

DATA SHEET

HGPRDT006A

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1 Product Description 製品説明

1.1 Overview 概要

ALPSALPINE Product No.	HGPRDT006A
Characteristic	Encoder
Package type	SOT-23
Supply Voltage	3.0 to 30 V
Supply Current	1.6mA
Interface	Open Drain Output
Temperature	-40 to 140 deg.C

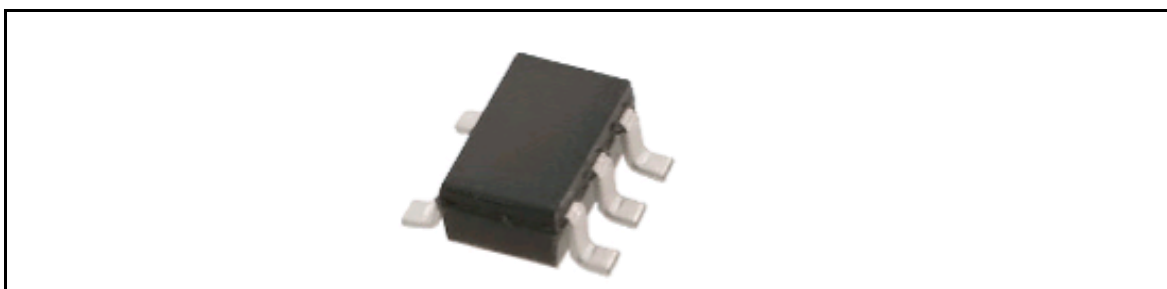


Figure 1-1 Image of HGPRDT006A in the SOT-23-5 Package

1.2 Target Applications ターゲットアプリケーション

Automotive
Industrial
Building Automation
Office Automation
Home Appliance

2 Functional Description 機能説明

2.1 Pin Configuration ピン配置

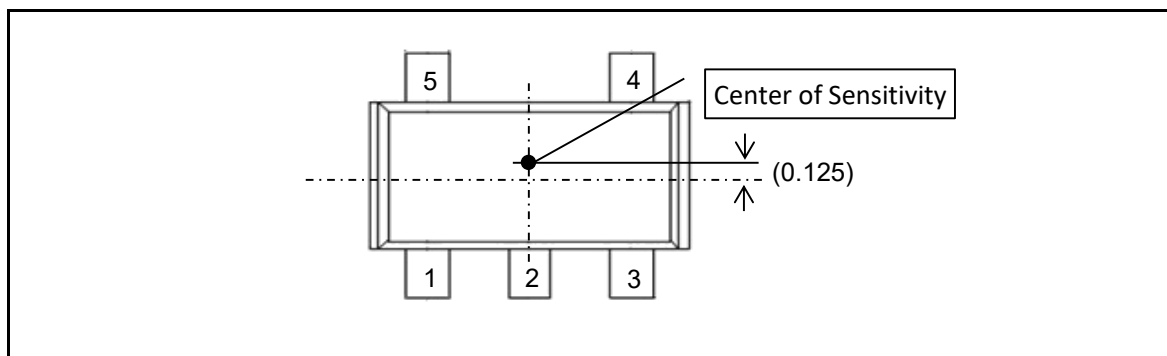


Figure 2-1 Pin Configuration and Center of Sensitive Area

2.2 Pin Description ピン機能

Table2-1 Pin Description

Pin No.	Symbol	Function
1	OUT2	Output2
2	GND	Ground
3	NC	No Connection
4	VDD	Supply voltage
5	OUT1	Output1

