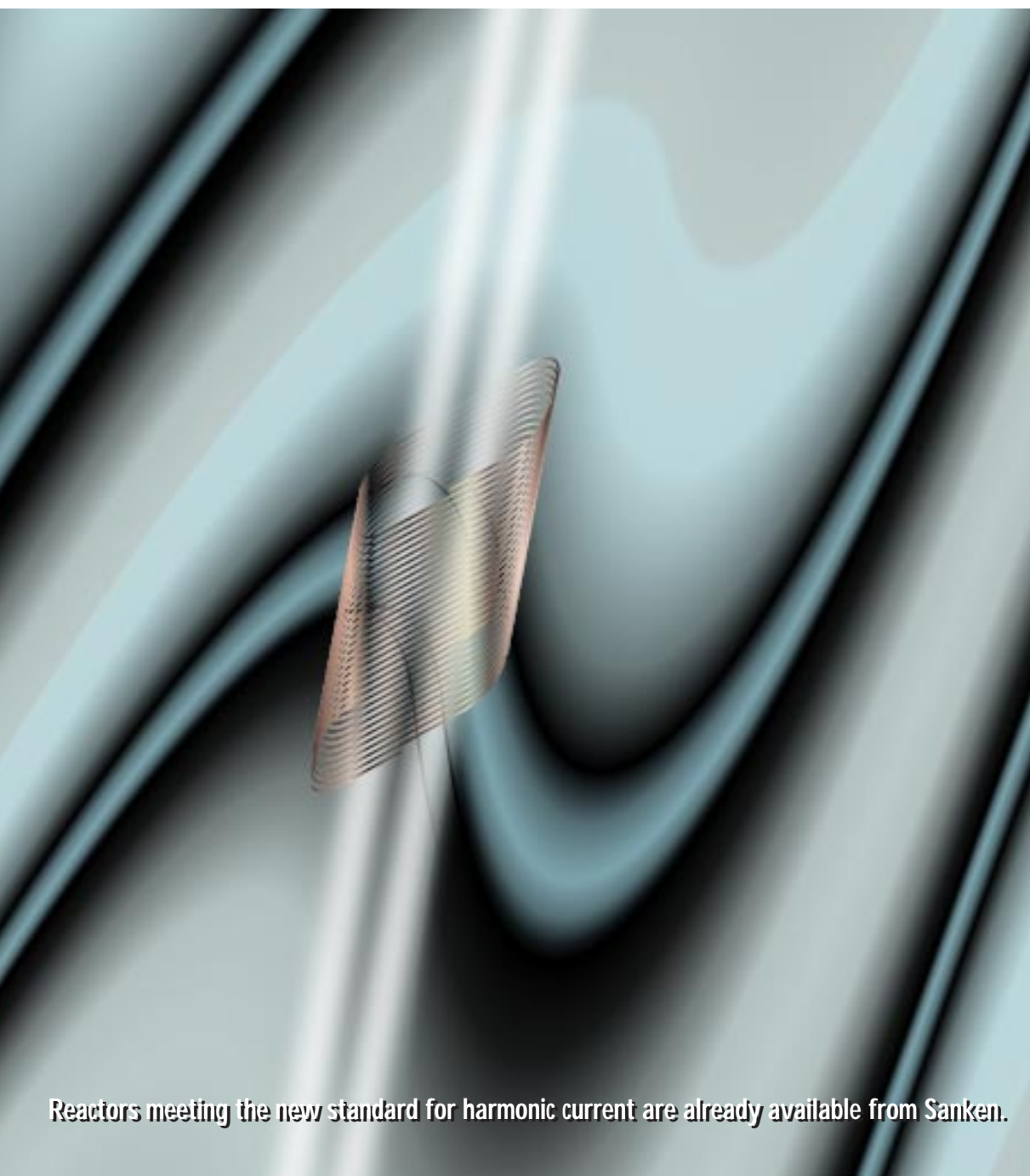


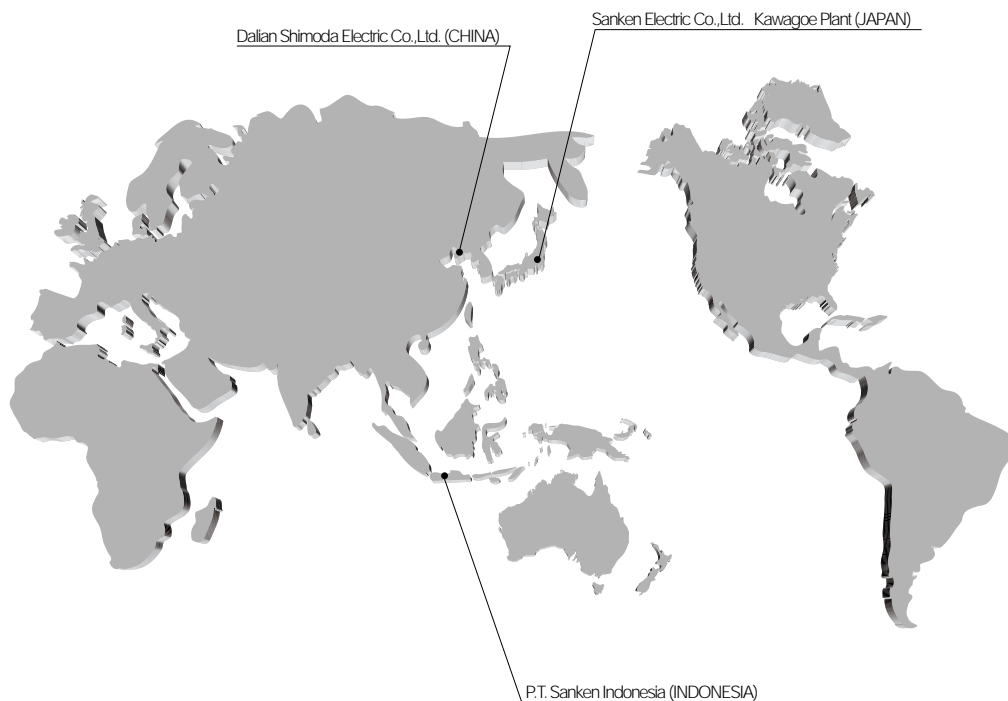
# *Reactor & Transformer*



Reactors meeting the new standard for harmonic current are already available from SanKen.

サンケン電気株式会社  
SANKEN ELECTRIC CO.,LTD.

# Production Factory



## Cautions

- ◆The names of the products and the specifications in this catalog are subject to change without notice for the sake of improvement. The manufacturer also reserves the right to discontinue any of these products. At the time of delivery, please ask for specifications sheets to check the contents in order to use the products properly and safely.
- ◆Descriptions in this catalog regarding product characteristics and quality are based solely on discrete components. When using these components, be sure to check the specifications with the component in question mounted onto the products.
- ◆The manufacture's warranty will not cover any disadvantage or damage caused by improper use of the products that differs from the characteristics, specifications, or conditions for use described in this catalog.
- ◆The products in this catalog are intended for use in ordinary electronic products. If any of these products are to be used in special applications requiring extremely high reliability, please conduct appropriate test first and decide yourself at your own risk.
- ◆Though the manufacturer has taken all possible precautions to ensure the quality and reliability of its products, improper use of products may result in bodily injury, fire, or similar accident. If you have any questions regarding the use of the products in question, please consult your SANKEN sales representatives.
- ◆Please be advised that the manufacturer accepts no responsibility for any infraction by users of the manufacturer's products on third party patents or industrial copyrights. The manufacturer is responsible only when such infractions are attributable to the structural design of the product and its manufacturing process. Should any of these products come under the category of strategic goods or services(according to japan's foreign trade and foreign exchange regulations), the sender must obtain an export license from the Japanese Government before said products can be exported outside Japan.

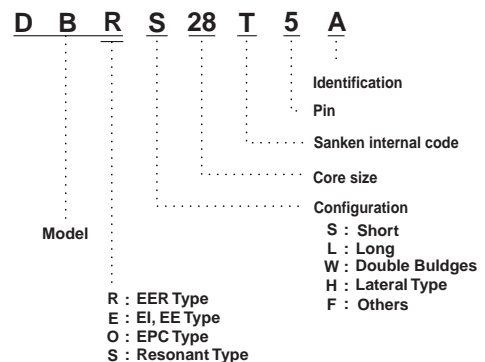
# SANKEN Reactor & Transformer

## C O N T E N T S

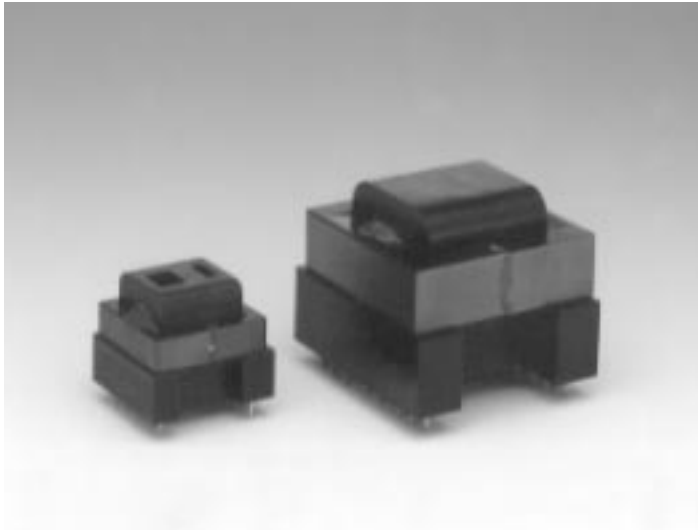
Product Name		Series	
<i>Transformer</i>	<i>Switching Transformer for Resonant</i>	DBS	2
	<i>Triple Insulated Wire type Transformer</i>	SDT	6
	<i>Switching Transformer EER type</i>	DBR	8
	<i>Switching Transformer EE, EI type</i>	DBE	16
Also low-frequency transformer is available.	<i>Switching Transformer Flat type</i>	DBH	20
<i>Harmonic Current Restraint Reactor</i>	<i>Low leakage flux TS type</i>	TS	26
	<i>Low leakage flux type for TV</i>	TS	30
	<i>Standard type</i>	SS	32
	<i>Customized standard type</i>	SS	34
	<i>Hybrid choke coil for Harmonics/EMI HS type</i>	HS	36
	<i>Universal type</i>	WS	40

Design of any minor change which is not stated in this catalog will be available for all series of harmonic current restraint reactor

### ●Note(Transformer)



# Switching Transformer for Resonant



## ◆Features

- Divided bobbin into primary bobbin and secondary bobbin
- High efficiency
- Low noise

## ◆Applications

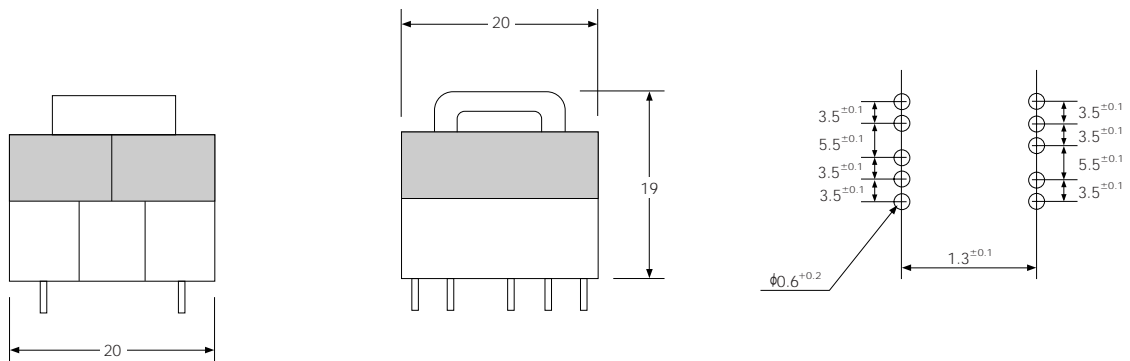
- TV, OA, SMPS

## ◆Performance

Size	Item	Output (W) F=100KMZ	PINS
	DBSS20S5	30	5×5
	DBSS25S6	50	5×6
	DBSS27S4	60	4×4
	DBSS28S6	80	5×6
	DBSS28S6A	80	5×6
	DBSS28S4	60	4×4
	DBSS30S4	80	5×4
	DBSS33S4	100	4×4
	DBSS33S6	120	5×6
	DBSS40S9	180	8×9
	DBSS42S9	220	8×9

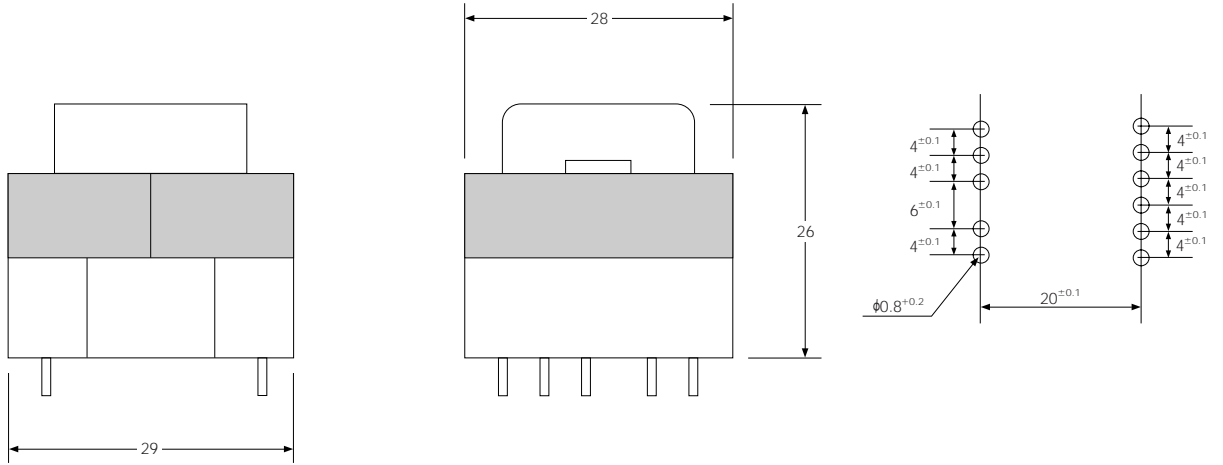
## ◆Dimensions In mm (not to scale)

DBSS20S5

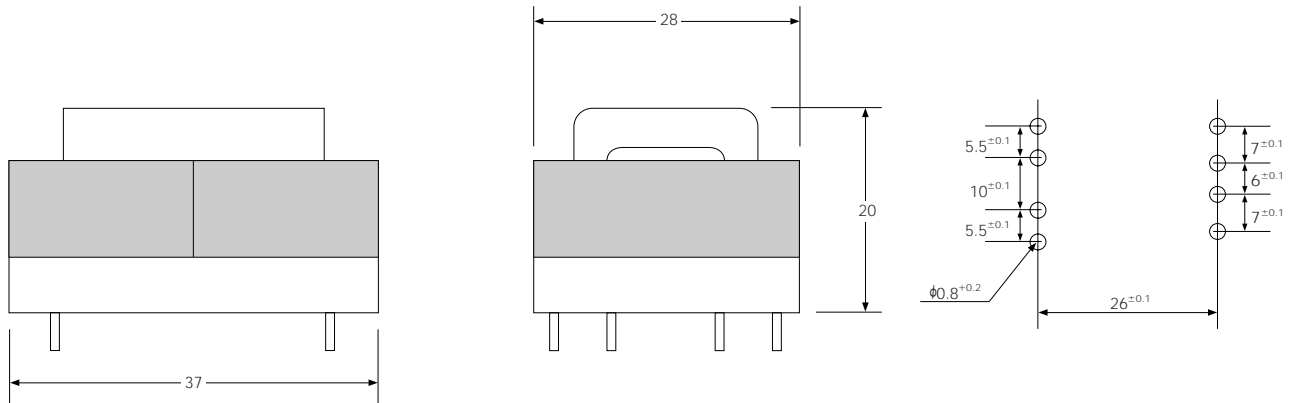


◆ Dimensions In mm (not to scale)

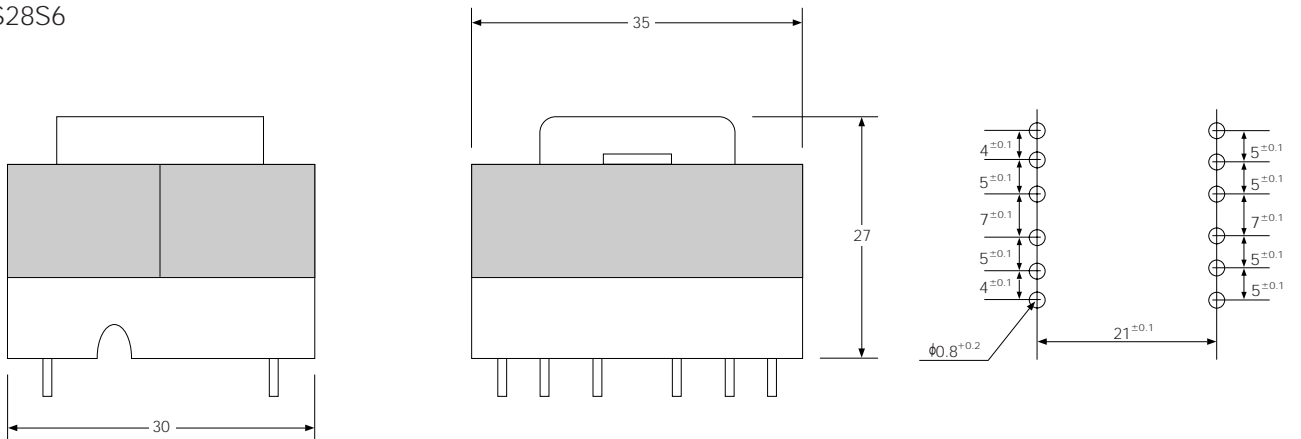
DBSS25S6



DBSF27S4



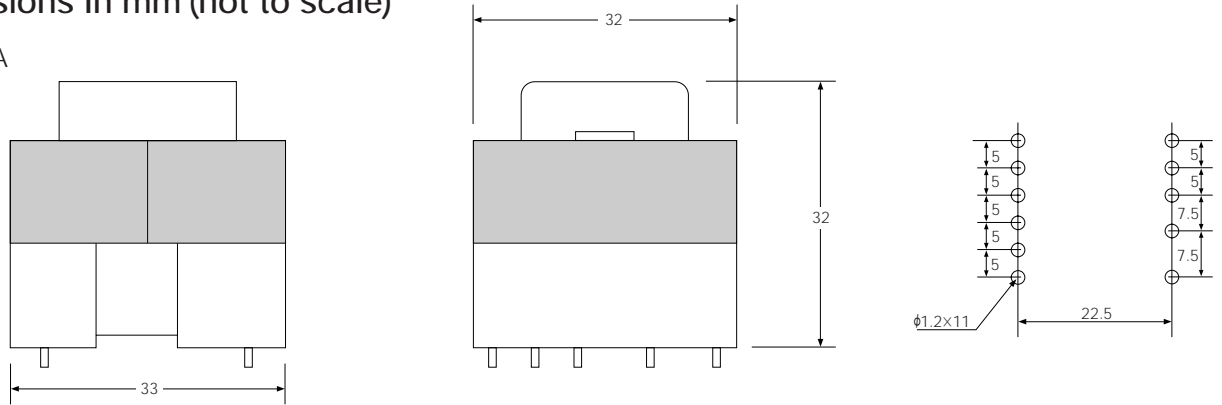
DBSS28S6



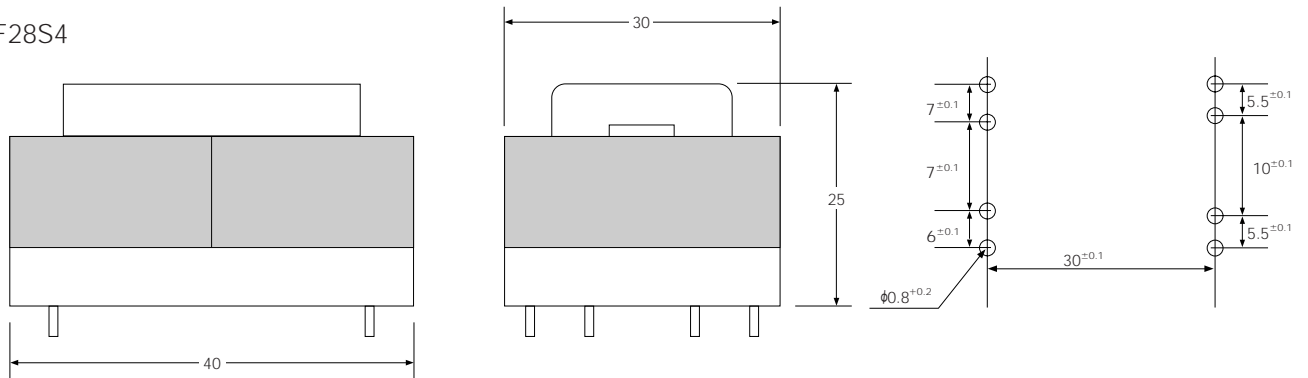
# Switching Transformer for Resonant

◆ Dimensions In mm (not to scale)

