LCC

TANTALUM CAPACITORS

THOMSON-CSF

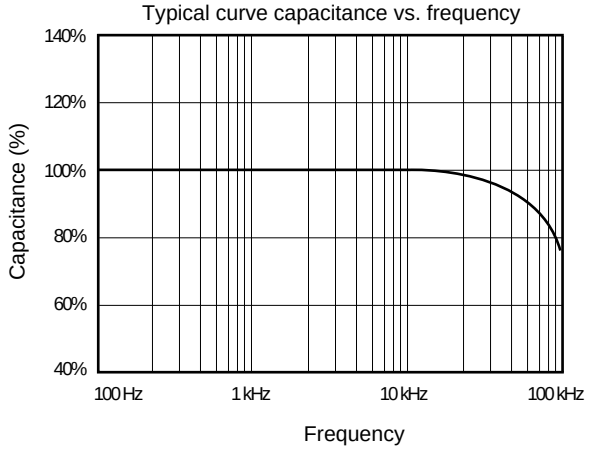
S U M M A R Y

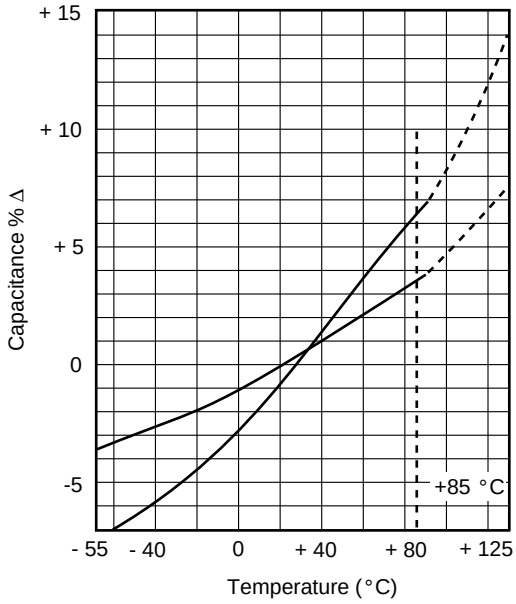
Tanlalum capacitors are manufactured from a powder of pure tantalum metal pressed to form a slug around a tantalum wire and subsequently vacuum sintered at high temperature.

The resulting slug, although of high mechanical strength and density, is also highly porous giving a large internal surface area. This forms the positive "plate" of the capacitor.

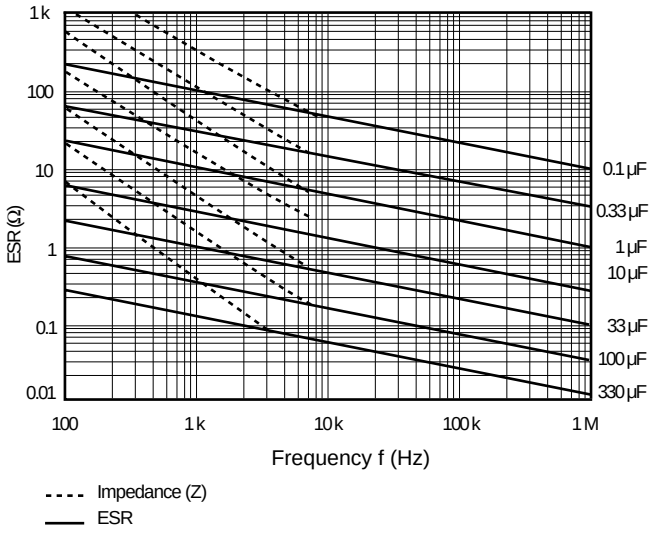
A dielectric layer of tantalum pentoxide is anodized on the surface of the tantalum anode, the cathode is formed by layers of manganese dioxide. Electrical contact is established by the deposition of carbon onto the surface of the "slug". The cathode connection is then made by means of conductive contact to a lead frame. Packaging is carried out to meet individual specification and customer requirements.

