105℃ LEAD FREE REFLOW SOLDERING.

ALUMINUM ELECTROLYTIC CAPACITOR, POLARIZED

G RoHS COMPLIANT

FEATURES

* NSPE-HC capacitors are the electrolytic capacitors with hybrid cathode construction, which is realized by adding electro conductive polymer together with liquid electrolyte as cathode.
* Structure of hybrid cathode electrolyte keeps their self-healing function as aluminum electrolytic capacitors.
* High ripple current
* High capacitance
* Lead free terminals

CHARACTERISTICS

Rated Voltage Range		16 ～ 35 Vdc		
Capacitance Range		56 ～ 820 μF		
Operating Temperature Range		-55 ～ +105℃		
Capacitance Tolerance (120Hz/20℃)		±20%(M)		
Max. Leakage Current After 2 minutes @20℃		0.01CV		
Rated Voltage (V)		16	25	35
Surge Voltage (V)		20	32	44
Max. Tan δ at 120Hz & 20℃		0.16	0.14	0.12
Temperature Stability Impedance Ratio @ 120Hz	Z-55℃/Z+20℃	1.0～2.5		
	Z+105℃/Z+20℃	0.6～1.0		
Load Life Test 105℃ With Rated Voltage	Test	5000hrs		
	Capacitance Change	Within ±30% of initial measured value		
	Tan δ	Less than 200% of specified value		
	ESR	Less than 200% of specified value		
	Leakage Current	Less than specified value		
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20℃, capacitors shall meet the following limits.			
	Capacitance Change	Within ±10% of initial measured value		
	Tan δ	Less than specified value		
	ESR	Less than 130% of specified value		
	Leakage Current	Less than specified value		

PART NUMBER SYSTEM

NSPE-HC 331 M 35V 10X12.8 N LB Y F – RoHS Compliant

- F: Y control
- LB: Sn-Bi Finish & 15" reel
- N: Reflow peak temp. 260℃
- 10X12.8: Case Size (mm)
- 35V: Rated Voltage (Vdc)
- M: Capacitance Tolerance, M : ±20%
- 331: Capacitance (μF), 3 digits system (R shows decimal point)
- NSPE-HC: Series

*W: Wide Terminal (Option): See the latest version of the specification "NAE1 WT SERIES"

STANDARD PRODUCTS TABLE ΦDXL :

R.V.(Vdc) / Cap.(μF)	16	25	35
56			6.3X6.3
100		6.3X6.3	6.3X8
150		6.3X8	
180			8X10.8
220	6.3X8		
270		8X10.8	
330			10X10.8
390			10X12.8
470	8X10.8	10X10.8	
560		10X12.8	
820	10X10.8		

MAXIMUM ESR (mΩ at 100kHz & 20℃)

R.V.(Vdc) / Cap.(μF)	16	25	35
56			60
100		50	35
150		30	
180			27
220	30		
270		27	
330			20
390			17
470	27	20	
560		16	
820	20		

MAXIMUM PERMISSIBLE RIPPLE CURRENT (mA r.m.s. at 100kHz & 105℃)

R.V.(Vdc) / Cap.(μF)	16	25	35
56			1600
100		1600	2000
150		2000	
180			2550
220	2000		
270		2550	
330			3500
390			4000
470	2550	3500	
560		4000	
820	3500		

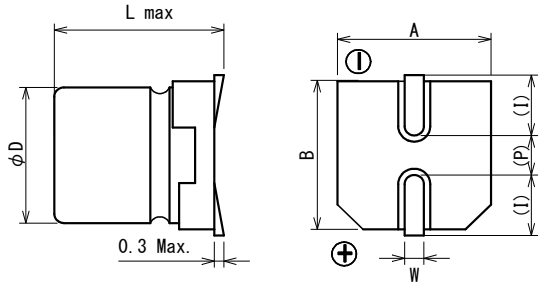
MULTIPLIER FOR RIPPLE CURRENT (Frequency coefficient)

Frequency(Hz)				
100≦F＜1k	1k≦F＜10k	10k≦F＜50k	50k≦F＜100k	100k≦F＜500k
0.15	0.35	0.65	0.85	1.00