2.3 Block Diagram ブロックダイアグラム

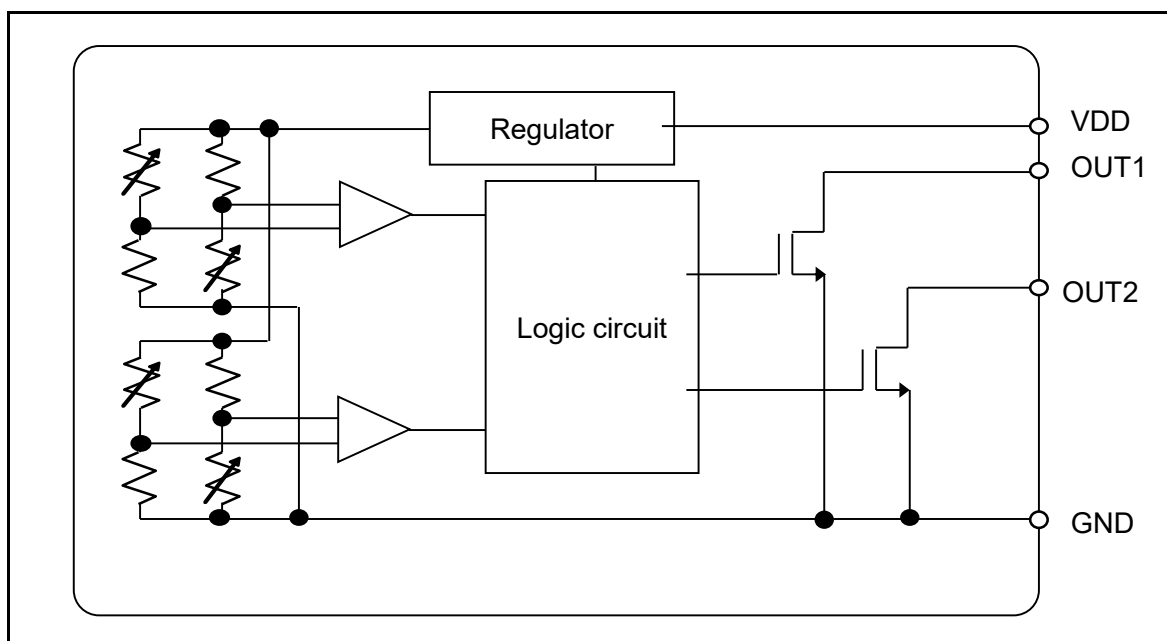


Figure 2-2 Functional Block Diagram

3 Specifications 仕様

3.1 Application Circuit アプリケーション回路

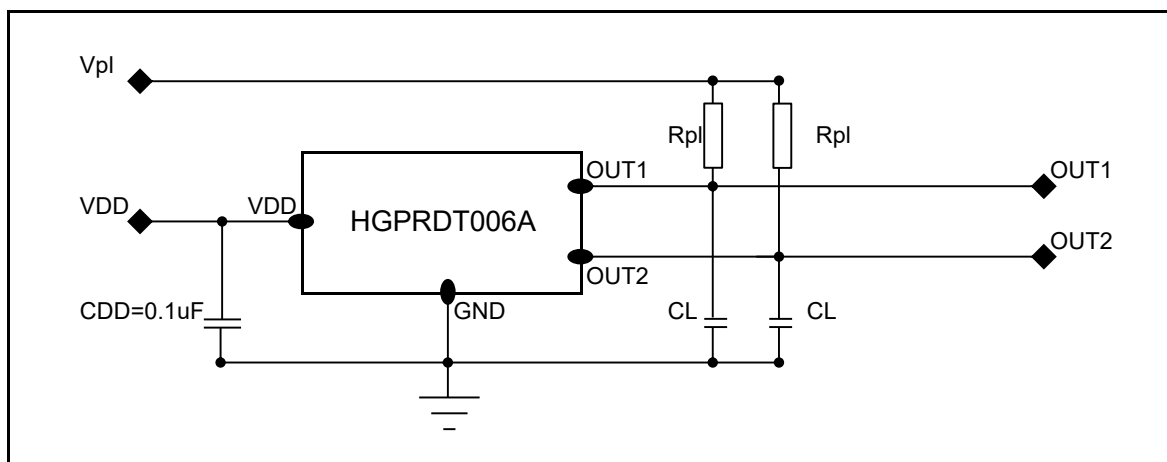


Figure 3-1 Application Circuit Example

3.2 Absolute Maximum Ratings 絶対最大定格

Table3-1 Absolute Maximum Rating Parameters

Parameter	Symbol	Values			Unit	Note
		Min.	Typ.	Max.		
Supply Voltage	VDD	-0.3	-	30	V	
Pull-up Voltage	Vpl	-0.3	-	30	V	
Output Current	Isink	-	-	30	mA	
Operating Temperature	Top	-40	-	120	deg.C	VDD =30V
		-40	-	140	deg.C	VDD =9V
Storage Temperature	Tst	-40	-	150	deg.C	
Magnetic Field	Hmax	-	-	200	mT	

[note]

The maximum rating is the value that must not be exceeded it even if it is momentary. There is a possibility of the breakdown and/or destruction when this value is exceeded.

最大定格とは、たとえ瞬間的であっても超えてはならない値であり、この値を超えた場合、故障・破壊の可能性がありま。

Even if it is use within the maximum rating, continuous use on a high stress (high temperature and high superimposed voltage/large current drive, etc.) might spoil the product reliability.

最大定格内の使用であっても高負荷(高温および高電圧印加／大電流駆動etc.での連続使用は製品の信頼性を低下させる恐れがありま。

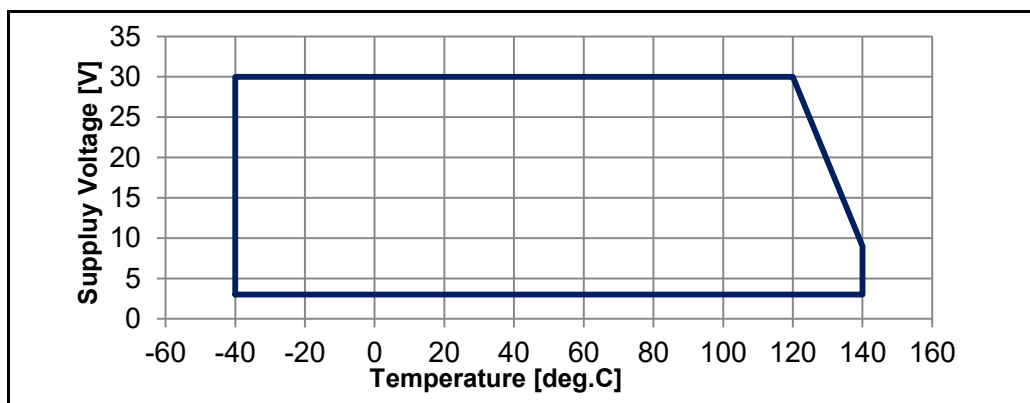


Figure 3-2 Operating Range about Supply Voltage and Temperature

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3.3 Recommended Operating Conditions 推奨動作条件

Table3-2 Recommended Operating Conditions Parameters

Parameter	Symbol	Values			Unit	Note
		Min.	Typ.	Max.		
Supply Voltage	VDD	3	12	30	V	
Pull-up Voltage	Vpl	3	5	30	V	
Output Current	Isink	-	-	10	mA	
Pull-up Resistance	Rpl	3	3.3	30	kOhm	
Load Capacitance	CL	10	30	1000	pF	
Bypass capacitor	CDD	0.1	-	-	μF	Required

3.4 Basic Characteristics 基本特性

Table3-3 General Electrical Characteristics

Parameter	Symbol	Values			Unit	Note
		Min.	Typ.	Max.		
Supply Current	IDD	-	1.6	2.5	mA	
Output Saturation Voltage	Vsat	-	-	0.4	V	VDD=12V Isink=10mA
Output Voltage	Vout	VOH	Vpl-0.1	-	V	"Hi" Level
		VOL	-	Vsat	V	"Lo" Level
Duty Ratio	D	40	50	60	%	see Fig.3-4

[note]

Unless otherwise specified, measurement condition is as follows.

VDD=12V, Vpl=5V, Rpl=3.3kΩ, CL=30pF, T=25deg.C with application circuit described in Figure3-2.

A magnet with 2 poles shall be rotated ideally on the top of sensor package.

