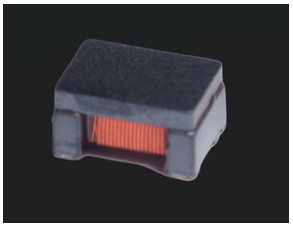
NTX Series
SMT LAN Transformers

ROHS/REACH COMPLIANT HALOGEN FREE

9001:2015 CERTIFIED

NIC Components Corp.

FEATURES
- SMT type pulse transformers
- Small size and low profile
- Excellent noise suppression performance
- High common mode impedance at high frequencies
- 10/100/1G BASE-T, 2.5G/5G, 10G BASE-T speeds
- 100% Lead (Pb) & Halogen-Free and RoHS compliant
- Power over ethernet supported (PoE, PoE+, PoE++)



RoHS Compliant
Includes all homogeneous materials

TYPICAL CHARACTERISTICS

*See Part Number System for Details

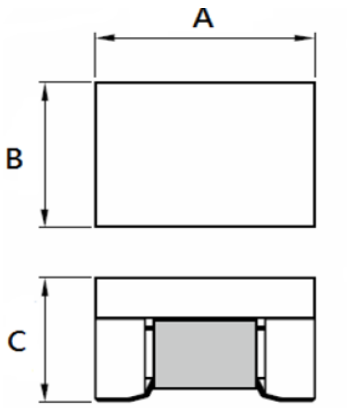
PART NUMBER SYSTEM

NTX F 1210 N 351 P0 TR F

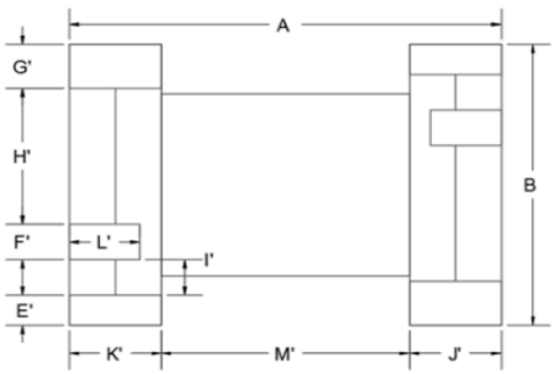
- F: RoHS Compliant
- TR: Packaging: TR = Tape & Reel
- P0: Blank= Non-PoE P0 = PoE, P1 = PoE+, P2 = PoE++
- 351: Inductance Code (µH): 1st two digits are significant; 3rd digit is multiplier for values 10 µH and up.
- N: Material
- 1210: Size Code 1210= 3.5mm x 3.2mm, 1812 = 4.5mm x 3.2
- F: F = 10/100/1G Base-T, H = 2.5/5G Base-T, G = 1G, 2.5/5G Base-T, S = 1G, 2.5/5G 10G Base-T, L = 10/100/1G Base-T, 7 Pins
- NTX: Series Name

NTX DIMENSIONS (mm)

Case Code	A ±0.20	B ±0.20	C max	E[1] ±0.06	F' ±0.06	G' ±0.06	H' ±0.10	I' ±0.10	J' ±0.06	K' ±0.10	L' ±0.06	M' ±0.10
NTX1210	3.50	3.20	2.90	0.40	0.43	0.61	1.50	0.26	0.72	0.72	0.57	2.06
NTX1812	4.60	3.25	2.90	0.45	0.47	0.60	1.43	0.25	0.25	1.00	0.8	2.70