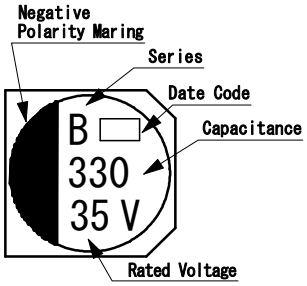
PRODUCTS AND SPECIFICATIONS

Part number	R.V. (V.DC)	Cap. (μF)	tan δ	ESR (mΩ) (100kHz, 20℃)	Max.Ripple Current mA r.m.s. (100kHz, 105℃)	Life Hours/105℃
NSPE-HC221M16V6.3X8NLBYF	16V	220	0.16	30	2000	5000
NSPE-HC471M16V8X10.8NLBYF		470	0.16	27	2550	5000
NSPE-HC821M16V10X10.8NLBYF		820	0.16	20	3500	5000
NSPE-HC101M25V6.3X6.3NLBYF	25V	100	0.14	50	1600	5000
NSPE-HC151M25V6.3X8NLBYF		150	0.14	30	2000	5000
NSPE-HC271M25V8X10.8NLBYF		270	0.14	27	2550	5000
NSPE-HC471M25V10X10.8NLBYF		470	0.14	20	3500	5000
NSPE-HC561M25V10X12.8NLBYF		560	0.14	16	4000	5000
NSPE-HC560M35V6.3X6.3NLBYF	35V	56	0.12	60	1600	5000
NSPE-HC101M35V6.3X8NLBYF		100	0.12	35	2000	5000
NSPE-HC181M35V8X10.8NLBYF		180	0.12	27	2550	5000
NSPE-HC331M35V10X10.8NLBYF		330	0.12	20	3500	5000
NSPE-HC391M35V10X12.8NLBYF		390	0.12	17	4000	5000

DIMENSIONS (mm)



MARKING

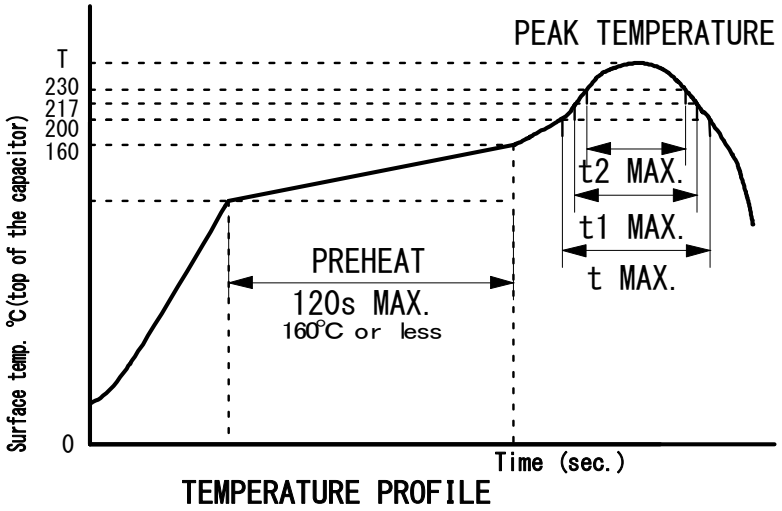


Color: Blue

Case Size	φD±0.5	L max.	A±0.2	B±0.2	(I)	W	(P)
6.3X6.3	6.3	6.3	6.6	6.6	2.5	0.5～0.8	2.2
6.3X8	6.3	8.0	6.6	6.6	2.5	0.5～0.8	2.2
8X10.8	8	10.8	8.3	8.3	2.9	0.7～1.0	3.2
10X10.8	10	10.8	10.3	10.3	3.2	1.0～1.4	4.6
10X12.8	10	12.8	10.3	10.3	3.2	1.0～1.4	4.6

( ) : Reference value

PERMISSIBLE REFLOW TEMPERATURE PROFILE



TEMPERATURE PROFILE

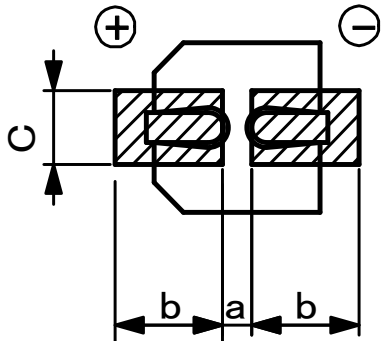
Rated Voltage : 16～35Vdc

Size	Peak temperature (T)	Time for more than 200℃ (t)	Time for more than 217℃ (t1)	Time for more than 230℃ (t2)	Reflow Cycle(max.)
Φ6.3～Φ10	Less than 260℃	Within 70sec.	Within 40sec.	Within 30sec.	2
~~Φ8, Φ10~~	~~Less than 260℃~~	~~Within 70sec.~~	~~Within 40sec.~~	~~Within 30sec.~~	~~1~~
	~~Less than 245℃~~	~~Within 70sec.~~	~~Within 50sec.~~	~~Within 40sec.~~	~~2~~

Capacitor can withstand two reflow processes on the above condition.
Second reflow shall be taken after more than one hour natural cooling time
and taken after the return to normal temperatures of PCB and components.

