



# DATASHEET

(Preliminary Data)

Datasheet T4076 0A V7

DATE: 30-Jul-19

TDK'S PRODUCT NAME

MMICT4076-0A-908

TDK Corporation  
Sales

Electronic Components Sales &  
Marketing Group

Engineering

TDK Electronics AG  
TEG MEMS

Sales Manager	Sales

Engineering Manager	Superior	Engineering Person in Charge
A. Leidl	H. Hayashi	M. Winter

## Features:

- TDK SiMic MEMS Microphone
- Surface Mounted Technology (SMT)
- Reflow soldering up to 260 °C
- RoHS compatible, Ni/Au-plated terminals suited for lead free soldering
- Small size of 2.75 × 1.85 mm<sup>2</sup>
- Very low height of typically 0.9 mm
- Approximate weight of 20 mg
- Sound hole on bottom side
- High long-term temperature stability
- High signal to noise ratio
- Excellent protection against EMI
- Positive polarity; sound pressure increase will increase output voltage

## Applications:

- Microphone designed for mobile phones, headsets, PDAs, notebooks and cameras

Rev.	Date	Revised by	Revision
1	Oct-9 2017	A. Schober	Initial issue
2	Feb-1-2018	A. Schober	Electrical specification updated
3	Mar-27-2018	A. Schober	Electrical and Mechanical specification updated, chapter 8 updated
4	Aug-14-2018	A. Schober	Electrical specification updated to reflect current sample performance
5	Oct-19-2018	A. Schober	PN updated
6	Jan-10-2019	A. Schober	Electrical and Mechanical specification and product marking updated
7	Jul-30-2019	A. Schober	Chapter 4 and 5 updated, chapter 7 added

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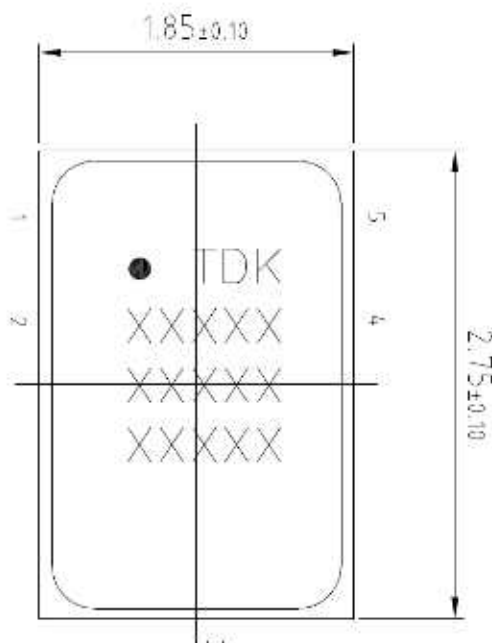
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## 1 General description

T4076 is an analog, omnidirectional MEMS microphone. It has positive polarity and single ended output.

## 2 Marking



Character Area:

