

Solid Tantalum Chip Capacitors – TC 211 Series

Operating Temp.: -55°C~+125°C



FEATURES

- Meets or exceeds EIA-535BAAC standard
- Taped and reeled per EIA481-1
- C_R range: 0.10-680μF
- V_R range: 2.5-50V_{DC}
- Low profile options available
- 100% surge current test
- Green environmental protection

APPLICATIONS

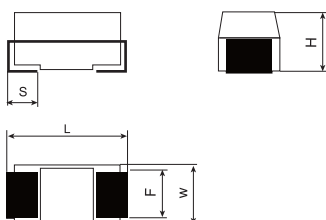
- Communication
- Consumer electronics
- Automotive electronics
- Instruments
- Medical electronics

PRODUCT IDENTIFICATION

<u>TC</u>	<u>211</u>	<u>B</u>	<u>105</u>	<u>M</u>	<u>035</u>	<u>A</u>
①	②	③	④	⑤	⑥	⑦
①			②			③
Type		Series		External Dimensions (L×W) (mm)		
TC	Solid Tantalum Chip Capacitor	211	Industrial			
Nominal Capacitance		Rated DC Voltage				
Example	Nominal Value	002	2.5Vdc			
105	1.0μF	004	4Vdc			
106	10μF	006	6.3Vdc			
Capacitance Tolerance		010	10Vdc			
K	±10%	016	16Vdc			
M	±20%	020	20Vdc			
		025	25Vdc			
		035	35Vdc			
		050	50Vdc			
		Internal Code				
		A			Black Molded Case	
		Y			Yellow Molded Case	

SHAPE AND DIMENSIONS

Unit: mm [inch]



Case	EIA	L	W	H	F	S
P	2012-12	2.00±0.15 [.078±.006]	1.25±0.15 [.049±.006]	1.10±0.15 [.043±.006]	0.90±0.10 [.035±.004]	0.50±0.30 [.020±.012]
A	3216-18	3.20±0.20 [.126±.008]	1.60±0.20 [.063±.008]	1.60±0.20 [.063±.008]	1.20±0.10 [.040±.004]	0.80±0.30 [.031±.012]
K	3216-10	3.20±0.20 [.126±.008]	1.60±0.20 [.063±.008]	1.00 max [.039]	1.20±0.10 [.047±.004]	0.80±0.30 [.031±.012]
B	3528-21	3.50±0.20 [.138±.008]	2.80±0.20 [.110±.008]	1.90±0.20 [.075±.008]	2.20±0.10 [.087±.004]	0.80±0.30 [.030±.012]
C	6032-28	6.00±0.30 [.236±.012]	3.20±0.30 [.126±.012]	2.50±0.30 [.098±.012]	2.20±0.10 [.087±.004]	1.30±0.30 [.051±.012]
D	7343-31	7.30±0.30 [.287±.012]	4.30±0.30 [.169±.012]	2.80±0.30 [.110±.012]	2.40±0.10 [.094±.004]	1.30±0.30 [.051±.012]
E	7343-43	7.30±0.30 [.287±.012]	4.30±0.30 [.169±.012]	4.00±0.30 [.161±.012]	2.40±0.10 [.094±.004]	1.30±0.30 [.051±.012]

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Specifications subject to change without notice. Please check our website for latest information. Revised 2012/07/18

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TECHNICAL SPECIFICATION

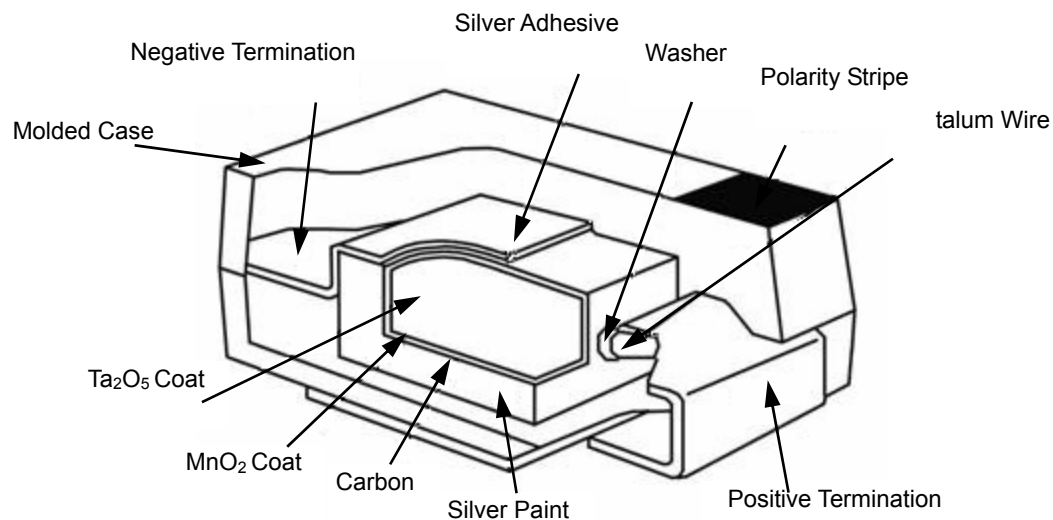
Item	SPEC									Test Condition
Operating Temp	-55℃~+125℃									
C _R Range	0.10μF~680μF									25℃, 120Hz
C _R Tolerance	±10% or ±20%									25℃, 120Hz
Rated Voltage (V _R)	2.5V	4V	6.3V	10V	16V	20V	25V	35V	50V	85℃
Category Voltage (V _C)	1.6V	2.5V	4V	6.3V	10V	13V	16V	20V	32V	125℃
Surge Voltage (V _S)	3.3V	5.2V	8V	13V	20V	26V	32V	46V	65V	85℃
Surge Voltage (V _S)	2.2V	3.4V	5V	8V	13V	16V	20V	28V	40V	125℃

