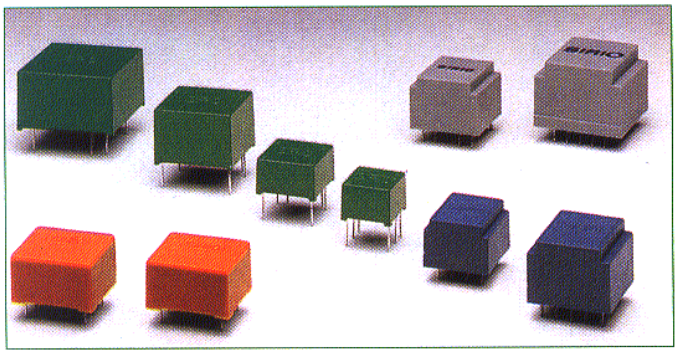
SIRIO

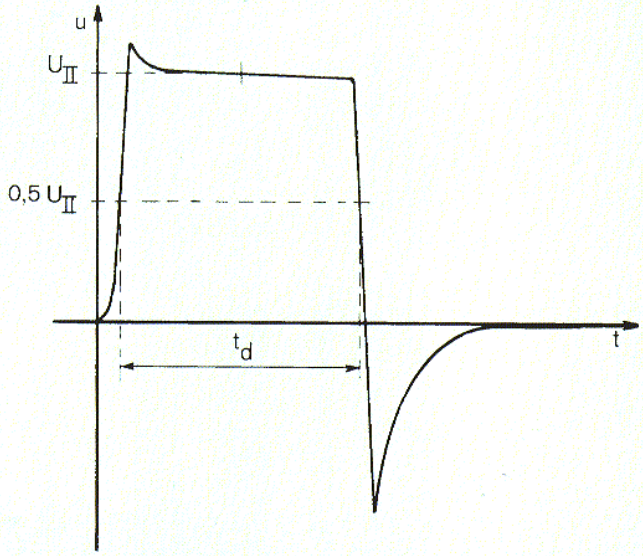
Inductive Components

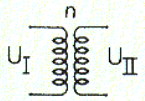
Pulse Transformers

Pulse Transformers

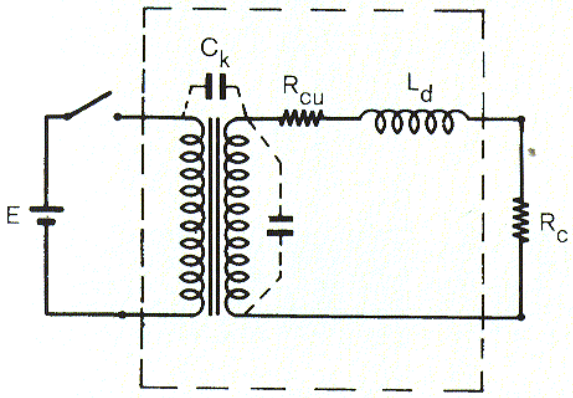


In this catalogue we present our range of standard transformers, designed for firing thyristors and triacs having low, medium and high powers.
A core having a high saturation inductance and low losses obtains a moderately dimensioned component with excellent square-shaped response. Reliability is ensured by a precise production and by checks performed during production and final tests as well.
Besides this standard range, we can offer pulse transformers with different transforming ratios, special insulation voltage and values exceeding μVs, in order to meet any requirement on our customers' part.





$$\int u\,dt = U_{II} t_d$$



Insulation transformers, designed for triacs or thyristor firing, need the following characteristics:

A) They can transfer unipolar pulses having a proper amplitude and duration with a low input of magnetizing current.
B) They have well coupled magnetic coils which can transfer high di/dt.
C) They have uncoupled electric coils which do not cause unrequired firings.
D) They present a high insulation rate between windings and can ensure it for a long time.
E) They have low losses.
F) They have compact sizes.

