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KOKI No-Clean **LEAD-FREE** Solder Paste

Low Melting Point Lead-Free Solder Paste for Dispensing Application

T4AB58-M742D

Product Information



Disclaimer:

This Product Information contains product performance assessed strictly according to our own test procedures and is not the guaranteed results at end-users. Please conduct thorough process optimization before mass production application.



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- Available Solder Alloy: **T4AB (Sn-0.4Ag-57.6Bi)**
- Low melting point solder alloy (138~140°C) reduces CO₂ emission and energy consumption
- Stable dispense performance allows efficient product usage
- Designated flux composition to satisfy both meltability and low void occurrence from the chip-size packages to large components



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| Application | | Dispense | |
|-------------------------|-----------------------|---------------------|-------|
| Product Name | | T4AB58-M742D | |
| Alloy Properties | Alloy Composition (%) | Sn 0.4Ag 57.6Bi | |
| | Melting Point (°C) | 138 - 140 | |
| | Grain Size (um) | 20 – 38 | |
| | Powder Shape | Sphere | |
| Flux Properties | Halide Content *1 (%) | IPC J-STD-004A | 0.019 |
| | | IPC J-STD-004B | 0.165 |
| | Flux Designation | IPC J-STD-004A | ROL0 |
| | | IPC J-STD-004B | ROL1 |
| Solder Paste Properties | Flux Content (%) | 12.0±1.0 | |
| | Viscosity *2 (Pa.s) | 100±20 | |
| | Cu Plate Corrosion*3 | No corrosion | |
| | Tack Time | >48 hours | |
| | Shelf Life (10°C) | 3 months | |

- Halide content: In accordance with IPC-TM-650 2.3.28.1 (It is a measurement result and not a guaranteed specification)
- Viscosity: Measured by Malcom spiral type viscometer PCU-205 at 25°C 10rpm
- Cu plate corrosion: In accordance with IPC-TM-650 2.6.15



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Dispensability (Shape)

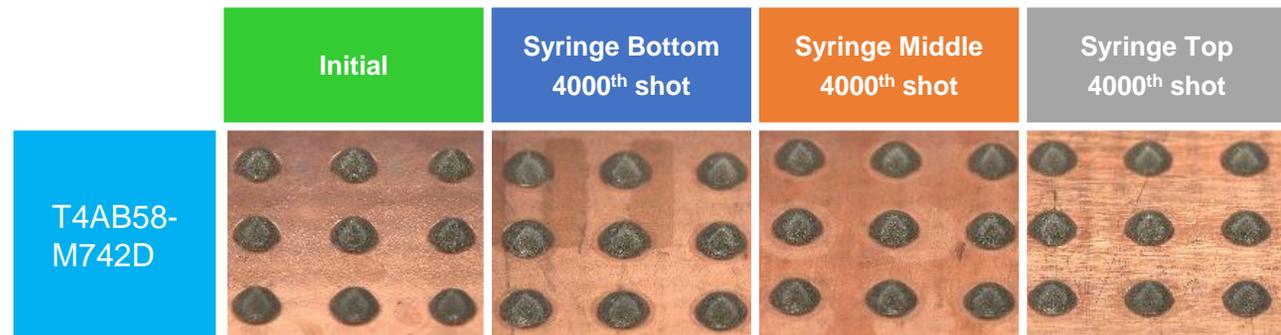
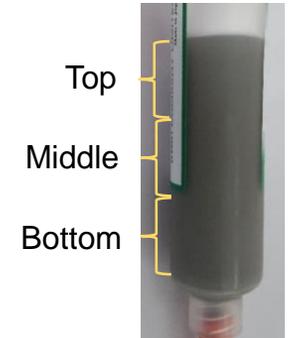
Dispensability Test Condition

- Needle diameter: 0.40mm (Tapered)
- Dispenser: ML-808FX (Musashi Engineering)
- Dispense pressure: 0.15MPa
- Dispense time: 0.1sec.
- Dispense interval: 0.5sec./ shot
- Ambient temperature: 24.0~26.0°C

Test Outline

Divide a syringe into Top, Middle and Bottom sections and perform a continuous dispensing test at each section.

At each section, 1000 shots were dispensed on 4 test PCBs (1000 shots per PCB, total 4000 shots). Inspect shape of dispensed solder pastes on each PCB.