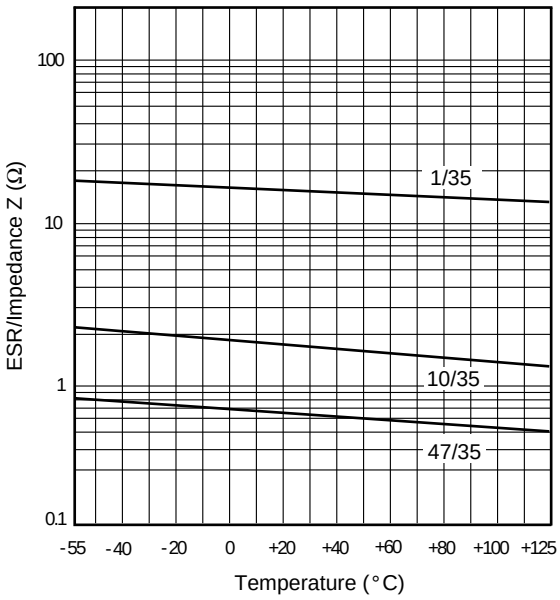
Typical curve capacitance vs. frequency





Frequency dependence of impedance and ESR





• DESCRIPTION

The FT series is specifically designed for surface mount applications in accordance with EIA specifications. The four chip sizes offer capacitance values from. 1 µF to 330 µF with rated voltages from 6.3 V to 35 V.

• TECHNICAL CHARACTERISTICS

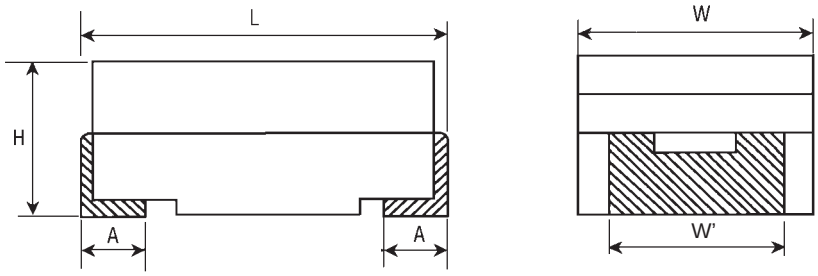
Operational temperature		- 55°C to 85°C ; to 125°C with voltage derating							
Capacitance range	C_R	0.1 µF to 330 µF							
Tolerance on C_R		± 10 % ± 20 %							
Nominal voltage	U_R	U_R	85°C	6.3	10.0	16	20	25	35
			125°C	4.0	6.3	10	13	16	23
Surge voltage	V-	U_R	85°C	8.0	13.0	20	26	33	46
			125°C	5.0	9.0	12	16	21	28
Reverse voltage max.		25°C (1 V - 0.10 U_R) / 125°C (0.1 V - 0.01 U_R) 85°C (0.5 V - 0.03 U_R)							
Dissipation factor (120 Hz, 20°C)	tgδ	4 % C_R 1 µF 6 % C_R > 1 µF 8 % C_R > 150 µF							
Environmental classification		55 / 125 / 56 (IEC 68-2)							
Soldering		Compatible with wave soldering, IR or vapor phase reflow, withstand immersion in 260°C solder for 10 seconds.							
Tape information		Plastic reeled, 7” and 13”							

• CAP VS VOLTAGE CASE CODES

Un (V) / Cn (µF)	6.3 V	10 V	16 V	20 V	25 V	35 V
0.10						A
0.15						A
0.22						A
0.33						A
0.47					A	A/B
0.68				A	A	A/B
1.00			A	A	A	B
1.50		A	A	A	A/B	B/C
2.20	A	A	A/B	B	B	B/C
3.30	A	A	A/B	B	B/C	C
4.70	A	A/B	B	B/C	C	C/D
6.80	A/B	B	B/C	C	C/D	D
10	A/B	B/C	B/C	C	C/D	D
15	B/C	B/C	C	C/D	D	D
22	B/C	C	C/D	D	D	E
33	C	C/D	D	D	E	
47	C/D	D	D	E		
68	D	D	D	E		
100	D	D	E			
150	D	E				
220	E	E				
330	E					

• LEAKAGE CURRENT (µA)