Dimensions in mm



Top View

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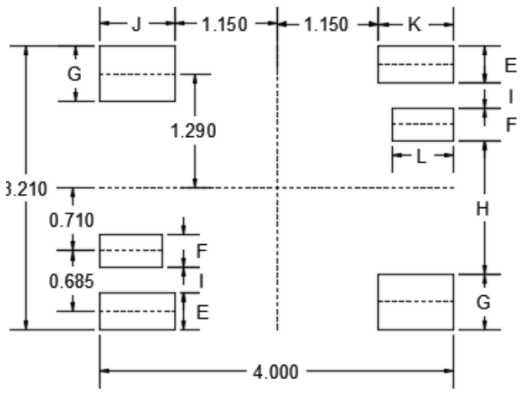
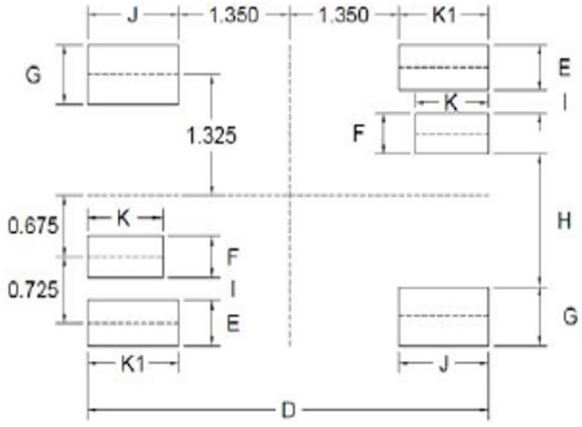
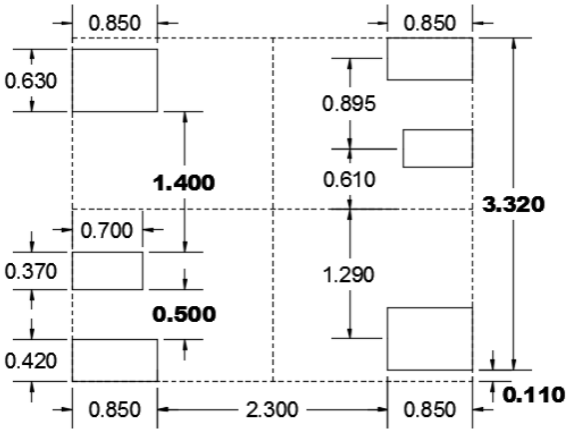
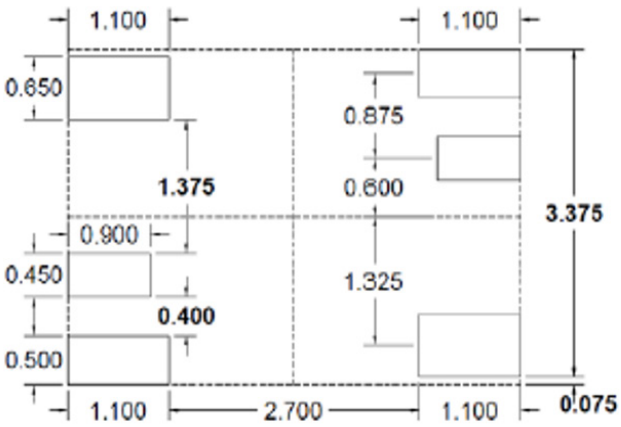
RECOMMENDED PC BOARD PATTERNS





SOLDER PASTE STENCIL APERTURE RECOMENDATION

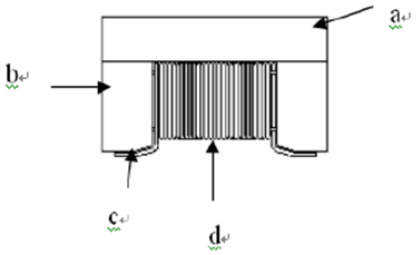




Case Code	D	E	F	G	H	I	J	K	L
NTXP1210	4.00	0.42	0.37	0.63	1.5	0.29	0.85	0.85	0.70
NTXP1812	4.90	0.50	0.45	0.65	1.45	0.25	1.10	0.90	1.10

MATERIALS

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



ELECTRICAL SPECIFICATIONS

Part Number	Speed	Inductance (uH) DC BIAS 0mA 1 to 2 or 4 to 5	Test Frequency (Hz/V)	Insertion Loss (Max)	Capacitance (pF) 3 to 6	Turns ratio 1 to 2 or 4 to 5	HI-POT 1, 2, 6 to 4,5,3
NTXF1210N121TRF	10/100,1G Base-T	120 (Min)	100K/0.1	1-100MHz-1.0dB	35pF (Typ)	1:1	AC 1.5KV 60SEC
NTXF1210N181TRF		180 (Min)	100K/0.1	1-100MHz-1.0dB	35pF (Typ)	1:1	AC 1.5KV 60SEC
NTXF1812N121TRF		120 (Min)	100K/0.1	1-125MHz-1.5dB	35pF (Typ)	1:1	AC 1.5KV 60SEC
NTXF1812N181TRF		180 (Min)	100K/0.1	1-125MHz-1.5dB	35pF (Typ)	1:1	AC 1.5KV 60SEC
NTXF1812N381TRF		380 (Min)	100K/0.1	1-125MHz-1.5dB	35pF (Typ)	1:1	AC 1.5KV 60SEC
NTXL1812N181TRF		180 (Min)	100K/0.1	1-100MHZ-1.0dB	35pF (Typ)	1:1	AC 1.5KV 60SEC
NTXL1812N231TRF		230 (Min)	100K/0.1	1-100MHZ-1.5dB	35pF (Typ)	1:1	AC 1.5KV 60SEC
NTXL1812N381TRF		380 (Min)	100K/0.1	1-100MHZ-1.5dB	35pF (Typ)	1:1	AC 1.5KV 60SEC
NTXG1812N121TRF	1G, 2.5/5G Base-T	120 (Min)	100K/0.1	1-125MHz-1.5dB	35pF (Typ)	1:1	AC 1.5KV 60SEC
NTXG1812N181TRF		180 (Min)	100K/0.1	1-125MHz-1.5dB	35pF (Typ)	1:1	AC 1.5KV 60SEC
NTXS1210N121TRF	1G, 2.5/5G, 10G Base-T	120 (Min)	100K/0.1	1-500MHz-3.5dB	35pF (Typ)	1:1	AC 1.5KV 60SEC
NTXS1812N101TRF		100 (Min)	100K/0.1	-2.0 Typ, -2.5 Max	35pF (Typ)	1:1	AC 1.5KV 60SEC
NTXS1812N121TRF		120 (Min)	100K/0.1	1-125MHz-1.5dB	35pF (Typ)	1:1	AC 1.5KV 60SEC