As you can see, they meet quite contrasting needs. This aim can be reached only by choosing suitable magnetic materials and correct shapes, and by following special production techniques.
As to a quantity definition of these characteristics, we suggest

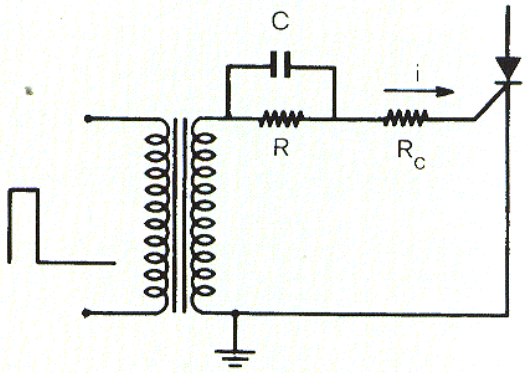
the following parameters:

A) Transfer area: it is the product of voltage amplitude at transformers secondary winding per its duration, when an unipolar pulse is applied at the primary and the secondary is without load. Measurement unit is (μVs). This parameter indicates the minimum area «voltage-time» which can be transferred from the primary to the secondary, without saturation phenomena at magnetic core.

n = winding ratio between primary and other coils.

B) di/dt: this parameter is function of all RLC values distributed in the transformer and the load. However this parameter is mainly due to loss inductance Ld, and load resistance Rc:

It is measured by means of a typical firing circuit which shows the current rise time to the secondary when an unipolar pulse is applied to the primary.



t_s = pulse rise time (μs).
Imax = max available current at the secondary, with a rise time lower than 1μs.

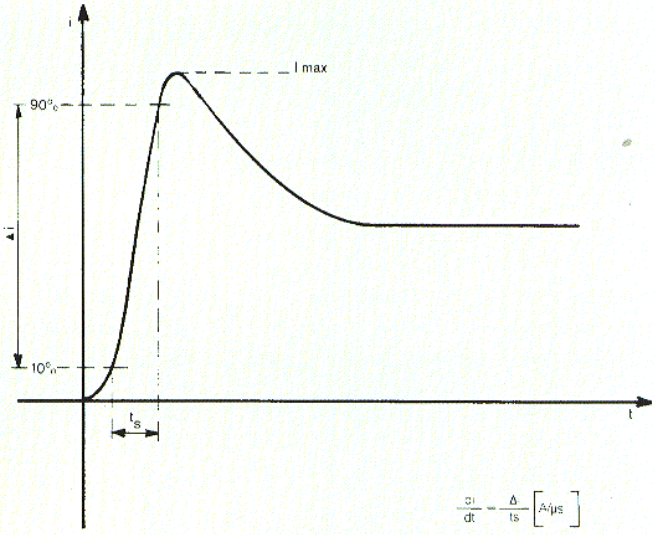
C) C_k: Coupling capacity between primary and secondary. A good magnetic coil coupling results to a too high capacitance causing unrequired firings. We must use a proper wire diameter, a correct winding number, coiling system and type of impregnation, in order to prevent unrequired firings. In this way a C_k can range within safety limits.

D) With the proximity of windings, the problem of insulation and of reliability must be taken into consideration: we solve this problem by choosing suitable materials (enamelled wire and impregnation), production techniques (wiring system and undervacuum casting). Undervacuum casting gives the component a long life.

Uis = maximum working voltage between two single windings.

Up = test voltage (50 Hz) per 1 min (unrepeated)

Ugl = minimum voltage (50 Hz) which, applied between two single windings, causes ionic interferences between them.



It must be higher than Uis to ensure the transformer life; the working voltage and possible repetitive overvoltages must not cause inner ionic disturbances having a periodical incidence, which, along with time, would damage the electric features of insulation. For this reason Ugl must be 1,5 Uis minimum.

E) **Low losses:** SCR firing transformers operate with pulse current and high voltage. In windings, losses can be reduced keeping low ohmic values and choosing suitable materials for high frequency operations.

F) **Shell type and size:** no European standard exists. However most of our transformers can be replaced with others available on the market.