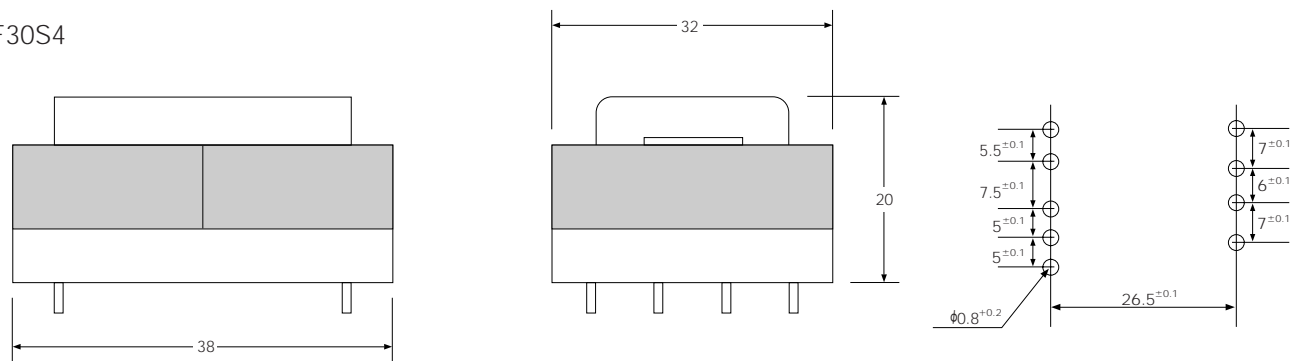
DBSS28S6A



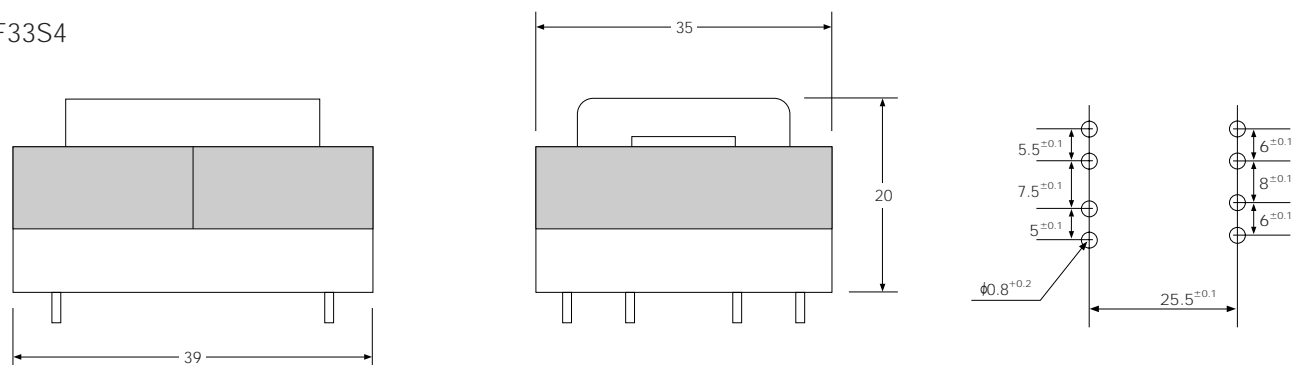
DBSF28S4



DBSF30S4

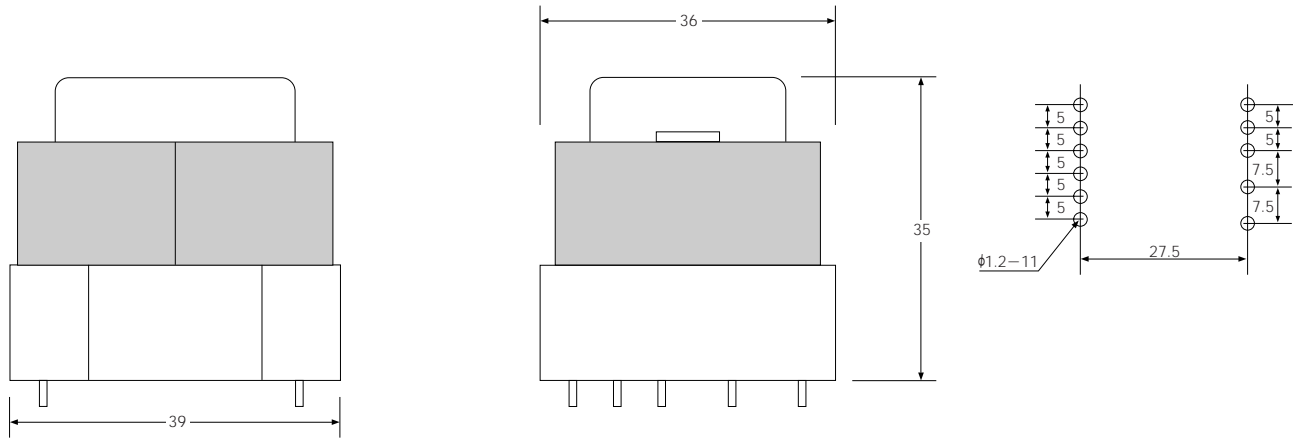


DBSF33S4

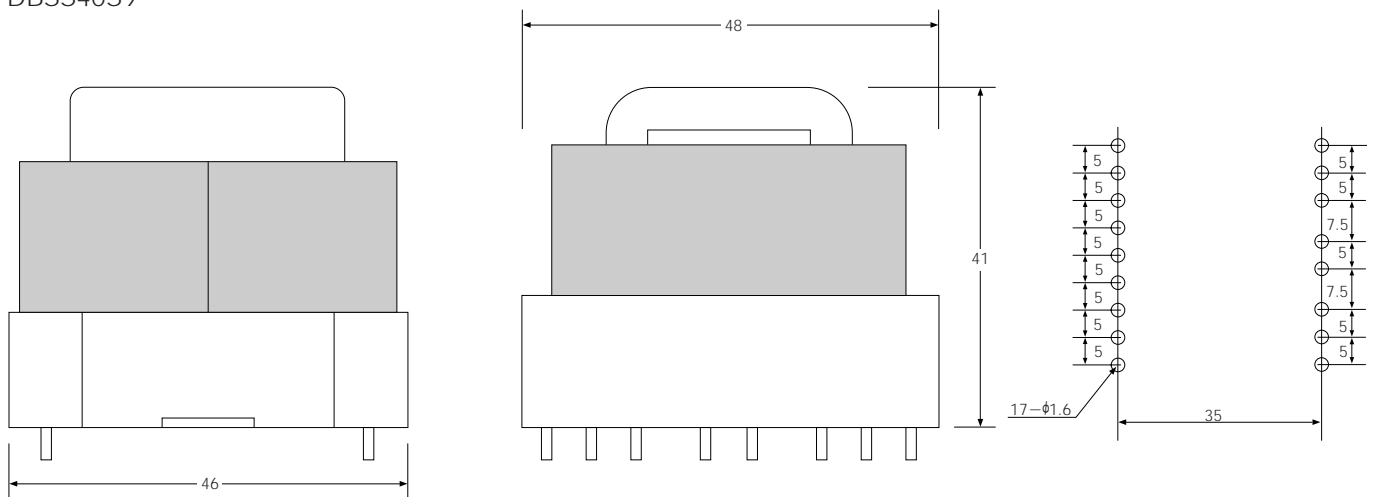


◆Dimensions In mm (not to scale)

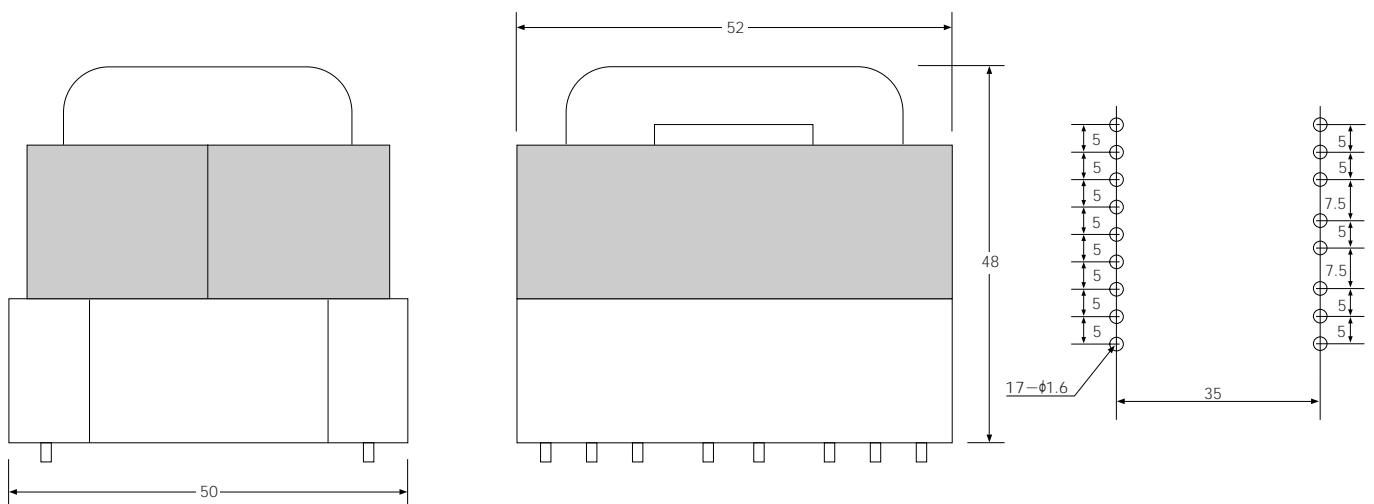
DBSS33S6



DBSS40S9

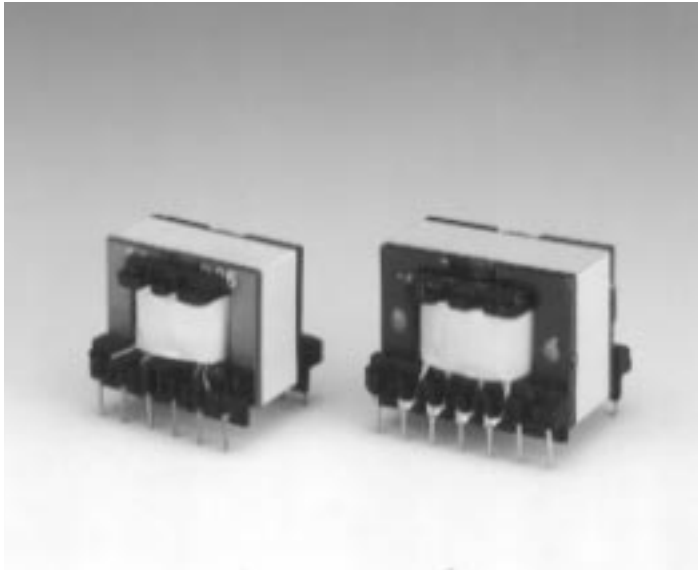


DBSS42S9



•Transformer•

# Triple Insulated Wire type



### ◆Performance

Size	Item	Output (W) F=100KMZ	PINS
	SDT28	80	6×6
	SDT33	130	7×7
	SDT38	180	8×8
	SDT42	200	9×9

### ◆Features

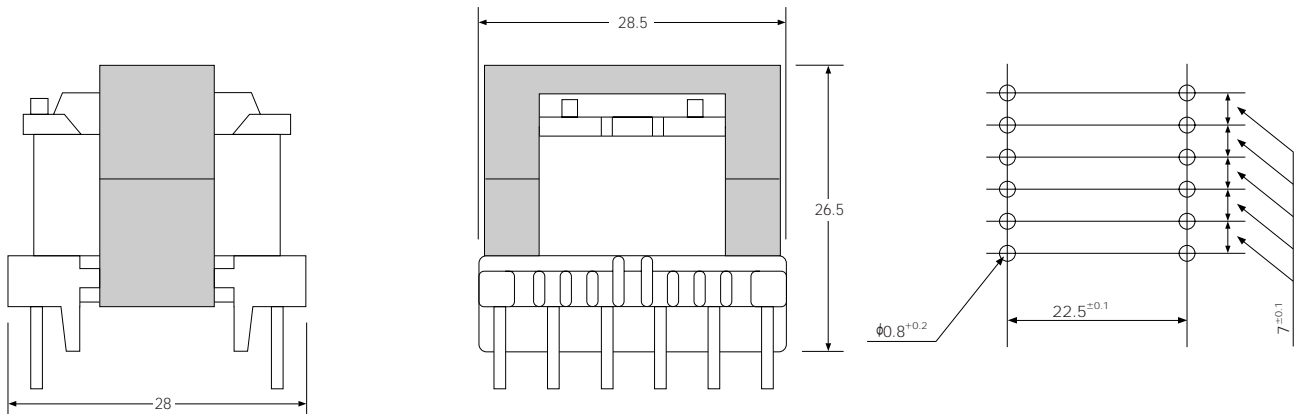
- Triple insulated wire is used
- Small
- High efficiency
- Without barrier

### ◆Applications

OA, SMAPS

### ◆Dimensions In mm (not to scale)

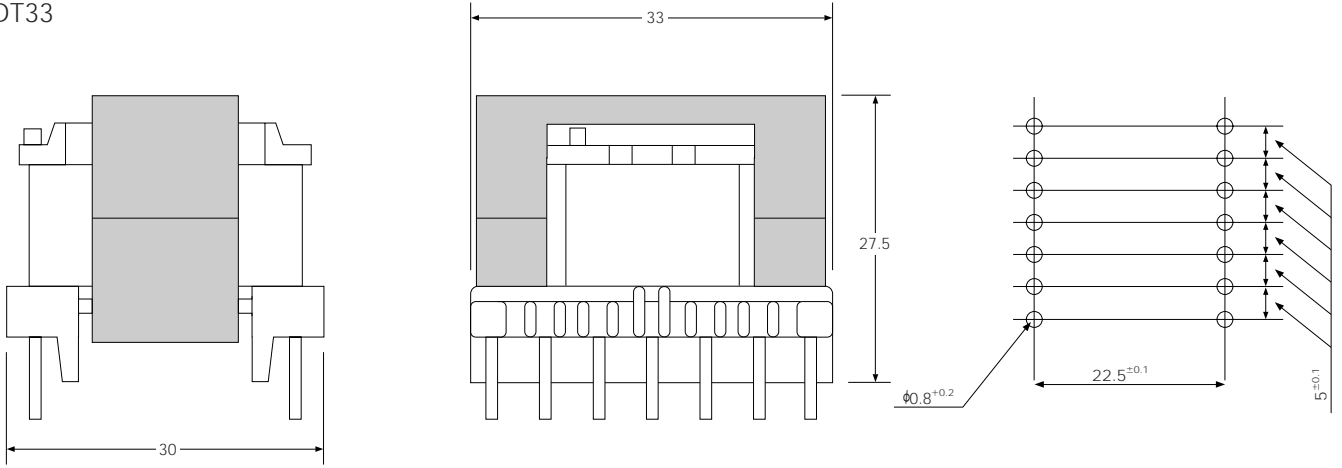
SDT28



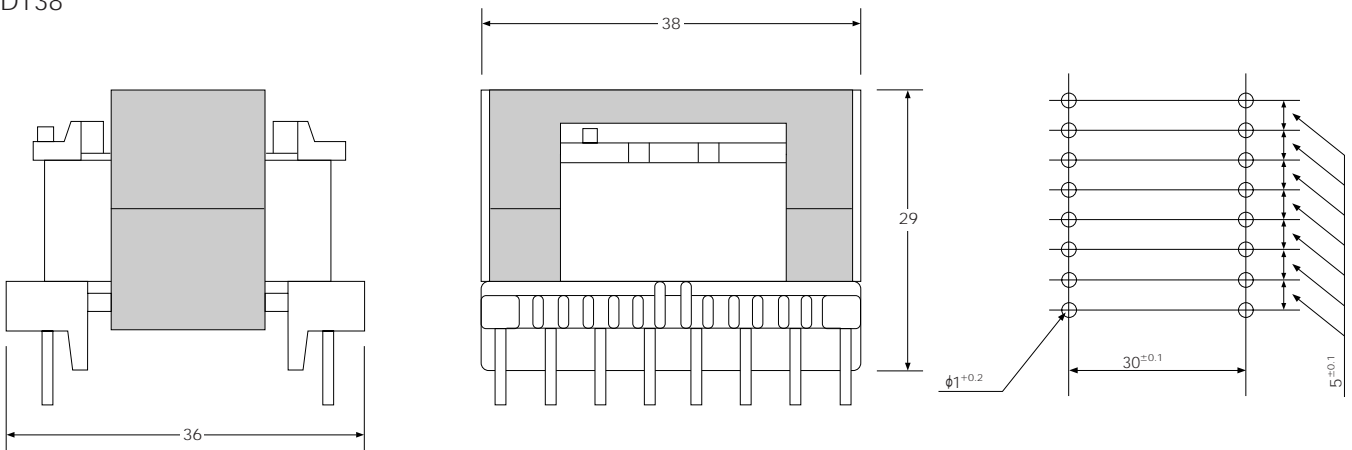


◆ Dimensions In mm (not to scale)

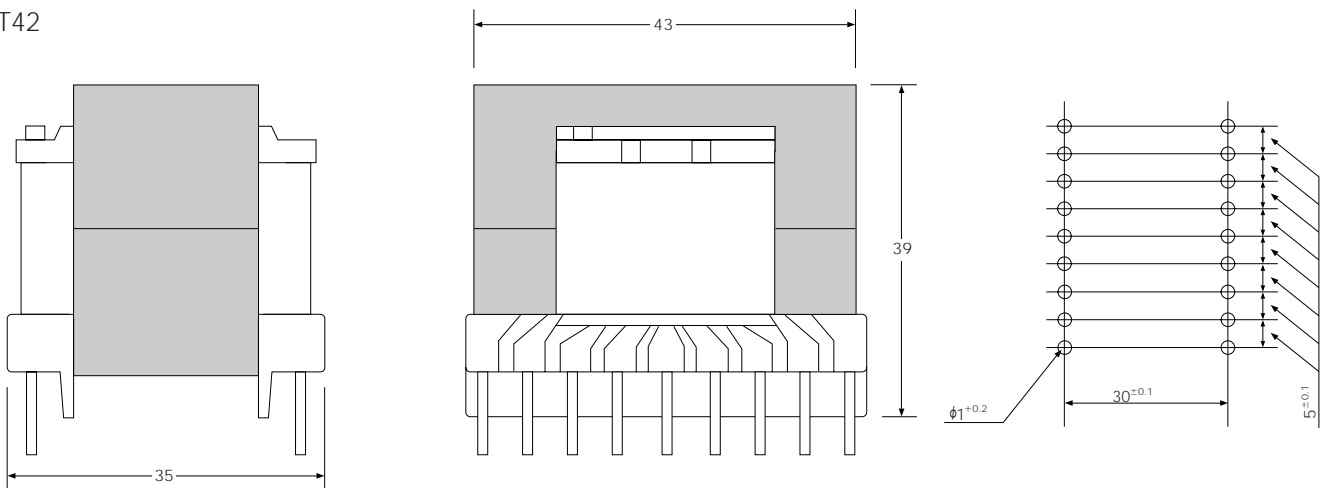
SDT33



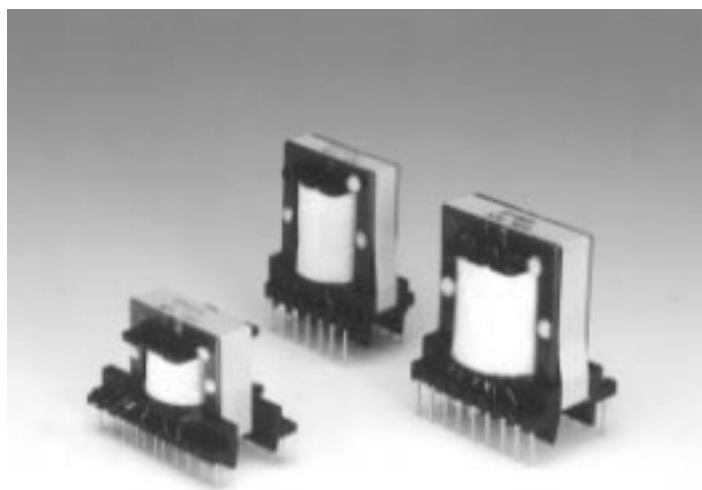
SDT38



SDT42



# Switching Transformer EER type



## ◆ Performance

Size	Item	Output (W) F=100KMZ	PINS
	DBRS25T4	40	4×4
	DBRS28T5	50	5×5
	DBRS28S5	50	5×5
	DBRL28T5	80	5×5
	DBRL28K6	80	6×6
	DBRW28S6	80	6×6
	DBRL28S8	80	8×8
	DBRS35T6	100	6×6
	DBRW35S7	100	7×7
	DBRF35S12	70	10×12
	DBRS40T6	120	6×6
	DBRW40S9	120	9×9
	DBRS42T7	160	7×7
	DBRS42S9	160	9×9
	DBRS42S9A	160	9×9
	DBRF42T6	200	6×6
	DBRW42S9	200	9×9
	DBRS49S9	200	9×9