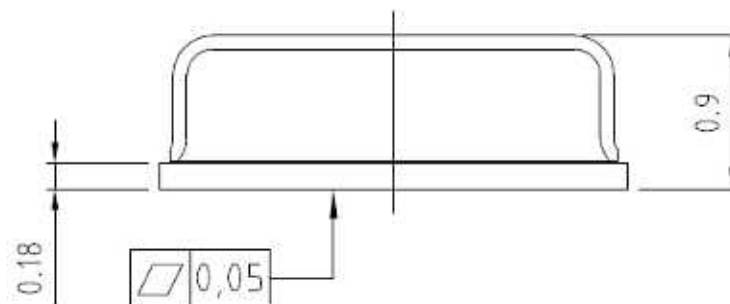
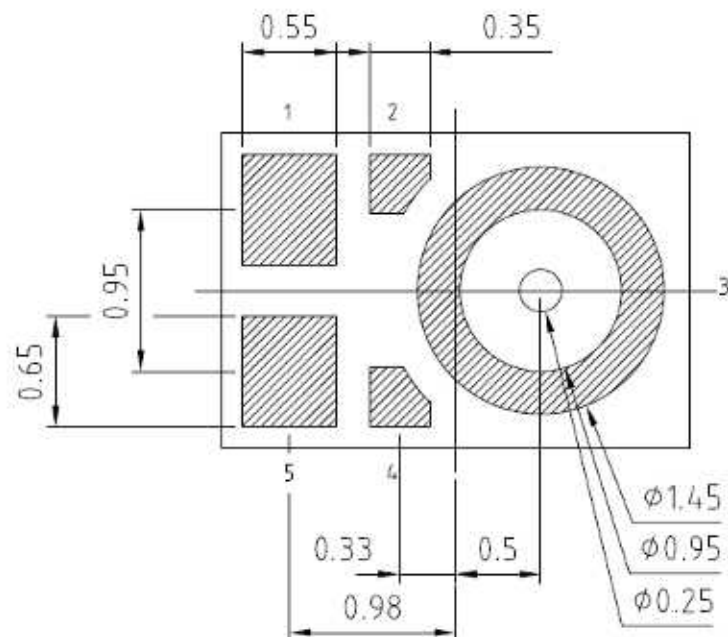
<b>1<sup>st</sup> row:</b>	Pin 1 mark	Blank	T	D	K
	Type and Revision (see below table)				
<b>Example:</b>	E	4	0	7	6
<b>3<sup>rd</sup> row:</b>	Blank	Production ID (4 digit)			
<b>Example:</b>		4	2	2	6
<b>4<sup>th</sup> row:</b>	Production ID (5 digit)				
<b>Example:</b>	A	0	G	5	9

Type and revision scheme:

Production status	Product marking	Example
Engineering Sample	"E" + Type	E4076
MP release	Type	4076
Product change (PCN)	Type + PCN revision	40761

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### 3 Mechanical specification



Pin	Name	Function
1	OUT	Output
2	KOA	keep out area, no structure on PCB recommended
3	GND	Ground
4	KOA	keep out area, no structure on PCB recommended
5	VDD	Supply Voltage

Item	Nominal	Tolerance
Length	2.75	$\pm 0.1$
Width	1.85	$\pm 0.1$
Height	0.9	$\pm 0.1$

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## 4 Electrical specification

### 4.1 Electrical characteristics

Ambient temperature of test conditions:

$T_A = 25\text{ }^{\circ}\text{C}$

Supply voltage:

$V_{DD} = 1.8\text{ V}$

All voltages refer to ground.

		Min.	Typ.	Max.	Unit	Note or condition
<b>Sensitivity 1 kHz</b>	<b>S<sub>1 kHz</sub></b>	-39	-38	-37	dBV/Pa	94 dB SPL
<b>Sensitivity settling time</b>		–	–	30	ms	Within +/- 0.5 dB of final sensitivity after power-on <sup>2)</sup>
<b>Signal to noise ratio</b>	<b>SNR</b>	60	63	–	dB(A)	94 dB SPL, A-weighted
<b>Total harmonic distortion</b>	<b>THD</b>	–	1	2	%	115 dB SPL, 1 kHz
<b>Acoustic overload point</b>	<b>AOP</b>	–	127	–	dB SPL	10% THD, 1 kHz
<b>Power supply Rejection Ratio</b>	<b>PSRR<sup>1)</sup></b>	65	75	–	dB	1kHz 200 mVpp
<b>Power supply Rejection</b>	<b>PSR+N</b>	–	-98	–	dBV(A)	200 mVpp square wave 217Hz
<b>Output impedance</b>	<b>ROUT</b>	–	250	–	$\Omega$	1kHz
<b>Current consumption</b>	<b>I<sub>CC</sub></b>	–	130	150	$\mu\text{A}$	

<sup>1)</sup>  $\text{PSRR} = 20 \cdot \log \frac{V_{\text{Disturb}}}{V_{\text{OUT}}}$ , <sup>2)</sup> verified by design

