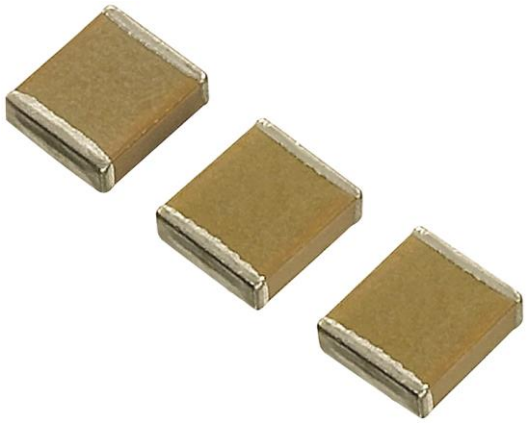
HIGH VOLTAGE CERAMIC CHIP CAPACITOR-SMD

Suntan®

TS18H

FEATURES

- Small size
- Excellent Break down voltage, low DF
- Suit to re-flow soldering, wave soldering, hand soldering

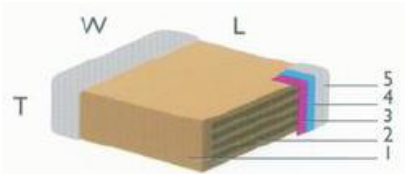


APPLICATIONS

- TS18H SMD is widely used in Analog & Digital Modems, LAN/WAN Interface, Lighting Ballast Circuits, Voltage Multipliers, DC-DC Converter, Back-lighting Inverters.

◆ OUTSIDE DIMENSION

Type		Dimensions (mm)			
British expression	**Metric expression**	L	W	T /Code	
0603	1608	1.60±0.10	0.80±0.10	0.80±0.10	C
0603*1	1608	1.60±0.20*1	0.80±0.20*1	0.80±0.20*1	C
0603*3	1608	1.60-0/+0.3	0.80-0/+0.3	0.80-0/+0.3	C
0805	2012	2.00±0.10	1.25±0.10	0.60±0.10	B
				0.85±0.10	D
				1.25±0.20	F
0805*1	2012	2.00±0.20*1	1.25±0.20*1	0.60±0.10	B
				0.85±0.20	D
				1.25±0.20	F
1206	3216	3.20±0.20	1.60±0.20	0.85±0.10	D
				1.00±0.10	E
				1.25±0.20	F
				1.60±0.20	H
1206*1	3216	3.20±0.30*1	1.60±0.30*1	0.85±0.10	D
				1.00±0.10	E
				1.25±0.20	F
				1.60±0.30*1	H
1210	3225	3.20±0.30	2.5±0.20	0.85±0.10	D
				1.25±0.20	F
				1.60±0.20	H
				2.00±0.20	G
				2.50±0.30	M
1210*1	3225	3.20±0.40*1	2.5±0.30*1	0.85±0.10	D
				1.25±0.20	F
				1.60±0.30	H
				2.00±0.20	G
				2.50±0.30	M



*1 Stands for Capacitance Range: ≥1uF

*3 Stands for Capacitance Range: ≥10uF

Please do not hesitate to contact us if you have interested in the size of 2225, 2220, 1812 and 1808.