STANDARD C-V VALUE BY CASE CODE

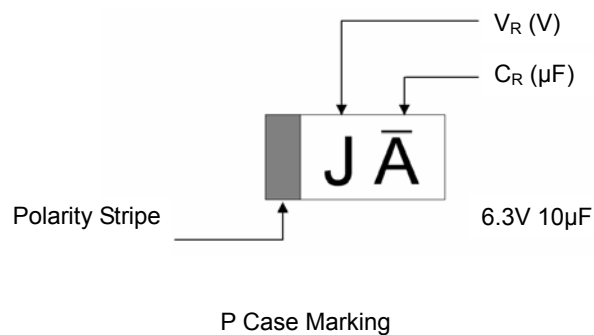
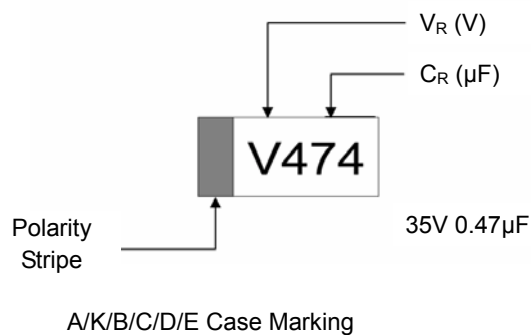
Rated Voltage (V _R)		2.5	4	6.3	10	16	20	25	35	50
Voltage Code		e	G	J	A	C	D	E	V	T
C _R (μF)	C Code	Case Code								
0.1	104						P		A/P	A
0.15	154						P		A	B/A
0.22	224						P	A	A	B/A
0.33	334						P	A	A	B/A
0.47	474					P	P	A/P	B/A	C/B/A
0.68	684				P	P	A/P	A	B/A	C/B/A
1.0	105			A/P	A/P	A/P	A/P	B/A/P	B/A	C/B
1.5	155			A/P	A/P	A/P	B/A	B/A	C/B	C/B
2.2	225		A	A/P	A/P	B/A/P	B/A	C/B/A	C/B/A	D/C/B
3.3	335		A/P	A/P	A/P	B/A	B/A	C/B/A	C/B	D/C/B
4.7	475		A/P	A/P	B/K/A/P	C/B/K/A	C/B/A	C/B/A	D/C/B	D
6.8	685		A/P	B/A/P	B/K/A/P	C/B/K/A	D/C/B	D/C/B	D/C	D
10	106	A/P	B/A/P	B/A/P	C/B/K/A/P	C/B/K/A	D/C/B	D/C/B	E/D/C	E/D
15	156	B/A	B/K/A	B/K/A/P	C/B/A	C/B	D/C	D/C/B	E/D	E
22	226	A/P	B/K/A	B/K/A/P	C/B/K/A	D/C/B/A	D/C/B	D/C	E/D	
33	336	K/A/P	C/B/K/A/P	C/B/K/A	D/C/B/A	D/C/B	D/C	E/D	E	
47	476	A	C/B/A	C/B/K/A	D/C/B/A	D/C/B	E/D/C	E/D	E	
68	686	B/A	D/C/B	D/C/B	D/C	D	E/D	E		
100	107	B/A	D/C/B/A	D/C/B/A	D/C/B	D/C	E/D	D		
150	157	B	D/C/B	D/C/B	E/D/C	E/D	E			
220	227	B	D/C/B	E/D/C/B	E/D	E/D				
330	337		E/D/C/B	E/D	E/D	E				
470	477		E	E/D	E					
680	687		E							

※: The first case code is standard product and the others are expansion products.

CONSTRUCTION



MARKINGS



Rated Voltage Code

Rated Voltage(V_R)	2.5	4	6.3	10	16	20	25	35	50
Code	e	G	J	A	C	D	E	V	T

Capacitance Code

Capacitance (μF)	0.1	0.15	0.22	0.33	0.47	0.68	1.0	1.5	2.2	3.3	4.7	6.8
Code (P Case)	$\bar{A}$	$\bar{E}$	$\bar{J}$	$\bar{N}$	$\bar{S}$	$\bar{W}$	A	E	J	N	S	W
Code (A/B/C/D/E Case)	104	154	224	334	474	684	105	155	225	335	475	685
Capacitance (μF)	10	15	22	33	47	68	100	150	220	330	470	680
Code (P Case)	$\bar{A}$	$\bar{E}$	$\bar{J}$	$\bar{N}$	$\bar{S}$	$\bar{W}$						
Code (A/B/C/D/E Case)	106	156	226	336	476	686	107	157	227	337	477	687

SPECIFICATIONS

Capacitance (μF)	Case	Part Number	DCL (μA) +25℃ Max.	DF(%) +25℃ 120Hz Max.	ESR(Ω) +25℃ 100kHz Max.
2.5V, +85℃ (1.6V @ +125℃)					
10.0	P	TC211P106◎002□	0.5	6.0	6.0
10.0	A	TC211A106◎002□	0.5	6.0	5.0
15.0	A	TC211A156◎002□	0.5	6.0	6.0
15.0	B	TC211B156◎002□	0.5	6.0	4.0
22.0	P	TC211P226◎002□	0.55	20.0	6.0
22.0	A	TC211A226◎002□	0.55	6.0	4.0
33.0	P	TC211P336◎002□	0.82	15.0	6.0
33.0	A	TC211A336◎002□	0.82	6.0	4.0
33.0	K	TC211K336◎002□	0.8	8.0	1.7
47.0	A	TC211A476◎002□	1.17	10.0	4.0
68.0	A	TC211A686◎002□	1.7	10.0	3.0
68.0	B	TC211B686◎002□	1.7	6.0	2.0
100.0	A	TC211A107◎002□	2.5	20.0	2.5
100.0	B	TC211B107◎002□	2.5	8.0	1.5
150.0	B	TC211B157◎002□	3.75	10.0	2.0
220.0	B	TC211B227◎002□	5.5	18.0	2.0
4V, +85℃ (2.5V @ +125℃)					
2.2	A	TC211A225◎004□	0.5	6.0	8.0
3.3	P	TC211P335◎004□	0.5	6.0	10.0
3.3	A	TC211A335◎004□	0.5	6.0	8.0
4.7	P	TC211P475◎004□	0.5	6.0	10.0
4.7	A	TC211A475◎004□	0.5	6.0	8.0
6.8	P	TC211P685◎004□	0.5	6.0	10.0
6.8	A	TC211A685◎004□	0.5	6.0	6.0
10.0	P	TC211P106◎004□	0.5	8.0	10.0
10.0	A	TC211A106◎004□	0.5	6.0	6.0
10.0	B	TC211B106◎004□	0.5	6.0	3.5
15.0	A	TC211A156◎004□	0.6	6.0	4.0
15.0	B	TC211B156◎004□	0.6	6.0	3.5
22.0	A	TC211A226◎004□	0.88	6.0	4.0
22.0	K	TC211K226◎004□	0.9	8.0	1.8
22.0	B	TC211B226◎004□	0.88	6.0	3.5
33.0	P	TC211P336◎004□	1.32	20.0	4.5
33.0	A	TC211A336◎004□	1.32	6.0	4.0
33.0	K	TC211K336◎004□	1.3	10.0	1.7
33.0	B	TC211B336◎004□	1.32	6.0	3.5
33.0	C	TC211C336◎004□	1.32	6.0	1.8
47.0	A	TC211A476◎004□	1.88	6.0	3.0
47.0	B	TC211B476◎004□	1.88	6.0	3.0
47.0	C	TC211C476◎004□	1.88	6.0	1.8
68.0	B	TC211B686◎004□	2.72	6.0	3.5
68.0	C	TC211C686◎004□	2.72	6.0	1.6
68.0	D	TC211D686◎004□	2.72	6.0	0.8
100.0	A	TC211A107◎004□	4.0	18.0	5.0
100.0	B	TC211B107◎004□	4.0	8.0	2.0
100.0	C	TC211C107◎004□	4.0	8.0	1.3
100.0	D	TC211D107◎004□	4.0	8.0	0.8
150.0	B	TC211B157◎004□	6.0	15.0	2.0
150.0	C	TC211C157◎004□	6.0	8.0	1.2
150.0	D	TC211D157◎004□	6.0	8.0	0.8

