

BES LITE-BM SERIES

3015-9833
Issue 1

Battery Safety Electrolyte Detector - Board Mount Version

Compact Board-Mount Design | Highly Sensitive & Selective | Analog Three-State Output



DESCRIPTION

BES LITE-BM is a board mount, cost-effective, low-profile, light-weight battery safety detector that uses Honeywell proprietary gas sensing technology to selectively detect battery electrolyte vapor, an indicator of thermal events. This provides an advanced warning of potential thermal runaway in Lithium-Ion battery packs.

BES LITE-BM is designed to detect gases that are typically released during the initial phase of thermal runaway as well as throughout the entire thermal runaway process. This advanced detection capability facilitates the prompt identification of imminent dangers or risks, significantly enhancing safety measures in critical situations. Therefore, the sensor allows for proactive responses that can prevent loss of assets and protection of lives.

Early detection may vary based on factors such as the nature of cell abuse and its severity, state of charge, and other variables. BES LITE-BM allows compliance with international regulations and guidance by providing a deterministic detection of thermal runaway events.

BES LITE-BM is compatible with all lithium-ion battery chemistries and cell types, making it versatile for use in industrial lithium-ion battery packs. Engineered to support a ten-year lifespan, it aligns with the typical operational life of industrial equipment. As concerns over lithium-ion battery safety continue to rise, BES LITE-BM stands out as the ideal battery safety detector, ensuring the protection of both personnel and assets.

PORTFOLIO

The BES LITE-BM joins the Battery Monitoring Suite. To view the entire product portfolio, [click here](#).

DIFFERENTIATION

- **Early thermal runaway detection:** BES LITE-BM is designed to detect gases commonly released during the initial phase of lithium-ion battery cell breakdown. This early detection allows for the timely implementation of safety mitigation actions, ensuring that appropriate measures can be taken to address potential hazards before they escalate
- **Selective response to battery electrolyte vapor:** BES LITE-BM's selective response to battery electrolyte vapor significantly reduces the risk of false alarms, making it ideal for use in environments where interference gases may be present
- **Efficient & safe design:** BES LITE-BM features BMS-mountable pins for seamless integration in space-constrained applications. It also employs simple electronics for easy integration and minimal power consumption. Unlike other gas sensing technologies, it operates without an internal heating element, making it ideal for explosion-proof environments and applications requiring extended battery life
- **Agnostic to Li-Ion chemistry & battery type:** Works with various Li-ion battery types including prismatic, pouch & cylindrical, as well as different chemistries such as NMC, LFP, LTO, and more

APPLICATIONS

Sealed and portable lithium-ion battery modules used in

- Battery Energy Storage Systems (BESS)
- UAM/UAV
- Micro-mobility
- Medical devices
- Light industrial goods

FEATURES

- Detects initial venting events before thermal runaway
- Provides early warning of thermal runaway events
- Selectively responds to electrolyte vapor
- Intrinsically safe with no internal heating element
- In-built diagnostics functionality
- Low-profile, compact design
- Designed for board-mounted applications
- Three-state analog output
- Customizable to specific application needs
- Compatible with all Lithium-ion battery chemistries and cell types
- Ten-year sensor life
- Resistant to common contaminants
- Highly resistant to siloxane poisoning
- Optimized for industrial applications

VALUE TO CUSTOMERS

- **Enhanced asset protection:** Battery electrolyte vapor detection enables early detection of thermal events, allowing enhanced asset protection
- **Selective detection:** Detects only electrolyte vapor. The selective response and high sensitivity to electrolyte vapor allows for the mitigation of false alarms
- **Reliability in critical environments:** Resistant to cross-gas interference & siloxane poisoning, ensuring reliable performance across demanding environments
- **Ease of installation:** The low-profile construction & mounting pins enable easy installation in space constrained applications. The three-state output simplifies integration

Honeywell

BES LITE-BM

BATTERY SAFETY ELECTROLYTE DETECTOR - BOARD MOUNT VERSION

TABLE 1. GENERAL SPECIFICATIONS

Characteristic	Parameter
Detection principle	Electrochemical sensing
Dimensions W × L × H (mm)	21 × 14 × 9,5
Startup time	1 second to valid output
Response time ¹	< 2 seconds (typical)
Detected media (Typical battery electrolytes)	Ethyl methyl carbonate (EMC) Dimethyl carbonate (DMC) Propylene carbonate (PC) Diethyl carbonate (DEC) Ethylene carbonate (EC)
Operational life ²	10 years
Storage life ³	3 years

