

# Wireless Communication LSIs

Specified Low Power Radio (Sub-GHz Band Radio)

(LAPIS Technology products)

| UHF Transmitter LSIs |   |                |                       |  |                                |  |   |                           |                                    |                            |  |                    |  |
|----------------------|---|----------------|-----------------------|--|--------------------------------|--|---|---------------------------|------------------------------------|----------------------------|--|--------------------|--|
| Part No.             | Support Standard  | Frequency Band | Supply Voltage (V)    | Modulation Method  | FEC Mode                       | Control I/F                                | Transmission Rate                                     | Transmission Output (dBm) | Reception Sensitivity              | Operating Temperature (°C) | Input Clock  | Package            | Halogen Free Support*2   |
| ML7386               | ARIB STD-T67<br>RCR STD-30  | 426MHz band    | 1.8 to 3.6            | 2-<br>(G) FSK<br>MSK   | -                              | Synchronous serial (Control)<br>DIO (DATA) | 2.4kbps   | 10mW                      | -                                  | -25 to +85                 | -  | P-WQFN28-0404-0.40 | ✓  |
| ML7386B              |   |                |                       |  |                                |  | 4.8kbps<br>7.2kbps                                    | 1mW/<br>10mW              |                                    |                            |  |                    | ✓  |
| UHF Transceiver LSIs |   |                |                       |  |                                |  |   |                           |                                    |                            |  |                    |  |
| ML7396D              | ARIB STD-T108<br>EN300-220<br>IEEE802.15.4g   | 900 to 960MHz  | 1.8 to 3.6            | 2-<br>(G) FSK<br>(G) MSK                                       | IEEE<br>802.15.4g<br>compliant | Synchronous serial (Control)<br>DIO (DATA) | to 50kbps<br>100kbps<br>150kbps<br>200kbps<br>400kbps | 1mW/<br>10mW/<br>20mW     | -107dBm<br>[100kbps<br>BER=0.1%]*1 | -40 to +85                 | -  | P-WQFN40-0606-0.50 | ✓  |
| ML7396E              | EN300-220<br>EN1357-4:2011  | 750 to 900MHz  |                       |  |                                |  | to 15kbps   | 1mW/<br>10mW/<br>20mW     | -117dBm<br>[4.8kbps<br>BER=0.1%]*1 |                            |  |                    | ✓  |
| ML7344Jy             | ARIB STD-T67<br>RCR STD-30  | 160 to 510MHz  | 1.8 to 3.6            | 2-<br>(G) FSK<br>(G) MSK                                       | -                              | Synchronous serial (Control)<br>DIO (DATA) | to 500kbps  | 1mW/<br>10mW/<br>20mW     | -106dBm<br>[100kbps<br>BER=0.1%]*1 | -40 to +85                 | (C) rystal input<br>y=<br>(S) PXO input<br>y=<br>(T) CXO input<br>y= | P-WQFN40-0606-0.50 | ✓  |
| ML7344Cy             | Q/GDW374.3  |                | 3.3 to 3.6<br>(100mW) |  |                                |  |   |                           |                                    |                            |  |                    | 20mW/<br>100mW   |
| ML7406y              | EN300-220<br>EN1357-4: 2011<br>IEEE802.15.4g  | 750 to 960MHz  | 1.8 to 3.6            | 2-<br>(G) FSK<br>(G) MSK                                       | -                              | Synchronous serial (Control)<br>DIO (DATA) | to 100kbps  | 1mW/<br>10mW/<br>20mW     | -123dBm<br>[2.4kbps<br>BER=1%]*1   | -40 to +85                 | -  | P-WQFN32-0505-0.50 | ✓  |
| ML7345               | ARIB STD-T67<br>ARIB STD-T108<br>RCR STD-30<br>EN300-220  | 160 to 960MHz  |                       |  |                                |  |   |                           |                                    |                            |  |                    | 2-<br>(G) FSK<br>(G) MSK<br>4-<br>(G) FSK                      |
| ML7345D              | EN13757-4: 2013<br>IEEE802.15.4g  | 315 to 960MHz  | 3.3 to 3.6<br>(100mW) | 4-<br>(G) FSK  | -                              | Synchronous serial (Control)<br>DIO (DATA) | to 100kbps  | 20mW/<br>100mW            | -119.5dBm<br>[2.4kbps<br>BER=1%]*1 | -40 to +85                 | -  | P-WQFN32-0505-0.50 | ✓  |
| ML7345C              | Q/GDW374.3  | 470 to 510MHz  |                       |  |                                |  |   |                           |                                    |                            |  |                    | 2-<br>(G) FSK<br>(G) MSK<br>4-<br>(G) FSK<br>BPSK<br>(TX only) |
| ML7414               | ARIB STD-T67<br>ARIB STD-T108<br>Sigfox® (Rev 2.E)<br>RCR STD-30<br>EN300-220<br>EN13757-4: 2013<br>IEEE802.15.4g | 315 to 960MHz  | 1.8 to 3.6            | 2-<br>(G) FSK<br>(G) MSK<br>4-<br>(G) FSK<br>BPSK<br>(TX only) | IEEE<br>802.15.4g<br>compliant | Synchronous serial (Control)<br>DIO (DATA) | to 100kbps  | 1mW/<br>10mW/<br>20mW     | -106dBm<br>[100kbps<br>BER=1%]*1   | -40 to +85                 | -  | P-WQFN32-0505-0.50 | ✓  |

