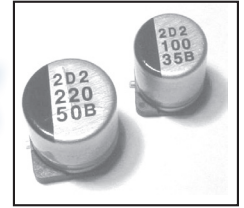


# Surface Mount Aluminum Electrolytic Capacitors NACK Series

- CYLINDRICAL V-CHIP CONSTRUCTION FOR SURFACE MOUNTING
- VERY LOW IMPEDANCE
- WIDE TEMPERATURE RANGE (-55 +105°C)
- REDUCED SIZE
- DESIGNED FOR AUTOMATIC MOUNTING AND REFLOW SOLDERING
- **MEETS THE REQUIREMENTS OF AEC-Q200\***

\*Contact NIC for supporting test data

See **NAZT** for  
New Designs



**RoHS  
Compliant**  
includes all homogeneous materials

\*See Part Number System for Details

Rated Voltage Range	6.3 ~ 100Vdc										
Rated Capacitance Range	3.3 ~ 1,500 $\mu$ F										
Operating Temperature Range	-55°C ~ +105°C										
Capacitance Tolerance	$\pm$ 20%(M)										
Maximum Leakage Current after 2 minutes @ 20°C	0.01CV or 3 $\mu$ A, whichever is greater										
Maximum Tan $\delta$ @ 120Hz/20°C	W.V. (Vdc)		6.3	10	16	25	35	50	63	80	100
	S.V. (Vdc)		8.0	13	20	32	44	63	79	100	125
	All Case Sizes	C $\leq$ 1,000 $\mu$ F	0.26	0.19	0.16	0.14	0.12	0.10	0.08	0.08	0.07
		C = 1,500 $\mu$ F	0.28	-	-	-	0.12	-	-	-	-
Low Temperature Stability Impedance Ratio @ 120Hz	Z -25°C/Z +20°C		2	2	2	2	2	2	2	2	2
	Z -40°C/Z +20°C		3	3	3	3	3	3	3	3	3
	Z -55°C/Z +20°C		4	4	4	3	3	3	3	3	3
Load Life Test @ 105°C 4 ~ 10mm Dia. 2,000 Hours 8x10.5mm 5,000 (Opt.) 10x10.5mm 5,000 (Opt.) 12.5 ~ 16mm Dia. 5,000 Hours	Capacitance Change					Within $\pm$ 30% of initial measured value					
	Tan $\delta$					Less than 200% of specified maximum value					
	Leakage Current					Less than specified maximum value					

Cap ( $\mu$ F)	Code	Working Voltage (Vdc)									
		6.3	10	16	25	35	50	63	80	100	
3.3	3R3	-	-	-	-	-	-	-	NAZT	-	
4.7	4R7	-	-	-	-	4x6.1	4x6.1	NAZT	NAZT	-	
10	100	-	-	4x6.1	4x6.1	4x6.1 5x6.1	5x6.1 6.3x6.1	NAZT	NAZT	-	
22	220	4x6.1	NAZT	4x6.1 5x6.1	NAZT	5x6.1	6.3x6.1	NAZT	8x10.5	8x10.5	
33	330	-	4x6.1 NAZT	-	5x6.1 6.3x6.1	NAZT	6.3x8 NAZT	8x10.5	8x10.5	10x10.5	
47	470	4x6.1 5x6.1	-	5x6.1 6.3x6.1	6.3x6.1	6.3x6.1	6.3x8 NAZT	NAZT	10x10.5	12.5x14	
68	680	-	-	NAZT	NAZT	6.3x8	-	8x10.5	-	12.5x14	
100	101	5x6.1 6.3x6.1	-	6.3x6.1	6.3x8	6.3x8 8x10.5	8x10.5	10x10.5	12.5x14	-	
150	151	-	6.3x6.1	6.3x8	NAZT	8x10.5	10x10.5	-	12.5x14	-	
220	221	6.3x6.1	6.3x8 8x6.5	NAZT	8x10.5	8x10.5	10x10.5	-	-	-	
330	331	NAZT NAZT	8x10.5	NAZT	8x10.5	10x10.5	12.5x14	-	-	-	
390	391	-	-	-	-	-	-	-	-	-	
470	471	NAZT	8x10.5	8x10.5	10x10.5	12.5x14	16x17	16x17	-	-	
560	561	-	-	-	-	-	-	-	-	-	
680	681	-	8x10.5	NAZT	-	12.5x14	-	-	-	-	
1000	102	NAZT	10x10.5	-	-	-	16x17	-	-	-	
1500	152	NAZT	-	-	-	16x17	-	-	-	-	

