

LOW IMPEDANCE

低阻抗品

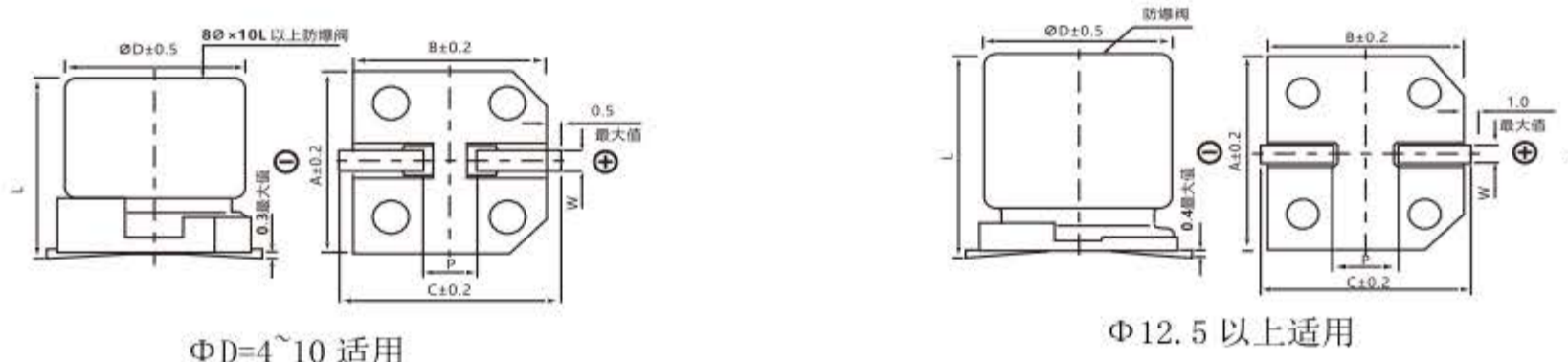
- Low impedance with temperature range -55~+105°C  
低阻抗和适用于-55~+105°C的温度范围
- Load life of 2000 hours  
负荷寿命2000小时
- Comply with the RoHS directive  
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 项目	Characteristics 主要特性																																							
Operation Temperature Range 使用温度范围	-55 ~ +105°C																																							
Voltage Range 额定工作电压范围	6.3 ~ 50V																																							
Capacitance Range 静电容量范围	1 ~ 4700 μF																																							
Capacitance Tolerance 静电容量允许偏差	±20% at 120Hz, 20°C																																							
Leakage Current 漏电流	Leakage current (∅4~∅10) ≤ 0.01CV or 3 μA, whichever is greater (after 2 minutes application of rated voltage) Leakage current (∅12.5~∅16) ≤ 0.03CV or 4 μA, whichever is greater (after 1 minute application of rated voltage) 漏电流 (∅4~∅10) ≤ 0.01CV 或 3 μA, 取较大值 (施加额定工作电压2分钟后) 漏电流 (∅12.5~∅16) ≤ 0.03CV 或 4 μA, 取较大值 (施加额定工作电压1分钟后)																																							
Dissipation Factor (tanδ) 损耗角正切	Measurement frequency 测试频率: 120Hz, Temperature 温度: 20°C <table border="1"> <tr> <td>Rated Voltage (V) 额定工作电压</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.) 最大损耗角正切</td> <td>∅4~∅10</td> <td>0.22</td> <td>0.20</td> <td>0.18</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> </tr> <tr> <td>∅12.5~∅16</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>	Rated Voltage (V) 额定工作电压	6.3	10	16	25	35	50	tan δ(max.) 最大损耗角正切	∅4~∅10	0.22	0.20	0.18	0.16	0.14	0.12	∅12.5~∅16	0.26	0.22	0.18	0.16	0.14	0.12																	
Rated Voltage (V) 额定工作电压	6.3	10	16	25	35	50																																		
tan δ(max.) 最大损耗角正切	∅4~∅10	0.22	0.20	0.18	0.16	0.14	0.12																																	
	∅12.5~∅16	0.26	0.22	0.18	0.16	0.14	0.12																																	
Stability at Low Temperature 低温特性	Measurement frequency 测试频率: 120Hz <table border="1"> <tr> <td colspan="2">Rated Voltage (V) 额定工作电压</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">Impedance Ratio 阻抗比</td> <td rowspan="2">∅4~∅10</td> <td>Z(-25°C) / Z(20°C)</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">ZT/Z20 (max.)</td> <td rowspan="2">∅12.5~∅16</td> <td>Z(-25°C)/Z(20°C)</td> <td>3</td> <td>3</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>	Rated Voltage (V) 额定工作电压		6.3	10	16	25	35	50	Impedance Ratio 阻抗比	∅4~∅10	Z(-25°C) / Z(20°C)	2	2	2	2	2	Z(-55°C) / Z(20°C)	5	4	4	3	3	3	ZT/Z20 (max.)	∅12.5~∅16	Z(-25°C)/Z(20°C)	3	3	2	2	2	2	Z(-55°C) / Z(20°C)	10	8	6	4	3	3
