PTM6880 RELIABILITY REPORT

TIMS TEAM

Honeywell

SHAPE THE FUTURE

2022 HONEYWELL TECH SYMPOSIUM

OCT 4-6 | PHOENIX

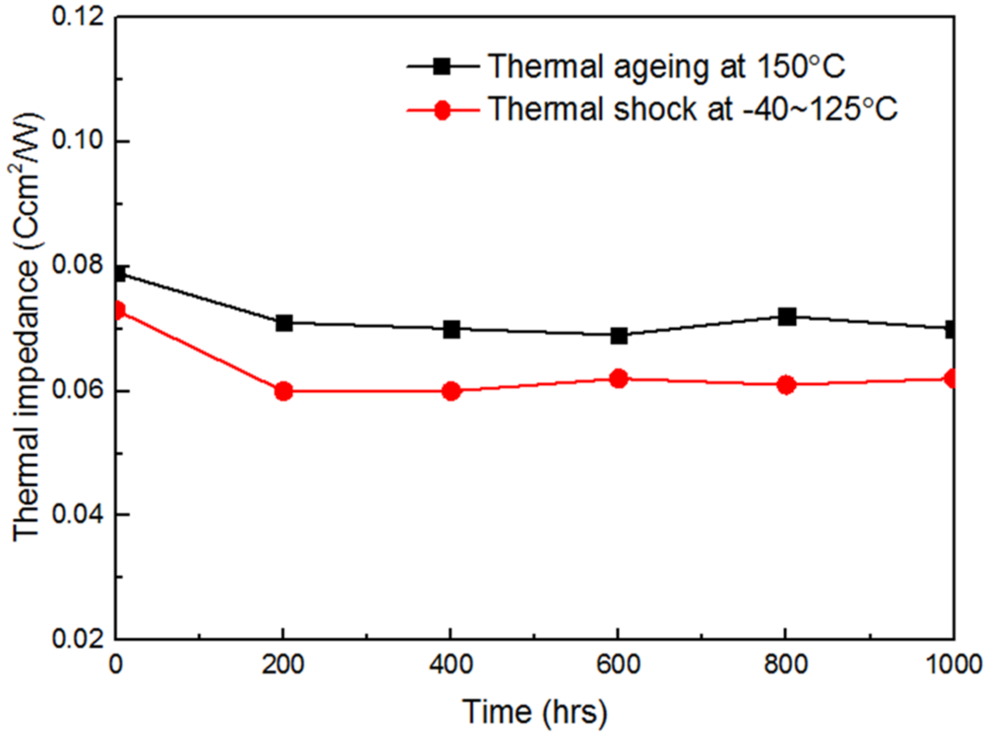
TYPICAL PROPERTIES

Properties	Value	Method
Thermal impedance (@80°C, 35psi)	0.056 °C·cm2/W	ASTM D5470
Density	2.7 g/cm3	ASTM D792
Phase change temperature	45°C	DSC
Thermal conductivity	6.0 W/m·K	ASTM D5470
Bond line thickness (@60°C, 20psi)	20μm	HON internal

RELIABILITY TEST

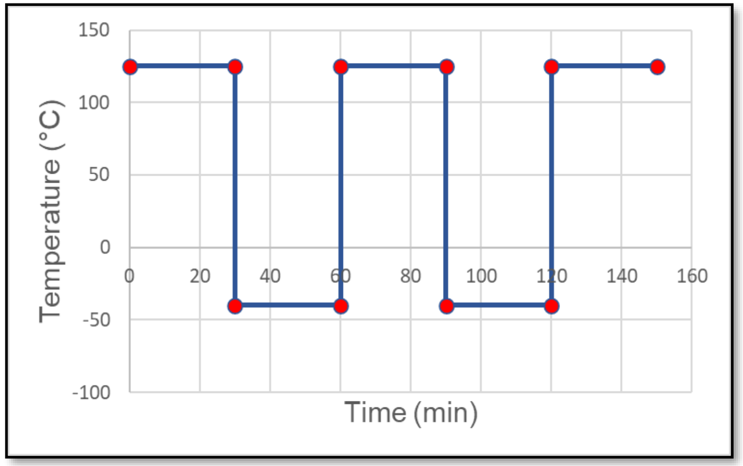
- The samples were placed into the test chamber for 1000 hours / cycles. Every 200 hours/ cycles, the sandwich samples (Si / PCM / Cu) were taken out and measured TI variation.
- The process was repeated every 200hrs to 1000 hours.

Sample size: 4 pcs samples.