  Available in "Y" Control Option (for Automotive Equipment)

NAZT See NAZT series datasheet

# Surface Mount Aluminum Electrolytic Capacitors NACK Series

## STANDARD VALUES, CASE SIZES AND SPECIFICATIONS

NIC Part Number*	Cap. (μF)	W.V. (Vdc)	Dissipation Factor (Tan δ)	Max. Ripple Current (mA) +105°C/100KHz	Max. Impedance (Ω) +20°C/100KHz	Load Life Hours @ +105°C	
NACK220M6.3V4x6.1TR13F	22	6.3	0.26	90	1.35	2,000	
NACK470M6.3V4x6.1TR13F	47		0.26	90	1.35	2,000	
NACK470M6.3V5x6.1TR13F	100		0.26	160	0.70	2,000	
NACK101M6.3V5x6.1TR13F			0.26	160	0.70	2,000	
NACK101M6.3V6.3x6.1TR13F			0.26	240	0.36	2,000	
NACK221M6.3V6.3x6.1TR13F			220	0.26	240	0.36	2,000
NACK330M10V4x6.1TR13F	33	10	0.19	90	1.35	2,000	
NACK151M10V6.3x6.1TR13F	150		0.19	240	0.36	2,000	
NACK331M10V8x10.5TR13F	330		0.19	600	0.16	2,000	
NACK331M10V8x10.5TR13EF	330		0.19	600	0.16	5,000	
NACK471M10V8x10.5TR13F	470		0.19	600	0.16	2,000	
NACK471M10V8x10.5TR13EF	470		0.19	600	0.16	5,000	
NACK102M10V10x10.5TR13F	1000		0.19	850	0.08	2,000	
NACK102M10V10x10.5TR13EF	1000		0.19	850	0.08	5,000	
NACK100M16V4x6.1TR13F	10		16	0.16	90	1.35	2,000
NACK220M16V4x6.1TR13F	22			0.16	90	1.35	2,000
NACK220M16V5x6.1TR13F		0.16		160	0.70	2,000	
NACK470M16V5x6.1TR13F	47	0.16		160	0.70	2,000	
NACK470M16V6.3x6.1TR13F		0.16		240	0.36	2,000	
NACK101M16V6.3x6.1TR13F		100		0.16	240	0.36	2,000
NACK151M16V6.3x8TR13F		150		0.16	280	0.34	2,000
NACK221M16V6.3x8TR13F	220	0.16		280	0.34	2,000	
NACK471M16V8x10.5TR13F	470	0.16		600	0.16	2,000	
NACK471M16V8x10.5TR13EF	470	0.16		600	0.16	5,000	
NACK681M16V10x10.5TR13F	680	0.16		850	0.08	2,000	
NACK681M16V10x10.5TR13EF	680	0.16		850	0.08	5,000	
NACK152M16V12.5x14TR15F	1500	0.18		1100	0.06	5,000	
NACK332M16V16x17TR15F	3300	0.20		1800	0.035	5,000	
NACK100M25V4x6.1TR13F	10	25		0.14	90	1.35	2,000
NACK330M25V5x6.1TR13F	33			0.14	160	0.70	2,000
NACK330M25V6.3x6.1TR13F			0.14	240	0.36	2,000	
NACK470M25V6.3x6.1TR13F	47		0.14	240	0.36	2,000	
NACK101M25V6.3x8TR13F	100		0.14	280	0.34	2,000	
NACK221M25V8x10.5TR13F	220		0.14	600	0.16	2,000	
NACK221M25V8x10.5TR13EF	220		0.14	600	0.16	5,000	
NACK331M25V8x10.5TR13F	330		0.14	600	0.16	2,000	
NACK331M25V8x10.5TR13EF	330		0.14	600	0.16	5,000	
NACK471M25V10x10.5TR13F	470		0.14	850	0.08	2,000	
NACK471M25V10x10.5TR13EF	470		0.14	850	0.08	5,000	
NACK4R7M35V4x6.1TR13F	4.7		35	0.12	90	1.35	2,000
NACK100M35V4x6.1TR13F	10	0.12		90	1.35	2,000	
NACK100M35V5x6.1TR13F		0.12		160	0.70	2,000	
NACK220M35V5x6.1TR13F	22	0.12		160	0.70	2,000	
NACK470M35V6.3x6.1TR13F	47	0.12		240	0.36	2,000	
NACK680M35V6.3x8TR13F	68	0.12		280	0.34	2,000	
NACK101M35V6.3x8TR13F	100	0.12		280	0.34	2,000	
NACK101M35V8x10.5TR13F		0.12		600	0.16	2,000	
NACK101M35V8x10.5TR13EF		100		0.12	600	0.16	5,000
NACK151M35V8x10.5TR13F		150		0.12	600	0.16	2,000
NACK151M35V8x10.5TR13EF	150	0.12		600	0.16	5,000	
NACK221M35V8x10.5TR13F	220	0.12		600	0.16	2,000	
NACK221M35V8x10.5TR13EF	220	0.12		600	0.16	5,000	

