

Winding Type Chip Inductor

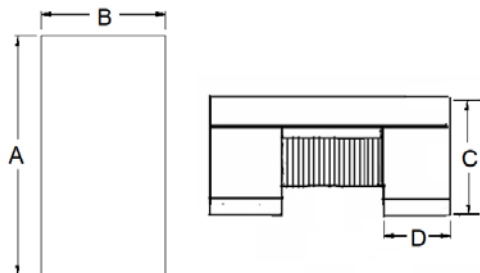
APO201216NV-SERIES

1. Features

1. Ferrite core wire wound construction.
2. High Reliability due to wire wound type construction.
3. Small footprint as well as low profile.
4. 100% Lead(Pb) & Halogen-Free and RoHS compliant.
5. High reliability -Reliability tests comply with AEC-Q200
6. Operating temperature-55~+150°C(Including self - temperature rise)
7. Inductor for use in-vehicle PoC (Power Over Coax)



2. Dimension



Size	A	B	C	D
APO201216	2.00±0.20	1.20±0.20	1.60±0.20	0.48±0.10

Unit:mm

3. Part Numbering

APO	201216	N	V	-	R47	M
A	B	C	D		E	F

A: Series

B: Dimension

C: Application

D: Category Code

E: Inductance

F: Inductance Tolerance

L x W x H

V=Vehicle

R47=0.47uH

M=±20%

4. Specification

TAI-TECH Part Number	Ls(μH) (@1 MHz)	DCR (Ω) Max.	SRF (MHz) min.	Rated current(mA)		
				Isat(mA)	Based on temperature rise	
					Ambient temperature 105°C	Ambient temperature 125°C
APO201216NV-R47M	0.47±20%	0.05	470	1000	1100	900
APO201216NV-R82M	0.82±20%	0.09	360	800	800	700
APO201216NV-1R0M	1.0±20%	0.13	320	700	700	600
APO201216NV-1R5M	1.5±20%	0.18	260	550	550	500
APO201216NV-2R0M	2.0±20%	0.29	230	450	450	400

Note:

Isat: Applied the current to coils, the inductance change shall be less than 30% of initial value.

Ambient temperature (85°C/105°C): the part temperature (ambient temperature plus self-generation of heat) should be under 150°C.

Ambient temperature (125°C):the part temperature (ambient temperature plus self-generation of heat) should be under 150°C.

Winding Type Chip Inductor

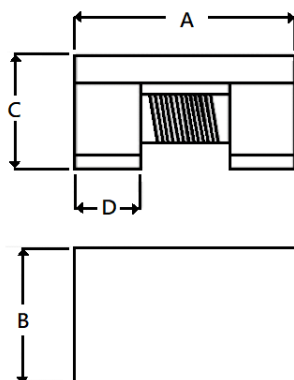
APO322523TV-SERIES

1. Features

1. Ferrite core wire wound construction.
2. High Reliability due to wire wound type construction.
3. Small footprint as well as low profile.
4. 100% Lead(Pb) & Halogen-Free and RoHS compliant.
5. High reliability -Reliability tests comply with AEC-Q200
6. Operating temperature-55~+150°C (Including self - temperature rise)
7. Inductor for use in-vehicle PoC (Power Over Coax)



2. Dimension



Size	A	B	C	D
APO3225	3.20±0.20	2.50±0.20	2.30±0.20	0.58±0.10

Unit:mm

3. Part Numbering

APO	322523	T	V	-	100	M
A	B	C	D		E	F

A: Series

B: Dimension

C: Application

D: Category Code

E: Inductance

F: Inductance Tolerance

L x W x H

V=Vehicle

100=10.0uH

M=±20%

4. Specification

TAI-TECH Part Number	Ls(μH) (@100KHz)	DCR (Ω) Max.	Rated current(mA)					
			Isat			Irms		
			25°C (mA) Typ.	105°C (mA) Typ.	125°C (mA) Typ.	25°C (mA) Typ.	105°C (mA) Typ.	125°C (mA) Typ.
APO322523TV-2R2M	2.2±20%	0.18	1100	1000	950	1350	1220	1045
APO322523TV-4R7M	4.7±20%	0.10	720	650	600	1500	1400	1300
APO322523TV-100M	10.0±20%	0.15	450	400	350	1300	1200	1100
APO322523TV-150M	15.0±20%	0.40	400	350	310	825	725	625

Note:

Isat : when based on the inductance change rate (30% below the initial L value)

Irms : When based on the temperature increase (temperature increase of 40°C by self-heating)

Winding Type Chip Inductor

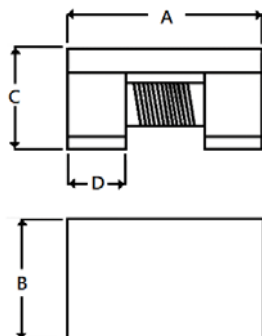
APO322523NV-SERIES

1. Features

1. Ferrite core wire wound construction.
2. High Reliability due to wire wound type construction.
3. Small footprint as well as low profile.
4. 100% Lead(Pb) & Halogen-Free and RoHS compliant.
5. High reliability -Reliability tests comply with AEC-Q200
6. Operating temperature-55~+150°C(Including self - temperature rise)
7. Inductor for use in-vehicle PoC (Power Over Coax)



