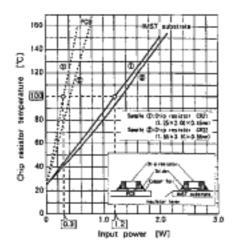
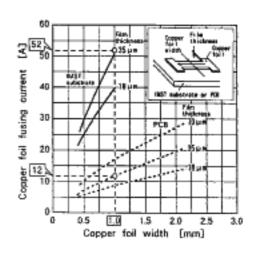
Features of the IMST® Hybrid ICs

Excellent heat dissipation

One of the most influential factors determining reliability of electronic devices is "heat".
The IMST substrate is most suitable for the field of power electronics, dissipating heat efficiently.



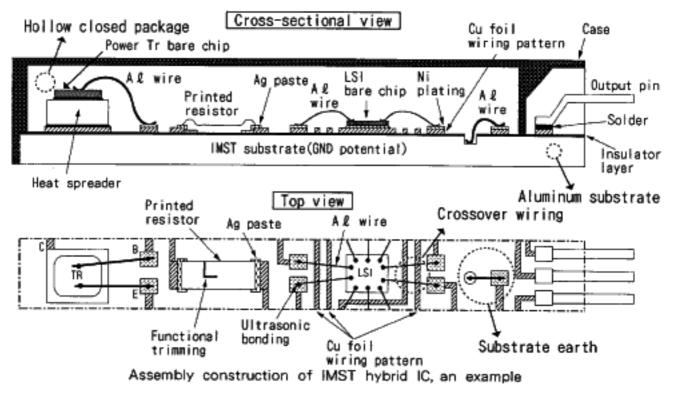
Comparison of chip resistor temperature rises [IMST@'s values are about 1/4 of PCB's.]



Comparison of copper foil fusing currents
[IMST@'s values are about 4 times of PCB's.]

High reliability

 Wiring is applied by mounting semiconductor bare chips directly and bonding aluminum wires. This reduces number of soldering points assuring high reliability.



Excellent electromagnetic shielding

Excellent electromagnetic shielding can be attained by putting the entire substrate on the ground potential because the base substrate is made of aluminum. This eliminates noise errors in the digitalized electronic devices.

Features of STK Series Audio Power ICs

Ample lineup

 STK series lineup is ample and standard based whereas the current hybrid IC market tends to customization.

Output power (per channel) :

:5 to 200W

Total harmonic distortion

: 10 to 0.005 %

Number of channels

: 1 to 3ch.

Load impedance

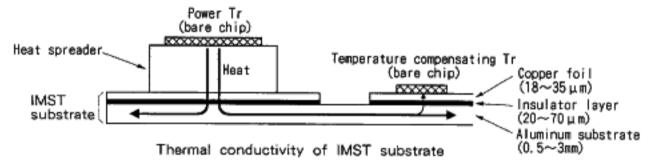
:1 to 8 \O

Pin compatibility

The design takes pin compatibility of the hybrid IC output pin important so that a same PCB can be used for various set grades such as output capacity and distortion factor.

Excellent thermal stability

• The IMST substrate of excellent heat dissipation naturally assures excellent thermal conductivity. Temperature of the output transistor can be almost the same as the temperature compensating transistor, preventing thermal runaway.



Decreasing adjustment processes

Adjustments of the neutral voltage of the power output stage and the quiescent current are done by functional trimming inside the hybrid IC.

This eliminates adjustment processes saving on the production procedure.

Reducing the term for design

• The audio output stage remains analog however digitalization technology may advance. Design of the analog power output stage, which is considered requiring the designer's experience and skill, can be simplified by employing hybrid ICs.

This reduces the term for design and saves on the design procedure.