Available in "Y" Control Option (for Automotive Equipment)

\*See part numbering system for how to denote WT termination style

Note: Standard reel size referenced in values table. Contact NIC for availability of optional reel size



# Surface Mount Aluminum Electrolytic Capacitors NACK Series

## STANDARD VALUES, CASE SIZES AND SPECIFICATIONS

NIC Part Number*	Cap. (μF)	W.V. (Vdc)	Dissipation Factor (Tan δ)	Max. Ripple Current (mA) +105°C/100KHz	Max. Impedance (Ω) +20°C/100KHz	Load Life Hours @ +105°C	
NACK331M35V10x10.5TR13F	330	35	0.12	850	0.08	2,000	
NACK331M35V10x10.5TR13EF	330		0.12	850	0.08	5,000	
NACK471M35V12.5x14TR15F	470		0.12	1100	0.06	5,000	
NACK681M35V12.5x14TR15F	680		0.12	1100	0.06	5,000	
NACK152M35V16x17TR15F	1500		0.12	1800	0.035	5,000	
NACK4R7M50V4x6.1TR13F	4.7	50	0.10	60	2.9	2,000	
NACK100M50V5x6.1TR13F	10		0.10	85	1.52	2,000	
NACK100M50V6.3x6.1TR13F			0.10	165	0.88	2,000	
NACK220M50V6.3x6.1TR13F	22		0.10	165	0.88	2,000	
NACK330M50V6.3x8TR13F	33		0.10	195	0.68	2,000	
NACK470M50V6.3x8TR13F	47		0.10	195	0.68	2,000	
NACK101M50V8x10.5TR13F	100		0.10	350	0.34	2,000	
NACK101M50V8x10.5TR13EF	100		0.10	350	0.34	5,000	
NACK151M50V10x10.5TR13F	150		0.10	670	0.18	2,000	
NACK151M50V10x10.5TR13EF	150		0.10	670	0.18	5,000	
NACK221M50V10x10.5TR13F	220		0.10	670	0.18	2,000	
NACK221M50V10x10.5TR13EF	220		0.10	670	0.18	5,000	
NACK331M50V12.5x14TR15F	330		0.10	900	0.12	5,000	
NACK471M50V16x17TR15F	470		0.10	1610	0.073	5,000	
NACK102M50V16x17TR15F	1000		0.10	1610	0.073	5,000	
NACK330M63V8x10.5TR13F	33		63	0.08	250	0.65	2,000
NACK470M63V8x10.5TR13F	47			0.08	250	0.65	2,000
NACK680M63V8x10.5TR13F	68	0.08		250	0.65	2,000	
NACK101M63V10x10.5TR13F	100	0.08		400	0.35	2,000	
NACK471M63V16x17TR15F	470	0.08		1410	0.082	5,000	
NACK470M80V10x10.5TR13F	47	80	0.08	200	0.7	2,000	
NACK101M80V12.5x14TR15F	100		0.08	500	0.32	5,000	
NACK151M80V12.5x14TR15F	150		0.08	500	0.32	5,000	
NACK220M100V8x10.5TR13F	22	100	0.07	130	1.3	2,000	
NACK330M100V10x10.5TR13F	33		0.07	200	0.7	2,000	
NACK470M100V12.5x14TR15F	47		0.07	500	0.32	5,000	
NACK680M100V12.5x14TR15F	68		0.07	500	0.32	5,000	