TABLE 2. ENVIRONMENTAL SPECIFICATIONS

Characteristic	Parameter
Operating temperature range	-20°C to 70°C [-4°F to 158°F]
Storage temperature range	-40°C to 85°C [-40°F to 185°F]
Humidity ⁴	10 %RH to 90 %RH (non-condensing)
Ingress protection	Not applicable
Vibration	Sine wave (logarithmic) sweep, 7 Hz to 200 Hz, 1 g to 8 g, 3 h per axis
Shock	50 g, 11ms (all axes)
EMC	As per AIS 004 Part 3
ESD (unpowered)	±2 kV contact discharge (IEC 61000-4-2) ±2 kV air discharge (IEC 61000-4-2)

TABLE 3. ELECTRICAL SPECIFICATIONS

Characteristic	Minimum	Nominal	Maximum	Unit
Supply voltage	4.5	5.0	5.5	Vdc
Current consumption	–	–	3.0	mA
Output type	Three-state output ⁵			
Output (nominal)	2.00	2.50	3.00	Vdc
Device fault (diagnostics) or no power condition	–	0.0	<0.5	Vdc
Output for first vent event	4.25	–	5.00	Vdc

TABLE 4. INSTALLATION

Characteristic	Parameter
Device enclosure material	Acetal (POM)
Connector	Samtec® through-hole 1-position header pin (4 off), P/N: TSW-101-06-T-S (On Device)
Weight	2.5 g
Mounting	Soldered ⁶ onto the BMS board
Interface circuit recommendation	Recommended filter capacitor at output: 0.001 μF to 0.22 μF
	Minimum input impedance of load: 850 Kohms
	Use of a buffer circuit to isolate the sensor output from input devices/circuits with low input impedance (less than 1 MΩ) is recommended

¹ Response time – the time required for the device to detect a change in an input physical parameter or stimulus and provide a commensurate or pre-determined change in output.

² At ambient operating conditions ranging from 25°C to 40°C.

³ At storage conditions ranging from -10°C to 50°C.

⁴ Refer to Table 5 for the temperature-relative humidity combinations within the application boundary.

⁵ Three-State Output – The device provides a constant analog voltage output signal of 2.50 Vdc during normal operating condition. When a first vent event is detected, the output rails to high (5 Vdc). If the internal diagnostics detects a fault in the device, it produces a constant low (0 Vdc) output. Output is ratiometric to supply voltage; 10% variation is applicable in all output conditions.

⁶ Soldering temperature must not exceed 85°C. Excessive heat can permanently damage the sensing element.