Part Number	Speed	Inductance (uH) DC BIAS 0mA 1 to 2 or 4 to 5	Test Frequency (Hz/V)	Insertion Loss (Max)	Capacitance (pF) 3 to 6	HI-POT 1, 2, 6 to 4,5,3	POE Rated Current mA (MAX)
NTXF1210N121P0TRF	10/100,1G Base-T	120 (Min)	100K/0.1	1-100MHz-1.0dB	35pF (MAX)	AC 1.5KV 60SEC	350
NTXF1210N181P0TRF		180 (Min)	100K/0.1	1-100MHz-1.0dB	35pF (MAX)	AC 1.5KV 60SEC	350
NTXF1210N121P1TRF		120 (Min)	100K/0.1	1-100MHz-1.0dB	35pF (MAX)	AC 1.5KV 60SEC	600
NTXF1812N121P0TRF		120 (Min)	100K/0.1	1-125MHz-1.5dB	35pF (Typ)	AC 1.5KV 60SEC	350
NTXF1812N181P0TRF		180 (Min)	100K/0.1	1-125MHz-1.5dB	35pF (Typ)	AC 1.5KV 60SEC	350
NTXF1812N381P0TRF		380 (Min)	100K/0.1	1-125MHz-1.5dB	35pF (Typ)	AC 1.5KV 60SEC	350
NTXF1812N121P1TRF		120 (Min)	100K/0.1	1-125MHz-1.5dB	35pF (Typ)	AC 1.5KV 60SEC	600
NTXF1812N181P1TRF		180 (Min)	100K/0.1	1-125MHz-1.5dB	35pF (Typ)	AC 1.5KV 60SEC	720
NTXF1812N121P2TRF		120 (Min)	100K/0.1	1-100MHz-1.5dB	35pF (Typ)	AC 1.5KV 60SEC	1000

Turns Ratio (1 to 2 or 4 to 5): 1:1

ELECTRICAL SPECIFICATIONS

Part Number	Speed	Inductance (uH) DC BIAS 0mA 1 to 2 or 4 to 5	Test Frequency (Hz/V)	Insertion Loss (Max)	Capacitance (pF) 3 to 6	HI-POT 1, 2, 6 to 4,5,3	POE Rated Current mA (MAX)
NTXG1210N121P0TRF	1G, 2.5/5G Base-T	120 (Min)	100K/0.1	1-125MHz-1.5dB	35pF (MAX)	AC 1.5KV 60SEC	350
NTXG1210N181P0TRF		180 (Min)	100K/0.1	1-125MHz-1.5dB	35pF (MAX)	AC 1.5KV 60SEC	350
NTXG1210N121P1TRF		120 (Min)	100K/0.1	1-125MHz-1.5dB	35pF (MAX)	AC 1.5KV 60SEC	600
NTXG1812N121P0TRF		120 (Min)	100K/0.1	1-100MHz-1.5dB	35pF (Typ)	AC 1.5KV 60SEC	350
NTXG1812N181P0TRF		180 (Min)	100K/0.1	1-100MHz-1.5dB	35pF (Typ)	AC 1.5KV 60SEC	350
NTXG1812N121P1TRF		120 (Min)	100K/0.1	1-100MHz-1.5dB	35pF (Typ)	AC 1.5KV 60SEC	600
NTXG1812N181P1TRF		180 (Min)	100K/0.1	1-100MHz-1.5dB	35pF (Typ)	AC 1.5KV 60SEC	720
NTXG1812N121P2TRF		120 (Min)	100K/0.1	1-125MHz-1.5dB	35pF (Typ)	AC 1.5KV 60SEC	1000
NTXS1210N121P0TRF	1G, 2.5/5G, 10G Base-T	120 (Min)	100K/0.1	1-500MHz-3.5dB	35pF (MAX)	AC 1.5KV 60SEC	350
NTXS1210N121P1TRF		120 (Min)	100K/0.1	1-500MHz-3.5dB	35pF (MAX)	AC 1.5KV 60SEC	600
NTXS1812N101P1TRF		100 (Min)	100K/0.1	-2.0 Typ, -2.5 Max	35pF (MAX)	AC 1.5KV 60SEC	600
NTXS1812N101P0TRF		100 (Min)	100K/0.1	-2.0 Typ, -2.5 Max	35pF (Typ)	AC 1.5KV 60SEC	350
NTXS1812N101P2TRF		100 (Min)	100K/0.1	1-100MHz-1.5dB	35pF (Typ)	AC 1.5KV 60SEC	1000
NTXS1812N121P0TRF		120 (Min)	100K/0.1	-2.0 Typ -3.0 Max	35pF (Typ)	AC 1.5KV 60SEC	350
NTXS1812N121P1TRF		120 (Min)	100K/0.1	-2.0 Typ -3.0 Max	35pF (Typ)	AC 1.5KV 60SEC	600
NTXS1812N121P2TRF		120 (Min)	100K/0.1	-2.0 Typ -3.0 Max	35pF (Typ)	AC 1.5KV 60SEC	1000