The case is made with self extinguishing thermoplastic material, following UL 94.

In the following tables electric and mechanical characteristics of our pulse transformers, standard type, are summarized.

NOTES:

n	Coil ratio between primary and secondary.
∫udt	Minimum area «voltage-time» which can be transferred to secondary with unipolar pulses.
Lp	Primary inductance.
C_k	Coupling capacity between two windings.
I	Primary.
II & III	Secondaries.
Rcul	Primary resistance.
Rcull/Rculll	Resistance of each secondary.
t_s	Rise time of pulse to secondary with working current equal to Imax.
Uis	Maximum working voltage between two single windings.
Up	Unrepeated testing voltage (50 Hz) between two windings (1 min.).

Single shot or multiple shot firing pulse transformers

Caratteristiche elettriche | Caracteristiques electriques | Electrical features | Caracteristicas electricas | Elektrischen Eigenschaften

Uis = 380V

CODICE CODE	n	∫udt (μVs)	t_S (μs)	Imax (mA)	R_C (Ω)	Lp (mH)	C_k (pF)	Rcul (Ω)	Rcull-III (Ω)	Up (kV)	Core / Raw Type / Material	Case	Schema
TI/111 010	1:1	200	<1	400	27	12	160	0,65	0,65	2	Toroidal/Ferrite	111	A
TI/111 020	1:1:1	200	<1	400	27	12	160	0,65	0,65	2	Toroidal/Ferrite	111	B
TI/111 030	1:1	200	<1	2000	10	2,5	110	0,4	0,4	2,5	Toroidal/Fe-Ni	111	A
TI/111 040	1:1:1	200	<1	2000	10	2,5	110	0,4	0,4	2,5	Toroidal/Fe-Ni	111	B
TI/112 010	1:1	300	<1	800	15	10	210	0,7	0,7	2,5	Toroidal/Ferrite	112	A
TI/112 020	1:1:1	300	<1	800	15	10	210	0,7	0,7	2,5	Toroidal/Ferrite	112	B
TI/112 030	1:1	500	<1	2000	15	4	150	0,5	0,5	2,5	Toroidal/Fe-Ni	112	A
TI/112 040	1:1:1	500	<1	2000	15	4	150	0,5	0,5	2,5	Toroidal/Fe-Ni	112	B
TI/112 045	2:1:1	400	<1	2000	10	9	130	0,8	0,4	2,5	Toroidal/Fe-Ni	112	B
TI/113 030	1:1	500	<1	2000	10	4,5	160	0,35	0,35	3,1	Toroidal/Fe-Ni	113	A
TI/113 040	1:1:1	500	<1	2000	10	4,5	160	0,35	0,35	3,1	Toroidal /Fe-Ni	113	B
TI/113 050	1:1	1000	<1	2000	10	5	190	0,4	0,4	3,1	Toroidal /Fe-Ni	113	A
TI/113 060	1:1:1	1000	<1	2000	10	5	190	0,4	0,4	3,1	Toroidal /Fe-Ni	113	B
TI/113 115	3:1:1	350	<1	2500	4,7	5	80	0,4	0,15	3,1	Toroidal /Fe-Ni	113	B
TI/113 119	3:1	350	<1	2500	4,7	5	80	0,4	0,15	3,1	Toroidal /Fe-Ni	113	A
TI/113 145	2:1:1	500	<1	2000	10	5	80	0,4	0,2	3,1	Toroidal /Fe-Ni	113	B
TI/114 050	1:1	1000	<1	1500	8	4	250	0,45	0,45	3,1	Toroidal /Fe-Ni	114	A
TI/114 060	1:1:1	1000	<1	1500	8	4	250	0,45	0,45	3,1	Toroidal /Fe-Ni	114	B
TI/114 065	2:1:1	1000	<1	2000	8	6	150	0,45	0,25	3,1	Toroidal /Fe-Ni	114	B
TI/114 070	1:1	2000	<1	2000	8	6	230	0,45	0,45	3,1	Toroidal /Fe-Ni	114	A
TI/114 080	1:1:1	2000	<1	2000	8	6	230	0,45	0,45	3,1	Toroidal /Fe-Ni	114	B