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ZT/Z20 (max.)	∅12.5~∅16	Z(-25°C)/Z(20°C)	3	3	2	2	2	2																																
		Z(-55°C) / Z(20°C)	10	8	6	4	3	3																																
Load Life 高温负荷特性	After 2000 hrs. application of the rated voltage at 105°C, they meet the characteristics listed below. 在105°C 环境中施加额定工作电压2000小时后, 电容器的特性符合下表的要求。 <table border="1"> <tr> <td>Capacitance Change 静电容量变化率</td> <td>Within ± 30% of initial value 初始值的 ±30%以内</td> </tr> <tr> <td>Dissipation Factor 损耗角正切</td> <td>200% or less of initial specified value 不大于规范值的200%</td> </tr> <tr> <td>Leakage Current 漏电流</td> <td>initial specified value or less 不大于规范值</td> </tr> </table>	Capacitance Change 静电容量变化率	Within ± 30% of initial value 初始值的 ±30%以内	Dissipation Factor 损耗角正切	200% or less of initial specified value 不大于规范值的200%	Leakage Current 漏电流	initial specified value or less 不大于规范值																																	
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Leakage Current 漏电流	initial specified value or less 不大于规范值																																							
Shelf Life 高温贮存特性	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在105°C 环境中无负荷放置1000小时后, 电容器的特性符合高温负荷特性中所列的规定值。																																							
Resistance to Soldering Heat 耐焊接热特性	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 经过回流焊并冷却至室温后, 电容器的特性符合下表的要求。 <table border="1"> <tr> <td>Capacitance Change 静电容量变化率</td> <td>Within ± 10% of initial value 初始值的 ±10%以内</td> </tr> <tr> <td>Dissipation Factor 损耗角正切</td> <td>initial specified value or less 不大于规范值</td> </tr> <tr> <td>Leakage Current 漏电流</td> <td>initial specified value or less 不大于规范值</td> </tr> </table>	Capacitance Change 静电容量变化率	Within ± 10% of initial value 初始值的 ±10%以内	Dissipation Factor 损耗角正切	initial specified value or less 不大于规范值	Leakage Current 漏电流	initial specified value or less 不大于规范值																																	
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Marking 标识	Black print on the case top. 铝壳顶部黑字印刷。																																							