2. Dimension



Size	A	B	C	D
APO3225	3.20±0.20	2.50±0.20	2.30±0.20	0.58±0.10

Unit:mm

3. Part Numbering

APO	322523	N	V	-	470	M
A	B	C	D		E	F

A: Series

B: Dimension

C: Application

D: Category Code

E: Inductance

F: Inductance Tolerance

L x W x H

V=Vehicle

470=47.0uH

M=±20%

4. Specification

TAI-TECH Part Number	Ls(μH) (@1 MHz)	DCR (Ω) Max.	SRF (MHz min.)	Rated current(mA)			
				Isat(mA)	Based on temperature rise		
					Ambient temperature 85°C	Ambient temperature 105°C	Ambient temperature 125°C
APO322523NV-2R2M	2.2 ±20%	0.19	200	1000	1000	880	520
APO322523NV-2R7M	2.7 ±20%	0.22	200	975	975	860	510
APO322523NV-3R3M	3.3 ±20%	0.24	150	950	950	840	500
APO322523NV-4R7M	4.7 ±20%	0.28	100	850	850	720	400
APO322523NV-100M	10.0 ±20%	0.40	100	500	700	620	360
APO322523NV-220M	22.0 ±20%	0.62	50	400	550	500	280
APO322523NV-470M	47.0 ±20%	0.90	30	300	500	300	100

Note:

Isat: Applied the current to coils, the inductance change shall be less than 30% of initial value.

Ambient temperature (85°C/105°C): the part temperature (ambient temperature plus self-generation of heat) should be under 150°C.

Ambient temperature (125°C):the part temperature (ambient temperature plus self-generation of heat) should be under 150°C.

Winding Type Chip Inductor

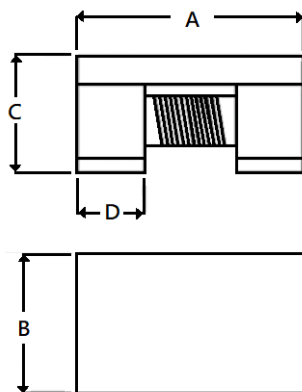
APO322530NV-SERIES

1. Features

1. Ferrite core wire wound construction.
2. High Reliability due to wire wound type construction.
3. Small footprint as well as low profile.
4. 100% Lead(Pb) & Halogen-Free and RoHS compliant.
5. High reliability -Reliability tests comply with AEC-Q200
6. Operating temperature-55~+150°C(Including self - temperature rise)
7. Inductor for use in-vehicle PoC (Power Over Coax)



2. Dimension



Size	A	B	C	D
APO322530	3.20±0.20	2.50±0.20	3.00±0.20	0.58±0.10

Unit:mm

3. Part Numbering



A: Series
 B: Dimension L x W x H
 C: Application
 D: Category Code V=Vehicle
 E: Inductance 220=22.0uH
 F: Inductance Tolerance M=±20%

4. Specification

Part number	Ls (μH) @100K/0.1V	DCR (Ohm)		SRF typ (MHz)	Isat(mA) Typ					Irms(mA) Typ		
		typ	max		25°C	85°C	105°C	125°C	140°C	25°C	85°C	125°C
APO322530NV-2R2M	2.2±20%	0.10	0.13	300	2200	1900	1700	1500	1300	1900	1730	1000
APO322530NV-6R8M	6.8±20%	0.20	0.24	120	1400	1000	930	800	700	1360	1230	800
APO322530NV-100M	10.0±20%	0.29	0.34	95	1100	850	760	660	560	1130	1020	570
APO322530NV-220M	22.0±20%	0.76	0.88	70	720	580	520	450	390	700	630	400

Note:

Maximum part temperature +140°C (ambient temperature plus self-generation of heat).

Winding Type Chip Inductor

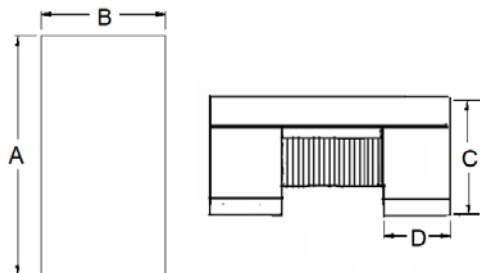
APO453235NV-SERIES

1. Features

1. Ferrite core wire wound construction.
2. High Reliability due to wire wound type construction.
3. Small footprint as well as low profile.
4. 100% Lead(Pb) & Halogen-Free and RoHS compliant.
5. High reliability -Reliability tests comply with AEC-Q200
6. Operating temperature-40~+125°C (Including self - temperature rise)
7. Inductor for use in-vehicle PoC (Power Over Coax)



2. Dimension



Size	A	B	C	D
APO453235	4.50±0.20	3.20±0.20	3.50±0.20	0.83±0.10

Unit:mm

3. Part Numbering

APO	453235	N	V	-	100	M
A	B	C	D		E	F

A: Series

B: Dimension

C: Application

D: Category Code

E: Inductance

F: Inductance Tolerance

L x W x H

V=Vehicle

100=10.0uH

M=±20%

4. Specification

TAI-TECH Part Number	Ls(μH) (@1 MHz)	DCR (Ω) Max.	SRF (MHz min.)	Rated current(mA)		
				Isat(mA)	Based on temperature rise	
					Ambient temperature 105°C	Ambient temperature 125°C
APO453235NV-100M	10±20%	0.13	60	1000	1000	710
APO453235NV-180M	18±20%	0.16	40	800	845	600
APO453235NV-220M	22±20%	0.18	30	700	700	500

