT-8A TSSOP-8

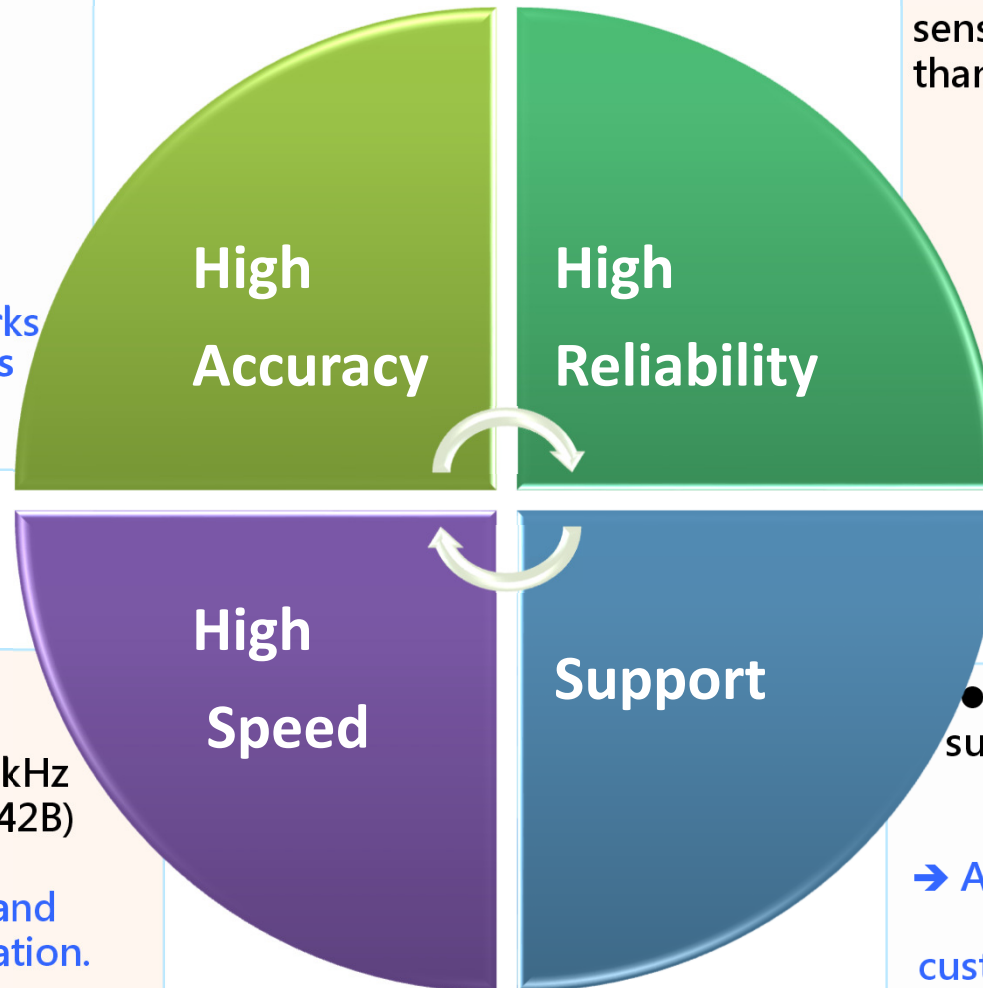
Advantages of ABLIC Hall IC



- High precision magnetic sensitivity
- Magnetic sensitivity precision : $\pm 1.0\text{mT}$ (S-5743A)
- Magnetic sensitivity precision : $\pm 1.5\text{mT}$ (S-5741B, S-5742B)
 - This performance works small Jitter and it makes reduce vibration & noise for BLDC motors.

- No market return with sensitivity defects (more than 1B pcs shipment)

→ This result proves high reliability products by our own design technology & accurate testing method.



- Output delay(typ) = $8.0\text{ }\mu\text{sec}$,
Chopper freq.(typ) = 500 kHz (S-5743A, S-5741B, S-5742B)

→ It is effective to withstand under higher speed operation.

