

AUTOMOTIVE COMMUNICATION MAGNETICS FOR BATTERY MANAGEMENT SYSTEMS (BMS)

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AUTOMOTIVE COMMUNICATION MAGNETICS

HIGH ISOLATION TRANSFORMERS FOR BATTERY MANAGEMENT SYSTEMS (BMS)

The Battery Management System measures the voltage and stops charging the battery cells during the charging process. The main goal is to achieve the best possible battery reliability, performance and longevity. The electronics in a BMS are required to send the measurement data to the central processor. Due to inverters, actuators, solid state switches, relays, and other sources of electromagnetic interference (EMI) in vehicles, BMS is in an electrically noisy environment where data communications links must be isolated, and EMI suppressed to provide adequate noise cancellation.

The Battery Management System has two main circuits. On the one side is the Cell Management Controller (CMC) and on the other side is the Battery Management Controller (BMC). The CMC subdivides between two applications, the monitoring and the cell balancing. The monitoring application provides the "real time" cell voltage and temperature, where the Cell balancing helps prolong battery life by charging or discharging the battery cell on the active cell balancing, and actively preventing overheating by switching out of the cells on the passive Cell balancing.





Passive Cell Balancing Convert cell charge into heat



Active Cell Balancing Deliver or take away energy from a cell

The Battery Module Controller (BMC) collects the battery data from every battery module in the pack. It is also in charge of the communication with the vehicles electronical control unit (ECU) which displays the battery health, charge status and temperature to the end consumer.

or

KEY ELEMENTS ON TYPICAL COMPLETE BMS



The serial communication links between the boards needs to be isolated by transformer coupling circuits.

Pulse offers a full line of isolation transformers and common mode chokes for small to large battery pack systems, for serial port safety isolation and EMI noise rejection applications. In large battery packs with daisy chain connections, the number of cells connected in series is very high, and the large voltage differences demand component-to-component isolation. The serial communication links between the boards need to be isolated by transformer coupling circuits and are not suitable for capacitive coupling.

Pulse BMS Transformers modules exhibit the following features and benefits:

- Supports major BMS isolation and EMI solutions
- Supports serial Daisy Chain isoSPI, SPI and other signal isolation
- Meets AEC-Q200 requirements for automotive application
- RoHS & REACH compliant
- Operational temperature ranges from -40C up to 150C
- Multiple options covering 600Vdc 1600Vdc working voltages
- High Voltage Breakdown and fixed Creepage distances





APPROVED BMS TRANSFORMER MODULES

The BMS Transformers from Pulse are designed to pass the requirements from 3rd Parties in terms of the high Automotive quality, reliability and safety standard. Due the need of high-quality isolation transformers in a very stringent environment, Pulse works very closely with major IC vendors to have these parts referenced on their CMC or BMC modules.



