

EasyPoint™ N40P107

Single Module (without IC, with push button)

1 General Description

EasyPoint™ N40P107 is a miniature joystick module concept based on contact-less, magnetic movement detection. The two-dimensional linear encoder IC AS5013 is mounted on the bottom side of the application's PCB, and monitors the movement of the magnet incorporated into the knob and provides directly the x and y coordinates via I²C output. An integrated mechanical push button built in the module provides a "select" function.

Figure 1. N40P107-xxxxx-H

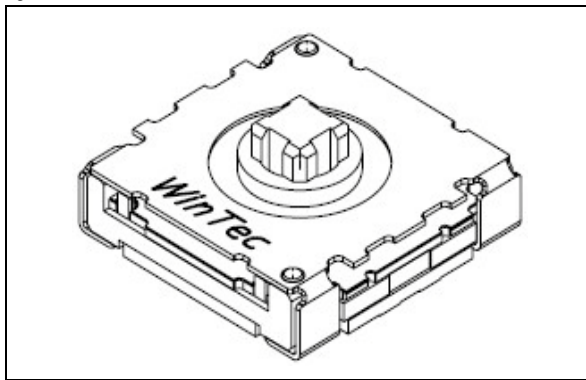
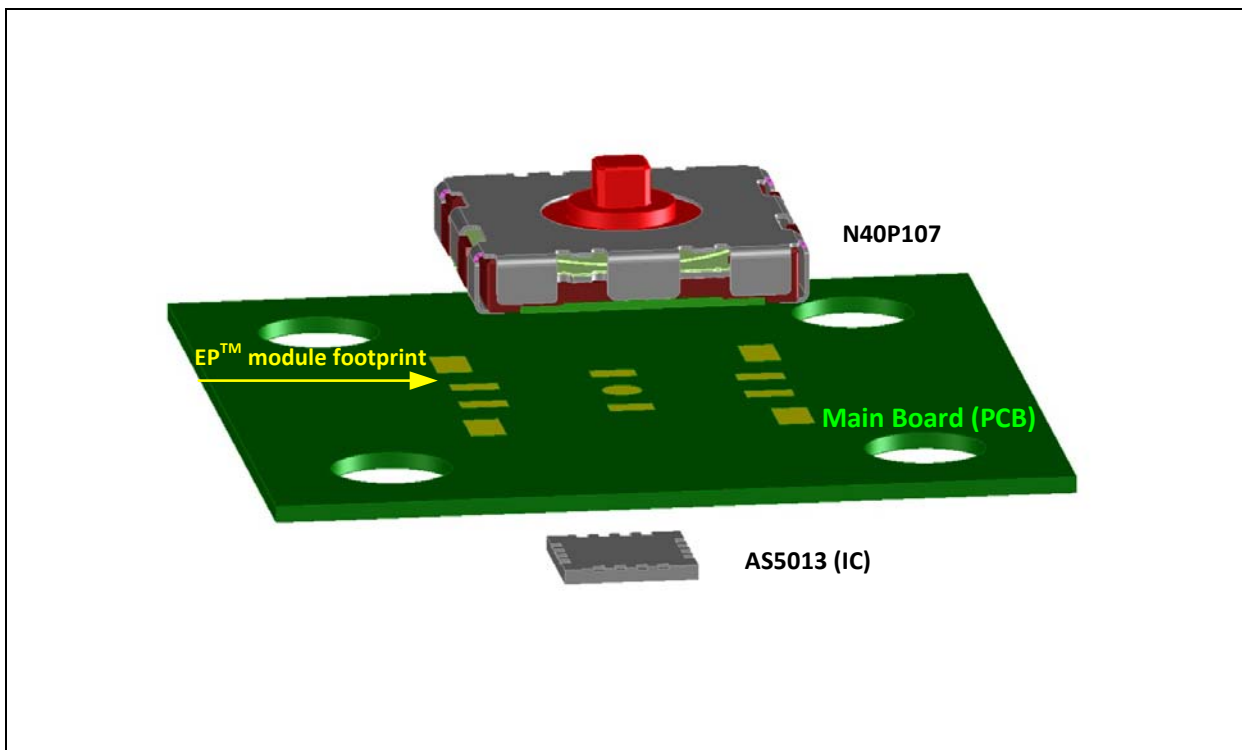


