

125°C LEAD FREE REFLOW SOLDERING.
ALUMINUM ELECTROLYTIC CAPACITOR, POLARIZED

FEATURES

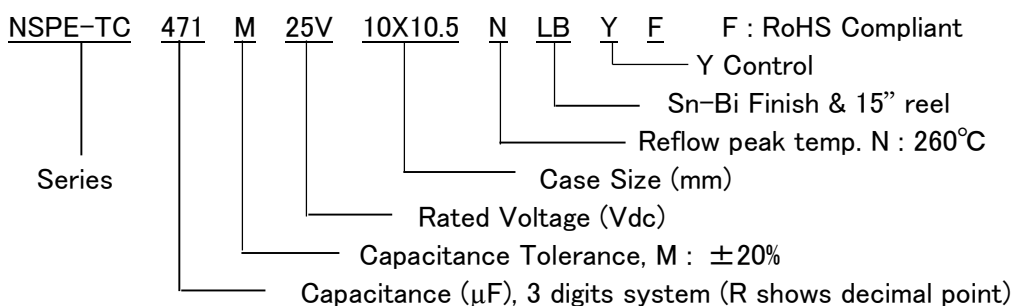
G RoHS COMPLIANT

- * NSPE-TC capacitors are the first 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.
- * NSPE-TC series has stable characteristics at temperature of wide range (-55 to +125°C)
- * Lead free terminals.

CHARACTERISTICS

Rated Voltage Range	16 ~ 35 Vdc			
Capacitance Range	33 ~ 820 μF			
Operating Temperature Range	-55 ~ +125 °C			
Capacitance Tolerance	±20%(M)			
Max. Leakage Current After 2 minutes at 20°C	0.01CV Max.			
Rated Voltage (V)	16	25	35	
Surge Voltage (V)	20	32	44	
Max. Tan δ at 120Hz & 20°C	0.16	0.14	0.12	
Low Temperature Stability	Z-55°C/Z+20°C	1.0~2.5		
Impedance Ratio @ 120Hz	Z+125°C/Z+20°C	0.6~1.0		
Load Life Test 125°C With Rated Voltage	R.V. (Vdc)	16	25	35
	Test	4000 hours		
	Capacitance Change	Within ±30% of initial measured value		
	Tan δ	Less than 200% of specified value		
	Leakage Current	Less than specified value		
	ESR	Less than 200% of specified value		
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20°C, capacitors shall meet the following limits.			
	Capacitance Change	Within ±10% of initial measured value		
	Tan δ	Less than specified value		
	Leakage Current	Less than specified value		
	ESR	Less than 130% of specified value		

PART NUMBER SYSTEM



REFLOW PEAK TEMPERATURE

Temp. Code	Peak Temperature
N	260°C

TERMINAL FINISH & REEL CODE

Code	Terminal Finish & Tape Reel
LBF	Sn-Bi Finish & 15" Reel
LSF	Sn 100% Finish & 15" Reel

STANDARD PRODUCTS TABLE ΦDXL

R.V.(Vdc) Cap.(μF)	16	25	35
33			5X6.1
56		5X6.1	6.3X6.1
100		6.3X6.1	6.3X8
150		6.3X8	
180			8X10.5
220	6.3X8		
270		8X10.5	
330			10X10.5
390			10X12.5
470	8X10.5	10X10.5	
560		10X12.5	
820	10X10.5		

MAXIMUM ESR (mΩ at 100kHz & 20°C)

R.V.(Vdc) Cap.(μF)	16	25	35
33			100
56		80	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 rms at 100kHz & 125°C)

R.V.(Vdc) Cap.(μF)	16	25	35
33			750
56		850	1200
100		1300	1700
150		1800	
180			2000
220	1800		
270		2000	
330			2800
390			3000
470	2000	2800	
560		3000	
820	2800		

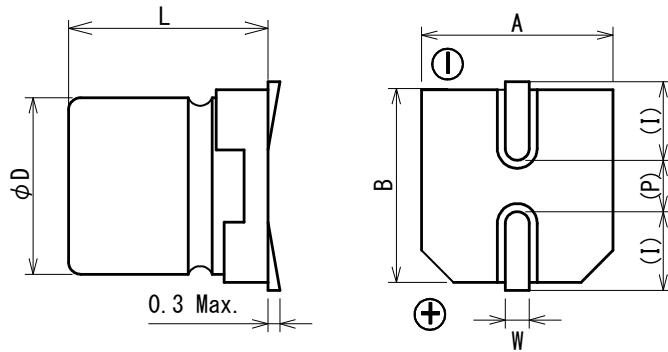
MULTIPLIER FOR RIPPLE CURRENT (Frequency coefficient)

