Crystal Bridge to the Future

Crystal Clock Oscillator

■NZ2520SHA Data Sheet

For Automotive Safety (32.768 kHz)

RoHS Compliant
Directive 2011/65/EU
Directive (EU) 2015/863

Pb free

AEC
Q100/Q200

Application

For Automotive safety
(e.g., Millimeter wave radar or Image processing for self-driving)

Features

- High quality and high reliability design for Automotive safety
- Supports a wide temperature range from -40 to +125 °C.
- Compact and light. Dimensions : 2.5 x 2.0 x 0.9 mm, weight : 0.02 g.
- Quick oscillation start up time(Typ. 1ms) is available compared to our Tuning Fork Crystal.
- Lead-free.
- Conforms to AEC-Q100/200.

1. Item : Crystal Clock Oscillator

2. Type : NZ2520SHA

3. Nominal Frequency : 32.768 kHz

4. NDK Spec. No. : See Table1, 2

5. Maximum Ratings

	Item	Ratings			Notes
		min	max	Units	
1	Supply Voltage	-0.3	+4.5	V	
2	Input Voltage	-0.3	V_{CC} +0.3	V	
3	Output Current	-5	+5	mA	
4	Storage Temperature Range	-55	+125	°C	

6. Electrical Specifications

	Parameters	SYM	Electrical Spec.				Notes
			min	typ	max	Units	
1	Nominal Frequency	f_{nom}		32.768		kHz	
2	Supply Voltage	V_{CC}	+1.8 to +3.3			V	
3	Current Consumption (Operating) Standard type	I_{CC}		18	32	μA	at 25 °C, No load
	Current Consumption (Operating) Oscillation start time reduction type			41	72		at 25 °C, No load
4	Current Consumption (Stand-by)	I_{ST}			5	μA	at 25 °C
5	Output Level	-	CMOS				
6	Load Capacitance	C_L			15	pF	
7	Operating Temperature Range	T_{opr}	[-40 to +85] to [-40 to +125]			°C	Table.1,2
8	Overall Frequency Tolerance	$\Delta f/f_{nom}$	± 30 to ± 100			ppm	Table.1,2 *1
9	Long-term Frequency Stability	Δf_{lt}	-5		+5		at 25 °C, 1year
10	Output Voltage	V_{OL}			0.1 V_{CC}	V	
		V_{OH}	0.9 V_{CC}			V	
11	Rise Time(t_r), Fall Time(t_f)	t_r/t_f			50	ns	0.1 V_{CC} to 0.9 V_{CC}
12	Symmetry	SYM	45		55	%	at 1/2 V_{CC}
13	Start-up Time Standard type	t_{su}			30	ms	+1.8 V
					20		+2.5 V ~ +3.3 V
	Start-up Time Oscillation start time reduction type				4		+1.8 V ~ +3.3 V
14	Output Wave Form	-	Square wave				
15	Stand-by Function	#1 PAD input				# 3 PAD output	
		H level (0.7 V_{CC} to V_{CC}) or open				Operating	
		L level (0.3 V_{CC} max)				High impedance	

*1 Inclusive of Freq. tolerance (at 25 °C), frequency/temperature characteristics, frequency/voltage coefficient.