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SPECIFICATIONS	
Dielectric & Values	NPO X7R X5R X7T X7S X6S Y5V consult product pages of catalog for cap ranges and voltage rating
Terminations	Tin / Nickel
Voltage	100, 200, 250, 500, 630, 1000, 2000 VDC
Packing	tape and reel (0603, 0805, 1206, 1210)
Capacitance	0.2pF ~ 4.7uF
Tolerance	±0.1pF ~ +80-20%
Operating Temperature Range	NPO, X7R, X7T, X7S: -55 ~ +125℃； X6S: -55 ~ +105℃； X5R: -55 ~ +85℃； Y5V: -30 ~ +85℃
Types of Capacitor and Dielectric Material	NPO: The capacitor of this kind dielectric material is considered as Class Ⅰ capacitor, including general capacitor and high frequency NPO capacitor. The electrical properties of NPO capacitor are the most stable one and have little change with temperature, voltage and time. They are suited for applications where low losses and high stability are required, such as filters, oscillators, and timing circuits.
	X7R, X5R, X6S, X7T, X7S: material is a kind of material has high dielectric constant. The capacitor made of this kind material is considered as Class Ⅱ capacitor whose capacitance is higher than that of class Ⅰ. These capacitors are classified as having a semi stable temperature characteristic and used over a wide temperature range, such in these kinds of circuits, DC blocking, decoupling, bypassing, frequency discriminating etc.
	Y5V: The capacitor made of this kind of material is the highest dielectric constant of all ceramic capacitors. They are used over a moderate temperature range in application where high capacitance is required because of its unstable temperature coefficient, but where moderate losses and capacitance changes can be tolerated. Its capacitance and dissipation factors are sensible to measuring conditions, such as temperature and voltage, etc

Specification and Test Condition：

1. Appearance

Dielectrics	Specification	Testing Condition
NPO/X7R/X5R/X7T/X6S/X7S	1/10L＜L≤1/8L, 1/10W＜W≤1/8W, 1/10T＜T≤1/8T (None is acceptable All judged unqualified)	Visual inspection.

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2. Dimensions

Dielectrics	Specification	Testing Condition
NPO/X7R/X5R/X7T/X6S/X7S	Within the specified dimensions	Using calipers on micrometer

3. Capacitance

Dielectrics	Specification	Testing Condition
NPO	Within the specified tolerance A: ±0.05pF; B: ±0.1pF; C: ±0.25pF; D: ±0.5pF; J: ±5%	1.0±0.2Vrms, 1MHz±10% (C>1000 pF, 1.0±0.2Vrms, 1KHz±10%)
X7R/X5R/X7T/X6S/X7S	Within the specified tolerance J: ±5%; K: ±10%; M: ±20%	1.0±0.2Vrms, 1KHz±10% （Cp＞10uF,0.5±0.1Vrms,120±24Hz）

4. Dissipation Factor

Dielectrics	Specification				Testing Condition
NPO	Cp<30pF, Q≥400+20Cp; Cp≥30pF, Q≥1000				1.0±0.2Vrms,1MHz±10% ,25℃ (Cp>1000pF, 1.0±0.2Vrms,1KHz±10%)
X7R/X5R/X7T/X6S/ X7S	Type	U_R	Capacitance	DF	1.0±0.2Vrms, 1KHz±10%, (Cp＞10uF,0.5±0.1Vrms,120±24Hz)
	0402	＞25V	C≤0.1uF	≤7.0%	
			C＞0.1uF	≤10.0%	
	0603	＞25V	C≤0.1uF	≤5.0%	
			0.1uF<C≤0.22uF	≤7.0%	
			C＞0.22uF	≤10.0%	
	0805	＞25V	C≤0.47uF	≤7.0%	
			C＞0.47uF	≤10.0%	
	1206	＞25V	C<1uF	≤7.0%	
			1uF≤C<47uF	≤10.0%	

5. Insulation Resistance

Dielectrics	Specification	Testing Condition
NPO /X7R/ X5R/X7T/ X6S/X7S	U_R≤50V, More than 10 GΩ or 100Ω·F/CR, whichever is smaller.	U_R≤50V U_{Test}= U_R; Charge Time: 60±5 sec; Temperature: 25℃
NPO /X7R/X7T/X6S/ X7S	U_R＞50V, More than 4 GΩ or 100Ω·F/CR, whichever is smaller.	U_R≤400V U_{Test}= U_R; U_R＞400V U_{Test}=400V; Charge Time: 60±5 sec; Temperature: 25℃
Test Temperature: 25℃±3℃; Test Humidity: <70%RH.		