Turns Ratio (1 to 2 or 4 to 5): 1:1

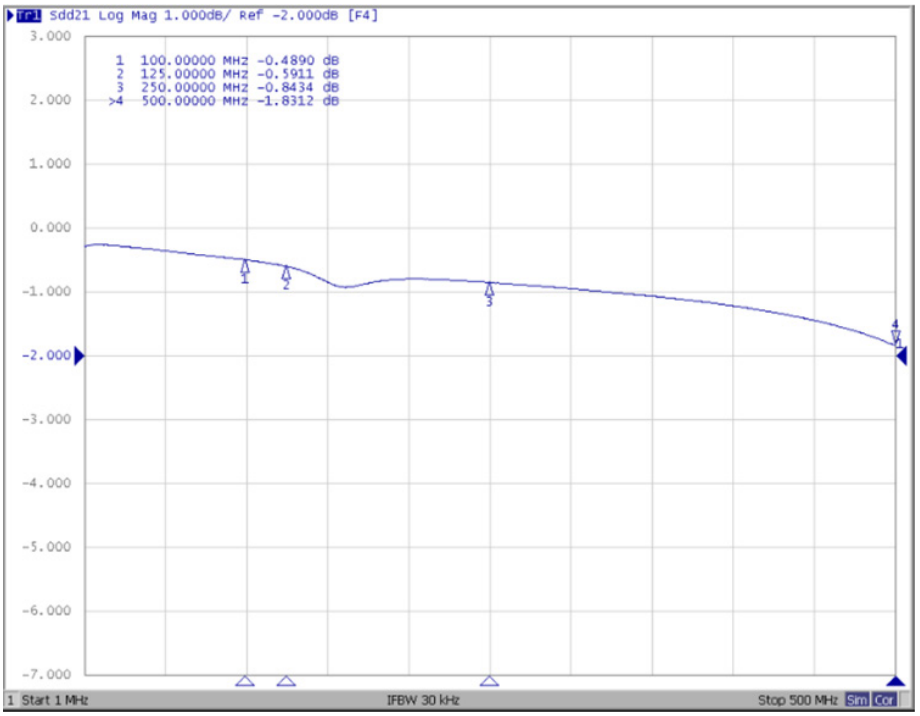
RELIABILITY AND TEST CONDITIONS CONT'D

<table>
<tr><th colspan="3">Reliability Tests</th></tr>
<tr><td>Operating Temperature</td><td>-40 °C ~+105°C (Including self-heating)</td><td></td></tr>
<tr><td>Storage Temperature</td><td>-40 °C ~+105 °C (on board)</td><td></td></tr>
<tr><td colspan="3">Electrical Performance Test</td></tr>
<tr><td>Ls</td><td rowspan="4">Refer to standard electrical characteristics list</td><td>Keysight –E4980AL+ Keysight t -16334A</td></tr>
<tr><td>Cs</td><td>Keysight –E4980AL+ Keysight t -16334A</td></tr>
<tr><td>Insertion Loss</td><td>Agilent E5071C</td></tr>
<tr><td>Return Loss</td><td>Agilent E5071C</td></tr>
<tr><td>Life Test</td><td rowspan="6">Appearance : No damage.
Inductance : within±10% of initial value Cp: within ±15% of initial value and shall not Insertion Loss : within Specification</td><td>Preconditioning: Run through IR reflow for 3 times.
(IPC/JEDEC J-STD-020E Classification Reflow Profiles)
Temperature : 105±2°C
Applied current : rated current
Duration : 1000±12hrs
Measured at room temperature after placing for 24 hrs.</td></tr>