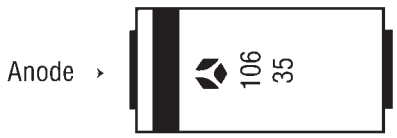
U_R (V) / C_R (µF)	6.3 V	10 V	16 V	20 V	25 V	35 V
0.10						0.5
0.15						0.5
0.22						0.5
0.33						0.5
0.47					0.5	0.5
0.68				0.5	0.5	0.5
1.00			0.5	0.5	0.5	0.5
1.50		0.5	0.5	0.5	0.5	0.5
2.20	0.5	0.5	0.5	0.5	0.6	0.8
3.30	0.5	0.5	0.5	0.7	0.9	1.2
4.70	0.5	0.5	0.8	1.0	1.2	1.6
6.80	0.5	0.7	1.1	1.4	1.7	2.4
10	0.6	1.0	1.6	2.0	2.5	3.5
15	1.0	1.5	2.4	3.0	3.8	5.3
22	1.4	2.2	3.5	4.4	5.5	7.7
33	2.1	3.3	5.3	6.6	8.3	
47	3.0	4.7	7.5	9.4		
68	4.3	6.8	10.8	13.6		
100	6.3	10.0	16.0			
150	9.0	15.0				
220	13.2	22.0				
330	19.8					



• DIMENSIONS

Format/size	L ± 0.2	W + 0.2 - 0.1	H + 0.2 - 0.1	W' ± 0.1	A + 0.3 - 0.2	S min
A	3.2	1.6	1.6	1.2	0.8	1.1
B	3.5	2.8	1.9	2.2	0.8	1.4
C	6.0	3.2	2.6	2.2	1.3	2.9
D	7.3	4.3	2.9	2.4	1.3	4.4
E	7.3	4.3	4.1	2.4	1.3	4.4

• MARKING



• HOW TO ORDER

F	T	–	C	0	C	0	1	0	6	K	–	–

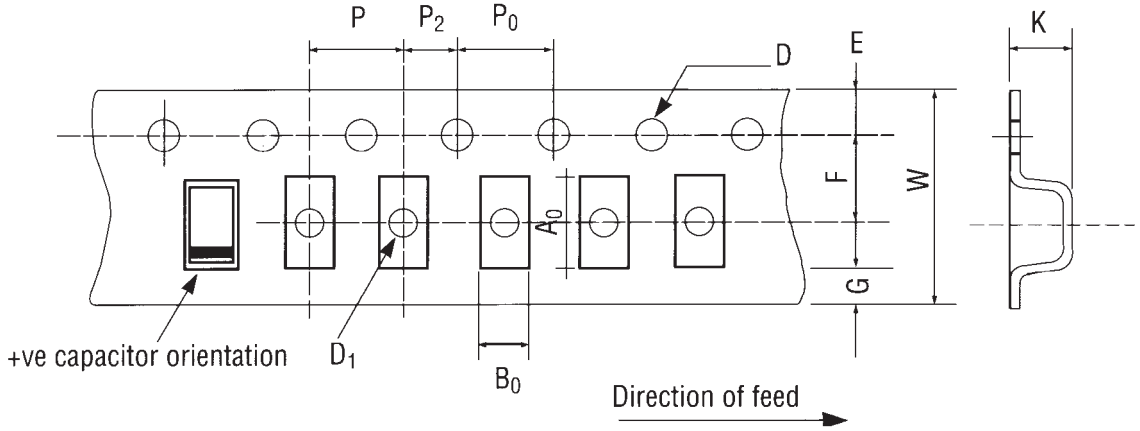
Type and Case
FT - A
FT - B
FT - C
FT - D

Voltage
B = 6.3 V
C = 10 V
D = 16 V
E = 20 V
F = 25 V

Capacitance Expressed with EIA code
Ex : 1 µF = 0105
33 µF = 0336

Tolerance
K = ± 10 %

Suffix
BA - reel ø 7"



• TAPE SPECIFICATION

Dimensions A_0 and B_0 of the pocket and the tape thickness, K, are dependent on the component size.

Tape materials do not affect component solderability during storage.