BES LITE-BM BATTERY SAFETY ELECTROLYTE DETECTOR - BOARD MOUNT VERSION

Figure 1. Product Dimensions (for reference only), mm

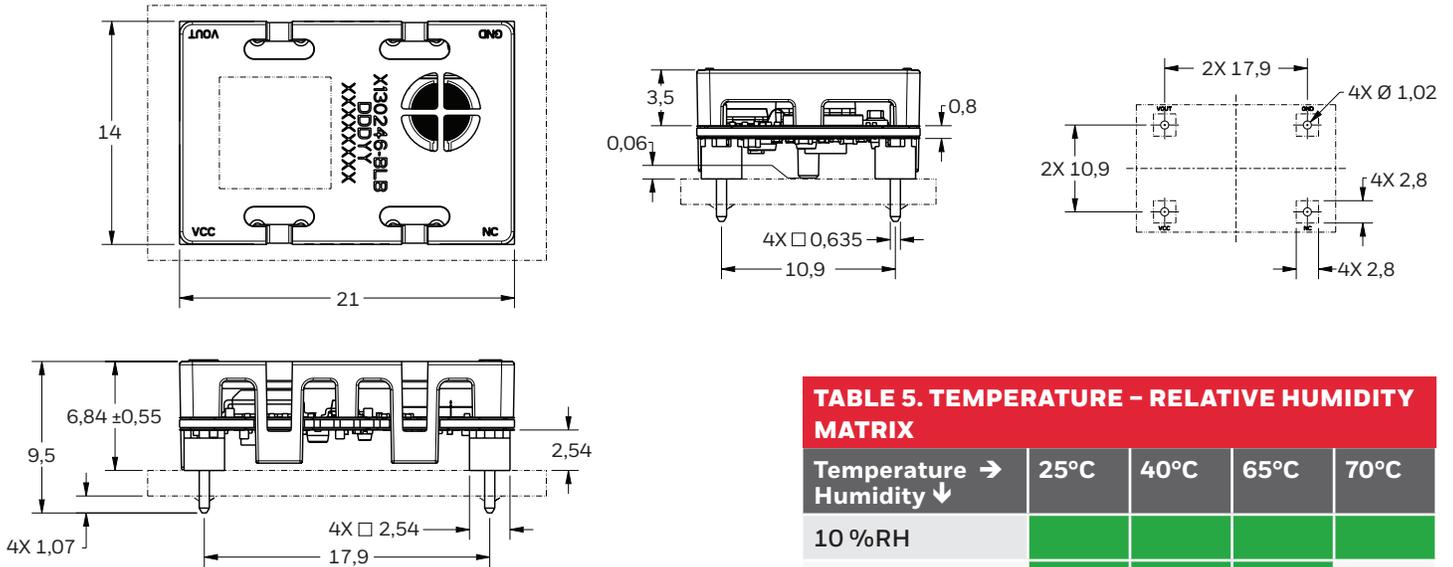


Figure 2. Electrical Connection

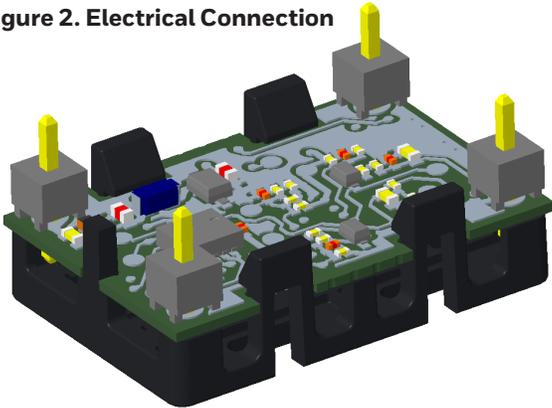


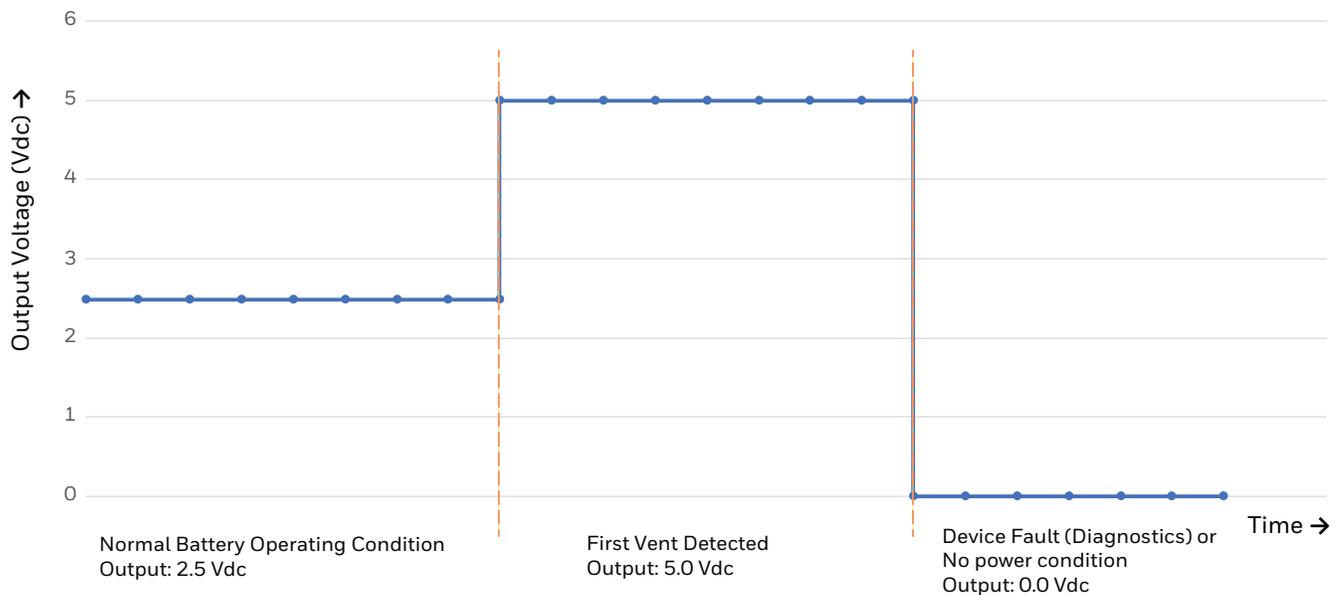
TABLE 5. TEMPERATURE - RELATIVE HUMIDITY MATRIX

Temperature → Humidity ↓	25°C	40°C	65°C	70°C
10 %RH				
15 %RH				
65 %RH				
85 %RH				
90 %RH				