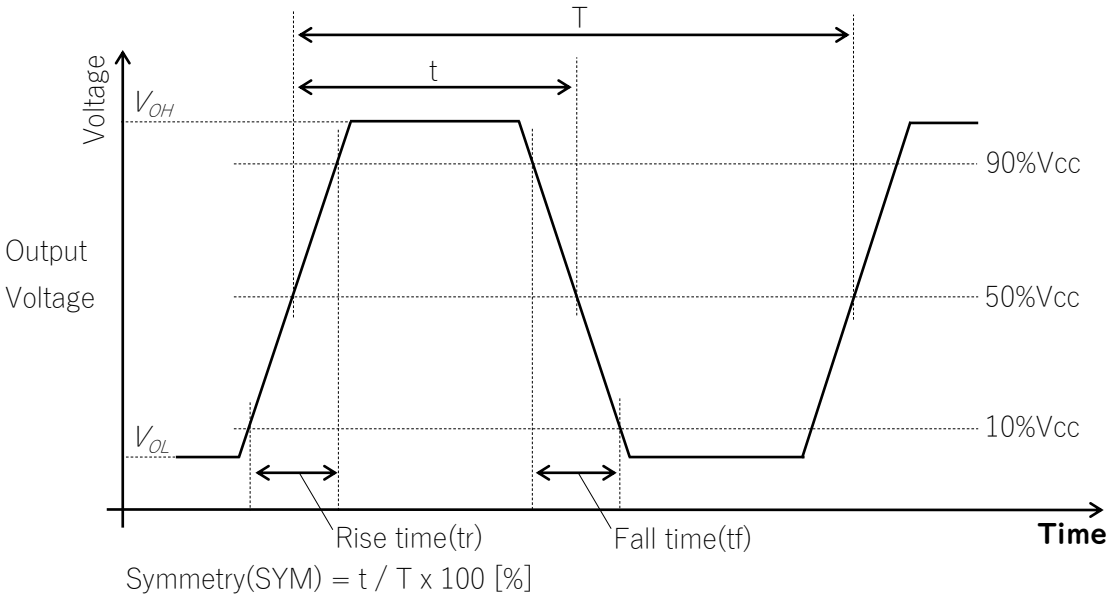
Table.1 [Standard type] NDK Spec. No. List

Overall Frequency Tolerance	Operating Temperature Range (°C)	Supply Voltage (V)			
		+1.8±0.18	+2.5±0.25	+3.0±0.3	+3.3±0.33
$\pm 100 \times 10^{-6}$	-40 to +125	NSC5271A	NSC5271B	NSC5271C	NSC5271D
$\pm 50 \times 10^{-6}$	-40 to +105	NSC5272A	NSC5272B	NSC5272C	NSC5272D
$\pm 30 \times 10^{-6}$	-40 to +85	NSC5273A	NSC5273B	NSC5273C	NSC5273D

Table.2 [Oscillation start time reduction type] NDK Spec. No. List

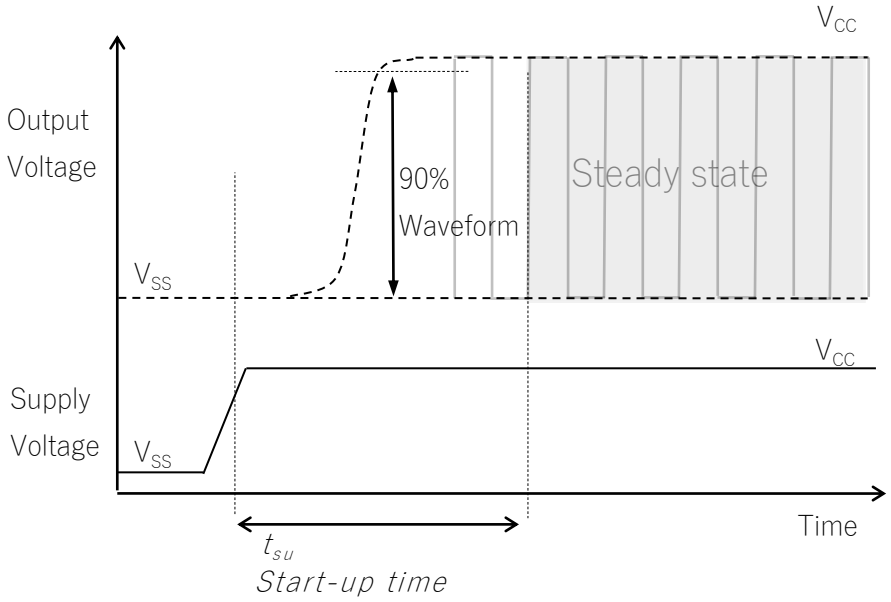
Overall Frequency Tolerance	Operating Temperature Range (°C)	Supply Voltage (V)			
		+1.8±0.18	+2.5±0.25	+3.0±0.3	+3.3±0.33
$\pm 100 \times 10^{-6}$	-40 to +125	NSC5382A	NSC5382B	NSC5382C	NSC5382D
$\pm 50 \times 10^{-6}$	-40 to +105	NSC5383A	NSC5383B	NSC5383C	NSC5383D
$\pm 30 \times 10^{-6}$	-40 to +85	NSC5384A	NSC5384B	NSC5384C	NSC5384D