Carrier Tape Thickness < 0.4 mm

code	8mm tape	12mm tape
P*	(4±0.1) or (8±0.1)	(4±0.1) or (8±0.1)
G	1.75 min.	1.75 min.
F	3.5±0.05	5.5±0.005
E	1.75±0.1	1.75±0.1
W	8±0.3	12±0.3
P_2	2±0.05	2±0.05
P_0	4±0.1	4±0.1
D	1.5±0.1 – 0	1.5±0.1 – 0
D_1	1.0 min	1.5 min

* See taping suffix tables for actual P dimension (component pitch)

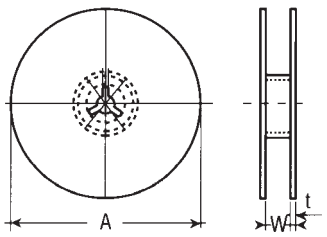
• PACKAGING FOR AUTOMATIC INSERTION

Packaging for specifications and reel dimensions are in accordance with IEC 286 and EIA 481.

• TAPING SUFFIX TABLE

Case size Reference	Tape width mm	P mm	Thickness K max	7" (178 mm) reel		13" (330 mm) reel	
				Suffix	Qty	Suffix	Qty
A	8	4	2.3	BA	2000	BC	8000
B	8	4	2.6	BA	2000	BC	8000
C	12	8	3.3	BA	500	BC	3000
D	12	8	3.6	BA	500	BC	2500
E	12	8	4.8	BA	400	BC	1500

• REEL DIMENSIONS



Suffix	A max	W max	t ± 0.5
BA	178 mm / 7"	10	2
BC	330 mm / 13"	14	2

• DESCRIPTION

The electrical characteristics and environment performance of the FB product makes it suitable for general, professional and industrial uses.

These capacitors are dipped radial leaded capacitors, encapsulated with flame retardant epoxy resin. The product is available in 2.5 mm and 5 mm lead spacing, in both bulk and tape format.

• TECHNICAL CHARACTERISTICS

Operational temperature		55°C to 85°C; to 125°C with voltage derating							
Capacitance range	C_R	0.1 µF to 330 µF							
Tolerances on C_R		± 10% ± 20%							
Nominal voltage	U_R –	U_R – ≤ 85°C	6.3	10	16	20	25	35	50
		≤ 125°C	4.0	6.3	10	13	16	23	33
Electrical characteristics		(25°C / 120 Hz / 0.5 Urms unless otherwise stated).							
Dissipation factor (tgδ %)		C_R (µF)	0.1 to 1.5		2.2 to 68		10 to 68		≥ 100
		tgδ %	4		6		8		10
Leakage current (I_L)		$I_L \leq 0.01\ C_R \bullet U_R$ or 0.5 µA whichever is the greatest.							
Surge voltage	V –	1.30 U_R							
Leads		Tinned radial leads - Diameter 0.5 mm							
Solderability		Recommended soldering bath 260°C with an immersion time of 3 seconds. The tin should cover 95% of wire surface.							
Permissive pull test		10 N							
Packaging		Refer to detailed information							

• PACKAGING

	Availability	Case size	Package Quant.
BULK	Format A / C	01 to 07	1000
		08 to 11	1000
		12 and 13	500
		14 and 15	100
REEL	Format A / B / C* *C : cases 01 to 13 only	01 to 03	1500
		04 to 07	1250
		08 to 11	1000
		12 and 13	750
		14	500
AMMOPACK	Format A / B / C	01 to 07	3000
		08 to 11	2500
		12	2000

• SELECTION CHART FOR CAPACITANCE/VOLTAGE/SIZE COMBINATIONS

C_R (µF) \ U_R (V–)	6.3 (B)	10 (C)	16 (D)	20 (E)	25 (F)	35 (G)	50 (H)
0.10	–	–	–	–	–	01	01
0.15	–	–	–	–	–	01	01
0.22	–	–	–	–	–	02	02
0.33	–	–	–	–	–	02	02
0.47	–	–	–	–	–	02	03
0.68	–	–	–	–	–	02	03
1.00	–	–	–	02	02	03	04
1.50	–	–	02	02	02	04	05
2.20	–	02	02	03	03	05	07
3.30	02	02	03	04	04	07	09
4.70	02	03	04	05	05	08	11
6.80	03	04	05	06	07	09	11
10	04	05	07	08	09	10	12
15	05	06	09	10	10	12	13
22	06	08	10	11	12	13	13
33	08	09	11	12	13	14	–
47	09	11	12	13	14	15	–
68	11	12	13	14	15	–	–
100	12	13	14	15	–	–	–
150	13	14	15	–	–	–	–
220	14	15	15	–	–	–	–
330	15	15	–	–	–	–	–

Value/Voltage combinations not shown may be available. Contact factory.