<tr><td>Load Humidity</td><td>Preconditioning: Run through IR reflow for 3 times.
(IPC/JEDEC J-STD-020E Classification Reflow Profiles
Humidity : 85 °C ±3% R.H,
Temperature : 85°C ±2
Duration : 1000hrs Min. Bead : with 100% rated current : Inductance: with 10% rated current
Measured at room temperature after placing for 24 hrs.</td></tr>
<tr><td>Shock</td><td>
<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>50</td><td>11</td><td>Half-sine</td><td>11.3</td></tr>
<tr><td>Lead</td><td>50</td><td>11</td><td>Half-sine</td><td>11.3</td></tr>
</table>
3 shocks in each direction along 3 perpendicular axes. (18 shocks).
</td></tr>
<tr><td>Resistance to Soldering Heat</td><td>Depth: completely cover the termination</td></tr>
<tr><td>Terminal Strength</td><td>Preconditioning: Run through IR reflow for 3 times.
(IPC/JEDEC
J-STD-020E Classification Reflow Profiles

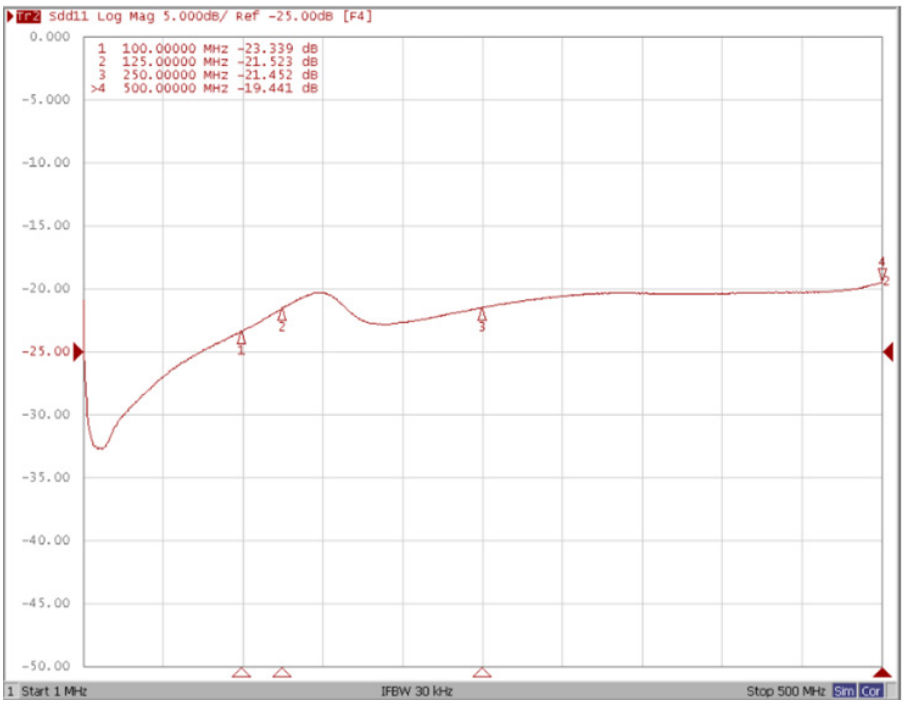
With the component mounted on a PCB with the device to be tested, apply a force (>0805:1kg, <=0805:0.5kg)to the side of a device being tested. This force shall be applied for 60 +1 seconds. Also, the force shall be applied gradually as not to apply a shock to the component being tested.</td></tr>
</table>