## 5 Absolute maximum ratings

		Min.	Max.	Unit	Note or condition
<b>Operable temperature range</b>	<b>T</b>	0	+85	$^{\circ}\text{C}$	
<b>Temperature range (storage)</b>	<b>T<sub>STG</sub></b>	-40	+125	$^{\circ}\text{C}$	
	<b>T<sub>STGT</sub></b>	0	+60	$^{\circ}\text{C}$	Stored in tape
<b>Operable Power supply voltage</b>	<b>V<sub>DD</sub></b>	1.6	3.60	V	
<b>ESD capability MM</b>	<b>V<sub>ESD_MM</sub></b>	–	200 <sup>1)</sup>	V	Any pin
<b>ESD capability HBM</b>	<b>V<sub>ESD_HBM</sub></b>	–	2,000 <sup>2)</sup>	V	Any pin
<b>Mechanical Shock</b>		–	10,000	g	

<sup>1)</sup> According to JESD22-A115A.

<sup>2)</sup> According to JESD22-A114E.

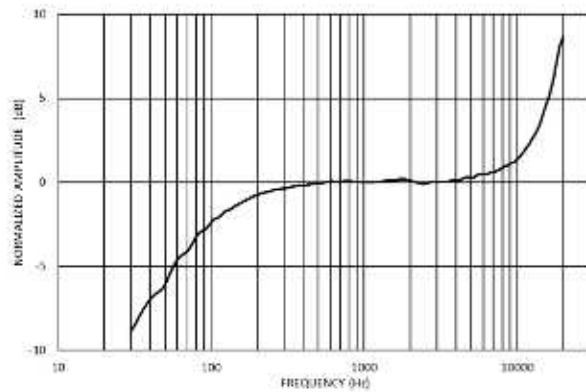
Stress above those listed as Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these conditions is not implied. Exposure to the absolute maximum ratings conditions for extended periods may affect device reliability.

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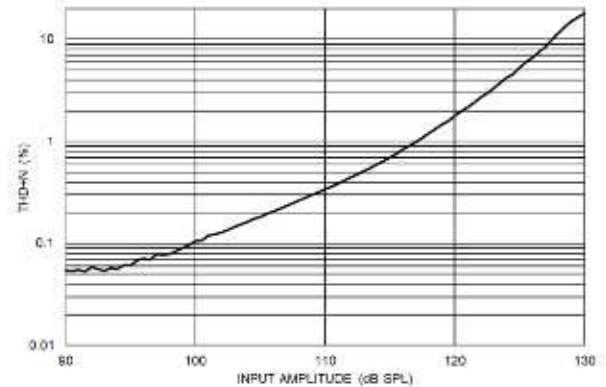
## 6 Application example

T.B.D.

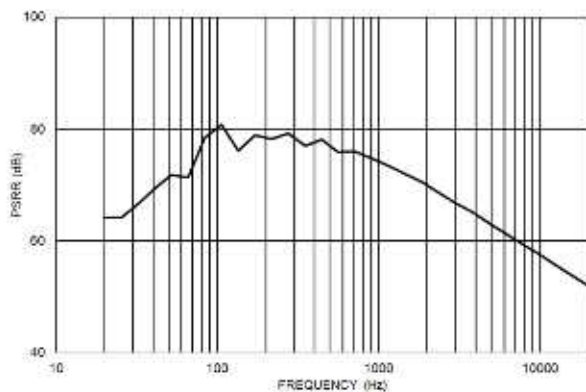
## 7 Typical Performance Characteristics



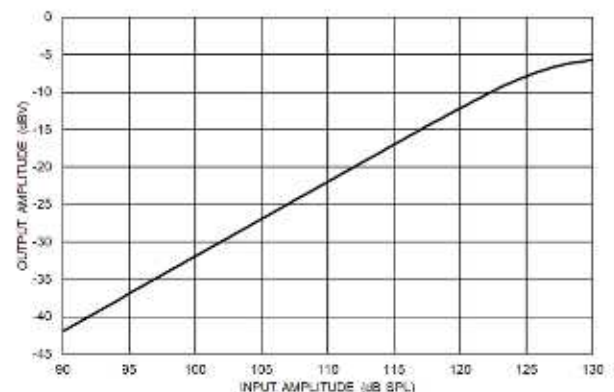
Typical Frequency Response (Measured)