• MAX. E.S.R. ( ) MEASURED AT 100 kHz @ 25°C

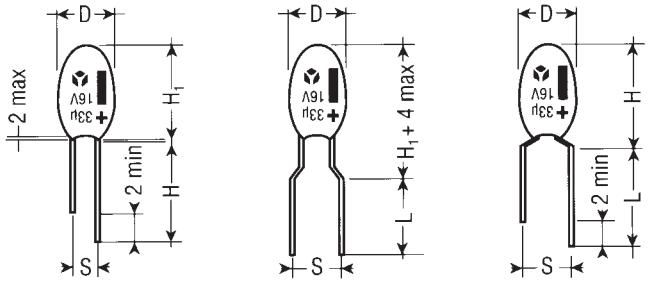
C_R (µF) \ U_R (V–)	6.3	10	16	20	25	35	50
0.10	–	–	–	–	–	26.0	26.0
0.15	–	–	–	–	–	21.0	21.0
0.22	–	–	–	–	–	17.0	17.0
0.33	–	–	–	–	–	15.0	15.0
0.47	–	–	–	–	–	13.0	13.0
0.68	–	–	–	–	–	10.0	10.0
1.00	–	–	–	10.0	10.0	8.0	8.0
1.50	–	–	10.0	9.0	8.0	6.0	5.0
2.20	–	13.0	8.0	7.0	6.0	5.0	3.5
3.30	13.0	10.0	6.0	5.5	5.0	4.0	3.0
4.70	10.0	8.0	5.0	4.5	4.0	3.0	2.5
6.80	8.0	6.0	4.0	3.6	3.1	2.5	2.0
10	6.0	5.0	3.2	2.9	2.5	2.0	1.6
15	5.0	3.7	2.5	2.3	2.0	1.6	1.2
22	3.7	2.7	2.0	1.8	1.5	1.3	1.0
33	3.0	2.1	1.6	1.4	1.2	1.0	–
47	2.0	1.7	1.3	1.2	1.0	0.8	–
68	1.8	1.3	1.0	0.9	0.8	–	–
100	1.6	1.0	0.8	0.6	–	–	–
150	0.9	0.8	0.6	–	–	–	–
220	0.9	0.6	0.5	–	–	–	–
330	0.7	0.5	–	–	–	–	–

• CASE DIMENSIONS (mm)

Case size	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
D max	4.5	4.5	4.5	5.0	5.0	5.0	5.5	5.5	6.0	6.0	7.0	8.0	9.0	9.0	10.0
H1 max	7.0	7.0	7.5	8.5	9.0	9.0	9.0	9.0	10.0	10.0	10.5	10.5 (1)	–	–	–
H max	8.5	8.5	9.0	10.0	10.5	10.5	10.5	10.5	11.0	11.5	12.0	13.0	14.0	16.0	18.5

• LEAD WIRE CONFIGURATIONS (mm)

Format A Format B* Format C



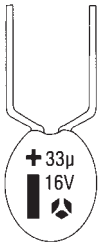
Format A	Cases 01 to 12 (1)	L = 16 ± 4	S = 2.5 ± 0.5	d = 0.5 ± 0.05
Format B	Cases 01 to 12 (1)	L = 16 ± 4	S = 5.0 ± 1.0	d = 0.5 ± 0.05
Format C	Cases 01 to 15	L = 16 ± 4	S = 5.0 ± 1.0	d = 0.5 ± 0.05

* supplied in tape format only (1) 12 Case size : 47 µF 16 V, 33 µF 20 V, 10 µF 50 V are not available in Format A and B.

• MARKING

Capacitance, D.C. voltage, polarity and the THOMSON logo are laser marked on the capacitor body which is made of flame retardant orange coloured epoxy resin.