NTXP1812FN121TRF

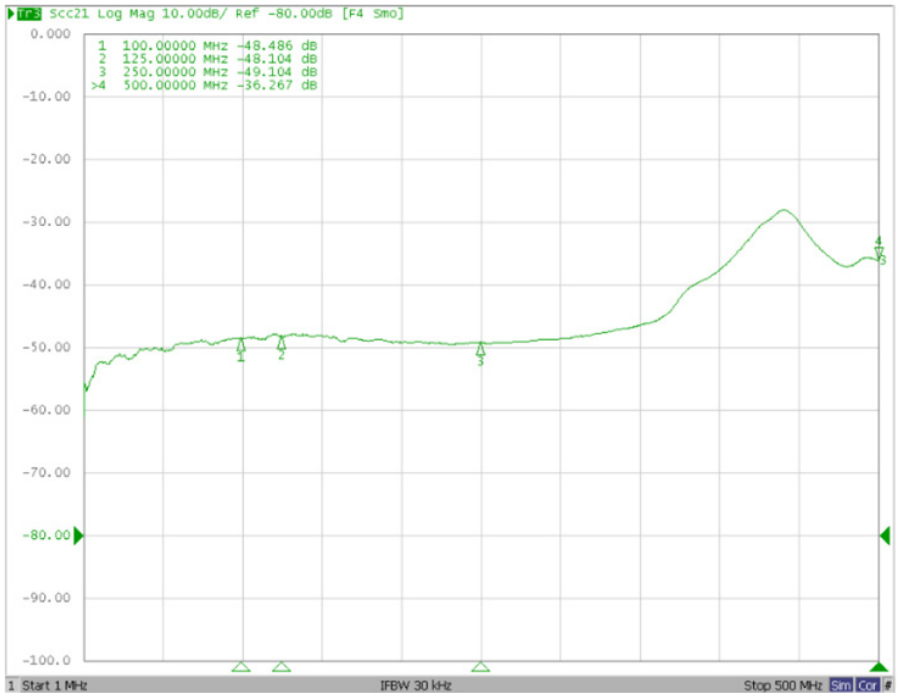
Insertion Loss



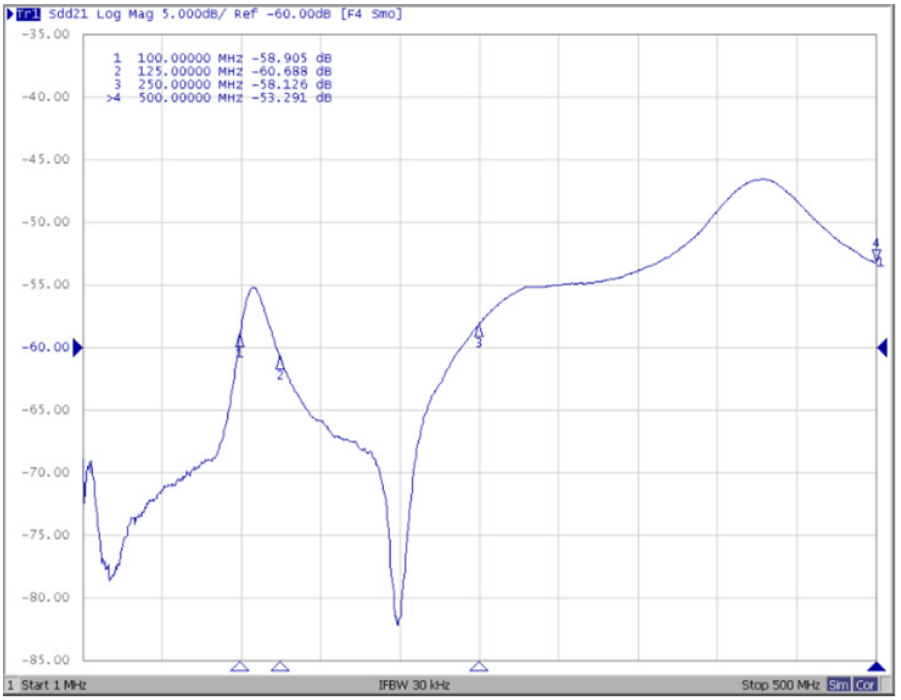
Return Loss



CMRR



Cross Talk



Note: Extended values, tolerances, and enhanced versions are available please contact NIC for more details.

Soldering and Mounting

Soldering

Mildly activated rosin fluxes are preferred. Component 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.