Available in "Y" Control Option (for Automotive Equipment)

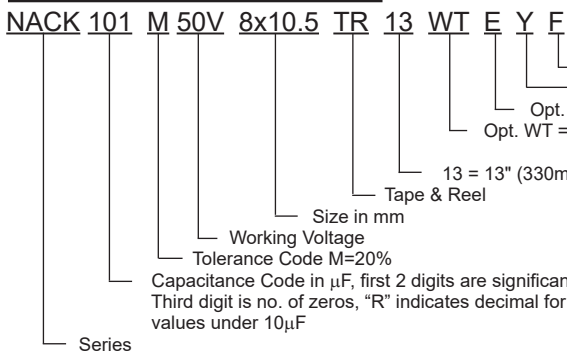
\*See part numbering system for how to denote WT termination style

Note: Standard reel size referenced in values table. Contact NIC for availability of optional reel size

### RIPPLE CURRENT FREQUENCY CORRECTION FACTOR

Frequency	60Hz	120Hz	1KHz	10KHz	100KHz
Correction Factor	0.7	0.75	0.9	0.95	1.0

### PART NUMBER SYSTEM



Optional: Suitable for automotive equipment, sourced to special production and inspection at IATF-16949 certified production site

### PRECAUTIONS

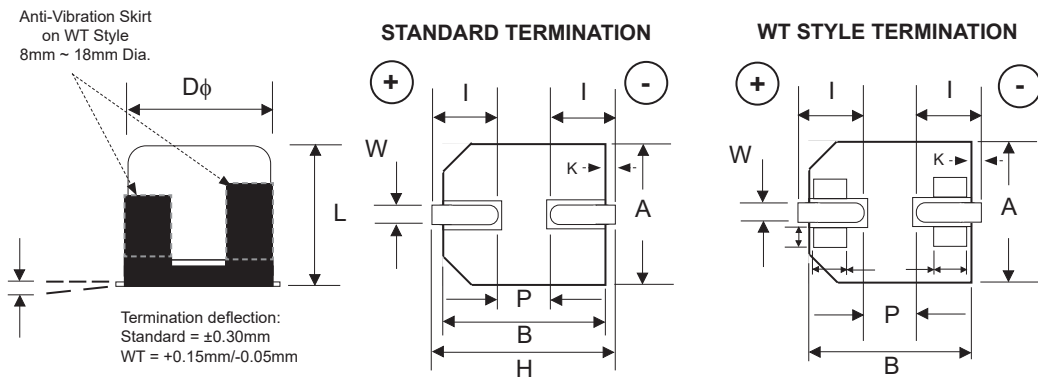
Please review the notes on correct use, safety and precautions found at <https://www.niccomp.com/resource/files/aluminum/AlumApplInfoCautions.pdf>  
 If in doubt or uncertainty, please review your specific application - process details with NIC's technical support personnel: [tpmg@niccomp.com](mailto:tpmg@niccomp.com)