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6. Dielectric Strength

Dielectrics	Rated voltage range	Measuring Method
NPO	$U_R \leqslant 50V$	Force 300%Rated voltage for 5second. Max..current should not exceed 50mA.
X7R/X5R/X7T/X6S/X7S	$U_R \leqslant 50V$	Force 250%Rated voltage for 5second. Max..current should not exceed 50mA.
NPO /X7R/X7T/X7S	$100V \leqslant U_R < 500V$	Force 200%Rated voltage for 5second. Max..current should not exceed 50mA.
	$500V \leqslant U_R < 1000V$	Force 150%Rated voltage for 5second. Max..current should not exceed 50mA.
	$1000V \leqslant U_R < 2000V$	Force 150%Rated voltage for 5second. Max..current should not exceed 50mA.
	$U_R \geqslant 2000V$	Force 120%Rated voltage for 5second. Max..current should not exceed 50mA.

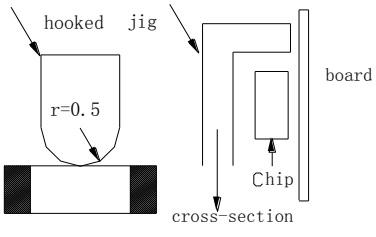
7. Temperature Coefficient of Capacitance

Dielectrics	Specification	Testing Condition
NPO	Temperature coefficient within ±30ppm/℃ Cp drift within ±0.2% or ±0.05pF	Measure capacitance under follow table list
X7R/X5R	Capacitance change within ±15%	
X7T	Capacitance change within ±22%, -33%	1) NPO The capacitance drift is calculated by dividing the differences between the maximum and minimum measured values in the step 1, 3 and 5. The temperature coefficient is determined using the Capacitance measured in step 3 as a reference. 2) X7R, X5R, X7T, X6S and X7S The ranges of capacitance change compared within the above 25℃ value over the temperature ranges shall be within the specified ranges.
X6S/X7S	Capacitance change within ±22%	

STEP	NPO, X7R, X7T	X6S	X5R	X7S
1	25 ±2	25 ±2	25 ±2	25 ±2
2	-55±3	-55±3	-55±3	-55±3
3	25 ±2	25 ±2	25 ±2	25 ±2
4	125±3	105±3	85 ±3	125±3
5	25 ±2	25 ±2	25 ±2	25 ±2

8. Adhesion

Dielectrics	Specification	Testing Condition
NPO/X7R/X5R/ X7T/X6S/X7S	No removal of the terminations or other defect shall occur.	The pressurizing force shall be 6N (=600g*f) and the duration of application shall be 10±1sec.



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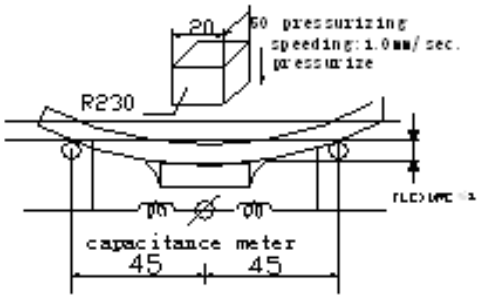
9. Solderability of Termination

Dielectrics	Specification	Testing Condition
NPO/X7R/X5R/ X7T/X6S/X7S	95% min. coverage of both terminal electrodes and less than 5% have pin holes or rough spots.	Solder temperature: 245±5℃ Dipping time: 2±1 seconds. Completely soak both terminal electrodes in solder

10. Resistance to leaching

Dielectrics	Specification	Testing Condition
NPO/X7R/X5R/ X7T/X6S/X7S	95% min. coverage of both terminal electrodes and less than 5% have pin holes or rough spots. No remarkable visual damage.	Solder temperature: 270±5℃ Preheated: 120℃~150℃/60sec Dipping time: 10±1 seconds. Completely soak both terminal electrodes in solder

11. Bending

Dielectrics	Specification	Testing Condition
NPO	No remarkable visual damage Cp change ≤ ±5% or ±0.5pF, whichever is larger.	Solder the capacitor on testing substrate and put it on testing stand. The middle part of substrate shall successively be pressurized by pressuring rod at a rated of about 1.0mm/sec. Until the deflection become means of the 1.0mm. 
X7R/X5R/X7T/ X6S/X7S	No remarkable visual damage Cp change ≤ ±10%	