Uis = 500V

CODICE CODE	n	∫udt (μVs)	t_S (μs)	Imax (mA)	R_C (Ω)	Lp (mH)	C_k (pF)	Rcul (Ω)	Rcull-III (Ω)	Up (kV)	Core / Raw Type / Material	Case	Schema
TI/112 130	1:1	500	<1	2000	15	4	70	0,6	0,6	4	Toroidal/Fe-Ni	112	A
TI/112 140	1:1:1	500	<1	2000	15	4	70	0,6	0,6	4	Toroidal/Fe-Ni	112	B
TI/113 130	1:1	500	<1	2000	10	3,5	60	0,25	0,25	4	Toroidal/Fe-Ni	113	A
TI/113 140	1:1:1	500	<1	2000	10	3,5	60	0,25	0,25	4	Toroidal/Fe-Ni	113	B
TI/113 150	1:1	1000	<1	2000	10	5	100	0,4	0,4	5	Toroidal/Fe-Ni	113	A
TI/113 160	1:1:1	1000	<1	2000	10	5	100	0,4	0,4	5	Toroidal/Fe-Ni	113	B
TI/117 110	1:1	300	<1	750	15	3,5	35	0,8	0,8	4	EE/Ferrite	117	C
TI/117 120	1:1:1	300	<1	750	15	3,5	35	0,8	0,8	4	EE/Ferrite	117	D
TI/117 147	2:1	250	<1	1000	10	5,8	25	0,5	0,25	4	EE/Ferrite	117	C
TI/117 155	2:1:1	250	<1	1000	10	5,8	25	0,5	0,25	4	EE/Ferrite	117	D
TI/117 160	3:1	150	<1	2000	10	5,8	30	0,5	0,15	4	EE/Ferrite	117	C
TI/118 310	1:1	500	<1	1000	10	2,3	50	0,4	0,4	4	EE/Ferrite	118	E
TI/118 320	1:1:1	500	<1	1000	10	2,3	50	0,4	0,4	4	EE/Ferrite	118	F
TI/118 330	2:1:1	500	<1	1000	10	9	50	0,9	0,4	4	EE/Ferrite	118	F
TI/118 340	1:1	1000	<2	1000	20	9	50	0,7	0,8	4	EE/Ferrite	118	E
TI/118 350	1:1:1	1000	<2	1000	20	9	55	0,85	0,85	4	EE/Ferrite	118	F
TI/118 360	3:1	300	<1	1200	10	10,5	40	0,6	0,2	4	EE/Ferrite	118	E
TI/118 370	3:1:1	300	<1	1200	10	6,3	40	0,6	0,2	4	EE/Ferrite	118	F

Scatole	Boitiers	Cases	Cajas	Gehäuse

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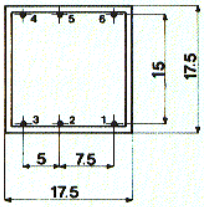

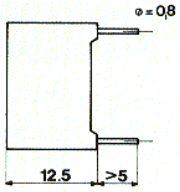

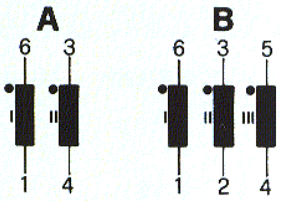

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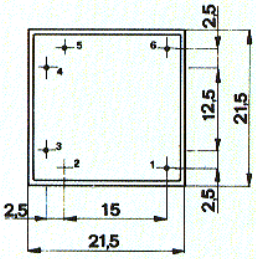