## ◆ Features

Well-Suited with Sanken's IC

Various transformers with various number of pins to be suitable to products with high output

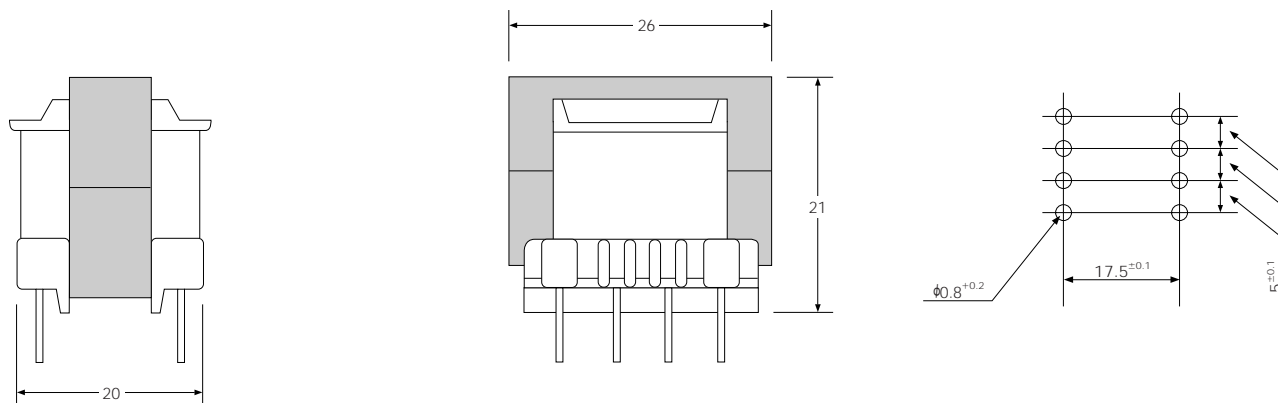
Less leakage flux compared with EE, EI core of the same sized transformer

## ◆ Applications

TV, OA, SMPS

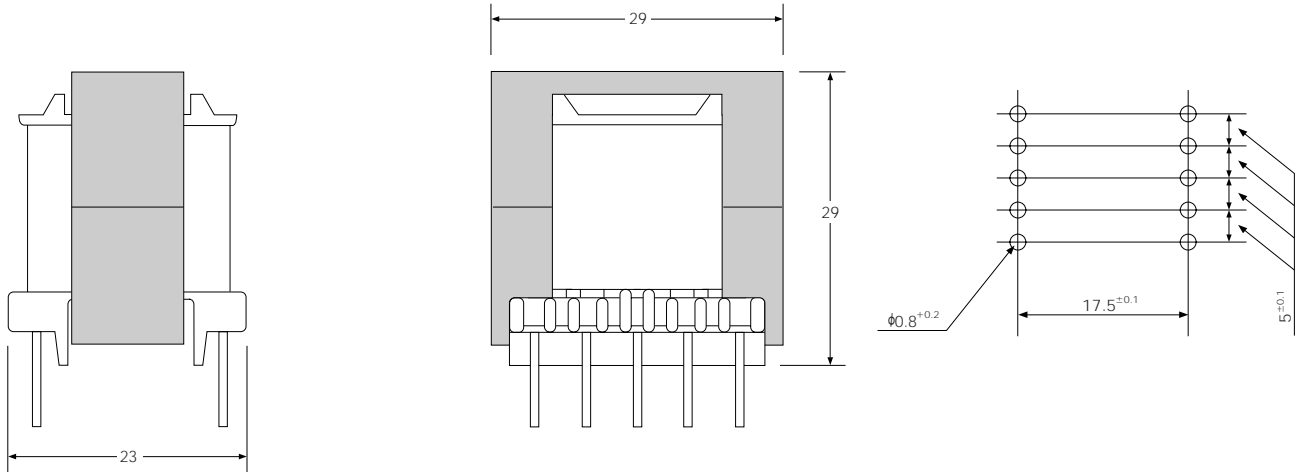
## ◆ Dimensions In mm (not to scale)

DBRS25T4

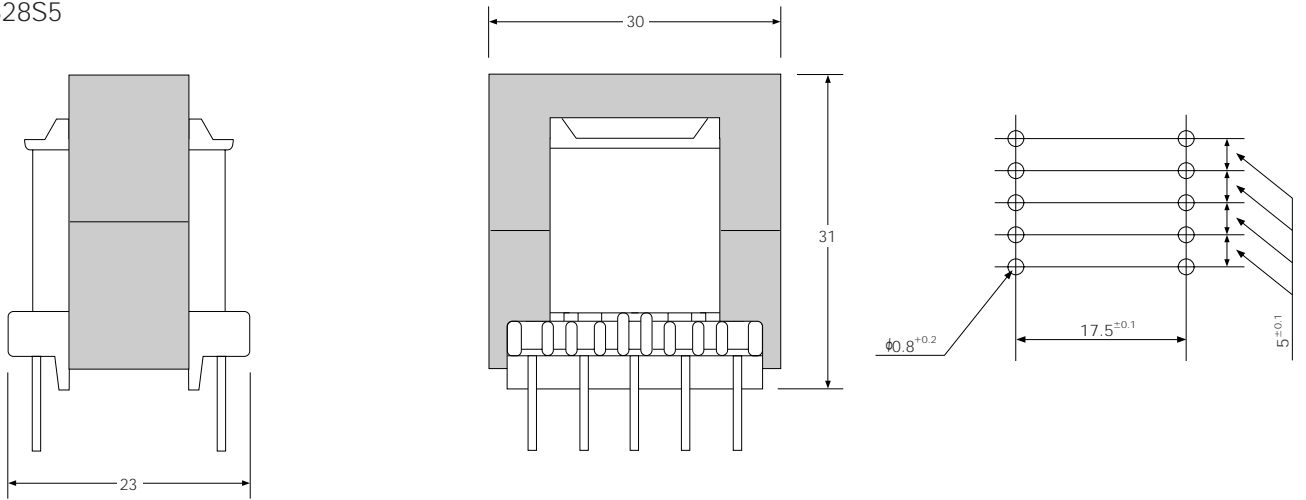


◆ Dimensions In mm (not to scale)

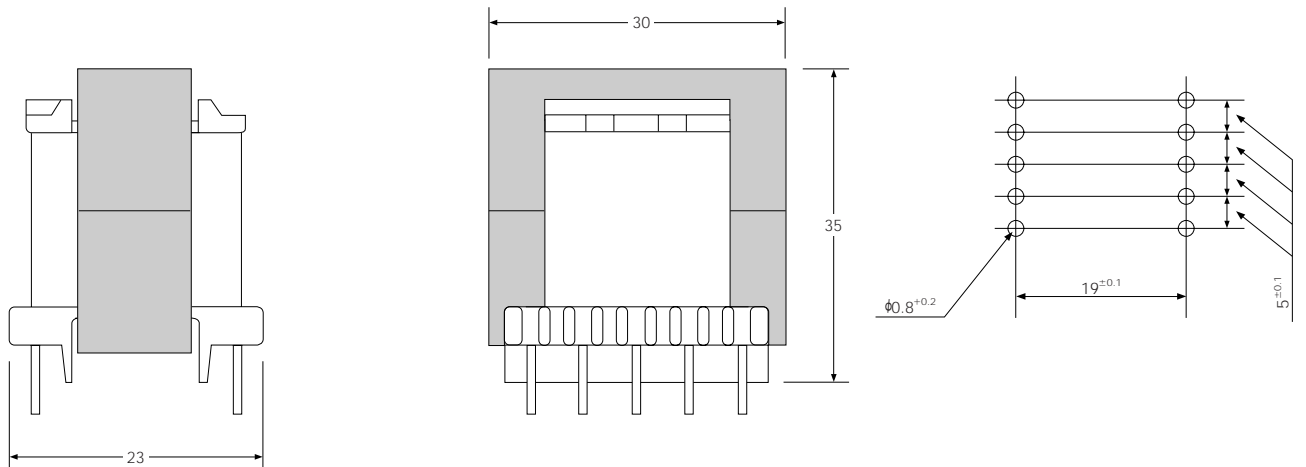
DBRS28T5



DBRS28S5



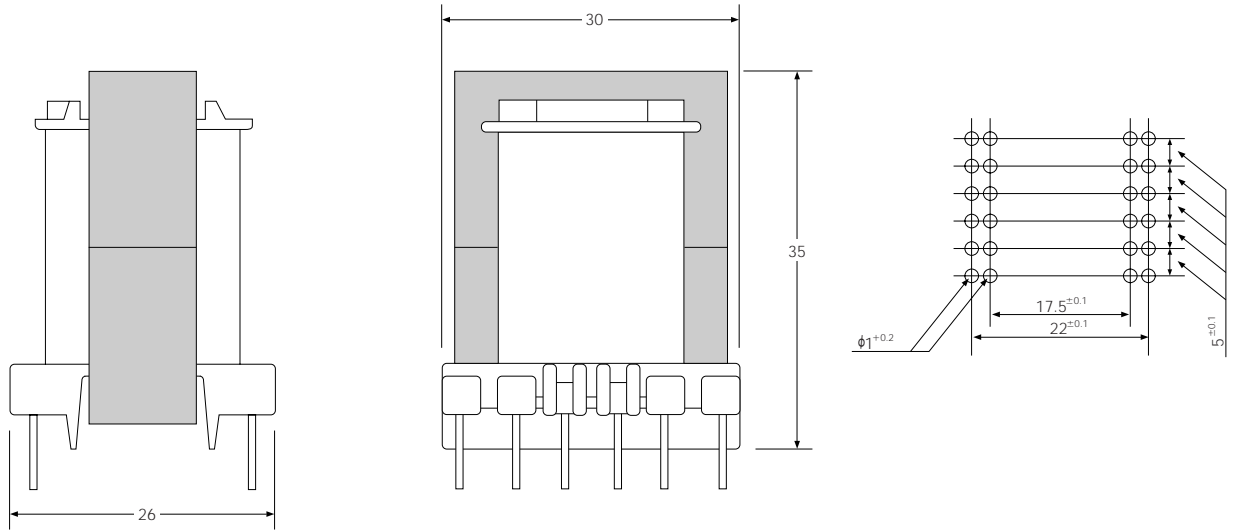
DBRL28T5



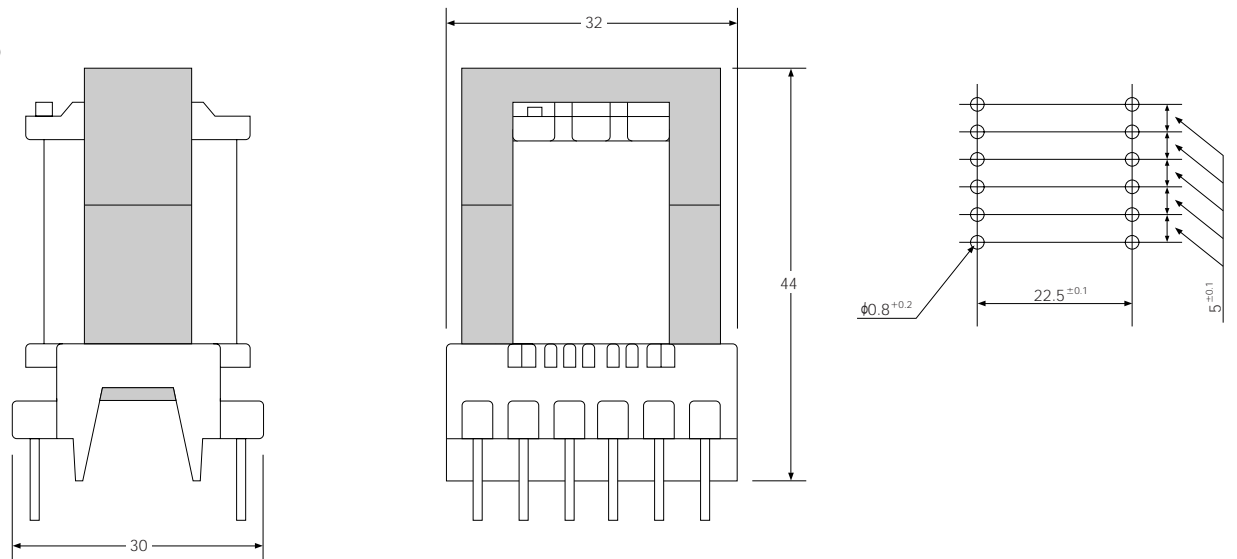
# Switching Transformer EER type

◆ Dimensions In mm (not to scale)

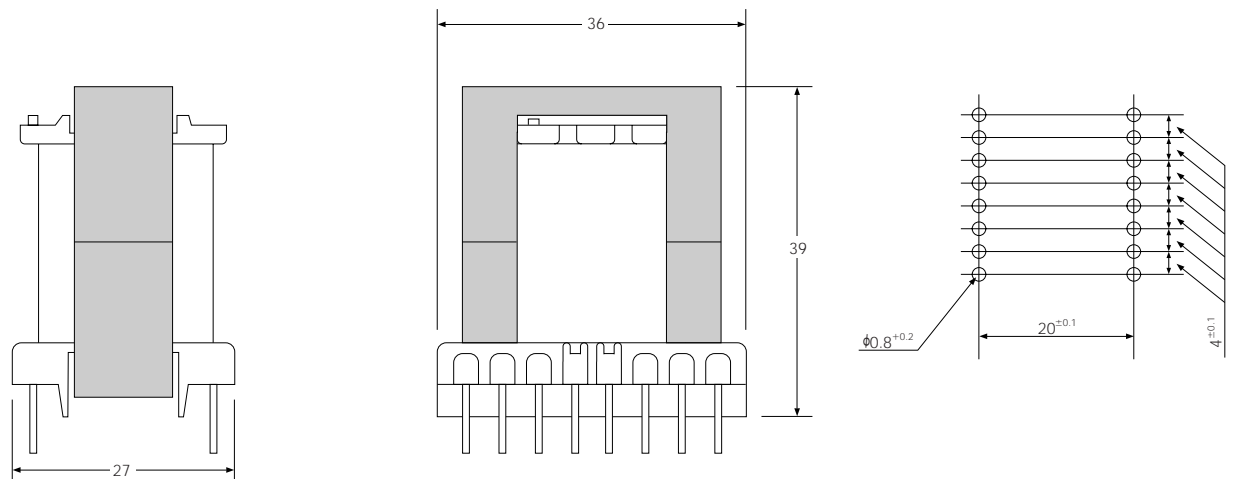
DBRL28k6



DBRW28S6

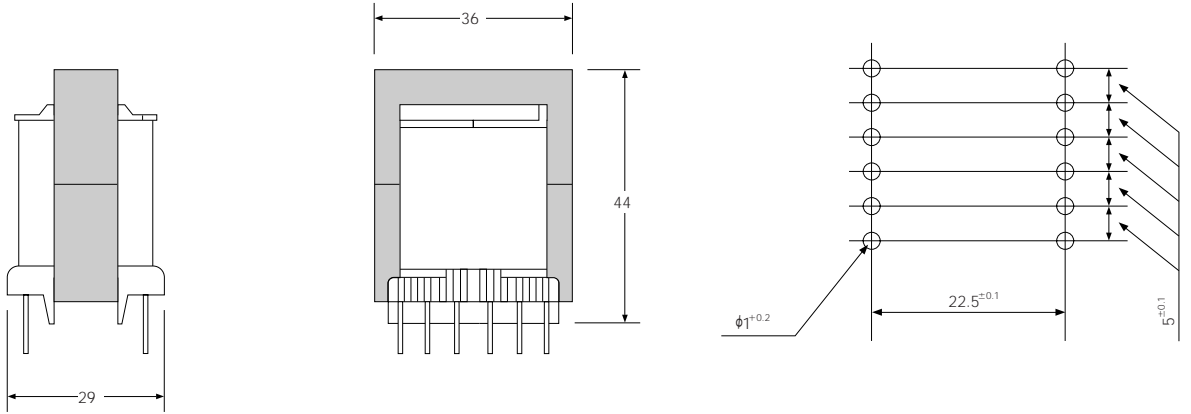


DBRL28S8

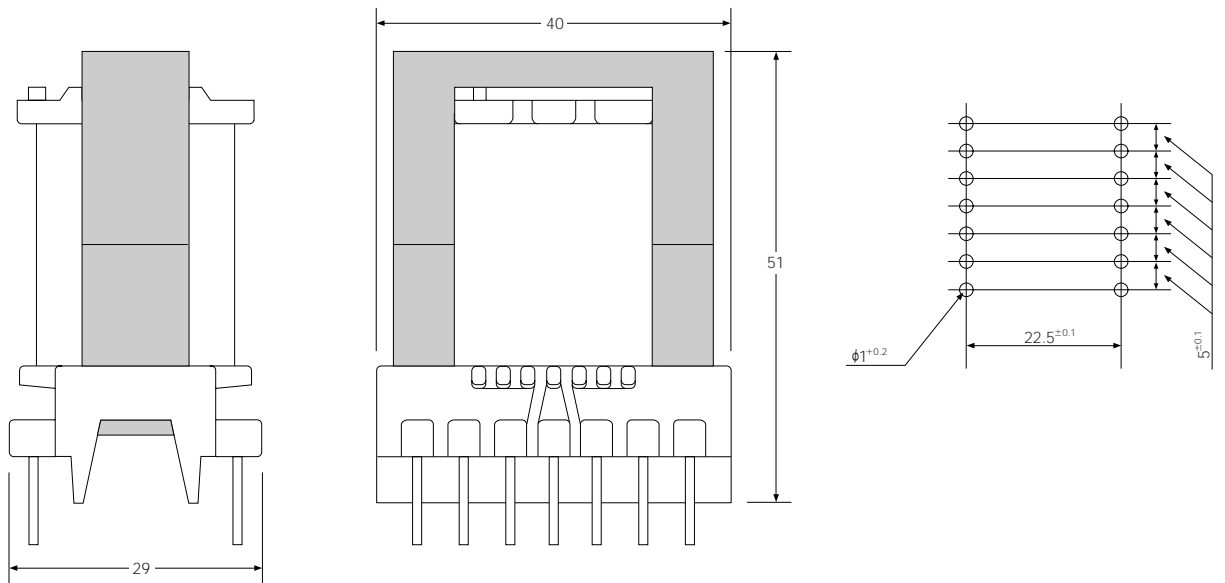


◆ Dimensions In mm (not to scale)