IR Soldering Reflow

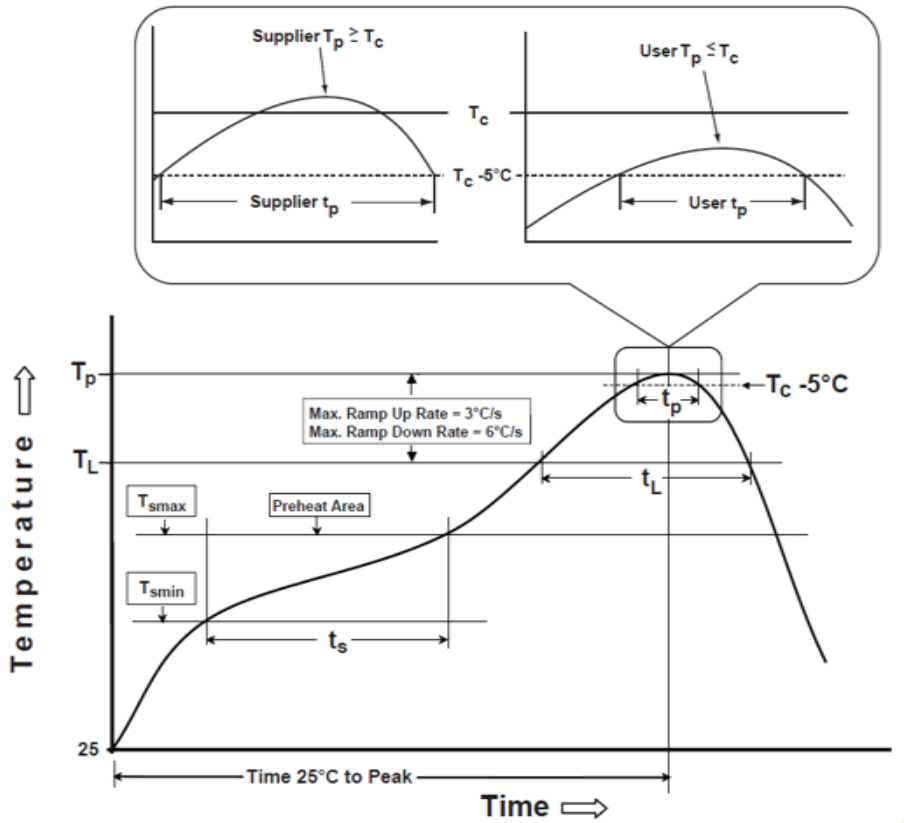
Recommended temperature profiles for lead free re-flow soldering in Figure 1. Table 1.1&1.2 (J-STD-020E)

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.)

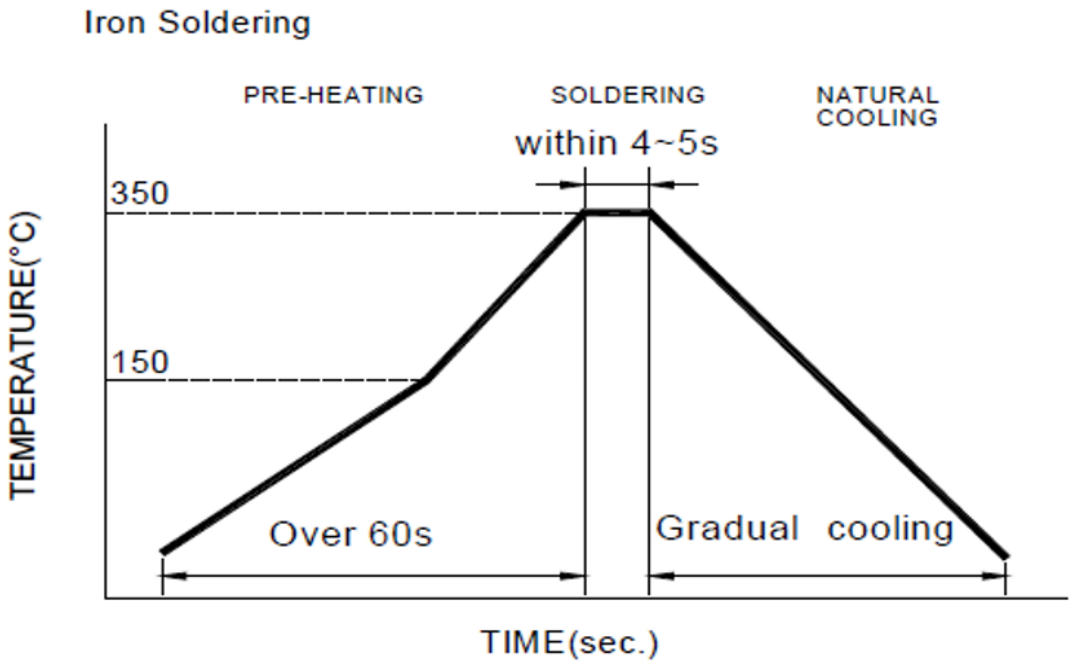
- Preheat circuit and products to 150°C
- 350 °C tip temperature (max)
- Never contact the ceramic with the iron tip
- 1.0mm tip diameter (max)
- Use a 20-watt soldering iron with tip diameter of 1.0mm
- Limit soldering time to 4~5sec.

Soldering Reflow / Reflow per IPC/JEDEC J-STD-020E



Reflow Cycles : 3 times max

Iron Soldering Temperature Profiles



Iron Soldering times : 1 times max

Reflow Soldering

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

Tp: maximum peak package body temperature, Tc: the classification temperature.
For user (customer) Tp should be equal to or less than Tc.