Output Voltage

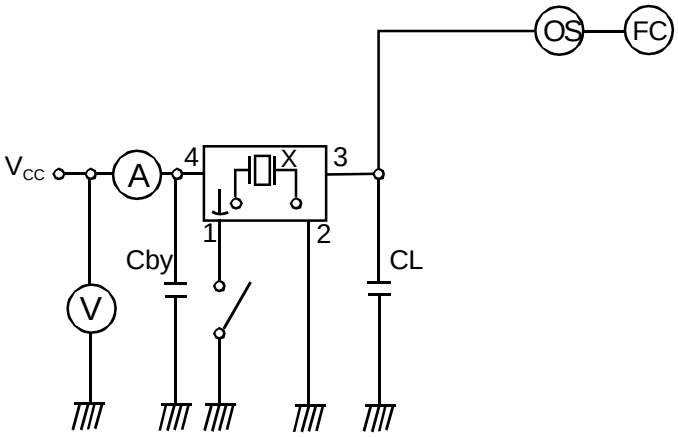


Symmetry(SYM) = t / T x 100 [%]

Start-up Time



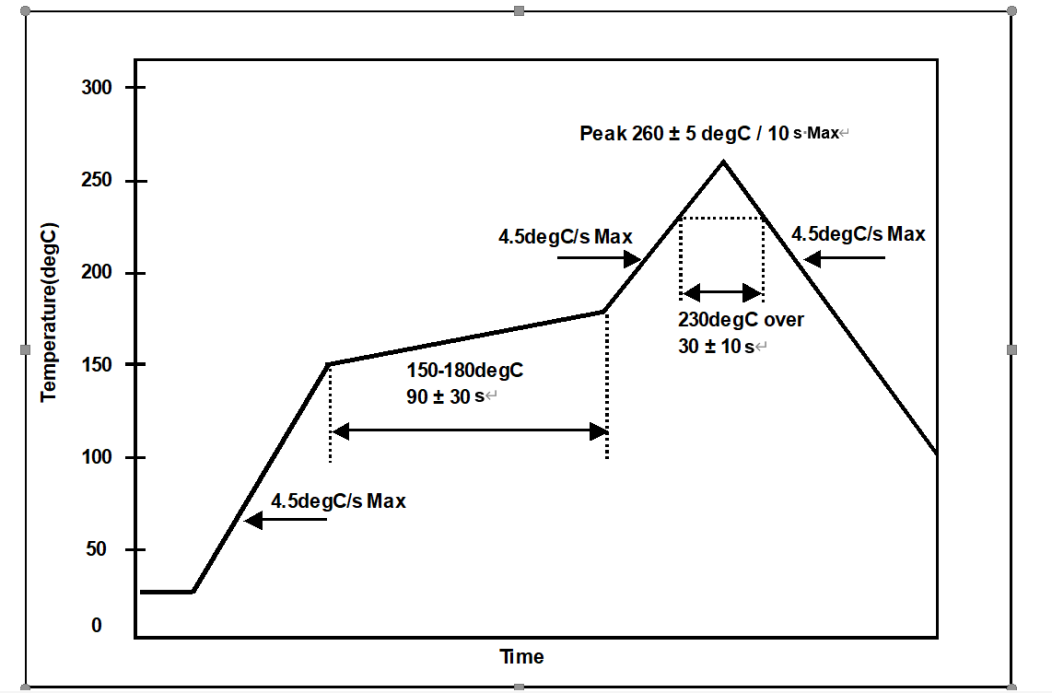
Measuring circuits



CL ; 15pF MAX including input capacity of oscilloscope
Cby ; Bypass capacitor (0.01uF)

7. Prohibited items

Example For Soldering Conditions (The below graph corresponds to Pb free solder)



Be sure to use the product under the following conditions. Otherwise, the characteristics deterioration or destruction of the product may result.