Capacitance (μF)	Case	Part Number	DCL (μA) +25℃ Max.	DF(%) +25℃ 120Hz Max.	ESR(Ω) +25℃ 100kHz Max.
220.0	B	TC211B227◎004□	8.8	15.0	0.5
220.0	C	TC211C227◎004□	8.8	8.0	1.0
220.0	D	TC211D227◎004□	8.8	8.0	0.8
330.0	B	TC211B337◎004□	13.2	18.0	1.2
330.0	C	TC211C337◎004□	13.2	8.0	1.2
330.0	D	TC211D337◎004□	13.2	8.0	0.7
330.0	E	TC211E337◎004□	13.2	8.0	0.7
470.0	E	TC211E477◎004□	18.8	8.0	0.8
680.0	E	TC211E687◎004□	27.2	8.0	0.5
6.3V, +85℃ (4.0V @ +125℃)					
1.0	P	TC211P105◎006□	0.5	6.0	25.0
1.0	A	TC211A105◎006□	0.5	6.0	14.0
1.5	P	TC211P155◎006□	0.5	8.0	25.0
1.5	A	TC211A155◎006□	0.5	6.0	8.0
2.2	P	TC211P225◎006□	0.5	8.0	20.0
2.2	A	TC211A225◎006□	0.5	6.0	8.0
3.3	P	TC211P335◎006□	0.5	6.0	10.0
3.3	A	TC211A335◎006□	0.5	6.0	8.0
4.7	P	TC211P475◎006□	0.5	6.0	10.0
4.7	A	TC211A475◎006□	0.5	6.0	6.0
6.8	P	TC211P685◎006□	0.5	6.0	10.0
6.8	A	TC211A685◎006□	0.5	6.0	6.0
6.8	B	TC211B685◎006□	0.5	6.0	3.5
10.0	P	TC211P106◎006□	0.63	8.0	10.0
10.0	A	TC211A106◎006□	0.63	6.0	4.0
10.0	B	TC211B106◎006□	0.63	6.0	3.5
15.0	P	TC211P156◎006□	0.94	10.0	7.0
15.0	A	TC211A156◎006□	0.94	6.0	4.0
15.0	K	TC211K156◎006□	0.9	6.0	2.0
15.0	B	TC211B156◎006□	0.94	6.0	3.5
22.0	P	TC211P226◎006□	1.3	18.0	6.0
22.0	A	TC211A226◎006□	1.38	6.0	4.0
22.0	K	TC211K226◎006□	1.3	10.0	1.8
22.0	B	TC211B226◎006□	1.38	6.0	3.5
33.0	A	TC211A336◎006□	2.07	8.0	4.5
33.0	K	TC211K336◎006□	2.1	10.0	1.8
33.0	B	TC211B336◎006□	2.07	6.0	3.0
33.0	C	TC211C336◎006□	2.07	6.0	1.8
47.0	A	TC211A476◎006□	2.96	8.0	3.5
47.0	K	TC211K476◎006□	3.0	12.0	1.8
47.0	B	TC211B476◎006□	2.96	6.0	3.0
47.0	C	TC211C476◎006□	2.96	6.0	1.6
68.0	B	TC211B686◎006□	4.28	10.0	1.2
68.0	C	TC211C686◎006□	4.28	6.0	1.0
68.0	D	TC211D686◎006□	4.28	6.0	0.8
100.0	A	TC211A107◎006□	6.3	20.0	4.0
100.0	B	TC211B107◎006□	6.3	10.0	3.0
100.0	C	TC211C107◎006□	6.3	8.0	1.2
100.0	D	TC211D107◎006□	6.3	8.0	0.8
150.0	B	TC211B157◎006□	9.45	15.0	1.0
150.0	C	TC211C157◎006□	9.45	8.0	1.2