12. Resistance to Soldering Heat

Dielectrics	Specification	Testing Condition
NPO	No remarkable visual damage Cp change within ±2.5% or ±0.25pF, whichever is larger. DF meets initial standard value. IR meets initial standard value.	Soldering temperature: 270±5℃ Preheating: 120~150℃ 60sec. Dipping time: 10±1 seconds. Measurement to be made after being kept at room temperature for 24±2 (NPO) or 48±4 (X7R, X5R, X7S, X7T, X6S) hours. Recovery for the following period under the standard condition after test. *Initial measurement for high dielectric constant type Perform a heat treatment at 140~150℃ for 1hr and let sit for 48±4hrs at room temperature. Perform the initial measurement.
X7R/X5R/X7T/ X6S/X7S	No remarkable visual damage Cp change within ±7.5% DF meets initial standard value. IR meets initial standard value.	

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13. Temperature Cycle

Dielectrics	Specification	Testing Condition
NPO	No remarkable visual damage Cp change within ±2.5% or ±0.25pF, whichever is larger.	To perform 5 cycles of the stated environment: Step / Temperature / Time 1 / Min. operating Temp.+0/-3℃ / 30min 2 / 25℃ / 2~3 min 3 / Max. operating Temp.+3/-0℃ / 30 min 4 / 25℃ / 2~3 min Measurement to be made after being kept at room temperature for 24±2hrs (NPO) or 48±4hrs (X7R, X5R, X7S, X7T, X6S) at room temperature, then measure. *Initial measurement for high dielectric constant type Perform a heat treatment at 140~150℃ for 1hr and let sit for 48±4hrs at room temperature. Perform the initial measurement.
X7R/X5R/X7T/ X6S/X7S	No remarkable visual damage Cp change within ±7.5%	

14. Moisture Resistance, steady state

Dielectrics	Specification	Testing Condition
NPO	No remarkable visual damage Cp change within ±5% or ±0.5pF, whichever is larger. Cp<10pF, Q≥200+10Cp; 10≤Cp<30pF, Q≥275+2.5Cp Cp≥30pF, Q≥350 R*C≥1000MΩ or 10Ω·F, whichever is smaller	Test temperature: 40±2℃ Humidity: 90~95% RH Testing time: 500 ±12hrs Measurement to be made after being kept at room temperature for 24±2hrs (NPO) or 48±4hrs (X7R, X5R, X7S, X7T, X6S) *Initial measurement for high dielectric constant type Perform a heat treatment at 140~150℃ for 1hr and let sit for 48±4hrs at room temperature. Perform the initial measurement.
X7R/X5R/X7T/ X6S/X7S	Cp change within ±12.5% DF: Not more than 2 times of initial value R*C≥1000MΩ or 10Ω·F, whichever is smaller	

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15. Damp heat with load

Dielectrics	Specification	Testing Condition
NPO	No remarkable visual damage Cp change≤±7.5% or ±0.75pF, whichever is larger. Cp<30pF, Q≥100+10/3*Cp Cp≥30pF, Q≥200 R*C≥500MΩ or 5Ω·F, whichever is smaller	Test temperature: 40±2℃ Humidity: 90~95% RH Voltage: 100% of the rated voltage Testing time: 500 ±12hrs Measurement to be made after being kept at room temperature for 24±2hrs (NPO) or 48±4hrs (X7R, X5R, X7S, X7T, X6S) *Apply the rated DC voltage for 1 hour at 40±2℃. Remove and let sit for 48±4hrs at room temperature. Perform the initial measurement.
X7R/X5R/X7T/ X6S/X7S	No remarkable visual damage Cp change≤±12.5% DF: Not more than 2 times of initial value R*C≥500MΩ or 5Ω·F, whichever is smaller	