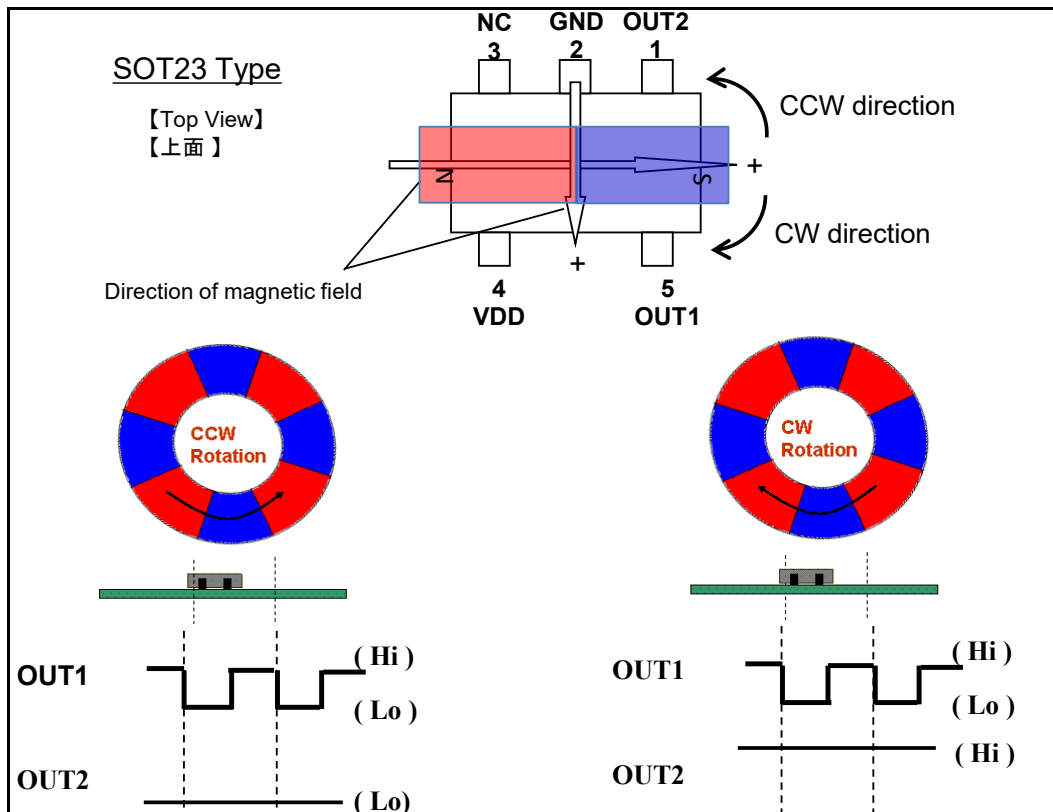


Figure 3-3 Magnetic characteristics:at multi-pole magnet rotation

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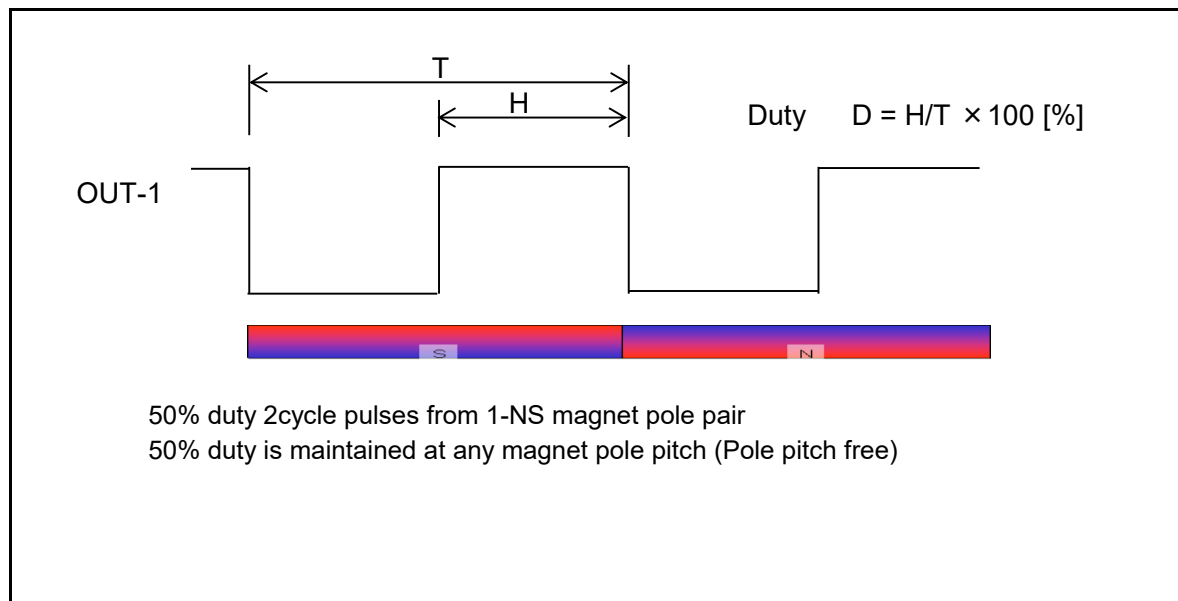


