SMD Aluminium Electrolytic Capacitors

multicomp PRO

RoHS Compliant

Features

- Extra low impedance with temperature range -55°C to +105°C and load life of 1000~3000 hours.
- Low impedance 40~60 less than MCVKZ Series

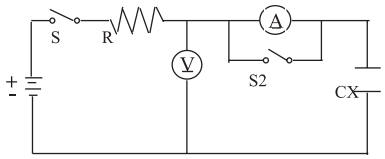
Specifications:

<table>
<tr><th>Items</th><th>Characteristics</th></tr>
<tr><td>Operating Temperature Range</td><td>-55°C to +105°C</td></tr>
<tr><td>Rated Voltage Range</td><td>6.3 to 50V DC</td></tr>
<tr><td>Capacitance Range</td><td>4.7 to 4,700µF</td></tr>
<tr><td>Leakage Current</td><td>For Ø4~Ø10, after 2 minutes application of rated voltage, leakage current is not more than 0.01CV or 3(µA), whichever is greater.
For Ø12.5~Ø16, after 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4(µA), whichever is greater.</td></tr>
<tr><td>(Tan δ)</td><td>
<table>
<tr><td colspan="8">Measurement Frequency: 120Hz. Temperature: 20°C</td></tr>
<tr><td colspan="2">Rated Voltage(V DC)</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr>
<tr><td rowspan="2">tan δ(Max)</td><td>Ø4~Ø10</td><td>0.22</td><td>0.19</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.12</td></tr>
<tr><td>Ø12.5~Ø16</td><td>0.26</td><td>0.22</td><td>0.18</td><td>0.16</td><td>0.14</td><td>0.12</td></tr>
</table>
</td></tr>
<tr><td>Stability at Low Temperature</td><td>
<table>
<tr><td colspan="9">Measurement Frequency: 120Hz.</td></tr>
<tr><td colspan="3">Rated Voltage (V DC)</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr>
<tr><td rowspan="4">Impedance ratio ZT/Z20 (max)</td><td rowspan="2">Ø4~Ø10</td><td>Z(-25°C)/Z(20°C)</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td></tr>
<tr><td>Z(-55°C)/Z(20°C)</td><td>5</td><td>4</td><td>4</td><td>3</td><td>3</td><td>3</td></tr>
<tr><td rowspan="2">Ø12.5~Ø16</td><td>Z(-25°C)/Z(20°C)</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td></tr>
<tr><td>Z(-55°C)/Z(20°C)</td><td>10</td><td>8</td><td>6</td><td>4</td><td>3</td><td>3</td></tr>
</table>
</td></tr>
<tr><td>Load Life</td><td>
<table>
<tr><td colspan="2">After 3000 hours (1000 hours for Φ4~Φ6.3x5.4, 2000 hours for Φ6.3x7.7 and Φ8) application of rated voltage at 105°C, capacitors meet the characteristics requirements listed at right.</td></tr>
<tr><td>Capacitance Change</td><td>Within ±30% of Initial Value</td></tr>
<tr><td>tan δ</td><td>200% or less of Initial Specified Value</td></tr>
<tr><td>Leakage Current</td><td>Initial Specified Value or less</td></tr>
</table>
</td></tr>
<tr><td>Shelf Life</td><td>After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above.</td></tr>
<tr><td>Resistance to Soldering Heat</td><td>
<table>
<tr><td rowspan="3">After reflow soldering and restored at room temperature, they meet the characteristics requirements listed at right.</td><td>Capacitance Change</td><td>Within ± 10% of Initial Value</td></tr>
<tr><td>tan δ</td><td>Initial Specified Value</td></tr>
<tr><td>Leakage Current</td><td>Initial Specified Value or less</td></tr>
</table>
</td></tr>
<tr><td>Applicable Standards</td><td>JIS C-5141 and JIS C-5102</td></tr>
</table>

Scope

This specification applies to aluminium electrolytic capacitor, used in electronic equipment.