THD + N vs. Input Amplitude



Power-Supply Rejection Ratio vs. Frequency

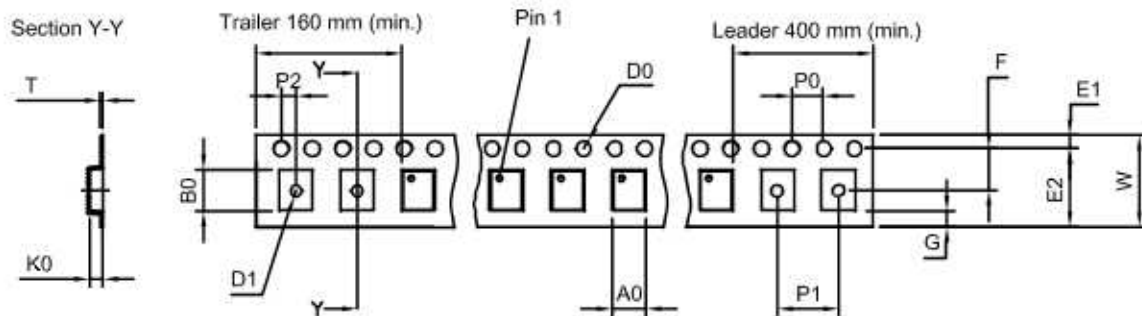


Linearity

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## 8 Packing material

### 8.1 Tape



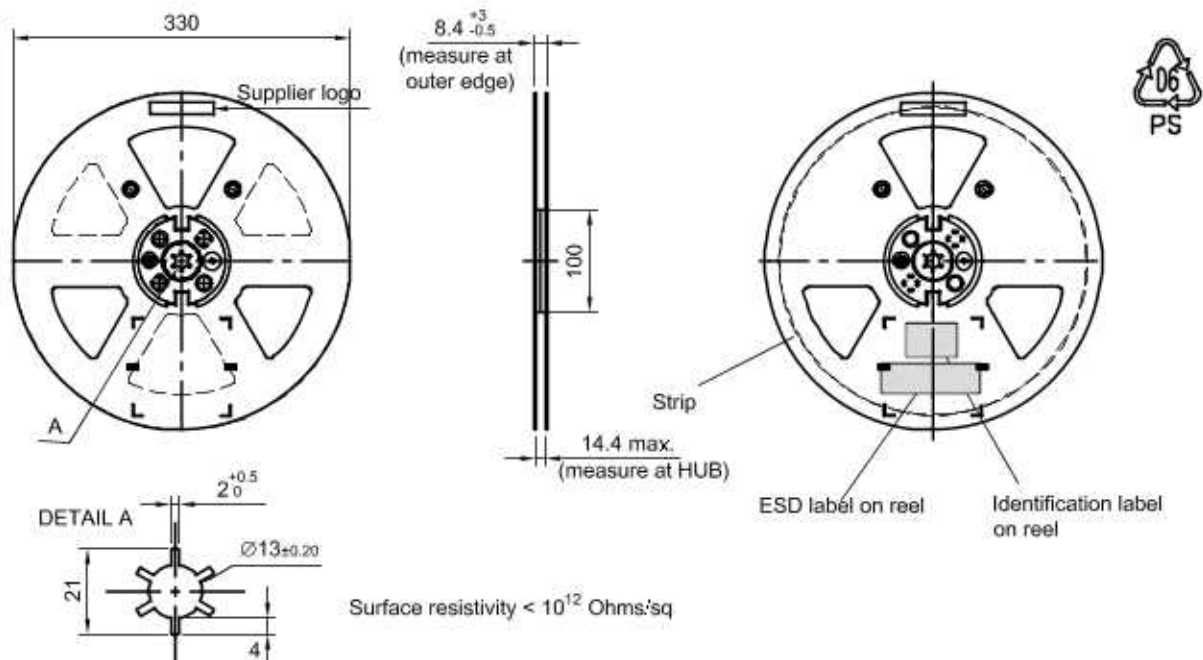
A <sub>0</sub>	2.05 $\pm$ 0.05 mm
B <sub>0</sub>	3.00 $\pm$ 0.05 mm
D <sub>0</sub>	$\varnothing 1.50^{+0.10}_{-0}$ mm
D <sub>1</sub>	min $\varnothing 1.00$ mm
E <sub>1</sub>	1.75 $\pm$ 0.10 mm