Figure 3-4 Definition of Duty

3.5 Magnetic Characteristics 磁気特性

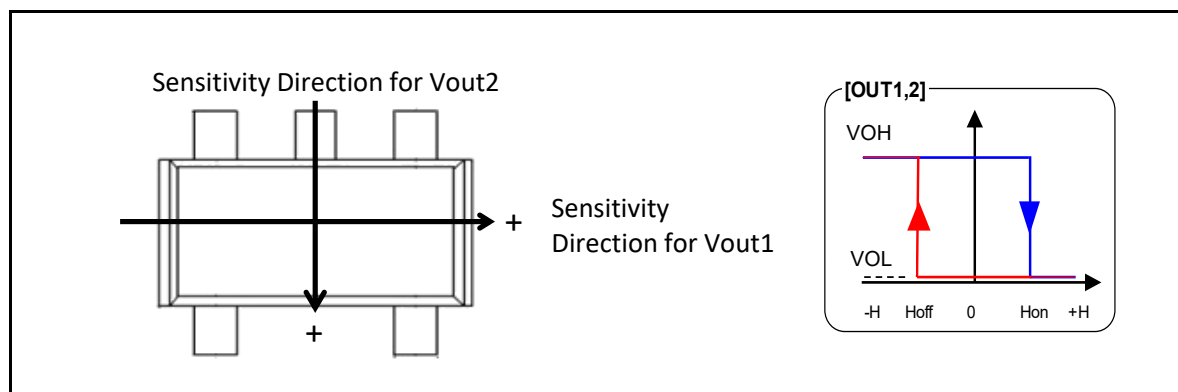


Figure 3-5 Definition of Sensitivity Direction

Table3-4 Operating Magnetic Field

Parameter	Symbol	Values			Unit	Note
		Min.	Typ.	Max.		
Operating Magnetic Field	Hon	-	0.8	(1.6)	mT	25deg.C
	Hoff	(-1.6)	-0.8	-	mT	
	Hhys	-	1.6	-	mT	

[note]

In case of applying magnetic field only sensor sensitivity direction for each

4 Package Information パッケージ情報

4.1 Package Outline 外形図

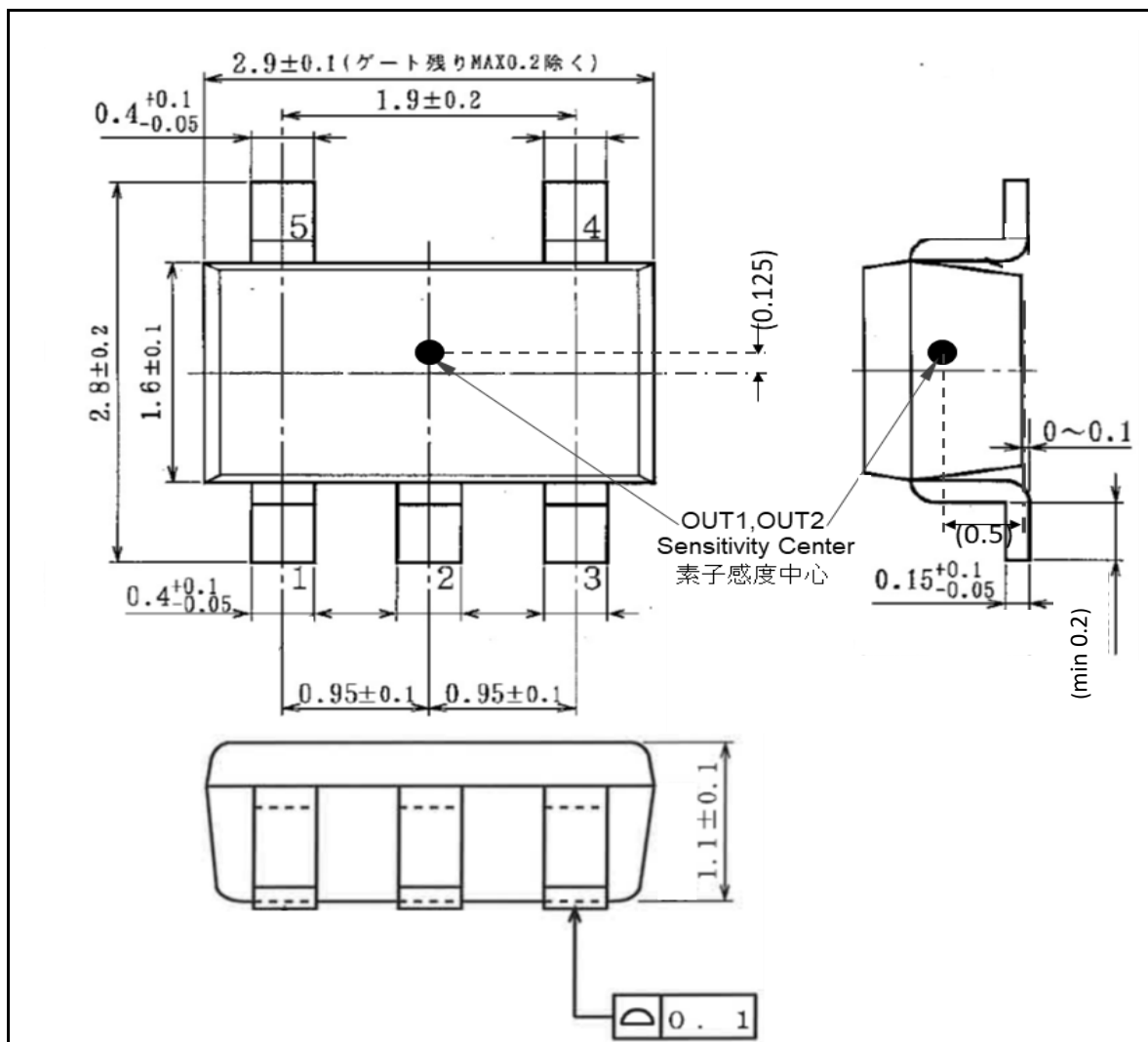


Figure 4-1 Package Outline (All dimensions in mm)