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SPECIFICATIONS

Capacitance (μF)	Case	Part Number	DCL (μA) +25°C Max.	DF(%) +25°C 120Hz Max.	ESR(Ω) +25°C 100kHz Max.
150.0	D	TC211D157◎006□	9.45	8.0	0.8
220.0	B	TC211B227◎006□	13.86	18.0	1.0
220.0	C	TC211C227◎006□	13.86	8.0	1.2
220.0	D	TC211D227◎006□	13.86	8.0	0.7
220.0	E	TC211E227◎006□	13.86	8.0	0.5
330.0	D	TC211D337◎006□	20.79	8.0	0.5
330.0	E	TC211E337◎006□	20.79	8.0	0.5
470.0	D	TC211D477◎006□	29.61	12.0	0.4
470.0	E	TC211E477◎006□	29.61	10.0	0.5
10V, +85°C (6.3V @ +125°C)					
0.68	P	TC211P684◎010□	0.5	4.0	28.0
1.0	P	TC211P105◎010□	0.5	10.0	25.0
1.0	A	TC211A105◎010□	0.5	4.0	13.0
1.5	P	TC211P155◎010□	0.5	10.0	10.0
1.5	A	TC211A155◎010□	0.5	6.0	8.0
2.2	P	TC211P225◎010□	0.5	6.0	10.0
2.2	A	TC211A225◎010□	0.5	6.0	8.0
3.3	P	TC211P335◎010□	0.5	6.0	15.0
3.3	A	TC211A335◎010□	0.5	6.0	6.0
4.7	P	TC211P475◎010□	0.5	6.0	10.0
4.7	A	TC211A475◎010□	0.5	6.0	6.0
4.7	K	TC211K475◎010□	0.5	6.0	3.0
4.7	B	TC211B475◎010□	0.5	6.0	3.5
6.8	P	TC211P685◎010□	0.68	8.0	5.0
6.8	A	TC211A685◎010□	0.68	6.0	6.0
6.8	K	TC211K685◎010□	0.7	8.0	3.5
6.8	B	TC211B685◎010□	0.68	6.0	3.5
10.0	P	TC211P106◎010□	1.0	15.0	10.0
10.0	A	TC211A106◎010□	1.0	6.0	4.0
10.0	K	TC211K106◎010□	1.0	6.0	2.2
10.0	B	TC211B106◎010□	1.0	6.0	3.5
10.0	C	TC211C106◎010□	1.0	6.0	1.8
15.0	A	TC211A156◎010□	1.5	6.0	6.0
15.0	B	TC211B156◎010□	1.5	6.0	3.5
15.0	C	TC211C156◎010□	1.5	6.0	1.8
22.0	A	TC211A226◎010□	2.2	8.0	4.0
22.0	K	TC211K226◎010□	2.2	8.0	2.2
22.0	B	TC211B226◎010□	2.2	6.0	3.0
22.0	C	TC211C226◎010□	2.2	6.0	1.8
33.0	A	TC211A336◎010□	3.3	15.0	6.0
33.0	B	TC211B336◎010□	3.3	6.0	3.5
33.0	C	TC211C336◎010□	3.3	6.0	1.6
33.0	D	TC211D336◎010□	3.3	6.0	0.8
47.0	A	TC211A476◎010□	4.7	15.0	4.0
47.0	B	TC211B476◎010□	4.7	6.0	1.0
47.0	C	TC211C476◎010□	4.7	6.0	1.2
47.0	D	TC211D476◎010□	4.7	6.0	0.8
68.0	C	TC211C686◎010□	6.8	6.0	1.2
68.0	D	TC211D686◎010□	6.8	6.0	0.8
100.0	B	TC211B107◎010□	10.0	15.0	1.5
100.0	C	TC211C107◎010□	10.0	8.0	1.2

Capacitance (μF)	Case	Part Number	DCL (μA) +25°C Max.	DF(%) +25°C 120Hz Max.	ESR(Ω) +25°C 100kHz Max.
100.0	D	TC211D107◎010□	10.0	8.0	0.7
150.0	C	TC211C157◎010□	15.0	10.0	0.9
150.0	D	TC211D157◎010□	15.0	8.0	0.7
150.0	E	TC211E157◎010□	15.0	8.0	0.5
220.0	D	TC211D227◎010□	22.0	8.0	0.5
220.0	E	TC211E227◎010□	22.0	8.0	0.5
330.0	D	TC211D337◎010□	33.0	10.0	0.5
330.0	E	TC211E337◎010□	33.0	10.0	0.5
470.0	E	TC211E477◎010□	47.0	10.0	0.5
16V, +85°C (10V @ +125°C)					
0.47	P	TC211P474◎016□	0.5	6.0	25.0
0.68	P	TC211P684◎016□	0.5	6.0	25.0
1.0	P	TC211P105◎016□	0.5	6.0	25.0
1.0	A	TC211A105◎016□	0.5	4.0	10.0
1.5	P	TC211P155◎016□	0.5	6.0	20.0
1.5	A	TC211A155◎016□	0.5	6.0	8.0
2.2	P	TC211P225◎016□	0.5	6.0	25.0
2.2	A	TC211A225◎016□	0.5	6.0	6.0
2.2	B	TC211B225◎016□	0.5	6.0	4.0
3.3	A	TC211A335◎016□	0.52	6.0	6.0
3.3	B	TC211B335◎016□	0.52	6.0	3.5
4.7	P	TC211P475◎016□	0.80	18.0	15.0
4.7	A	TC211A475◎016□	0.75	6.0	6.0
4.7	K	TC211K475◎016□	0.8	6.0	3.0
4.7	B	TC211B475◎016□	0.75	6.0	3.5
4.7	C	TC211C475◎016□	0.8	6.0	2.4
6.8	A	TC211A685◎016□	1.08	6.0	7.0
6.8	K	TC211K685◎016□	1.1	8.0	3.5
6.8	B	TC211B685◎016□	1.08	6.0	3.5
6.8	C	TC211C685◎016□	1.08	6.0	2.0
10.0	A	TC211A106◎016□	1.6	8.0	7.0
10.0	K	TC211K106◎016□	1.6	10.0	3.5
10.0	B	TC211B106◎016□	1.6	6.0	2.8
10.0	C	TC211C106◎016□	1.6	6.0	1.8
15.0	B	TC211B156◎016□	2.4	6.0	3.0
15.0	C	TC211C156◎016□	2.4	6.0	1.8
22.0	A	TC211A226◎016□	3.52	15.0	4.0
22.0	B	TC211B226◎016□	3.52	8.0	2.2
22.0	C	TC211C226◎016□	3.52	6.0	1.6
22.0	D	TC211D226◎016□	3.52	6.0	0.8
33.0	B	TC211B336◎016□	5.28	8.0	2.0
33.0	C	TC211C336◎016□	5.28	6.0	1.2
33.0	D	TC211D336◎016□	5.28	6.0	0.8
47.0	B	TC211B476◎016□	7.52	18.0	1.0
47.0	C	TC211C476◎016□	7.52	6.0	1.2
47.0	D	TC211D476◎016□	7.52	6.0	0.8
68.0	D	TC211D686◎016□	10.8	6.0	0.8
100.0	C	TC211C107◎016□	16.0	10.0	1.0
100.0	D	TC211D107◎016□	16.0	8.0	0.7
150.0	D	TC211D157◎016□	24.0	12.0	0.7
150.0	E	TC211E157◎016□	24.0	8.0	0.5