Oven

Temperature program of thermal shock



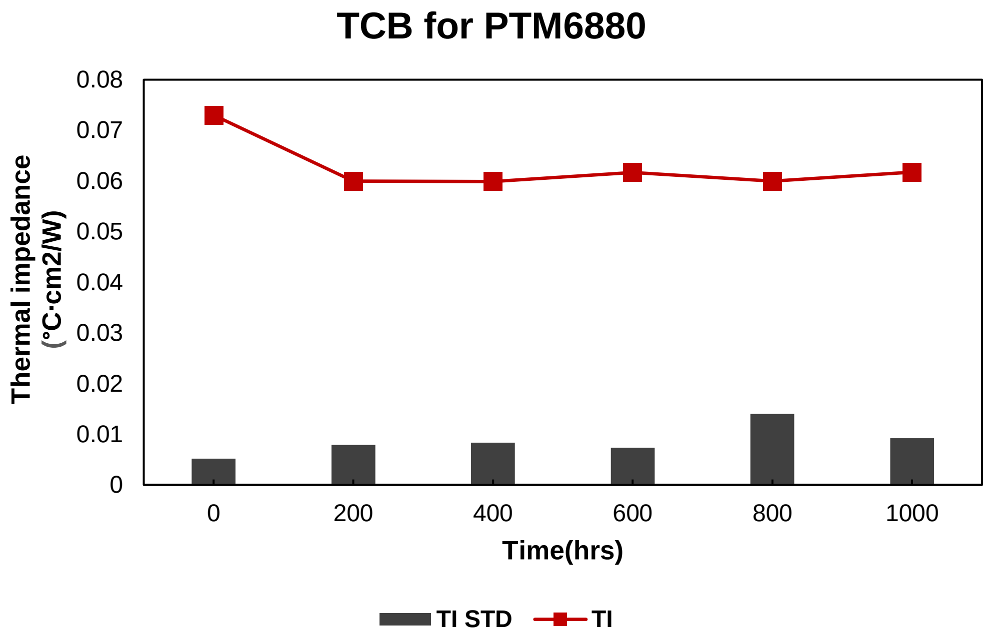
- Dwelling time @-40°C and 125°C:30mins
- Every cycle: 60min

Good reliability for Thermal ageing and thermal shock

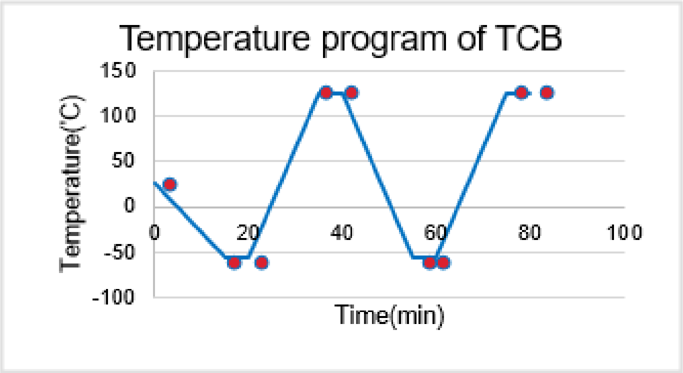
RELIABILITY TEST

- The samples were placed into the test chamber for 1000 hours / cycles. Every 200 hours/ cycles, the sandwich samples (Si / PCM / Cu) were taken out and measured TI variation.
- The process was repeated every 200hrs to 1000 hours.

<u>Sample size: 4 pcs samples.</u>



TC chamber



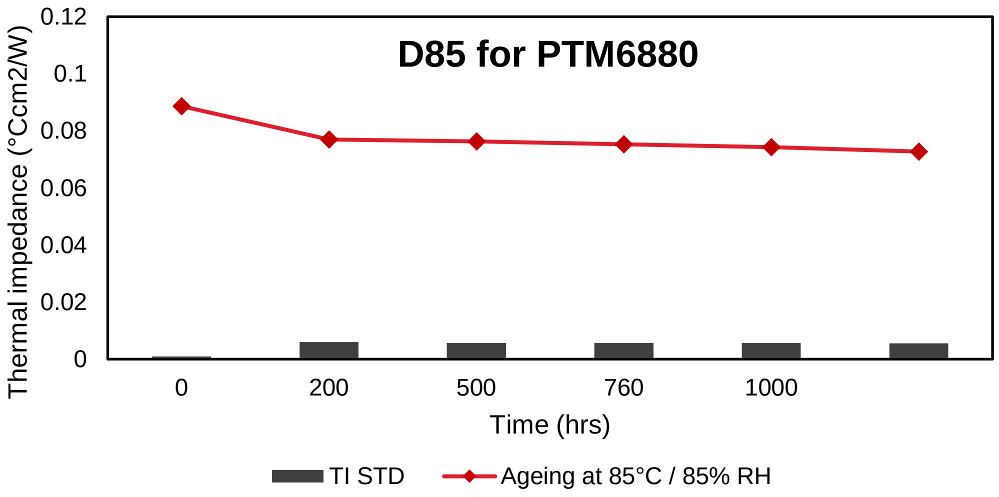
- Ramp time: 15mins
- Dwelling time @-55°C and 125°C:5mins
- Every cycle: 40mins

Good reliability for thermal cycling

RELIABILITY TEST

- The samples were placed into the test chamber(Temp:85, RH: 85%) for 1000 hours / cycles. Every 200 hours/ cycles, the sandwich samples (Si / PCM / Cu) were taken out and measured TI variation.
- The process was repeated every 200hrs to 1000 hours.