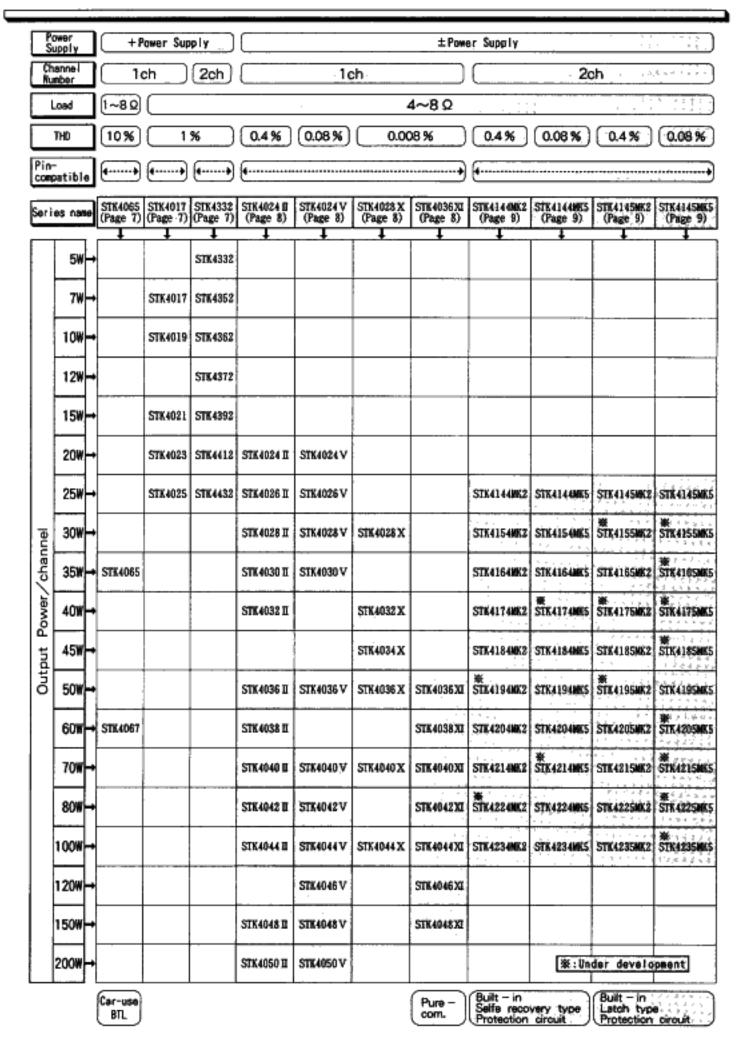
Decreasing number of parts

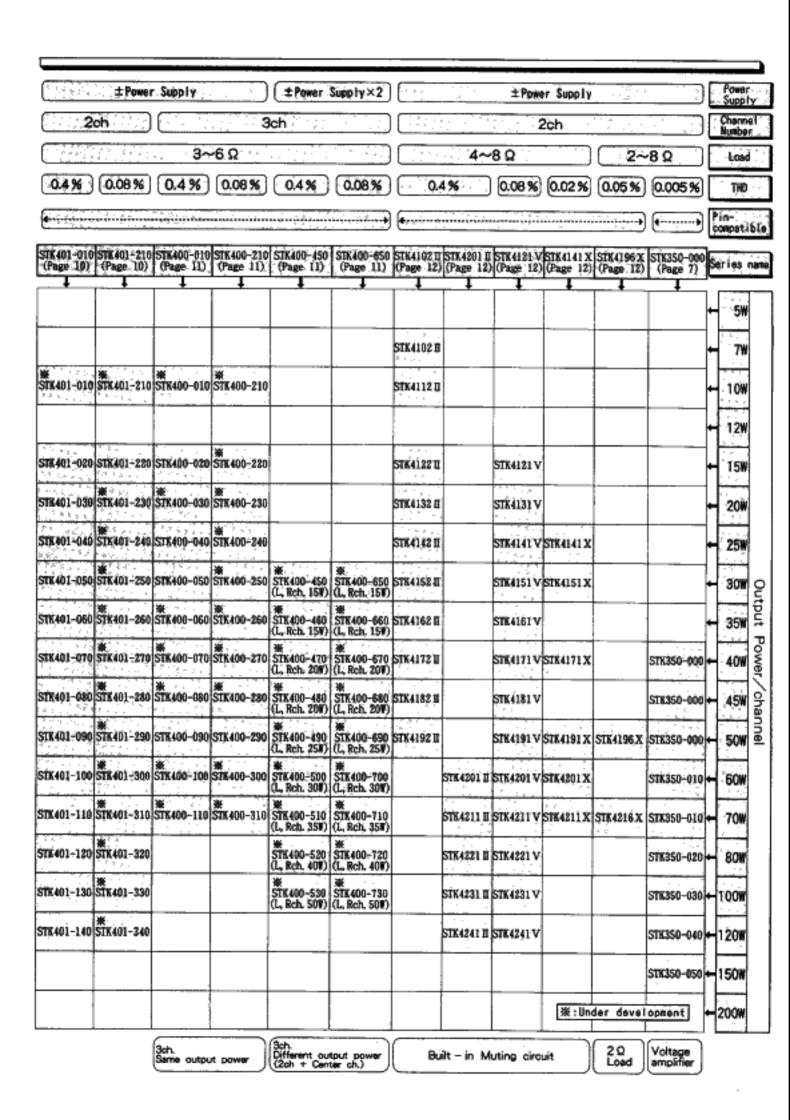
• The product of STK series decreases the total number of parts required for a unit, allowing to reduce its size, certain assembly manpower, simplify material control, improve serviceability and reduce cost.

No smoke for fire

Since the product of STK series is designed so to emit no smoke nor fire in any abnormality, it facilitates to obtain safety approvals.

Line – up of Audio power Amplifier ICs





■ Main Characteristics

■STK4065 series

Trees Number	Outp	ut power F	%(V)	THINDKO .	THD[X] Vcc max[V]		Case outline	Features
Type Number	R. = 4 Q	RL=2Ω	R _L = 1Ω	INDEN	ACC: MOX (1.1	Vcc[V]	Calsa Griculia	3 x x 1 4 earlings
STK4065	23	35	_	10	18	13.2	46. 5×25. 5×8. 5 (No. 4081)	◆Car-stereo use ◆BTL
STK4067	23	40	60	10	10	13.2	64×31×8.5 (No. 4131)	◆Pin-compatible

■STK4017 series

Type Number	Output power Po[V]	THD [X]	Voc max[V]	Voc RL=8Ω	[V]	Case outline	Features
000114017			45			· · · · · ·	1 1-48-27-1-7
STK4017	6.5		45	26.4	26.4	40 5405 540 5	
STK4019	10.0		54	32.0	29.0	146. 5 × 25. 5 × 8. 5 (No. 4021B)	♦lch./lpackage
STK4021	15.0	1.0	64	38.0	34.0	,,-0, 10212,	+power supply
STK4023	20.0		73	44.0	38.0	59. 2×31×8. 5	◆Pin-compatible
STK4025	25.0		80	48.0	44.0	(No. 4070)	

■STK4332 series

Type Number	Output power	THEFT	V	Vo	c [V]	Carin militari	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	Po[W]	THD[X]	Vec max(V)	RL=8Ω	RL = 4Ω	Case outline	Features
STK4332	5+5		32	23	21	59. 2×25. 5×8. 5	
STK4352	7 + 7		39	27	25	(No. 4032A)	
STK4362	10 + 10		50	33	28		◆2ch. /1package
STK4372	12 + 12	1.0	54	35	31		+power supply
STK4392	15 + 15		56	39	36	59. 2×31×8. 5 (No. 4033)	◆Pin-compatible
STK4412	20 + 20		63	44	40	(1.01.1000)	
STK4432	25 + 25		70	49	44	1	

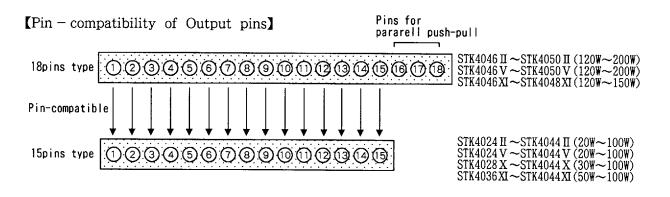
■STK350 -- 000 series

Type Number	Output power Po[V]	THO[X]	Vcc max[V]	Vcc [V] RL = 8.0	Case outline	Features
STK350 - 000	40 ~ 60		± 55	± 36		
STK350 - 010	60 ~ 80		± 59	± 41		
STK350 - 020	80 ~ 90	0.005	± 65	± 47	53×22×9 (No. 4147)	♦Voltage amplifier
STK350 - 030	90 ~ 100	0.005	± 75	± 50	(10, 4147)	◆Pin-compatible
STK350 - 040	100 ~ 120]	± 80	± 55		
STK350 - 050	120 ~ 150		± 90	± 60		