4.2 Footprint フットプリント

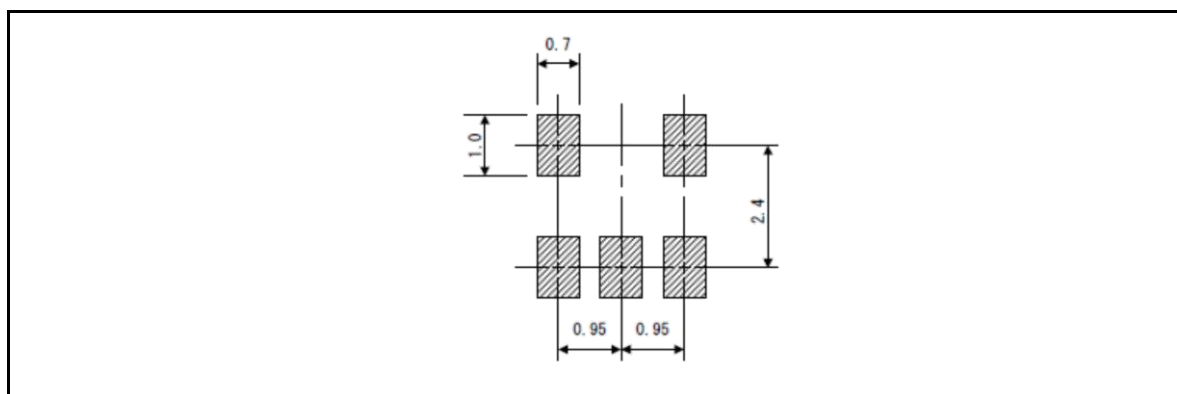


Figure 4-2 Footprint

4.3 Distance between Chip and Package チップ/パッケージ間距離

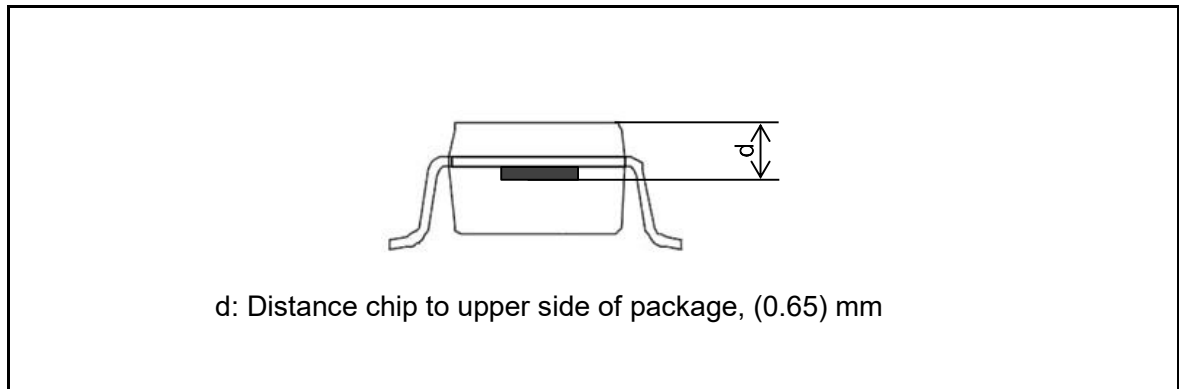


Figure 4-3 Distance between chip and package

4.4 Package Marking 捺印

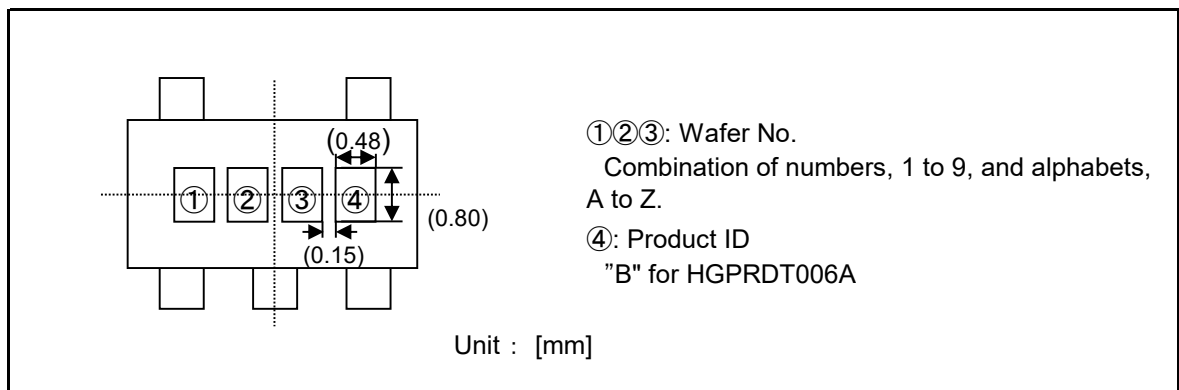


Figure 4-4 Marking of HGPRDT006A

4.5 Structure 構造

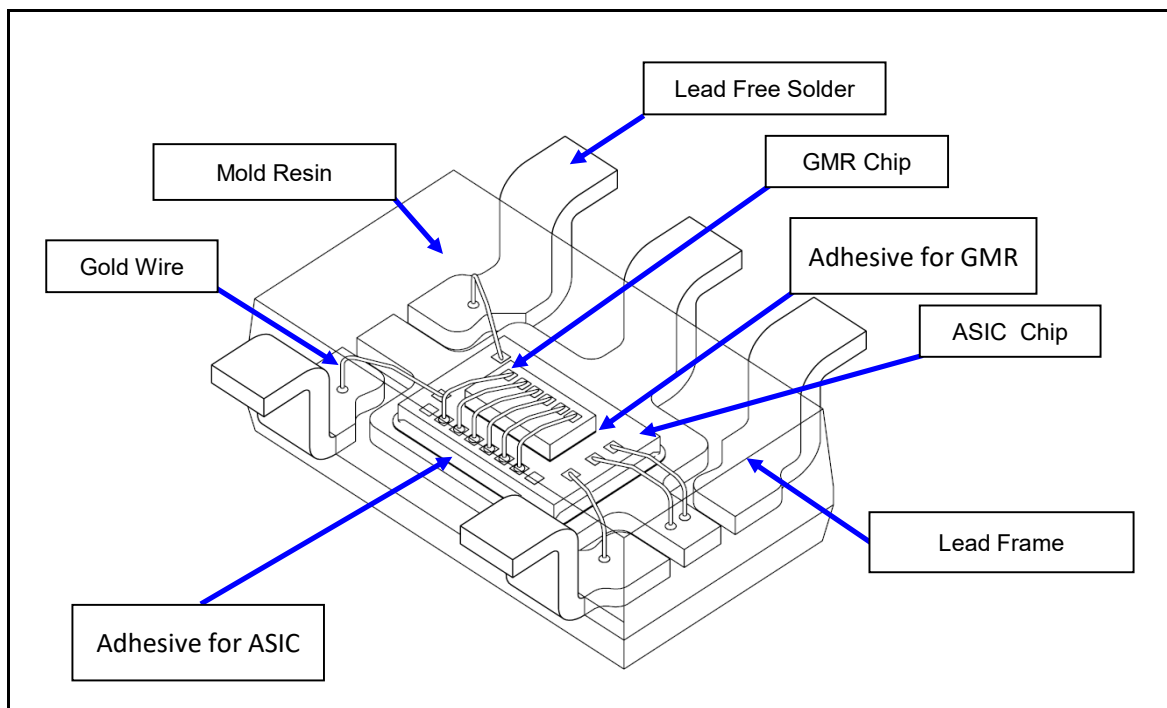


Figure 4-5 Internal Structure

Table 4-1 Components

Process	Parts Name	Materials
Die Mount	GMR Chip	Si
	ASIC Chip	Si
	Adhesive for GMR Die Bonding	Die Attach Film
	Adhesive for ASIC Die Bonding	Silver Paste
	Lead Frame	Cu-Plating
Wire Bonding	Gold Wire	Au
Molding	Mold Resin	Epoxy Resin
Terminal Plating	Outer Terminal Plating	Sn