Consistent shape and volume at all 3 sections in a syringe.



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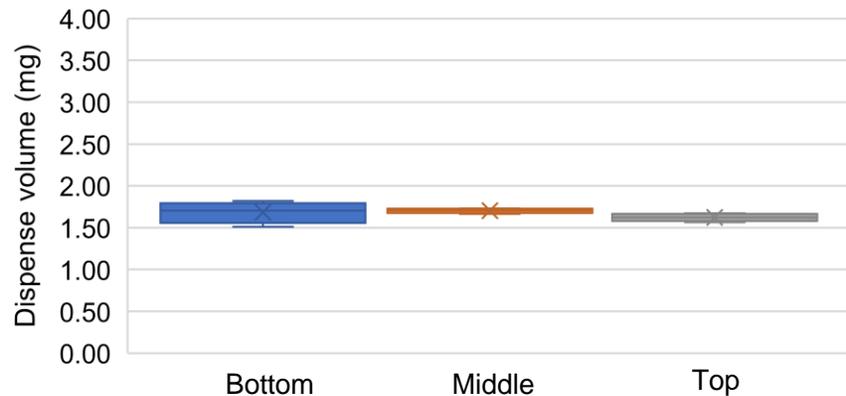
Dispensability (Volume)

Dispense Test Condition

- Needle diameter: 0.40mm (tapered)
- Dispenser: ML-808FX (Musashi Engineering)
- Dispense pressure: 0.15MPa
- Dispense time: 0.1sec.
- Dispense interval: 0.5sec./ shot
- Ambient temperature: 24.0~26.0°C

Test Outline

Divide a syringe into Top, Middle and Bottom sections and perform a continuous dispensing test at each section. At each section, 1000 shots were dispensed on 4 test PCBs (1000 shots per PCB, total 4000 shots). Weigh the test PCBs to obtain the dispensed solder paste volume of each shot.



Average weight of dispensed solder paste

| Location | Weight per dot (mg) |
|----------------------|---------------------|
| Top (ave.) | 1.62mg |
| Middle (ave.) | 1.70mg |
| Bottom (ave.) | 1.68mg |

Volume of dispensed solder paste is consistent throughout the syringe. It is determined that stable dispense volume is maintained.



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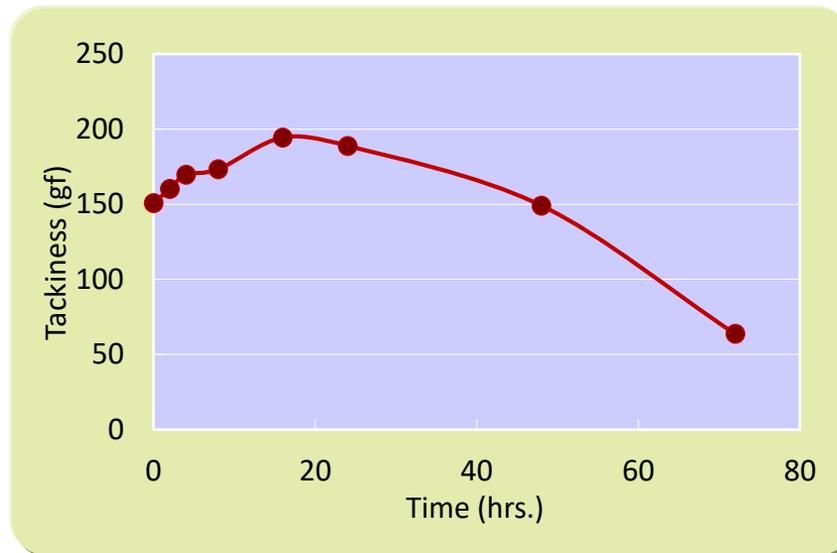
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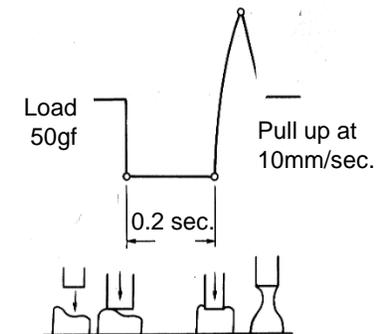
Tack Time

Test Condition

- Stencil thickness: 0.2mm thick, and 6.5mm round aperture
- Equipment: Malcom tackimeter TK-1
- Probe load: 50gf
- Measurement time: 0.2sec.
- Probe speed: 10mm/sec.
- Test standard: JIS Z 3284-3
- Test ambient: 25±1°C, 50±10%RH



Tensile strength = Tack force



Stable tackiness performance is maintained up to 48 hours.



