TO : _____

DATE : 2003. . .

SPECIFICATION

PRODUCT : STARCAP

MODEL : DC SERIES

WRITTEN	CHECKED	APPROVED

KORCHIP Corporation

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S P E C I F I C A S I O N
STARCAP(ELECTRIC DOUBLE LAYER CAPACITOR)

1. SCOPE

THESE ARE THE SPECIFICATIONS OF STARCAP(ELECTRIC DOUBLE LAYER CAPACITOR) WHICH YOU ARE USING.
PLEASE STUDY THESE APPLICATIONS AND APPROVED THEM.

2. PART NUMBER SYSTEM

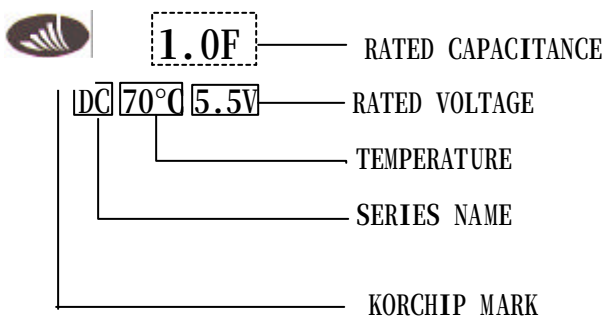
SC	DC	5R5	474	V
①	②	③	④	⑤

① STARCAP
② SERIES NAME
③ RATED VOLTAGE : 5.5Vdc
④ CAPACITANCE : 474 - 0.47F, 105 - 1.0F
⑤ LEAD TYPE : V - VERTICAL BULK
H - HORIZONTAL BULK C - CASE INSERT TYPE

3. CHARACTERISTICS

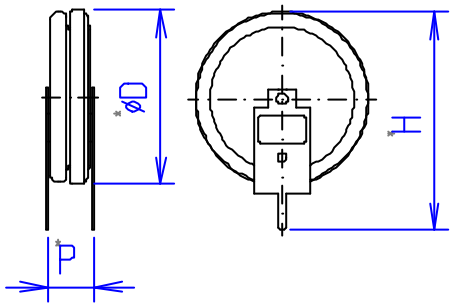
OPERATING TEMPERATURE	-25 ~ +70℃
RATED VOLTAGE	5.5 VDC
CAPACITANCE TOLERANCE	-20 ~ 80 %
EQUIVALENT SERIES RESISTANCE	0.22F : LESS THAN 75Ω 0.33F : LESS THAN 50Ω 0.47F : LESS THAN 60Ω 1.0 F : LESS THAN 30Ω
LEAKAGE CURRENT	0.22F : LESS THAN 330μA 0.33F : LESS THAN 500μA 0.47F : LESS THAN 710μA 1.0 F : LESS THAN 1500μA

4. MARKING

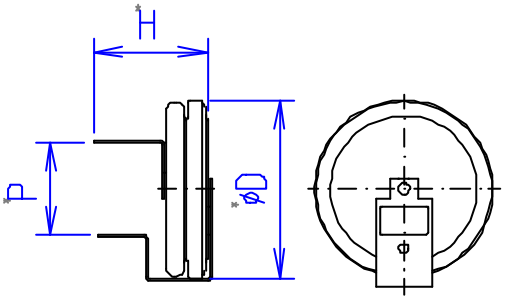


5. CONSTRUCTION AND DIMENSION

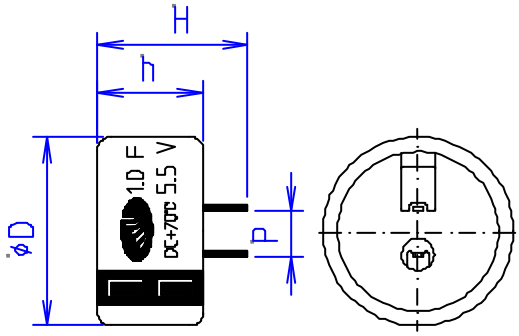
ITEMS	CAPACITANCE (F)	CAP TOL(%)	ESR (Ω)	LEAKAGE CURRENT(mA)
SCDC5R5224	0.22	-20 ~+80%	75 MAX	0.33 MAX
SCDC5R5334	0.33	-20 ~+80%	50 MAX	0.50 MAX
SCDC5R5474	0.47	-20 ~+80%	60 MAX	0.71 MAX
SCDC5R5105	1.0	-20 ~+80%	30 MAX	1.50 MAX