Figure 2. Typical Application Diagram



2 Key Features

- Small form factor
- Lateral magnet movement radius up to $\pm 1\text{mm}$
- Direct knob force feedback
- Push button output
- SMD mounting

3 Applications

The EasyPoint™ N40P107 in combination with the AS5013 is ideal for small form factor navigation user interfaces in battery driven portable devices, such as - Mobile phones (especially for gaming), Remote Controls, Gaming Consoles, Analog joysticks(360 degree), MP3 players, PDAs, PND, MID and GPS

4 Benefits

- High reliability due to magnetic contact-less sensing
- Easy to use and fast integration



5 Electrical Characteristics

5.1 Mechanical Specifications

Table 1. Mechanical Specifications

Parameter	Note
Number of operating shafts	Single shaft
Shaft material	LPC
Housing material	LPC & PA46
Shell material	Stainless Steel or Copper alloy
Travel (XY operation)	±1.00mm (±10%)
Travel (Z push operation)	0.22mm (±0.05mm)
Directional operating force (XY direction)	0.35N (±0.10N) or 0.55N (±0.15N)
Push operating force (Z direction)	1.80N (±15%)
Vibration	10-500-10Hz 15 minutes, 12 cycles, 3 axes (total 36 cycles)
Operating life – XY direction	Each direction > 1 million cycles
Operating life – Push Z direction	> 1 million cycles
Shaft strength (XYZ direction)	> 5.0kgf
Over force	1.5kgf > 100k cycles

5.2 Electrical Specifications

Table 2. Electrical Specifications

Parameter	Min	Max	Unit	Note
Contact resistance		500	mΩ	Norm: EIA-364-23
Dielectric withstanding voltage	100		Vac	Norm: EIA-364-20
Insulation resistance	100		MΩ	Norm: EIA-364-21, 100Vdc
Bouncing (On/Off)		5	ms	Rate: 2 times/sec.

