

STANDARD
标准品

- Operating with wide temperature range -55~+105°C
适用于 -55~+105° C 的宽温范围
- Load life of 2000 hours
负荷寿命2000 小时
- Comply with the RoHS directive
符合 RoHS 指令



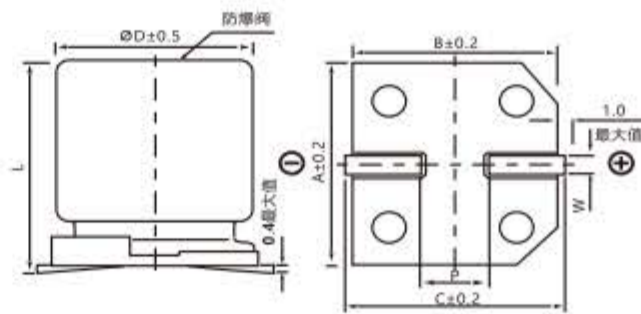
SPECIFICATIONS 特性表

| Items 项目 | Characteristics 主要特性 | | | | | | | | | | | |
|-------------------------------------|---|---|---|---|----|----|----|-------|-----|---------|---------|---------|
| Operation Temperature Range 使用温度范围 | 6.3~100V:-55~+105°C 160-400V:-40~+105°C 450V:-25~+105°C | | | | | | | | | | | |
| Voltage Range 额定工作电压范围 | 4 ~ 450V | | | | | | | | | | | |
| Capacitance Range 静电容量范围 | 0.1 ~ 6800 μF | | | | | | | | | | | |
| Capacitance Tolerance 静电容量允许偏差 | ±20% at 120Hz, 20°C | | | | | | | | | | | |
| Leakage Current 漏电流 | Rated Voltage 额定工作电压 | 6.3 ~ 100V | 160 ~ 450V | | | | | | | | | |
| | Case size 尺寸 | Ø4~Ø10 | Ø12.5~Ø16 | Ø6.3~Ø16 | | | | | | | | |
| | Time 时间 | after 2min. (application of rated voltage) 2 分钟后 (施加额定工作电压) | after 2min. (application of rated voltage) 2 分钟后 (施加额定工作电压) | after 5min.(application of rated voltage) 5 分钟后 (施加额定工作电压) | | | | | | | | |
| | Leakage current 漏电流 | ≤ 0.01CV or 3 μA, whichever is greater ≤ 0.01CV 或 3 μA, 取较大值 | ≤ 0.03CV or 4 μA, whichever is greater ≤ 0.03CV 或 4 μA, 取较大值 | ≤ 0.04CV+100 μA | | | | | | | | |
| Dissipation Factor (tan δ) 损耗角正切 | Measurement frequency 测试频率: 120Hz, Temperature 温度: 20°C | | | | | | | | | | | |
| | Rated Voltage(V) 额定工作电压 | 4 | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160-250 | 350-450 |
| Stability at Low Temperature 低温特性 | Measurement frequency 测试频率: 120Hz | | | | | | | | | | | |
| | Rated Voltage (V) 额定工作电压 | 4 | 6.3 | 10 | 16 | 25 | 35 | 50-63 | 100 | 160-250 | 350-450 | |
| Load Life 高温负荷特性 | Capacitance Change 静电容量变化率 | Within ±20% of initial value (Within ±30% of initial value for capacitors of 10V or less) 初始值的 ±20% 以内 (≤10V 为初始值的 ±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 | | | | | | | | | | |
| | Shelf Life 高温贮存特性 | 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。 | | | | | | | | | | |
| Resistance to Soldering Heat 耐焊接热特性 | 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 | | | | | | | | | | |
| | Marking 标识 | Black print on the case top. 铝壳顶部黑字印刷。 | | | | | | | | | | |

Diagram of Dimensions 尺寸图



ØD=4~10 适用



Ø12.5 以上适用

DIMENSIONS (Unit: mm) 尺寸表

| DXL | 4X5.4 | 5X5.4 | 6.3X4.5 | 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 | 6.6 | 8.3 | 10.3 | 10.3 | 13.0 | 13.0 | 17.0 |
| B | 4.3 | 5.3 | 6.6 | 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 | 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 | 2.0 | 3.1 | 4.4 | 4.4 | 4.4 | 4.4 | 6.4 |
| L | 5.4±0.3 | 5.4±0.3 | 4.5±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 |