\*1 BER means Bit Error Rate.

\*2 A check mark of halogen free support means that we will be able to ship out the halogen free products. For details, please inquire to the sales.  
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## LPWA

(LAPIS Technology products)

| UHF Transceiver LSI |  |                |                    |   |                                |  |   |                           |                                  |                            |                    |                        |  |
|---------------------|--|----------------|--------------------|---|--------------------------------|--|---|---------------------------|----------------------------------|----------------------------|--------------------|------------------------|--|
| Part No.            | Supported Standard   | Frequency Band | Supply Voltage (V) | Modulation Method   | FEC Mode                       | Control Interface                          | Transmission Rate                                 | Transmission Output (dBm) | Reception Sensitivity            | Operating Temperature (°C) | Package            | Halogen Free Support*3 |  |
| ML7404              | ARIB STD-T67<br>ARIB STD-T108<br>RCR STD-30<br>EN300-220<br>EN13757-4: 2013<br>Sigfox® (Rev 2.E)<br>IEEE802.15.4k<br>IEEE802.15.4g | 315 to 960MHz  | 1.8 to 3.6         | 2-<br>(G) FSK<br>(G) MSK<br>4-<br>(G) MSK<br>BPSK<br>(DSSS)               | IEEE<br>802.15.4k<br>compliant | Synchronous serial (Control)<br>DIO (DATA) | to 100kbps<br>(xFSK)<br>80k to 200kcpes<br>(DSSS) | 1mW/<br>10mW/<br>20mW     | -119.5dBm<br>[2.4kbps<br>BER=1%] | -40 to +85                 | P-WQFN32-0505-0.50 | ✓                      |  |
| ML7414              | ARIB STD-T67<br>ARIB STD-T108<br>Sigfox® (Rev 2.E)<br>RCR STD-30<br>EN300-220<br>EN13757-4: 2013<br>IEEE802.15.4g                  |                |                    | 2-<br>(G) FSK<br>(G) MSK<br>4-<br>(G) FSK<br>(G) MSK<br>BPSK<br>(TX only) | IEEE<br>802.15.4g<br>compliant |  | to 100kbps  |                           | -106dBm<br>[100kbps<br>BER=1%]*1 |                            |                    | ✓                      |  |

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\*1 BER means Bit Error Rate. \*2 PER means Packet Error Rate.

\*3 A check mark of halogen free support means that we will be able to ship out the halogen free products. For details, please inquire to the sales.