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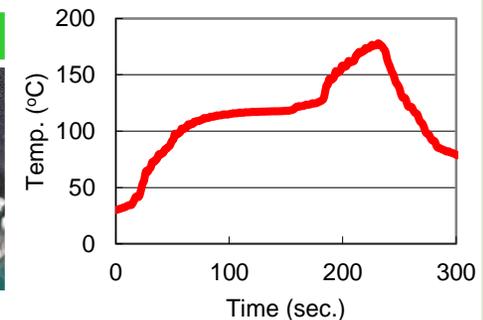
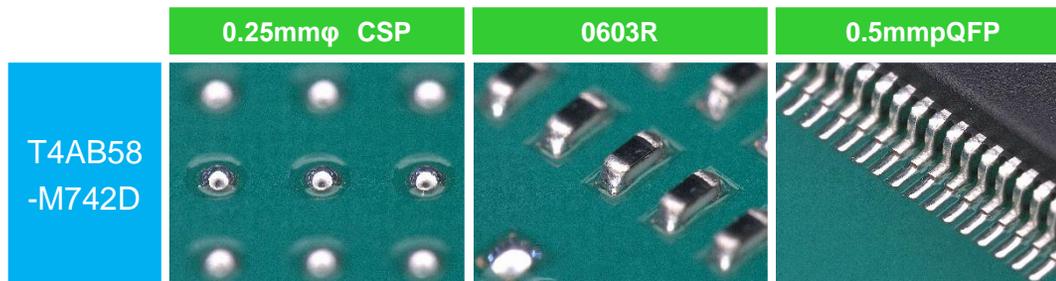
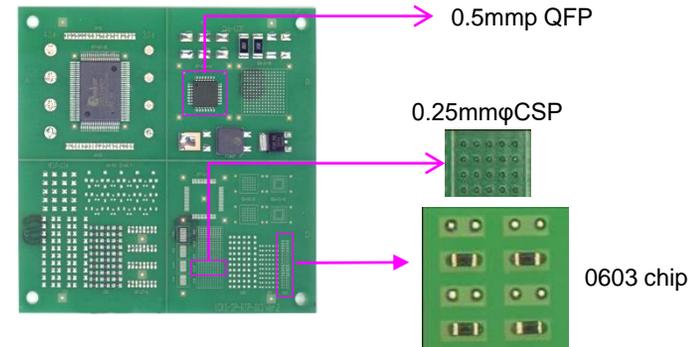
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Solder Meltability

Test Condition

- Test PCB: FR-4 grade glass epoxy
- Pad surface finish: OSP
- Metal stencil thickness: 0.12mm (laser etched)
- Evaluation pad: 0.25mm ϕ CSP pads
- Evaluation component: 0603R chip, 0.5mm pitch QFP
- Aperture ratio: 100%
- Heating method: Hot air reflow
- Reflow atmosphere: Air atmosphere
- Reflow profile: See the diagram at bottom right



Good meltability performance with various components, such as CSP pads, chip components, and QFPs, etc.