16. Life Test

Dielectrics	Specification	Testing Condition
NPO	No remarkable visual damage Cp change≤±3% or ±0.3pF, whichever is larger. Q≥350 (Cp≥30pF) Q≥275+(2.5* Cp) (10pF≤Cp<30pF) Q≥200+10*Cp (Cp<10pF) R*C≥1000MΩ or 50Ω·F, whichever is smaller	Test temperature: Max. Operating Temp. ±3℃ Voltage: U_R＜100V 150% of the rated voltage (*Remarks) Testing time: 1000 hrs Measurement to be made after being kept at room temperature for 24±2hrs (NPO) or 48±4hrs (X7R, X5R, X7S, X7T, X6S) *Initial measurement for high dielectric constant type Apply 150% of the rated DC voltage for one hour at the maximum operating temperature ±3℃. Remove and let sit for 48±4hrs at room temperature. Perform the initial measurement
X7R/X5R/X7T/ X6S/X7S	No remarkable visual damage Cp change≤±12.5% DF: Not more than 2 times of initial value R*C≥1000MΩ or 5Ω·F, whichever is smaller	

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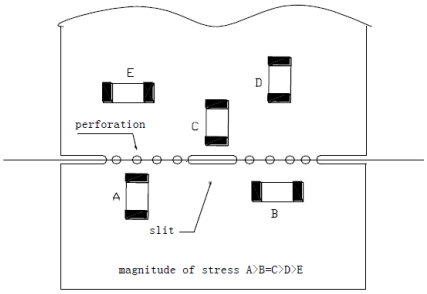
Precautions on the use of MLCC:

1. **G**eneral Precautions On The Use Of MLCC:

The Multi-layer Ceramic Capacitors MLCC may fail when subjected to severe conditions of electrical environment and mechanical stress beyond the specified "rating" and specified condition in the specification. Following the precautions for safety.

2. PCB Design

When breaking PC boards along their perforations, the amount if mechanical stress on the capacitors can vary according to the method used. The following methods are listed in order from least stressful to most stressful: push-back, silt, -grooving, and perforation. Thus, any ideal SMD capacitor layout must also consider the PCB splitting procedure.



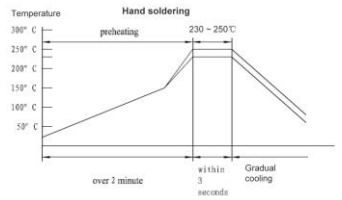
3. Considerations For Automatic Placement

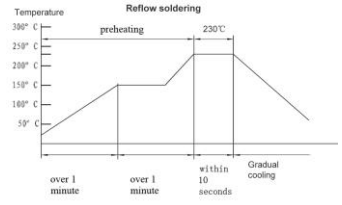
①. Excessive impact load should not be imposed on the capacitors when mounting the PC boards.
②. The maintenance and inspection of the mounters should be conducted periodically.

4. Soldering

The ceramic section and metal section combine to the MLCC. As the poor heat conductivity of the ceramic section ,ceramic chip capacitors are susceptible to thermal shock when exposed to rapid or concentrated heating or rapid cooling, especially for large s

When hand soldering, use a soldering iron with a maximum power of 20W and a maximum tip diameter of 1.0mm.The soldering iron should not touch the capacitor directly.





5. Breakaway PC Boards

When splitting the PC board after mounting capacitors and other components, care is required so as not to give any stresses of stresses of deflection or twisting to board.

Board separation should not be done manually, but by using the appropriate devices.

6. Storage Conditions

⑴ Keep the storage environment conditions as following: Temperature: 5~ 40 Humidity: ≤70% RH
⑵ Don't open the tape until the parts are to be used, and store them within one year since the date printed on the reel.
⑶ Use the chips within 3 months after the tape is opened.
⑷ The capacitance value of high dielectric constant capacitors (X7R,X5R,Y5V,X7T,X6S) will gradually decrease with the passage of time, so this should be taken into consideration in the circuit design. If such a capacitance reduction occurs, a heat treatment of 150 for 1 hour will return the capacitance to its initial level.