5 Packing Specifications 梱包仕様

5.1 Packing Information

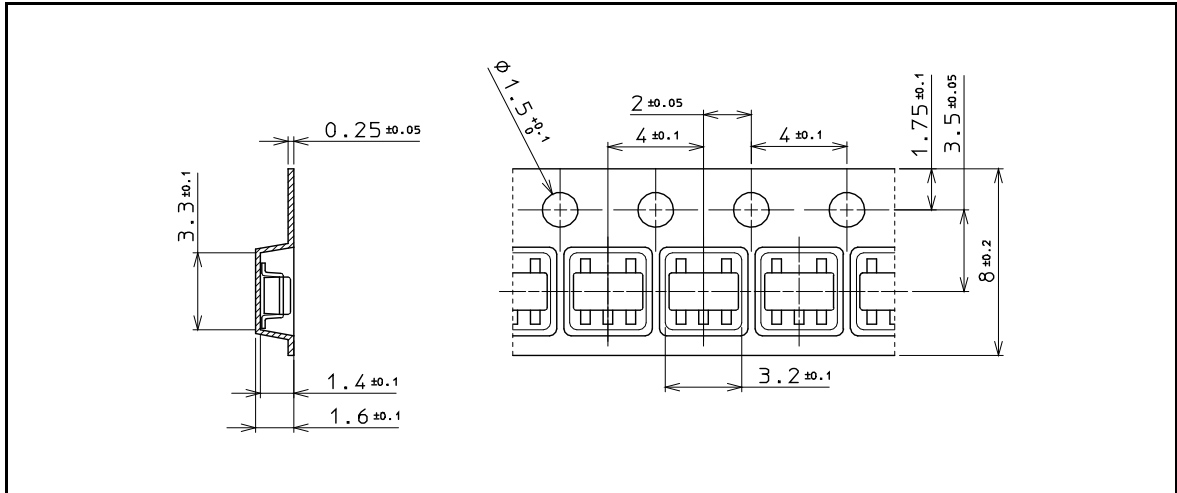


Figure 5-1 Packing of the HGPRDT006A in a tape

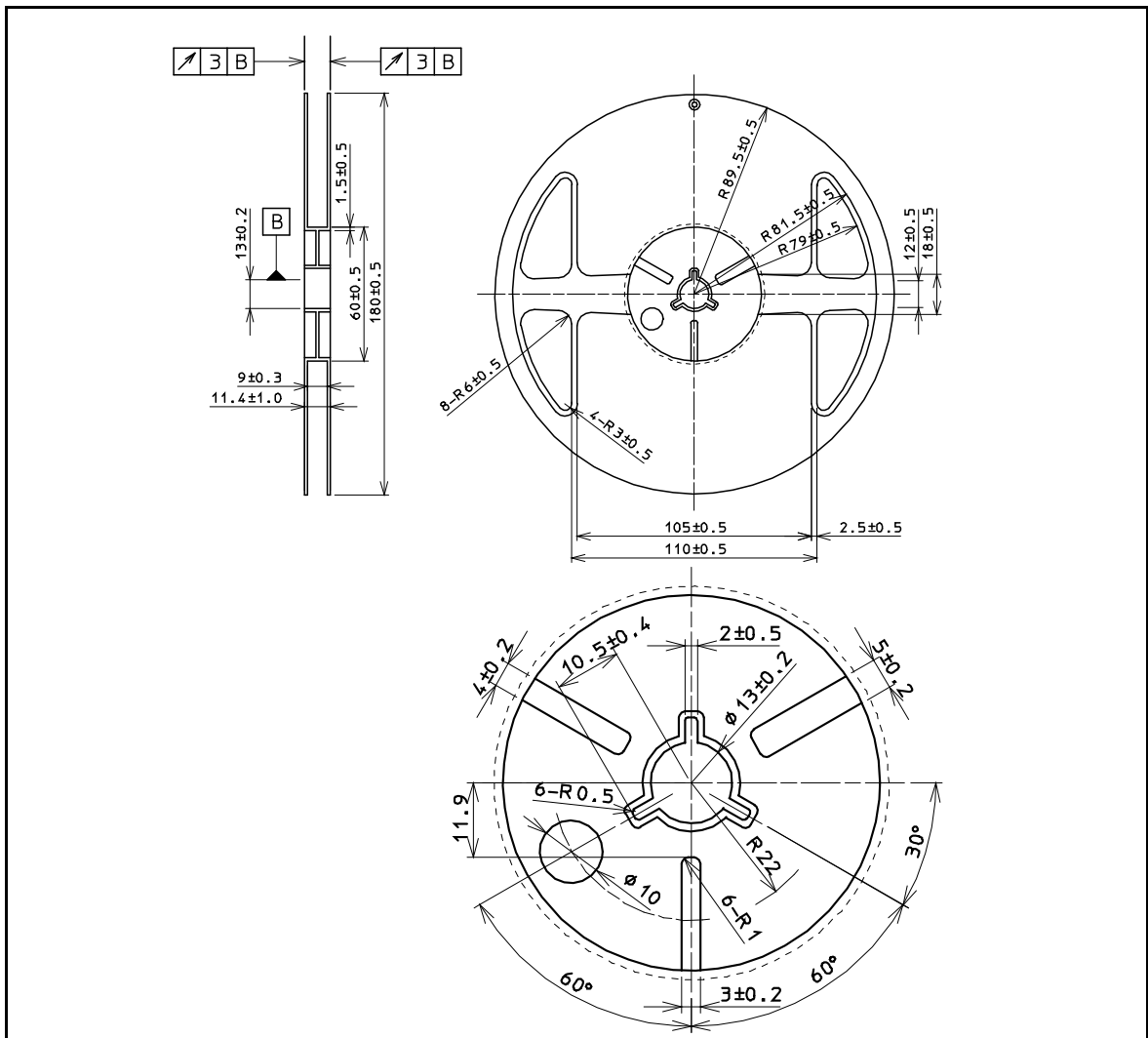


Figure 5-2 Reel Dimensions

5-2 梱包形態 (国内向け) Packing for Japan

- ①.本製品はテーピング包装(3,000個/リール)にて納入します。
This product is delivered by the taping wrapping (3,000 pcs/reel).
- ②.本製品は防湿梱包なしで納入します。
This product is delivered by a non damp-proof packing.
- ③.各リールには、バーコードラベルを貼付します。
The barcode label is put on each reel.
- ④.箱には、リール1個を収納します。(3,000pcs入り/箱)
1 reel stored in the carton box. (carton/with 3,000pcs)
- ⑤.本梱包は、日本国内の出荷に適用する
This packing form is adopted to the shipment in Japan

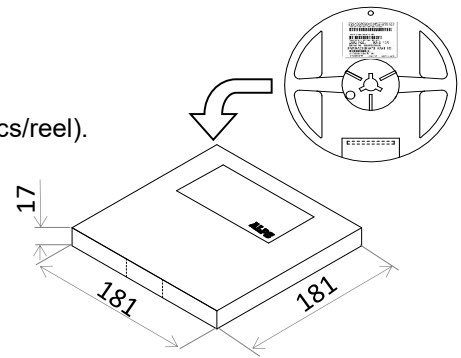


Figure 5-3 Packing for Japan

5-3. 梱包形態 (海外向け) Packing for Overseas

Add P15_ALAP's position on California Proposition 65.

- ①.本製品はテーピング包装(3,000個/リール)にて納入します。
This product is packed by tape wrapping (3,000 pcs/reel).
- ②.各リールには、バーコードラベルを貼付します。
The barcode label is put on each reel.
- ③.1リールを1Bagに収納します。