Electrical Characteristics

<table>
<tr><th>Item</th><th>Test Method</th><th>Specification</th></tr>
<tr><td>Rated Voltage</td><td></td><td>Voltage range, capacitance range, see specification of this series.</td></tr>
<tr><td>Capacitance
Dissipation factor</td><td>Measuring frequency : 120 ±12Hz
Measuring voltage : ≦0.5Vrms + 0.5 ~ 2.0VDC
Measurement circuit :  </td><td>Voltage range, capacitance range, see specification of this series.
Dissipation factor, leakage current, see specification of this series.</td></tr>
<tr><td>Leakage current</td><td>DC leakage current shall be measured after 1~2 minutes application of the DC rated working voltage through the 1000Ω resistor at 20°C
 
R : 1000 ±100Ω S1 : Switch
A : DC current meter S2 : Switch for protect of current meter
V : DC voltage meter CX : Testing capacitor</td><td>Dissipation factor leakage current, see specification of this series.</td></tr>
<tr><td>Temperature characteristics</td><td><table><tr><th>Step</th><th>Temperature</th><th>Storage Time</th></tr><tr><td>1</td><td>20 ±2°C</td><td>30 minutes</td></tr><tr><td>2</td><td>-40 ±3°C</td><td>2 hours</td></tr><tr><td>3</td><td>20 ±2°C</td><td>15 minutes</td></tr><tr><td>4</td><td>105 ±2°C</td><td>2 hours</td></tr></table>Step 1. Measure the capacitance and impedance. (Z_{r0}) (|Z|, 20°C , 120Hz ±10%)
Step 2. Measure the impedance at thermal balance after 2 hours. (|Z|, 20°C , 120Hz ±10%)
Step 4. Measure the capacitance and leakage current at thermal balance after 2 hours.</td><td>Step 2. Impedance ratio (Z_r / Z_{r0}) less than specified value.
Step 4. Capacitance change : within ± 20% of the initial measured value.
Leakage current : Less than 10 times of initial specified value .</td></tr>
<tr><td>Surge test</td><td>Rated surge voltage shall be applied (switch on) for 30 ±5 seconds and then shall be applied (switch off) with discharge for 5 ±0.5 min at room temperature . This cycle shall be repeated for 1000 cycles.
Duration of one cycle is 6 ±0.5 minutes .</td><td rowspan="2">Capacitance change : within ± 20% of the initial specified value.
Dissipation factor : less than 200% of the initial specified value.
Leakage current : within initial specified value.</td></tr>
<tr><td>Applicable Ripple Current</td><td>The maximum A.C. current having frequency of 100kHz which can be applied to the capacitor at 105 ±2°C continuously. Peak voltage not to exceed rated D.C. voltage.</td></tr>
</table>