Note:

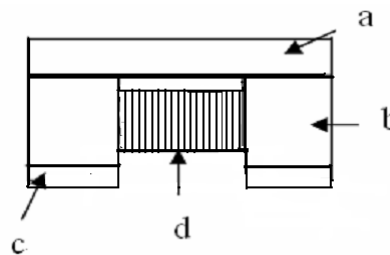
Isat: Applied the current to coils, the inductance change shall be less than 30% of initial value.

Ambient temperature (105°C): the part temperature (ambient temperature plus self-generation of heat) should be under 125°C.

Ambient temperature (125°C): the part temperature (ambient temperature plus self-generation of heat) should be under 130°C.

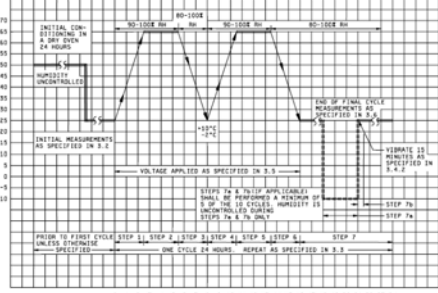
5. Materials

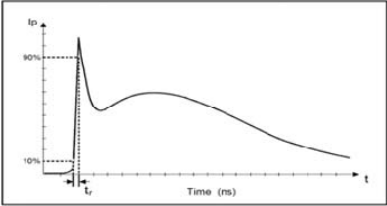
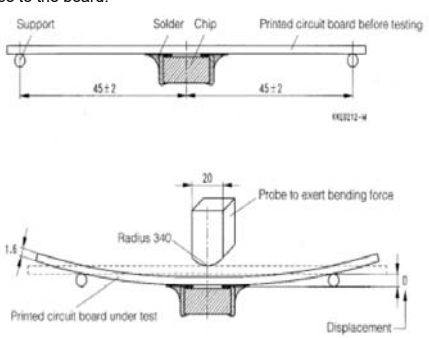
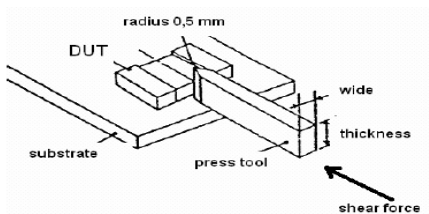
No.	Description	Specification
a.	Upper plate	Ferrite
b.	Core	Ferrite Core
c.	Termination	Ag/Ni/Sn
d.	Wire	Enameled Copper Wire



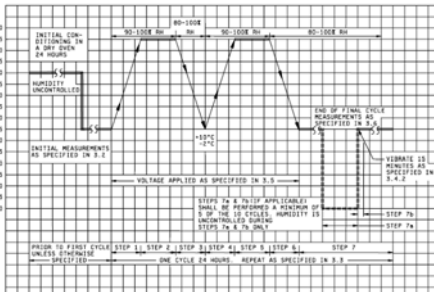
6. Reliability and Test Condition (APO453235)

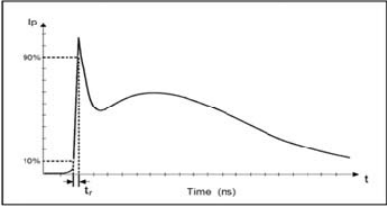
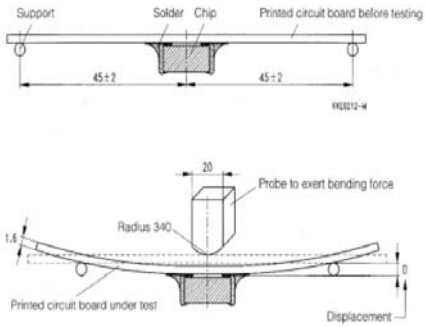
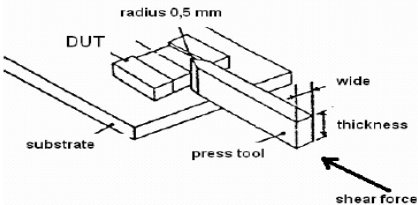
Item	Performance	Test Condition
Operating temperature	-40~+125°C (Including self - temperature rise)	
Storage temperature	-40~+125°C (on board)	
Electrical Performance Test		
Inductance L	Refer to standard electrical characteristic list	Agilent E4991A , Keysight E4991B ,Keysight 4980AL Agilent-4287, Agilent-4285
DC Resistance		Agilent-34420A Agilent-4338B
Isat	$\Delta L \leq 30\%$	Applied the current to coils, the inductance change shall be less than 30% to initial value.
Irms	$\Delta T \leq 40^\circ\text{C}$	Heat Rated Current (Irms) will cause the coil temperature rise $\Delta T(^{\circ}\text{C})$ without core loss. 1.Applied the allowed DC current. 2.Temperature measured by digital surface thermometer

