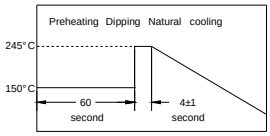
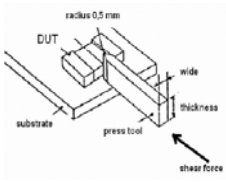
5. Reliability and Test Condition

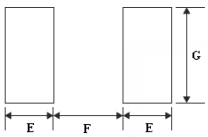
Item	Performance	Test Condition
Series No.	WCB	--
Operating Temperature	-40~+125℃ (Including self-generated heat)	--
Transportation Storage Temperature	-40~+85℃ (on board)	For long storage conditions, please see the Application Notice
Impedance (Z)	Within the specified tolerance	HP4291A or its equivalent
Rated Current		
DC Resistance		Milliohm High-Tester 3226 (Hioki Denki) or its equivalent.
Resistance to Soldering Heat	Appearance：No damage. Impedance：within±15% of initial value Inductance：within±10% of initial value Q：Shall not exceed the specification value. RDC：within ±15% of initial value and shall not exceed the specification value	Number of heat cycles: 1 Temperature (°C) / Time (s) / Temperature ramp/immersion and emersion rate 260 ±5 (solder temp) / 10 ±1 / 25mm/s ±6 mm/s Depth: completely cover the termination
Solderability	More than 95% of the terminal electrode should be covered with solder. 	Preheat: 150℃,60sec. Solder: Sn96.5%-Ag3%-Cu0.5% Solder temperature: 245±5℃ Flux for lead free: Rosin. 9.5% Depth: completely cover the termination. Dip time: 4±1sec.
Terminal strength	Appearance：No damage. Impedance：within±15% of initial value Inductance：within±10% of initial value Q：Shall not exceed the specification value. RDC：within ±15% of initial value and shall not exceed the specification value 	Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020D Classification Reflow Profiles) Component mounted on a PCB apply a force >0805inch(2012mm):1kg <=0805inch(2012mm):0.5kg to the side of a device being tested. This force shall be applied for 60 +1 seconds. Also the force shall be applied gradually as not to shock the component being tested.
Bending	Appearance：No damage. Impedance：within±10% of initial value Inductance：within±10% of initial value Q：Shall not exceed the specification value. RDC：within ±15% of initial value and shall not exceed the specification value	Shall be mounted on a FR4 substrate of the following dimensions: >=0805inch(2012mm):40x100x1.2mm <0805inch(2012mm):40x100x0.8mm Bending depth: >=0805inch(2012mm):1.2mm <0805inch(2012mm):0.8mm Duration of 10 sec for a min.
Vibration Test	Appearance：No damage. Impedance：within±15% of initial value Inductance：within±10% of initial value Q：Shall not exceed the specification value. RDC：within ±15% of initial value and shall not exceed the specification value	Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020D Classification Reflow Profiles) Oscillation Frequency: 10～2K～10Hz for 20 minutes Equipment： Vibration checker Total Amplitude:1.52mm±10% Testing Time：12 hours(20 minutes, 12 cycles each of 3 orientations)。
Shock	Appearance：No damage. Impedance：within±10% of initial value Inductance：within±10% of initial value Q：Shall not exceed the specification value. RDC：within ±15% of initial value and shall not exceed the specification value	Test condition: Type / Peak Value (g's) / Normal duration (D) (ms) / Wave form / Velocity change (Vi)ft/sec SMD / 50 / 11 / Half-sine / 11.3 Lead / 50 / 11 / Half-sine / 11.3
Thermal shock	Appearance: no damage. Impedance: within±15%of initial value. Inductance: within±10%of initial value. Q：Shall not exceed the specification value. RDC：within ±15% of initial value and shall not exceed the specification value	Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020D Classification Reflow Profiles) Condition for 1 cycle Step1: -40±2℃ 30±5 min. Step2: 25±2℃ ≦0.5min Step3: +125±2℃ 30±5min. (Bead) Number of cycles: 500 Measured at room temperature after placing for 24±2 hrs.