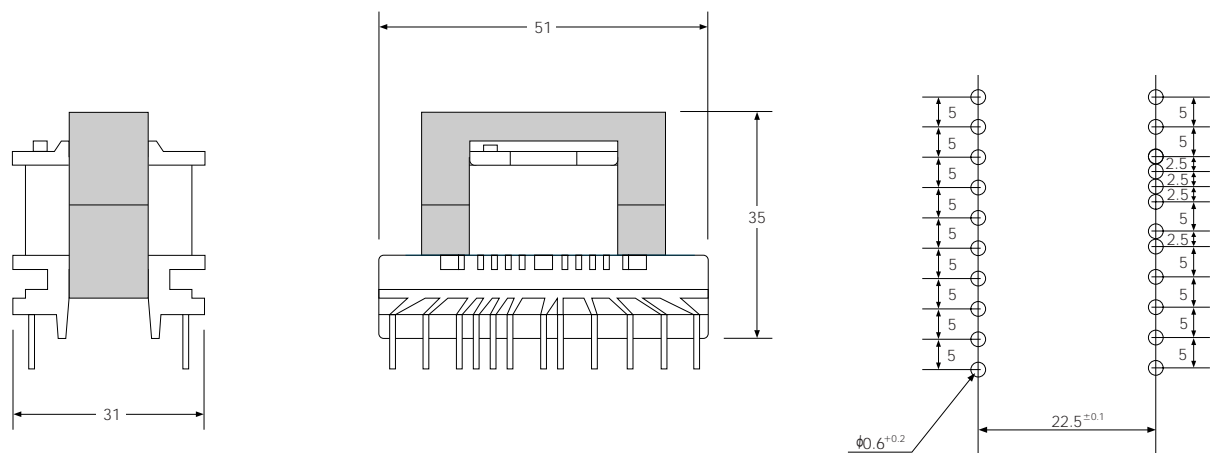
DBRS35T6



DBRW35S7



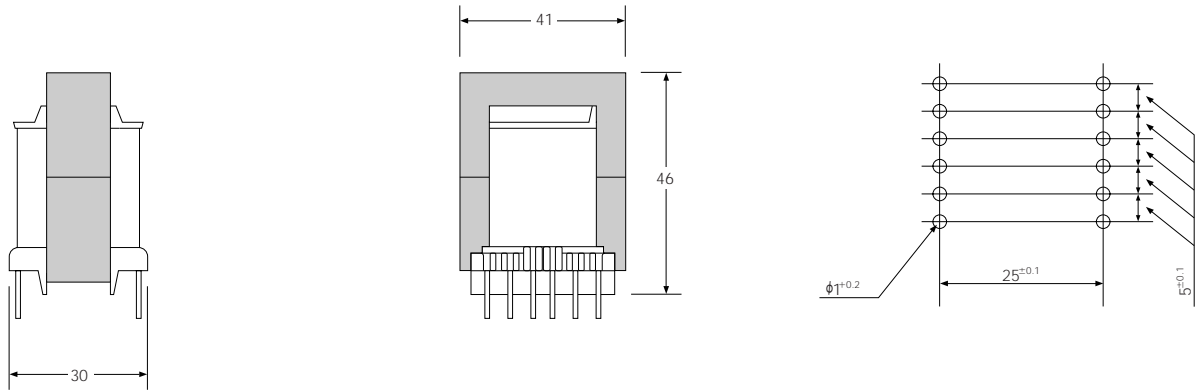
DBRF35S12



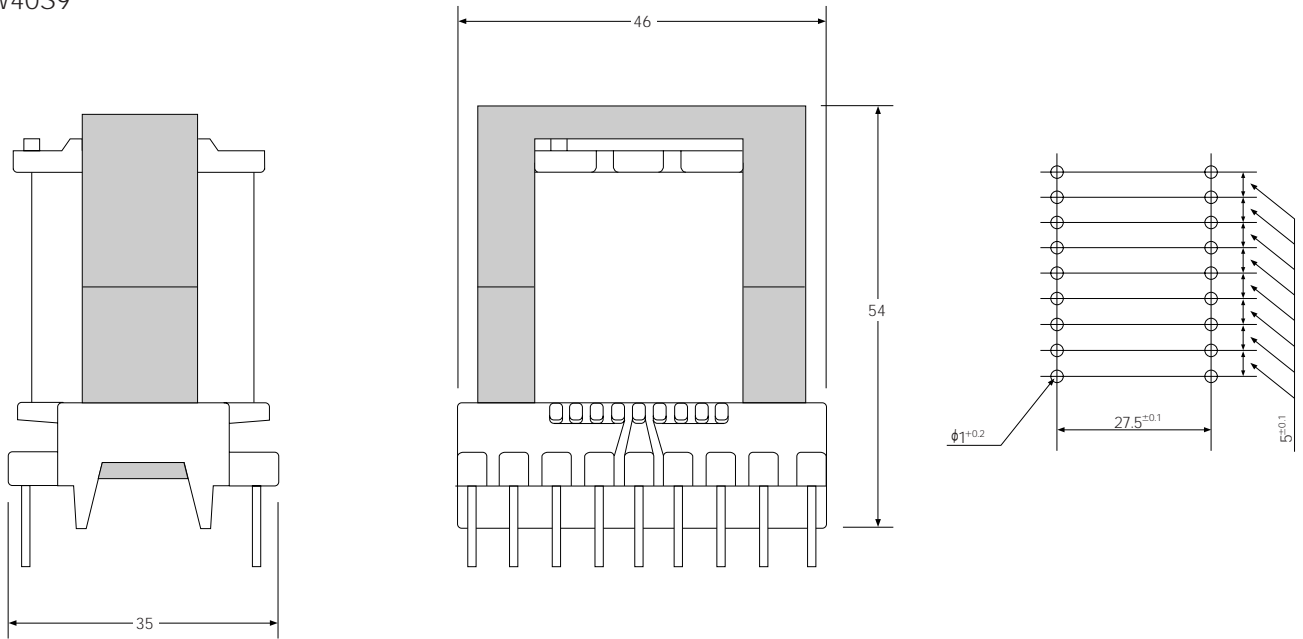
# Switching Transformer EER type

◆ Dimensions In mm (not to scale)

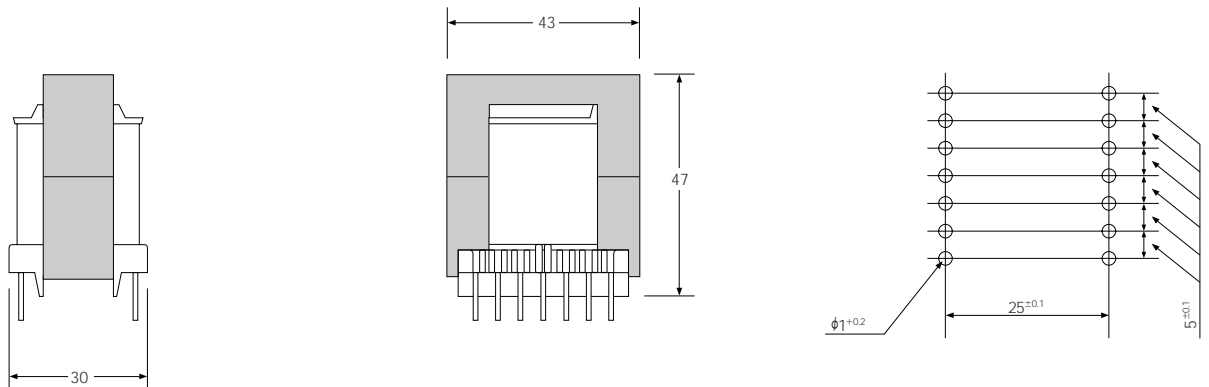
DBRS40T6



DBRW40S9

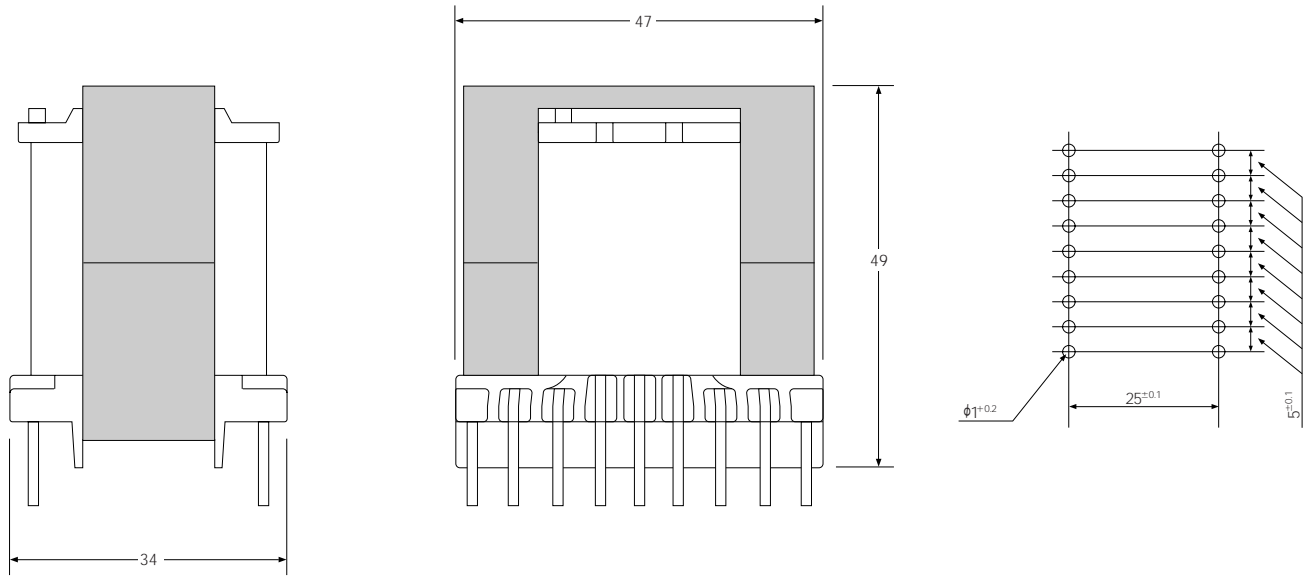


DBRS42T7

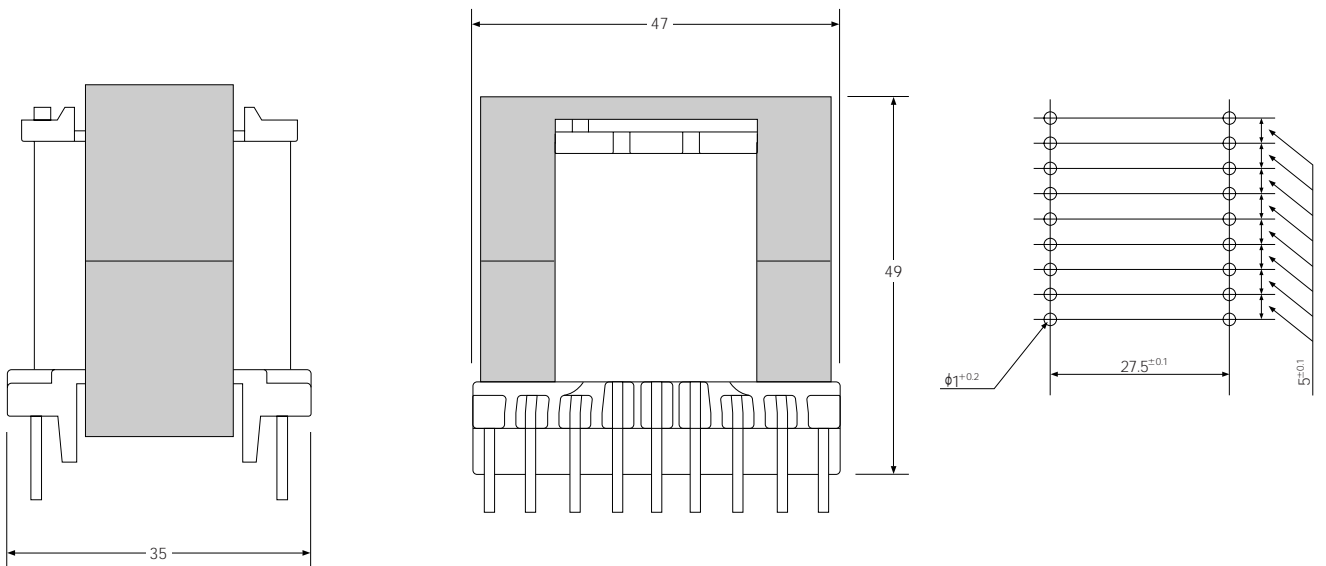


◆ Dimensions In mm (not to scale)

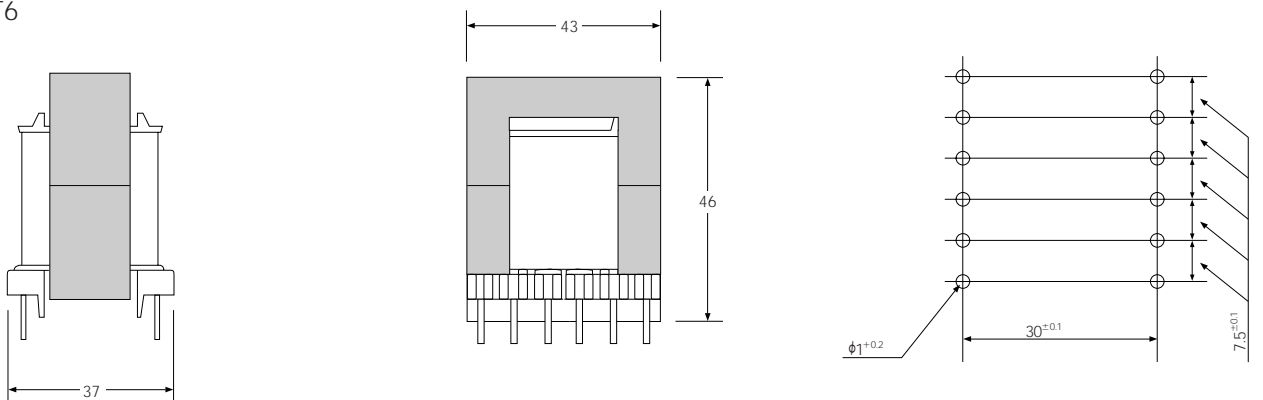
DBRS42S9



DBRS42S9A



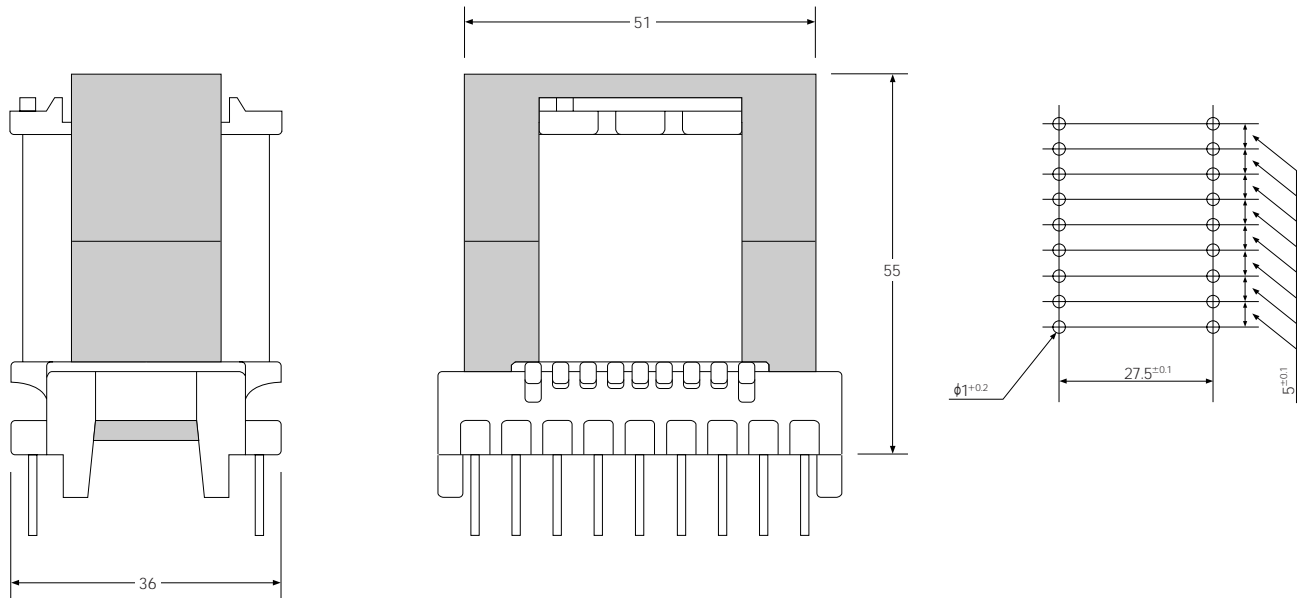
DBRF42T6



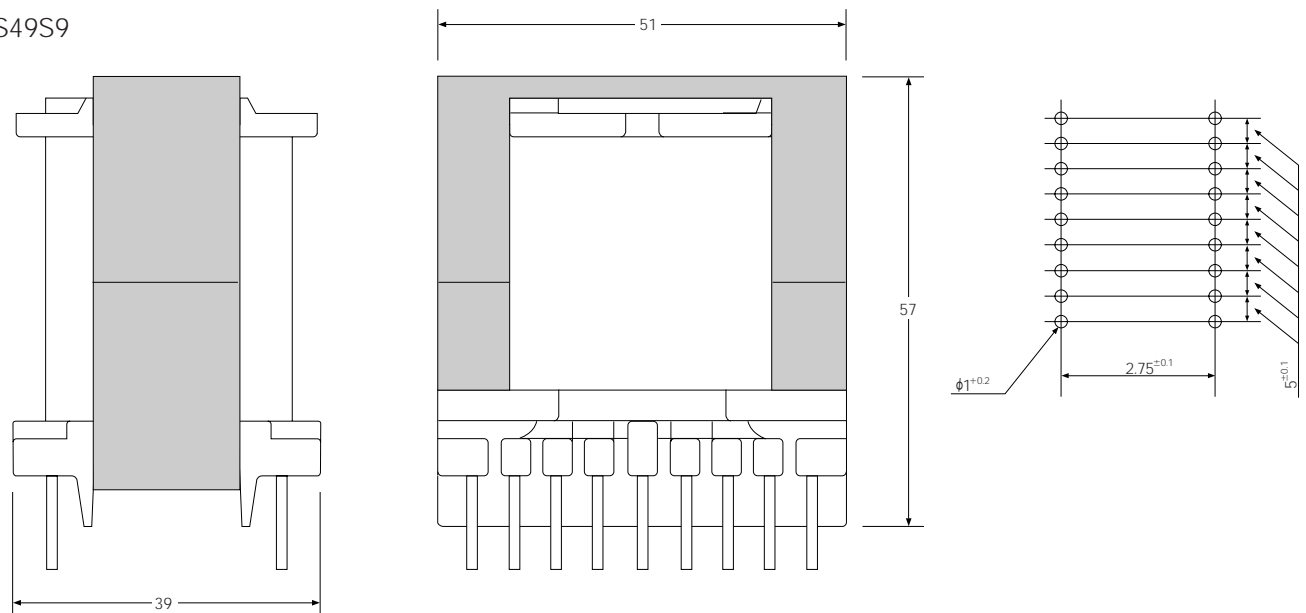
# Switching Transformer EER type

◆ Dimensions In mm (not to scale)

DBRW42S9



DBRS49S9

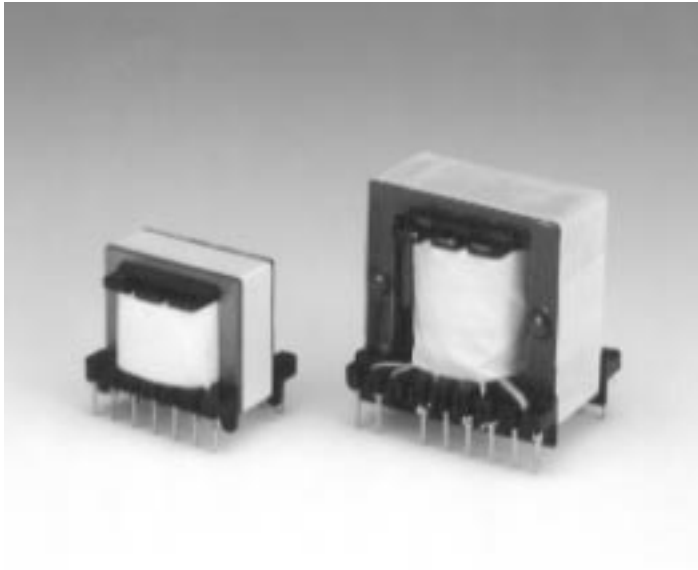






• Transformer •

Switching Transformer  
EE, EI type



◆ Performance

Size	Item	Output (W) F=100KMZ	PINS
DBES19S4		30	4×4
DBES22S4		40	4×4
DBEL22S5		60	5×5
DBES28S5		80	5×5
DBEL28S5		110	5×5
DBES33S7		130	7×7
DBES33S7A		130	7×7
DBES40S8		160	8×8
DBES44S8		200	8×8
DBES50S7		230	7×7