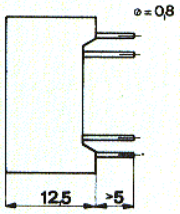

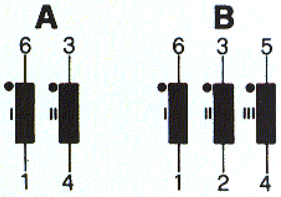

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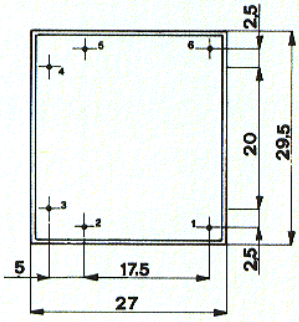

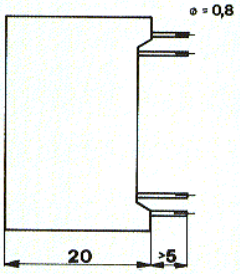

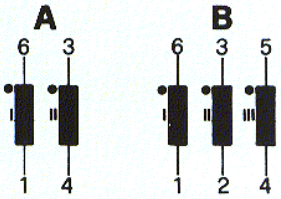

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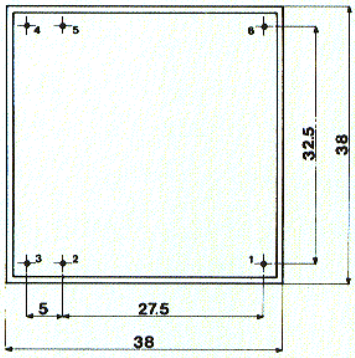

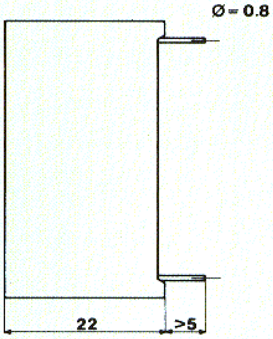

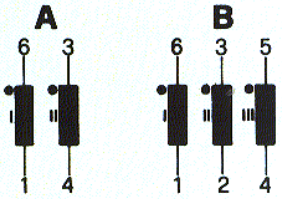

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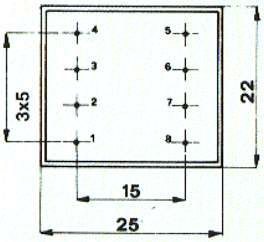

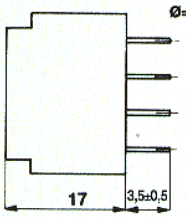

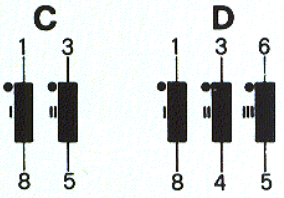

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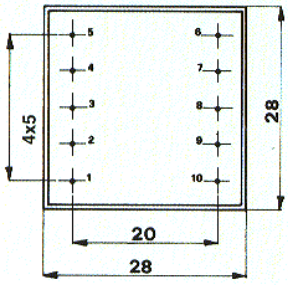
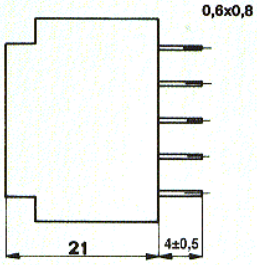
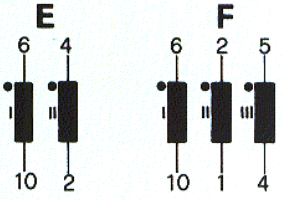






Scatola in materiale autoestinguente UL 94-HB; riempimento sottovuoto.

Boitier en matériel autoestinguible UL 94-HB; impregnation sous vide.

Box made with self extinguishing material UL 94-HB; vacuum filled.

Caja en material autoextinguible UL 94-HB; impregnada al vacio.

Gehäuse in selbstlöschenden materiell UL 94-HB; vergossen unter vakuum.

Le quote, espresse in mm, si intendono massime.

Les valeurs, exprimées en mm, s'entendent maximum.

Values, in mm, are maximum ones.

Los valores expresados en mm, son los máximos.