Reliability Test																			
High Temperature Exposure(Storage) AEC-Q200			Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles Temperature : 125±2℃ Duration : 1000hrs Min. Measured at room temperature after placing for 24±4 hrs.																
Temperature Cycling AEC-Q200			Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles Condition for 1 cycle Step1 : -40±2℃ 30min Min. Step2 : 125±2℃ transition time 1min MAX. Step3 : 125±2℃ 30min Min. Step4 : Low temp. Transition time 1min MAX. Number of cycles : 1000 Measured at room temperature after placing for 24±4 hrs.																
Moisture Resistance (AEC-Q200)	Appearance : No damage. Inductance : within±10% of initial value RDC : within ±15% of initial value and shall not exceed the specification value		t=24 hours/cycle. Note: Steps 7a & 7b not required. Unpowered. Measurement at 24±2 hours after test conclusion. 																
Biased Humidity (AEC-Q200)			Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles Humidity : 85±3% R.H, Temperature : 85℃±2℃ Duration: 1000hrs Min. Measured at room temperature after placing for24±4hrs																
High Temperature Operational Life (AEC-Q200)			Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles Temperature : 125±2℃ Duration : 1000hrs Min. with 100% rated current. Measured at room temperature after placing for24±4hrs																
External Visual	Appearance : No damage.		Inspect device construction, marking and workmanship. Electrical Test not required.																
Physical Dimension	According to the product specification size measurement		According to the product specification size measurement																
Resistance to Solvents	Appearance : No damage.		Add aqueous wash chemical - OKEM clean or equivalent.																
Mechanical Shock	Appearance : No damage. Inductance : within±10% of initial value RDC : within ±15% of initial value and shall not exceed the specification value		<table><tr><th>Type</th><th>Peak value (g's)</th><th>Normal duration (D) (ms)</th><th>Wave form</th><th>Velocity change (Vi)ft/sec</th></tr><tr><td>SMD</td><td>100</td><td>6</td><td>Half-sine</td><td>12.3</td></tr><tr><td>Lead</td><td>100</td><td>6</td><td>Half-sine</td><td>12.3</td></tr></table> 3 shocks in each direction along 3 perpendicular axes. (18 shocks).		Type	Peak value (g's)	Normal duration (D) (ms)	Wave form	Velocity change (Vi)ft/sec	SMD	100	6	Half-sine	12.3	Lead	100	6	Half-sine	12.3
Type	Peak value (g's)	Normal duration (D) (ms)	Wave form	Velocity change (Vi)ft/sec															
SMD	100	6	Half-sine	12.3															
Lead	100	6	Half-sine	12.3															

Item	Performance	Test Condition								
Vibration	Appearance : No damage. Inductance : within±10% of initial value. RDC : within ±15% of initial value and shall not exceed the specification value	IPC/JEDEC J-STD-020E Classification Reflow Profiles Oscillation Frequency:10Hz~2KHz~10Hz for 20 minute Equipment : Vibration checker Total Amplitude:5g Testing Time : 12 hours(20 minutes, 12 cycles each of 3 orientations) °								
Resistance to Soldering Heat		Test condition : <table><tr><th>Temperature(°C)</th><th>Time(s)</th><th>Temperature ramp/immersion and emersion rate</th><th>Number of heat cycles</th></tr><tr><td>260 ±5 (solder temp)</td><td>10 ±1</td><td>25mm/s ±6 mm/s</td><td>1</td></tr></table>	Temperature(°C)	Time(s)	Temperature ramp/immersion and emersion rate	Number of heat cycles	260 ±5 (solder temp)	10 ±1	25mm/s ±6 mm/s	1
Temperature(°C)		Time(s)	Temperature ramp/immersion and emersion rate	Number of heat cycles						
260 ±5 (solder temp)	10 ±1	25mm/s ±6 mm/s	1							
Thermal shock (AEC-Q200)	Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles Condition for 1 cycle Step1 : -40±2℃ 15±1min Step2 : 125±2℃ within 20Sec. Step3 : 125±2℃ 15±1min Number of cycles : 300 Measured at room temperature after placing fo24±4hrs									
ESD	Appearance : No damage.	 Direct Contact and Air Discharge PASSIVE COMPONENT HBM ESD Discharge Waveform to a Coaxial Target Test method: AEC-Q200-002 Test mode : Contact Discharge Discharge level : 4 KV (Level: 2)								
Solderability	More than 95% of the terminal electrode should be covered with solder °	a. Method B, 4 hrs @155°C dry heat @235°C±5°C Testing Time :5 +0/-0.5 seconds b. Method D category 3. (8hours ± 15 min)@ 260°C±5°C Testing Time :30 +0/-0.5 seconds								
Electrical Characterization	Refer Specification for Approval	Summary to show Min, Max, Mean and Standard deviation.								
Flammability	Electrical Test not required.	V-0 or V-1 are acceptable.								
Board Flex	Appearance : No damage	Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles Place the 100mm X 40mm board into a fixture similar to the one shown in below Figure with the component facing down. The apparatus shall consist of mechanical means to apply a force which will bend the board (D) x = 2 mm minimum. The duration of the applied forces shall be 60 (+ 5) sec. The force is to be applied only once to the board. 								
Terminal Strength(SMD)	Appearance : No damage	Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles With the component mounted on a PCB with the device to be tested, apply a 17.7 N (1.8 Kg) force 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 apply a shock to the component being tested. 								