APPROVED BMS TRANSFORMER MODULES

Part Number	Number of Channel	СМС	Working Voltage	HI–POT Isolation	Centre Tap	Package Size (mm) (L x W x H)	Operation Range	BMS IC
HM1188NL	2	Yes	100Vdc	1500Vrms Yes		12.7 x 9.40 x 5.97	-40 ~105°C	ADI
HM1236NL	1	Yes	600Vdc	3200Vdc	Yes	10.92 x 8.64 x 4.06	-40 ~125°C	ADI
HM1238NL	1	Yes	1000Vdc	4300Vdc	Yes	10.92 x 8.64 x 4.06	-40 ~125°C	ADI
HM2100NL	2	Yes	1000Vdc	4300Vdc	No	14.7 x 14.9 x 3.45	-40 ~125°C	ADI/NXP
HM2101NL	1	Yes	1000Vdc	4300Vdc No		8.37 x 9.27 x 5.72	-40 ~125°C	AD/NXP
HM2102NL	2	Yes	1000Vdc	4300Vdc No		14.7 x 14.9 x 5.00	-40 ~125°C	ADI/NXP
HM2103NL	1	Yes	1000Vdc	4300Vdc	No	8.37 x 9.27 x 5.72	-40 ~125°C	ADI/NXP/INF
HM2106NL	1	No	1000Vdc	4300Vdc	Yes	8.50 x 16.8 x 5.75	-40 ~125°C	NXP/ADI/INF
HM2108NL	1	Yes	1000Vdc	4300Vdc	Yes	8.50 x 16.8 x 5.75	-40 ~125℃	NXP/ADI/INF/ TEXAS
HM2112ZNL	2	Yes	1000Vdc	4300Vdc	Yes	14.7 x 14.9 x 3.45	-40 ~125℃	NXP/ADI/INF/ TEXAS
HM2113ZNL	1	Yes	1000Vdc	4300Vdc	Yes	15.43 x 9.25 x 3.45	-40 ~125°C	NXP/ADI/INF/ TEXAS
HM2118NL	2	No	1000Vdc	4300Vdc	Yes	14.8 x 14.7 x 4.88	-40 ~125°C	NXP/ADI/INF/ TEXAS
HM2119NL	1	No	1000Vdc	4300Vdc	Yes	8.37 x 9.27 x 5.72	-40 ~125°C	NXP/ADI/INF/ TEXAS
HM2146NL	1	No	1500Vdc	4300Vdc	Yes	15.43 x 9.25 x 3.45	-40 ~125°C	NXP/ADI/INF/ TEXAS
HM2147NL	1	No	1500Vdc	4300Vdc	Yes	15.43 x 9.25 x 3.45	-40 ~125°C	TEXAS
HM2162NL	2	Yes	1500Vdc	4300Vdc	Yes	14.8 x 16.15 x 6.99	-40 ~125°C	NXP/ADI/INF/ TEXAS
HM3000NL	1	No	1500Vdc	3000Vrms	No	18.5 x 9.00 x 6.00	-40 ~125°C	TEXAS
HMU1228NL	1	No	1000Vdc	4300Vdc	Yes	8.89 x 10.03 x 6.85	40 ~125°C	NXP/ADI/INF/ TEXAS
HMU2129NL	2	Yes	1000Vdc	4300Vdc	Yes	14.8 x 14.7 x 4.88	-40 ~125°C	TEXAS

Common Mode Chokes								
AC1210-101-C	СМС		500Vdc			1210 (3.2x2.5x2.3)	-40 ~125°C	ADI
PE-1812ACC101STS	СМС	-	500Vdc	-	-	1812 (4.5x4.3x3.0)	-40 ~125°C	ADI



COMMON MODE CHOKES FEATURED PRODCUTS

HM2118NL

- Dual Channel / XFMR + CENTER TAP without CMC
- Functional Isolation
- Isolation 4300VDC / 1600VDC working voltage



HM2119NL

- Single Channel / XFMR + CENTER TAP without CMC
- Functional Isolation
- Isolation 4300VDC / 1000VDC working voltage

HM2162NL

- Dual Channel / XFMR with CMC
- Basic Isolation: 11mm min creepage distance
- Isolation 4300VDC / 1500VDC working voltage









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Other Great Products from Pulse Electronics



Integrated Connector Modules (ICMs)

- 100Base-T to 25GBase-T
- PoE, PoE+, 4 Pair PoE
- 1x1, 1xN, 2xN Packaging
- THT, SMT, Pin-in-Paste and Press Fit



Automotive Network Magnetics

- BMS Modules & Xfrms Transformers (functional, basic, reinforced insulation)
- Automotive Ethernet
 (100Base-T to 10GBase-T)
- CMC (100Base-T, CAN)



Ethernet Transformer & Modules (LAN)

- 100Base-T to 25GBase-T
- PoE, PoE+, 4 Pair PoE
- Single, Dual, Quad, Octal
- THT, SMT, BGA & Pin-in-Paste



Telecom & Audio Magnetics (WAN)

- PLC Transformers
- ISDN, T1/E1, T3/E3, xDSL & G.Fast
- Multiple Port Options



Connectors & Cages

- Unfiltered Connectors
- (RJ45, RJxx, USBx)
- Optical Connectors & Cages
 (SFP, SFP+, QSFP)
- 1x1, 1xN, 2xN

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