Item	Performance	Test Condition
Life test	Appearance: no damage. Impedance: within±15%of initial value. Inductance: within±10%of initial value. Q：Shall not exceed the specification value. RDC：within ±15% of initial value and shall not exceed the specification value	Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020D Classification Reflow Profiles) Temperature: 125±2℃(bead) Applied current: rated current. Duration: 1000±12hrs. Measured at room temperature after placing for 24±2 hrs.
Load Humidity		Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020D Classification Reflow Profiles) Humidity: 85±2%R.H. Temperature: 85±2℃. Duration: 1000hrs Min. with 100% rated current. Measured at room temperature after placing for 24±2 hrs.
Moisture Resitance	Appearance: no damage. Impedance: within±15%of initial value. Inductance: within±10%of initial value. Q：Shall not exceed the specification value. RDC：within ±15% of initial value and shall not exceed the specification value	Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020DClassification Reflow Profiles 1. Baked at 50℃ for 25hrs, measured at room temperature after placing for 4 hrs. 2. Raise temperature to 65±2℃ 90-100%RH in 2.5hrs, and keep 3 hours, cool down to 25℃ in 2.5hrs. 3. Raise temperature to 65±2℃ 90-100%RH in 2.5hrs, and keep 3 hours, cool down to 25℃ in 2.5hrs,keep at 25℃ for 2 hrs then keep at -10℃ for 3 hrs 4. Keep at 25℃ 80-100%RH for 15min and vibrate at the frequency of 10 to 55 Hz to 10 Hz, measure at room temperature after placing for 1~2 hrs.

6.Soldering and Mounting

6-1. Recommended PC Board Pattern

Chip Size					Land Patterns For Reflow Soldering		
Type	**A(mm)**	**B(mm)**	**C(mm)**	**D(mm)**	**E(mm)**	**F(mm)**	**G(mm)**
2016	2.0±0.2	1.6±0.2	1.6±0.2	0.5+0.3	1.4	1.2	2.0
3216	3.2±0.3	1.6±0.2	1.6±0.2	0.5±0.3	1.4	2.2	2.0
3225	3.2±0.3	2.5±0.3	2.5±0.3	0.5±0.3	1.4	2.2	2.9
4516	4.5±0.3	1.6±0.2	1.6±0.2	0.5±0.3	1.75	3.5	2.0
4525	4.5±0.4	2.5±0.3	2.5±0.3	0.9±0.6	1.75	3.5	2.9
4532	4.5±0.4	3.2±0.3	3.2±0.3	0.9±0.6	1.75	3.5	3.7



PC board should be designed so that products can prevent damage from mechanical stress when warping the board.

6-2. Soldering

Mildly activated rosin fluxes are preferred. The terminations are suitable for re-flow soldering systems. If hand soldering cannot be avoided, the preferred technique is the utilization of hot air soldering tools.
Note.

If wave soldering is used ,there will be some risk.
Re-flow soldering temperatures below 240 degrees, there will be non-wetting risk

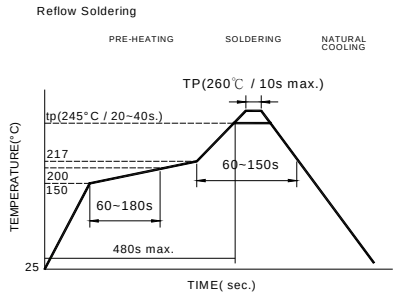
6-2.1 Lead Free Solder re-flow:

Recommended temperature profiles for lead free re-flow soldering in Figure 1. (Refered to J-STD-020C)

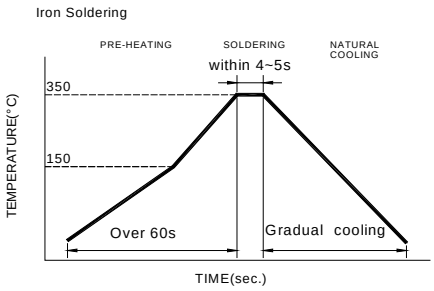
6-2.2 Soldering Iron:

Products attachment with a soldering iron is discouraged due to the inherent process control limitations. If a soldering iron must be employed the following precautions are recommended. for Iron Soldering in Figure 2.

- Preheat circuit and products to 150℃
- 350℃ tip temperature (max)
- Never contact the ceramic with the iron tip
- 1.0mm tip diameter (max)
- Use a 20 watt soldering iron with tip diameter of 1.0mm
- Limit soldering time to 4~5sec.