Item	Test Method	Specification

Mechanical characteristics

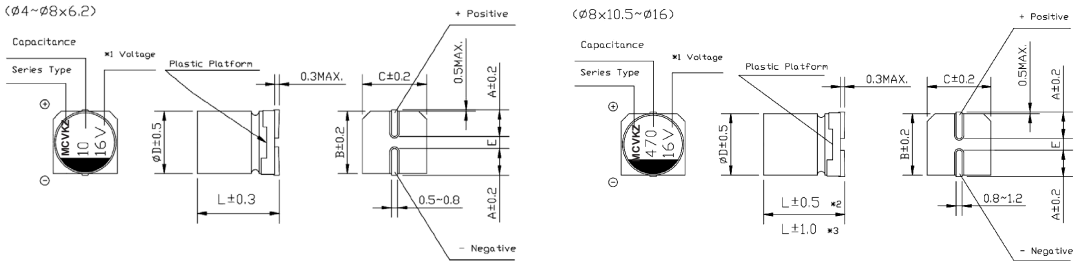
<table>
<tr>
<td>Lead strength</td>
<td>(A) Tensile strength :
wire lead terminal :
<table>
<tr><td>d (mm)</td><td>≦0.45</td><td>0.5 ~ 0.8</td><td>0.8<d ≦1.25</td></tr>
<tr><td>Load (kg)</td><td>0.51</td><td>1</td><td>2</td></tr>
</table>
Snap-in terminal
<table>
<tr><td>d (mm)</td><td>snap-in terminal</td></tr>
<tr><td>Load (kg)</td><td>2</td></tr>
</table>
The capacitor shall withstand the constant tensile force specified between the body and each lead for 10 seconds without damage either mechanical or electrical.
(B) Bending strength :
wire lead terminal :
<table>
<tr><td>d (mm)</td><td>≦0.45</td><td>0.5 ~ 0.8</td><td>0.8<d ≦1.25</td></tr>
<tr><td>Load (kg)</td><td>0.25</td><td>0.51</td><td>1</td></tr>
</table>
Snap-in terminal
<table>
<tr><td>Cross section area of terminal</td><td>Force (kg)</td></tr>
<tr><td>0.5<S≦1</td><td>1</td></tr>
<tr><td>S>1</td><td>2.5</td></tr>
</table>
With the capacitor in a vertical position apply the load specified axially to each lead. The capacitor shall be rotated slowly from the vertical to the horizontal position, back to the vertical position. The 90° in the opposite direction and back the original position. Performance of capacitor shall not have changed and leads shall be undamaged</td>
<td>When the capacitance is measured, there shall be no intermittent contacts, or open- or short-circuiting.
There shall be no such mechanical damage as terminal damage etc.</td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>The frequency of the vibration shall vary uniformly within the range 10 to 55 Hz with the amplitude of 1.5mm, completing the cycle in the internal of one minute.
The capacitor shall be securely mounted by its leads with hold the body of capacitor. The capacitor shall be vibrated in three mutually perpendicular directions for a period of 2 hours in each direction .</td>
<td>Capacitance : no unsteady.
Appearance : no abnormal.
Capacitance change : within ± 5% of initial measured value .</td>
</tr>
<tr>
<td>Solderability</td>
<td>The leads are dipped in the solder bath of Sn at 260 ±5°C for 2 ± 0.5 seconds . The dipping depth should be set at 1.5 ~ 2mm .</td>
<td>The solder alloy shall cover the 95% or more of the dipped lead’s area .</td>
</tr>
</table>

Reliability

Item	Test Method	Specification
Soldering heat resistance	The leads immerse in the solder bath of Sn at 260 ±5°C for 10 ± 1 seconds until a distance of 1.5 ~ 2mm from the case.	No damage or leakage of electrolyte. Capacitance change : within ± 10% of the initial measured value. Tan δ : less than specified value. Leakage current : less than specified value.
Damp heat (Steady state)	Subject the capacitors to 40 ±2°C and 90% to 95% relative humidity for 240 ±8 hours.	Capacitance change : within ±10% of the initial measured value. Tan δ : less than specified value. Leakage current : less than specified value.
Load life	After X hours continuous application of DC rated working voltage at 105 ±2°C, the measurements shall meet the following limits. Measurements shall be performed after 2 hours exposed at room temperature .	Standard of judgement is according to requirement of this series.
Shelf life	After storage for Y hours at 105 ±2°C without voltage application , the measurements shall meet the following limits. Measurements shall be performed after exposed for 1 to 2 hrs at room temperature after application of DC rated voltage to the capacitor for Z minutes .	
Storage at Low Temperature	The capacitor shall be stored at temperature of -40 ±3°C for 240 ±8 hours, during which time no voltage shall be applied. And then the capacitor shall be subjected to standard atmospheric conditions for 16 hours or more, after which measurements shall be made.	Capacitance change : within ±10% of the initial value. Tan δ : less than specified value. Leakage current : less than specified value Appearance : no abnormal.

MCVKZ Series

Dimensions:



1. Voltage mark [6V] represents 6.3V for Φ4~Φ10
2. L±0.3] is applicable to Φ6.3×7.7 and Φ8×6.2
3. [L±0.5] is applicable to Φ8×10.5~Φ10
4. [L±1.0] is applicable to Φ12.5~Φ16.

