

トランジスタ・モジュール (NPN, 単相/三相ブリッジ)

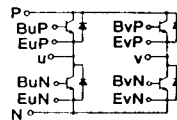
- ダーリントン・トランジスタ4個/6個内蔵
(単相ブリッジ/3相ブリッジ接続)
- フリーホイール・ダイオード付
- 絶縁形
- UL認定品あり

Yellow Card No.: E80276 (N)

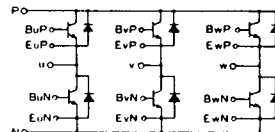
File No.: E80271

■等価回路

BA-1A



TA-1A

注1. $I_C = 1A$, $V_{EB} = 2V$, #印は V_{CEX} ($V_{EB} = 2V$)。

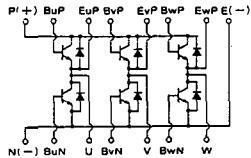
注2. 60Hz, 単相半波1サイクル波高値。

注3. $T_c = 25^\circ C$ 。

注4. AC, 1分間。

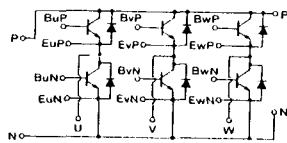
型 名	最 大 定 格 ($T_J = 25^\circ C$)											電 気 的 特 性									
	V_{CBO}	$V_{CEX(SUS)}$ (注1)	V_{EBO}	I_C	I_B	I_F	I_{FM} (注2)	P_C (注3)	T_J	T_{JL}	V_{ISO} (注4)	I_{CEX}			I_{EBO}		$V_{CEX(SUS)}$		h_{FE}		
	(V)	(V)	(V)	(A)	(A)	(A)	(A)	(W)	($^\circ C$)	($^\circ C$)	(V)	(mA) 最 大	V_{CE} (V)	V_{EB} (V)	(mA) 最 大	V_{EB} (V)	(V) 最 小	(A) 最 小	(V) 最 小	V_{VCE} (V)	I_C (A)
QM20BA-H	600	600	7	20	1.0	20	200	160	150	-40~125	2500	1	600	2	150	7			75/100	2/5	20
QM10TD-H	600	600	7	10	1.0	10	100	83	150	-40~125	2000	1	600	2	100	7			75/100	2/5	10
QM10TE-HB	600	600	7	10	1.0	10	100	73	150	-40~125	2500	1	600	2	40	7			250	2	10
QM10KD-HB	600	600	7	10	1.0	10	100	74	150	-40~125	2500	1	600	2	40	7			250	2	10
QM15TD-9	500	450	7	15	1.0	15	150	83	150	-40~125	2000	1	500	2	100	7			75/100	2/5	15
QM15TD-9B	500	450	7	15	1.0	15	150	74	150	-40~125	2500	1	500	2	40	7			250	2	15
QM15TG-9	500	450	7	15	1.0	15	150	83	150	-40~125	2000	1	500	2	100	7			75/100	2/5	15
QM15TG-9B	500	450	7	15	1.0	15	150	83	150	-40~125	2000	1	500	2	40	7			250	2	15
QM15TB-2H	1000	1000	7	15	1.0	15	150	150	150	-40~125	2500	2	1000	2	100	7			75/100	2.8/5	15
QM15TB-2HB	1000	1000	7	15	1.0	15	150	150	150	-40~125	2500	1	1000	2	50	7			250	3	15
QM15TB-24	1200	1200	7	15	1.0	15	150	150	150	-40~125	2500	2	1200	2	100	7			75	5	15
QM15TD-H	600	600	7	15	1.0	15	150	100	150	-40~125	2000	1	600	2	100	7			75/100	2/5	15
QM15TD-HB	600	600	7	15	1.0	15	150	75	150	-40~125	2500	1	600	2	40	7			250	2	15
QM15KD-HB	600	600	7	15	1.0	15	150	76	150	-40~125	2500	1	600	2	40	7			250	2	15
QM20TD-9	500	450	7	20	1.0	20	200	100	150	-40~125	2000	1	500	2	100	7			75/100	2/5	20
QM20TD-9B	500	450	7	20	1.0	20	200	76	150	-40~125	2500	1	500	2	40	7			250	2	20
QM20TG-9B	500	450	7	20	1.0	20	200	100	150	-40~125	2000	1	500	2	40	7			250	2	20
QM20TD-H	600	600	7	20	1.0	20	200	100	150	-40~125	2000	1	600	2	150	7			75/100	2/5	20