# Surface Mount Aluminum Electrolytic Capacitors NACK Series

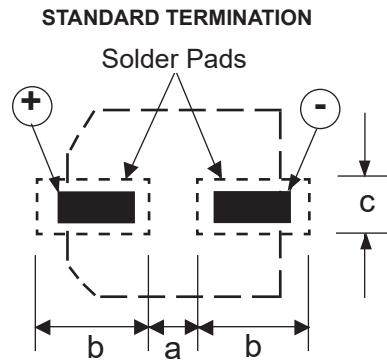
## COMPONENT DIMENSIONS

Case Size	D $\phi$ $\pm 0.5$	L max.	A, B	H max.	I $\pm 0.3$	P $\pm 0.3$	W	K	R	S	T
4x6.1	4.0	6.1	4.3 $\pm 0.2$	5.5	1.8	1.0	0.65 $\pm 0.15$	0.35 $\pm 0.2$	-	-	-
5x6.1	5.0	6.1	5.3 $\pm 0.2$	6.5	2.2	1.5	0.65 $\pm 0.15$	0.35 $\pm 0.2$	-	-	-
6.3x6.1	6.3	6.1	6.6 $\pm 0.2$	7.8	2.6	1.8	0.70 $\pm 0.20$	0.35 $\pm 0.2$	-	-	-
6.3x8	6.3	8.0	6.6 $\pm 0.2$	7.8	2.6	1.8	0.65 $\pm 0.15$	0.35 $\pm 0.2$	-	-	-
8x6.5	8.0	6.5	8.3 $\pm 0.2$	9.5	3.4	2.2	0.65 $\pm 0.15$	0.35 $\pm 0.2$	-	-	-
8x6.5WT	8.0	6.8	8.3 $\pm 0.2$	9.5	3.4	2.2	0.70 $\pm 0.10$	0.35 $\pm 0.2$	0.70 $\pm 0.2$	5.3 $\pm 0.2$	1.7 $\pm 0.2$
8x10.5	8.0	10.5	8.3 $\pm 0.2$	10.0	3.1	3.1	0.90 $\pm 0.20$	0.70 $\pm 0.2/-0.5$	-	-	-
8x10.5WT	8.0	10.8	8.3 $\pm 0.2$	10.0	3.4	3.1	0.90 $\pm 0.20$	0.70 $\pm 0.2$	0.70 $\pm 0.2$	5.3 $\pm 0.2$	1.3 $\pm 0.2$
10x10.5	10.0	10.5	10.3 $\pm 0.2$	12.0	3.2	4.6	1.05 $\pm 0.35$	0.70 $\pm 0.2/-0.5$	-	-	-
10x10.5WT	10.0	10.8	10.3 $\pm 0.2$	12.0	3.5	4.6	1.05 $\pm 0.35$	0.70 $\pm 0.2$	0.70 $\pm 0.2$	6.9 $\pm 0.2$	1.3 $\pm 0.2$
12.5x14	12.5	14.0	13.2 $\pm 0.6$	15.0	4.5	4.6	1.00 $\pm 0.40$	0.70 $\pm 0.3/-0.5$	-	-	-
12.5x14WT	12.5	14.3	13.5 $\pm 0.2$	15.0	4.7	4.4	1.20 $\pm 0.30$	0.70 $\pm 0.3$	2.2 $\pm 0.2$	7.1 $\pm 0.2$	2.4 $\pm 0.2$
16x17	16.0	17.0	16.7 $\pm 0.6$	19.0	5.2	6.9	1.50 $\pm 0.60$	0.70 $\pm 0.3/-0.4$	-	-	-
16x17WT	16.0	17.5	17.0 $\pm 0.2$	20.0	5.5	6.9	1.65 $\pm 0.45$	0.70 $\pm 0.3/-0.4$	3.0 $\pm 0.2$	9.0 $\pm 0.2$	1.9 $\pm 0.2$



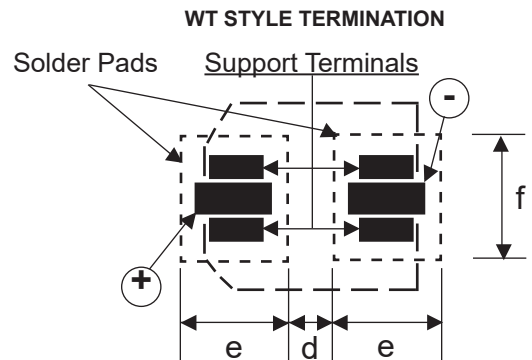
## RECOMMENDED LAND PATTERN (mm) STANDARD TERMINAL

Case Dia.	a	b	c
4x6.1	1.0	2.6	1.8
5x6.1	1.4	3.0	1.8
6.3x6.1	2.1	3.5	1.8
6.3x8	2.1	3.5	1.8
8x6.5	2.2	4.5	1.6
8x10.5	2.8	4.1	2.2
10x10.5	4.5	4.5	2.5
12.5x14	4.3	5.8	2.5
16x17	6.6	6.5	4.0