NO	ITEM	RATED VOLT	CAP	SIZE(mm)		
				ΦD	H	P
1	SCDC5R5224V	5.5VDC	0.22F	11.5	16.0	5.0
2	SCDC5R5334V	5.5VDC	0.33F	11.5	16.0	5.0
3	SCDC5R5474V	5.5VDC	0.47F	19.0	23.5	5.0
4	SCDC5R5105V	5.5VDC	1.0F	19.0	23.5	5.0



NO	ITEM	RATED VOLT	CAP	SIZE(mm)		
				ΦD	H	P
1	SCDC5R5224H	5.5VDC	0.22F	11.5	10.5	10.0
2	SCDC5R5334H	5.5VDC	0.33F	11.5	10.5	10.0
3	SCDC5R5474H	5.5VDC	0.47F	19.0	10.5	20.0
4	SCDC5R5105H	5.5VDC	1.0F	19.0	10.5	20.0



NO	ITEM	RATED VOLT	CAP	SIZE(mm)		
				ΦD	H	P
1	SCDC5R5224C	5.5VDC	0.22F	13.5	13.5	5.0
2	SCDC5R5334C	5.5VDC	0.33F	13.5	13.5	5.0
3	SCDC5R5474C	5.5VDC	0.47F	21.5	13.5	5.0
4	SCDC5R5105C	5.5VDC	1.0F	21.5	13.5	5.0

6. SPECIFICATIONS AND TEST METHOD

ITEM		SPECIFICATION		TEST CONDITION
OPERATING TEMP. RANGE		-25℃ ~+70℃		
RATED VOLTAGE		5.5VDC		
CAPACITANCE		0.22F ~1.0F		TO SEE MEASURE METHOD
CAPACITANCE TOLERANCE		+80% , -20%		TO SEE MEASURE METHOD
EQUIV. SERIES. RES.(ESR)		TO SEE CONSTRUCTION&DIM.		FRE.:1kHz,1mA,
LEAKAGE CURRENT(30 MIN)		TO SEE CONSTRUCTION&DIM.		VOLT:5V,TO SEE MEASURE METHOD RES.:0.022F ~0.047F 1000Ω 0.1F ~0.47F 100Ω 1.0F 10Ω
SURGE VOLTAGE	CAPACITANCE	MORE THAN90% SPEC. VALUE		TEMP:70±2℃,VOLT:6.3V CH.:30SEC,DISCH:5MIN30SEC CYCLE:1000CYCLE RESISTANCE: 0.022F:560Ω,0.047F:300Ω 0.1F:150Ω,0.22F:56Ω 0.33F:40Ω,0.47F:30Ω,1.0F:15Ω DISCHARGE RESISTANCE:0Ω
	ESR	LESS THAN 1.2TIMES SPECIFICATION VALUE		
	LC(30 MIN)			
	APPEARANCE	NO MARKED DEFECT		
TEMPERATURE CHARACTERISTICS	CAPACITANCE	STAGE 2	50%↑OF INI. VAL	
	ESR		3TIMES↓ OF INI. V	
	CAPACITANCE	STAGE 4	150%↓OF INI. VAL	
	ESR		SPEC. VALUE	
	LC(30 MIN)		1.5CV(mA) ↓	
	CAPACITANCE	STAGE 5	WITHIN±30% INI V	
	ESR		SPEC. VALUE	
	LC(30MIN)		SPEC. VALUE	
LEAD STRENGTH		LEAD TERMINAL SHALL NOT BE SEPARATED		LOAD 1kg , 10±1SEC
LEAD BEND STRENGTH				LOAD:1kg ANGLE 90° , 1 CYCLE
VIBRATION RESISTANCE	CAPACITANCE	SPEC. VALUE		AMPLITUDE:1.5mm FREQUENCY:10 ~55Hz DIRECTION:X,Y,Z 3DIRECTIONS TEST TIME:6HOURS
	ESR	SPEC. VALUE		
	LC(30MIN)	SPEC. VALUE		
	APPEARANCE	NO MARKED DEFECT		
SOLDER ABILITY		TERMINAL SHALL BE SOLDERED OVER THAN 3/4		SOLDER TEMP:230±5℃ IMMERSION TIME:5±0.5SEC DIP LENGTH:TO 1.6mm FROM THE BOTTOM OF BODY
SOLDERING EFFECT	CAPACITANCE	SPEC. VALUE		SOLDER TEMP:260±5℃ IMMERSION TIME:10±1SEC DIP LENGTH:TO 1.6mm FROM THE BOTTOM OF BODY
	ESR	SPEC. VALUE		
	LC(30MIN)	SPEC. VALUE		
	APPEARANCE	NO MARKED DEFECT		