Frequency(Hz)	100 ≤ F < 1k	1k ≤ F < 10k	10k ≤ F < 50k	50k ≤ F < 100k	100k ≤ F < 500k
33~820 μF	0.10	0.35	0.65	0.90	1.00

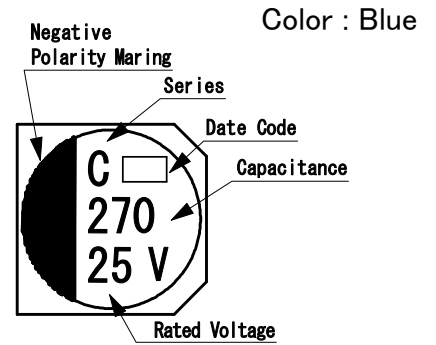
PRODUCTS AND SPECIFICATIONS

Part number	Size	R.V. (V.DC)	Cap. (μ F)	$\tan \delta$	Max.ESR(m Ω) (100kHz,20 $^{\circ}$ C)	Max.Ripple Current mA(100kHz,125 $^{\circ}$ C)	Life Hours/125 $^{\circ}$ C
NSPE-TC221M16V6.3X8NLBYF	6.3X8	16V	220	0.16	30	1800	4000
NSPE-TC471M16V8X10.5NLBYF	8X10.5		470	0.16	27	2000	4000
NSPE-TC821M16V10X10.5NLBYF	10X10.5		820	0.16	20	2800	4000
NSPE-TC560M25V5X6.1NLBYF	5X6.1	25V	56	0.14	80	850	4000
NSPE-TC101M25V6.3X6.1NLBYF	6.3X6.1		100	0.14	50	1300	4000
NSPE-TC151M25V6.3X8NLBYF	6.3X8		150	0.14	30	1800	4000
NSPE-TC271M25V8X10.5NLBYF	8X10.5		270	0.14	27	2000	4000
NSPE-TC471M25V10X10.5NLBYF	10X10.5		470	0.14	20	2800	4000
NSPE-TC561M25V10X12.5NLBYF	10X12.5		560	0.14	16	3000	4000
NSPE-TC330M35V5X6.1NLBYF	5X6.1	35V	33	0.12	100	750	4000
NSPE-TC560M35V6.3X6.1NLBYF	6.3X6.1		56	0.12	60	1200	4000
NSPE-TC101M35V6.3X8NLBYF	6.3X8		100	0.12	35	1700	4000
NSPE-TC181M35V8X10.5NLBYF	8X10.5		180	0.12	27	2000	4000
NSPE-TC331M35V10X10.5NLBYF	10X10.5		330	0.12	20	2800	4000
NSPE-TC391M35V10X12.5NLBYF	10X12.5		390	0.12	17	3000	4000

DIMENSIONS (mm)



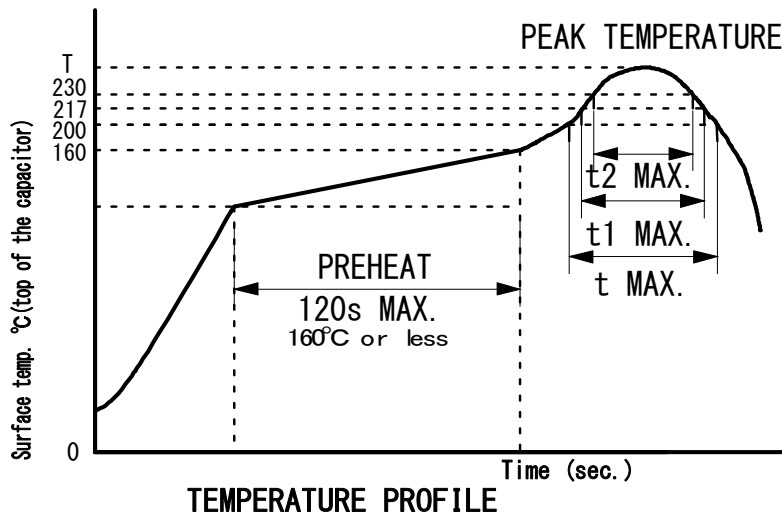
MARKING



Case Size	$\phi D \pm 0.5$	L max	$A \pm 0.2$	$B \pm 0.2$	(I)	W	(P)
5X6.1	5	6.1	5.3	5.3	2.3	0.5~0.8	1.4
6.3X6.1	6.3	6.1	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
8X10.5	8	10.5	8.3	8.3	2.9	0.7~1.0	3.2
10X10.5	10	10.5	10.3	10.3	3.2	1.0~1.4	4.6
10X12.5	10	12.5	10.3	10.3	3.2	1.0~1.4	4.6