□ DRAWING (Unit: mm) 外形图



□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 规格尺寸及最大允许纹波电流

| WV Code μF 代码 | 4 | | 6.3 | | 10 | | 16 | | 25 | |
|------------------------|--------------------------|--------------|----------------------------|--------------|---|---------------------|---|-----------------------|--------------------------|------------------------|
| | 0G | | 0J | | 1A | | 1C | | 1E | |
| 4.7 4R7 | | | | | | | 4 × 5.4 | 13 | 4 × 5.4 | 14 |
| 10 100 | | | | | | | 4 × 5.4 | 19 | 5 × 5.4 (4 × 5.4) | 23 (16) |
| 22 220 | 4 × 5.4 | 20 | 4 × 5.4 | 23 | 5 × 5.4 (4 × 5.4) | 29 (20) | 5 × 5.4 (4 × 5.4) | 32 (25) | 6.3 × 5.4 (5 × 5.4) | 39 (32) |
| 33 330 | 5 × 5.4 (4 × 5.4) | 30 (25) | 5 × 5.4 (4 × 5.4) | 32 (30) | 5 × 5.4 (4 × 5.4) | 35 (22) | 6.3 × 5.4 (5 × 5.4) | 45 (35) | 6.3 × 5.4 (5 × 5.4) | 48 (35) |
| 47 470 | 5 × 5.4 (4 × 5.4) | 36 (30) | 5 × 5.4 (4 × 5.4) | 38 (35) | 5 × 5.4 | 38 | 6.3 × 5.4 (5 × 5.4) | 55 (40) | 6.3 × 5.4 | 60 |
| 100 101 | 6.3 × 5.4 (5 × 5.4) | 60 (49) | 6.3 × 5.4 (5 × 5.4) | 65 (54) | 6.3 × 5.4 (5 × 5.4) | 70 (60) | 6.3 × 5.4 (6.3 × 4.5) | 80 (55) | 6.3 × 7.7 (6.3 × 5.4) | 100 (80) |
| 150 151 | 6.3 × 5.4 | 70 | 6.3 × 5.4 | 55 | 6.3 × 5.4 | 62 | 6.3 × 7.7 | 105 | 8 × 10.5 (6.3 × 7.7) | 140 (120) |
| 220 221 | 6.3 × 5.4 | 85 | 6.3 × 7.7 (6.3 × 5.4) | 120 (95) | 6.3 × 7.7 (6.3 × 5.4) (6.3 × 4.5) | 120 (95) (60) | 8 × 10.5 (6.3 × 7.7) | 180 (120) | 8 × 10.5 | 200 |
| 330 331 | 6.3 × 7.7 | 100 | 6.3 × 7.7 | 120 | 8 × 10.5 (6.3 × 7.7) | 200 (135) | 8 × 10.5 | 220 | 10 × 10.5 (8 × 10.5) | 240 (250) |
| 470 471 | 6.3 × 7.7 | 105 | 8 × 10.5 (6.3 × 7.7) | 230 (120) | 6.3 × 7.7 (8 × 10.5) | 120 (230) | 10 × 10.5 (8 × 10.5) | 300 (270) | 10 × 10.5 | 280 |
| 680 681 | 8 × 10.5 | 210 | 8 × 10.5 | 230 | 10 × 10.5 (8 × 10.5) | 270 (220) | 10 × 10.5 | 315 | 10 × 13.5 | 400 |
| 1000 102 | 8 × 10.5 | 230 | 10 × 10.5 (8 × 10.5) | 340 (290) | 10 × 10.5 | 315 | 12.5 × 13.5 (10 × 13.5) (10 × 10.5) | 500 (390) (340) | 12.5 × 13.5 | 580 |
| 1500 152 | 10 × 10.5 | 315 | 10 × 13.5 (10 × 10.5) | 450 (410) | 10 × 13.5 | 460 | 12.5 × 13.5 | 550 | 12.5 × 16 | 850 |
| 2200 222 | 10 × 13.5 (10 × 10.5) | 440 (340) | 12.5 × 13.5 (10 × 13.5) | 620 (500) | 12.5 × 13.5 | 680 | 16 × 16.5 (12.5 × 16) | 950 (750) | 16 × 16.5 | 1050 |
| 3300 332 | 10 × 13.5 | 490 | 12.5 × 16 (12.5 × 13.5) | 700 (660) | 16 × 16.5 | 1000 | 16 × 16.5 | 1000 | | |
| 4700 472 | 12.5 × 13.5 | 600 | 16 × 16.5 | 1000 | | | | | Case size 尺寸 | Ripple current 纹波电流 |
| 6800 682 | 16 × 16.5 (12.5 × 16) | 950 (650) | | | | | | | | |