D × L	4×5.4	5×5.4	6.3×5.4	6.3×7.7	8×6.2	8×10.5	10 ×10.5	10×13.5	12.5×13.5	12.5×16	16×16.5
A	1.8	2.1	2.4	2.4	3.3	2.9	3.2	3.2	4.7	4.7	5.5
B	4.3	5.3	6.6	6.6	8.3	8.3	10.3	10.3	12.8	12.8	16.3
C	4.3	5.3	6.6	6.6	8.3	8.3	10.3	10.3	12.8	12.8	16.3
E ±0.2	1	1.3	2.2	2.2	2.2	3.1	4.4	4.4	4.4	4.4	6.7
L	5.4	5.4	5.4	7.7	6.2	10.5	10.5	13.5	13.5	16.0	16.5

Dimensions : Millimetres

Standard Ratings:

Cap (µF)	WV (Code)	6.3 (0J)			10 (1A)			16 (1C)		
10	100	-	-	-	-	-	-	4×5.4	1.8	80
15	150	-	-	-	-	-	-	4×5.4	1.8	80
22	220	4×5.4	1.8	80	4×5.4	1.8	80	5×5.4 (4×5.4)	0.76 (1.8)	150 (80)
33	330	5×5.4 (4×5.4)	0.76 (1.8)	150 (80)	5×5.4 (4×5.4)	0.76 (1.8)	150 (80)	6.3×5.4 (5×5.4)	0.44 (0.76)	230 (150)
47	470	5×5.4 (4×5.4)	0.76 (1.8)	150 (80)	6.3×5.4 (5×5.4)	0.44 (0.76)	230 (150)	6.3×5.4 (5×5.4)	0.44 (0.76)	230 (150)
56	560	5×5.4	0.76	150	6.3×5.4	0.44	230	6.3×5.4	0.44	230
68	680	6.3×5.4 (5×5.4)	0.44 (0.76)	230 (150)	6.3×5.4	0.44	230	6.3×7.7 (6.3×5.4) (8×6.2)	0.34 (0.44) (0.34)	280 (230) (280)
100	101	6.3×5.4 (5×5.4)	0.44 (0.76)	230 (150)	6.3×7.7 (6.3×5.4) (8×10.5)	0.34 (0.44) (0.34)	280 (230) (280)	6.3×7.7 (6.3×5.4) (8×10.5)	0.34 (0.44) (0.34)	280 (230) (280)
150	151	6.3×5.4	0.44	230	6.3×7.7	0.34	280	6.3×7.7	0.34	280
220	221	6.3×7.7 (6.3×5.4) (8×6.2)	0.34 (0.44) (0.34)	280 (230) (280)	6.3×7.7 (8×6.2)	0.34 (0.34)	280 (280)	8×10.5 (6.3×7.7)	0.17 (0.34)	450 (280)
330	331	6.3×7.7 (8×6.2)	0.34 (0.34)	280 (280)	8×10.5	0.17	450	10×10.5 (8×10.5)	0.09 (0.17)	670 (450)
470	471	8×10.5	0.17	450	10×10.5	0.17	450	10×10.5 (8×10.5)	0.09 (0.17)	670 (450)
680	681	10×10.5 (8×10.5)	0.09 (0.17)	670 (450)	10×10.5	0.09	670	10×13.5 (10×10.5)	0.075 (0.09)	800 (670)
1000	102	10×10.5 (8×10.5)	0.09 (0.17)	670 (450)	10×10.5	0.09	0.09	16×16.5 (12.5×16) (12.5×13.5)	0.055 (0.06) (0.065)	1350 (1050) (900)
1500	152	10×13.5 (10×10.5)	0.075 (0.09)	800 (670)	12.5×13.5	0.065	900	16×16.5	0.055	1350
2200	222	12.5×13.5	0.065	900	12.5×16	0.060	1050	16×16.5	0.055	1350
3300	332	12.5×16	0.06	1050	16×16.5	0.055	1350	Case Size	Impedance	Ripple Current
4700	472	16×16.5	0.055	1350	-	-	-			