Diagram of Dimensions 尺寸图



ΦD=4~10 适用

Φ12.5 以上适用

DIMENSIONS (Unit: mm) 尺寸表

DXL	4X5.4	5X5.4	6.3X5.4	6.3X7.7	8X10.5	10X10.5	10X13.5	12.5X13.5	12.5X16	16X16.5
A	4.3	5.3	6.6	6.6	8.3	10.3	10.3	13.0	13.0	17.0
B	4.3	5.3	6.6	6.6	8.3	10.3	10.3	13.0	13.0	17.0
C	5.1	5.9	7.2	7.2	9.2	11.2	11.2	13.7	13.7	18.0
P±0.2	1.0	1.5	2.0	2.0	3.1	4.4	4.4	4.4	4.4	6.4
L	5.4±0.3	5.4±0.3	5.4±0.3	7.7±0.3	10.5±0.5	10.5±0.5	13.5±0.5	13.5±0.5	16±0.5	16.5±0.5

FVZ | Chip Type 贴片式

□ DRAWING (Unit: mm) 外形图



□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 规格尺寸及最大允许纹波电流及阻抗值

μF	WV Code 代码	6.3			10			16		
		0J			1A			1C		
10	100							4 x 5.4	3.0	60
15	150							5 x 5.4 (4 x 5.4)	1.8 (3.0)	95 (60)
22	220	4 x 5.4	3.0	60	5 x 5.4 (4 x 5.4)	1.8 (3.0)	95 (60)	5 x 5.4 (4 x 5.4)	1.8 (3.0)	95 (60)
33	330	5 x 5.4 (4 x 5.4)	1.8 (3.0)	95 (60)	5 x 5.4 (4 x 5.4)	1.8 (3.0)	95 (60)	6.3 x 5.4 (5 x 5.4)	1.0 (1.8)	140 (95)
47	470	5 x 5.4 (4 x 5.4)	1.8 (3.0)	95 (60)	6.3 x 5.4 (5 x 5.4)	1.0 (1.8)	140 (95)	6.3 x 5.4 (5 x 5.4)	1.0 (1.8)	140 (95)
68	680	6.3 x 5.4 (5 x 5.4)	1.0 (1.8)	140 (95)	6.3 x 5.4	1.0	140	6.3 x 7.7 (6.3 x 5.4)	0.6 (1.0)	230 (140)
100	101	6.3 x 5.4 (5 x 5.4)	1.0 (1.8)	140 (95)	6.3 x 7.7 (6.3 x 5.4)	0.6 (1.0)	230 (140)	6.3 x 7.7 (6.3 x 5.4)	0.6 (1.0)	230 (140)
150	151	6.3 x 7.7 (6.3 x 5.4)	0.6 (1.0)	230 (140)	6.3 x 7.7 (6.3 x 5.4)	0.6 (1.0)	230 (140)	6.3 x 7.7	0.6	230
220	221	6.3 x 7.7 (6.3 x 5.4)	0.6 (1.0)	230 (140)	6.3 x 7.7	0.6	230	8 x 10.5 (6.3 x 7.7)	0.30 (0.6)	450 (230)
330	331	6.3 x 7.7	0.6	230	8 x 10.5	0.30	450	10 x 10.5 (8 x 10.5)	0.15 (0.30)	670 (450)
470	471	8 x 10.5 (6.3 x 7.7)	0.30 (0.60)	450 (230)	8 x 10.5	0.30	450	10 x 10.5 (8 x 10.5)	0.15 (0.30)	670 (450)
680	681	8 x 10.5	0.30	450	10 x 10.5	0.15	670	10 x 10.5	0.15	670
1000	102	10 x 10.5 (8 x 10.5)	0.15 (0.30)	670 (450)	10 x 10.5	0.15	670	10 x 10.5	0.15	670
1500	152	10 x 13.5 (10 x 10.5)	0.13 (0.15)	750 (670)	12.5 x 13.5 (10 x 13.5)	0.11 (0.13)	820 (750)	12.5 x 13.5	0.11	820
2200	222	12.5 x 13.5 (10 x 13.5)	0.11 (0.13)	820 (750)	12.5 x 16	0.09	950	16 x 16.5 (12.5 x 16)	0.08 (0.09)	1260 (950)
3300	332	12.5 x 16 (12.5 x 13.5)	0.09 (0.11)	950 (820)	16 x 16.5	0.08	1260	16 x 16.5	0.08	1260
4700	472	16 x 16.5	0.08	1260	16 x 16.5	0.08	1260			

μF	WV Code 代码	25			35			50		
		1E			1V			1H		
1	010				4 x 5.4	3.0	60	4 x 5.4	5.0	30
1.5	1R5				4 x 5.4	3.0	60	4 x 5.4	5.0	30
2.2	2R2				4 x 5.4	3.0	60	4 x 5.4	5.0	30
3.3	3R3				4 x 5.4	3.0	60	4 x 5.4	5.0	30
4.7	4R7	4 x 5.4	3.0	60	4 x 5.4	3.0	60	5 x 5.4	3.0	50
6.8	6R8	4 x 5.4	3.0	60	5 x 5.4	1.8	95	6.3 x 5.4	2.0	70
10	100	5 x 5.4 (4 x 5.4)	1.8 (3.0)	95 (60)	5 x 5.4 (4 x 5.4)	1.8 (3.0)	95 (60)	6.3 x 5.4	2.0	70
15	150	6.3 x 5.4	1.8	95	5 x 5.4	1.8	95	6.3 x 5.4	2.0	70
22	220	6.3 x 5.4 (5 x 5.4)	1.0 (1.8)	140 (95)	6.3 x 5.4 (5 x 5.4)	1.0 (1.8)	140 (95)	6.3 x 7.7 (6.3 x 5.4)	1.0 (2.0)	120 (70)
33	330	6.3 x 5.4 (5 x 5.4)	1.0 (1.8)	140 (95)	6.3 x 7.7 (6.3 x 5.4)	0.60 (1.0)	230 (140)	6.3 x 7.7	1.0	120
47	470	6.3 x 7.7 (6.3 x 5.4)	0.6 (1.0)	230 (140)	6.3 x 7.7 (6.3 x 5.4)	0.60 (1.0)	230 (140)	6.3 x 7.7	1.0	120
68	680	6.3 x 7.7	0.6	230	6.3 x 7.7	0.60	230	8 x 10.5	0.60	300
100	101	6.3 x 7.7	0.6	230	8 x 10.5 (6.3 x 7.7)	0.30 (0.60)	450 (230)	8 x 10.5	0.60	300
150	151	8 x 10.5 (6.3 x 7.7)	0.30 (0.6)	450 (230)	8 x 10.5	0.30	450	10 x 10.5	0.30	500
								Case size ∅D×L(mm) 尺寸	Impedance (Ω) at 20°C, 100KHz 阻抗值	Ripple current (mA rms) at 105°C, 100KHz 纹波电流