6. Reliability and Test Condition (APO201216/APO322523/APO322530)

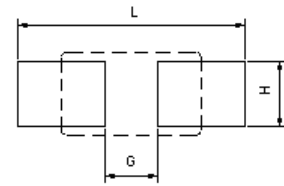
Item	Performance	Test Condition															
Operating temperature	-55~+150℃ (Including self - temperature rise)																
Storage temperature	-55~+125℃ (on board)																
Electrical Performance Test																	
Inductance L	Refer to standard electrical characteristic list	Agilent E4991A , Keysight E4991B ,Keysight 4980AL Agilent-4287, Agilent-4285															
DC Resistance		Agilent-34420A Agilent-4338B															
Isat	ΔL≤30%	Applied the current to coils, the inductance change shall be less than 30% to initial value.															
Irms	ΔT≤40℃	Heat Rated Current (Irms) will cause the coil temperature rise ΔT(℃) without core loss. 1.Applied the allowed DC current. 2.Temperature measured by digital surface thermometer															
Reliability Test																	
High Temperature Exposure(Storage) AEC-Q200	Appearance : No damage. Inductance : within±10% of initial value RDC : within ±15% of initial value and shall not exceed the specification value	Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles Temperature : 150±2℃ Duration : 1000hrs Min. Measured at room temperature after placing for 24±4 hrs.															
Temperature Cycling AEC-Q200		Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles Condition for 1 cycle Step1 : -55±2℃ 30min Min. Step2 : 150±2℃ transition time 1min MAX. Step3 : 150±2℃ 30min Min. Step4 : Low temp. Transition time 1min MAX. Number of cycles : 1000 Measured at room temperature after placing for 24±4 hrs.															
Moisture Resistance (AEC-Q200)		t=24 hours/cycle. Note: Steps 7a & 7b not required. Unpowered. Measurement at 24±2 hours after test conclusion. 															
Biased Humidity (AEC-Q200)		Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles Humidity : 85±3% R.H, Temperature : 85℃±2℃ Duration: 1000hrs Min. Measured at room temperature after placing for24±4hrs															
High Temperature Operational Life (AEC-Q200)		Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles Temperature : 150±2℃ Duration : 1000hrs Min. with 100% rated current. Measured at room temperature after placing for24±4hrs															
External Visual	Appearance : No damage.	Inspect device construction, marking and workmanship. Electrical Test not required.															
Physical Dimension	According to the product specification size measurement	According to the product specification size measurement															
Resistance to Solvents	Appearance : No damage.	Add aqueous wash chemical - OKEM clean or equivalent.															
Mechanical Shock	Appearance : No damage. Inductance : within±10% of initial value RDC : within ±15% of initial value and shall not exceed the specification value	<table><tr><th>Type</th><th>Peak value (g's)</th><th>Normal duration (D) (ms)</th><th>Wave form</th><th>Velocity change (Vi)ft/sec</th></tr><tr><td>SMD</td><td>100</td><td>6</td><td>Half-sine</td><td>12.3</td></tr><tr><td>Lead</td><td>100</td><td>6</td><td>Half-sine</td><td>12.3</td></tr></table> 3 shocks in each direction along 3 perpendicular axes. (18 shocks).	Type	Peak value (g's)	Normal duration (D) (ms)	Wave form	Velocity change (Vi)ft/sec	SMD	100	6	Half-sine	12.3	Lead	100	6	Half-sine	12.3
Type	Peak value (g's)	Normal duration (D) (ms)	Wave form	Velocity change (Vi)ft/sec													
SMD	100	6	Half-sine	12.3													
Lead	100	6	Half-sine	12.3													

Item	Performance	Test Condition								
Vibration		IPC/JEDEC J-STD-020E Classification Reflow Profiles Oscillation Frequency:10Hz~2KHz~10Hz for 20 minute Equipment : Vibration checker Total Amplitude:5g Testing Time : 12 hours(20 minutes, 12 cycles each of 3 orientations) °								
Resistance to Soldering Heat	Appearance : No damage. Inductance : within±10% of initial value. RDC : within ±15% of initial value and shall not exceed the specification value	Test condition : <table><tr><th>Temperature(°C)</th><th>Time(s)</th><th>Temperature ramp/immersion and emersion rate</th><th>Number of heat cycles</th></tr><tr><td>260 ±5 (solder temp)</td><td>10 ±1</td><td>25mm/s ±6 mm/s</td><td>1</td></tr></table>	Temperature(°C)	Time(s)	Temperature ramp/immersion and emersion rate	Number of heat cycles	260 ±5 (solder temp)	10 ±1	25mm/s ±6 mm/s	1
Temperature(°C)	Time(s)	Temperature ramp/immersion and emersion rate	Number of heat cycles							
260 ±5 (solder temp)	10 ±1	25mm/s ±6 mm/s	1							
Thermal shock (AEC-Q200)		Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles Condition for 1 cycle Step1 : -55±2℃ 15±1min Step2 : 150±2℃ within 20Sec. Step3 : 150±2℃ 15±1min Number of cycles : 300 Measured at room temperature after placing fo24±4hrs								
ESD	Appearance : No damage.	 Direct Contact and Air Discharge PASSIVE COMPONENT HBM ESD Discharge Waveform to a Coaxial Target Test method: AEC-Q200-002 Test mode : Contact Discharge Discharge level : 4 KV (Level: 2)								
Solderability	More than 95% of the terminal electrode should be covered with solder °	a. Method B, 4 hrs @155°C dry heat @235°C±5°C Testing Time :5 +0/-0.5 seconds b. Method D category 3. (8hours ± 15 min)@ 260°C±5°C Testing Time :30 +0/-0.5 seconds								
Electrical Characterization	Refer Specification for Approval	Summary to show Min, Max, Mean and Standard deviation.								
Flammability	Electrical Test not required.	V-0 or V-1 are acceptable.								
Board Flex	Appearance : No damage	Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles Place the 100mm X 40mm board into a fixture similar to the one shown in below Figure with the component facing down. The apparatus shall consist of mechanical means to apply a force which will bend the board (D) x = 2 mm minimum. The duration of the applied forces shall be 60 (+ 5) sec. The force is to be applied only once to the board. 								
Terminal Strength(SMD)	Appearance : No damage	Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles With the component mounted on a PCB with the device to be tested, apply a 17.7 N (1.8 Kg) force 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 apply a shock to the component being tested. 								

