



Product Specification for Reference Only

Issued Date: 18 July 2013

Rev. :

Part Description: Ultrasonic Sensor

MURATA Part No.: MA58MF14-7N

The product specification in this sheet is for reference only.
The contents of this specification are subject to change.

You are requested to receive the latest specification and to return one copy of the specification to us with your receipt signature before going into mass production.

Product Promotion Sec. 1
Sensor Products Dept. 1
Sensor Products Division
Device Business Unit
Murata MFG. Co., Ltd.

MURATA MANUFACTURING Co., LTD.



Specification of Ultrasonic Transducer

Type: MA58MF14-7N

1. Scope

This product specification is applied to the drip proof type ultrasonic transducer used for an obstacle detection system around a vehicle.

Please contact us when using this product for any other applications than described in the above.

2. Customer Part Number

3. Murata Part Number

MA58MF14-7N

4. Dimension

As per Fig.1

5. Absolute Maximum Ratings

	Items	Specification	Note
5-1	Maximum Input Voltage	120Vp-p	Pulse number: 20 pulses or less Interval: 20msec or more. Do not apply D.C. voltage.
5-2	Operating temperature range	-40 to +85 deg C	
5-3	Storage temperature range	-40 to +85 deg C	

6. Specifications (* Temperature 25 ± 3 deg C, 45 to 75 % R.H, unless otherwise noted)

	Items	Specification	Note
6-1	Resonant frequency	58.5 ± 1.5 kHz	
6-2	Overall Sensitivity	More than 1 Vop	With Murata STD Circuit for 58kHz (per Fig.2).
6-3	Decay time	Less than 1.4ms for 1Vop crossing time	With Murata STD Circuit for 58kHz (per Fig.2).
6-4	Beam pattern	(Typical) 80 deg x 34 deg	6dB down angle of overall sensitivity
6-5	Capacitance	1400pF \pm 20%	at 1kHz
6-6	Insulation Resistance	100 Mohm min.	at 100V D.C.

7. Environmental Tests (Standard Test Condition: 25 ± 3 deg C, 45 to 75 % R.H)

7.1 Shock Test

The variation of the Overall sensitivity at 58 kHz is within ± 3 dB compared with initial figures at 25 deg C after following test conditions

Acceleration	:	sine 980 m/s^2 (100G), 6ms
Direction	:	3 directions
Shock time	:	3 times / directions

7.2 Vibration Test

The variation of the Overall sensitivity at 58 kHz is within ± 3 dB compared with initial figures at 25 deg C after following test conditions

Vibration frequency:	:	10 to 200 Hz
Sweep Period	:	15 min.
Acceleration	:	43.12 m/s^2 (4.4G)
Directions	:	3 directions
Time	:	96 hours / direction

7.3 Drop Test

The variation of the Overall sensitivity at 58 kHz is within ± 3 dB compared with initial figures at 25 deg C after following test conditions

Height	:	1 meter onto concrete floor
Times	:	3 times

7.4 Pull Strength

There should be no substantial damage after 2.45 N of force.

7.5 High Temperature Test

The variation of the Overall sensitivity at 58 kHz is within ± 3 dB compared with initial figures at 25 deg C in 24 hours after following test conditions

Temperature	:	$+85 \pm 2$ deg C
Time	:	1000 hours

7.6 Low Temperature Test

The variation of the Overall sensitivity at 58 kHz is within ± 3 dB compared with initial figures at 25 deg C in 24 hours after following test conditions

Temperature	:	-40 ± 3 deg C
Time	:	1000 hours

7.7 Humidity Test

The variation of the Overall sensitivity at 58 kHz is within ± 3 dB compared with initial figures at 25 deg C in 24hours after following test conditions

Temperature	:	$+85 \pm 2$ deg C
Humidity	:	85 % R.H.
Time	:	1000 hours

7.8 Heat Cycle Test

The variation of the Overall sensitivity at 58 kHz is within ± 3 dB compared with initial figures at 25 deg C in 24hours after following test conditions

Temperature	:	$+85 \pm 3$ deg C, 30 min -40 ± 3 deg C, 30 min
		*heat up and pull down time are less than 5min.
Cycles	:	1000 cycles

8. ⚠ Caution

8-1 Limitation of Applications

Please do not use for the applications listed below which require especially high reliability for the prevention of defects which might directly cause damage to the third party's life, body or property.