◆ Features

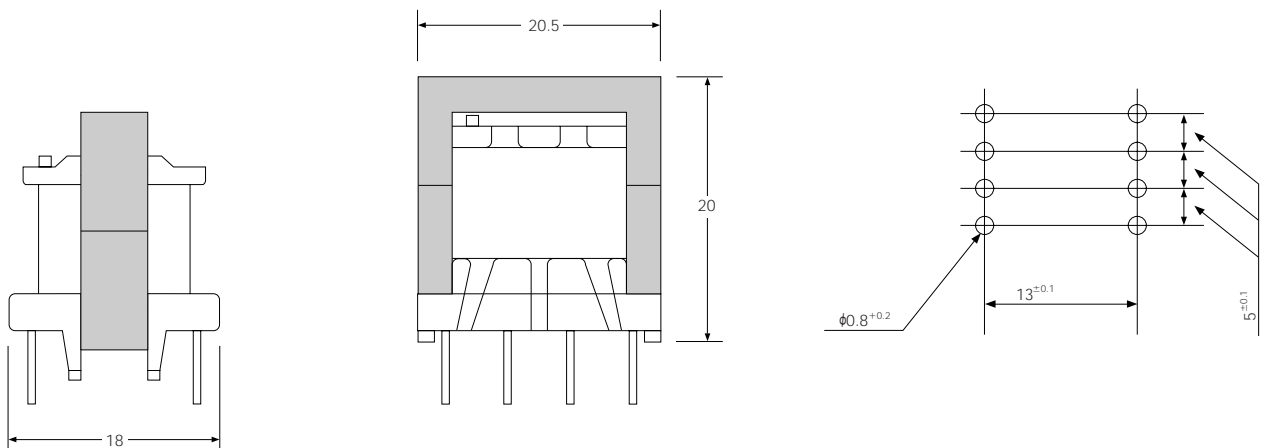
- Low cost
- High flux density

◆ Applications

- TV, OA, SMPS

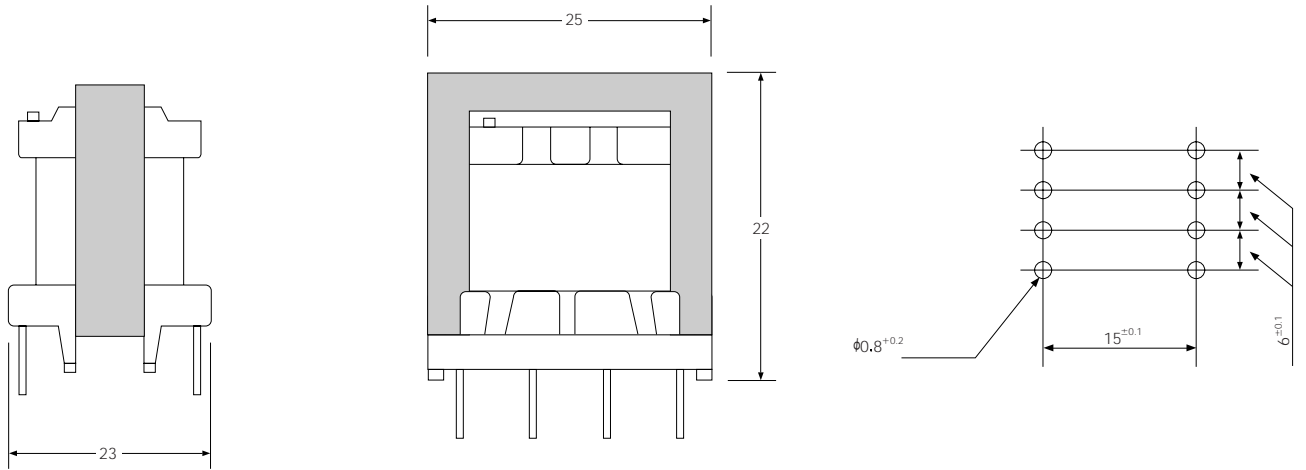
◆ Dimensions In mm (not to scale)

DBES19S4

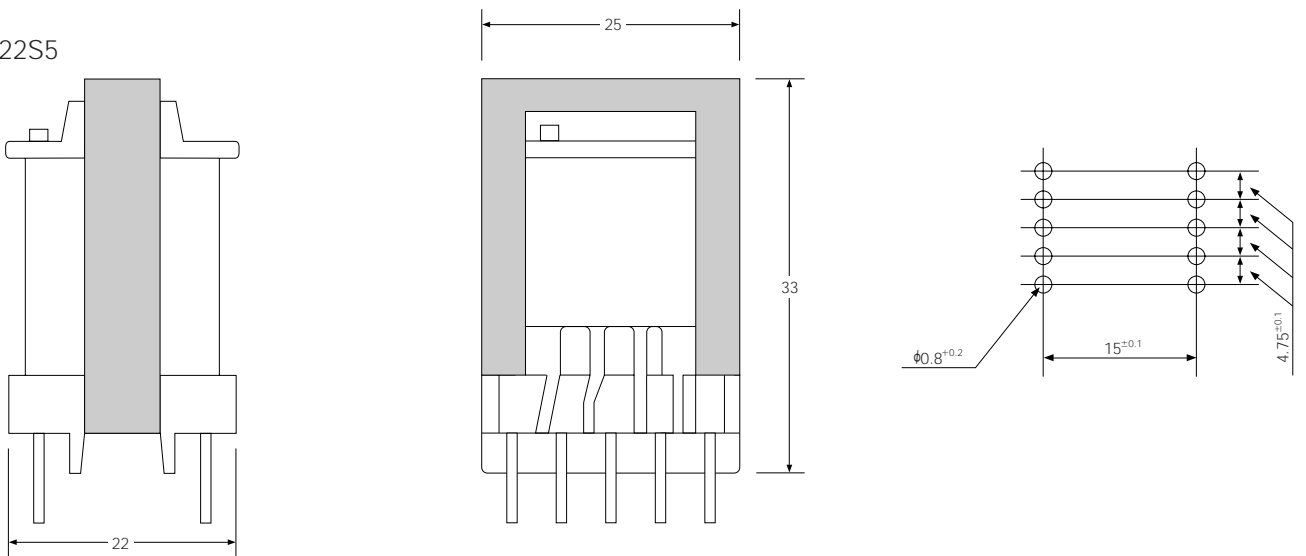


◆ Dimensions In mm (not to scale)

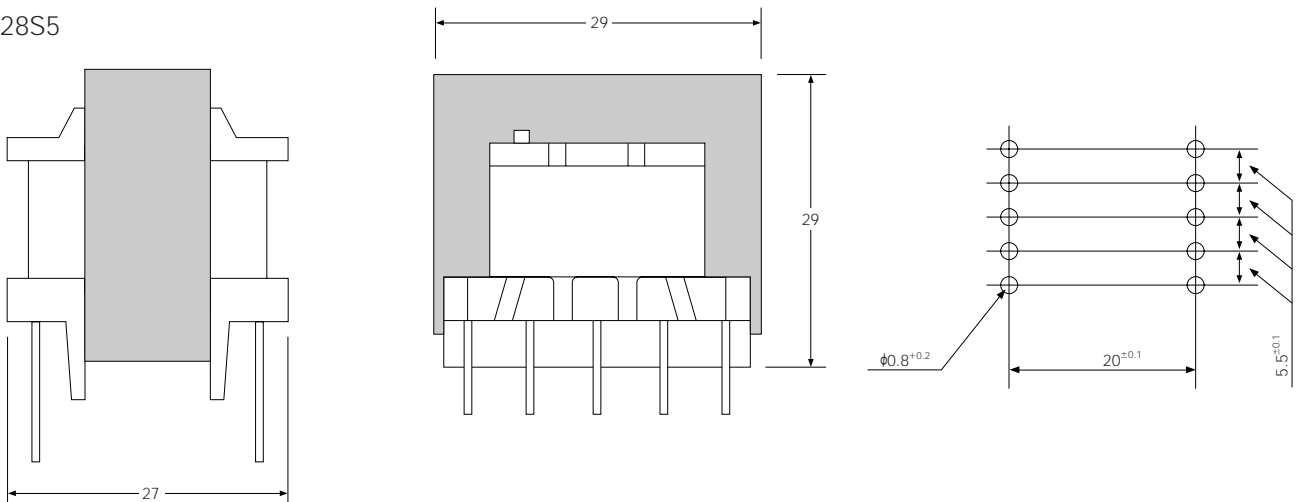
DBES22S4



DBEL22S5



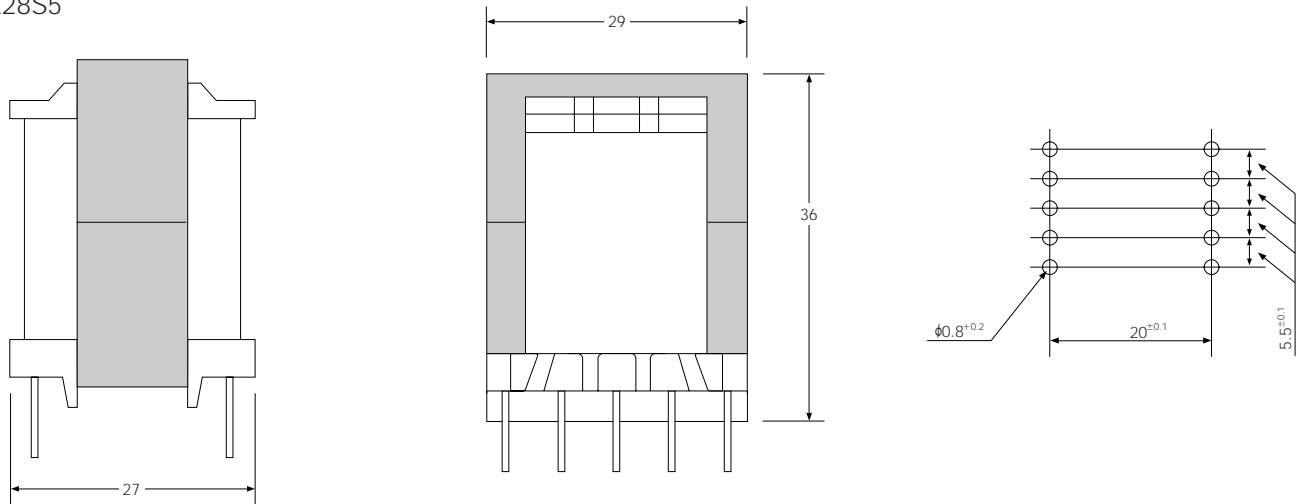
DBES28S5



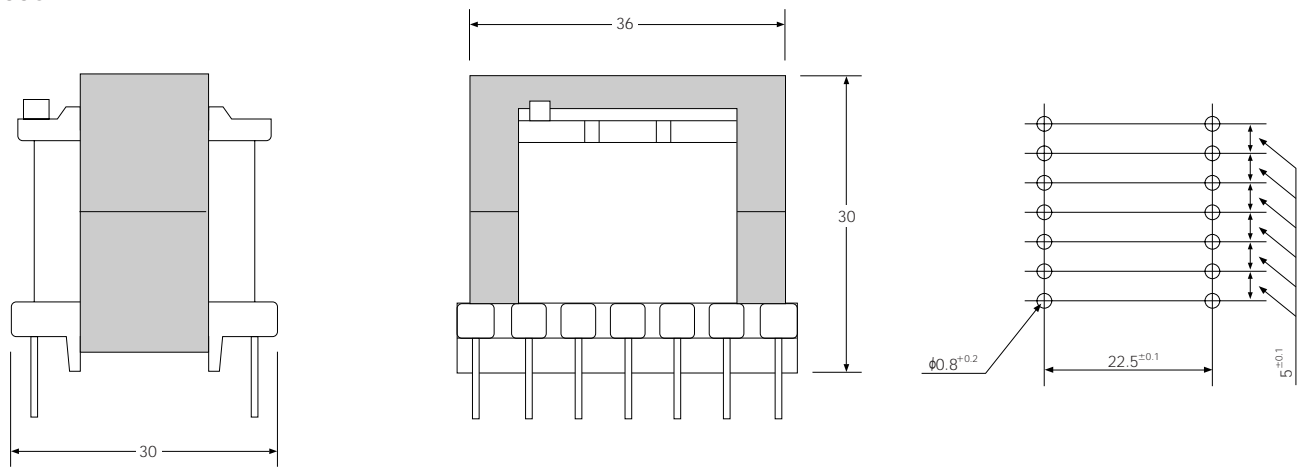
# Switching Transformer EE, EI type

◆ Dimensions In mm (not to scale)

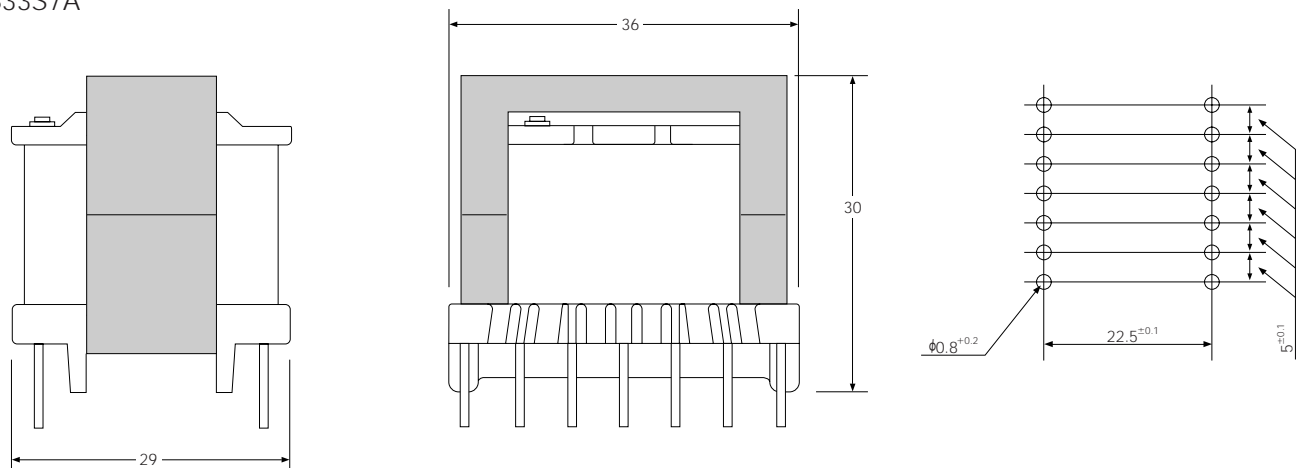
DBEL28S5



DBES33S7

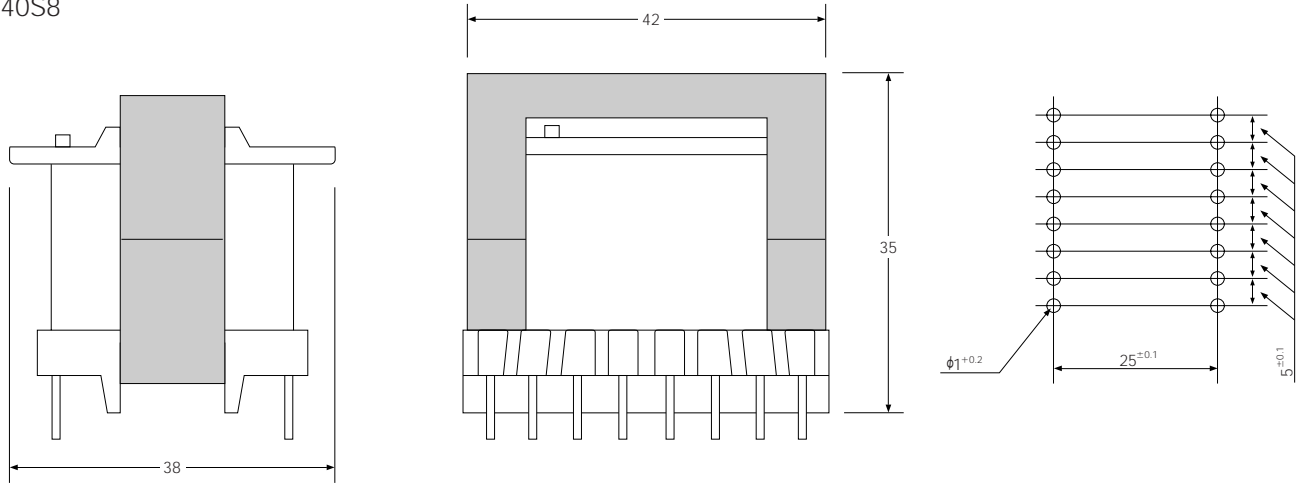


DBES33S7A

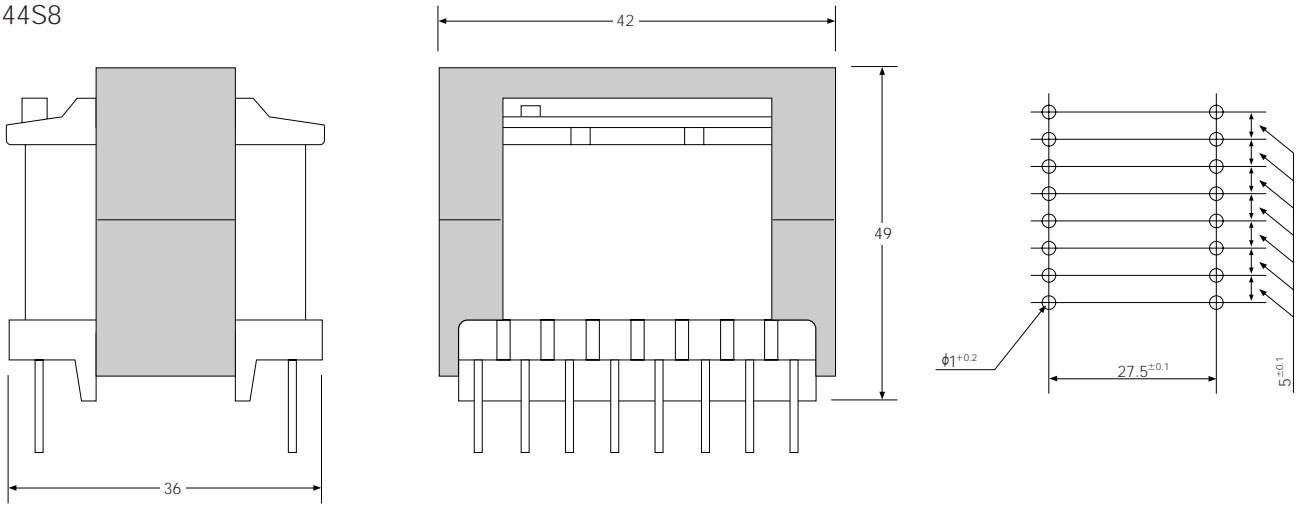


◆ Dimensions In mm (not to scale)

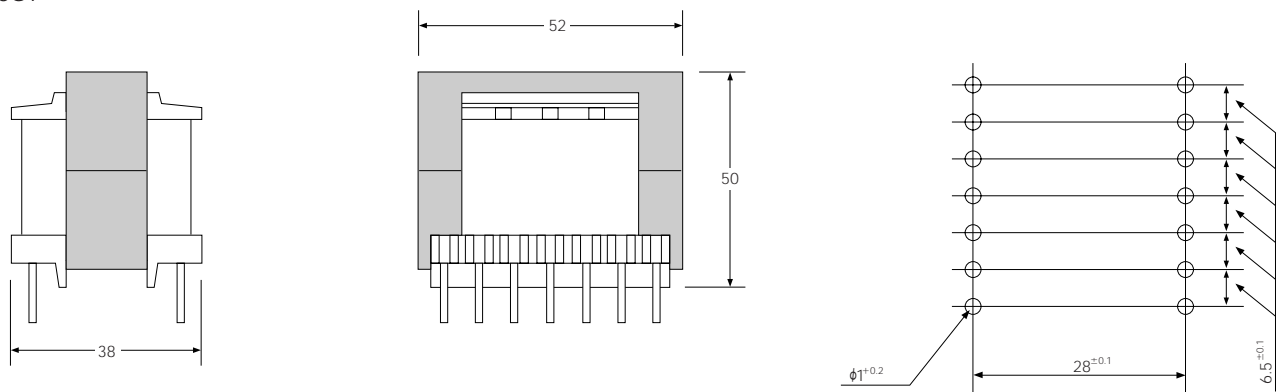
DBES40S8



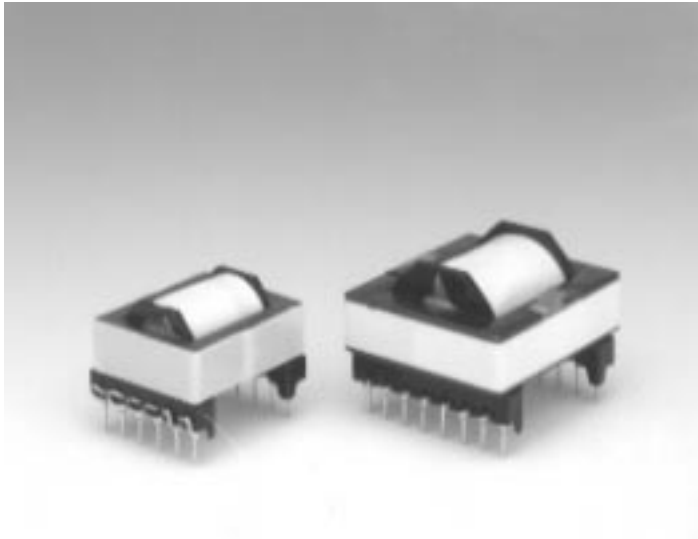
DBES44S8



DBES50S7



# Switching Transformer FLAT type



### ◆ Features

- Thin type
- Meeting IEC standard depend on size

### ◆ Applications

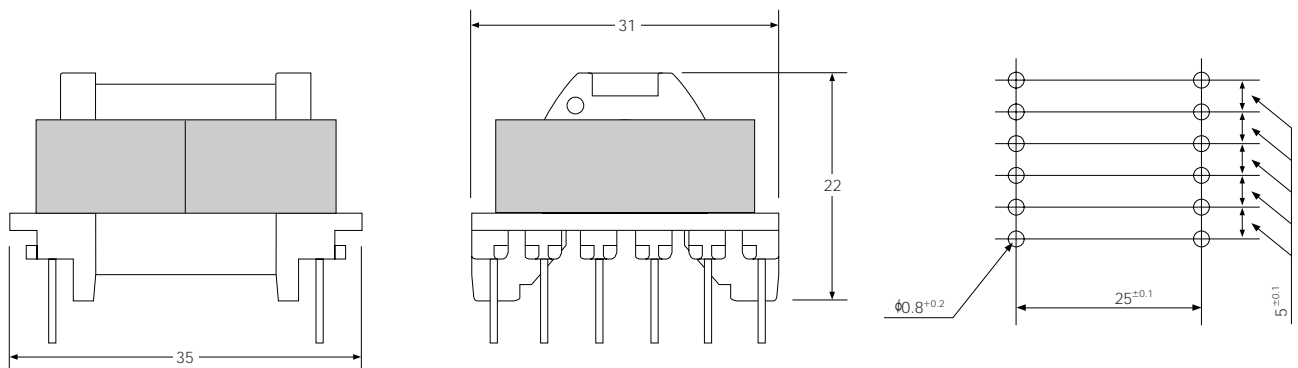
- TV, OA, SMPS

### ◆ Performance

Size	Item	Output (W) F=100KMZ	PINS
DBRH24K6		60	6X6
DBRH28T6		80	6X6
DBRH35T8		100	8X8
DBRH40T8		120	8X8
DBRH40S7		120	7X7
DBRH42T8		180	8X8
DBOH17T5		20	4X5
DBOH19T6		25	5X6
DBOH19S6		25	6X6
DBOH25T6		50	5X6
DBOH27T6		60	5X6
DBOH30T6		70	6X6