(1) Reflow soldering heat resistance
- Peak temperature: 265 °C, 10 s
- Heating: 230 °C or higher, 40 s
- Preheating: 150 °C to 180 °C, 120 s
- Reflow passage times: 3 times

(2) Manual soldering heat resistance

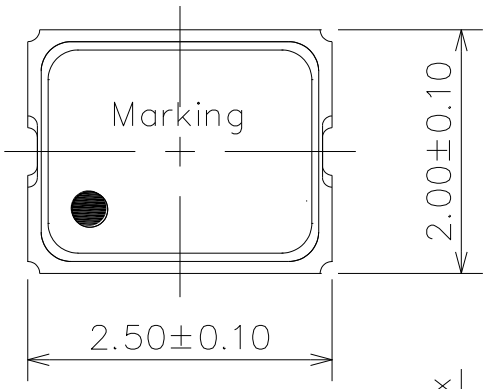
Pressing a soldering iron of 350 °C on the terminal electrode for 3 s.

8. Electrostatic Discharge

MM: 200 V
HBM: 2000 V
CDM: 500 V

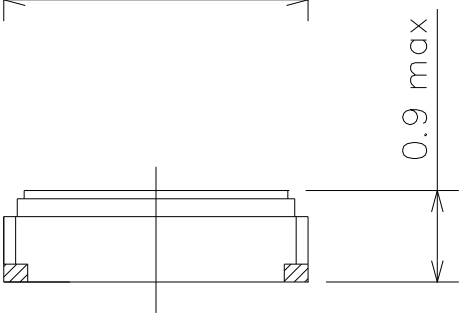
■Dimension of External

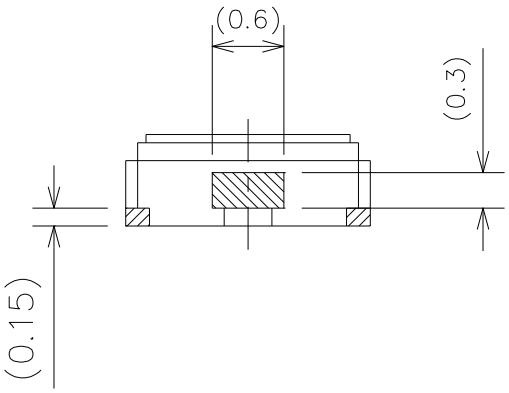
Unit : mm

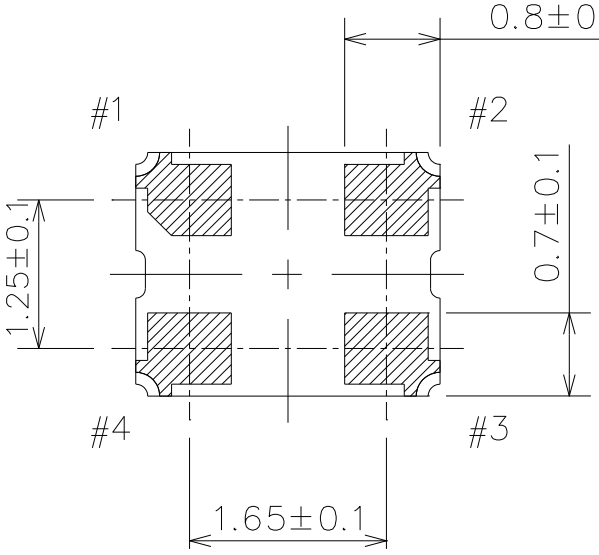


Terminal land connections

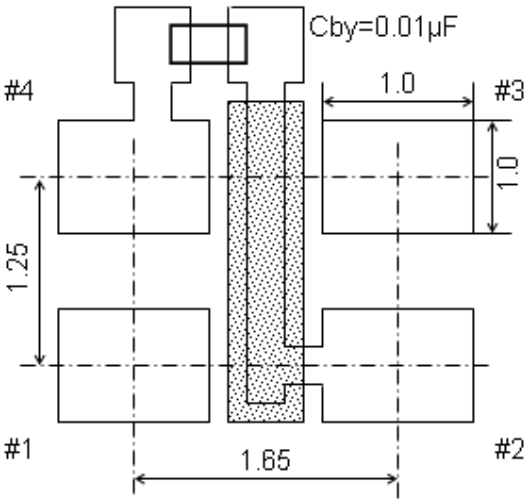
#1	STAND-BY
#2	GND
#3	OUTPUT
#4	V_{CC}





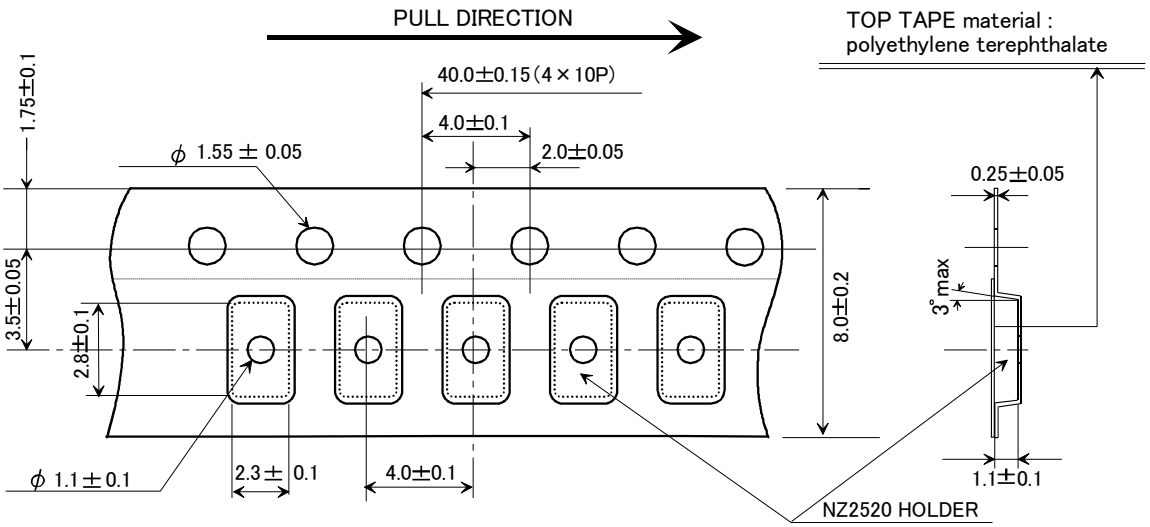


Land pattern (Recommended)



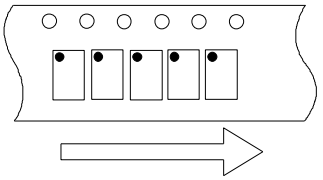
■Taping and Reel Spec.