Maximum Impedance (Ω) at 20°C 100kHz, Ripple Current (mA rms) at 105°C 100kHz

Cap (μF)	WV (Code)	25 (IE)			35 (1V)			50 (1H)		
4.7	4R7	-	-	-	4×5.4	1.8	80	5×5.4 (4×5.4)	1.52 (3.0)	85 (60)
10	100	4×5.4	1.8	80	5×5.4 4×5.4)	0.76 (1.8)	150 (80)	6.3×5.4 (5×5.4)	0.88 (1.52)	165 (85)
15	150	5×5.4	0.76	150	5×5.4	0.76	150	6.3×5.4	0.88	165
22	220	6.3×5.4 (5×5.4)	0.44 (0.76)	230 (150)	6.3×5.4 (5×5.4)	0.44 (0.76)	230 (150)	6.3×7.7 (6.3×5.4) (8×10.5)	0.68 (0.88) (0.68)	185 165) 185)
33	330	6.3×5.4 (5×5.4)	0.44 (0.76)	230 (150)	6.3×5.4 (8×10.5)	0.44 (0.34)	230 (280)	6.3×7.7 (8×6.2)	0.68 (0.68)	185 (185)
47	470	6.3×7.7 (6.3×5.4) (8×6.2)	0.34 (0.44) (0.34)	280 (230) (280)	6.3×7.7 (6.3×5.4) (8×10.5)	0.34 (0.44) (0.34)	280 (230) (280)	6.3×7.7 (8×6.2)	0.68 (0.68)	185 (185)
56	560	6.3×7.7 (6.3×5.4)	0.34 (0.44)	280 (230)	6.3×7.7	0.34	280	8×10.5 (6.3x7.7)	0.34 (0.68)	350 (185)
68	680	6.3×7.7	0.34	280	6.3×7.7	0.34	280	8×10.5	0.34	350
100	101	6.3×7.7 (8×6.2)	0.34 (0.34)	280 (280)	10×10.5	0.17	450	10×10.5 (8×10.5)	0.18 (0.34)	670 (350)
150	151	8×10.5 (6.3×7.7)	0.17 (0.34)	450 (280)	10×10.5	0.09	670	10×10.5	0.18	670
220	221	8×10.5	0.17	450	10×10.5	0.09	670	10×13.5 (10×10.5)	0.16 (0.18)	750 (670)
330	331	10×10.5 (8×10.5)	0.09 (0.17)	670 (450)	10×10.5	0.09	670	12.5×13.5	0.14	800
470	471	10×13.5 (10×10.5)	0.075 (0.09)	800 (670)	12.5×13.5 (10×13.5)	0.065 (0.075)	900 (800)	16×16.5 (12.5×16)	0.10 (0.12)	1150 (900)
680	681	12.5×13.5	0.065	900	12.5×16 (12.5×13.5)	0.060 (0.065)	1050 (900)	-	-	-
1000	102	16×16.5 (12.5×16)	0.055 (0.060)	1350 (1050)	16×16.5	0.055	1350	Case Size	Impedance	Ripple Current
1500	152	16×16.5	0.055	1350	-	-	-			