5.3 Environmental Specifications

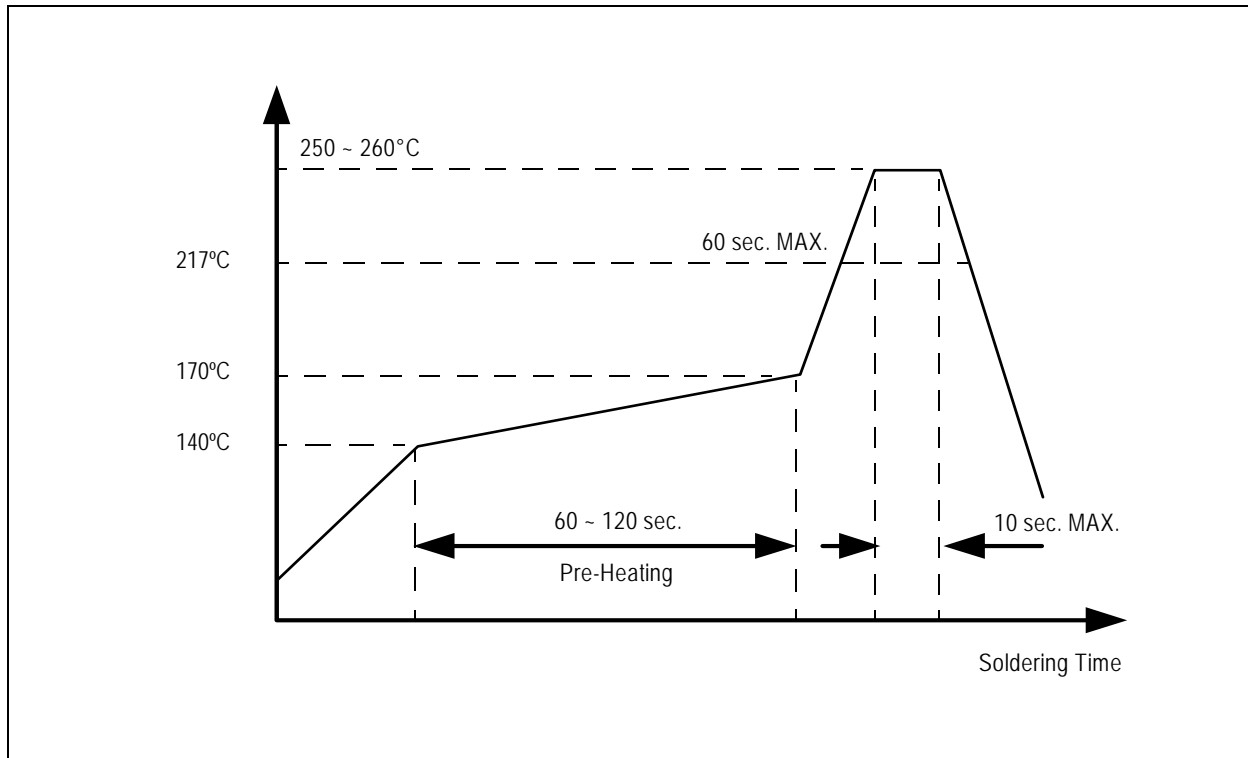
Table 3. Environmental Specifications

Parameter	Note
Operating temperature range	-20 ~ +70°C
Storage temperature range	-40 ~ +85°C
Humidity non-condensing	5 ~ 85% RH
Degrees of protection	IP 5X



5.4 Recommended Reflow Temperature Profile

Figure 3. Reflow Temperature Profile



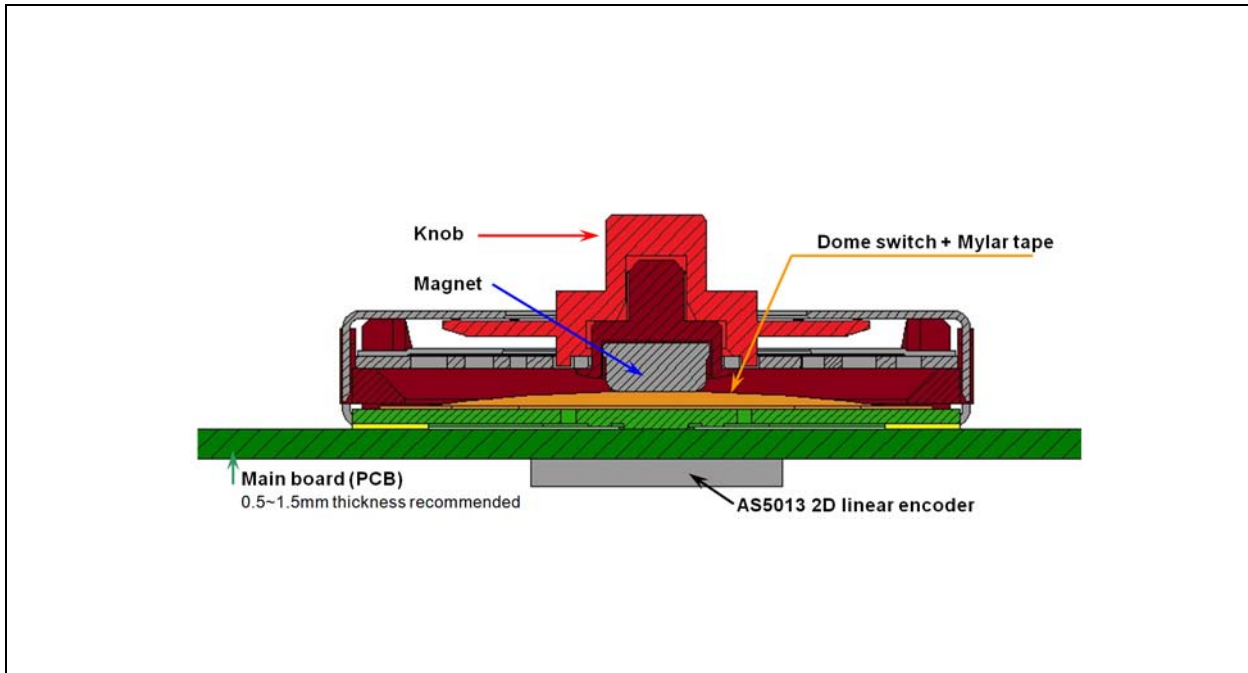
Notes:

1. Do not wash the module! Do not use flux cleaner or solder paste remover!
2. Maximum 3 passes through reflow oven.



6 Application Using AS5013 2D Linear Encoder

Figure 4. Application Diagram



For further information, please refer to the *ams* AS5013 encoder application note AN5013-20:

<http://www.ams.com/eng%29/Products/Position-Sensors/EasyPoint-Joystick-Position-Sensor/AS5013/Technical-Documents/EasyPoint-AS5013-Downloads>



7 Package Drawings and Markings

Figure 5. N40P107 Dimensions (mm ±0.15)

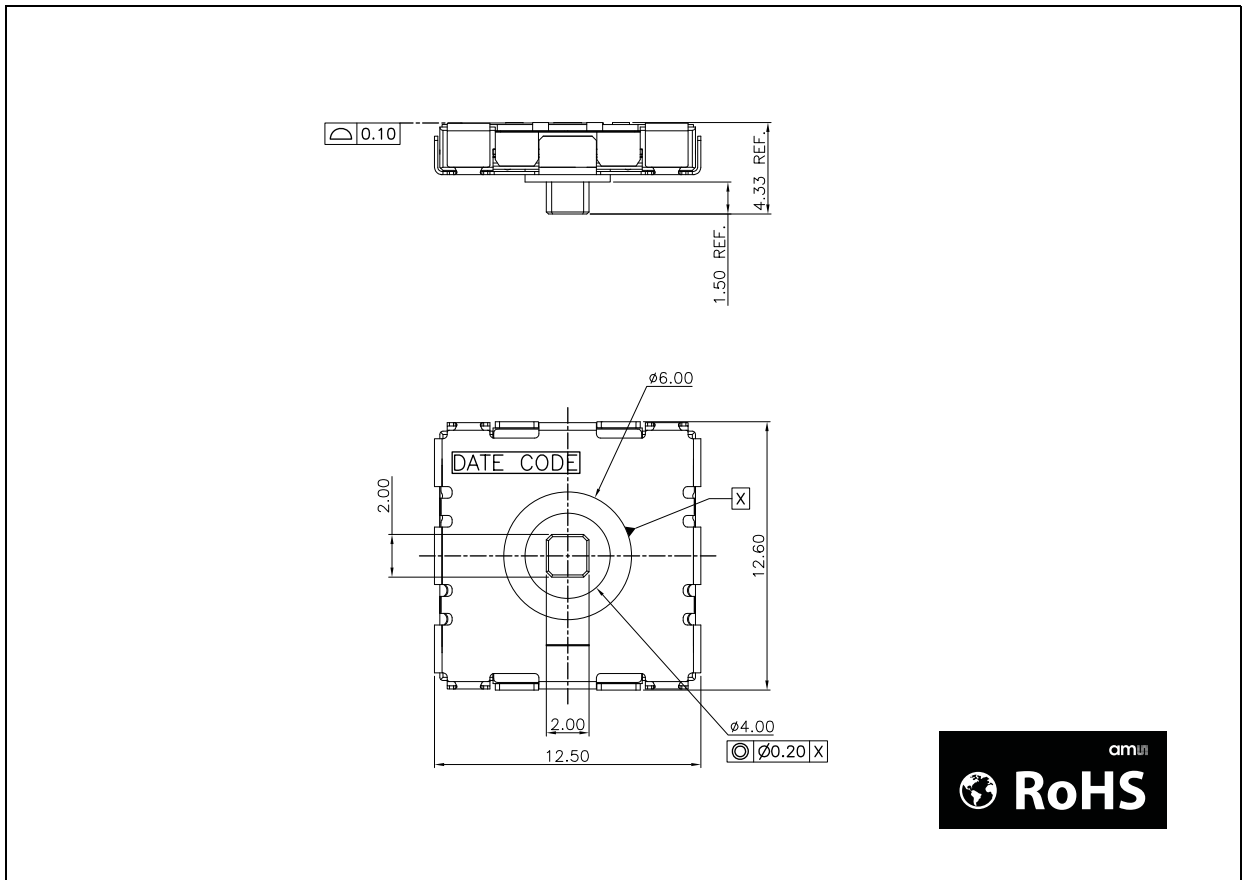


Figure 6. Recommended PCB Layout (mm ±0.05) & Circuit Diagram

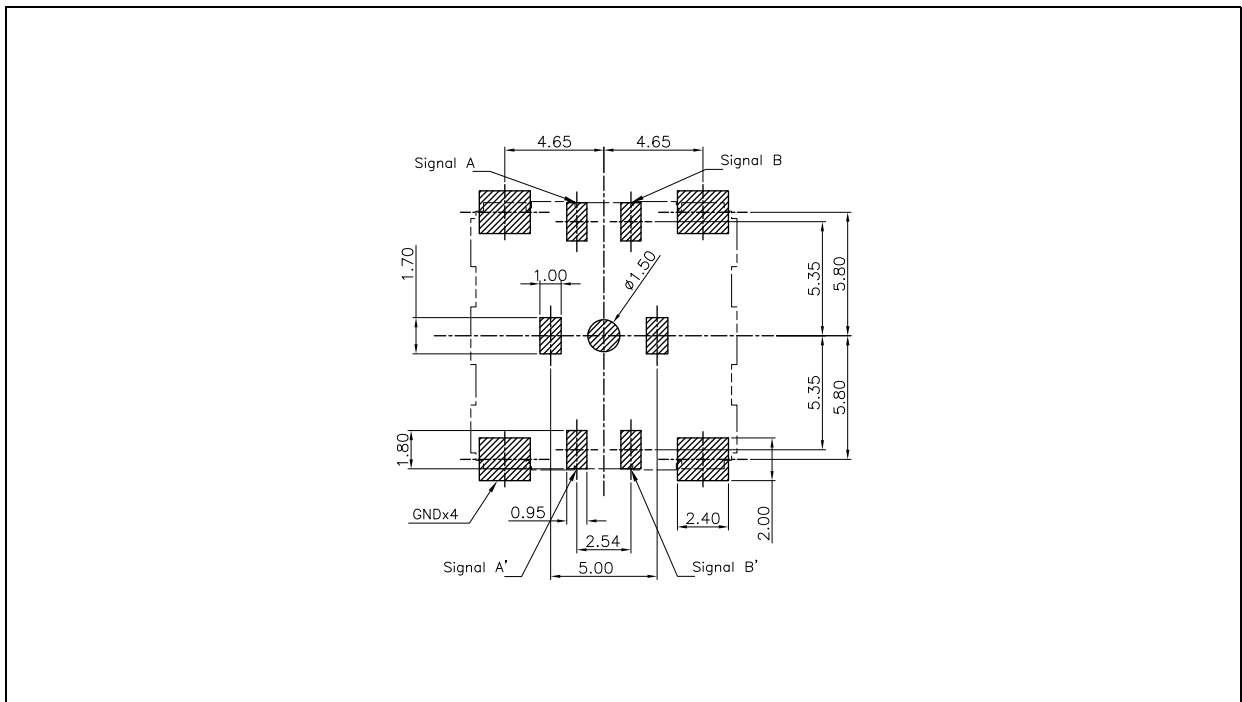




Figure 7. Recommended on Casing Design

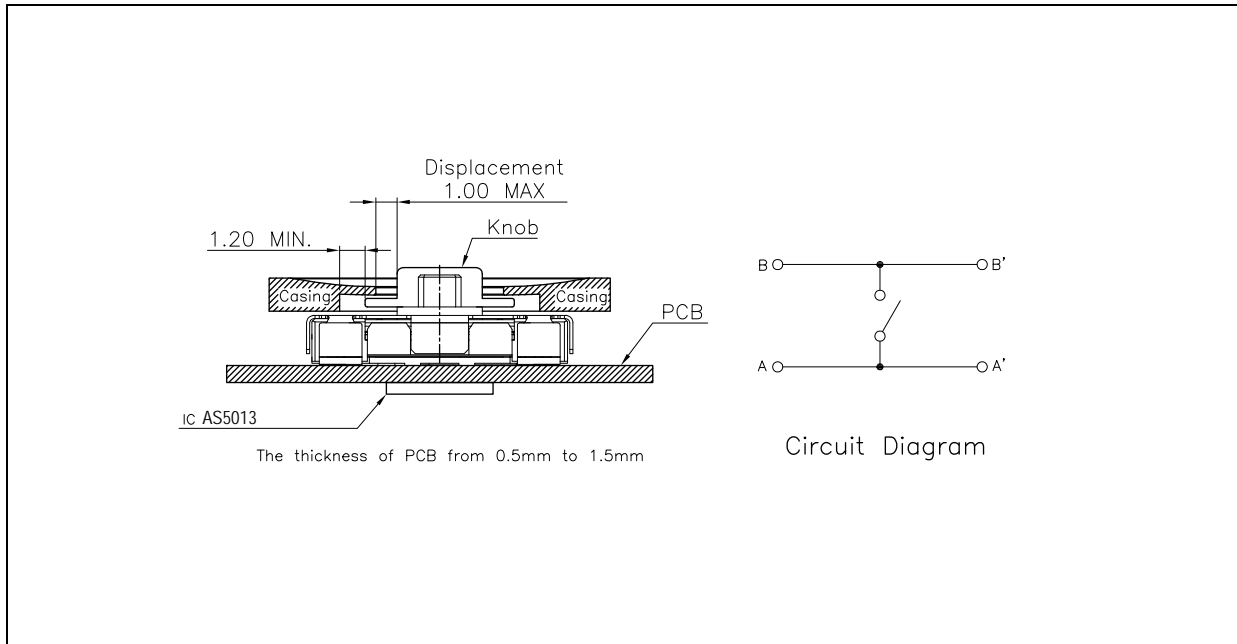
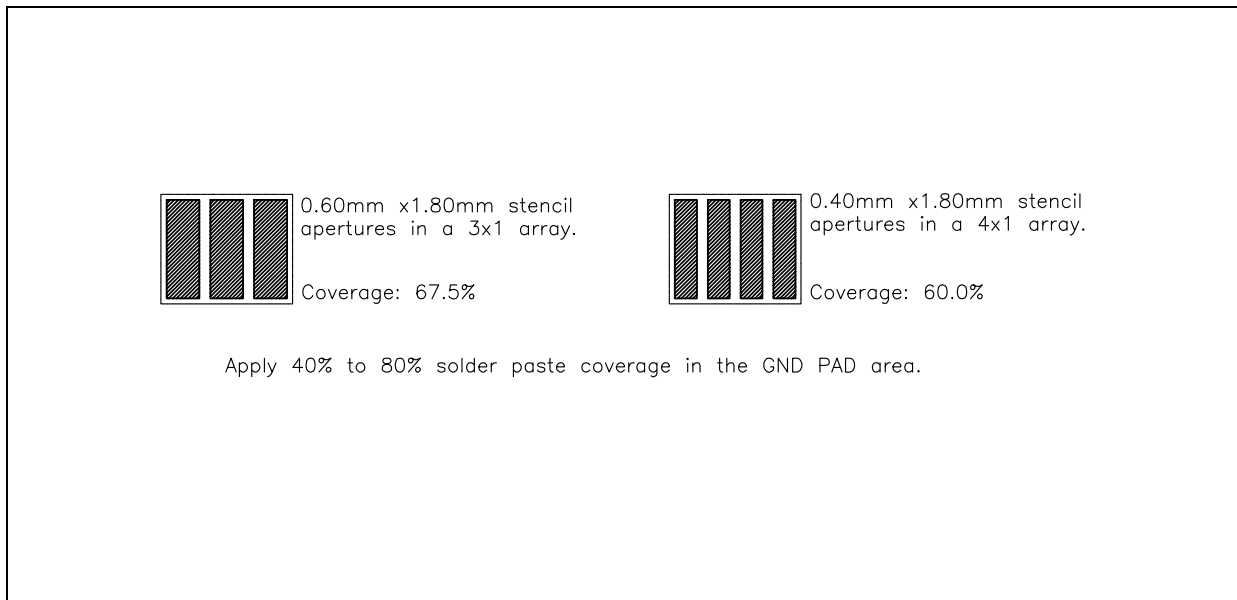