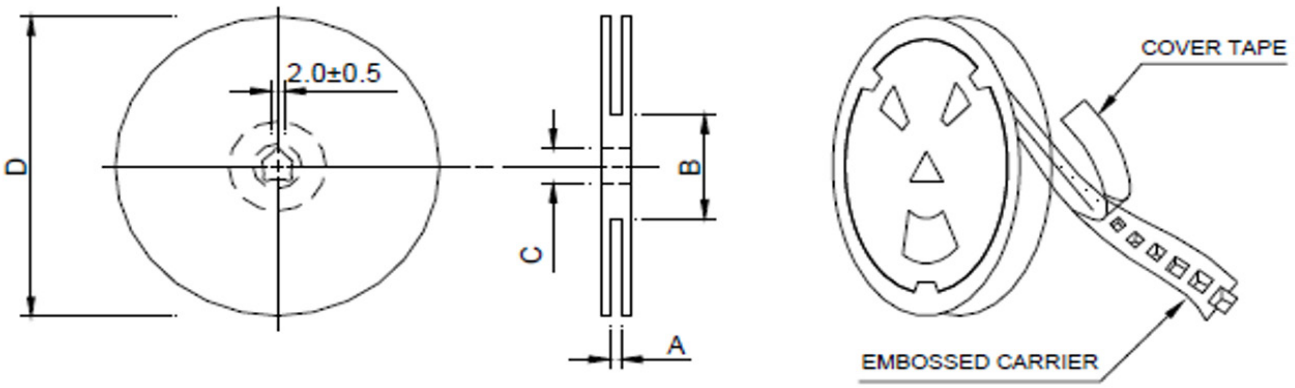
Package Thickness/Volume and Classification Temperature (Tc)

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

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

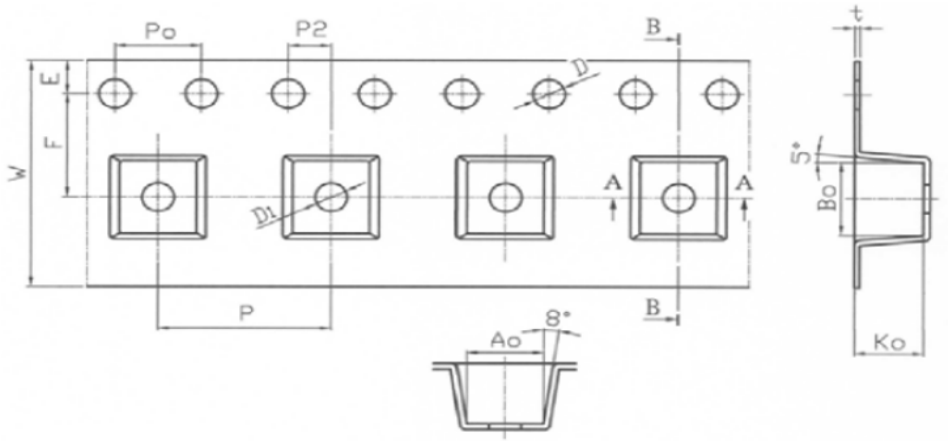
Packaging Information

Reel Dimensions



Type	A(mm)	B(mm)	C(mm)	D(mm)
13X12mm	12.5 ±0.5	100±2	13.5±0.5	330

(1) Tape Dimension / 12mm



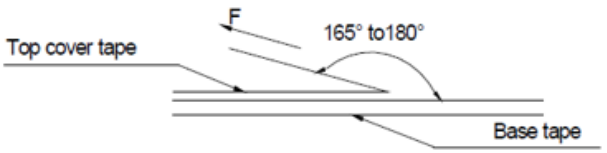
Series	P(mm) ±0.10	Po(mm) ±0.10	P2(mm) ±0.05	B0(mm) ±0.10	A0(mm) ±0.10	K0(mm) ±0.10	D(mm) ±0.10	D1(mm) ±0.10	E(mm) ±0.10
NTX1210	8.0	4.0	2.0	3.9	3.55	3.2	1.5 +0.10/-0.00	1.50	1.75
NTX1812	8.0	4.0	2.0	4.9	3.6	3.0	1.5 +0.10/-0.00	0.90	1.75

Series	F(mm) ±0.05	W(mm) ±0.10	t(mm) ±0.05
NTX1210NXXXF	5.50	12.0	0.3
NTX1812MXXXF	5.50	12.0	0.26

Packaging Quantity

Chip Size	Chip/Reel	Inner Box	Carton
NTX1210NXXXF	2000	4000	32000
NTX1812NXXXF	2000	4000	32000

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. (℃)	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℃ and 60% RH.
  3. Recommended products should be used within 6 months form 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.