

Model Name: SLA12
 Type of product: Sense Line Assembly
 Brand Name: Visteon
 Manufacturer: Visteon Corporation
 Manufacturer Address: One Village center drive, Van Buren Township
 48111-5711 Michigan
 United States of America

SLA Features

The SLA12 (Sense Line Assembly) is an electronic module intended to monitor battery module cell groups voltages and module temperatures from the High Voltage battery bus in addition to activate cell balancing to improve battery cells life.

All cell voltages and module temperatures are reported directly to the VICM3 on a regular periodic basis via Wireless communication through the BRFM.

The SLA12 implements a Cell Monitoring Unit (CMU) board that uses a Pinnacle IC (ADRF8800), this is an IC that provides wireless communication between the Battery Cell Monitoring chip and the Battery Management System Controller

SLA12 operates in the frequency range 2.405 GHz - 2.480 GHz (ISM band) by using Wireless battery management technology.

Duty Cycle

SLA12 can send 3 packets per 100ms + 3 packets of (health reports) every minute.

With a path stability of 81 %, this means $(30*60+3)/0.81 = 2225.92$ transmissions per minute or 37.0987 transmissions per second.

The max TX length is 1.016 ms

37.0987 TX per second with each TX being 1.016 ms = on for 37.6 ms every second = 3.7% of Duty Cycle.

The 27% Duty Cycle belongs to the Dual BRFM (FCC ID: NT8-BRFM/IC: 3043A-BRFM).

System interaction:

<i>Module-to-Vehicle Electrical Interface</i>	
<i>Analog Input</i>	<i>Battery module provides voltage to SLA12. Power nominal value is 43.8 V Minimum voltage expected is 26.4 V and maximum is 52.8 V. NTC1, NTC2 and NTC3 thermistors from ICB.</i>
<i>Digital (discrete state) Input</i>	<i>NA</i>
<i>Analog Output</i>	<i>NA</i>

Digital (discrete state) Output	NA
Communication Bus	NA
RF Link(s)	ISM Band (2.405 GHz to 2.480 GHz) used to communicate with BRFM modules. Rx sensitivity shall be around 50% of PER, where each measurement shall vary by no more than +/- 2.0dB from the golden sample. Tx output power shall vary by no more than +/-2.5dB from the golden sample. Radio frequency reference shall be within ±20PPM from desired frequency (2.44GHz, channel 7).
Module-to-Vehicle Non-Electrical Interface	
N/A	
User Interface	
NA	
Internal Interface	
Note: For these internal I/O, monitoring shall only occur via communication bus data or via indirect methods. Direct monitoring using attachments leads to external monitoring devices shall not be included.	
Analog Input	NA
Digital (discrete state) Input – steady-state I/O	NA
Switching & Clock Frequency Content	SPI communication shall be 1Mbps nominal. Used to communicate between RF manager to Sensors ASIC. RF Manager IC XTAL frequency shall be 40MHz nominal.
Digital (discrete state) Input – dynamic I/O	NA
Analog Output	Main power supply SMPS U302 0shall have an output voltage of 3.3V with ±5mV peak-to-peak ripple voltage
Digital (discrete state) Output	
Communication Bus	
<p>Note: This section assumes that production software is not mandatory; the use of specialized software is acceptable.</p> <p>Note: Software diagnostic timers should be reset to minimum detection values, to facilitate assertion of potential diagnostic flags during the RF exposure time (maximum 2 seconds).</p> <p>Note: States/faults/issues shall be reported directly over the communication bus (i.e., Class 2, Controller Area Network (CAN), etc.) or indirectly if the communication bus is not available via the cycling of output(s) (e.g., PWM duty cycle change, telltale flash rate change, etc.)</p> <p>Note: Unless otherwise specified in the EMC Test Plan, in order to ensure a refreshed value, all information related to data monitoring (such as analog input voltages, operating states, etc.) shall be via parameter requests (e.g., Parameter ID (PID)) and not via scheduled, or periodic, broadcast messages. This ensures bi-directional communications during immunity testing.</p>	

The following information shall also be included in the case of radio equipment intentionally emitting radio waves:

- a. Frequency band : 2.405 – 2.480 GHz
- b. Maximum radio-frequency power transmitted in the frequency band(s) in which the radio equipment operates. Max output power = 10 dBm

(U.S.A. and Canada)

FCC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) The device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

RF exposure safety

This device complies with the FCC RF exposure limits and has been evaluated in compliance with portable exposure conditions.

*The equipment must be installed and operated and was evaluated with minimum distance of **3.69 cm** of the human body. This distance or greater is maintained by vehicle design and ensures compliance by normal use of the vehicle.*

For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.*
- Increase the separation between the equipment and receiver.*
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- Consult the dealer or an experienced radio/TV technician for help.*

ISED CANADA

This device complies with Industry Canada License-exempt RSS standard(s). Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) The device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

- (1) l'appareil ne doit pas produire de brouillage, et,
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

RF exposure safety

This device complies with the RF exposure limits and has been evaluated in compliance with portable exposure conditions.

*The equipment must be installed and operated and was evaluated with minimum distance of **3.69 cm** of the human body. This distance or greater is maintained by vehicle design and ensures compliance by normal use of the vehicle.*

CAN ICES-003

Les changements ou modifications non expressément approuvés par la partie responsable de la conformité peuvent annuler le droit de l'utilisateur à utiliser l'équipement.

Sécurité d'exposition aux RF

Cet appareil est conforme aux limites d'exposition RF d'ISED et a été évalué conformément aux conditions d'exposition portable.

*L'équipement doit être installé et utilisé à une distance minimale de **3.69 cm** du corps humain. Cette distance ou plus est maintenue par la conception du véhicule et assure la conformité par l'utilisation normale du véhicule.*

CAN NMB-003

Cet appareil numérique de classe B est conforme à la norme canadienne NMB-003.