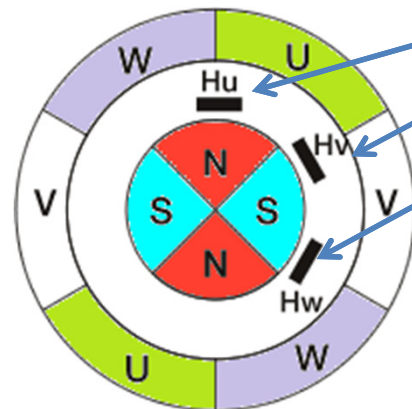
- Magnetic simulation support (J-MAG simulator equipped)

→ ABLIC has a policy which we want to go with customers since first stage of the development.

Make a survey of Power Tools

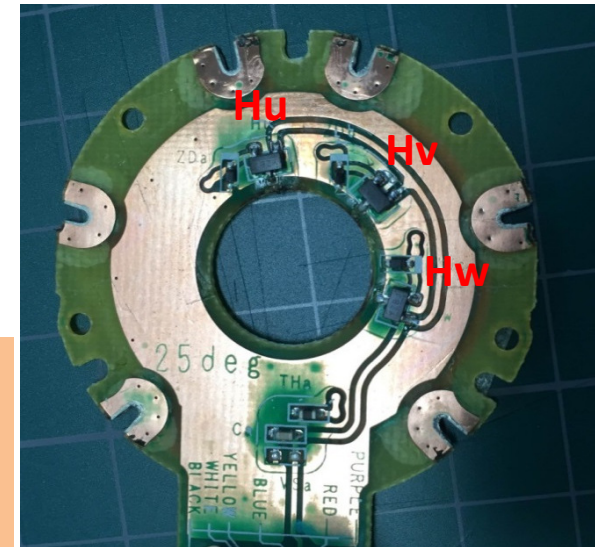
[Inside of BLDC Motor]

Hall Sensor's PCB



**Positions of
Hall ICs**

**ABLIC Hall IC
can be
replaced !**

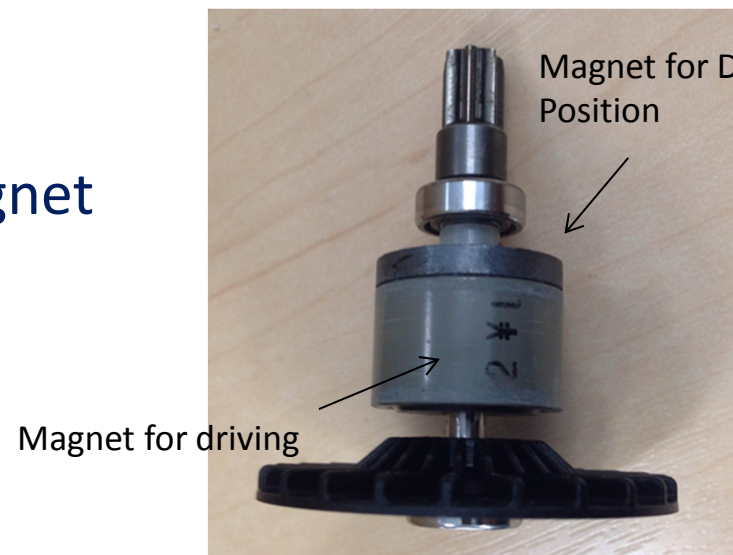


Rotor :

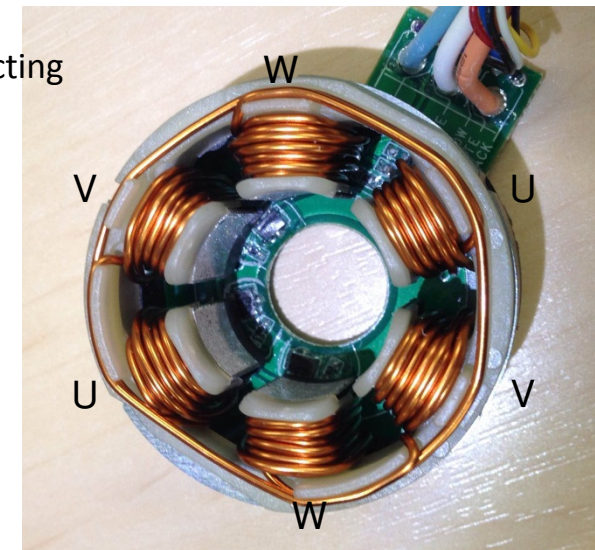
4-phase magnet

Stator :