- 1) Aircraft equipment
- 2) Aerospace equipment
- 3) Undersea equipment
- 4) Power plant control equipment
- 5) Medical equipment
- 6) Transportation equipment (trains, ships, etc.)
- 7) Traffic signal equipment
- 8) Disaster prevention / crime prevention equipment
- 9) Data-processing equipment
- 10) Forklift, road building equipment and other special-purpose vehicles
- 11) Military equipment (regardless of directly/indirectly)
- 12) Security device/system
- 13) Application of similar complexity and/or reliability requirement to the applications listed in the above

8-2 Fail-safe

Please make sure to provide an appropriate fail-safe function on your product to prevent a second damage which may be caused by an abnormal function or a failure of our product.

9. Caution in use

9-1. Notice in design and usage

- 1) The transducer may generate a surge voltage by a mechanical or thermal shock. Care should be taken to avoid it on designing your application circuit.
- 2) Please do not apply an excessive stress to the transducer because its piezo electric element might be damaged or the inner cable might be disconnected.
- 3) Please do not put a pressure on the top surface of the transducer, because its piezo electric element might be damaged by a pressure from its back. Please do not put more than 25N pressure on the side of the transducer, because transducer might be damaged by a pressure.
- 4) Please do not apply D.C.voltage to the transducer to avoid failure. Electrode of piezo electric element might be shorted out with an electronic migration.
- 5) Please do not use the transducer in water.
- 6) Please hold the transducer with a soft material such as rubber. The direct holding with a hard material will cause of a vibration leakage from/into the transducer. It might have an effect on a decay time and short distance detection.
- 7) Please take countermeasures for waterproofing on the back side of the transducer to maintain the sensors' characteristic and to avoid a short circuit.
- 8) Please do not use the sensor without painting on the surface and evaluate the painting and electrical characteristic well with your coated sensor. Please do not exceed 95 deg C / 120min during the assembly and painting process to avoid a malfunction.
- 9) We cannot guarantee a quality of painting after shipping out. Please pay attention to avoid a contamination on painting area during storage or/and transportation in your process.
- 10) The transducer is designed for dual use purpose. Please do not use the transducer only as a receiver.
- 11) Please pay attention to select the material to hold or cover the backside of transducer. If it contains sulfur or sulfide, electrode on piezo-electric element might be corroded and cause a malfunction.
- 12) We suggest wiping cases by a cloth absorbed with organic solvent, like thinner, xylene etc., only its surface in case of cleaning before color painting. (It is not enough to touch the surface of transducer with an organic solvent). But please avoid using a strong surface activator that gives damage to under-coating, sanding a primer type, and cleaning the whole transducer with



water and/or solvent.

- 13) Please do not use a water base paint(ex. Acrylic emulsion type), Phthalic acid type, Chlorinated rubber type, RTV epoxy type, which are not applicable.

9-2. Notice in storage

- 1) The products should not be used nor stored in a corrosive atmosphere, especially where chloride gas, sulfide gas, acid, alkali or the like are present. Please store the products in the room temperature/humidity and avoid a direct sunlight and sudden changes in temperature /humidity. It may cause a malfunction in such conditions.
- 2) Please store the products under the condition; -10 to 40 deg C and 30 to 80%RH and use the products within 6 months after receiving.

9-3. Notice in soldering and mounting

- 1) Please do not clean the transducer with water nor solvent.
- 2) Please do not solder the transducer with flow nor reflow soldering. Soldering iron condition; temperature below 360 deg C for 6 sec.

10. Note

- 1) Please make sure that your product has been evaluated in view of your specifications with our product being mounted to your product.
- 2) You are requested not to use our product deviating from the agreed specifications.
- 3) We consider it not to appropriate to include any terms and conditions with regard to the business transaction in the product specifications, drawings or other technical documents. Therefore, if your technical documents as above include such terms and conditions such as warranty clause, product liability clause, or intellectual property infringement liability clause, they will be deemed to be invalid.
- 4) We do not guarantee anything concerning your painting.