TABLE 6. PIN OUT

Pin	Designation	Function
1	V _{CC}	Supply voltage
2	V _{OUT}	Output
3	GND	Ground
4	NC	No connection

Figure 3. Output Signal During Normal Battery Operating Condition and When First Vent is Detected



BES LITE-BM BATTERY SAFETY ELECTROLYTE DETECTOR - BOARD MOUNT VERSION

Figure 4. Product Nomenclature

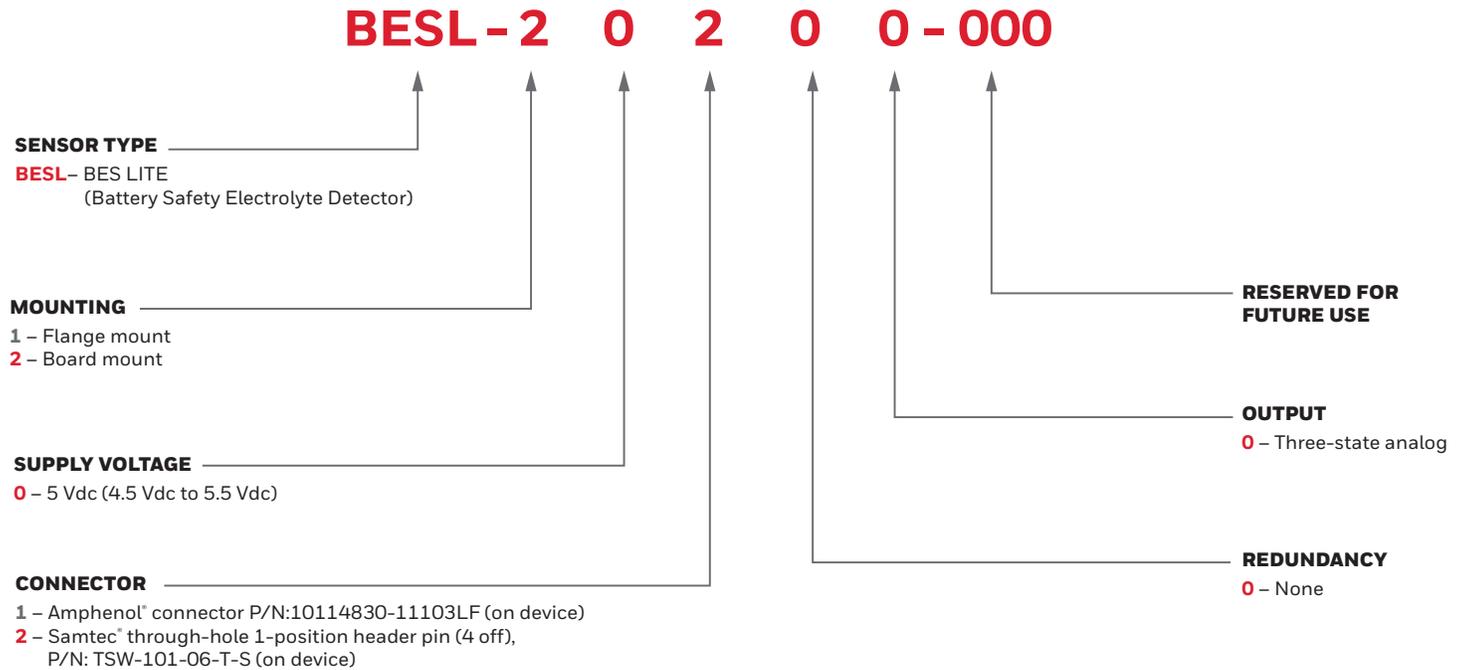


TABLE 7. ORDER GUIDE

Part Number	Description
BESL-10100-000	Battery Safety Electrolyte Detector - flange-mount version Operating temperature range -20°C to 70°C, 5 V supply voltage, three-state analog output
BESL-20200-000	Battery Safety Electrolyte Detector - board-mount version Operating temperature range -20°C to 70°C, 5 V supply voltage, three-state analog output

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship during the applicable warranty period. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items that Honeywell, in its sole discretion, finds defective.

The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.

While Honeywell may provide information or engineering support for its products through Honeywell personnel, literature and website, it is the buyer's sole responsibility to determine the suitability of the Honeywell product(s) for the buyer's requirements.

Specifications may change without notice. The information we supply is believed to be accurate as of this writing. However, Honeywell assumes no responsibility for its use.

WARNING

PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.

Failure to comply with these instructions could result in death or serious injury.

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