## MCU Included Specified Low Power Radio (Sub-GHz Band Radio) System LSI

(LAPIS Technology products)

| UHF Transceiver LSI |  |                         |                    |  |                           |                          |   |                           |                                    |                            |                                 |                        |
|---------------------|--|-------------------------|--------------------|--|---------------------------|--------------------------|---|---------------------------|------------------------------------|----------------------------|---------------------------------|------------------------|
| Part No.            | Support Standard   | Frequency Band          | Supply Voltage (V) | Modulation Method  | CPU core                  | Memory resources         | Transmission Rate                                     | Transmission Output (dBm) | Reception Sensitivity              | Operating Temperature (°C) | Package                         | Halogen Free Support*2 |
| <b>ML7416N</b>      | ARIB STD-T108<br>IEEE802.15.4g   | 750 to 960MHz           | 1.8 to 3.6         | 2-<br>(G) FSK<br>(G) MSK                                       | Cortex®-M0+<br>(to 40MHz) | FLASH512KB,<br>RAM64KB   | to 50kbps<br>100kbps<br>150kbps<br>200kbps<br>400kbps | 1mW/<br>10mW/<br>20mW     | -106dBm<br>[100kbps<br>BER=0.1%]*1 | -40 to +85                 | P-LFBGA81-1010-1.00             | ✓                      |
| <b>ML7436N</b>      | ARIB STD-T66<br>ARIB STD-T67<br>ARIB STD-T108<br>EN300-220<br>FCC part15<br>IEEE802.15.4g                            | 400 to 960MHz<br>2.4GHz | 2.6 to 3.6         | 2-<br>(G) FSK<br>(G) MSK<br>4-<br>(G) FSK                      | Cortex®-M3<br>(to 81MHz)  | FLASH1024KB,<br>RAM256KB | 1.2k to<br>300kbps                                    |                           | -107dBm<br>[100kbps<br>BER=1%]*1   |                            | P-TQFP48-0707-0.50              | ✓                      |
| <b>New ML7446N</b>  | ARIB STD-T67<br>ARIB STD-T108<br>Sigfox®<br>(Rev 2.E)<br>RCR STD-30<br>EN300-220<br>EN13757-4: 2013<br>IEEE802.15.4g | 315 to 960MHz           |                    | 2-<br>(G) FSK<br>(G) MSK<br>4-<br>(G) FSK<br>BPSK<br>(TX only) |                           |                          | 0.1k to<br>100kbps                                    |                           | -106dBm<br>[100kbps<br>BER=1%]*1   |                            | P-TFBGA81-6.5X6.5-<br>0.65-6-MC | ✓                      |

Cortex® is a registered trademark of Arm Limited (or one of its subsidiaries) in the EU and other countries.

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## Car Communication LSIs

### FM Data Broadcast Reception LSIs

(LAPIS Technology products)

| FM Data Reception Tuner              |  |                    |                           |                            |                       |                        |                    |
|--------------------------------------|--|--------------------|---------------------------|----------------------------|-----------------------|------------------------|--------------------|
| Part No.                             | Feature  | Supply Voltage (V) | Supply Current (Max) (mA) | Operating Temperature (°C) | Package               | Halogen Free Support*1 | Automotive Grade*2 |
| <b>ML7174 [J]</b>                    | FM VICS® tuner, FM multiplexing demodulate LSI for VICS®, Built-in BPF, frame memory, and VICS® descrambler, Frames A,B,C, SPI slave | 3.0 to 3.6         | 85                        | -40 to +85                 | P-WQFN64-0909-0.50-63 | ✓                      | YES                |
| <b>ML7183 [J]</b>                    | FM VICS® tuner & Filter LSI, BPF, I²C slave  |                    | 75                        |                            |                       | ✓                      | YES                |
| FM Multiplexing Demodulate for VICS® |  |                    |                           |                            |                       |                        |                    |
| <b>ML7154 [J]</b>                    | VICS® compliant FM multiplexing demodulate LSI for VICS®, Built-in BPF, frame memory, and VICS® descrambler, Frames A,B,C, SPI slave | 3.0 to 3.6         | 28                        | -40 to +85                 | P-WQFN64-0909-0.50-63 | ✓                      | YES                |

[J] This LSI is limited to the market in Japan.

VICS® is a registered trademark of Vehicle Information and Communication System Center.

\*1 A check mark of halogen free support means that we will be able to ship out the halogen free products. For details, please inquire to the sales.

\*2 Please inquire to the sales for AEC-Q100.