TA-1B



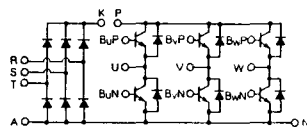
注) トランジスタはすべてダーリントン

TA-1C

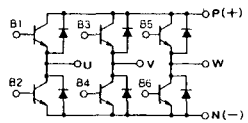


注) トランジスタはすべてダーリントン

KD-1A



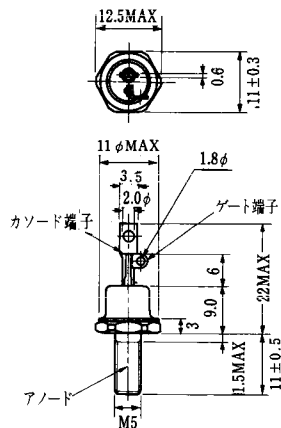
TX 1A



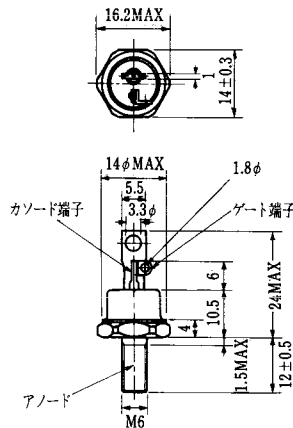
注) トランジスタはすべてダーリントン

(T _J = 25°C)										エミッタ・コレクタ間ダイオード							熱抵抗		等 価 回 路	外形図	記	事	型	名
飽和電圧 (V)		I _c	I _b	スイッチング時間 (μs)			I _{b1}	I _{b2}	V _{cc}	I _c	V _F (V)	I _F (A)	t _{rr} (μs)	I _F (A)	V _{BE} (V)	di/dt (A/μs)	θ _{J-C} (°C/W)							
V _{CE}	V _{BE}			t _{on}	t _{off}	t _r											トランジスタ部	ダイオード部						
最大	最大	(A)	(A)	最大	最大	最大	(A)	(A)	(V)	(A)	最大	最大	最大	最大	最大	最大	最大	最大	最大					
2.0	2.5	20	0.28	1.5	12	2.0	0.4	-0.4	300	20	1.5	20					0.8	2.2	BA-1A	M-2D4A	U.L.認定済		QM20BA-H	
2.0	2.5	10	0.13	1.5	10	2.5	0.2	-0.2	300	10	1.5	10					1.5	2.5	TA-1A	M-2G6B	U.L.認定済		QM10TD-H	
2.0	2.5	10	0.04	1.5	10	2.0	0.06	-0.2	300	10	1.5	10					1.7	2.8	TA-1B	M-3D6A	U.L.認定済		QM10TE-HB	
2.0	2.5	10	0.04	1.5	10	2.0	0.06	-0.2	300	10	1.5	10					1.7	2.8	KD-1A	M-3D6B	U.L.認定済		QM10KD-HB	
2.0	2.5	15	0.2	1.5	9.5	2.5	0.3	-0.3	250	15	1.5	15					1.5	2.5	TA-1A	M-2G6B	U.L.認定済		QM15TD-9	
2.0	2.5	15	0.06	1.5	10	2.0	0.09	-0.3	250	15	1.5	15					1.7	2.8	TA-1A	M-2G6A	U.L.認定済		QM15TD-9B	
2.0	2.5	15	0.2	1.5	9.5	2.5	0.3	-0.3	250	15	1.5	15					1.5	2.5	TA-1B	M-2F6A	U.L.認定済		QM15TC-9	
2.0	2.5	15	0.06	1.5	10	2.0	0.09	-0.3	250	15	1.5	15					1.5	2.5	TA-1B	M-2F6A	U.L.認定済		QM15TC-9B	
2.5	3.5	15	0.3	2.5	15	3.0	0.3	-0.3	600	15	1.5	15					0.8	1.2	TA-1A	M-2E6B	U.L.認定済		QM15TB-2H	
3.0	3.5	15	0.06	2.0	10	3.0	0.09	-0.3	600	15	1.8	15					0.8	2.0	TA-1A	M-2E6B	U.L.認定済		QM15TB-2HB	
3.0	3.5	15	0.3	2.5	15	3.0	0.3	-0.3	600	15	1.5	15					0.8	1.2	TA-1A	M-2E6B	U.L.認定済		QM15TB-24	
2.0	2.5	15	0.2	1.5	10	3.0	0.3	-0.3	300	15	1.5	15					1.2	2.5	TA-1A	M-2G6B	U.L.認定済		QM15TD-H	
2.0	2.5	15	0.06	1.5	10	2.0	0.09	-0.3	300	15	1.5	15					1.65	2.8	TA-1A	M-2G6B	U.L.認定済		QM15TD-HB	
2.0	2.5	15	0.06	1.5	10	2.0	0.09	-0.3	300	15	1.5	15					1.65	2.8	KD-1A	M-2F6A	U.L.認定済		QM15KD-HB	
2.0	2.5	20	0.28	1.5	9.5	2.5	0.4	-0.4	250	20	1.5	20					1.2	2.5	TA-1A	M-2G6B	U.L.認定済		QM20TD-9	
2.0	2.5	20	0.08	2.0	10	2.0	0.12	-0.4	250	20	1.5	20					1.65	2.8	TA-1A	M-2G6A	U.L.認定済		QM20TD-9B	
2.0	2.5	20	0.08	2.0	10	2.0	0.12	-0.4	250	20	1.5	20					1.25	2.5	TA-1B	M-2F6A	U.L.認定済		QM20TC-9B	
2.0	2.5	20	0.28	1.5	12	2.0	0.4	-0.4	300	20	1.5	20					1.2	2.2	TA-1A	M-2G6B	U.L.認定済		QM20TD-H	