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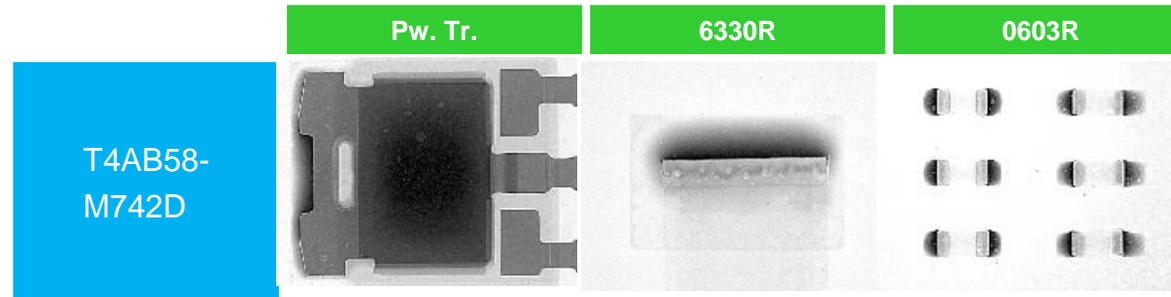
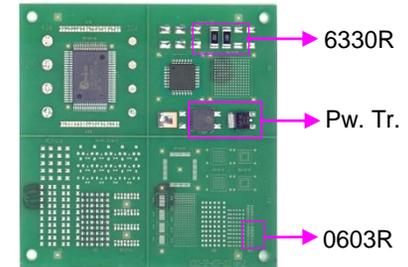
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Void Performance

Test Condition

- Test PCB: FR-4 grade glass epoxy
- Pad surface finish: OSP
- Metal stencil thickness: 0.12mm (laser etched)
- Evaluation components: Power transistor (Pw. Tr.), 6330R, 0603R
- Aperture ratio: 100%
- Heating method: Hot air reflow
- Reflow atmosphere: Air atmosphere
- Reflow profile: Same as "Meltability Test"



Exhibited low void occurrence regardless of the size of the joints and also the type of the components.



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Halogen Content

Halogen content test standard: Quartz-tube combustion ion chromatography (BS EN14582)

Halogen Content

| Method | n1 | n2 |
|-----------------|--------------|--------------|
| Chlorine | Not detected | Not detected |
| Bromine | 340ppm | 360ppm |

Complies with halogen free standard (Cl: <900ppm, Br:<900ppm and total halogen <1500ppm).



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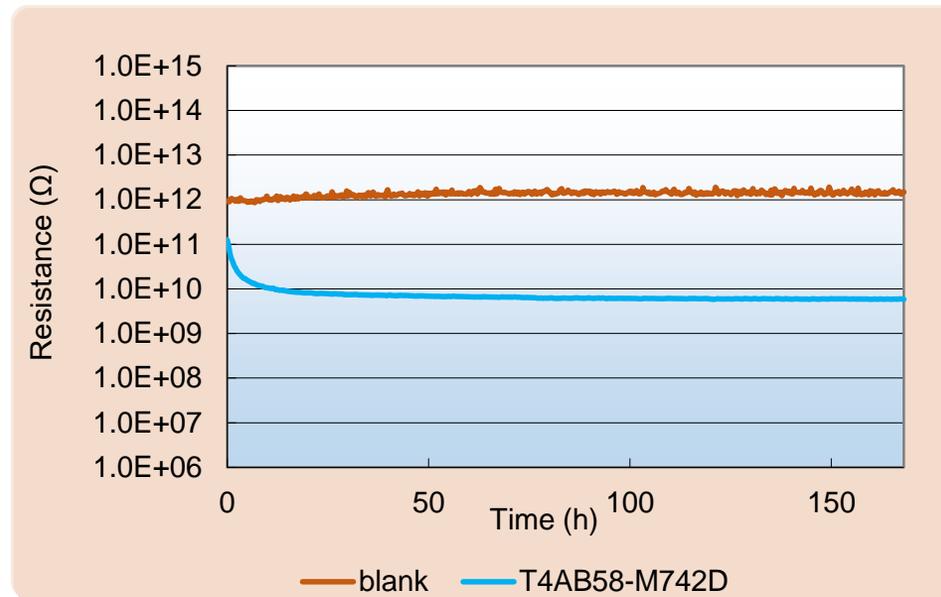
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Surface Insulation Resistance (SIR) Test

Test Condition

- Test ambient: $40 \pm 1^\circ\text{C} \times 90 \pm 3\% \text{RH}$ for 168 hours
- Stencil thickness: 150 μm
- Test PCB: IPC-B-24
- Measurement voltage: 12.5V
- Bias voltage: 12.5V
- Test standard: IPC-TM-650 2.6.3.7



Insulation resistance was consistently above $1.0\text{E}+09$. In addition, test PCB did not show any evidence of migration.