HIGH VOLTAGE CERAMIC CHIP CAPACITOR-SMD

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Capacitance & Voltage

	0603						
	NPO				X7R		
Cp/VDC	500	250	200	100	250	200	100
0R2	C	C	C	C			
0R3	C	C	C	C			
0R4	C	C	C	C			
0R5	C	C	C	C			
0R6	C	C	C	C			
0R7	C	C	C	C			
0R8	C	C	C	C			
0R9	C	C	C	C			
1R0	C	C	C	C			
1R1	C	C	C	C			
1R2	C	C	C	C			
1R3	C	C	C	C			
1R5	C	C	C	C			
1R6	C	C	C	C			
1R8	C	C	C	C			
2R0	C	C	C	C			
2R2	C	C	C	C			
2R4	C	C	C	C			
2R7	C	C	C	C			
3R0	C	C	C	C			
3R3	C	C	C	C			
3R6	C	C	C	C			
3R9	C	C	C	C			
4R0	C	C	C	C			
4R3	C	C	C	C			
4R7	C	C	C	C			
5R0	C	C	C	C			
5R1	C	C	C	C			
5R6	C	C	C	C			
6R0	C	C	C	C			
6R2	C	C	C	C			
6R8	C	C	C	C			
7R0	C	C	C	C			
7R5	C	C	C	C			
8R0	C	C	C	C			
8R2	C	C	C	C			
9R0	C	C	C	C			
9R1	C	C	C	C			
100	C	C	C	C			
120	C	C	C	C			
150	C	C	C	C			
180	C	C	C	C			
200	C	C	C	C			

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Capacitance & Voltage

	0603						
	NPO				X7R		
Cp/VDC	500	250	200	100	250	200	100
220	C	C	C	C			
270	C	C	C	C			
300	C	C	C	C			
330	C	C	C	C			
390	C	C	C	C			
470	C	C	C	C			
560	C	C	C	C			
680	C	C	C	C			
820	C	C	C	C			
101	C	C	C	C	C	C	C
121	C	C	C	C	C	C	C
151	C	C	C	C	C	C	C
181	C	C	C	C	C	C	
221		C	C	C	C	C	C
271		C	C	C	C	C	C
331		C	C	C	C	C	C
391		C	C	C	C	C	C
471		C	C	C	C	C	C
561				C	C	C	C
681				C	C	C	C
821				C	C	C	C
102				C	C	C	C
152					C	C	C
182					C	C	C
222					C	C	C
272					C	C	C
332					C	C	C
472					C	C	C
562					C	C	C
682					C	C	C
103							C
153							C
183							C
223							C
273							C
333							C
393							C
473							C
563							C
683							C
104							C

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Capacitance & Voltage

	0805					
	NPO				X7R	
Cp/VDC	630	500	250	100	250	100
0R2	B	B	B	B		
0R3	B	B	B	B		
0R4	B	B	B	B		
0R5	B	B	B	B		
0R6	B	B	B	B		
0R7	B	B	B	B		
0R8	B	B	B	B		
0R9	B	B	B	B		
1R0	B	B	B	B		
1R1	B	B	B	B		
1R2	B	B	B	B		
1R3	B	B	B	B		
1R5	B	B	B	B		
1R6	B	B	B	B		
1R8	B	B	B	B		
2R0	B	B	B	B		
2R2	B	B	B	B		
2R4	B	B	B	B		
2R7	B	B	B	B		
3R0	B	B	B	B		
3R3	B	B	B	B		
3R6	B	B	B	B		
3R9	B	B	B	B		
4R0	B	B	B	B		
4R3	B	B	B	B		
4R7	B	B	B	B		
5R0	B	B	B	B		
5R1	B	B	B	B		
5R6	B	B	B	B		
6R0	B	B	B	B		
6R2	B	B	B	B		
6R8	B	B	B	B		
7R0	B	B	B	B		
7R5	B	B	B	B		
8R0	B	B	B	B		
8R2	B	B	B	B		
9R0	B	B	B	B		
9R1	B	B	B	B		
100	B	B	B	B		
120	B	B	B	B		
150	B	B	B	B		
180	B	B	B	B		
200	B	B	B	B		
220	B	B	B	B		