E <sub>2</sub>	min 6.25 mm
F	3.50 $\pm$ 0.05 mm
G	min 0.75 mm
K <sub>0</sub>	1.15 $\pm$ 0.05 mm
P <sub>0</sub>	4.00 $\pm$ 0.10 mm

P <sub>1</sub>	4.00 $\pm$ 0.10 mm
P <sub>2</sub>	2.00 $\pm$ 0.05 mm
T	0.25 $\pm$ 0.03 mm
W	$\varnothing 8.00^{+0.30}_{-0.10}$ mm

### 8.2 Reel

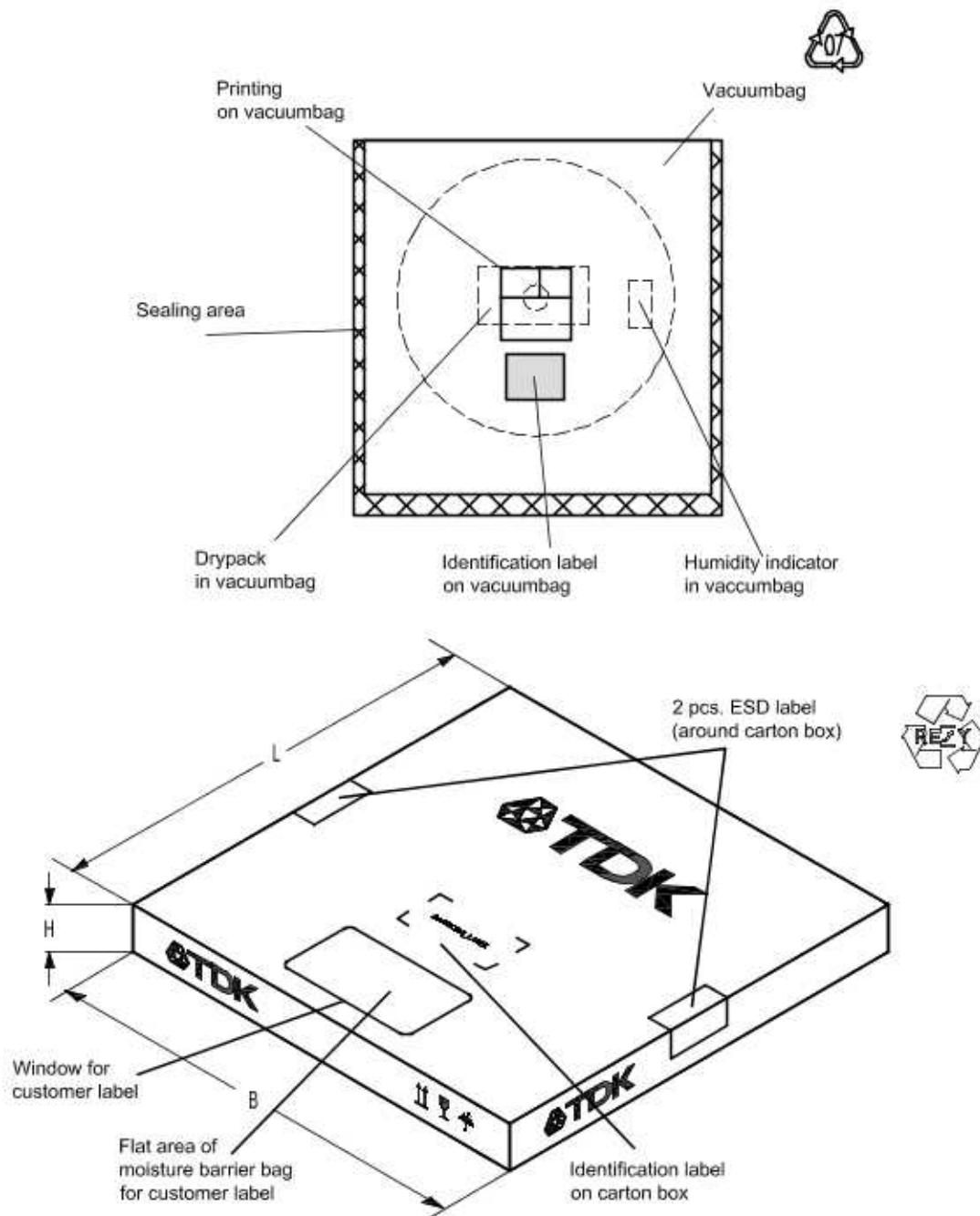
All dimensions in mm unless otherwise stated