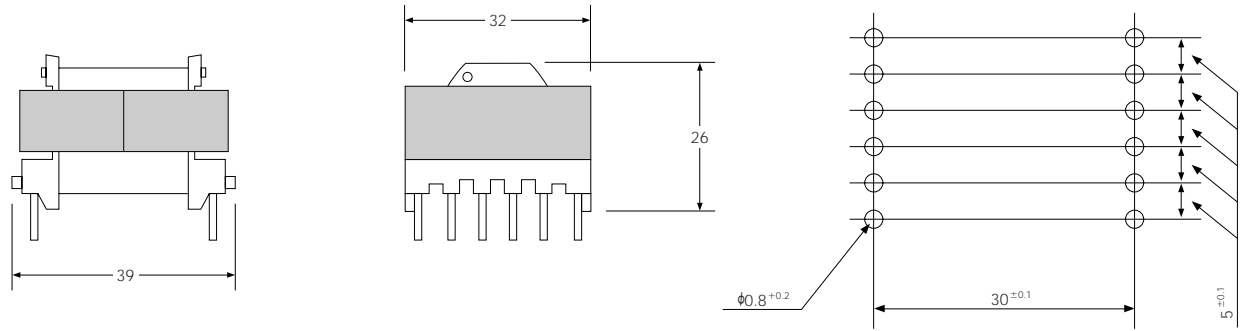
### ◆ Dimensions In mm (not to scale)

DBRH24K6

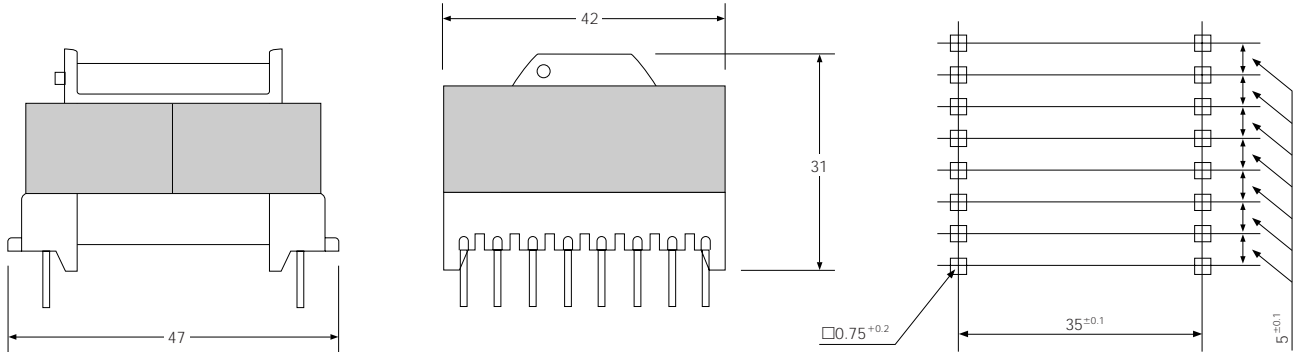


◆ Dimensions In mm (not to scale)

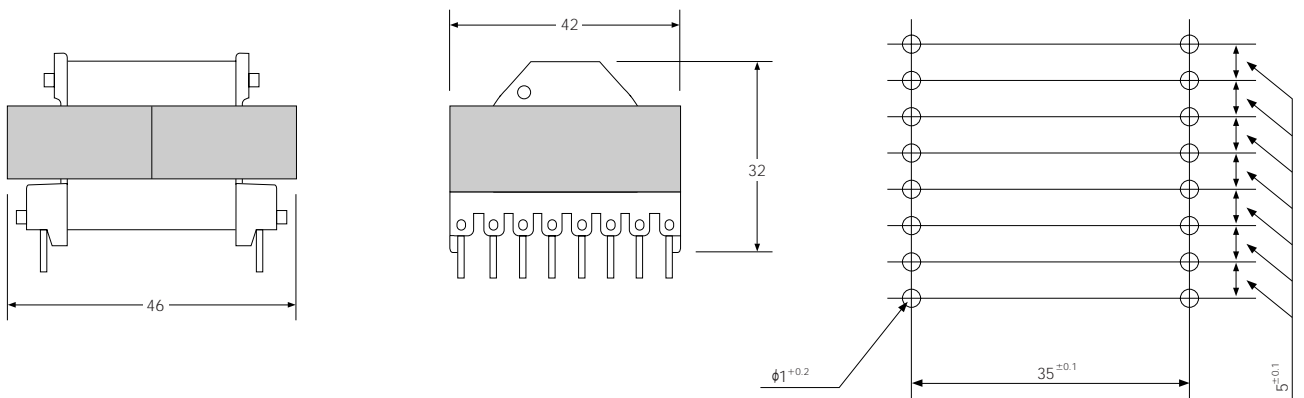
DBRH28T6



DBRH35T8



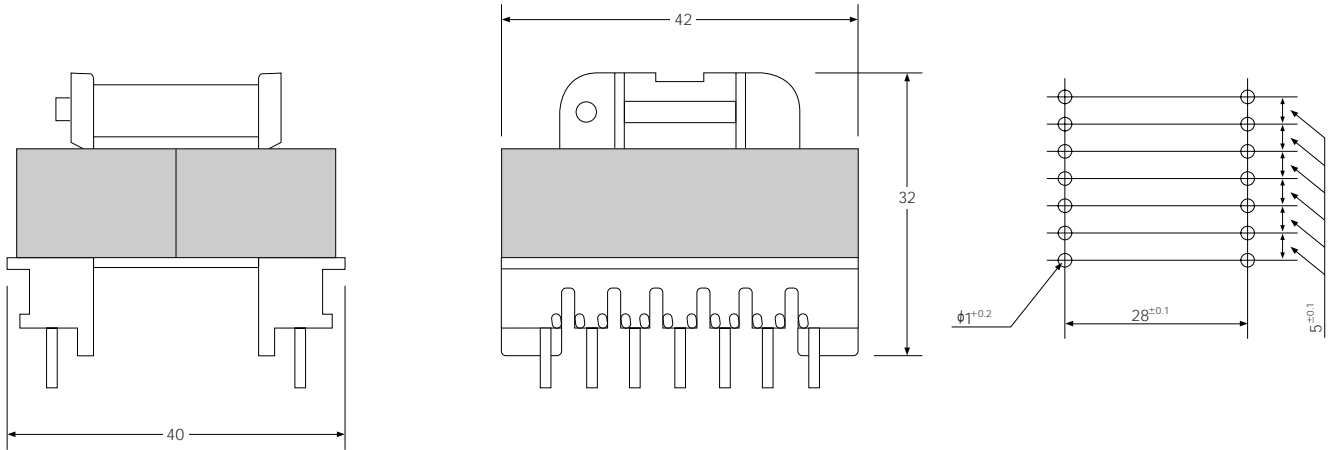
DBRH40T8



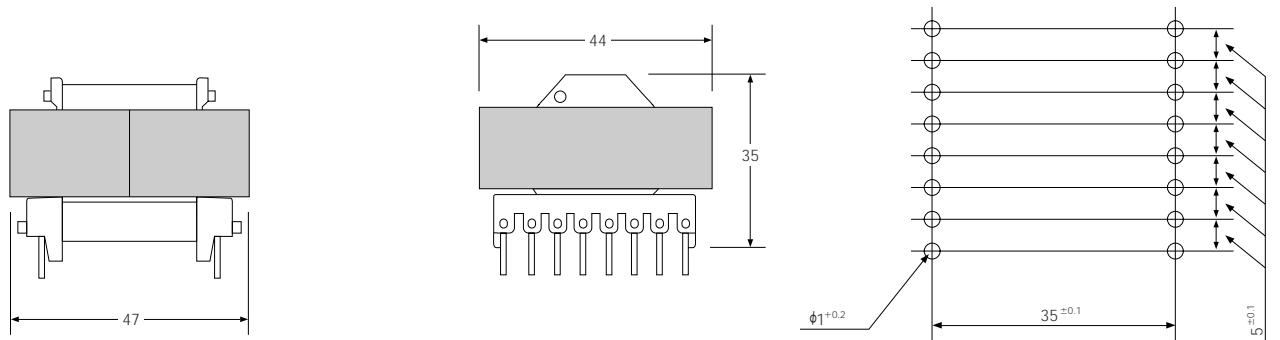
# Switching Transformer FLAT type

◆ Dimensions In mm (not to scale)

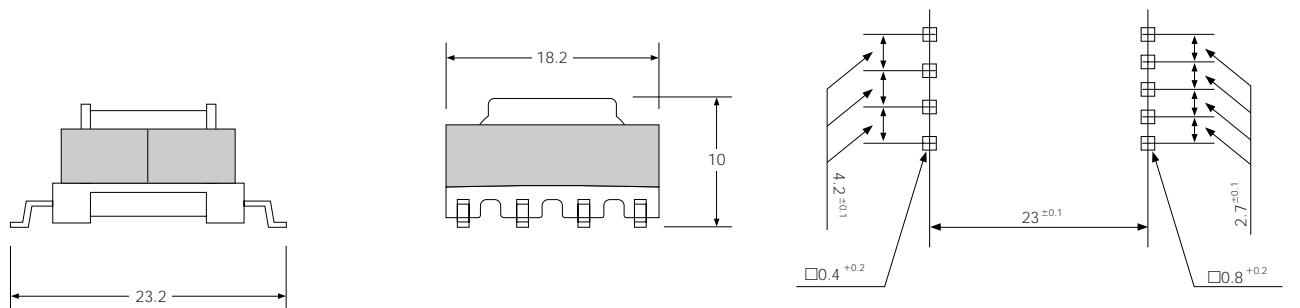
DBRH40S7



DBRH42T8



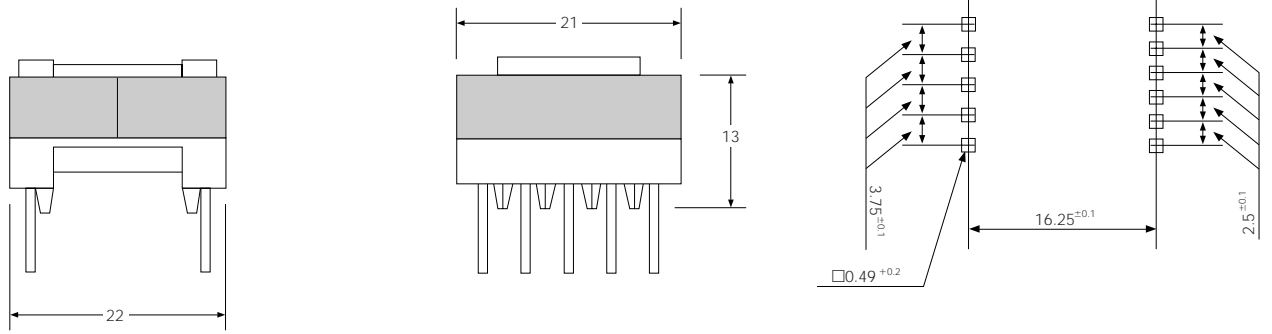
DBOH17T5



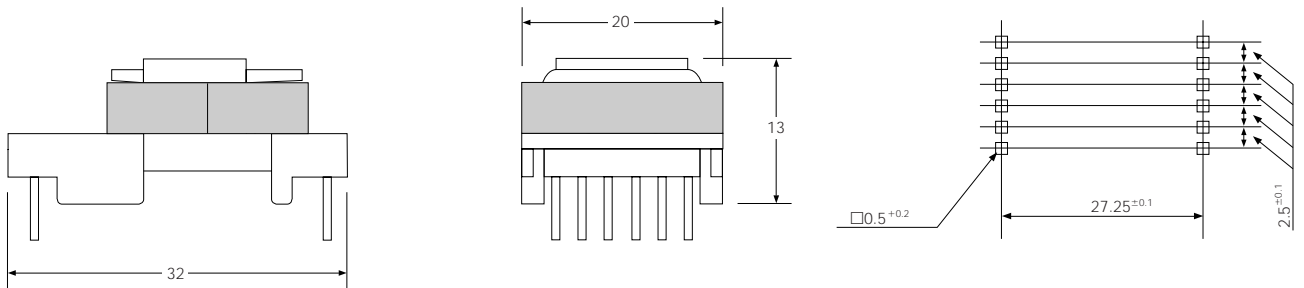


◆ Dimensions In mm (not to scale)

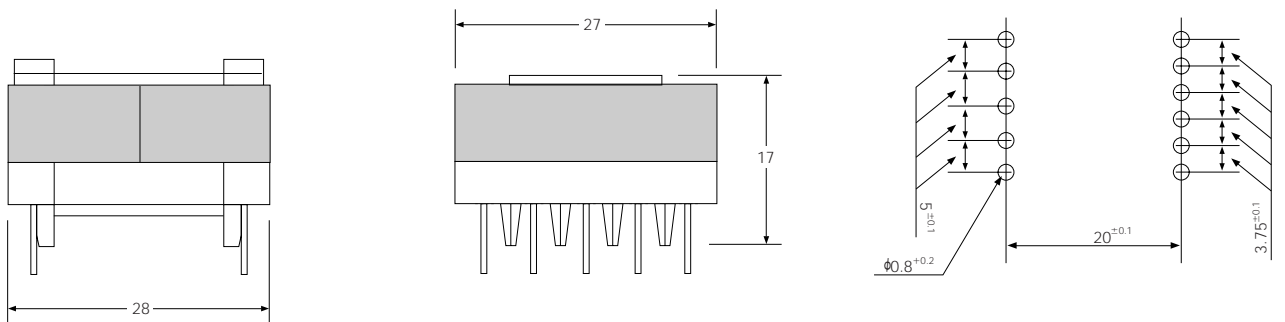
DBOH19T6



DBOH19S6



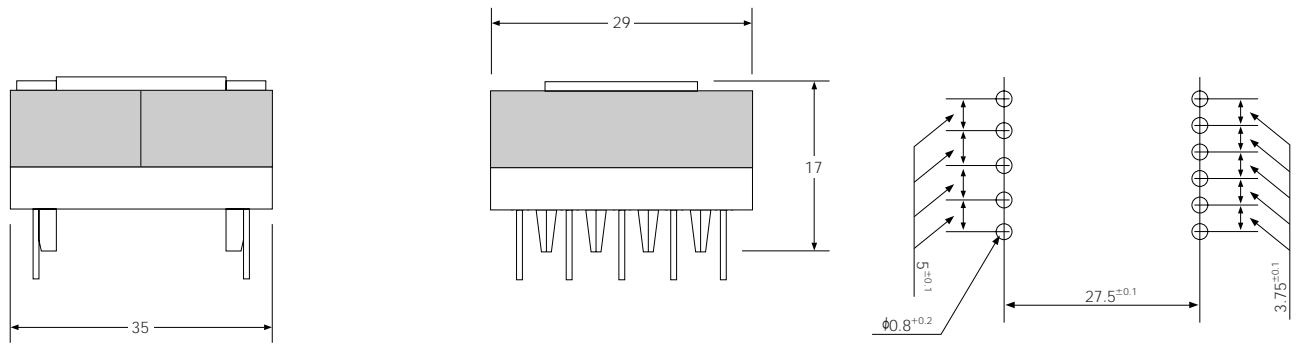
DBOH25T6



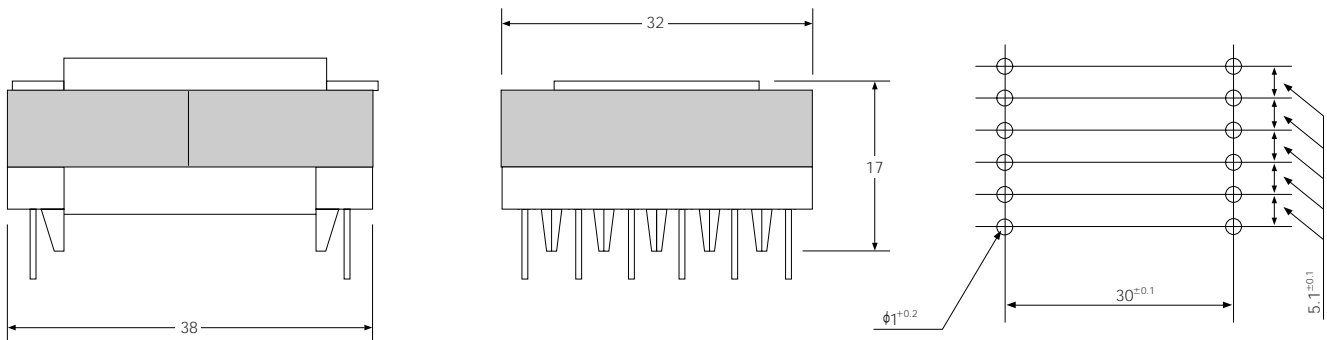
# Switching Transformer FLAT type

◆ Dimensions In mm (not to scale)

DBOH27T6

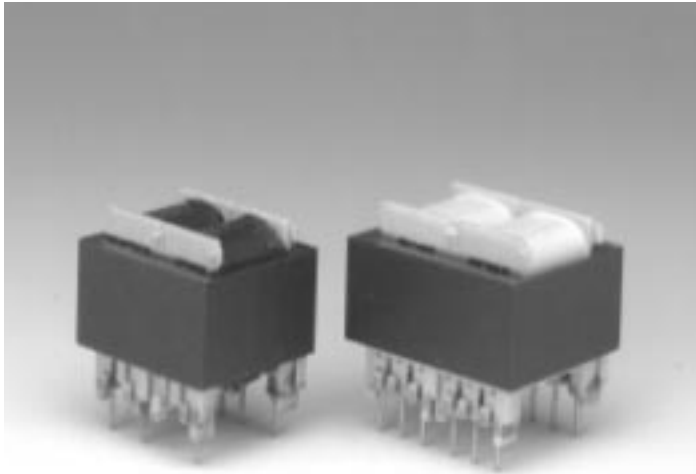


DBOH30T6





# Low leakage flux (TS type)



## ◆ Features

- Low leakage flux (with twin coils)
- Reduction of inrush current
- Shrunk electrolytic capacitor
- Meets the new standard of harmonic current at low cost

## ◆ Applications

TV, CRT

## ◆ Performance

Model Name	Rated Current	Inductance	DC Resistance	Weight	Options			
					With Case (Model Name Suffix:2)	Pin Cut (Model Name Suffix:3)	Pin Cut with Case (Model Name Suffix:4)	Color of Outer Tape
TS10L1	1.3A	15.5mH	1.1Ω	160g	—	○	—	Green
TS15L1	2.0A	12.7mH	0.7Ω	240g	○	○	○	Green
TS20L1	2.6A	8.5mH	0.45Ω	270g	○	○	○	Green
TS10H1	0.6A	88.0mH	5.6Ω	160g	—	○	—	Yellow
TS15H1	0.9A	56.0mH	2.8Ω	240g	○	○	○	Yellow
TS20H1	1.2A	47.0mH	2.5Ω	270g	○	○	○	Yellow

Note: Resistance values are reference data.