※:Under development

■ STK4024 II series/STK4024 V series/STK4028 X series/STK4036 XI series

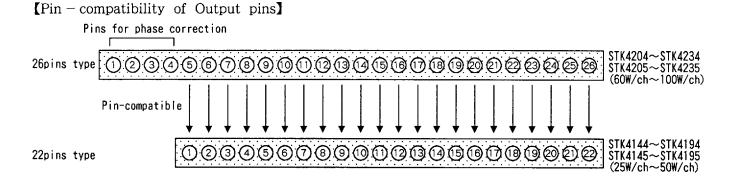
Type Number	Output power Po[W]	THD[X]	Vcc max[V]	Vcc RL = 8 Ω	[V] RL = 4 Ω	Case outline	Features
STK4024 II	20		± 34.5	± 23.0	± 20.0		
STK4026 II	25		± 38.0	± 26.0	± 22.0	1	
STK4028 II	30	1	± 42.0	± 27.5	± 25.0		
STK4030 II	35		± 45.0	± 30.0	± 27.0	$59.2 \times 31 \times 8.5$	
STK4032 II	40		± 48.0	± 32.0	± 29.0	(No. 4033)	
STK4036 II	50		± 52.0	± 35.0	± 31.0		
STK4038 II	60	0.4	± 57.0	± 38.0	± 32.5	-	
STK4040 II	70		± 60.0	± 42.0	_	-	
STK4042 II	80		± 65.0	± 45.0	_	$64 \times 36.5 \times 8.5$	
STK4044 II	100	1	± 73.0	± 51.0	_	(No. 4075)	
STK4048 II	150		± 86.0	± 59.0	_	78×44×9	
STK4050 II	200	-	± 95.0	± 66.0	_	(No. 4051A)	
STK4024 V	20		± 37.0	± 24.5	± 21.5		
STK4026 V	25		± 39.0	± 26.0	± 22.0	1	◆Pin-compatible with STK4036XI series
STK4028 V	30		± 42.0	± 27.5	± 25.0	64×31×8.5	
STK4030 V	35		± 46.0	± 30.0	± 27.0	(No. 4062)	
STK4036 V	50	1	± 52.0	± 35.0	± 31.0		
STK4040 V	70	0.08	± 62.0	± 42.0	± 36.0	1	
STK4042 V	80		± 65.0	± 45.0	_	64×36. 5×8. 5	
STK4044 V	100		± 73.0	± 51.0		(No. 4075)	
STK4046 V	120		± 80.0	± 55.0	_		
STK4048 V	150		± 87.0	± 60.0	_	$78 \times 44 \times 9$ (No. 4051A)	
STK4050 V	200		± 95.0	± 66.0	_	(10, 10011)	
STK4028 X	30		± 42.0	± 29.0	± 26.0		
STK4032 X	40		± 49.0	± 33.5	± 30.0		
STK4034 X	45	0.008	± 50.0	± 35.0	± 31.0	64×31×8.5 (No. 4062)	
STK4036 X	50		± 52.0	± 36.5	± 31.5	(110: 1002)	
STK4040 X	70		± 62.0	± 42.5	± 36.0		
STK4044 X	100	0.018	± 74.0	± 51.0	_	64×36.5×8.5 (No. 4075)	
STK4036 XI	50		± 53.5	± 37.0	-		♦1ch. /lpackage
STK4038 XI	60		± 58.0	± 40.0	_		◆±Power supply
STK4040 XI	70		± 63.0	± 43.5	_	64×36.5×8.5 (No. 4075)	◆Pure-complimentary
STK4042 XI	80	0.008	± 67.0	± 46.5	_	(110. 4070)	◆Pin-compatible with
STK4044 XI	100] [± 74.0	± 51.0	_		STK4024 II series,
STK4046 XI	120		± 80.0	± 55.0	_	78×44×9	STK4024V series,
STK4048 XI	150		± 87.0	± 60.0	_	(No. 4151A)	STK4028X series



Main Characteristics

STK4144MK2 Type Number	Output power	THD[X]	Vec max[V]		(V)	Equivalent	Case outline	
Type Number	Po[W]	TUD [4]	YGC IBAX[Y]	RL = 8 Ω	30.	circuit	"Gaža "Ominia	Features
STK4144MK2	25 + 25		± 40.0	± 27.0	± 22.0			
STK4154MK2	30 + 30		± 42.0	± 28.0	± 25.0			
STK4164MK2	35 + 35		± 45.0	± 30.5	± 26.5	Fig.1	$78 \times 44 \times 9$	
STK4174MK2	40 + 40		± 48.0	± 32.0	± 28.0	1 19.1	(No. 4086A)	
STK4184MK2	45 + 45	0.4	± 50.0	± 33.5	± 30.0			
* STK4194MK2	50 + 50	0.4	± 52.5	± 35.0	± 32.0			A.D
STK4204MK2	60 + 60		± 55.0	± 38.5	_			◆Built-in
STK4214MK2	70 + 70		± 60.0	± 42.0	_	Fig.2	$90 \times 53 \times 8.5$	Self recovery type
* STK4224MK2	80 + 80		± 65.0	± 45.0	-	rig.z	(No. 4110A)	Protection circuit
STK4234MK2	100 + 100		± 75.0	± 51.0	_			◆2ch./1package
STK4144MK5	25 + 25		± 40.5	± 27.0	± 24.0			◆±Power supply
STK4154MK5	30 + 30		± 42.0	± 28.5	± 25.0			◆Pin-compatible with
STK4164MK5	35 + 35		± 46.0	± 30.5	± 26.5	F: 0	$78 \times 44 \times 9$	STK4145MK2 series.
* STK4174MK5	40 + 40		± 49.0	± 32.5	± 28.0	Fig.3	(No. 4086A)	STK4145MK5 series
STK4184MK5	45 + 45	0.00	± 51.0	± 34.0	± 30.0			
STK4194MK5	50 + 50	0.08	± 53.0	± 35.5	± 32.0			
STK4204MK5	60 + 60		± 57.0	± 39.0	_		90×53×8.5 (No. 4110A)	
* STK4214MK5	70 + 70		± 62.0	± 43.0	_	.		
STK4224MK5	80 + 80		± 65.0	± 45.0	_	Fig.4		
STK4234MK5	100 + 100		± 75.0	± 51.0	_			
STK4145MK2	25 + 25		± 40.0	± 27.0	± 22.0			
* STK4155MK2	30 + 30		± 42.0	± 28.0	± 25.0			
STK4165MK2	35 + 35		± 45.0	± 30.5	± 26.5		$78 \times 44 \times 9$	
* STK4175MK2	40 + 40		± 48.0	± 32.0	± 28.0	Fig.5	(No. 4086A)	
STK4185MK2	45 + 45		± 50.0	± 33.5	± 30.0			
* STK4195MK2	50 + 50	0.4	± 52.5	± 35.0	± 32.0			
STK4205MK2	60 + 60		± 55.0	± 38.5	_			◆Built-in
STK4215MK2	70 + 70		± 60.0	± 42.0	_		90×53×8.5	Latch type
STK4225MK2	80 + 80		± 65.0	± 45.0		Fig.6	(No. 4110A)	Protection circuit
STK4235MK2	100 + 100	1	± 75.0	± 51.0	_			◆2ch. /1package
STK4145MK5	25 + 25		± 40.5	± 27.0	± 24.0			◆±Power supply
* STK4155MK5	30 + 30		± 42.0	± 28.5	± 25.0			◆Pin-compatible with
* STK4165MK5	35 + 35		± 46.0	± 30.5	± 26.5		$78 \times 44 \times 9$	STK4144MK2 series,
* STK4175MK5	40 + 40		± 49.0	± 32.5	± 28.0	Fig.7	(No. 4086A)	STK4144MK5 series
* STK4185MK5	45 + 45		± 51.0	± 34.0	± 30.0		(no. 100m)	SIN4144MAD SETIES
STK4195MK5	50 + 50	0.08	± 53.0	± 35.5	± 32.0			
* STK4205MK5	60 + 60		± 57.0	± 39.0			<u>. </u>	
* STK4215MK5	70 + 70		± 62.0	± 43.0	_		90×53×8.5	
* STK4225MK5	80 + 80		± 65.0	± 45.0	 	Fig.8	(No. 4110A)	
* STK4235MK5	100 + 100		± 75.0	± 51.0			(