•Case size ∅D×L(mm), ripple current (mA rms) at 105°C, 100KHz, Impedance (Ω) at 20°C 100KHz •尺寸∅D×L(mm), 纹波电流(mA rms)于105°C, 100KHz, 阻抗值(Ω)于20°C 100KHz

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 规格尺寸及最大允许纹波电流及阻抗值

μF	Code 代码	25			35			50		
		1E			1V			1H		
220	221	8 × 10.5	0.30	450	10 × 10.5 (8 × 10.5)	0.15 (0.30)	670 (450)	10 × 10.5	0.30	500
330	331	10 × 10.5 (8 × 10.5)	0.15 (0.30)	670 (450)	10 × 10.5	0.15	670	16 × 16.5 (12.5 × 13.5) (10 × 13.5)	0.12 (0.20) (0.25)	1060 (650) (580)
470	471	10 × 10.5	0.15	670	10 × 13.5 (10 × 10.5)	0.13 (0.15)	750 (670)	16 × 16.5 (12.5 × 16)	0.12 (0.15)	1060 (700)
680	681	10 × 13.5	0.13	750	12.5 × 13.5 (10 × 13.5)	0.11 (0.13)	820 (750)	16 × 16.5	0.12	1060
1000	102	16 × 16.5 (12.5 × 13.5)	0.08 (0.11)	1260 (820)	16 × 16.5 (12.5 × 16)	0.08 (0.09)	1260 (950)			
1500	152	12.5 × 16	0.09	950	16 × 16.5	0.08	1260	Case size ∅D×L(mm) 尺寸	Impedance (Ω) at 20°C, 100KHz 阻抗值	Ripple current (mA rms) at 105°C, 100KHz 纹波电流
2200	222	16 × 16.5	0.08	1260						

• Case size ∅D×L(mm), ripple current (mA rms) at 105°C, 100KHz, Impedance (Ω) at 20°C 100KHz    • 尺寸∅D×L(mm), 纹波电流(mA rms)于105°C, 100KHz, 阻抗值(Ω)于20°C 100KHz

□ FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 纹波电流频率补偿系数

Frequency 频率		50Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient 系数	∅4 ~ ∅10	1 ~ 68μF	0.35	0.50	0.64	0.83
		100 ~ 2200μF	0.40	0.55	0.70	0.85
	∅12.5 ~ ∅16	~ 680μF	0.45	0.65	0.80	0.90
		1000 ~ 4700μF	0.65	0.85	0.95	1.00

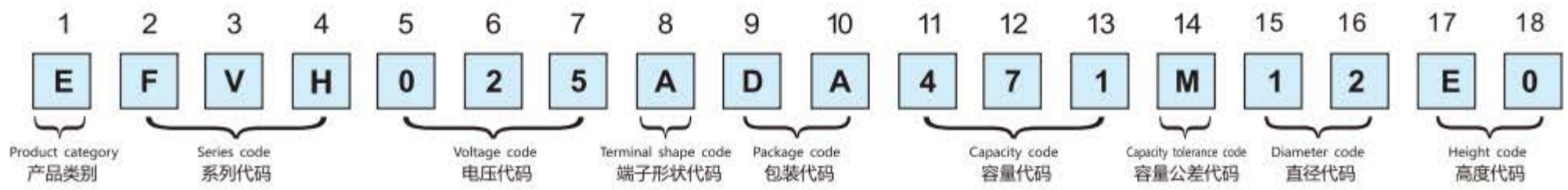
● The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

● 铝电解电容器由于在纹波电流叠加时自我发热，温度上升而老化，每升温10°C寿命减少一半；要想保持长寿命请在使用过程中降低纹波电流。

● Taping specifications are given in page 17 "Taping Specifications". 编带标准请参阅第 17 页“编带标准”。