One reel is stored in one Bag.
- ④.箱には、Bagに収納したリール最大15個を収納します。(max. 45,000pcs入り/箱)
15 bags are put in 1 carton (max. 45,000pcs/carton)
- ⑤.箱の上下には、クッションを収納します。
The cushion is stored in the top and bottom of the carton.
- ⑥.本梱包は、海外向けの出荷に適用する
This packing form is adopted to the shipment to overseas.

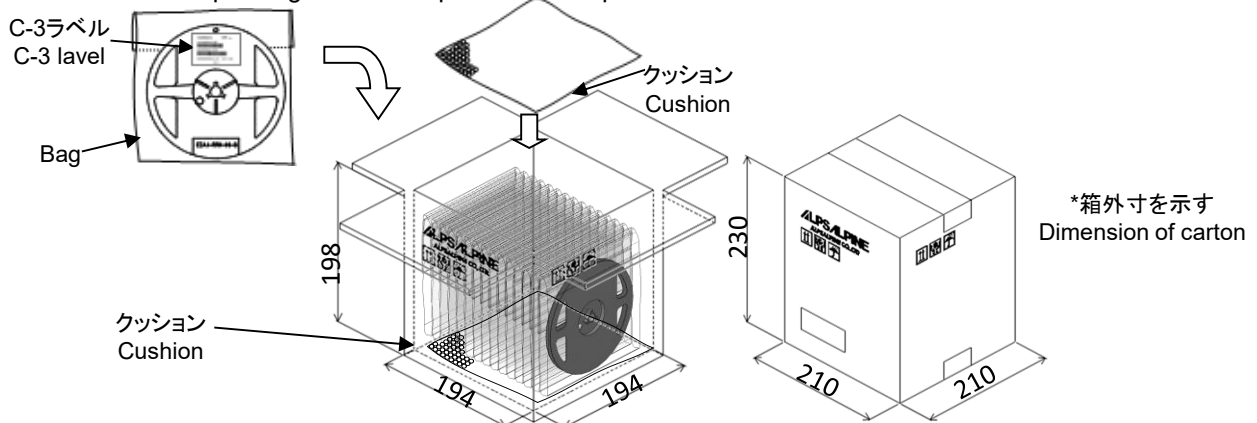


Figure 5-4 Packing for Overseas

5-4. 推奨保管条件 Recommended storage condition

30°C- 85%以下 1年以内 30°C- 85%, less than 1year

5-5 梱包箱 段積み規定 Stacking height of carton

- ・Shipment to Japan : 10段max とする Maximum 10cartons
- ・Shipment to Overseas : 5段max とする Maximum 5cartons

5-6 最小発注単位 MOQ

- ・3,000 個/リール 単位 3,000 pcs/reel at Units

6 Precautions When Handling Magnetic Sensor 製品お取り扱い時の注意

6.1 Storage Environment 保管環境

Products should be stored at an appropriate temperature and humidity (Recommended storage condition). Keep products away from chlorine and corrosive gas. There is a thing that influences product features when keeping it in an improper environment.