## RECOMMENDED LAND PATTERN (mm) WIDE TERMINAL

Case Dia.	d	e	f
8x6.5WT	1.8	4.1	5.0
8x10.5WT	2.7	4.0	4.7
10x10.5WT	3.9	4.4	4.7
12.5x14WT	3.9	6.0	2.5
16x17WT	4.7	8.4	9.6



# Surface Mount Aluminum Electrolytic Capacitors NACK Series

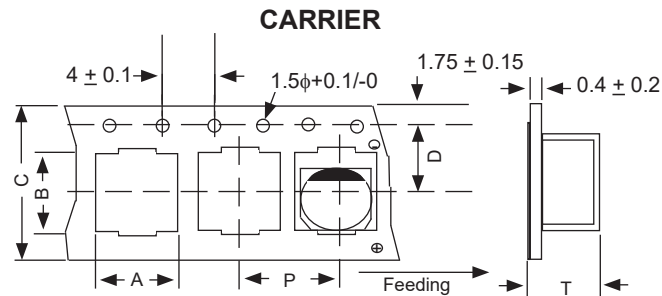
WT (Wide Terminations) Anti-Vibration Test	
Test Method	Direction: X, Y, Z axis Frequency & Duration: 5 to 2000Hz reciprocation for 20 minutes, 2 hours each direction Peak to Peak Amplitude: 5mm Peak Acceleration: 30G Sweep Type: Log
Δ Capacitance	Within ± 10% of initial value
Tangent of Loss	≤ Specified value
Leakage Current	≤ Specified value

## CARRIER TAPE

Case Size	A ±0.5	B ±0.2	C ±0.3	D ±0.1	P ±0.1	T ±0.2
4x6.1	4.7	4.7	12.0	5.5	8.0	6.4
5x6.1	5.7	5.7	12.0	5.5	12.0	6.4
6.3x6.1	7.0	7.0	16.0	7.5	12.0	6.4
6.3x8	7.0	7.0	16.0	7.5	12.0	8.3
8x6.5	8.7	8.7	16.0	7.5	12.0	6.8
8x6.5WT						
8x10.5	8.7	8.7	24.0	7.5	12.0	11.1
8x10.5WT						
10x10.5	10.7	10.7	24.0	11.5	16.0	11.2
10x10.5WT						
12.5x14	13.2	13.2	32.0	14.2	24.0	14.2
12.5x14WT	14.0	14.0	32.0	14.2	24.0	14.2
16x17	17.5	17.5	44.0	20.2	28.0	17.5
16x17WT						

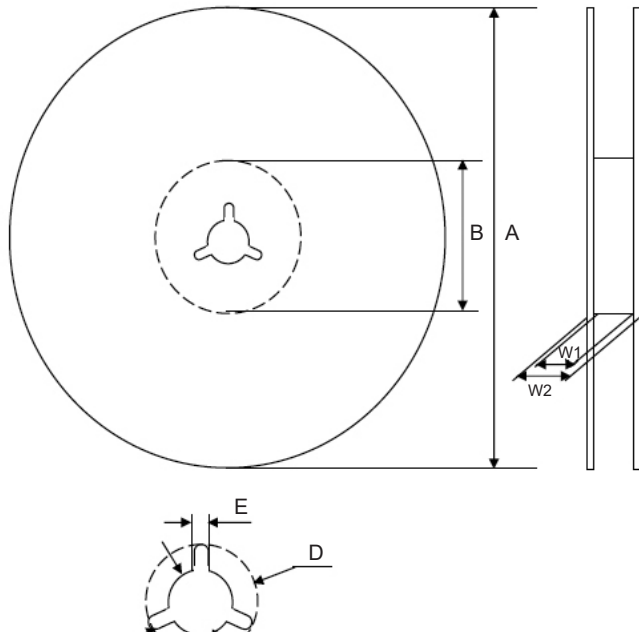
## TAPING SPECIFICATIONS (mm)

- Both Leader and Trailer tape: Minimum 40mm (1.57") empty carrier tape pockets.
- Leader tape: Approximately 20cm of cover tape at leader.
- Connection: Maximum 3 connections (slices) per reel.