Fig.1 Dimensions

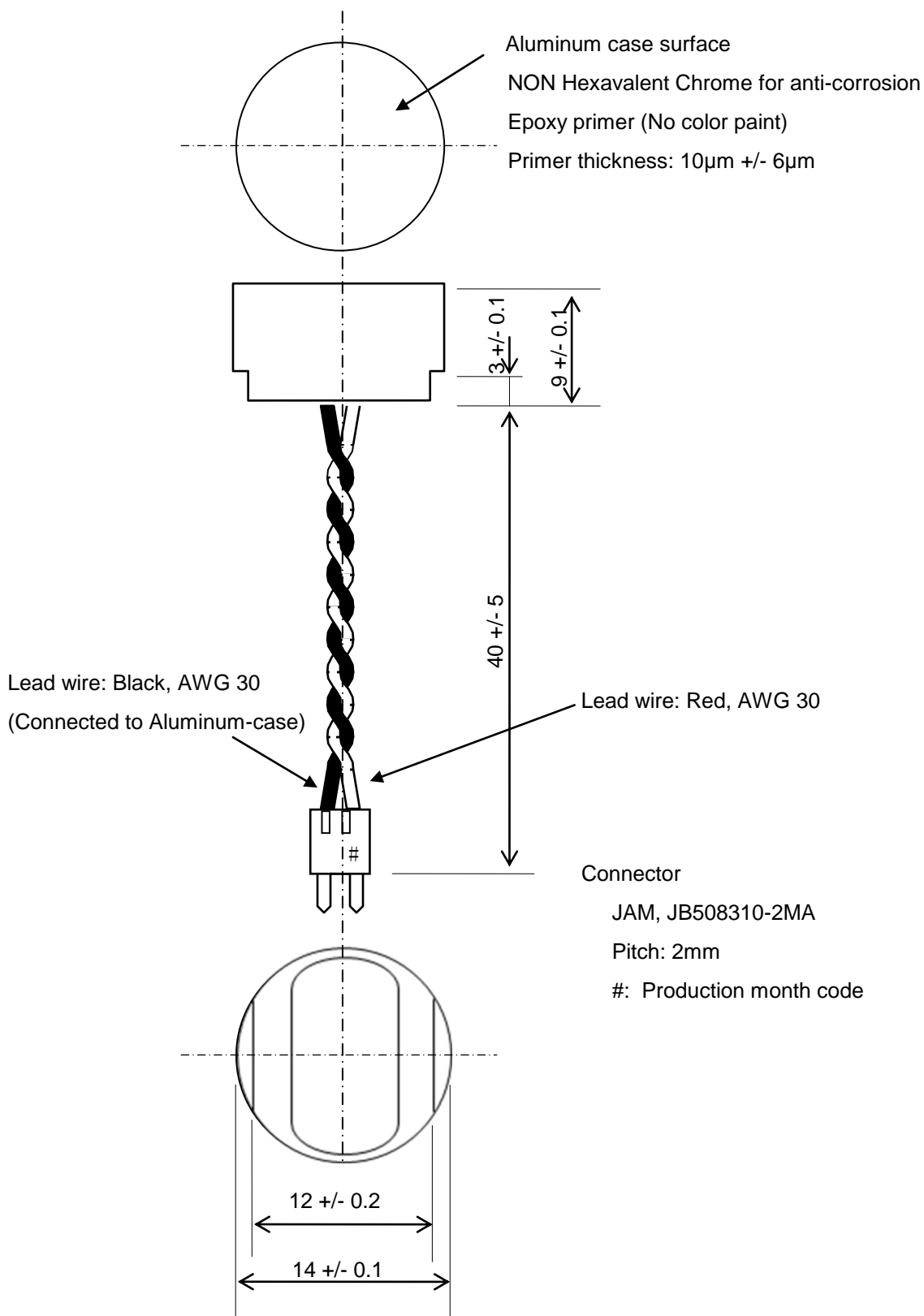
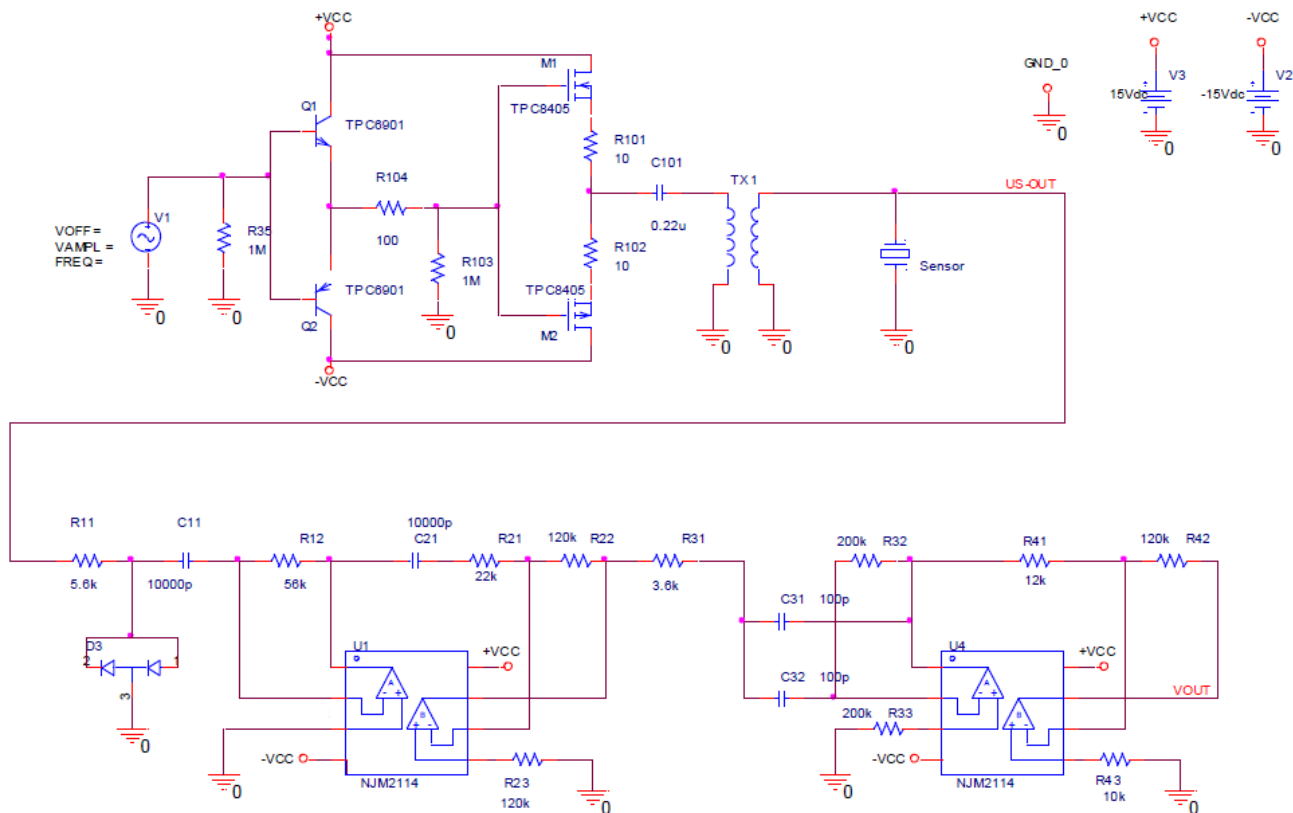




Fig.2 Murata Standard Circuit



Circuit condition
 Input Voltage: $V_{cc}=15V, -V_{cc}= -15V$
 Input signal V1: burst waveform (58kHz, 8pulses), 7.5Vpp
 Amplifier gain: 83dB
 Trance: Primary inductance: 68 μ H
 Secondary inductance: typ. 5.8mH
 Q value is more than 75 at 252 kHz

Fig.3 Test Condition for Overall Sensitivity