(): Reference value

PERMISSIBLE REFLOW TEMPERATURE PROFILE



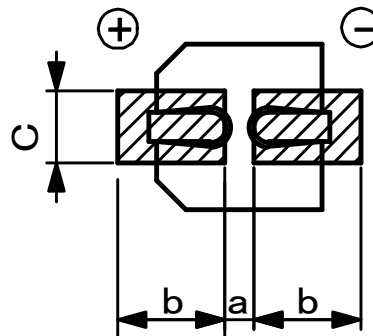
Rated Voltage : 16~35Vdc

Size	Peak temperature (T)	Time for more than 200°C (t)	Time for more than 217°C (t1)	Time for more than 230°C (t2)	Reflow Cycle(max.)
Φ5~Φ10	Less than 260°C	Within 70sec.	Within 40sec.	Within 30sec.	2

Capacitor can withstand two reflow processes on the above conditions.
 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)

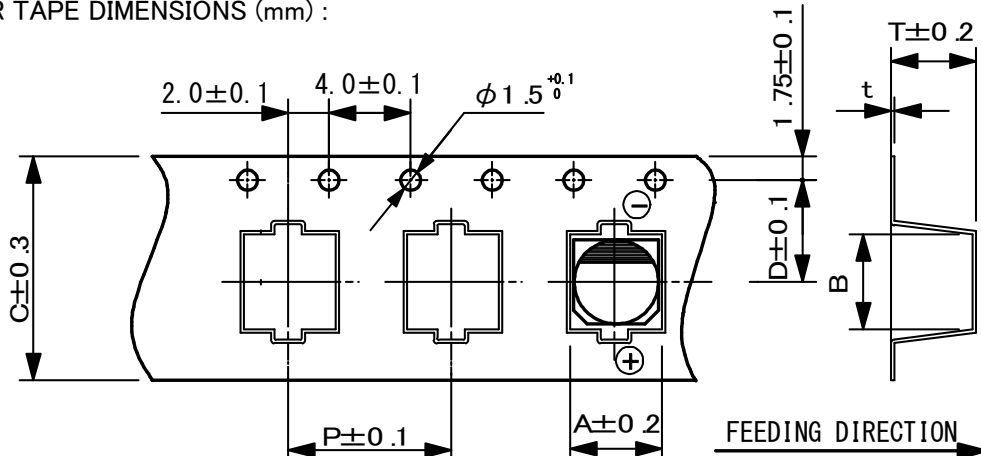
Case Size	a	b	c
Φ5	1.4	3.0	1.8
Φ6.3	1.8	3.6	1.8
Φ8	2.8	4.1	2.1
Φ10	4.3	4.4	2.5



TAPING SPECIFICATIONS

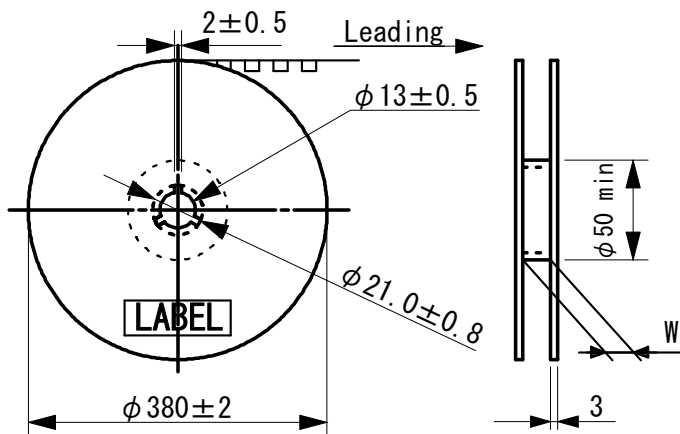
1. Leader and ending tape : Min. 10 cm empty pockets and min. 20 cm of cover tape.
2. Connection : Within 3 connections per reel.

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.
5X6.1	5.7	5.7	12.0	5.5	12.0	6.4	0.6
6.3X6.1	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
8X10.5	8.7	8.7	24.0	11.5	16.0	11.1	0.6
10X10.5	10.7	10.7	24.0	11.5	16.0	11.2	0.6
10X12.5	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)
5X6.1	14	1200
6.3X6.1	18	1000
6.3X8	18	900
8X10.5	26	500
10X10.5	26	500
10X12.5	26	400