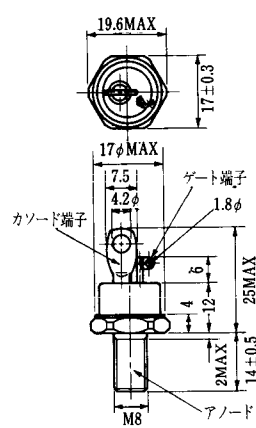
FD-1



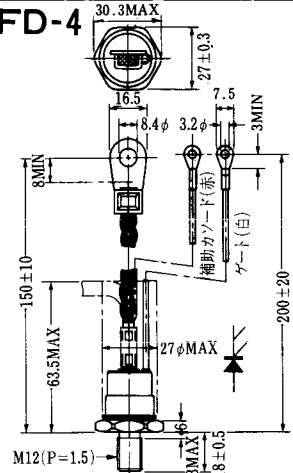
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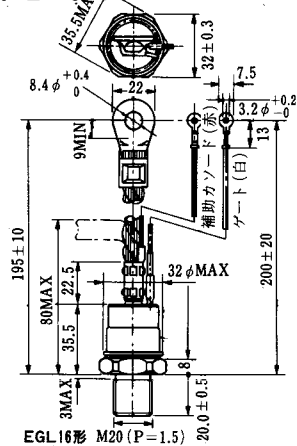
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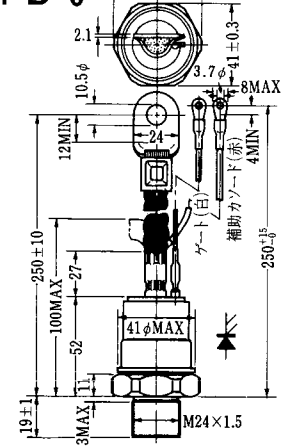
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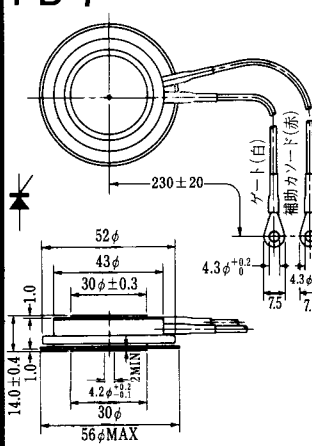
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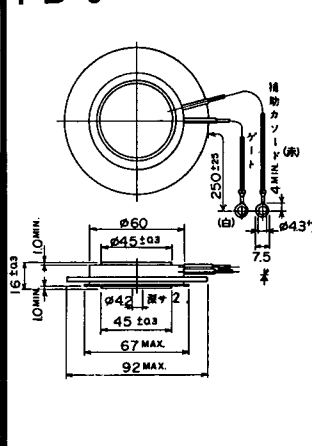
FD-6