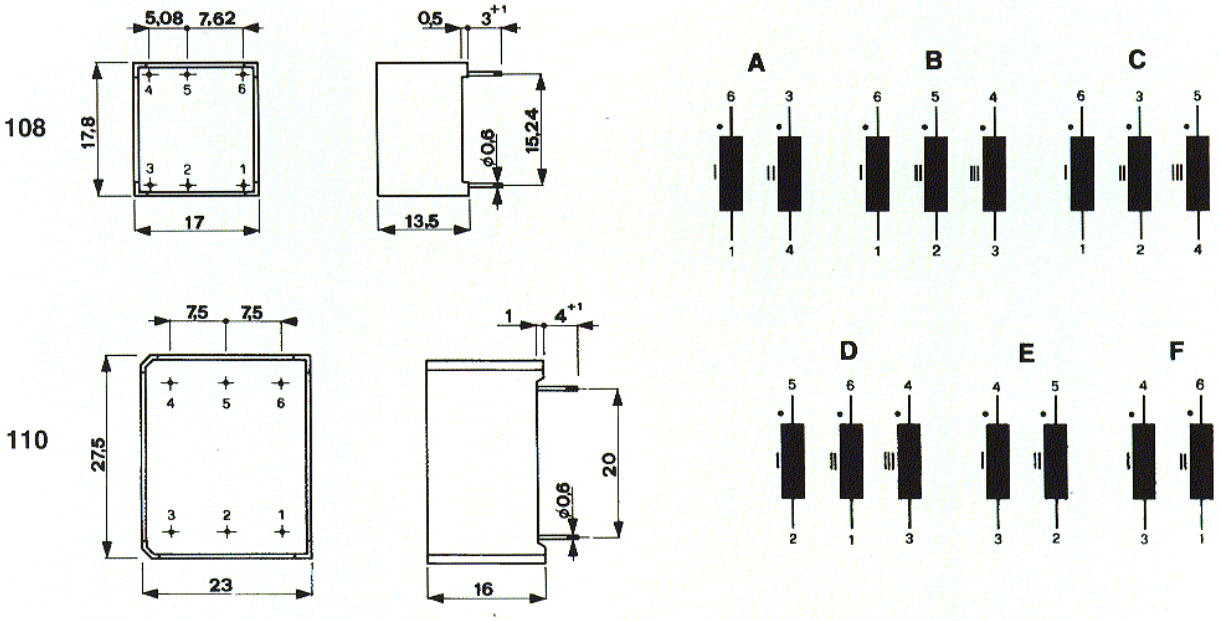
Die Angaben sind Maximalwerte in mm.

Single shot or multiple shot firing pulse transformers

Caratteristiche elettriche | **Caracteristiques electriques** | **Electrical features** | **Caracteristicas electricas** | **Elektrischen Eigenschaften**