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| Item | Result | Test Method |
|---------------------------------------|--------------------------|-----------------------------|
| Slump test | 0.3mm pass | JIS Z 3284-3 110°C-5min. |
| Cu mirror corrosion test | Type L | IPC-TM-650 2.3.32 |
| Cu plate corrosion test | Pass | IPC-TM-650 2.6.15 |
| Electrochemical migration test | No evidence of migration | IPC-TM-650 2.6.14.1 |



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1. Dispensing process - Recommended dispense condition

(1) Needle

- 1) Needle inner diameter: $\geq 0.4\text{mm}$ (for grain size 20~38 μm) to $\geq 0.45\text{mm}$ (for grain size 20~45 μm)
- 2) Dispense pressure: $\geq 0.15\text{MPa}$
- 3) Needle shape: Straight or tapered needle

*The above recommendations are based on the assessment with KOKI equipment using their testing environment and does not guarantee the best result at your facility. Please conduct thorough trials to determine the optimal condition prior to mass production application.

(2) Usage environment

- 1) Temperature: 23~27°C
- 2) Humidity: 40~60%RH

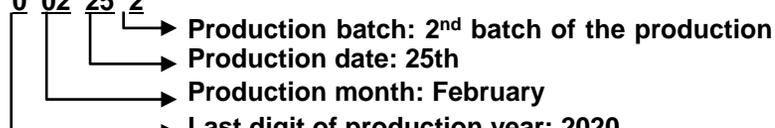
*For stable dispense volume, make sure the product temperature matches the temperature setting of the dispenser.

2. Product Life

0~10°C: 3 months from the date of production

* How to interpret the lot number:

e.g. Lot No. 0 02 25 2



Production batch: 2nd batch of the production
 Production date: 25th
 Production month: February
 Last digit of production year: 2020



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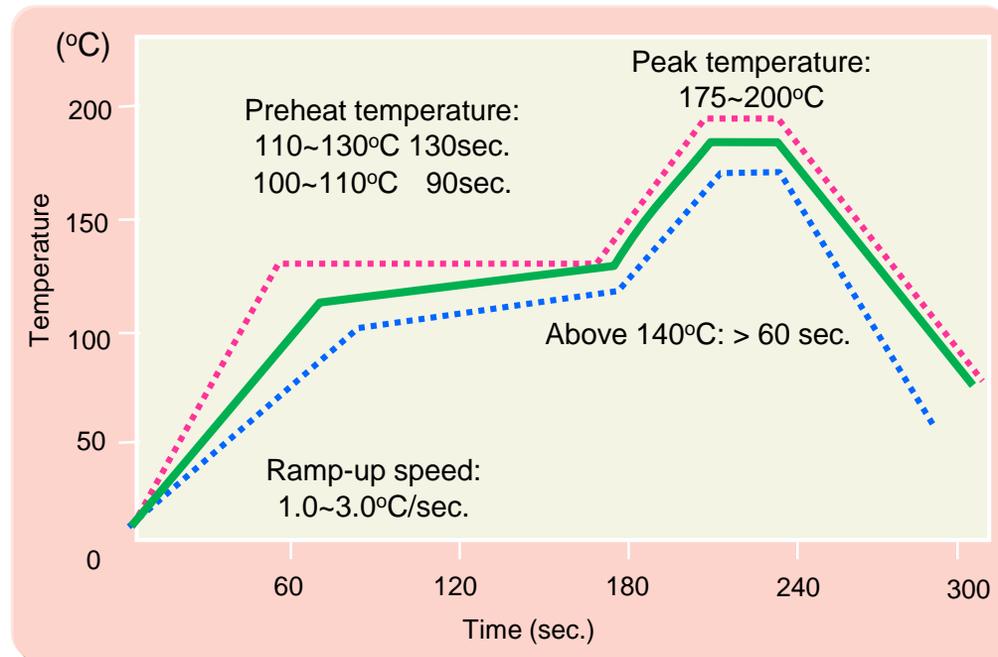
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Handling Guide – Recommended Reflow Profile



| | <u>Pre-heat zone</u> | <u>Peak zone</u> |
|--------------------|----------------------|------------------|
| Lower limit: | 100 ~ 110°C 90sec | 175°C |
| Upper limit: | 130 ~ 130°C 130sec | 200°C |

Using a reflow profile below the lower limit of the recommended reflow profile may deteriorate electrical reliability.



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