| WV Code μF 代码 | 35 | | 50 | | 63 | | 100 | |
|------------------------|---|--------------------|--------------------------|-------------|--------------------------|------------------------|---|-----------------------|
| | 1V | | 1H | | 1J | | 2A | |
| 0.1 0R1 | | | 4 × 5.4 | 2 | 4 × 5.4 | 2 | | |
| 0.22 R22 | | | 4 × 5.4 | 4 | 4 × 5.4 | 4 | | |
| 0.33 R33 | | | 4 × 5.4 | 4 | 4 × 5.4 | 4 | | |
| 0.47 R47 | | | 4 × 5.4 | 5 | 4 × 5.4 | 5 | | |
| 1 010 | | | 4 × 5.4 | 8 | 4 × 5.4 | 8 | 4 × 5.4 | 8 |
| 2.2 2R2 | | | 4 × 5.4 | 11 | 4 × 5.4 | 11 | 6.3 × 5.4 (5 × 5.4) | 14 (12) |
| 3.3 3R3 | 4 × 5.4 | 13 | 4 × 5.4 | 14 | 5 × 5.4 | 14 | 6.3 × 7.7 (6.3 × 5.4) | 32 (20) |
| 4.7 4R7 | 4 × 5.4 | 15 | 5 × 5.4 (4 × 5.4) | 19 (14) | 5 × 5.4 | 19 | 6.3 × 7.7 (6.3 × 5.4) | 35 (21) |
| 10 100 | 5 × 5.4 (4 × 5.4) | 25 (18) | 6.3 × 5.4 (5 × 5.4) | 31 (20) | 6.3 × 7.7 (6.3 × 5.4) | 39 (24) | 8 × 10.5 (6.3 × 7.7) | 77 (35) |
| 22 220 | 6.3 × 5.4 (5 × 5.4) | 42 (34) | 6.3 × 7.7 (6.3 × 5.4) | 51 (42) | 8 × 10.5 (6.3 × 7.7) | 98 (49) | 10 × 10.5 (8 × 10.5) | 126 (84) |
| 33 330 | 6.3 × 5.4 | 50 | 6.3 × 7.7 | 60 | 8 × 10.5 | 112 | 10 × 10.5 | 133 |
| 47 470 | 6.3 × 7.7 (6.3 × 5.4) (6.3 × 4.5) | 78 (58) (50) | 8 × 10.5 (6.3 × 7.7) | 120 (63) | 10 × 10.5 (8 × 10.5) | 160 (119) | 12.5 × 13.5 (10 × 13.5) (10 × 10.5) | 250 (160) (140) |
| 68 680 | | | | | Case size 尺寸 | Ripple current 纹波电流 | 12.5 × 13.5 (10 × 13.5) | 300 (180) |

•Case size ∅D×L(mm), ripple current (mA rms) at 105°C, 120Hz •尺寸∅D×L(mm), 纹波电流(mA rms) 于105°C, 120Hz

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 规格尺寸及最大允许纹波电流

| μF | WV Code 代码 | 35 | | 50 | | 63 | | 100 | | 160 | |
|------|------------|---|-----------------------|---|-----------------------|---|-----------------------|----------------------------|--------------|----------------------------|---------------------------|
| | | 1V | | 1H | | 1J | | 2A | | 2C | |
| 22 | 220 | | | | | | | | | 10 × 13.5 | 50 |
| 33 | 330 | | | | | | | | | 12.5 × 13.5 | 95 |
| 47 | 470 | | | | | | | | | 12.5 × 13.5 (16 × 16.5) | 205 (240) |
| 100 | 101 | 8 × 10.5 (6.3 × 7.7) | 150 (92) | 10 × 10.5 (8 × 10.5) | 180 (160) | 12.5 × 13.5 (10 × 13.5) (10 × 10.5) | 270 (210) (196) | 16 × 16.5 (12.5 × 13.5) | 450 (380) | 16 × 16.5 | 250 |
| 150 | 151 | 8 × 10.5 | 185 | 10 × 10.5 | 200 | 10 × 13.5 | 225 | | | | |
| 220 | 221 | 10 × 10.5 (8 × 10.5) | 250 (220) | 10 × 13.5 (10 × 10.5) | 280 (220) | 16 × 16.5 (12.5 × 13.5) | 560 (470) | 16 × 16.5 | 550 | | |
| 330 | 331 | 10 × 10.5 | 300 | 16 × 16.5 (12.5 × 13.5) (10 × 13.5) | 600 (420) (295) | 16 × 16.5 (12.5 × 16) | 700 (510) | | | | |
| 470 | 471 | 12.5 × 13.5 (10 × 13.5) (10 × 10.5) | 520 (375) (310) | 16 × 16.5 (12.5 × 16) (12.5 × 13.5) | 700 (520) (470) | 16 × 16.5 | 750 | | | | |
| 680 | 681 | 12.5 × 13.5 | 530 | 16 × 16.5 | 750 | | | | | | |
| 1000 | 102 | 16 × 16.5 (12.5 × 16) | 750 (600) | | | | | | | Case size 尺寸 | Ripple current 纹波电流 |
| 1500 | 152 | 16 × 16.5 | 750 | | | | | | | | |