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SPECIFICATIONS

Capacitance (μF)	Case	Part Number	DCL (μA) +25°C Max.	DF(%) +25°C 120Hz Max.	ESR(Ω) +25°C 100kHz Max.
220.0	D	TC211D227◎016□	35.2	15.0	0.9
220.0	E	TC211E227◎016□	35.2	10.0	0.5
330.0	E	TC211E337◎016□	52.8	10.0	0.5
20V, +85°C (13V @ +125°C)					
0.1	P	TC211P104◎020□	0.5	4.0	25.0
0.15	P	TC211P154◎020□	0.5	4.0	25.0
0.22	P	TC211P224◎020□	0.5	4.0	25.0
0.33	P	TC211P334◎020□	0.5	4.0	25.0
0.47	P	TC211P474◎020□	0.5	4.0	25.0
0.68	P	TC211P684◎020□	0.5	4.0	25.0
0.68	A	TC211A684◎020□	0.5	4.0	12.0
1.0	P	TC211P105◎020□	0.5	6.0	15.5
1.0	A	TC211A105◎020□	0.5	4.0	10.0
1.5	A	TC211A155◎020□	0.5	6.0	8.0
1.5	B	TC211B155◎020□	0.5	6.0	5.0
2.2	A	TC211A225◎020□	0.5	6.0	7.0
2.2	B	TC211B225◎020□	0.5	6.0	3.5
3.3	A	TC211A335◎020□	0.66	6.0	7.0
3.3	B	TC211B335◎020□	0.66	6.0	3.5
4.7	A	TC211A475◎020□	0.94	6.0	4.0
4.7	B	TC211B475◎020□	0.94	6.0	3.5
4.7	C	TC211C475◎020□	0.94	6.0	2.4
6.8	A	TC211A685◎020□	1.40	8.0	6.0
6.8	B	TC211B685◎020□	1.36	6.0	3.5
6.8	C	TC211C685◎020□	1.36	6.0	2.0
6.8	D	TC211D685◎020□	1.36	6.0	1.9
10.0	B	TC211B106◎020□	2.0	6.0	3.0
10.0	C	TC211C106◎020□	2.0	6.0	1.8
10.0	D	TC211D106◎020□	2.0	6.0	1.0
15.0	C	TC211C156◎020□	3.0	6.0	1.7
15.0	D	TC211D156◎020□	3.0	6.0	1.0
22.0	B	TC211B226◎020□	4.4	8.0	4.0
22.0	C	TC211C226◎020□	4.4	6.0	1.2
22.0	D	TC211D226◎020□	4.4	6.0	0.8
33.0	C	TC211C336◎020□	6.6	6.0	1.2
33.0	D	TC211D336◎020□	6.6	6.0	0.8
47.0	C	TC211C476◎020□	9.4	10.0	1.0
47.0	D	TC211D476◎020□	9.4	6.0	0.8
47.0	E	TC211E476◎020□	9.4	6.0	0.8
68.0	D	TC211D686◎020□	13.6	6.0	0.8
68.0	E	TC211E686◎020□	13.6	6.0	0.8
100.0	D	TC211D107◎020□	20.0	8.0	0.6
100.0	E	TC211E107◎020□	20.0	8.0	0.5
150.0	E	TC211E157◎020□	30.0	8.0	0.5
25V, +85°C (16V @ +125°C)					
0.22	A	TC211A224◎025□	0.5	4.0	15.0
0.33	A	TC211A334◎025□	0.5	4.0	15.0
0.47	A	TC211A474◎025□	0.5	4.0	14.0
0.47	P	TC211P474◎025□	0.5	4.0	13.0
0.68	A	TC211A684◎025□	0.5	4.0	7.0
1.0	P	TC211P105◎025□	0.5	6.0	12.0

Capacitance (μF)	Case	Part Number	DCL (μA) +25°C Max.	DF(%) +25°C 120Hz Max.	ESR(Ω) +25°C 100kHz Max.
1.0	A	TC211A105◎025□	0.5	4.0	8.0
1.0	B	TC211B105◎025□	0.5	4.0	5.0
1.5	A	TC211A155◎025□	0.5	6.0	10.0
1.5	B	TC211B155◎025□	0.5	6.0	5.0
2.2	A	TC211A225◎025□	0.6	6.0	6.0
2.2	B	TC211B225◎025□	0.55	6.0	4.5
2.2	C	TC211C225◎025□	0.55	6.0	3.5
3.3	A	TC211A335◎025□	0.82	6.0	7.0
3.3	B	TC211B335◎025□	0.82	6.0	3.5
3.3	C	TC211C335◎025□	0.82	6.0	2.5
4.7	A	TC211A475◎025□	1.17	8.0	6.0
4.7	B	TC211B475◎025□	1.17	6.0	2.0
4.7	C	TC211C475◎025□	1.17	6.0	2.4
6.8	B	TC211B685◎025□	1.7	6.0	3.0
6.8	C	TC211C685◎025□	1.7	6.0	1.9
6.8	D	TC211D685◎025□	1.7	6.0	1.2
10.0	B	TC211B106◎025□	2.5	6.0	3.0
10.0	C	TC211C106◎025□	2.5	6.0	1.5
10.0	D	TC211D106◎025□	2.5	6.0	1.0
15.0	B	TC211B156◎025□	3.75	8.0	4.0
15.0	C	TC211C156◎025□	3.75	6.0	1.5
15.0	D	TC211D156◎025□	3.75	6.0	1.0
22.0	C	TC211C226◎025□	5.5	6.0	1.4
22.0	D	TC211D226◎025□	5.5	6.0	0.8
33.0	D	TC211D336◎025□	8.25	6.0	0.8
33.0	E	TC211E336◎025□	8.25	6.0	0.7
47.0	D	TC211D476◎025□	11.7	6.0	0.8
47.0	E	TC211E476◎025□	11.7	6.0	0.7
68.0	E	TC211E686◎025□	17.0	6.0	0.7
100.0	D	TC211D107◎025□	25.0	10.0	1.2
35V, +85°C (20V @ +125°C)					
0.1	P	TC211P104◎035□	0.5	4.0	30.0
0.1	A	TC211A104◎035□	0.5	4.0	20.0
0.15	A	TC211A154◎035□	0.5	4.0	19.0
0.22	A	TC211A224◎035□	0.5	4.0	18.0
0.33	A	TC211A334◎035□	0.5	4.0	15.0
0.47	A	TC211A474◎035□	0.5	4.0	14.0
0.47	B	TC211B474◎035□	0.5	4.0	8.0
0.68	A	TC211A684◎035□	0.5	4.0	10.0
0.68	B	TC211B684◎035□	0.5	4.0	6.5
1.0	A	TC211A105◎035□	0.5	4.0	10.0
1.0	B	TC211B105◎035□	0.5	4.0	5.0
1.5	B	TC211B155◎035□	0.52	6.0	5.0
1.5	C	TC211C155◎035□	0.52	6.0	4.5
2.2	A	TC211A225◎035□	0.77	6.0	6.0
2.2	B	TC211B225◎035□	0.77	6.0	4.0
2.2	C	TC211C225◎035□	0.77	6.0	3.5
3.3	B	TC211B335◎035□	1.15	6.0	3.5
3.3	C	TC211C335◎035□	1.15	6.0	2.5
4.7	B	TC211B475◎035□	1.64	6.0	2.0
4.7	C	TC211C475◎035□	1.64	6.0	2.5