፠:Under development

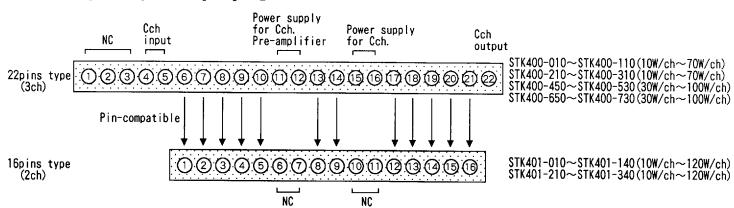


■ STK401 - 010 series / STK401 - 210 series

Type Number	Output power	THO[X]	Vcc max[V]	Vec	[V]	Equivalent	Case outline	
1 1 4 1 4 4 5 4 4 5 4 4 7 6 8 5 5	* Po[W]			RL = 6 Ω	RL = 3 Ω	circuit	Case outline	Features
* STK401 - 010	10 + 10	<u>.</u>	± 26	± 17.0	± 14			
STK401 - 020	15 + 15		± 29	± 20.0	± 16			
STK401 - 030	20 + 20		± 34	± 23.0	± 19			
STK401 - 040	25 + 25		± 36	± 25.0	± 21			
STK401 - 050	30 + 30		± 39	± 26.0	± 22	Fig.9	64×36. 5×8. 5 (No. 4134)	
STK401 - 060	35 + 35		± 41	± 28.0	± 23		(110.17)	
STK401 - 070	40 + 40	0.4	± 44	± 30.0	± 24			
STK401 - 080	45 + 45	0.4	± 45	± 31.0	± 25			
STK401 - 090	50 + 50		± 47	± 32.0	± 26			
STK401 - 100	60 + 60		± 51	± 35.0	± 27			
STK401 - 110	70 + 70		± 56	± 38.0	_	Fig.10	78×44×9 (No. 4029)	◆Rt=6/3Ω ◆2ch./lpackage
STK401 - 120	80 + 80		± 61	± 42.0	_			
STK401 - 130	100 + 100		± 65	± 45.0	_	Fig.11	(NO. 4023)	◆±Power supply
STK401 - 140	120 + 120		± 74	± 51.0	_			◆Pin-compatible with STK400-010 series, STK400-210 series, STK400-450 series, STK400-650 series
* STK401 - 210	10 + 10		± 26	± 17.5	± 14			
STK401 - 220	15 + 15		± 29	± 20.0	± 16			
* STK401 - 230	20 + 20		± 34	± 23.0	± 19			
* STK401 - 240	25 + 25		± 36	± 25.0	± 21			
* STK401 - 250	30 + 30		± 39	± 26.0	± 22	Fig.12	$64 \times 36.5 \times 8.5$	
※ STK401 − 260	35 + 35		± 41	± 28.0	± 23		(No. 4134)	
※ STK401 − 270	40 + 40	0.00	± 44	± 30.0	± 24			
※ STK401 − 280	45 + 45	0.08	± 45	± 31.0	± 25			
※ STK401 − 290	50 + 50		± 47	± 32.0	± 26			
※ STK401 − 300	60 + 60		± 51	± 35.0	± 27			
※ STK401 − 310	70 + 70		± 56	± 38.0	_	Fig.13		
* STK401 - 320	80 + 80		± 61	± 42.0	_		$78 \times 44 \times 9$	
* STK401 - 330	100 + 100		± 65	± 45.0	_	Fig.14	(No. 4029)	
* STK401 - 340	120 + 120		± 74	± 51.0	_	_		

★:Under development

[Pin - compatibility of Output pins]