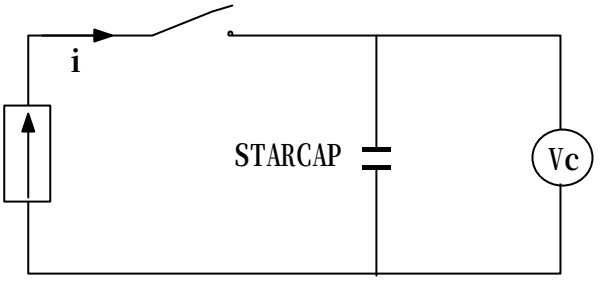
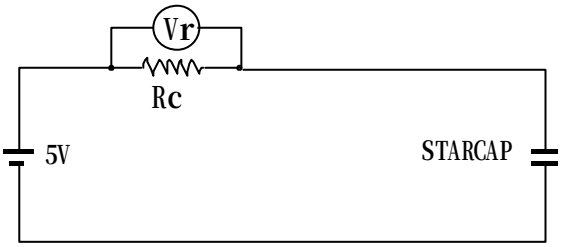
STAGE	TEMPERATURE
1	20±2℃
2	-25±2℃
3	20±2℃
4	70±2℃
5	20±2℃

ITEM		SPECIFICATION	TEST CONDITION	
TEMP. CYCLE	CAPACITANCE	SPEC. VALUE	TEMP:-25°C→20°C→70°C→20°C CYCLE:5CYCLE	
	ESR	SPEC. VALUE		
	LC(30MIN)	SPEC. VALUE		
	APPEARANCE	NO MARKED DEFECT		
HUMIDITY	CAPACITANCE	90%↑OF SPEC. VAL	TEMP:40±2°C HUMIDITY:90 ~95%RH TEST TIME:240±8HOURS	
	ESR	1.2TIMES↓ OF SPE. V		
	LC(30MIN)	1.2TIMES↓ OF SPE. V		
	APPEARANCE	NO MARKED DEFECT		
HIGH TEMP. LOADING	CAPACITANCE	70%↑OF SPEC. VAL	TEMP:70±2°C VOLT:WORKING VOLTAGE RESISTANCE:0Ω TEST TIME:1,000(+48,-0)HOURS	
	ESR	3TIMES↓ OF SPE. V		
	LC(30MIN)	3TIMES↓ OF SPE. V		
	APPEARANCE	NO MARKED DEFECT		
SELF DISCHARGE CHARACTERISTICS		MORE THAN 4.2V	CHARGING CONDITION	VOLTAGE:5.0V RESISTANCE:0Ω CHARGE TIME:24HOURS
			NEGLIGE-NCE CONDITION	24HOURS NEGLIGENCE IN OPEN STATE TEMP:LESS THAN25°C HUMIDITY:LESS THAN 70%RH

7. PACKING WAY

PRODUCT		QUANTITY(PCS)			SIZE(WxHxT)		WEIGHT
		VINYL BAG(☆) /TRAY (★)	INNER BOX	OUTER BOX	INNER BOX(㎜)	OUTER BOX(㎜)	
5.5V 0.22F	BULK	500 ☆	2,000	4,000	240*220*95	460*260*130	7KG
5.5V 0.33F	BULK	500 ☆	2,000	4,000	240*220*95	460*260*130	7KG
5.5V 0.47F	BULK[V]	100 ★	500	2,000	310*310*110	640*330*250	12KG
	BULK[C]						22KG
5.5V 1.0F	BULK[V]	100 ★	500	2,000	310*310*110	640*330*250	12KG
	BULK[C]						22KG

8.MEASURING METHOD OF CHARACTERISTICS

CAPACITANCE	1) CHARGE THE STARCAP WITH 10±0.1mA. 2) READ THE TIME TAKEN FOR THE VOLTAGE TO RISE FROM 2±0.05V TO 4±0.05V. THE TIME MEASURED IS INDICATED BY "T". 3) CALCULATE CAPACITANCE USING THE FOLLOWING FORMULA. C = (i/T) / Vc i : A T : SECOND Vc ; VOLTAGE (2V = 4V-2V) 
EQUIVALENT SERIES RESISTANCE	MEASURE ESR BY THE LCR METER. FREQUENCY : 1kHz BIAS VOLTAGE : 0V
LEAKAGE CURRENT	1) APPLY 5±0.1V TO THE STARCAP. 2) MEASURE Vr AFTER 30±0.5 MIN. 3) CALCULATE CURRENT USING THE FOLLOWING FORMULA. LC (AT 30 MINUTES) = Vr / Rc (A) Rc=10±0.1(Ω) 

☞ THE STARCAP SHOULD BE SHORTED BEFORE EACH MEASUREMENT AS FOLLOWS ;
CAPACITANCE : 60 MIN., ESR: 15 MIN., L C : 15 MIN.