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SPECIFICATIONS

Capacitance (μ F)	Case	Part Number	DCL (μ A) +25°C Max.	DF(%) +25°C 120Hz Max.	ESR(Ω) +25°C 100kHz Max.
4.7	D	TC211D475 $\odot$ 035 $\square$	1.64	6.0	1.5
6.8	C	TC211C685 $\odot$ 035 $\square$	2.38	6.0	2.0
6.8	D	TC211D685 $\odot$ 035 $\square$	2.38	6.0	1.5
10.0	C	TC211C106 $\odot$ 035 $\square$	3.5	6.0	2.0
10.0	D	TC211D106 $\odot$ 035 $\square$	3.5	6.0	1.0
10.0	E	TC211E106 $\odot$ 035 $\square$	3.5	6.0	1.0
15.0	D	TC211D156 $\odot$ 035 $\square$	5.25	6.0	1.0
15.0	E	TC211E156 $\odot$ 035 $\square$	5.25	6.0	0.9
22.0	D	TC211D226 $\odot$ 035 $\square$	7.7	6.0	0.8
22.0	E	TC211E226 $\odot$ 035 $\square$	7.7	6.0	0.7
33.0	E	TC211E336 $\odot$ 035 $\square$	11.0	6.0	0.6
47.0	E	TC211E476 $\odot$ 035 $\square$	16.5	8.0	0.6
50V, +85°C (32V @ +125°C)					
0.1	A	TC211A104 $\odot$ 050 $\square$	0.5	4.0	22.0
0.15	A	TC211A154 $\odot$ 050 $\square$	0.5	4.0	19.0
0.15	B	TC211B154 $\odot$ 050 $\square$	0.5	4.0	16.0
0.22	A	TC211A224 $\odot$ 050 $\square$	0.5	4.0	18.0
0.22	B	TC211B224 $\odot$ 050 $\square$	0.5	4.0	14.0
0.33	A	TC211A334 $\odot$ 050 $\square$	0.5	4.0	15.0
0.33	B	TC211B334 $\odot$ 050 $\square$	0.5	4.0	10.0

Capacitance (μ F)	Case	Part Number	DCL (μ A) +25°C Max.	DF(%) +25°C 120Hz Max.	ESR(Ω) +25°C 100kHz Max.
0.47	A	TC211A474 $\odot$ 050 $\square$	0.5	4.0	3.0
0.47	B	TC211B474 $\odot$ 050 $\square$	0.5	4.0	9.0
0.47	C	TC211C474 $\odot$ 050 $\square$	0.5	4.0	8.0
0.68	A	TC211A684 $\odot$ 050 $\square$	0.5	4.0	4.0
0.68	B	TC211B684 $\odot$ 050 $\square$	0.5	4.0	8.0
0.68	C	TC211C684 $\odot$ 050 $\square$	0.5	4.0	7.0
1.0	B	TC211B105 $\odot$ 050 $\square$	0.5	6.0	6.0
1.0	C	TC211C105 $\odot$ 050 $\square$	0.5	4.0	5.5
1.5	B	TC211B155 $\odot$ 050 $\square$	0.75	6.0	4.5
1.5	C	TC211C155 $\odot$ 050 $\square$	0.75	6.0	3.5
2.2	B	TC211B225 $\odot$ 050 $\square$	1.1	6.0	2.0
2.2	C	TC211C225 $\odot$ 050 $\square$	1.1	6.0	3.5
2.2	D	TC211D225 $\odot$ 050 $\square$	1.1	6.0	2.5
3.3	B	TC211B335 $\odot$ 050 $\square$	1.65	6.0	1.7
3.3	C	TC211C335 $\odot$ 050 $\square$	1.65	6.0	3.0
3.3	D	TC211D335 $\odot$ 050 $\square$	1.65	6.0	2.0
4.7	D	TC211D475 $\odot$ 050 $\square$	2.35	6.0	1.5
6.8	D	TC211D685 $\odot$ 050 $\square$	3.4	6.0	1.2
10.0	D	TC211D106 $\odot$ 050 $\square$	5.0	6.0	1.0
10.0	E	TC211E106 $\odot$ 050 $\square$	5.0	6.0	0.7
15.0	E	TC211E156 $\odot$ 050 $\square$	7.5	6.0	0.7

※ $\odot$: Please specify the capacitance tolerance code (K=±10%, M=±20%)

※ $\square$: Please specify the internal code (A=Black molded case, Y=Yellow molded case)

Chip Solid Polymer Tantalum Capacitors– TC3 Series

Operating Temp.: -55℃~+105℃



FEATURES

- Meets or exceeds EIA-535BAAC standard
- Taped and reeled per EIA481-1
- Low profile options available
- 100% surge current test
- Green environmental protection
- Polymer cathode technology
- Ultra low ESR