■ Main Characteristics

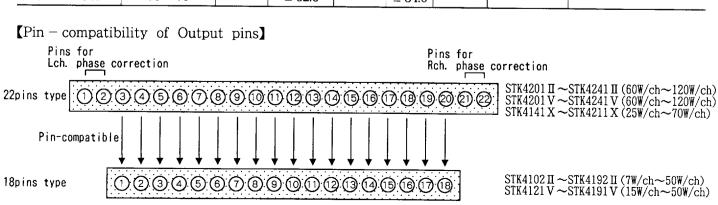
■STK400 - 010	series/STF	<u> </u>	10 series/				`K400 – 650	
Type Number	Output power Po[W]	THD[X]	Vcc max[V]	Vcc RL = 6 Ω	[V] RL = 3 Ω	Equivalent circuit	Case outline	Features
* STK400 - 010	10 + 10 + 10		± 26	± 17.0	± 14	Oncore		
	15 + 15 + 15		± 29	± 20.0	± 16			
	20 + 20 + 20		± 34	± 23.0	± 19			
	25 + 25 + 25		± 36	± 25.0	± 21	-		
	30 + 30 + 30		± 39	± 26.0	± 22	Fig.15	78×44×9	
	35 + 35 + 35	0.4	± 41	± 28.0	± 23		(No. 4086A)	
* STK400 - 070	40 + 40 + 40		± 44	± 30.0	± 24			
* STK400 - 080	45 + 45 + 45		± 45	± 31.0	± 25			$RL=6/3\Omega$
STK400 - 090	50 + 50 + 50		± 47	± 32.0	± 26			◆3ch. /1package
* STK400 - 100	60 + 60 + 60		± 51	± 35.0	± 27	F: 10	90×53×8.5	(Same output power)
* STK400 - 110	70 + 70 + 70		± 56	± 38.0	-	Fig.16	(No. 4145)	◆ ± Power supply
* STK400 - 210	10 + 10 + 10		± 26	± 17.5	± 14			♦Pin-compatible with
※ STK400 − 220	15 + 15 + 15		± 29	± 20.0	± 16			STK401-010 series, STK401-210 series,
* STK400 - 230	20 + 20 + 20		± 34	± 23.0	± 19			STK400-450 series, STK400-650 series
* STK400 - 240	25 + 25 + 25		± 36	± 25.0	± 21			
* STK400 - 250	30 + 30 + 30		± 39	± 26.0	± 22	Fig.17	78×44×9 (No. 4086A)	BINIOU UUU BEITEB
※ STK400 − 260	35 + 35 + 35	0.08	± 41	± 28.0	± 23		(
* STK400 - 270	40 + 40 + 40		± 44	± 30.0	± 24			
* STK400 - 280	45 + 45 + 45		± 45	± 31.0	± 25			
	50 + 50 + 50		± 47	± 32.0	± 26			
	60 + 60 + 60		± 51	± 35.0	± 27	Fig.18	$90 \times 53 \times 8.5$	
	70 + 70 + 70		± 56	± 38.0	-		(No. 4145)	
	15 + 30 + 15		± 39	± 26.0	± 22.0			
	15 + 35 + 15		± 41	± 28.0	± 23.0		78×44×9	
	20 + 40 + 20		± 44	± 30.0	± 24.0	Fig.15	(No. 4086A)	
	20 + 45 + 20		± 45	± 31.0	± 25.0			
	25 + 50 + 25	0.4	± 47	± 32.0	± 26.0			♦ R∟=6/3Ω
	30 + 60 + 30		± 51	± 35.0	± 27.0			♦3ch. /1package
	35 + 70 + 35		± 56	± 38.0	_	Fig.19	90×53×8.5 (No.4145)	(2ch. + Center ch.)
	40 + 80 + 40		± 61	± 42.0	_		(NO. 4140)	◆ ± Power supply×2
* STK400 - 530 5	,		± 65	± 45.0	-	Fig.20		♦Pin-compatible with
	$\frac{15 + 30 + 15}{15 + 30}$		± 39	± 26.0	± 22.0			STK401-010 series,
	15 + 35 + 15		± 41	± 28.0	± 23.0		78×44×9	STK401-210 series,
	20 + 40 + 20		± 44	± 30.0	± 24.0	Fig.17	(No. 4086A)	STK400-010 series,
	20 + 45 + 20	0.00	± 45	± 31.0	± 25.0			STK400-210 series
	25 + 50 + 25	0.08	± 47	± 32.0	± 26.0			
	30 + 60 + 30		± 51	± 35.0	± 27.0	Fig.21		
	$\frac{35 + 70 + 35}{40 + 30 + 40}$		± 56	± 38.0	-		90×53×8.5 (No. 4145)	
* STK400 - 720 4 * STK400 - 730 5	40 + 80 + 40		± 61	± 42.0		Fig.22	(110, 4140)	
* 31N400 - 730 D	00 + 100 + 00		± 65	± 45.0				*:Under development

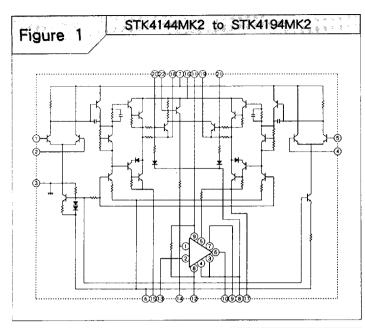
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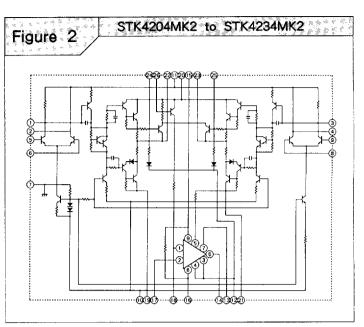
[Caution] In case of 3 channel different output STK400-450, STK400-650 series, maximum power supply Vccmax and recommend power supply Vcc in the list shows numerical value of power supply of center channel. The numerical value of the power supply for L, R channel is same as 2 channel amplifier STK401-010 series which is same output.

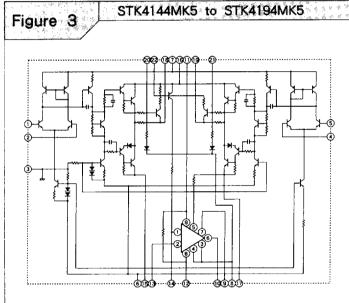
STK4102 II series/STK4201 II series/STK4121 V series/ STK4141 X series/STK4196 X series