適切な温度・湿度環境(推奨保管条件)で保管していただけるようお願いします。また、塩素や腐食性のあるガスも避けるようお願いします。不適切な環境で保管した場合は、製品特性に影響する事があります。

6.2 Long-term Storage 長期保管

Long-term storage may result in poor lead solder ability and degraded electrical performance even under proper conditions. For those part that stored more than 1 year, solder ability should be checked before use. For storage longer than 1 year, it is recommended to store in nitrogen atmosphere. Oxygen in atmosphere oxidant leads of products and lead solder ability get worse.

適切な保管環境でも長期に保管した場合は、リード端子の半田付け性が悪くなったり、電気特性が不良になる場合がありますので、長期保管した場合は、半田付け性や電気特性をご確認の上、ご使用下さい。保管が長期(1年以上)に及ぶ場合は、窒素雰囲気中での保管をお勧めします。大気中で保管されますと、大気中の酸素により素子のリード部分が酸化され、リード端子の半田付け性が悪くなります。

6.3 ESD 静電気ESD

Every products has built in ESD protect circuit, however it may break if over ESD applied to this circuit. Please take measure for ESD when handle the products. Conducted container is recommended for product conveyance and packing instead of plastic container. Please connect ground line and use non high voltage leakage, when using soldering iron or external measurement circuit.

全ての端子に接続されたICについて静電気保護回路を内蔵していますが、その能力を超える静電気が加わった場合には破壊されることがありますので、製品を取り扱う場合には十分な静電気対策を実施してください。包装・運搬容器はプラスチック製を極力避け、導電容器をご使用ください。また製品のハンドリングについても十分に考慮してください。(リストストラップの使用等)はんだごてや測定回路などは高電圧リークのないものを、必ずアースを取ってご使用ください。

7. LEGAL DISCLAIMER 法的放棄宣言

1. 国内外の輸出関連法規により規制されている製品の輸出に際しては、同法規を遵守の上、必要な許可、手続き等をとってください。

For the export of products which are controlled items subject to foreign and domestic export laws and regulations, you must obtain approval and/or follow the formalities of such laws and regulations.

2. 軍事用途又はテロ等の反社会活動目的では、当製品を一切使用しないでください。
また、最終的にそれら用途・目的で使用されるおそれがある法人・団体・個人等へも当製品を一切供給しないでください。

Products must not be used for military and/or antisocial purposes such as terrorism, and shall not be supplied to any party intending to use the products for such purposes.

3. 当製品は、特に用途を指定していないかぎり、本来、AV、家電、事務機、情報機器、通信機器、アミューズメント機器等の一般電子機器用に設計、製造されたものです。
したがって、原子力制御機器、宇宙・航空機で運行にかかわる機器等の用途では一切使用しないでください。

上記の使用禁止の用途以外で、医療機器、防犯機器、防災機器、海底用機器等の高度の安全性・信頼性を必要とする機器でのご使用の際は、弊社営業担当迄ご相談いただくか、またはセットでの十分な適合性の確認を行っていただいた上で、フェールセーフ設計、保護回路、冗長回路、誤動作防止設計、延焼対策設計等のセットでの安全対策設計を設けてください。

Unless provided otherwise, the products have been designed and manufactured for application to equipment and devices which are sold to end-users in the market, such as AV (audio visual) equipment, home electric equipment, office and commercial electronic equipment, information and communication equipment or amusement equipment. The products are not intended for use in, and must not be used for, any application of nuclear equipment, driving control equipment for aerospace or any other unauthorized use. With the exception of the above mentioned banned applications, for applications involving high levels of safety and liability such as medical equipment, burglar alarm equipment, disaster prevention equipment and undersea equipment, please contact an Alps sales representative and/or evaluate the total system on the applicability. Also, implement a fail-safe design, protection circuit, redundant circuit, malfunction protection and/or fire protection into the complete system for safety and reliability of the total

4. 車載対応製品以外の製品を車載用にご使用される場合は、事前に弊社へご相談ください。

Before using products which were not specifically designed for use in automotive applications, please contact an Alps sales representative.

7. LEGAL DISCLAIMER (continue) 法的放棄宣言(続き)

5. 当社製品は、当社が意図し予見する通常の使用目的において、皮膚接触、飲食物の摂取、吸入などの曝露経路は存在せず、曝露リスクをもたらさないため、California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986) に基づく警告ラベルは不要と判断しております。
- ただし、通常の推奨用途以外での使用を検討される場合には、曝露リスクを緩和するため、防塵マスクや防護手袋の使用、換気の良い環境での作業など、安全対策の実施を推奨いたします。California Proposition 65における具体的な対象物質や規制内容は、以下の公式サイトをご参照ください：
<https://www.P65Warnings.ca.gov>

The products, when used for their intended and reasonably foreseeable purposes, do not involve exposure pathways such as dermal contact, ingestion, or inhalation. Accordingly, the products do not pose an exposure risk and therefore do not require a warning label under California Proposition 65

(Safe Drinking Water and Toxic Enforcement Act of 1986).

If consideration is being given to using the products for purposes other than the normally recommended applications, it is recommended that appropriate safety precautions be implemented to minimize any potential exposure risk.

Such precautions may include wearing dust masks and protective gloves, and working in a well-ventilated environment.

For detailed information on substances listed under California Proposition 65 and the applicable regulatory requirements, please refer to the official website:

<https://www.P65Warnings.ca.gov>

Appendix 補足

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A3 Document Revision History 改定履歴

Datasheet Rev.	Date	Page	Note
00	Nov.08, 2021	-	Preliminary
01	Oct.27, 2022	6,7,12	Add P12_Packing for Overseas、 Modify a drawing
02	Mar.17, 2022	8,9,10	Modify a drawing、
03	Aug.08, 2023	6,7	Modify a drawing、
04	Nov.28, 2023	6	Modify a drawing、 eliminate "Preliminary"
05	Apr.28, 2026	6	Modify a drawing
06	Jul.21, 2026	4,7	Modify a drawing
07	Jul.24, 2026	2,15, 16,17	Add P15_ALAP's position on California Proposition 65. Modify a drawing