## ◆ Common Specifications

Item	Specifications
Operating temperature range	-20°C +20°C (incl. inherent temperature rise)
Insulation Types	E-type Insulation
Withstand Voltage	500V AC/1min. max.
Insulation Resistance	100MΩmin. (measured with 500V DC)
Inherent Temperature Rise	60°C max.

## ◆ Practical Example of Model Name

TSXYZ, SSXYZ

XX ..... Output/10W

Y ..... Input voltage (L:100V system; H:200V system)

Z ..... Specifications

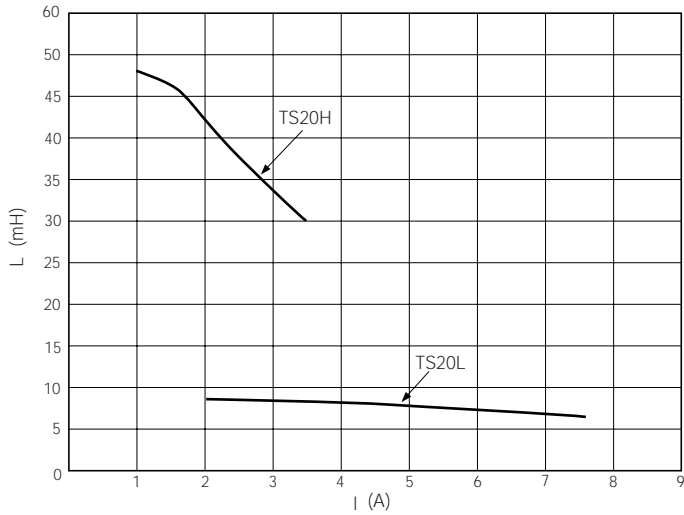
1 : Standard product (without case and pin cut)

2 : With case

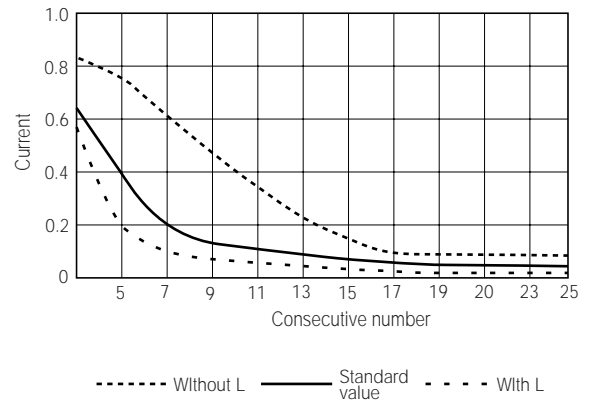
3 : Pin cut (TS10 ...⑥ TS15, 20 ...⑩)

4 : With case and pin cut

### ◆ Outstanding DC Properties (Example)



### ◆ Harmonic Current during Reactor Operation (Example)

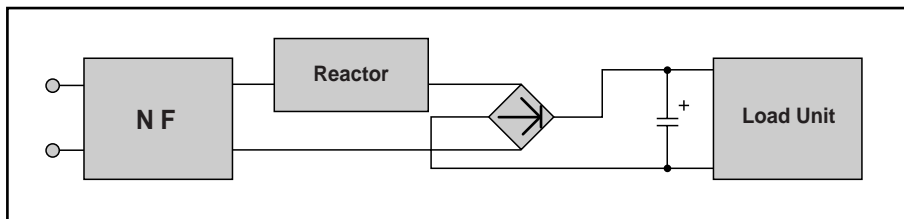


#### Operating Conditions

Harmonic current when the TS-20H has been inserted into the capacitor input rectifier circuit

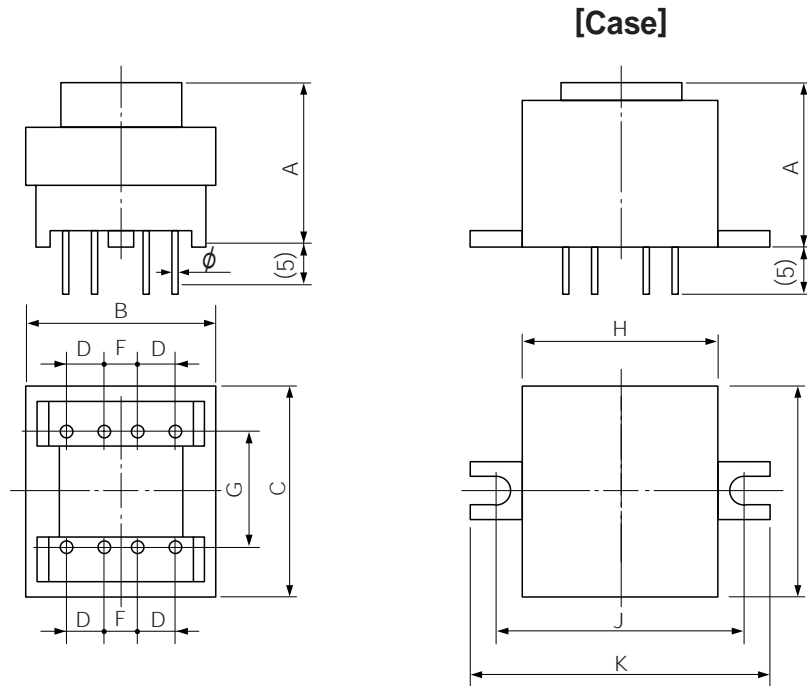
- Input voltage : 230V AC
- Input power : 200W
- Input current : 1.14A
- Power factor : 0.76

### Circuit Used

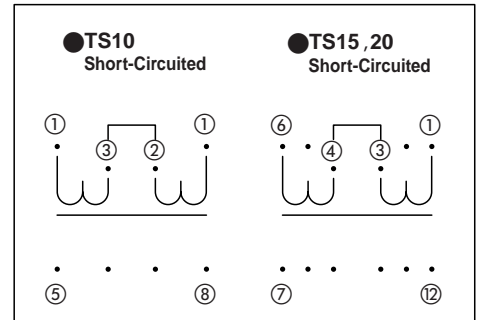


# Low leakage flux (TS type)

◆ Dimensions In mm (not to scale)



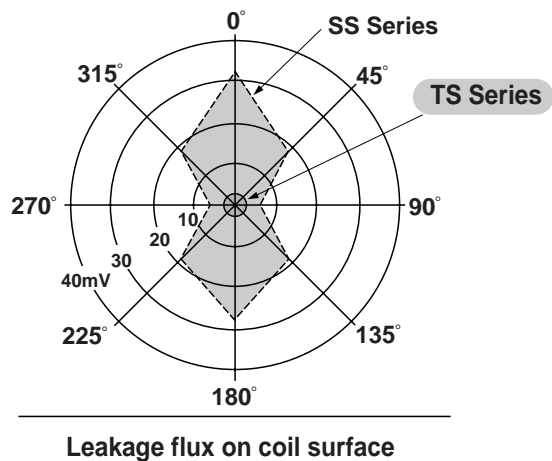
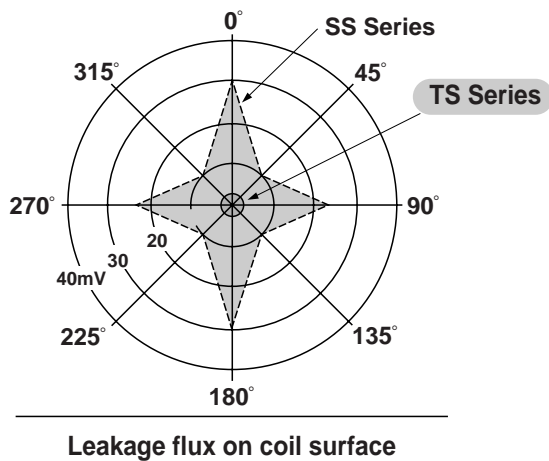
◆ Connection Diagram-Pin Array Diagram  
(Views from Back)



(Unit:mm)

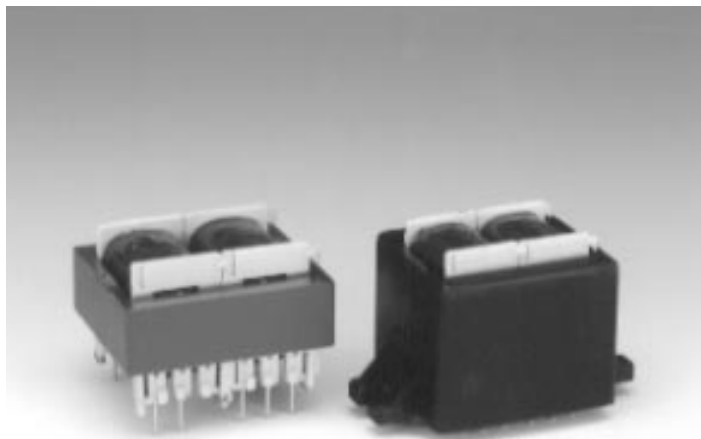
Model Name	A	B	C	D	E	F	G	H	I	J	K	$\phi$	Number of Pins
TS10L, H	40.0	37.0	32.0	9.0		6.0	21.0					1.0	4×4
TS15L, H	41.0	43.0	36.0	5.5		7.0	25.0	45.0	38.0	54.0	66.0	1.0	6×6
TS20L, H	37.0	50.0	43.0	6.0		8.5	30.0	51.0	44.0	59.0	71.0	1.0	6×6

◆ Comparison of Leakage Flux between SS Series and TS Series





# Low leakage flux (TV type)



## ◆ Features

- ◆ Low leakage flux (with twin coils)
- ◆ Reduction of inrush current
- ◆ Shrunk electrolytic capacitor
- ◆ Meetig the new standard of harmonic currenet at low cost

## ◆ Applications

TV

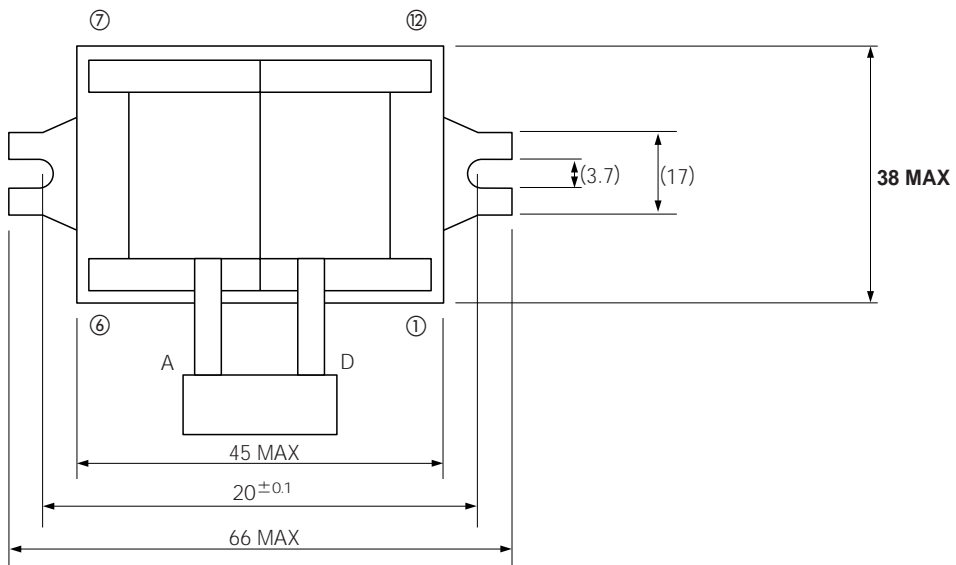
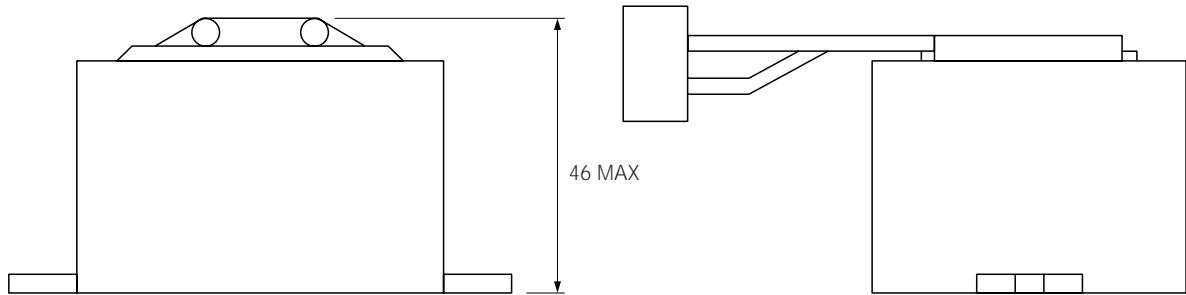
## ◆ Performance (For TV and modified a little)

Model Name	Rated Current	Inductance	Dimensions	TV Size (Reference)
TS10	2.0A	8mH	See P28 TS10L, H	14—25 inch
TS15	2.5A	8mH	See P28 TS15L, H	25—29 inch
TS15	3.0A	5.0mH	See P28 TS15L, H	28—25 inch
TS20	3.5A	5.2mH	See P28 TS20L, H	28—36 inch
TS20	3.0A	3.8mH	See P28 TS20L, H	28—36 inch
* TS15	2.0A	12.7mH	See P31	14—25 inch

Please consult with us about any request for adjustment, etc. of inductance beside those models stated herein.



◆ Dimensions In mm (not to scale)



# Standard type (SS)



## ◆ Features

- Low cost
- Reduction of inrush current
- Shrunked electrolytic capacitor

## ◆ Applications

OA, SMPS

## ◆ Performance

Model Name	Rated Current	Inductance	DC Resistance	Weight	Options			
					With Case (Model Name Suffix:2)	Pin Cut (Model Name Suffix:3)	Pin Cut with Case (Model Name Suffix:4)	Color of Outer Tape
SS10L1	1.3A	15.7mH	1.0Ω	130g	—	—	—	Green
SS15L1	2.0A	11.7mH	0.6Ω	190g	○	—	—	Green
SS20L1	2.6A	8.4mH	0.35Ω	240g	○	—	—	Green
SS10H1	0.6A	84.0mH	5.3Ω	130g	—	—	—	Yellow
SS15H1	0.9A	57.0mH	2.8Ω	190g	○	—	—	Yellow
SS20H1	1.2A	43.0mH	1.9Ω	240g	○	—	—	Yellow

Note: Resistance values

## ◆ Common Specifications

Item	Specifications
Operating temperature range	-20°C +20°C (incl. inherent temperature rise)
Insulation Types	E-type Insulation
Withstand Voltage	500V AC/1min. max.
Insulation Resistance	100MΩmin. (measured with 500V DC)
Inherent Temperature Rise	60°C max.

## ◆ Practical Example of Model Name

SSXXYZ

XX…… Output/10W

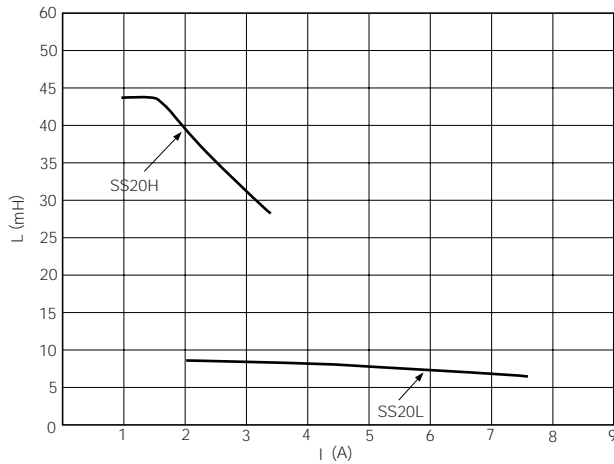
Y…… Input voltage (L:100V system; H:200V system)

Z…… Specifications

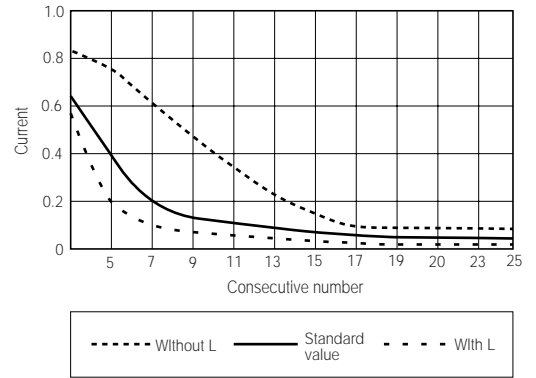
1 : Standard product (without case and pin cut)

2 : With case

### ◆ Outstanding DC Properties (Example)



### ◆ Harmonic Current during Reactor Operation (Example)

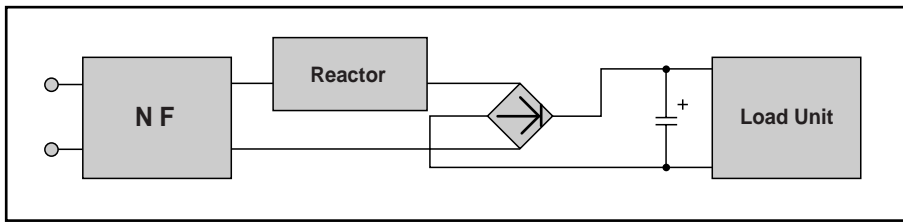


#### Operating Conditions

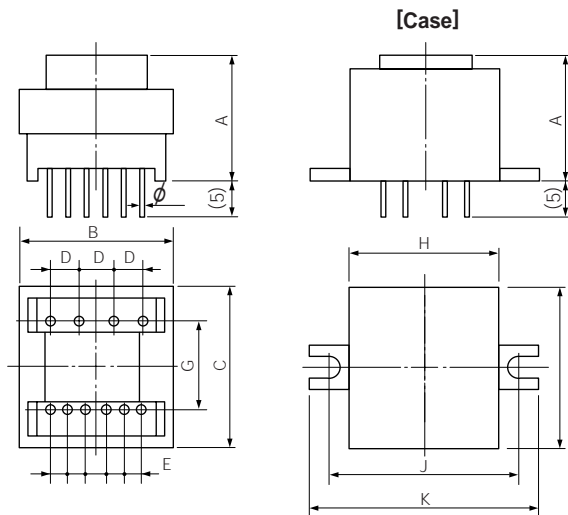
Harmonic current when the SS20H has been inserted into the capacitor input rectifier circuit

- Input voltage : 230V AC
- Input power : 200W
- Input current : 1.14A
- Power factor : 0.76

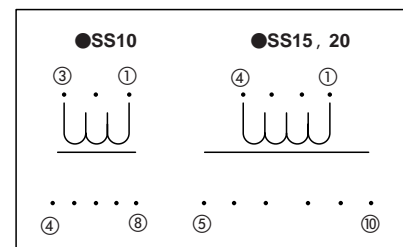
### Circuit Used



### ◆ Dimensions In mm (not to scale)



### ◆ Connection Diagram-Pin Array Diagram (Views from Back)



(Unit:mm)

Model Name	A	B	C	D	E	F	G	H	I	J	K	φ	Number of Pins
SS10L, H	37.0	37.0	32.0	7.5	5.0		21.5					1.0	3×5
SS15L, H	38.0	43.0	36.0	7.5	5.0		23.0	45.0	38.0	54.0	66.0	1.0	4×6
SS20L, H	43.0	43.0	36.0	7.5	5.0		23.0	45.0	38.0	54.0	66.0	1.0	4×6