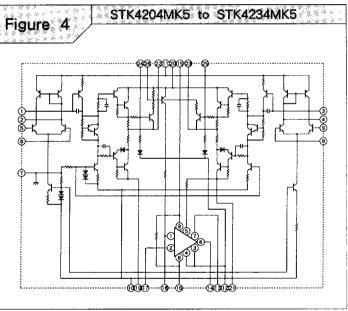
Type Number	Output power Po(W)	THD[%]	Vcc max[V]	Vcc RL = 8 Ω	[V] BL = 4 Q	Equivalent circuit	Case outline	Features
STK4102 Ⅱ	6+6		± 20.5	± 13.2	± 12.0			
STK4112 II	10 + 10		± 26.0	± 17.0	± 14.0		64×31×8.5	
STK4122 II	15 + 15	-	± 30.5	± 20.0	± 17.0		(No. 4083)	
STK4132 II	20 + 20		± 34.5	± 23.0	± 20.0			
STK4142 II	25 + 25		± 39.0	± 26.0	± 22.0	1		
STK4152 II	30 + 30	0.4	± 42.0	± 27.5	± 25.0	Fig.23		
STK4162 II	35 + 35	1	± 45.0	± 30.0	± 27.0		$64 \times 36.5 \times 8.5$	
STK4172 II	40 + 40		± 48.0	± 32.0	± 29.0		(No. 4040)	
STK4182 II	45 + 45		± 50.0	± 33.5	± 30.5			
STK4192 II	50 + 50		± 52.5	± 35.0	± 31.0			
STK4201 II	60 + 60		± 55.0	± 38.0	-			
STK4211 II	70 + 70		± 60.0	± 42.0			78×44×9 (No. 4086A)	
STK4221 II	80 + 80	0.4	± 65.0	± 45.0	_	Fig.24		
STK4231 II	100 + 100		± 75.0	± 51.0				
STK4241 II	120 + 120		± 77.0	± 53.0	_			
STK4121 V	15 + 15		± 32.0	± 21.5	± 19.0			◆2ch./lpackage ◆±Power supply ◆Built-in muting circuit ◆Pin-compatible ◆R _L =2Ω (STK4196X series)
STK4131 V	20 + 20		± 36.0	± 24.5	± 22.0		64×36.5×8.5	
STK4141 V	25 + 25		± 40.5	± 27.0	± 24.0			
STK4151 V	30 + 30		± 42.0	± 28.0	± 25.0	E:= 0#		
STK4161 V	35 + 35		± 46.0	± 30.5	± 26.5	Fig.25	(No. 4040)	
STK4171 V	40 + 40		± 49.0	± 32.5	± 28.0			
STK4181 V	45 + 45	0.08	± 51.0	± 34.0	± 30.0			
STK4191 V	50 + 50		± 53.0	± 35.5	± 32.0			
STK4201 V	60 + 60		± 57.0	± 39.0				
STK4211 V	70 + 70		± 62.0	± 43.0	_			
STK4221 V	80 + 80		± 65.0	± 45.0	_	Fig.26	$78 \times 44 \times 9$ (No. 4086A)	
STK4231 V	100 + 100		± 75.0	± 51.0	_		()	
STK4241 V	120 + 120		± 78.0	± 54.0	-			
STK4141 X	25 + 25		± 41.0	± 27.5	± 24.5			
STK4151 X	30 + 30		± 42.5	± 29.0	± 25.5			
STK4171 X	40 + 40	0.02	± 49.5	± 33.0	± 28.5	C:- 27	105×32×8.5 (No. 4146)	
STK4191 X	50 + 50	0.02	± 53.5	± 36.0	\pm 32.5	Fig.27		
STK4201 X	60 + 60		± 57.5	± 39.5	_			
STK4211 X	70 + 70		± 62.5	± 43.5	_			
STK4196 X	50 + 50	0.05	± 53.5		± 29.0	Fig.28		
STK4216 X	70 + 70	0.00	± 62.5		± 34.0	1 19.20		