# Surface Mount Aluminum Electrolytic Capacitors NACK Series

## Preferred V-Chip 15" (380mm) Reels (TR15 suffix)



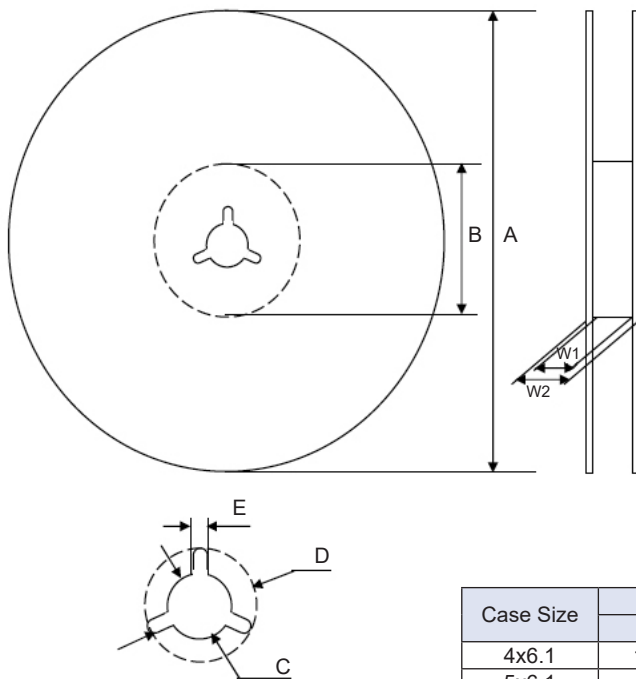
### Dimensions (mm)

Case Size	Tape Width	W1	W2
4x6.1, 5x6.1	12.0	12.5 ~ 14.0	15.5 ~ 20.0
6.3x6.1, 6.3x8, 8x6.5	16.0	16.5 ~ 18.0	19.5 ~ 24.0
8x10.5, 10x10.5	24.0	24.5 ~ 26.0	27.5 ~ 32.0
12.5x14	32.0	33.0 ~ 34.0	36.5 ~ 38.5
16x17	44.0	45.0 ~ 46.0	48.5 ~ 50.5

Case Size	Tape Width	A	B	C	D	E
4x6.1, 5x6.1	12.0	$\phi 380$ $\pm 2$	$\phi 80 \sim 105$	$\phi 13$ $\pm 0.5$	$\phi 21$ $\pm 1.0$	2.0 $\pm 0.5$
6.3x6.1, 6.3x8, 8x6.5	16.0					
8x10.5, 10x10.5	24.0					
12.5x14	32.0					
16x17	44.0					

Color
Black or Blue

## Optional V-Chip 13" (330mm) Reels (TR13 suffix)



### Dimensions (mm)

Case Size	Tape Width	W1	W2
4x6.1, 5x6.1	12.0	12.4 ~ 14.4	15.5 ~ 20.0
6.3x6.1, 6.3x8, 8x6.5	16.0	16.4 ~ 18.4	19.5 ~ 24.0
8x10.5, 10x10.5	24.0	24.4 ~ 26.4	27.5 ~ 32.0
12.5x14	32.0	32.4 ~ 35.0	36.5 ~ 38.4
16x17	44.0	44.4 ~ 47.0	48.2 ~ 50.4

Case Size	Tape Width	A	B	C	D	E
4x6.1, 5x6.1	12.0	$\phi 330$ $\pm 2.0$	$\phi 50 \sim 105$	$\phi 13$ $\pm 0.5$	$\phi 21$ $\pm 1.0$	2.0 $\pm 0.5$
6.3x6.1, 6.3x8, 8x6.5	16.0					
8x10.5, 10x10.5	24.0					
12.5x14	32.0					
16x17	44.0					

Color
Black or Blue

Case Size	Quantity Per Reel	
	13" Reel	15" Reel
4x6.1	1,200 pcs	2,000 pcs
5x6.1	800 pcs	1,000 pcs
6.3x6.1	800 pcs	1,000 pcs
6.3x8	500 pcs	900 pcs
8x6.5	800 pcs	1,000 pcs
8x10.5	300 pcs	500 pcs
10x10.5	300 pcs	500 pcs
12.5x14	200 pcs*	250 pcs*
16x17	125 pcs*	200 pcs*

\*See specific part number in standard values tables for available reel diameter.