Sample size: 4 pcs samples.



D85 chamber

Good reliability for D85

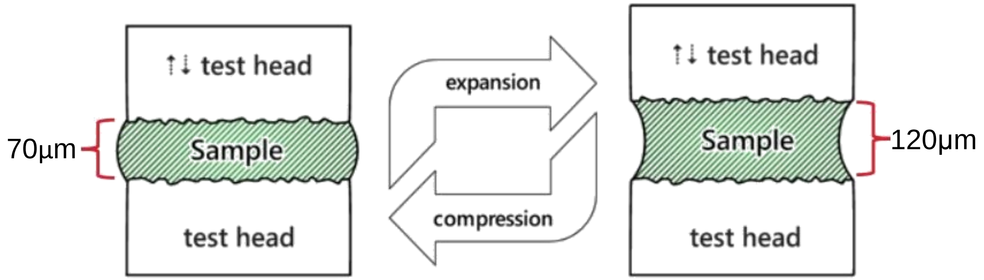
PUMPING OUT RISK EVALUATION

❑ Thickness cycling test

- To simulate the impact of warpage changes on the thermal resistance of PTM materials during the thermal cycling of electronic devices
- Gap changes from 120μm to 70μm in one cycle and then repeats

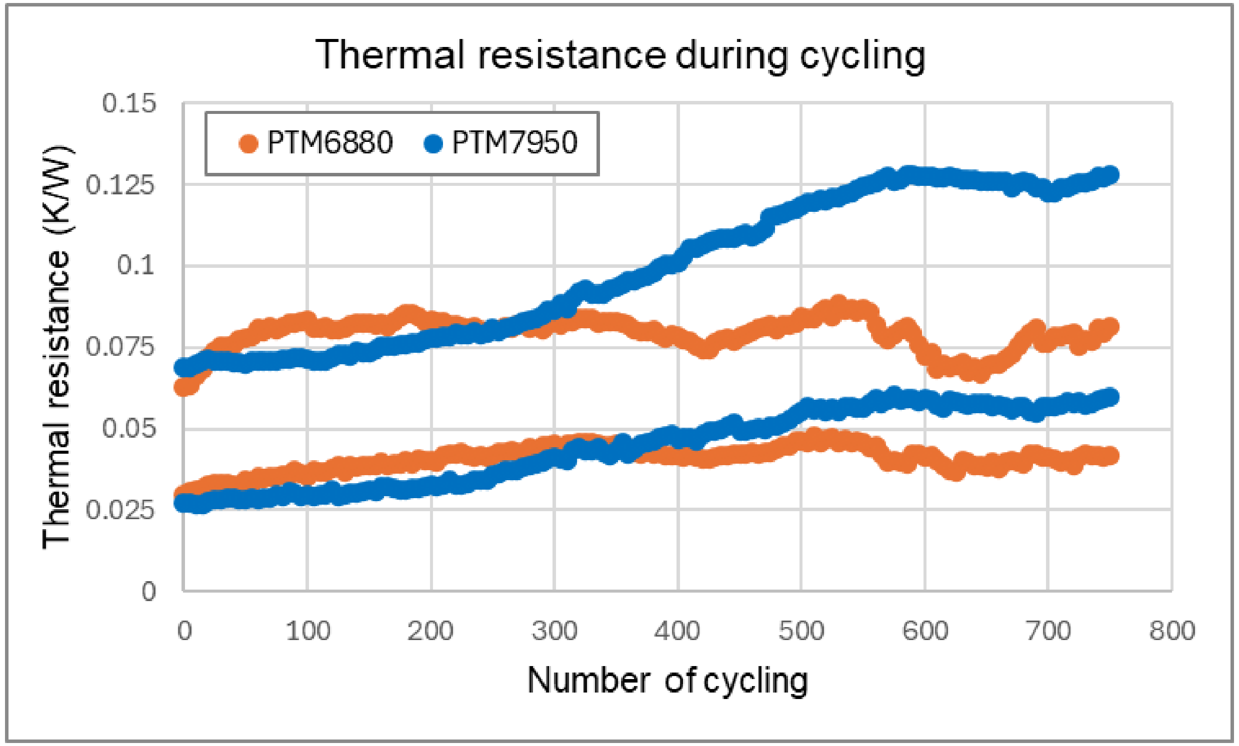
TIMA5

Gap change during cycling



The proportion of thermal resistance increase after different number of cycles

Cycles	PTM7950		PTM6880	
	70um	120um	70um	120um
250	32%	16%	39%	27%
500	108%	73%	42%	28%
750	119%	85%	42%	30%



Lower risk for pumping out