● Please refer to page 18 "Package Quantity" for the minimum package quantity. 最小包装数量请参阅第 18 页“包装数量”。

## SMD EXPLANATION OF PART NUMBERS 贴片产品编码规则

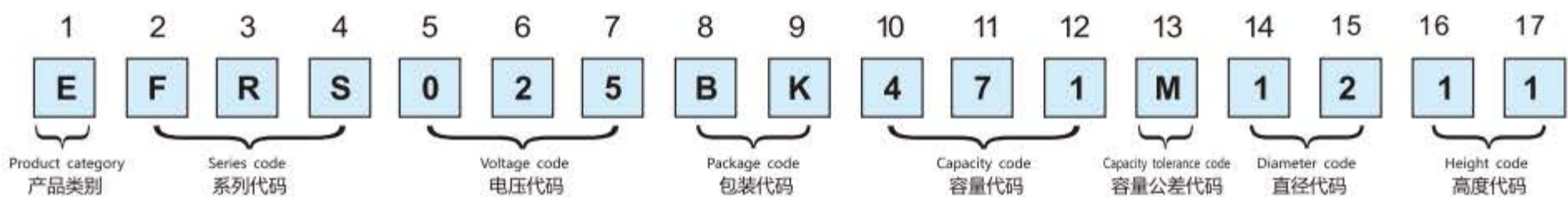


(2, 3, 4)			(5, 6, 7)		(11, 12, 13)		(14)		(8)		(15, 16)		(17, 18)	
Series 系列	Voltage (w.v) 电压	Code 代码	Capacitance (uF) 静电容量	Code 代码	Cap.Tolerance (%) 容量允许	Code 代码	Tape 端子类型		Code 代码	Diameter (mm) 直径	Code 代码	Length (mm) 高度	Code 代码	
FVE	4	4R0	0.1	0R1	±10	K	No dummy terminal 无辅助端子		A	4	04	4.5	45	
FVH	6.3	6R3	0.22	R22	±20	M	With dummy terminal 有辅助端子		G	5	05	5.4	54	
FVA	10	010	1	010						6.3	06	5.8	58	
FVZ	16	016	4.7	4R7						8	08	6.5	65	
FVR	25	025	10	100						10	10	7.7	77	
FVL	35	035	47	470						12.5	12	10.2	A0	
FVM	50	050	100	101						16	16	10.5	B0	
FVU	63	063	470	471						18	18	13.5	E0	
FVG	100	100	1000	102								16	G5	
FVB	160	160	4700	472								16.5	H0	
FVN	250	250	10000	103								21.5	N0	
FVD	350	350												
FVC	400	400												

(9, 10)		External diameter 纸盘外径	Fit size 适合尺寸	Code 代码		
Packaging 包装要求	External diameter 纸盘外径	□(mm)		Code 代码		
		□D(mm)				
		Paper tray 纸盘	380		∅D4~18	DA
		Glue tray 胶盘	330		∅D4~18	DB
Blister box 吸塑盒	Blister box 吸塑盒	380	∅D4~10	RA		
		-	∅D12.5~18	TR		

## Radial EXPLANATION OF PART NUMBERS 插件产品编码规则



(2, 3, 4)			(5, 6, 7)		(10, 11, 12)		(13)		(8, 9)		(14, 15)		(16, 17)	
Series 系列	Voltage (w.v) 电压	Code 代码	Capacitance (uF) 静电容量	Code 代码	Cap.Tolerance (%) 容量允许	Code 代码	Packaging 包装形式		Code 代码	Diameter (mm) 直径	Code 代码	Length (mm) 高度	Code 代码	
FRA	4	4R0	0.1	0R1	±10	K	Long-legged bulk长脚散装		BK	4	04	4.5	04	
FRS	6.3	6R3	0.22	R22	±20	M	Long-legged taping长脚编带		BA	5	05	5.5	05	
FRU	10	010	1	010						6.3	06	6.0	06	
FRK	16	016	4.7	4R7						8	08	6.5	06	
FBR	25	025	10	100						10	10	7.0	07	
FBU	35	035	47	470						12.5	12	8.0	08	
	50	050	100	101						16	16	10	10	
	63	063	470	471						18	18	11	11	
	100	100	1000	102								11.5	11	
	160	160	4700	472								12	12	
	250	250	10000	103								16	16	
	350	350												
	400	400												

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