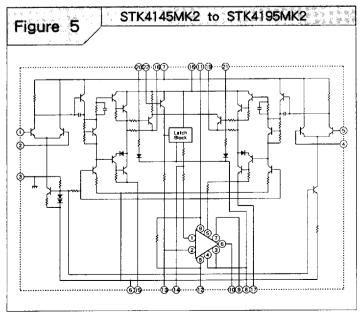


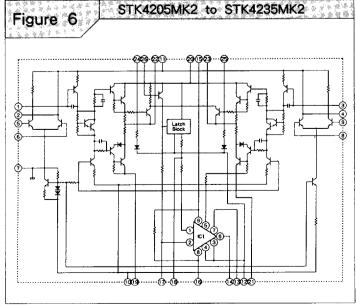


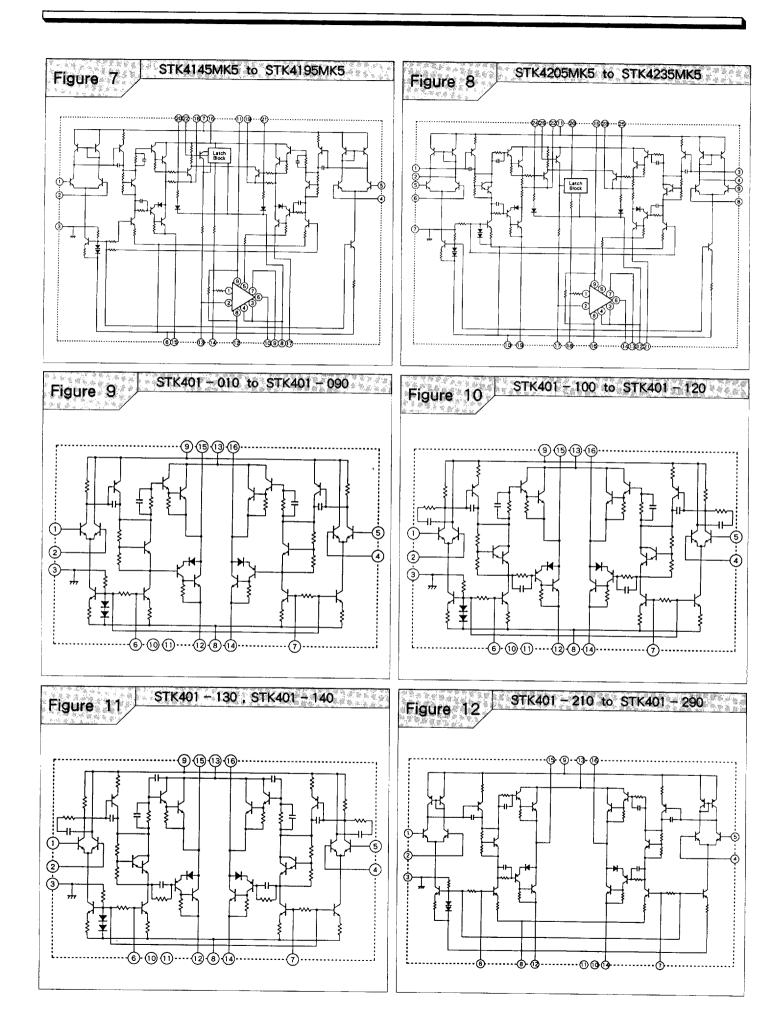


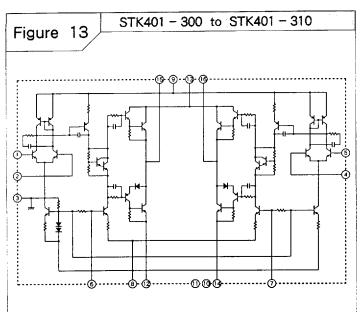


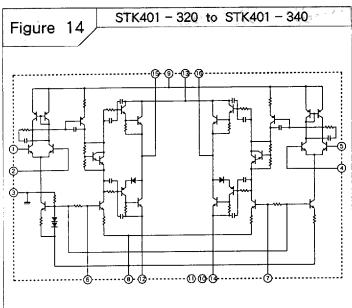


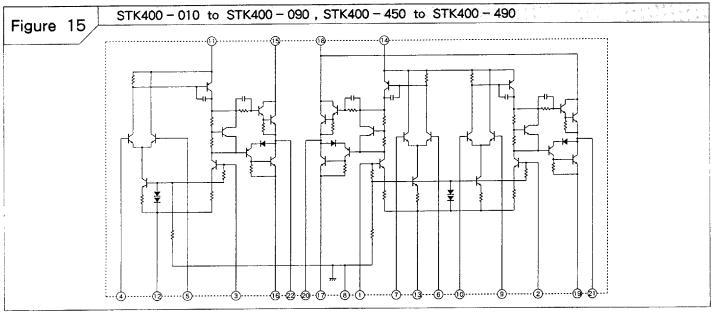


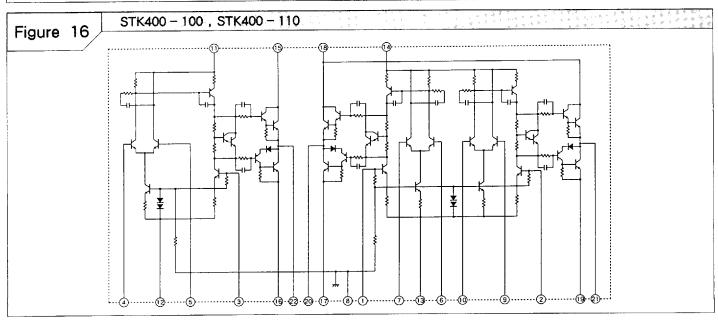


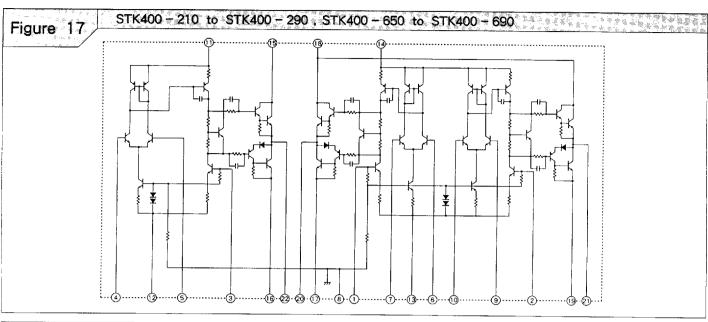


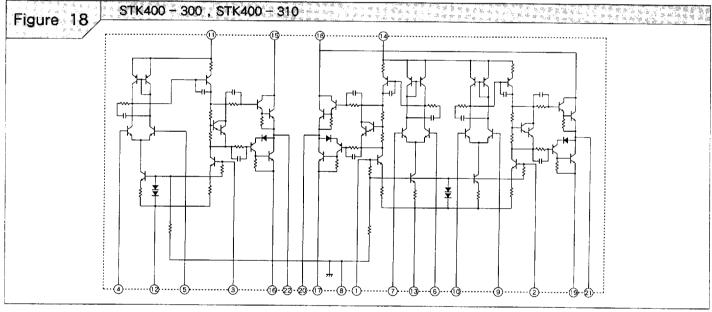


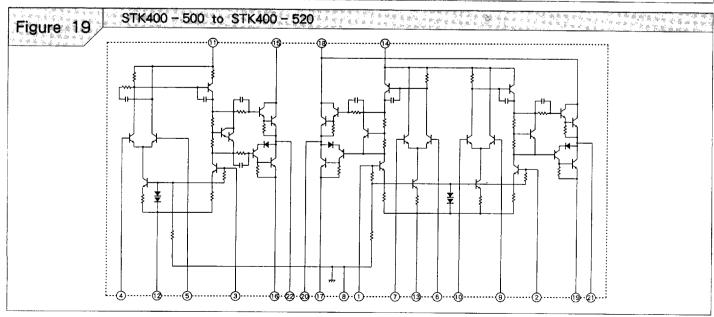


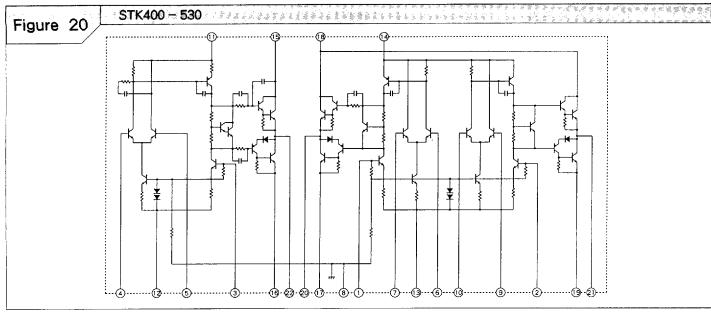


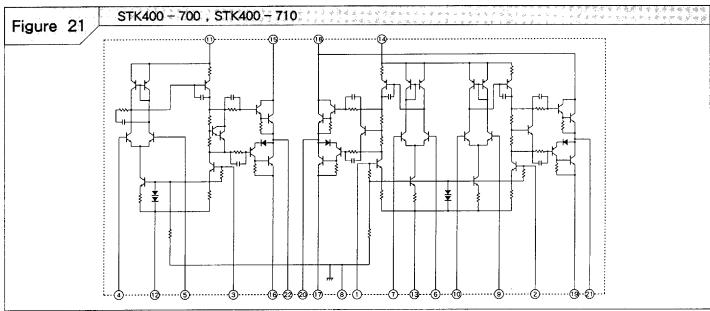


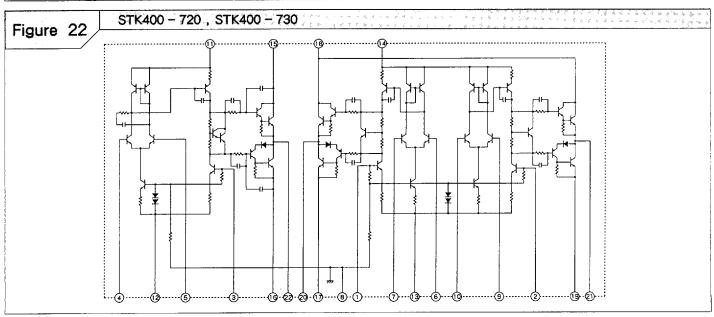


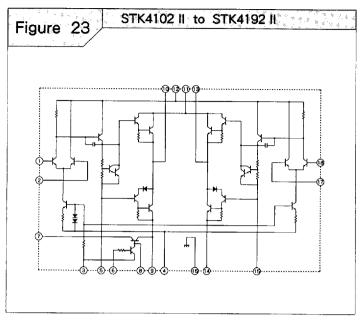


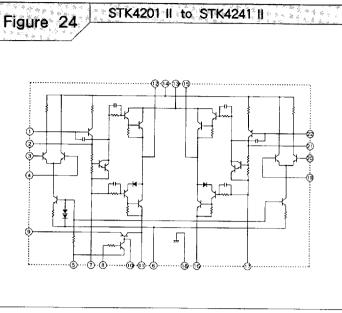


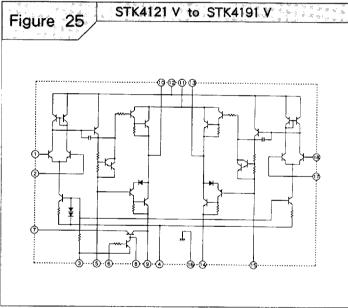