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Capacitance & Voltage

	0805						
	NPO				X7R		X7S
Cp/VDC	630	500	250	100	250	100	100
270	B	B	B	B			
300	B	B	B	B			
330	B	B	B	B			
390	B	B	B	B			
470	B	B	B	B			
560	B	B	B	B			
680	B	B	B	B			
820	B	B	B	B			
101	B	B	B	B	B	B	
121	B	B	B	B	B	B	
151	B	B	B	B	B	B	
181	B	B	B	B	B	B	
201	B	B	B	B	B	B	
221	B	B	B	B	D	D	
271	B	B	B	B	D	D	
331	B	B	B	B	D/F	D/F	
391		D	B	B	D/F	D/F	
471		D	B	B	D/F	D/F	
561		D	B	B	D/F	D/F	
681		D	B	B	D/F	D/F	
821		D	B	B	D/F	D/F	
102		D	B	B	D/F	D/F	
152			B	B	D/F	D/F	
182				B	D/F	D/F	
222				B	D/F	D/F	
272					D/F	D/F	
332					D/F	D/F	
472					D/F	D/F	
562					D/F	D/F	
682					D/F	D/F	
103					D/F	D/F	
153					F	D/F	
183					F	D/F	
223					F	D/F	
273					F	D/F	
333					F	D/F	
393					F	D/F	
473					F	D/F	
563					F	D/F	
683					F	D/F	
104					F	D/F	
154						F	
184						F	
224						F	F

HIGH VOLTAGE CERAMIC CHIP CAPACITOR-SMD

Suntan®

TS18H

Capacitance & Voltage

	1206											
	NPO						X7R					
Cp/VDC	2000	1000	630	500	250	100	2000	1000	630	500	250	100
0R5	D	D	D	D	D	D						
1R0	D	D	D	D	D	D						
1R1	D	D	D	D	D	D						
1R2	D	D	D	D	D	D						
1R3	D	D	D	D	D	D						
1R5	D	D	D	D	D	D						
1R6	D	D	D	D	D	D						
1R8	D	D	D	D	D	D						
2R0	D	D	D	D	D	D						
2R2	D	D	D	D	D	D						
2R4	D	D	D	D	D	D						
2R7	D	D	D	D	D	D						
3R0	D	D	D	D	D	D						
3R3	D	D	D	D	D	D						
3R6	D	D	D	D	D	D						
3R9	D	D	D	D	D	D						
4R0	D	D	D	D	D	D						
4R3	D	D	D	D	D	D						
4R7	D	D	D	D	D	D						
5R0	D	D	D	D	D	D						
5R1	D	D	D	D	D	D						
5R6	D	D	D	D	D	D						
6R0	D	D	D	D	D	D						
6R2	D	D	D	D	D	D						
6R8	D	D	D	D	D	D						
7R0	D	D	D	D	D	D						
7R5	D	D	D	D	D	D						
8R0	D	D	D	D	D	D						
8R2	D	D	D	D	D	D						
9R0	D	D	D	D	D	D						
9R1	D	D	D	D	D	D						
100	D	D	D	D	D	D						
120	D	D	D	D	D	D						
150	D	D	D	D	D	D						
180	D	D	D	D	D	D						
200	D	D	D	D	D	D						
220	D/E	D	D	D	D	D						
270	D/E	D	D	D	D	D						
300	D/E	D	D	D	D	D						
330	D/E	D	D	D	D	D						
390	D/E	D	D	D	D	D						
470	D/E	D	D	D	D	D						
560	D/E	D	D	D	D	D						
680	D/E	D	D	D	D	D						
820	D/E	D	D	D	D	D						