7. Soldering and Mounting

7-1. Recommended PC Board Pattern

Land Patterns For Reflow Soldering								
Series	Type	A(mm)	B(mm)	C(mm)	D(mm)	L(mm)	G(mm)	H(mm)
APO	201216	2.00±0.20	1.20±0.20	1.60±0.20	0.48±0.10	2.42	1.10	1.20
APO	322523	3.20±0.20	2.50±0.20	2.30±0.20	0.58±0.10	3.80	2.20	2.80
APO	322530	3.20±0.20	2.50±0.20	3.0±0.2.0	0.58±0.10	3.80	2.20	2.80
APO	453235	4.50±0.20	3.20±0.20	3.50±0.20	0.83±0.10	4.90	3.00	3.25



7-2. Soldering

Mildly activated rosin fluxes are preferred. TAI-TECH 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.

7-2.1 Soldering Reflow:

Recommended temperature profiles for lead free re-flow soldering in Figure 1. Table 1.1&1.2 (J-STD-020E)

7-2.2 Soldering Iron:

Products attachment with a soldering iron is discouraged due to the inherent process control limitations. In the event that a soldering iron must be employed the following precautions are recommended. (Figure 2.)

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

Fig.1 Soldering Reflow

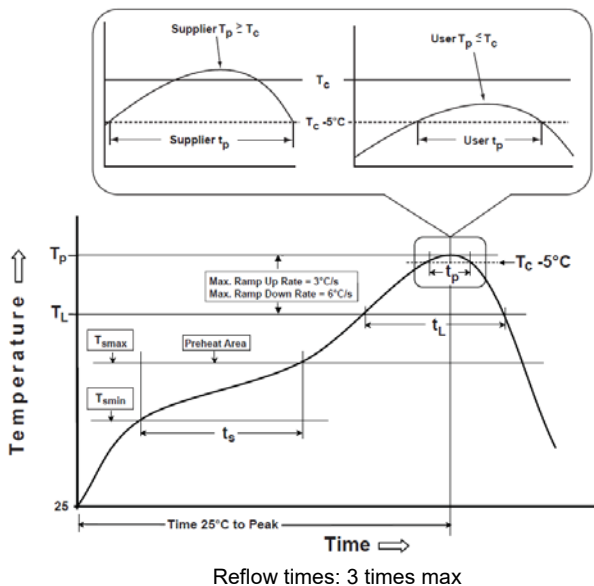


Fig.2 Iron soldering temperature profiles

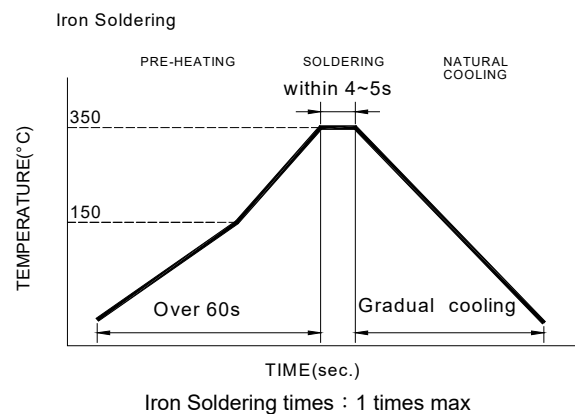


Table (1.1): Reflow Profiles

Profile Type:	Pb-Free Assembly
Preheat -Temperature Min(T_{smin}) -Temperature Max(T_{smax}) -Time(t_s)from(T_{smin} to T_{smax})	150°C 200°C 60-120seconds
Ramp-up rate(T_L to T_p)	3°C /second max.
Liquidus temperature(T_L) Time(t_L)maintained above T_L	217°C 60-150 seconds
Classification temperature(T_c)	See Table (1.2)
Time(t_p) at $T_c - 5^\circ\text{C}$ (T_p should be equal to or less than T_c .)	< 30 seconds
Ramp-down rate(T_p to T_L)	6°C /second max.
Time 25°C to peak temperature	8 minutes max.