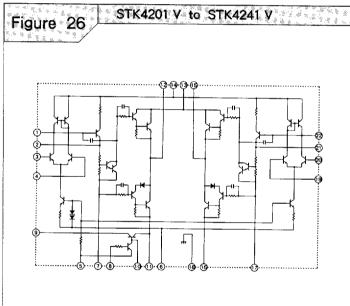


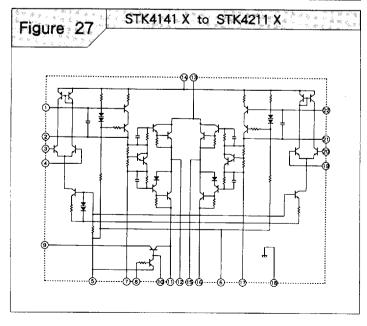


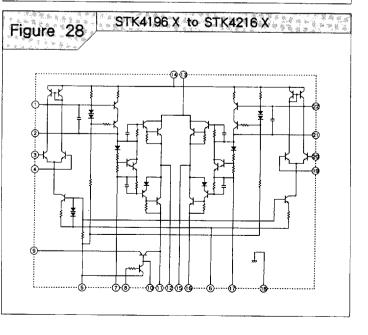




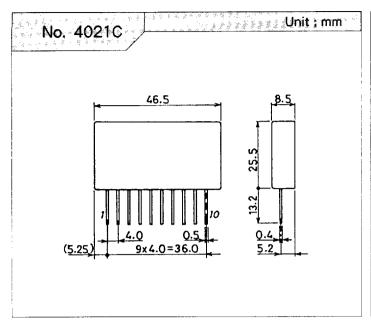


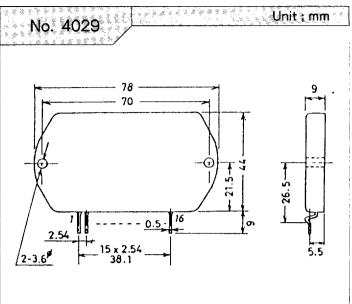


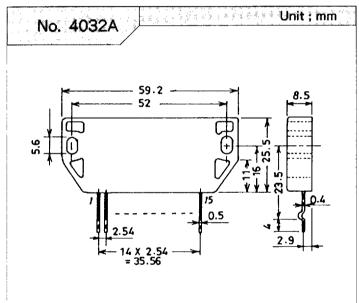


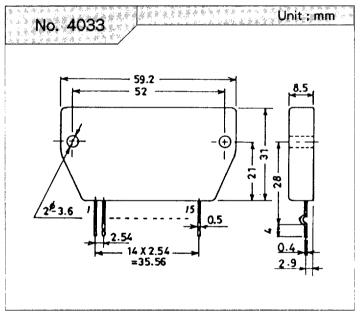


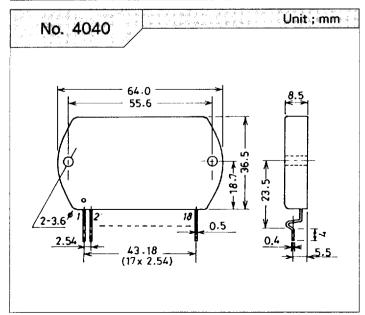
Case Outline

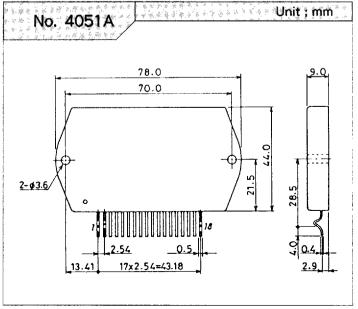


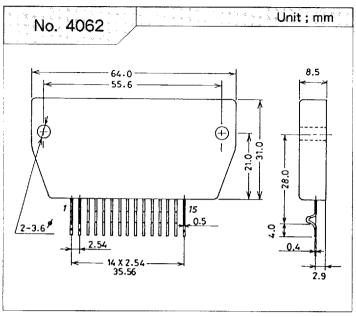


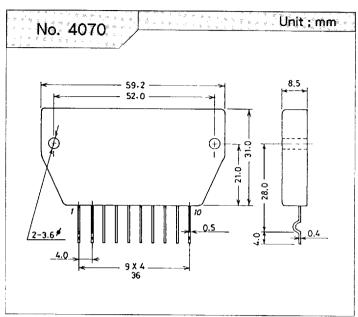


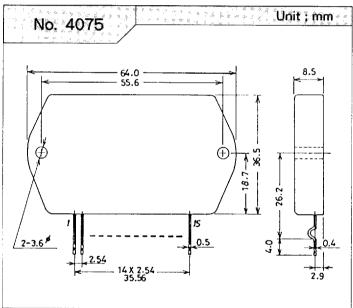


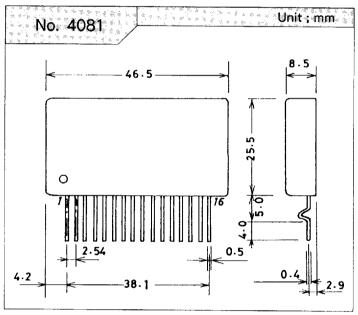


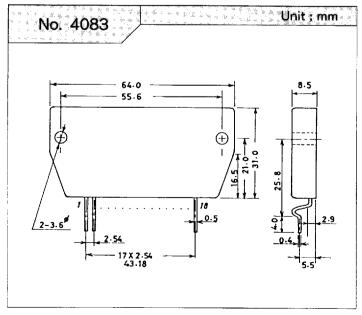


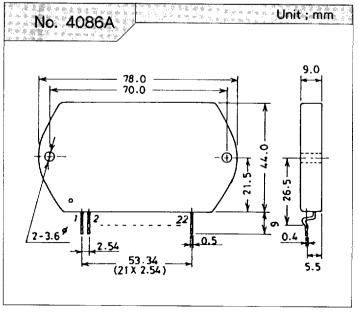












Case Outline