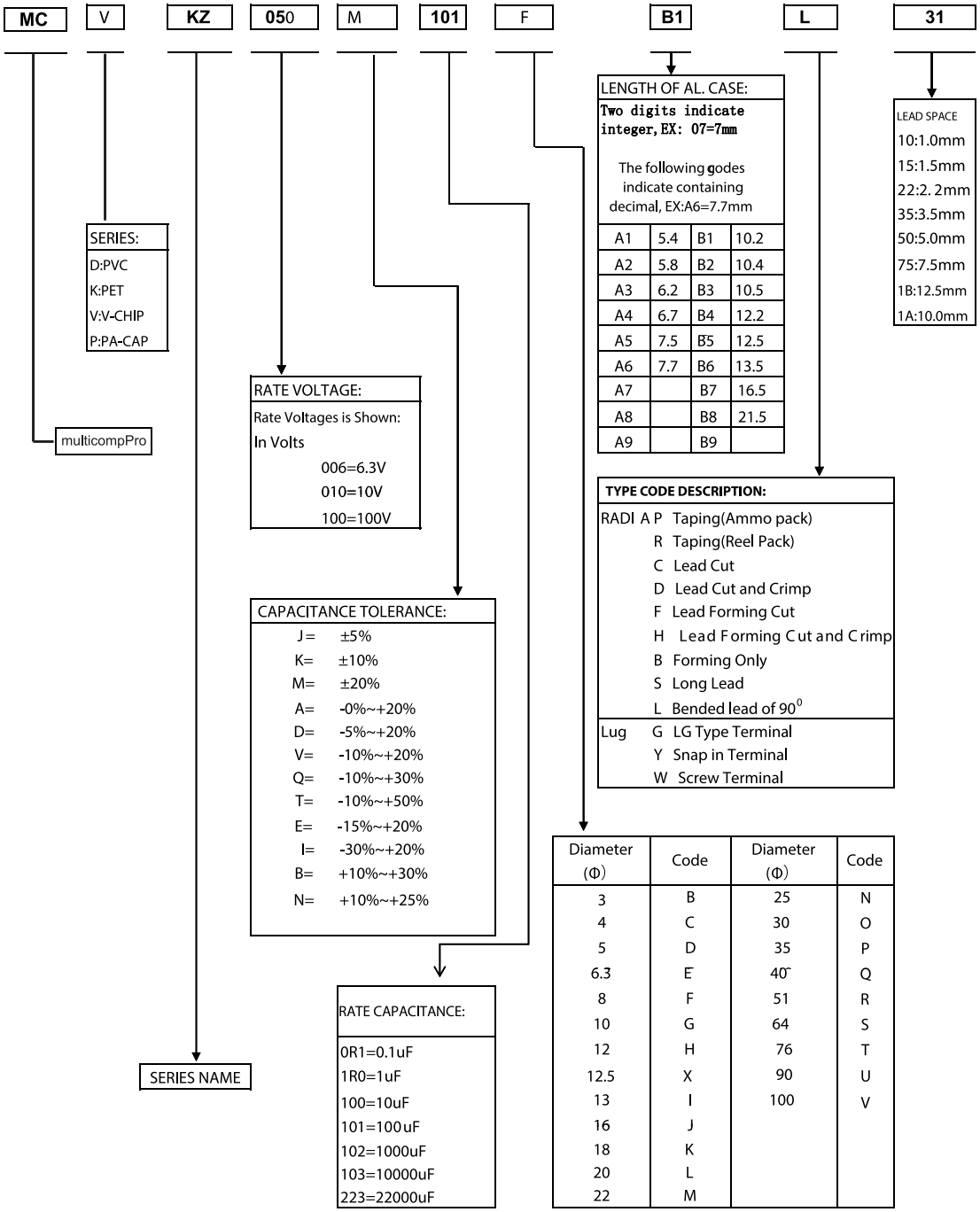
Maximum Impedance (Ω) at 20°C 100kHz, Ripple Current (mA rms) at 105°C 100kHz

Frequency Correction Factor of Rated Ripple Current

Capacitance (μF)	Frequency	50Hz	120Hz	300Hz	1kHz	10kHz~
Φ4 ~ Φ10	4.7~68	0.35	0.5	0.64	0.83	1
	100~1500	0.4	0.55	0.7	0.85	1
Φ12.5 ~ Φ16	~680	0.45	0.65	0.8	0.9	1
	1000~4700	0.65	0.85	0.95	1	1

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

Explanation of parts numbers



Diameter (Φ)	Code	Diameter (Φ)	Code
3	B	25	N
4	C	30	O
5	D	35	P
6.3	E	40	Q
8	F	51	R
10	G	64	S
12	H	76	T
12.5	X	90	U
13	I	100	V
16	J		
18	K		
20	L		
22	M		