- Polarity
- Capacitance
- ± 10 % tolerance coded with "K" on reverse side of unit
- Voltage
- Thomson Logo



• HOW TO ORDER

F	B	0	3	0	G	0	1	0	5	M	H	B

Type

Size
01 to 15

Special Use
0 Standard

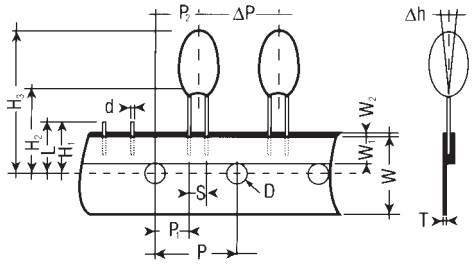
Voltage
B = 6.3 V
C = 10 V
D = 16 V
E = 20 V
F = 25 V
G = 35 V
H = 50 V

Capacitance Expressed with EIA code
Ex : 1 µF = 0105
33 µF = 0336

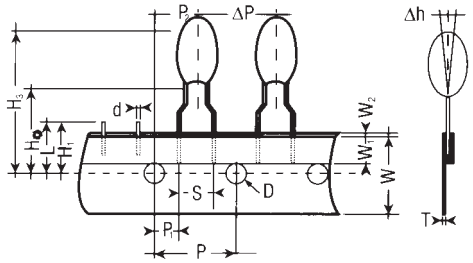
Tolerance
K = ± 10 %
M = ± 20 %

Suffix
... : 2.5 mm pitch, bulk, format A
HB : 5.0 mm pitch, bulk, format C
CA/CB/CC/CD/DA
DB/DC/DD/DE/DF
DG/DH
} Refer to taping conditions
Other suffix available for special configurations.

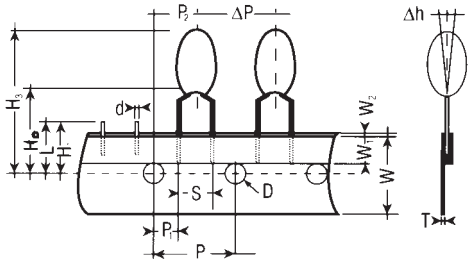
• PACKING FOR AUTOMATIC INSERTION



• **Format A** - Automatic insertion on 2.5 pitch
- **CA** suffix : AMMOPACK Panasert
- **CB** suffix : Reel Panasert
- **CC** suffix : AMMOPACK Avisert
- **CD** suffix : Reel Avisert



• **Format B** - Automatic insertion on 5.0 pitch
- **DE** suffix : AMMOPACK Panasert
- **DF** suffix : Reel Panasert
- **DG** suffix : AMMOPACK Avisert
- **DH** suffix : Reel Avisert



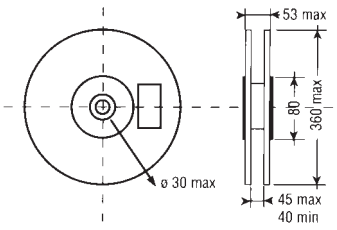
• **Format C** - Automatic insertion on 5.0 pitch
- **DA** suffix : AMMOPACK Panasert
- **DB** suffix : Reel Panasert
- **DC** suffix : AMMOPACK Avisert
- **DD** suffix : Reel Avisert

• DIMENSIONS (mm)

Description	Code	Dimensions
Feed hole pitch	P	12.7 ± 0.3
Hole center to lead	P_1	3.85 ± 0.7 to be measured at bottom of clench
		5.05 ± 1 for format A
Hole center to component center	P_2	6.35 ± 0.4
Change in pitch	³P	± 1.0
Lead diameter	d	0.5 ± 0.05
Lead spacing	S	5.0 ± 0.8 - 0.2
		2.5 + 0.4 for format A - 0.1
Component alignment	³h	0 ± 2.0

Description	Code	Dimensions
Feed hole diameter	D	4.0 ± 0.2
Tape width	W	18.0 + 1.0 - 0.5
Hold down tape width	W_1	6.0 min.
Hold down tape position	W_2	1.0 max.
Lead wire chench height	H_0	16 ± 0.5 Panasert 19 ± 1.0 Avisert
Hole position	H_1	9.0 ± 0.5
Base of component height	H_2	18 min.
Component height	H_3	32.25 max.
Length of snipped lead	L	11.0 max.
Total tape thickness	T	0.7 ± 0.2
		Carrying card 0.5 ± 0.1

• REEL CONFIGURATION AND DIMENSIONS (mm)



Holding tape outside. Positive terminal leading.
(negative terminal by special request).

WORLDWIDE SALES OFFICES

AMERICAS

BRAZIL

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"Specifications mentioned in this publication are subject to change without notice"

LCC

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