TS18H

Capacitance & Voltage

	1206													
	NPO						X7R						X7S	
Cp/VDC	2000	1000	630	500	250	100	2000	1000	630	500	250	100	250	100
101	D/E	D/E	D	D	D	D	F	F	F	F	F			
121		D/E	D	D	D	D	F	F	F	F	F			
151		D/E	D	D	D	D	F	F	F	F	F			
181		D/E	D	D	D	D	F	F	F	F	F			
201		D/E	D	D	D	D	F	F	F	F	F			
101		D/E	D	D	D	D	F	F	F	F	F			
121		D/E	D	D	D	D	F	F	F	F	F			
151		D/E	D	D	D	D	F	F	F	F	F			
181		D/E	D	D	D	D	F	F	F	F	F			
221		D/E	D	D	D	D	F	F	F	F	F	D		
271		D/E	D	D	D	D	F	F	F	F	F	D		
331		D/E	D	D	D	D	F	F	F	F	F	D		
391			D	D	D	D	F	F	F	F	F	D		
471			D	D	D	D	F	F	F	F	F	D		
561			D	D	D	D	F	F	F	F	F	D		
681			D	D	D	D	F	F	F	F	F	D		
821			D	D	D	D	F	F	F	F	F	D		
102			D	D	D	D	F	F	F	F	F	D		
152			D	D	D	D	H	F	F	F	F	D		
182			D	D	D	D	H	F	F	F	F	D		
222			D	D	D	D	H	F	F	F	F	D		
272				D	D	D		F	F	F	F	D		
332				D	D	D		F	F	F	F	D		
472						D		F	F	F	F	D		
562						D		F	F	F	F	D		
682						D		F	F	F	F	D		
103						D		F	F	F	F	D		
153								H	F	F	F	D		
183									F	F	F	D		
223									F	F	F	D		
273									H	H	F	D		
333									H	H	F	D		
393									H	H	F	D		
473									H	H	F	D		
563										H	F	D		
683										H	F	D		
104										H	F	D		
154											H	D		
184											H	D		
224											H	D	H	D
274												D		D
334												D		D
474												F		F
684												F/H		F/H
105												H		H

HIGH VOLTAGE CERAMIC CHIP CAPACITOR-SMD

Suntan®

TS18H

Capacitance & Voltage

	1210												
	NPO					X7R						X7S	X7T
Cp/VDC	2000	1000	500	250	100	2000	1000	630	500	250	100	100	100
100	D												
120	D												
150	D												
180	D												
200	D												
220	D												
270	D												
300	D												
330	D												
390	D												
470	D												
560	D												
680	D												
820	D												
101	D	D	D	D	D								
121	F	D	D	D	D								
151	F	D	D	D	D								
181	F	D	D	D	D								
201	F	D	D	D	D								
221	F	D	D	D	D	F	F	F	F	F	F		
271		D	D	D	D	F	F	F	F	F	F		
331		D	D	D	D	F	F	F	F	F	F		
391		D	D	D	D	F	F	F	F	F	F		
471		D	D	D	D	F	F	F	F	F	F		
561		F	D	D	D	F	F	F	F	F	F		
681		F	D	D	D	F	F	F	F	F	F		
821		F	D	D	D	F	F	F	F	F	F		
102		F	D	D	D	F	F	F	F	F	F		
152			D	D	D	F	F	F	F	F	F		
182			D	D	D	F	F	F	F	F	F		
222			D	D	D	F	F	F	F	F	F		
272			F	D	D	H	F	F	F	F	F		
332				D	D	H	F	F	F	F	F		
472				D	D	H	F	F	F	F	F		
562							F	F	F	F	F		
682							F	F	F	F	F		
103							F	F	F	F	F		
153							F	F	F	F	F		
223							H	H	H	F	F		
333								H	H	F	F		
473								G	G	F	F		
563										F	F		
683										F	F		
104										F	F		
154										H	H		
224										G	H		
334											G		
374											G		
474											G	G	
684											H	H	
105											H	H	
225													M
475													M

Note: Specification are subject to change without notice. For more detail and update, please visit our website.