| μF | WV Code 代码 | 200 | | 250 | | 350 | | 400 | | 450 | |
|-----|------------|-------------|-----|-------------|-----|-------------|-----|----------------------------|------------|----------------------------|---------------------------|
| | | 2D | | 2E | | 2V | | 2G | | 2W | |
| 3.3 | 3R3 | | | | | | | 10 × 13.5 (8 × 10.5) | 40 (35) | 10 × 13.5 (8 × 12.5) | 40 (38) |
| 4.7 | 4R7 | | | 10 × 13.5 | 75 | 10 × 13.5 | 85 | 10 × 13.5 (12.5 × 13.5) | 45 (48) | 10 × 13.5 (12.5 × 13.5) | 42 45 |
| 10 | 100 | 10 × 13.5 | 75 | 10 × 13.5 | 75 | 12.5 × 13.5 | 105 | 12.5 × 13.5 | 50 | 12.5 × 13.5 | 55 |
| 22 | 220 | 12.5 × 13.5 | 105 | 12.5 × 13.5 | 105 | 16 × 16.5 | 130 | 16 × 16.5 | 85 | 16 × 16.5 | 85 |
| 33 | 330 | 12.5 × 13.5 | 120 | 16 × 16.5 | 135 | | | | | Case size 尺寸 | Ripple current 纹波电流 |
| 47 | 470 | 16 × 16.5 | 220 | | | | | | | | |

• Case size ØD×L(mm), ripple current (mA rms) at 105°C, 120Hz • 尺寸ØD×L(mm), 纹波电流(mA rms) 于105°C, 120Hz

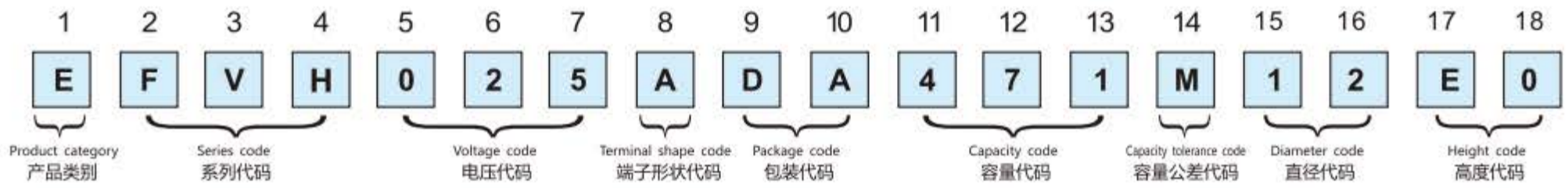
□ FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 纹波电流频率补偿系数

| Frequency 频率 | | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|----------------|-------------|---------------|-------|-------|------|--------|
| Coefficient 系数 | Ø4 ~ Ø10 | 0.1 ~ 68μF | 0.70 | 1.00 | 1.17 | 1.36 |
| | | 100 ~ 3300μF | 0.85 | 1.00 | 1.08 | 1.20 |
| | Ø12.5 ~ Ø16 | ~ 68μF | 0.75 | 1.00 | 1.35 | 1.57 |
| | | 100 ~ 680μF | 0.80 | 1.00 | 1.23 | 1.34 |
| | | 1000 ~ 6800μF | 0.85 | 1.00 | 1.10 | 1.13 |

- 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) | | | |
|-----------------|------------------------------|----------------------|---------|
| Packaging 包装要求 | External diameter 纸盘外径 □(mm) | Fit size 适合尺寸 □D(mm) | Code 代码 |
| | | | |
| Glue tray 胶盘 | 330 | ∅D4~18 | DB |
| Blister box 吸塑盒 | - | ∅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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