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### 8.3 Bag and Box



Reel Size	Width B	Length L	Height H
330 mm	338 mm	335 mm	36 mm

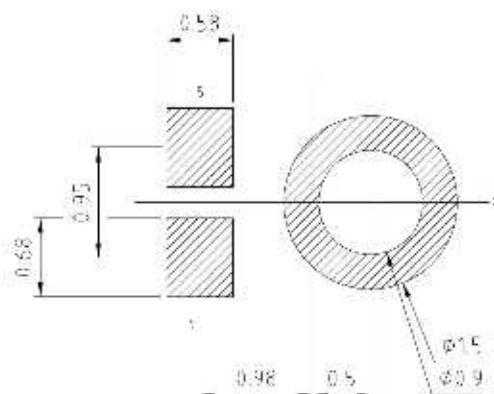
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## 8.4 Identification Label (BPL) Example

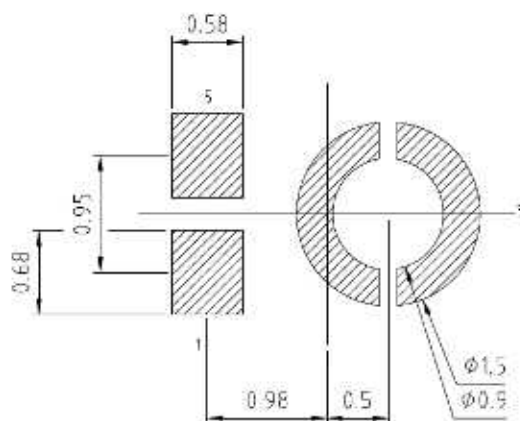


## 9 Assembly recommendations

### 9.1 Recommended landing area



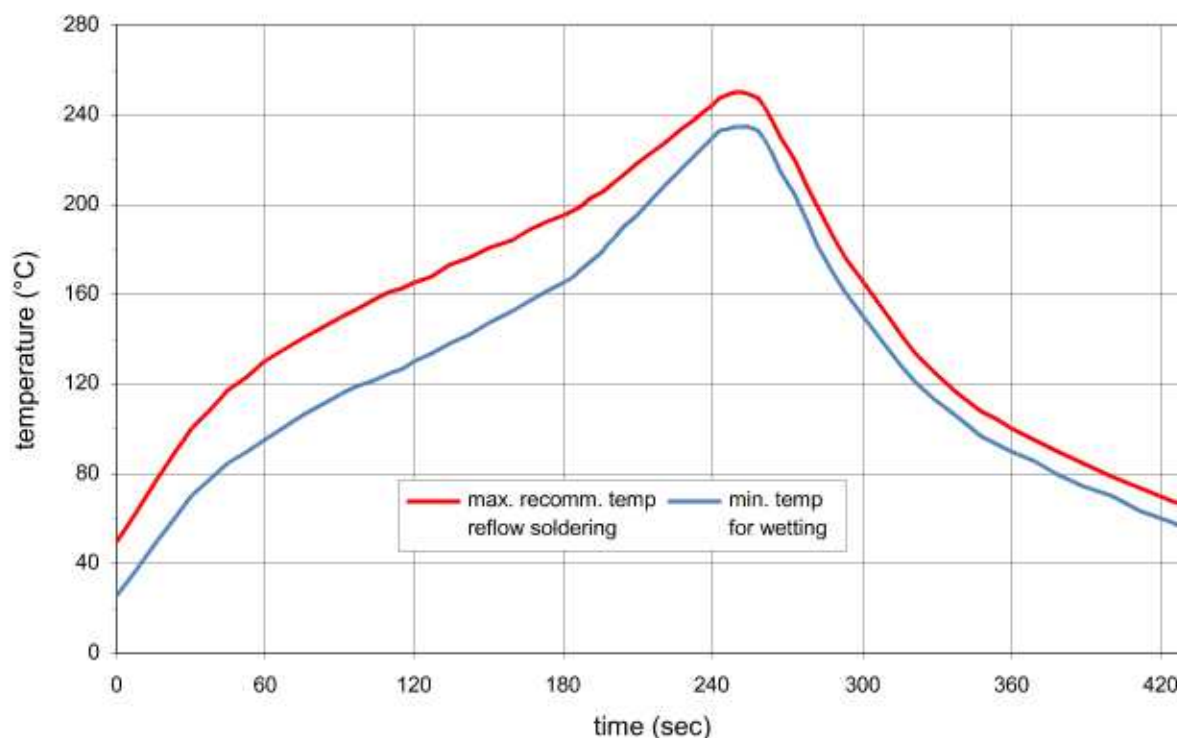
### 9.2 Recommended solder paste stencil layout