T_p : maximum peak package body temperature, T_c : the classification temperature.

For user (customer) T_p should be equal to or less than T_c .

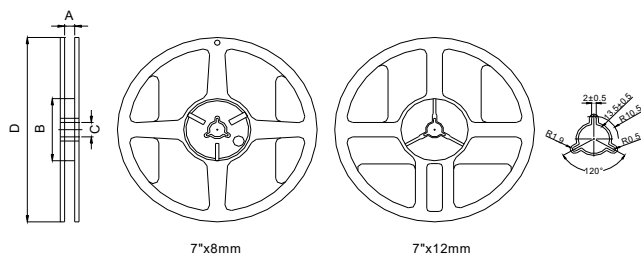
Table (1.2) Package Thickness/Volume and Classification Temperature (T_c)

	Package Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ >2000
PB-Free Assembly	<1.6mm	260°C	260°C	260°C
	1.6-2.5mm	260°C	250°C	245°C
	≥2.5mm	250°C	245°C	245°C

Reflow is referred to standard IPC/JEDEC J-STD-020E .

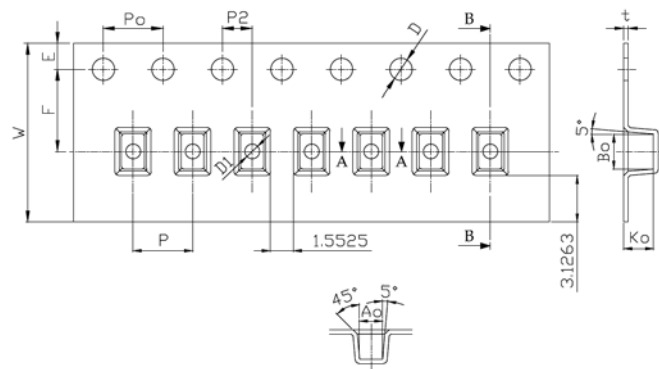
8. Packaging Information

8-1. Reel Dimension



Type	A(mm)	B(mm)	C(mm)	D(mm)
7"x12mm	13.5±0.5	60.0±2.0	13.5±0.5	178.0±2.0

8-2. Tape Dimension / 12mm

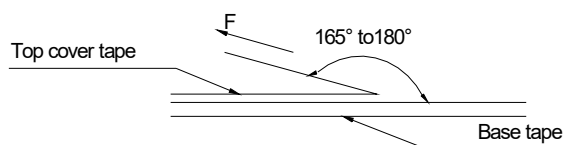


Series	Size	W(mm)	P(mm)	E(mm)	F(mm)	P2(mm)	D(mm)	D1(mm)	Po(mm)	Ao(mm)	Bo(mm)	Ko(mm)	t(mm)
APO	201216	12.00±0.3	4.00±0.1	1.75±0.1	5.50±0.1	2.00±0.1	1.5+0.1/-0.0	1.0±0.10	4.00±0.1	1.55±0.1	2.35±0.1	1.80±0.1	0.30±0.05

8-3. Packaging Quantity

Chip size	Chip / Reel	Inner box	Middle box	Carton
APO201216N	2000	8000	40000	80000

8-4. Tearing Off Force



The force for tearing off cover tape is 15 to 80 grams in the arrow direction under the following conditions.

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

Application Notice

• Storage Conditions(component level)

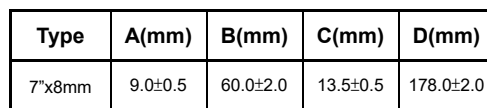
To maintain the solderability of terminal electrodes:

1. TAI-TECH products meet IPC/JEDEC J-STD-020E standard-MSL, level 1.
2. Temperature and humidity conditions: Less than 40°C 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.

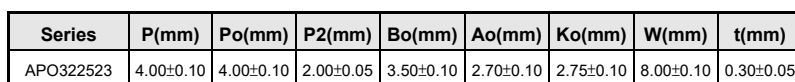
• Transportation

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.

8-1. Reel Dimension



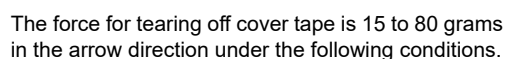
8-2. Tape Dimension / 8mm



8-3. Packaging Quantity

APO	322523
Chip / Reel	1500
Reel Size	7"x8mm

8-4. Tearing Off Force

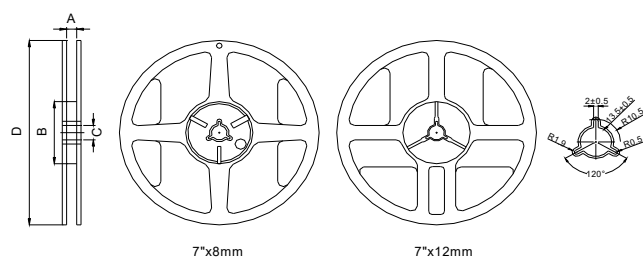


Room Temp. (°C)	Room Humidity (%)	Room atm (hPa)	Tearing Speed mm/min
5~35	45~85	860~1060	300