APPLICATIONS

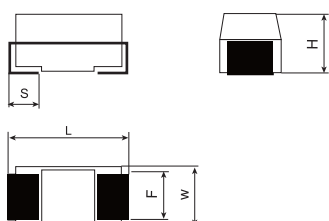
- Communication
- Consumer electronics
- Automotive electronics
- Instruments
- Medical electronics

PRODUCT IDENTIFICATION

<u>TC</u>	<u>311</u>	<u>B</u>	<u>107</u>	<u>M</u>	<u>004</u>	<u>A</u>	<u>(070)</u>																													
①	②	③	④	⑤	⑥	⑦	⑧																													
①	<table><tr><th colspan="2">Type</th></tr><tr><td>TC</td><td>Solid Tantalum Chip Capacitor</td></tr></table>		Type		TC	Solid Tantalum Chip Capacitor	②	<table><tr><th colspan="2">Series</th></tr><tr><td>311</td><td>Polymer</td></tr></table>		Series		311	Polymer	③	<table><tr><th colspan="2">External Dimensions (L×W) (mm)</th></tr><tr><td>A</td><td>3.2×1.6</td></tr><tr><td>B</td><td>3.5×2.8</td></tr><tr><td>C</td><td>6.0×3.2</td></tr><tr><td>D</td><td>7.3×4.3</td></tr></table>		External Dimensions (L×W) (mm)		A	3.2×1.6	B	3.5×2.8	C	6.0×3.2	D	7.3×4.3										
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④	<table><tr><th colspan="2">Nominal Capacitance</th></tr><tr><td>Example</td><td>Nominal Value</td></tr><tr><td>105</td><td>1.0μF</td></tr><tr><td>106</td><td>10μF</td></tr></table>		Nominal Capacitance		Example	Nominal Value	105	1.0μF	106	10μF	⑤	<table><tr><th colspan="2">Capacitance Tolerance</th></tr><tr><td>K</td><td>±10%</td></tr><tr><td>M</td><td>±20%</td></tr></table>		Capacitance Tolerance		K	±10%	M	±20%	⑥	<table><tr><th colspan="2">Rated DC Voltage</th></tr><tr><td>2R5</td><td>2.5Vdc</td></tr><tr><td>004</td><td>4Vdc</td></tr><tr><td>006</td><td>6.3Vdc</td></tr><tr><td>010</td><td>10Vdc</td></tr><tr><td>016</td><td>16Vdc</td></tr><tr><td>025</td><td>25Vdc</td></tr></table>		Rated DC Voltage		2R5	2.5Vdc	004	4Vdc	006	6.3Vdc	010	10Vdc	016	16Vdc	025	25Vdc
Nominal Capacitance																																				
Example	Nominal Value																																			
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010	10Vdc																																			
016	16Vdc																																			
025	25Vdc																																			
⑧	<table><tr><th colspan="2">ESR</th></tr><tr><td>035</td><td>35m Ω</td></tr><tr><td>070</td><td>70m Ω</td></tr></table>		ESR		035	35m Ω	070	70m Ω	⑦	<table><tr><th colspan="2">Internal Code</th></tr><tr><td>A</td><td>Black Molded Case</td></tr><tr><td>Y</td><td>Yellow Molded Case</td></tr></table>		Internal Code		A	Black Molded Case	Y	Yellow Molded Case																			
ESR																																				
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070	70m Ω																																			
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A	Black Molded Case																																			
Y	Yellow Molded Case																																			

SHAPE AND DIMENSIONS

Unit: mm [inch]



Case	EIA	L	W	H	F	S
A	3216-18	3.20±0.20 [.126±.008]	1.60±0.20 [.063±.008]	1.60±0.20 [.063±.008]	1.20±0.10 [.040±.004]	0.80±0.30 [.031±.012]
B	3528-21	3.50±0.20 [.138±.008]	2.80±0.20 [.110±.008]	1.90±0.20 [.075±.008]	2.20±0.10 [.087±.004]	0.80±0.30 [.030±.012]
C	6032-28	6.00±0.30 [.236±.012]	3.20±0.30 [.126±.012]	2.50±0.30 [.098±.012]	2.20±0.10 [.087±.004]	1.30±0.30 [.051±.012]
D	7343-31	7.30±0.30 [.287±.012]	4.30±0.30 [.169±.012]	2.80±0.30 [.110±.012]	2.40±0.10 [.094±.004]	1.30±0.30 [.051±.012]

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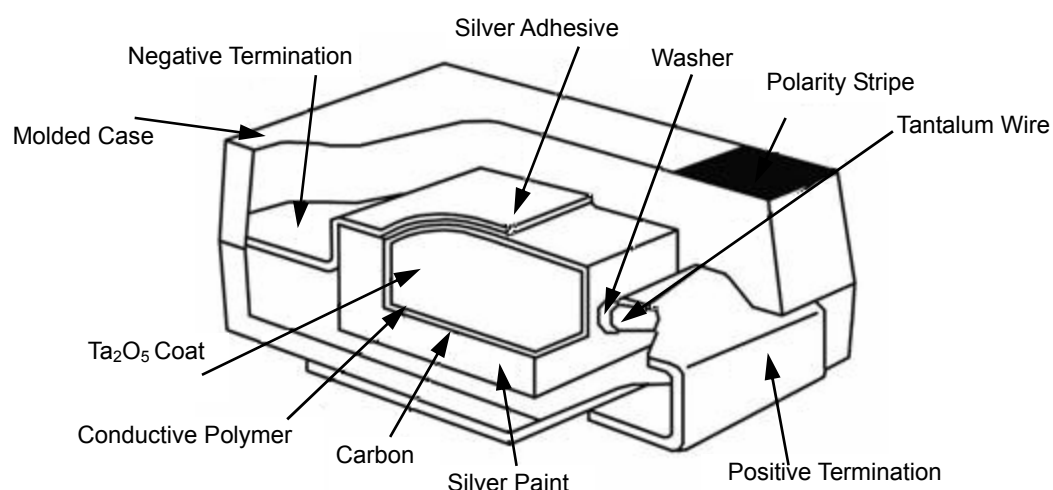
TECHNICAL SPECIFICATION