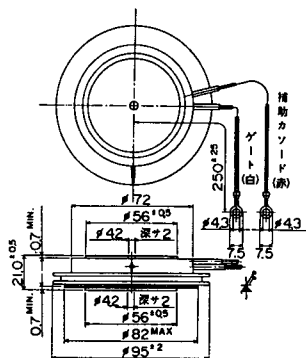
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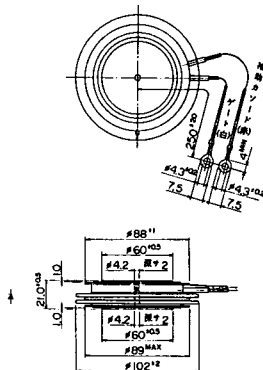
FD-8



FD-9

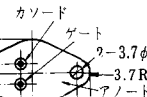


FD-10

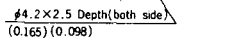


FD-11

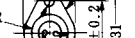
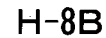
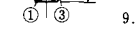
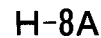
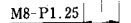
FD-12



Unit in mm(inch)

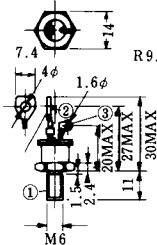


Unit in mm(inch)

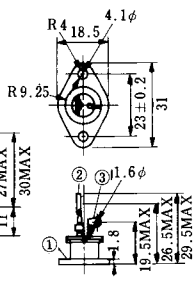


- ①アノード
②カソード
③ゲート

H-9A



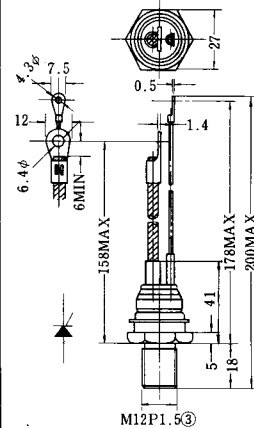
H-9B



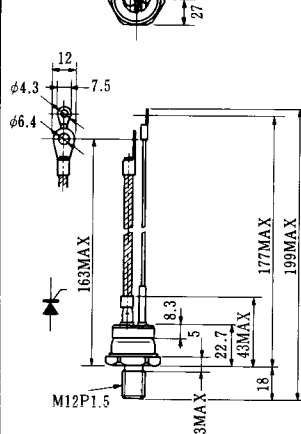
- ①アノード
②カソード
③ゲート



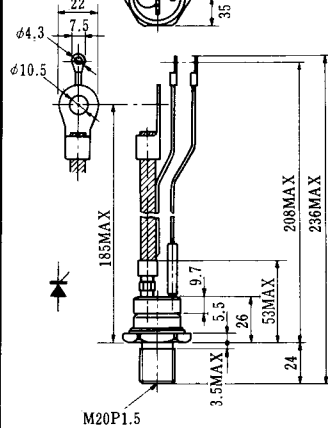
H-10



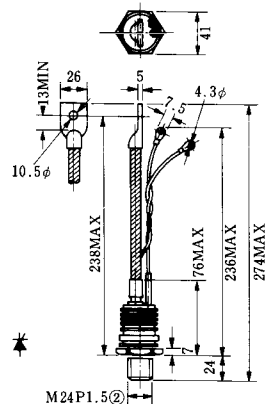
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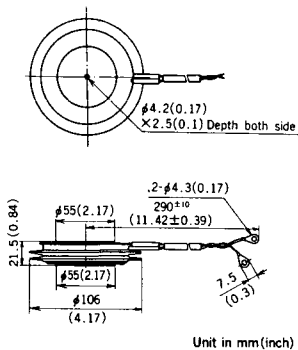
H-12