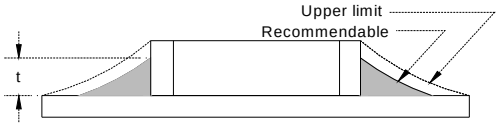
Reflow times: 3 times max
Fig.1



Iron Soldering times：1 times max
Fig.2

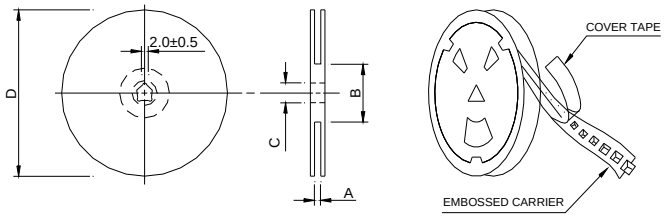
6-2.3 Solder Volume:

Accordingly increasing the solder volume, the mechanical stress to product is also increased. Exceeding solder volume may cause the failure of mechanical or electrical performance. Solder shall be used not to be exceed as shown in right side:
Minimum fillet height = soldering thickness + 25% product height



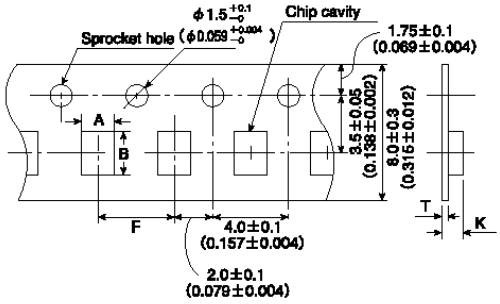
7.Packaging Information

7-1. Reel Dimension



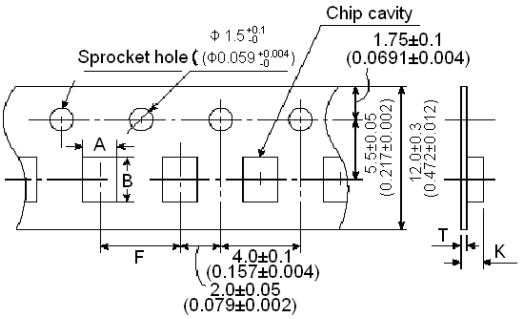
Type	A(mm)	B(mm)	C(mm)	D(mm)
2016 3216 3225	10.0±1.5	60+1/-0	13±0.5	180+0/-3
4516 4525	14.0±1.5	60+1/-0	13±0.5	180+0/-3
4532	14.0±2.0	100±1.0	13±0.5	330±2.0

7-2.1 Tape Dimension / 8mm



Size	A(mm)	B(mm)	K(mm)	F(mm)	T(mm)
2016	1.8±0.2	2.2±0.2	2.6 max.	4.0±0.2	0.6 max.
3216	1.9±0.2	3.5±0.2	2.6 max.	4.0±0.2	0.6 max.
3225	2.8±0.2	3.5±0.2	4.0 max.	4.0±0.2	0.6 max.

7-2.2 Tape Dimension / 12mm



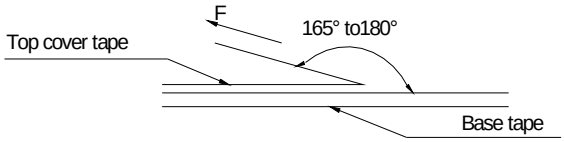
Size	A(mm)	B(mm)	K(mm)	F(mm)	T(mm)
4516	1.9±0.2	4.9±0.2	2.6 max.	4.0±0.2	0.6 max.
4525	2.9±0.2	4.9±0.2	4.0 max.	4.0±0.2	0.6 max.
4532	3.6±0.2	4.9±0.2	4.0 max.	8.0±0.2	0.6 max.

7-3. Packaging Quantity

Chip Size	2016	3216	3225	4516	4525	4532
Chip / Reel	2000	2000	1000	2000	1000	2000

Units: pcs

7-4. Top Tape Strength



The force for tearing off cover tape is 15 to 60 grams in the arrow direction under the following conditions.

Room Temp. (℃)	Room Humidity (%)	Room atm (hPa)	Tearing Speed mm/min
5~35	45~85	860~1060	300

Application Notice

・Storage Conditions(component level)
To maintain the solder ability of terminal electrodes:
1. TAI-TECH products meet IPC/JEDEC J-STD-020D standard-MSL, level 1.
2. Temperature and humidity conditions: Less than 40℃ and 60% RH.
3. Recommended products should be used within 12 months from the time of delivery.
4. The packaging material should be kept where no chlorine or sulfur exists in the air.

・Transportation
1.Products should be handled with care to avoid damage or contamination from perspiration and skin oils.
2. The use of tweezers or vacuum pick up is strongly recommended for individual components.
3. Bulk handling should ensure that abrasion and mechanical shock are minimized.