## Customized Standard type (SS)



### ◆ Features

- Low cost
- Reduction of inrush current
- Shrunked electrolytic capacitor

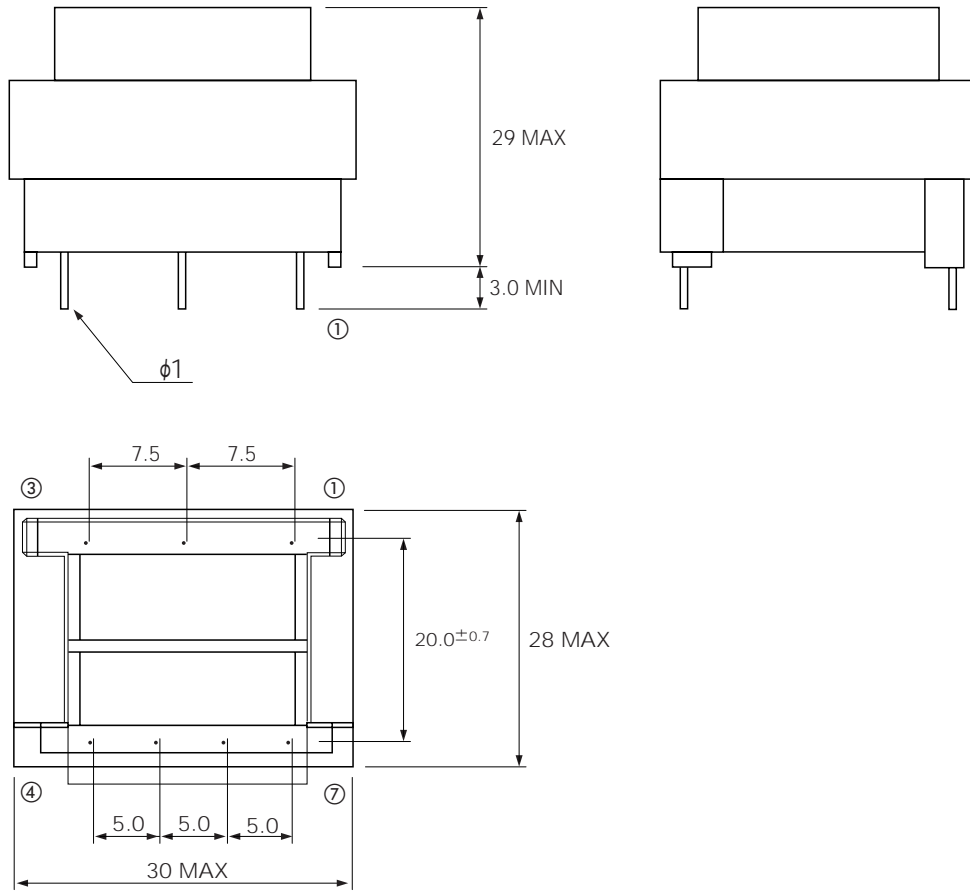
### ◆ Applications

- OA, SMPS

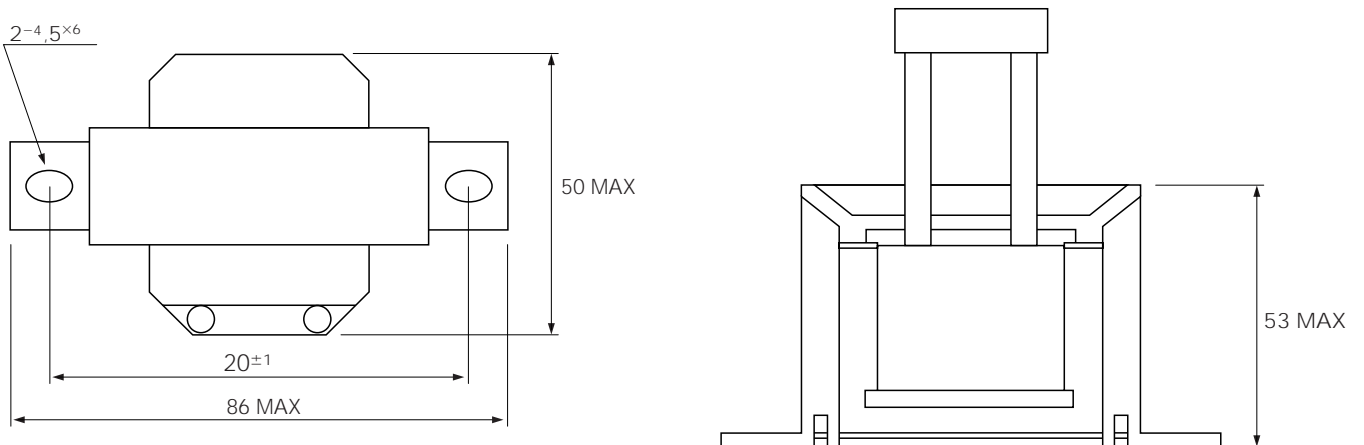
### ◆ Performance

Type	Rated Current	Inductance	External drawing
SS80L	1.0	18.5	①
SS80H	0.5	86	①
SS300L	4.5	4.7	②
SS300H	2.0	34	②

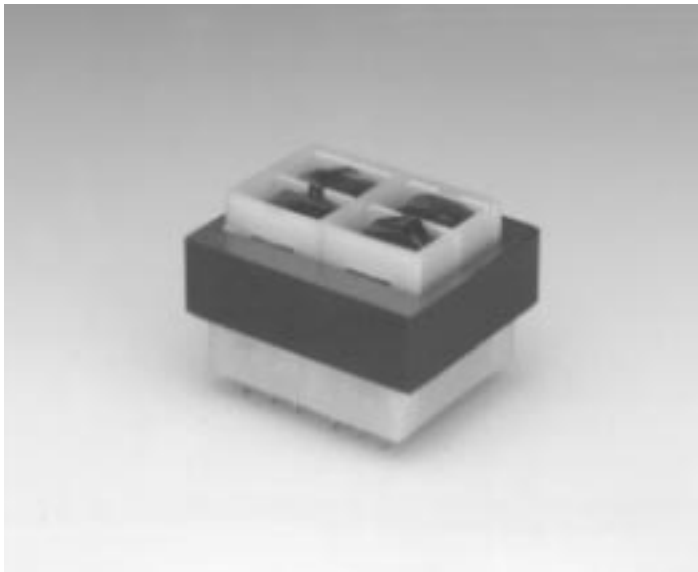
◆ Dimensions In mm (not to scale) ①



◆ Dimensions In mm (not to scale) ②



# Hybrid choke coil for Harmonics/EMI (HS type)



## ◆ Features

- ◆ Low leakage flux
- ◆ Reduction of inrush current
- ◆ Shrunk electrolytic capacitor
- ◆ Reduction of normal mode noise and common mode noise
- ◆ Reduction of line filter (from two to one)

## ◆ Applications

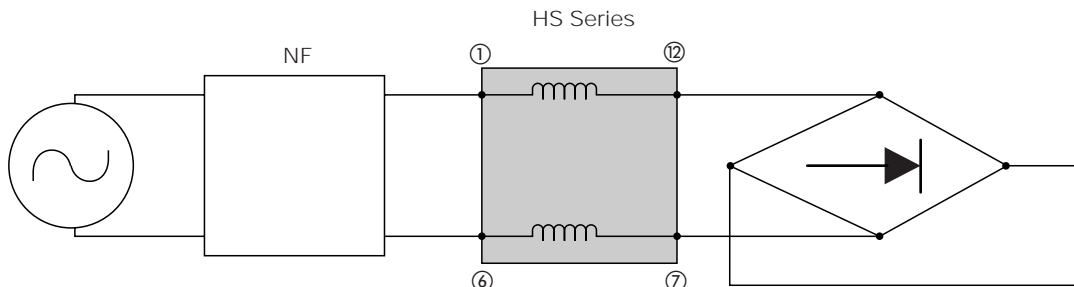
TV, CRT

## ◆ Performance

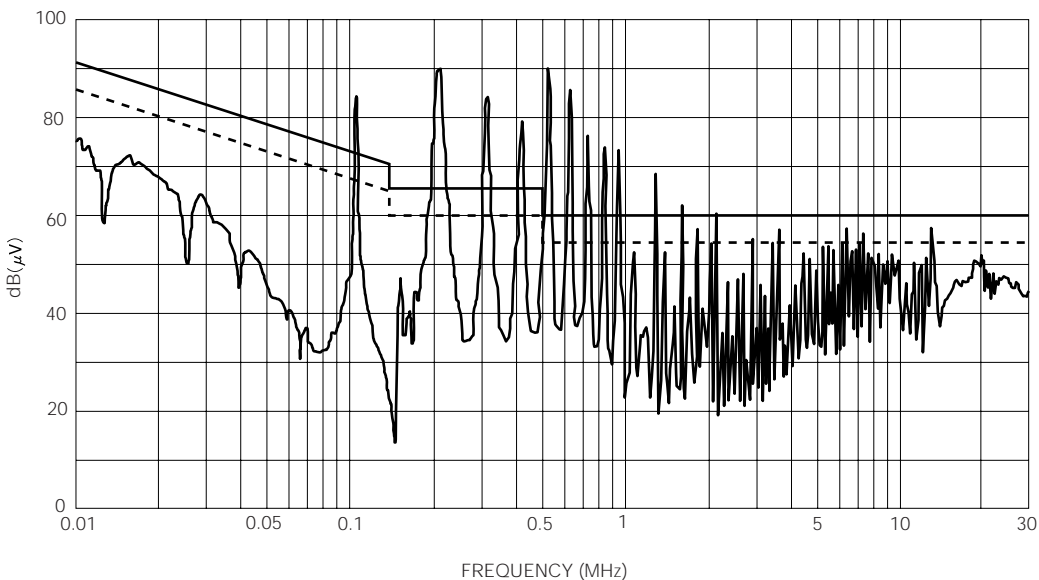
Type	Rated Current	Inductance	DC Resistance	Weight	Color of Outer Tape	External drawing
HS15L	2.4	8	0.7Ω	240g	Green	①
HS20L	3.2	5.6	0.32Ω	270g	Green	②
HS15H	1.2	32	2.8Ω	240g	Yellow	①
HS20H	1.5	20	2.5Ω	270g	Yellow	②

Note: Resistance values are reference data.

## ◆ Connection diagram

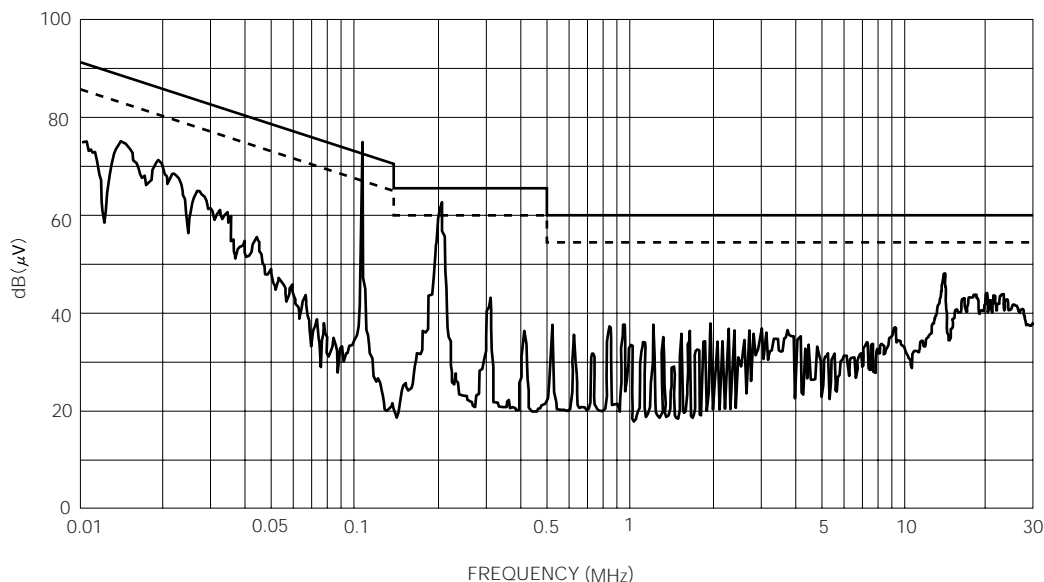


◆ Conduction noise when HS type is used



**Condition**  
This is conduction noise data when HS15H type was installed into power supply of 150W

● 230V INPUT  
In case no use of reactor of filter

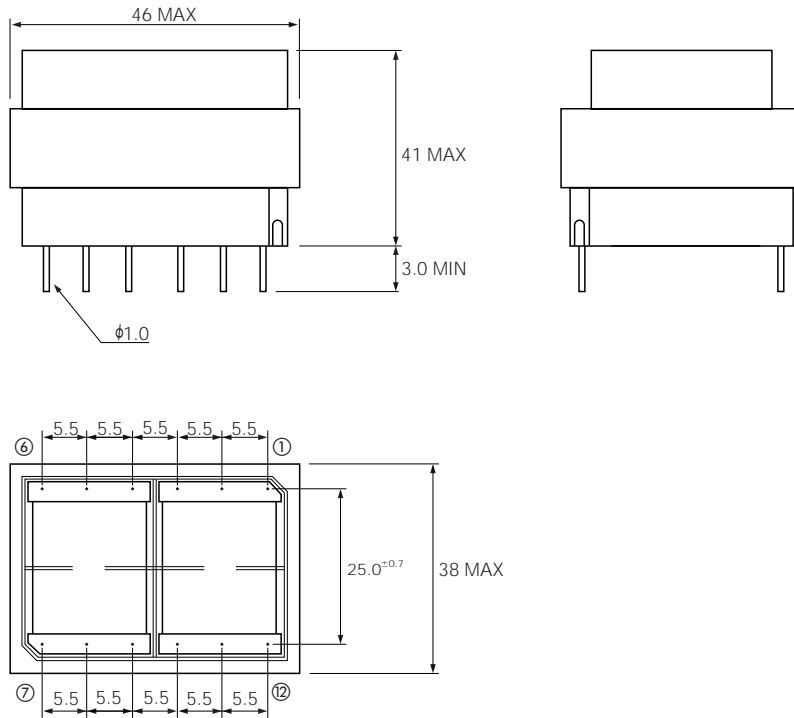


● 230V INPUT  
In case no use of reactor of filter and installation of HS15H type

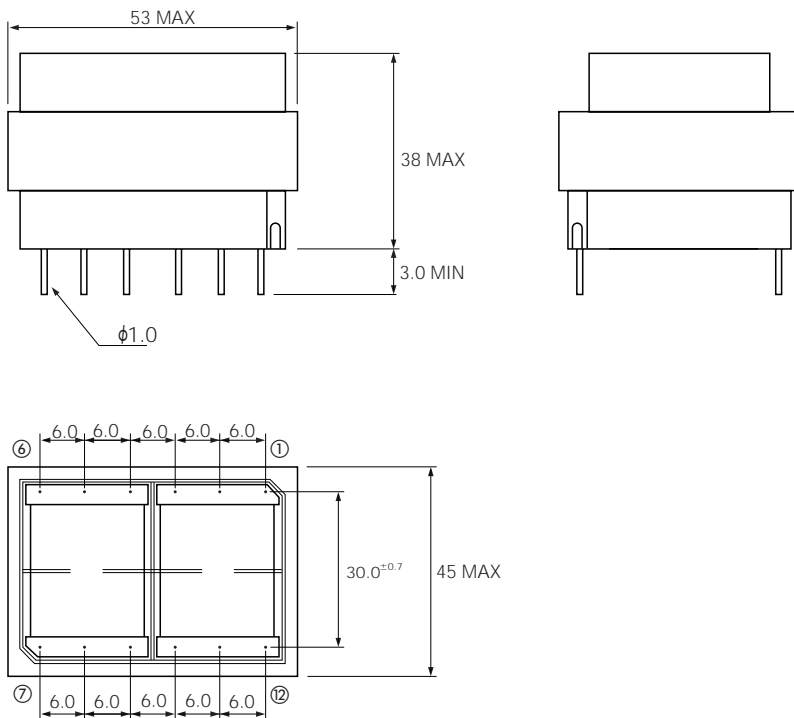
VDE0871 classA

# Hybrid choke coil for Harmonics/EMI (HS type)

◆ Dimensions In mm (not to scale) ①



◆ Dimensions In mm (not to scale) ②







# Universal type (WS) To be released shortly



### ◆ Features

- ◆ Low leakage flux
- ◆ Reduction of inrush current
- ◆ Shrunk electrolytic capacitor
- ◆ Reduction of normal mode noise and common mode noise
- ◆ For wide range input

### ◆ Applications

TV, CRT, OA, SMPS

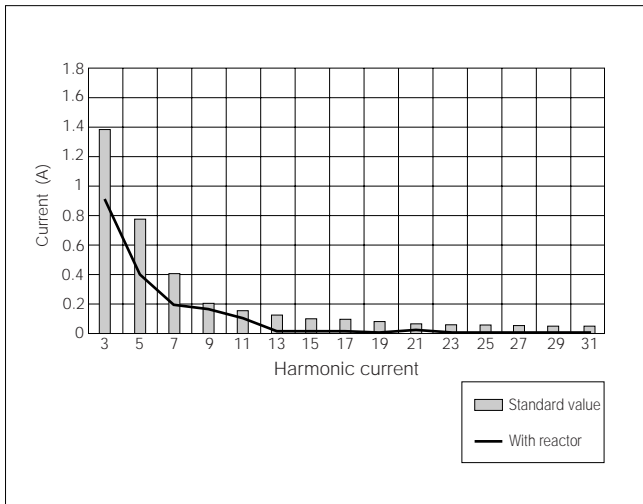
### ◆ Performance

Type		Rated Current	Inductance	External drawing
WS10	AC100V Input	1.3	47	See P38 HS15L, H
	AC230V Input	0.6	54	
WS15	AC100V Input	2.0	25	See P38 HS20L, H
	AC230V Input	1.0	30	

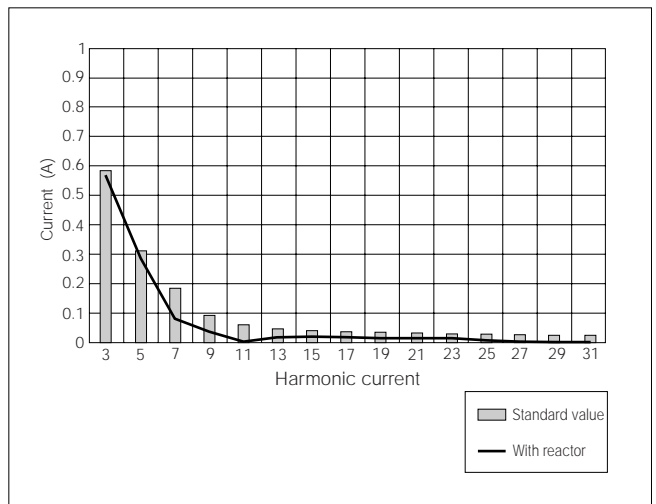
Note: Figures are given reference values, which would be changed in mass production.

◆Data comprison of WS100 harmonic current restraint (For reference)

●100V AC Input

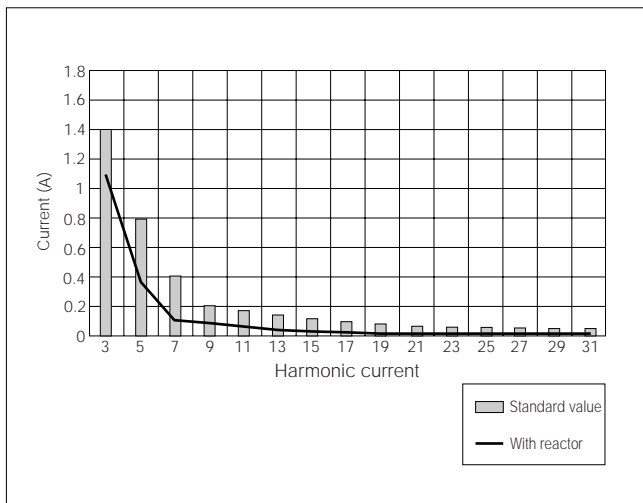


●230V AC Input

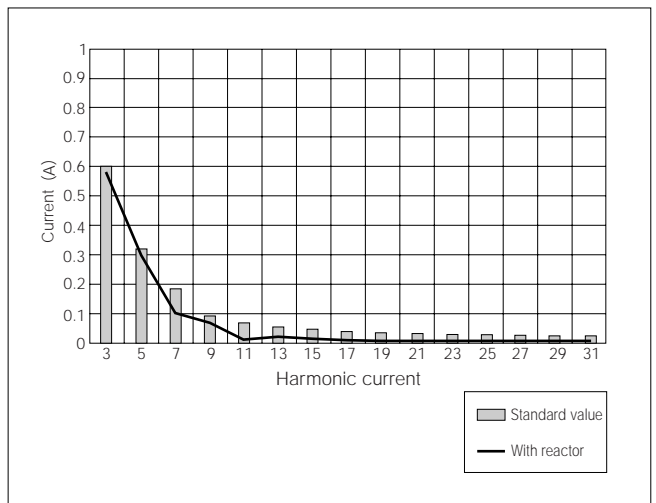


◆Data comprison of WS150 harmonic current restraint (For reference)

●100V AC Input



●230V AC Input



●<http://www.sanken-ele.co.jp>

**Sanken** サンケン電気株式会社

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#### Acquisition of ISO 9001 Certification:

Sanken Electric Co., Ltd. has obtained ISO 9001 Certification. All equipments and products manufactured by Sanken Electric, including our TS and SS series, are supplied to customers throughout the world after passing through our stringent quality control based on the certification standards.

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●Specifications are subject to change without notice.

●For typographical reasons, the color tones of the products featured in this brochure may differ from those of the actual products.

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