Note: All dimensions in mm unless otherwise stated

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### 9.3 Reflow profile



Parameter	Condition
Ramp rate	≤ 3 K/s
Preheat	125°C to 220°C, 150 s to 210 s, 0.4 K/s to 1.0 K/s
T > 220°C	30 s to 70 s
T > 230°C	Min. 10 s
T > 245°C	Max. 20 s
T ≥ 255°C	–
Peak temperature T <sub>peak</sub>	250°C +0/-5°C
Wetting temperature T <sub>min</sub>	230°C +5/-0°C for 10 s ± 1 s
Cooling rate	≤ 3 K/s
Soldering temperature T	Measured at solder pads

### 9.4 Cautions and warnings

- Vacuum on the bottom side of a device with a sound inlet hole has to be avoided
- Compressed air and liquid cleaners should not be used around the area of the sound inlet hole
- The sound inlet hole must not be covered with solder
- The maximum number of reflows should not exceed three

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## 10 Appendix

### 10.1 Ordering codes

Ordering code	Packing units	Reel size
MMICT4076-0A-908	9k	330 mm

### 10.2 RoHS compatibility

ROHS-compatible means that products are compatible with the requirements according to Art. 4 (substance restrictions) of Directive 2011/65/EU of the European Parliament and of the Council of June 8th, 2011, on the restriction of the use of certain hazardous substances in electrical and electronic equipment ("Directive") with due regard to the application of exemptions as per Annex III of the Directive in certain cases.

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## 11 Legal Disclaimer

The products listed on this specification sheet are intended for use in general electronic equipment (AV equipment, telecommunications equipment, home appliances, amusement equipment, computer equipment, personal equipment, office equipment, measurement equipment, industrial robots) under a normal operation and use condition.

The products are not designed or warranted to meet the requirements of the applications listed below, whose performance and/or quality require a more stringent level of safety or reliability, or whose failure, malfunction or trouble could cause serious damage to society, person or property. Please understand that we are not responsible for any damage or liability caused by use of the products in any of the applications below or for any other use exceeding the range or conditions set forth in this specification sheet.

Aerospace/Aviation equipment  
Transportation equipment (cars, electric trains, ships, etc.)  
Medical equipment  
Power-generation control equipment  
Atomic energy-related equipment  
Seabed equipment  
Transportation control equipment  
Public information-processing equipment  
Military equipment  
Electric heating apparatus, burning equipment  
Disaster prevention/crime prevention equipment  
Safety equipment  
Other applications that are not considered general-purpose applications

When using this product in general-purpose applications, you are kindly requested to take into consideration securing protection circuit/equipment or providing backup circuits, etc., to ensure higher safety.

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