9.CAUTION FOR USE

PLEASE BE CAREFUL FOLLOWING POINTS WHEN YOU USE STARCAP.

1) DON'T APPLY MORE THAN RATED VOLTAGE.
IF YOU APPLY MORE THAN RATED VOLTAGE, STARCAP'S ELECTROLYTE IS ELECTROLYZED. AND ITS ESR GETS HIGHER. AT THE WORST, IT IS BROKEN.

2) DON'T USE FOR RIPPLE ABSORPTION.

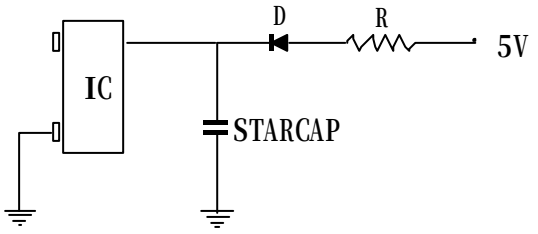
3) POLARITY
THE STARCAP IS NON-POLAR FUNDAMENTALLY. HOWEVER STARCAP IS MADE POLARITY, WHEN IT IS PACKED.
PLEASE MOUNT IT IN ACCORDANCE WITH ITS POLARITY FOR THE MAINTAINING BEST CONDITION.

4) OPERATING TEMPERATURE AND LIFE
GENERALLY SPEAKING, STARCAP HAS A LOWER LEAKAGE CURRENT, LONGER BACK-UP TIME AND LONGER LIFE IN THE LOW TEMP.
BUT, IT HAS A HIGHER LEAKAGE CURRENT, SHORTER BACK-UP TIME AND SHORTER LIFE IN THE HIGH TEMP.
PLEASE DESIGN TO KEEP STARCAP AWAY A CALORIFIC PARTS.

5) CLEANING
STARCAP IS A PROOF AGAINST CLEANING. CLEANING GUARANTEE IS AS FOLLOWS ;
SOLVENT : FREON TES45°C
ULTRASONIC WAVE : LESS THAN 38kHz, LESS THAN 20 Watt/Liter.
IMMERSING TIME : LESS THAN 10 MIN.
ULTRASONIC WAVE MUST NOT BE CENTERED.

6) SOLDERING
WHEN YOU SOLDER BY SOLDER IRON, PLEASE DO QUICKLY IT WITHIN 3SEC.
PLEASE DON'T TOUCH THE RESIN CASE OF STARCAP BY SOLDER IRON.
BECAUSE THE RESIN MAY BE MELTED BY ITS HEAT.

7) FOLLOWING FIGURE SHOWS THE GENERAL BACK-UP CIRCUIT.



D:DIODE FOR PROTECTION OF COUNTER
R:RESISTOR FOR PROTECTION OF ELECTRIC POWER SOURCE

8) SHORT CIRCUIT STARCAP
YOU CAN SHORT-CIRCUIT BETWEEN TERMINALS WITHOUT RESISTER.
HOWEVER WHEN YOU SHORT CIRCUIT FREQUENTLY, PLEASE LET US KNOW.
WE THINK THAT FREQUENTLY CONDITION IS AS FOLLOWS ;
CHARGE : 30 SEC., DISCHARGE : 30 SEC., CYCLE : 1000 CYCLE, TEMP. : 70°C

9) STORAGE
PLEASE STORE STARCAP IN FOLLOWING CONDITION ;
TEMP. : 15 ~35°C, HUMIDITY : 45 ~75%RH, NON-DUST

10) PLEASE DON'T DISASSEMBLE STARCAP. BECAUSE ITS ELECTROLYTE IS SULFURIC ACID.
IT'S DANGEROUS TO MANKIND.

11) WHEN YOU USE BOND CURE SKIN, PLEASE CONTACT US FOR ITS CONDITION.

12) SERIES CONNECTION OF STARCAP CAUSES A DIFFERENCE OF APPLIED VOLTAGE
FOR EACH STARCAP, BECAUSE OF DISPERSION OF CAPACITANCE AND ESR.
AS A RESULT, IT'S POSSIBLE TO APPLY OVER-RATED VOLTAGE.
PLEASE INFORM US IF YOU ARE USING STARCAP IN SERIES CONNECTION.
AND PLEASE DESIGN SO AS NOT TO APPLY OVER-RATED VOLTAGE TO EACH STARCAP,
AND USE STARCAPS IN SAME LOT.