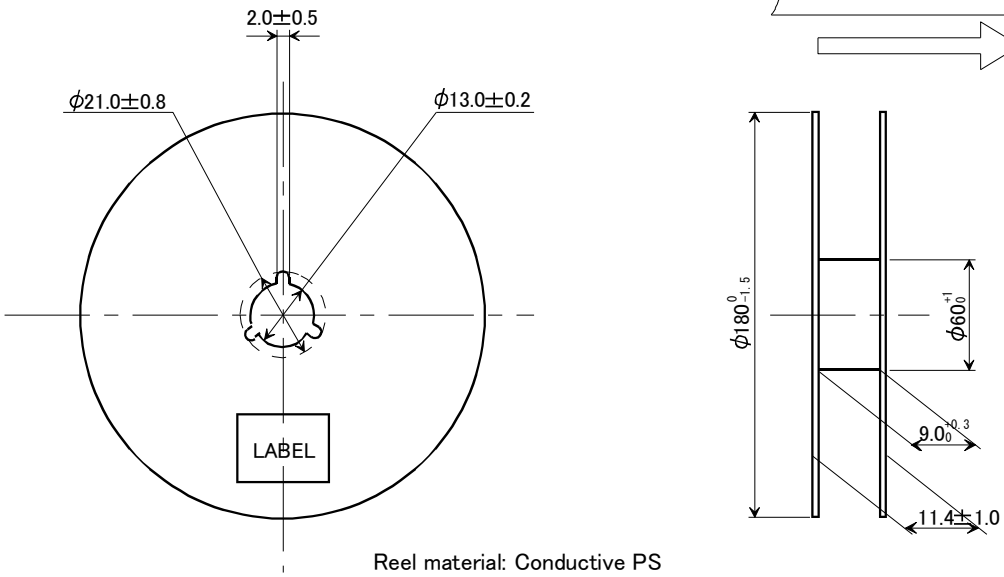
Unit : mm



TAPING material: Conductive PS

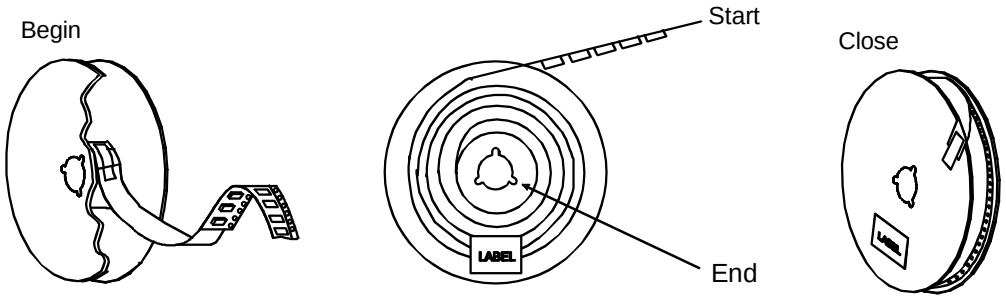
DIRECTION OF UNIT





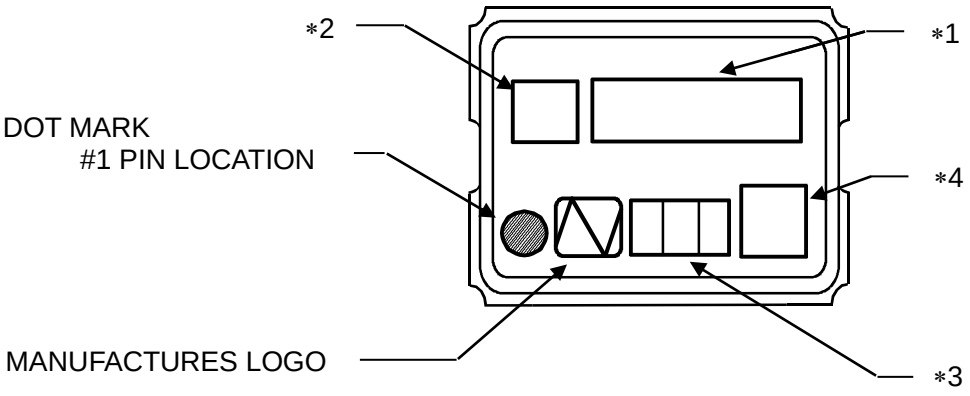
Reel material: Conductive PS

EIAJ standard reel



3000pcs MAX-Product Tape

■Marking



∗1 [FREQUENCY]

∗2 [MODEL MARK]
NZ2520SHA → H

∗3 [WEEK CODE (Digit are three)]

∗4 [Trace code]

Instruction Notice

1 Noise

When using this product, please insert a bypass capacitor between the power supply and GND. (Closer to the product terminal is desirable.)
The bypass capacitor values shown in our specifications and drawings are for reference only. (They are not guaranteed values.)
In actual use, please select the appropriate bypass capacitor value for your circuit.
NDK shall not be liable for any and all events resulting from or in connection with the use of this product in a manner that does not comply with the above instruction.

2 Resistance to dropping

The NZ2520S series is designed to be impactproof so that no damage occurs when dropped a height (75 cm) three times. However, if dropped from a desk etc., it is advisable to check their performance or contact us to check it.

3 Electrostatic protection

The NZ2520S series employ C-MOS ICs for the active element. Please use them in static-free environments.

4 Cleaning

Basically, the NZ2520S series are applicable for ultrasonic wave cleaning. However, in some case, during ultrasonic wave cleanings, internal design may get damage. Please check condition carefully beforehand.

5 Other

The NZ2520S series are C-MOS applied products. And careful handling (same as with C-MOS IC) are needed to avoid electrostatic problems.
Incorrect PAD connection is cause of trouble. Please make sure to connect correctly as below.

#2 terminal $\rightarrow$ GND
#4 terminal $\rightarrow V_{CC}$

Notes On Use

1 Even if the appearance color etc. of the product differs by purchasing the component parts by more than two companies, there is no influence on the characteristics and reliability.