Uis = 500V

CODICE CODE	n	∫udt (µVs)	t_S (µs)	Imax (mA)	R_C (Ω)	Lp (mH)	C_k (pF)	Rcul (Ω)	Rcull-III (Ω)	Up (kV)	Core / Raw Material	Case	Schema
TI/108 001	1:1	500	3,0	100	100	8	10	1,8	1,8	4	EE/Ferrite	108	A
TI/108 002	2:1	200	0,8	100	100	7	8	1,8	0,9	4	EE/Ferrite	108	A
TI/108 010	1:1	250	1,5	250	40	2,5	7	0,65	0,65	3,1	EE/Ferrite	108	A
TI/108 020	1:1:1	250	1,5	250	40	2,5	7	0,65	0,65	3,1	EE/Ferrite	108	C
TI/108 021	1:1:1	200	1,4	250	40	1,6	5	0,50	0,5	3,1	EE/Ferrite	108	B
TI/108 022	1:1:1	250	1,8	250	40	2,5	7	0,65	0,65	3,1	EE/Ferrite	108	B
TI/108 030	2:1	350	3,5	250	40	19	8	3,8	1,1	3,1	EE/Ferrite	108	A
TI/108 040	2:1:1	350	3,5	250	40	19	8	3,8	1,1	3,1	EE/Ferrite	108	B
TI/108 050	3:1	300	2,5	250	40	21	8	5	0,7	3,1	EE/Ferrite	108	A
TI/108 060	3:1:1	300	2,5	250	40	21	8	5	0,7	3,1	EE/Ferrite	108	C
TI/110 143	1:1:1	800	1,0	25	400	10	10	3,5	3,5	4	EE/Ferrite	110	D
TI/110 144	3:1:1	800	1,0	25	400	110	10	17	3,5	4	EE/Ferrite	110	D
TI/110 145	1:1	800	1,0	25	400	10	10	3,5	3,5	4	EE/Ferrite	110	E
TI/110 153	1:1:1	600	1,2	100	100	7	8	1,5	1,5	4	EE/Ferrite	110	D
TI/110 154	3:1:1	600	1,2	100	100	65	7	7	1,5	4	EE/Ferrite	110	D
TI/110 155	1:1	500	1,0	100	100	5,5	7	1,1	1,1	4	EE/Ferrite	110	E
TI/110 233	1:1:1	300	1,2	250	40	2	7	0,55	0,55	4	EE/Ferrite	110	D
TI/110 234	3:1:1	300	1,0	250	40	15	7	2	0,55	4	EE/Ferrite	110	D
TI/110 235	1:1	300	1,0	250	40	2	6	0,55	0,55	4	EE/Ferrite	110	E
TI/110 239	1:1	350	2,0	250	40	2	5	0,6	0,6	10	EE/Ferrite	110	F



Scatola in materiale autoestinguente UL 94-HB; riempimento sottovuoto.
Le quote sono espresse in mm.

Boitier en matériel autoestinguible UL 94-HB; impregnation sous vide.
Les valeurs sont exprimées en mm.

Box made with self extinguishing material UL 94-HB; vacuum filled.
Values are in mm.

Caja en material autoextinguible UL 94-HB; impregnada al vacio.
Valores expresados en mm.

Gehäuse in selbstlöschenden materiell UL 94-HB; vergossen unter vakuum.
Abmessungen (mm).

Single shot, large voltage-time area, firing pulse transformers

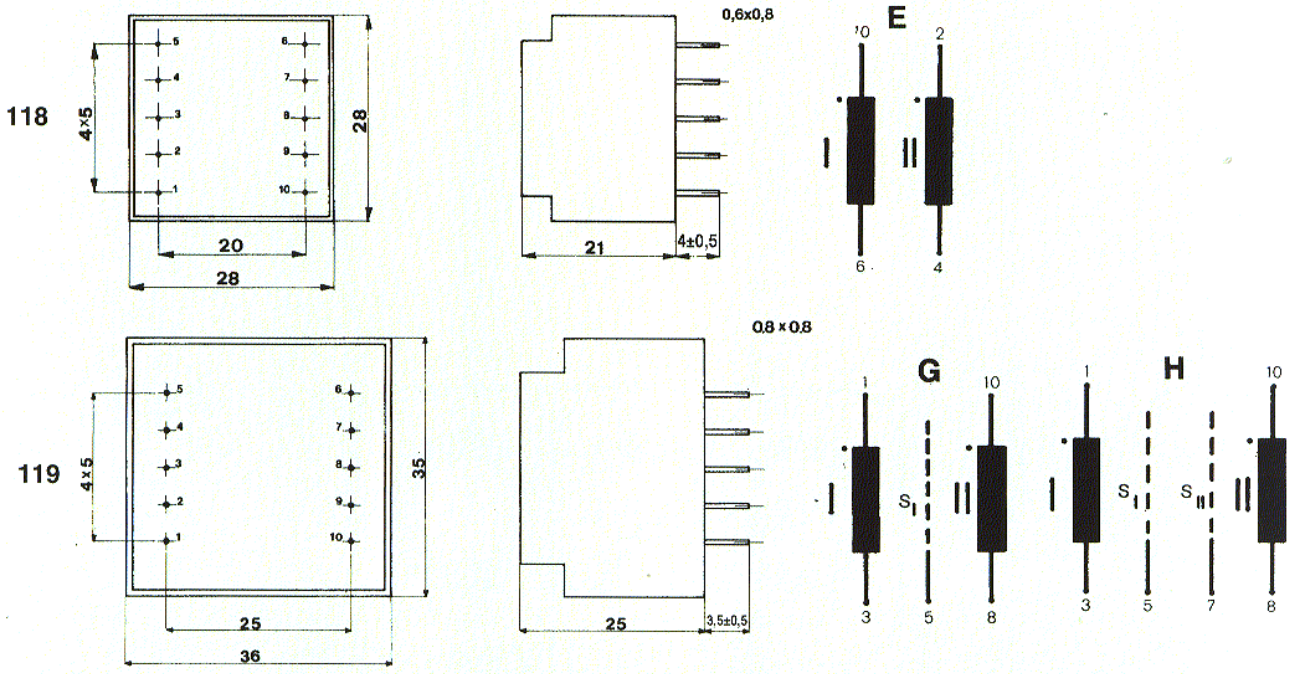
Caratteristiche elettriche | **Caracteristiques electriques** | **Electrical features** | **Caracteristicas electricas** | **Elektrischen Eigenschaften**