RECOMMEND LAND PATTERN : (mm)

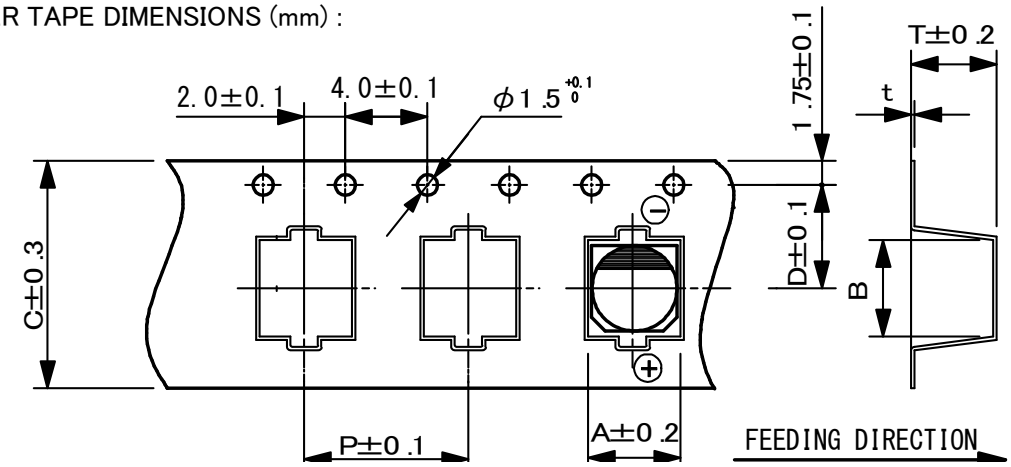
Case Size	a	b	c
Φ6.3	1.8	3.6	1.8
Φ8	2.8	4.1	2.1
Φ10	4.3	4.4	2.5



TAPING SPECIFICATIONS :

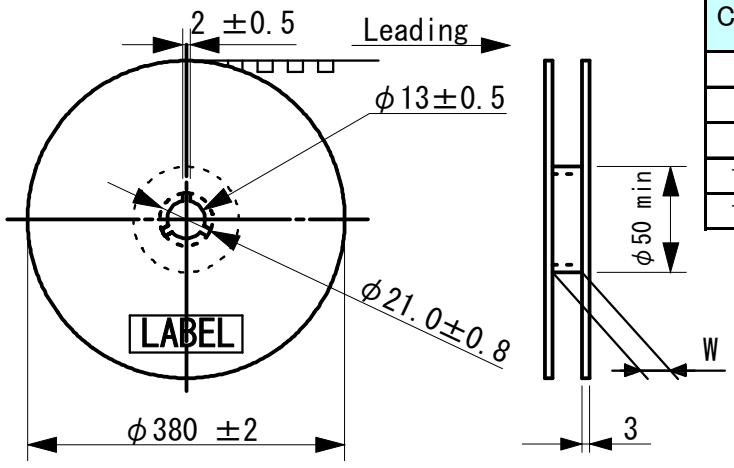
1. Leader and ending tape : Min. 10 cm empty pockets and min. 20 cm of cover tape.
2. Connection : Within 3 connections per reel.

CARRIER TAPE DIMENSIONS (mm) :



Case Size	A ±0.2	B ±0.2	C ±0.3	D ±0.1	P ±0.1	T ±0.2	t Max.
6.3X6.3	7.0	7.0	16.0	7.5	12.0	6.5	0.6
6.3X8	7.0	7.0	16.0	7.5	12.0	8.2	0.6
8X10.8	8.7	8.7	24.0	11.5	16.0	11.1	0.6
10X10.8	10.7	10.7	24.0	11.5	16.0	11.2	0.6
10X12.8	10.7	10.7	24.0	11.5	16.0	13.3	0.6

REEL DIMENSIONS (mm) :



Case Size	W	Q'ty per reel (pcs) TR15 (380mm)
6.3X6.3	18	1000
6.3X8	18	900
8X10.8	26	500
10X10.8	26	500
10X12.8	26	400