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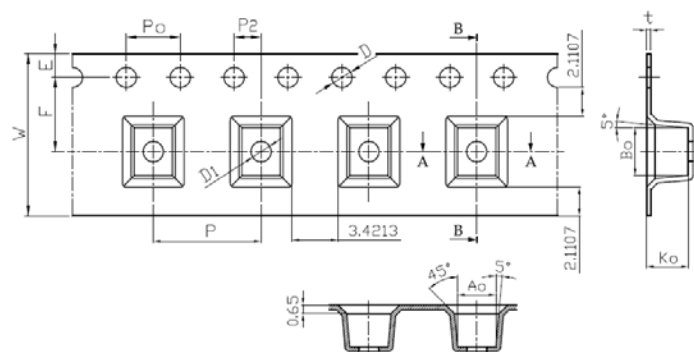
8. Packaging Information

8-1. Reel Dimension



Type	A(mm)	B(mm)	C(mm)	D(mm)
7"x12mm	13.5±0.5	60.0±2.0	13.5±0.5	178.0±2.0

8-2. Tape Dimension / 12mm

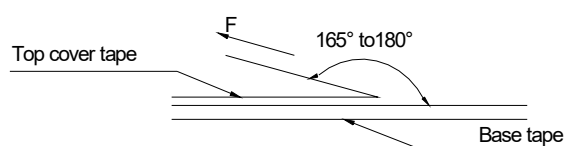


Series	Size	W(mm)	P(mm)	E(mm)	F(mm)	P2(mm)	D(mm)	D1(mm)	Po(mm)	Ao(mm)	Bo(mm)	Ko(mm)	t(mm)
APO	322530	12.00±0.1	8.00±0.1	1.75±0.1	5.50±0.1	2.00±0.1	1.5+0.1/-0	1.5±0.10	4.00±0.1	2.85±0.1	3.55±0.1	3.10±0.1	0.35±0.05

8-3. Packaging Quantity

Chip size	Chip / Reel	Inner box	Middle box	Carton
APO322530N	500	2000	10000	20000

8-4. Tearing Off Force



The force for tearing off cover tape is 15 to 80 grams in the arrow direction under the following conditions.

Room Temp. (°C)	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 solderability of terminal electrodes:

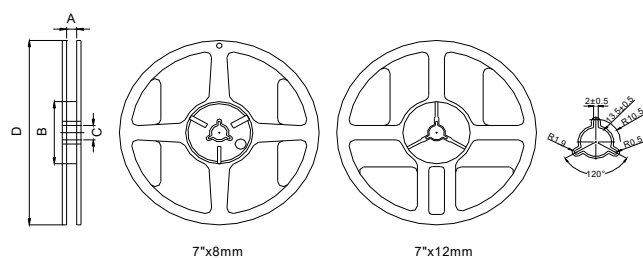
1. TAI-TECH products meet IPC/JEDEC J-STD-020E standard-MSL, level 1.
2. Temperature and humidity conditions: Less than 40°C and 60% RH.
3. Recommended products should be used within 12 months from the time of delivery.
4. The packaging material should be kept where no chlorine or sulfur exists in the air.

• Transportation

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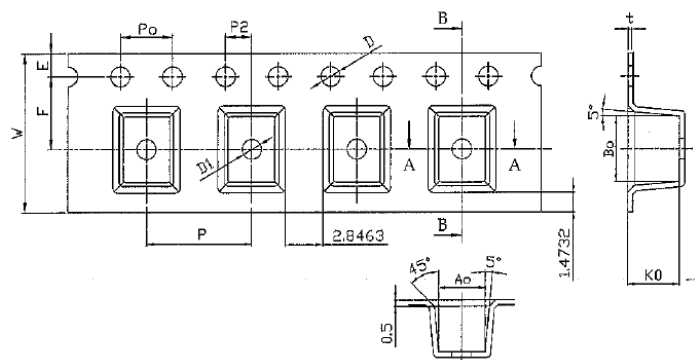
8. Packaging Information

8-1. Reel Dimension



Type	A(mm)	B(mm)	C(mm)	D(mm)
7"x12mm	13.5±0.5	60.0±2.0	13.5±0.5	178.0±2.0

8-2. Tape Dimension / 12mm

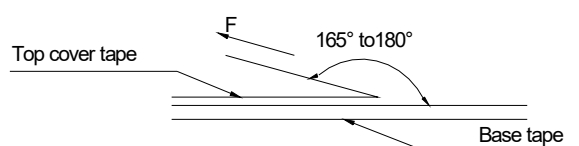


Series	Size	W(mm)	P(mm)	E(mm)	F(mm)	P2(mm)	D(mm)	D1(mm)	Po(mm)	Ao(mm)	Bo(mm)	Ko(mm)	t(mm)
APO	453235	12.00±0.3	8.00±0.1	1.75±0.1	5.50±0.1	2.00±0.1	1.5+0.1/-0.0	1.5±0.10	4.00±0.1	3.55±0.1	4.95±0.1	3.95±0.1	0.40±0.05

8-3. Packaging Quantity

Chip size	Chip / Reel	Inner box	Middle box	Carton
APO453235N	500	2000	10000	20000

8-4. Tearing Off Force



The force for tearing off cover tape is 15 to 80 grams in the arrow direction under the following conditions.

Room Temp. (°C)	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 solderability of terminal electrodes:

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