2 IN THE CASE OF THE FOLLOWING ITEMS, WE ARE NOT RESPONSIBLE FOR WARRANTY / COMPENSATION.

(1) WHEN PRODUCTS OF THIS SPECIFICATION ARE USED FOR EQUIPMENT RELATED TO HUMAN LIFE OR PROPERTY, IT IS THE RESPONSIBILITY OF THE CUSTOMER TO CONFIRM THE INFLUENCE ON THIS PRODUCT AND EQUIPMENT TO BE USED BEFOREHAND, CONDUCT NECESSARY SAFETY DESIGN (INCLUDING REDUNDANT DESIGN, MALFUNCTION PREVENTION DESIGN, etc.), PLEASE USE IT AFTER SECURING SUFFICIENT SAFETY OF EQUIPMENT.

1.SAFETY-RELATED EQUIPMENT SUCH AS AUTOMOBILES, TRAINS, SHIPS, etc., OR EQUIPMENT DIRECTLY INVOLVED IN OPERATION
2.AIRCRAFT EQUIPMENT
3.SPACE EQUIPMENT
4.MEDICAL EQUIPMENT
5.MILITARY EQUIPMENT
6.DISASTER PREVENTION / CRIME PREVENTION EQUIPMENT
7.TRAFFIC LIGHT
8.OTHER EQUIPMENT REQUIRING THE SAME PERFORMANCE AS THE ABOVE-MENTIONED EQUIPMENT

(2) IN CASES WHERE IT IS NOT INDICATED IN THE REQUESTED STANDARD AND IS USED UNDER CONDITIONS OF USE (INCLUDING CIRCUIT MARGIN etc.) THAT CAN NOT BE PREDICTED AT THE PRODUCTION STAGE.

(3) WHEN USING ULTRASONIC WELDING MACHINE.(THERE IS A POSSIBILITY THAT THE CHARACTERISTIC DEGRADATION IS CAUSED BY THE RESONANCE PHENOMENON OF THE PIEZOELECTORIC MATERIAL.(EXAMPLE;CRYSTAL PIECE))
WE WILL NOT TAKE ANY RESPONSIBILITY FOR THE INFLUENCE OF THE CUSTOMERS' PROCESS.
SO, PLEASE SUFFICIENTLY EVALUATE AT A SAMPLE STEP WHEN YOU USE ULTRASONIC WELDING MACHINE.

(4) USING RESIN MOLD MAY AFFECT THE PRODUCT CHARACTERISTIC.
PLEASE MAKE SURE TO TELL OUR SALES CONTACT WHEN YOU USE RESIN MOLD. WE WILL PERFORM INDIVIDUAL CORRESPONDENCE ABOUT A DELIVERY SPECIFICATION AND A EVALUATION METHOD.
IN ADDITION, IF YOU USE RESIN MOLD WITHOUT CONTACTING US, AND CAUSES DAMAGES AGAINST A CUSTOMER OR A THIRD PARTY, WE WILL NOT BE LIABLE FOR THE DAMAGES AND OTHER RESPONSIBILITIES BECAUSE WE CONSIDER IT IS UNDER ELF-RESPONSIBILITY USING RESIN MOLD.
WE WILL NOT TAKE ANY RESPONSIBILITY FOR THE INFLUENCE OF THE CUSTOMERS' PROCESS. PLEASE EFFICIENTLY EVALUATE AT A SAMPLE STEP WHEN YOU USE RESIN MOLD.

(5) WHEN PERFORMING IMPROPER HANDLING THAT EXCEEDS THE GUARANTEED RANGE.

Notes on storage

1 When storing the product in high temperature and high humidity condition for a long time, product characteristics (solderability etc.) and packaging condition may be deteriorated. Please store product at temperature + 5 °C to + 35 °C, humidity 85 % RH or less. The product is an electronic component, so please do not storage and use, under a dewing state.

2 The product storage deadline is 12 months after delivery in unopened state. Please use within storage deadline. If you exceed storage deadline, please check the product characteristics etc, please use.

Handling of this document and other requests

Please refer to the " Site Guidance" on our website for the handling of information contained in this document. (https://www.ndk.com/en/terms/)