Uis = 500V

CODICE CODE	n	∫udt (mVs)	t_S (µs)	Imax (mA)	R_C (Ω)	Lp (mH)	C_k (pF)	Rcul (Ω)	Rcull-III (Ω)	Up (kV)	Core Type / Raw Material	Case	Schema
TI/118 010	2:1	2,5	≤1	1000	10	7	45	1	0,5	3,1	EE/Fe Si	118	E
TI/118 020	2:1	10	≤10	400	25	80	65	6	1,9	3,1	EE/Fe Si	118	E
TI/118 030	4:1	6	≤5	400	25	140	50	12	1,2	3,1	EE/Fe Si	118	E
TI/118 040	1,5:1	20	≤20	200	47	90	50	13	6,7	3,1	EE/Fe Si	118	E

Uis = 750V

CODICE CODE	n	∫udt (mVs)	t_S (µs)	Imax (mA)	R_C (Ω)	Lp (mH)	C_k (pF)	Rcul (Ω)	Rcull-III (Ω)	Up (kV)	Core Type / Raw Material	Case	Schema
TI/119 010	4:1	5	≤2	400	25	35	40	3,6	0,45	5	EE/Fe Si	119	G
TI/119 020	2:1	5	≤2	400	25	27	40	1,5	0,40	5	EE/Fe Si	119	H
TI/119 030	2:1	10	≤5	400	25	55	50	3,6	0,80	5	EE/Fe Si	119	G
TI/119 040	4:1	2,5	≤1	400	25	27	50	1,5	0,20	5	EE/Fe Si	119	G



Scatola in materiale autoestinguente UL 94-HB; riempimento sottovuoto. Le quote sono espresse in mm.

Boitier en matériel autoestinguible UL 94-HB; impregnation sous vide. Les valeurs sont exprimées en mm.

Box made with self extinguishing material UL 94-HB; vacuum filled. Values are in mm.

Caja en material autoextinguible UL 94-HB; impregnada al vacio. Valores expresados en mm.

Gehäuse in selbstlöschenden materiell UL 94-HB; vergossen unter vakuum. Abmessungen (mm).

S_I: Schermo da collegare al primario.
S_{II}: Schermo da collegare al secondario.

S_I: à connecter au primaire.
S_{II}: à connecter au secondaire.

S_I: must be connected to primary winding.
S_{II}: must be connected to secondary winding

S_I: Debe ser conectado con el primario.
S_{II}: Debe ser conectado con el secundario.

S_I: Schirm zu Primärwicklung anschließen
S_{II}: Schirm zu Sekundärwicklung anschließen