6-coils



Rotor: 4-phase magnet



Stator: 6-coils

UVW 3-phase control: How to put Hall effect ICs ABLIC

Detection of 3-phase control : Phase Detecting by 3 Hall effect ICs

3 Hall effect ICs can detect “UVW (60°(120°) Phase difference x 3)” if those ICs are located in the 60° phase shift position. S/N pole pair of magnet makes 1 sign wave. The right position of Hall effect ICs are each 60°(120°) difference of electric angle.

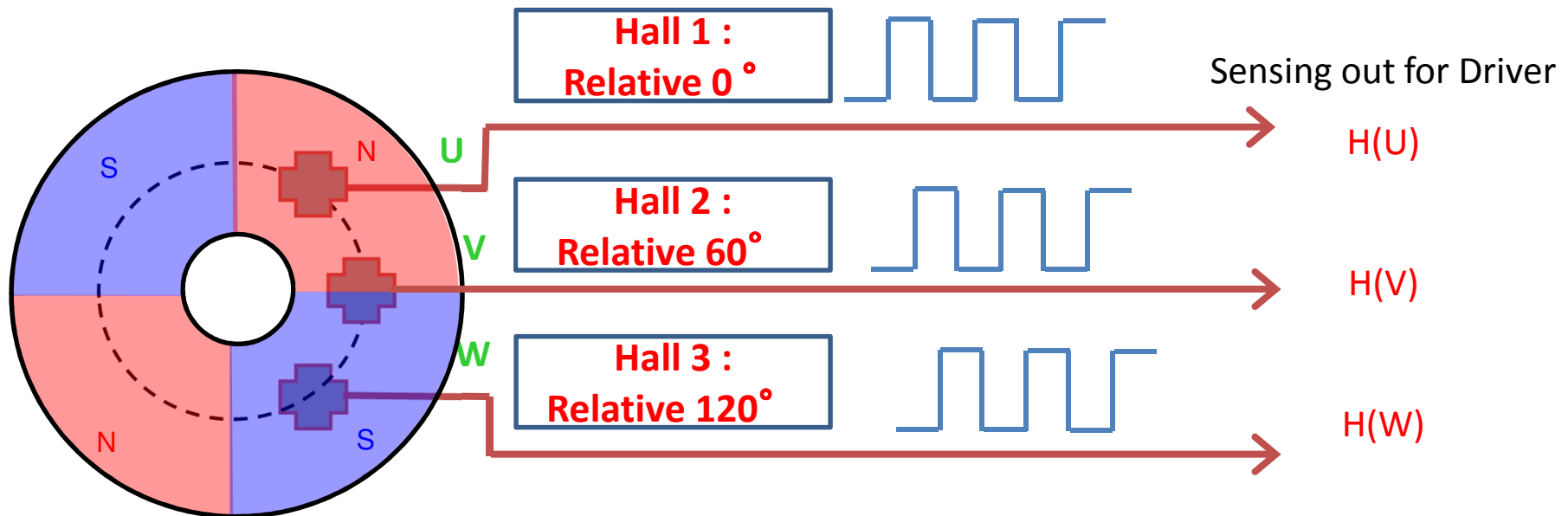
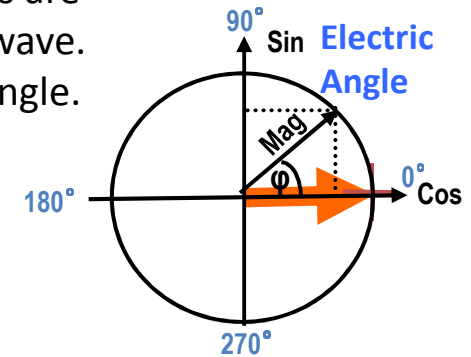
Electric angle = (Pole pair / 2) × Mechanical angle:

4 poles → Electric angle = 2 × Mechanical angle

Position of Hall 2 = Hall 1 + position of Electric angle 60° (or 120 °)

Position of Hall 3 = Hall 1 + position of Electric angle 120° (or 240 °)

→ (0°, 60°, 120°) or (0°, 120°, 240°) positons are possible



Other application of Hall IC at Power Tools

S-5712 /
S-5716

- Usage: Contactless switch for trigger, ON/OFF, mode, etc.
- Benefit: Good for water proof and dust proof

S-5718

- Usage: Discern battery pack with magnet polarity (ID detection)
- Benefit: No additional electric circuit in battery pack, just put magnet.

Other applications of Hall ICs

Part : S-57A1

Shift Lever



Ignition Sensor



HEV Inverter Unit

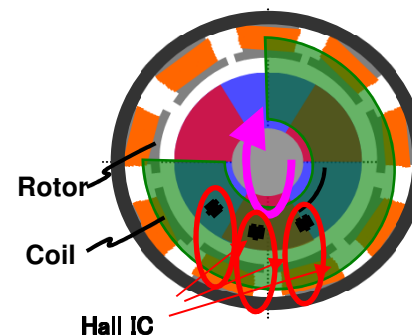


Part: S-57K1



Part: S-57P1

EPS Motor



ABLIC Hall Effect Latch ICs for Power Tools

Item	S-5741B	S-5742B	S-5743A
Mag Sens.(Typ)	1.8 / 3.0 / 6.0 mT	1.8 / 3.0 / 6.0 mT	0.5 / 1.5 / 2.2 / 3.0 mT
Torrerance	$\pm 1.5\text{mT}$	$\pm 1.5\text{mT}$	$\pm 1.0\text{mT}$
Chopping Freq	500KHz	500KHz	500KHz
Output Delay	8.0us	8.0us	8.0us
Max Voltage	28.0V	28.0V	28.0V
Voltage Range	3.5~26.0V	3.5~26.0V	2.7~26.0V
Ta Range	-40~125°C	-40~125°C	-40~150°C
Tj Range	-40~150°C	-40~150°C	-40~170°C
Current Cons.	4.0mA	4.0mA	4.0mA
Output form	Nch O.D. Nch O.D.+ R	Nch O.D. Nch O.D.+ R	Nch O.D.
Reverse Protect	Yes	Yes	Yes
Short Protect	Yes	Yes	Yes
PKG	SOT-23-3S	TO-92S	SOT-23-3S

Features of S-1142 Series



1) High Rating Voltage

- Absolute Maximum Rating 60V.
Operating voltage 50V.

2) Low Current Consumption

- During operation: 4 μ A type, 9 μ A max.
- During power-down: 0.1 μ A type, 1 μ A max.

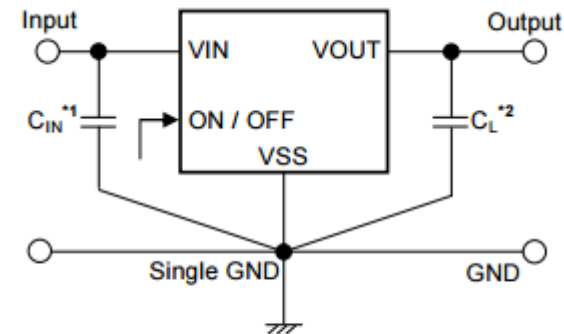
3) Over shoot protection

Built-in overcurrent protection circuit.

4) Over temperature protection

Built-in thermal shutdown circuit.

5) HSOP-6 Package



*1. C_{IN} is a capacitor for stabilizing the input.

*2. A ceramic capacitor of 0.1 μ F or more can be used as C_L .



Thank you



關注 ABLIC 微信公眾號
可到展台領取紀念品一份！

ABLIC Inc.

Achieving
the Impossible



ABLIC

SMALL
SMART
SIMPLE

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