Figure 8. Recommended Stencil Design for 4 GND-Pads





Revision History

Revision	Date	Owner	Description
1.0	25 May, 2011	abi	Initial release
1.1	21 Jun, 2011		Minor changes on text and format
1.2	19 Oct, 2011	rph	Added logos to Package Drawings and Markings on page 5
1.3	05 Jan, 2012		Changed logos in Package Drawings and Markings on page 5
1.4	17 Jan, 2012		Added note to Recommended Reflow Temperature Profile on page 3
1.5	19 Jun 2012		Updated Key Features on page 1 and Figure 4
1.6	19 Aug, 2013		Updated Figure 5
	23 Apr, 2014	Updated link under Figure 4	

Note: Typos may not be explicitly mentioned under revision history.



Copyrights & Disclaimer

Copyright ams AG, Tobelbader Strasse 30, 8141 Unterpemstaetten, Austria-Europe. Trademarks Registered. All rights reserved. The material herein may not be reproduced, adapted, merged, translated, stored, or used without the prior written consent of the copyright owner.

Devices sold by ams AG are covered by the warranty and patent indemnification provisions appearing in its Term of Sale. ams AG makes no warranty, express, statutory, implied, or by description regarding the information set forth herein. ams AG reserves the right to change specifications and prices at any time and without notice. Therefore, prior to designing this product into a system, it is necessary to check with ams AG for current information. This product is intended for use in commercial applications. Applications requiring extended temperature range, unusual environmental requirements, or high reliability applications, such as military, medical life-support or life-sustaining equipment are specifically not recommended without additional processing by ams AG for each application. This product is provided by ams AG "AS IS" and any express or implied warranties, including, but not limited to the implied warranties of merchantability and fitness for a particular purpose are disclaimed.

ams AG shall not be liable to recipient or any third party for any damages, including but not limited to personal injury, property damage, loss of profits, loss of use, interruption of business or indirect, special, incidental or consequential damages, of any kind, in connection with or arising out of the furnishing, performance or use of the technical data herein. No obligation or liability to recipient or any third party shall arise or flow out of ams AG rendering of technical or other services.

Contact Information:



Headquarters

ams AG
Tobelbaderstrasse 30
8141 Unterpemstaetten
Austria, Europe

Tel: +43 (0) 3136 500 0

Website: www.ams.com