Item	SPEC								Test Condition
Operating Temp	-55℃~+105℃								
C _R Range	10μF~680μF								25℃, 120Hz
C _R Tolerance	±10% or ±20%								25℃, 120Hz
Rated Voltage (V _R)	2.0V	2.5V	4V	6.3V	10V	16V	20V	25V	-55℃~85℃
Category Voltage (V _C)	1.6V	2.0V	3.2V	5.0V	8.0V	12.8V	16V	20V	105℃
Surge Voltage (V _S)	2.6V	3.3V	5.2V	8.2V	13V	20.8V	26V	32.5V	-55℃~85℃
Surge Voltage (V _S)	2.1V	2.6V	4.2V	6.5V	10.4V	16.6V	20.8V	26V	105℃

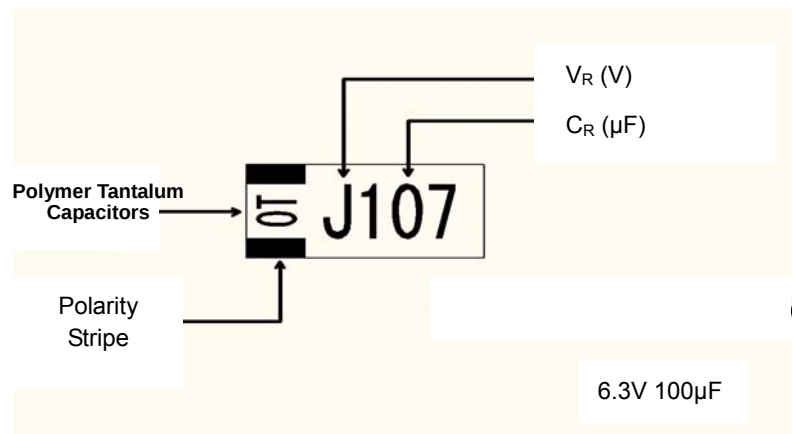
STANDARD C-V VALUE BY CASE CODE

Rated Voltage (V _R)		2.5	4	6.3	10	16	25
Voltage Code		e	G	J	A	C	E
C _R (μF)	C Code	Case Code					
10	106				A	B	
15	156						D
22	226			A			
33	336			A/B			D
47	476	A	A	A/B	B/C	D	
68	686			B/C			
100	107	B	A/B	B/C			
150	157	C	B	B/C/D			
220	227	B/C/D	B/C/D	C/D			
330	337	B/C/D	D				
470	477	D					
680	687	D					

CONSTRUCTION



MARKINGS



A/B/C/D Case Marking

Rated Voltage Code

Rated Voltage(V_R)	2.5	4	6.3	10	16	20	25
Code	e	G	J	A	C	D	E

Capacitance Code

Capacitance (μ F)	0.1	0.15	0.22	0.33	0.47	0.68	1.0	1.5	2.2	3.3	4.7	6.8
Code (A/B/C/D Case)	104	154	224	334	474	684	105	155	225	335	475	685
Capacitance (μ F)	10	15	22	33	47	68	100	150	220	330	470	680
Code (A/B/C/D Case)	106	156	226	336	476	686	107	157	227	337	477	687

SPECIFICATIONS

TC311 TYPE

Capacitance (μF)	Case	Part Number	DCL (μA) +25℃ Max.	DF (%) +25℃ 120Hz Max.	ESR(m Ω)+25℃ 100kHz Max.
2.5V, +85℃ (2.0V @ +105℃)					
47	A	TC311A476②2R5□(090)	12	8.0	90
100	B	TC311B107②2R5□(070)	25	8.0	70
150	C	TC311C157②2R5□(055)	38	8.0	55
220	B	TC311B227②2R5□(070)	55	8.0	70
220	C	TC311C227②2R5□(045)	55	8.0	45
220	D	TC311D227②2R5□(040)	55	10.0	40
330	B	TC311B337②2R5□(070)	83	8.0	70
330	C	TC311C337②2R5□(045)	83	8.0	45
330	D	TC311D337②2R5□(007)	83	10.0	7
470	D	TC311D477②2R5□(009)	118	10.0	9
680	D	TC311D687②2R5□(040)	170	10.0	40
4V, +85℃ (3.2V @ +105℃)					
47	A	TC311A476②004□(080)	19	8.0	80
100	A	TC311A107②004□(200)	40	8.0	200
100	B	TC311B107②004□(070)	40	8.0	70
150	B	TC311B157②004□(070)	60	8.0	70
220	B	TC311B227②004□(070)	88	8.0	70
220	C	TC311C227②004□(055)	88	8.0	55
220	D	TC311D227②004□(065)	88	10.0	65
330	D	TC311D337②004□(045)	132	10.0	45
6.3V, +85℃ (5.0V @ +105℃)					
22	A	TC311A226②006□(100)	14	8.0	100

Capacitance (μF)	Case	Part Number	DCL (μA) +25℃ Max.	DF (%) +25℃ 120Hz Max.	ESR(m Ω)+25℃ 100kHz Max.
33	A	TC311A336②006□(120)	21	8.0	120
33	B	TC311B336②006□(070)	21	8.0	70
47	A	TC311A476②006□(150)	30	8.0	150
47	B	TC311B476②006□(070)	30	8.0	70
68	B	TC311B686②006□(070)	43	8.0	70
68	C	TC311C686②006□(100)	43	8.0	100
100	B	TC311B107②006□(070)	63	8.0	70
100	C	TC311C107②006□(045)	63	8.0	45
150	B	TC311B157②006□(070)	95	8.0	70
150	C	TC311C157②006□(055)	95	8.0	55
150	D	TC311D157②006□(055)	95	10.0	55
220	C	TC311C227②006□(045)	139	8.0	45
220	D	TC311D227②006□(050)	139	10.0	50
10V, +85℃ (8.0V @ +105℃)					
10	A	TC311A106②010□(080)	10	8.0	80
47	B	TC311B476②010□(070)	47	8.0	70
47	C	TC311C476②010□(100)	47	8.0	100
16V, +85℃ (12.8V @ +105℃)					
10	B	TC311B106②016□(100)	16	8.0	100
47	D	TC311D476②016□(070)	75	10.0	70
25V, +85℃ (20V @ +105℃)					
15	D	TC311D156②025□(080)	38	10.0	80
33	D	TC311D336②025□(060)	82.5	10.0	60

※◎: Please specify the capacitance tolerance code (K=±10%, M=±20%)

※□: Please specify the internal code (A=Black molded case, Y=Yellow molded case)