H-13

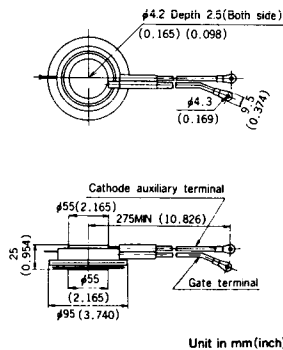


H-14



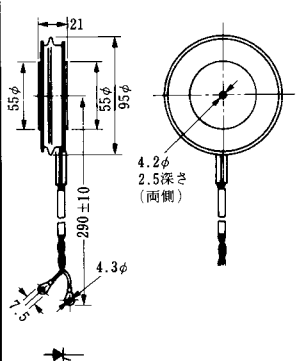
Unit in mm (inch)

H-15

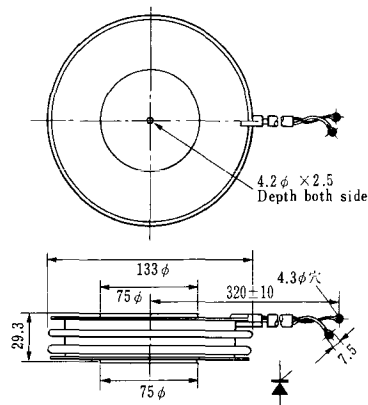


Unit in mm (inch)

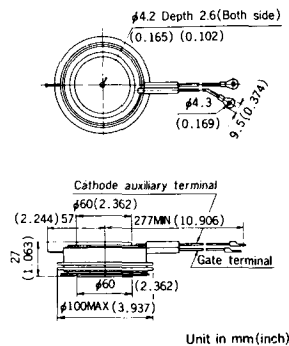
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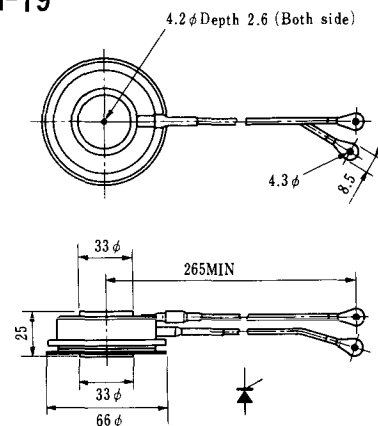
H-17



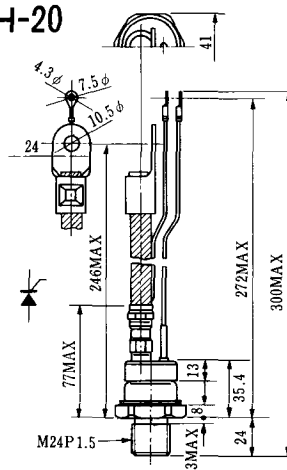
H-18



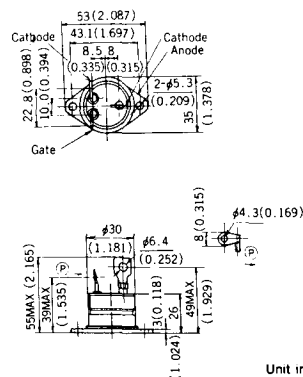
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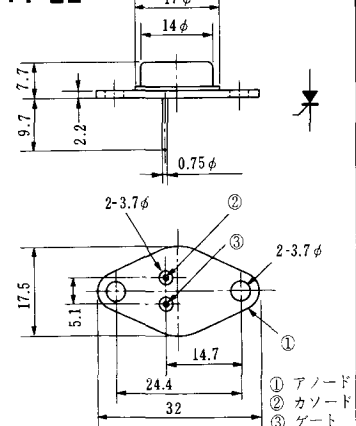
H-20



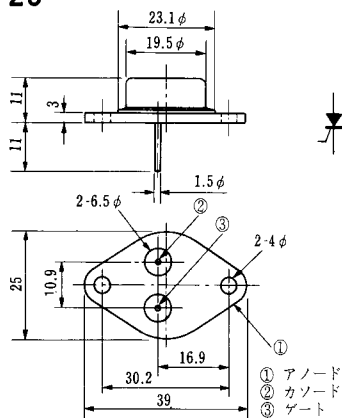
H-21



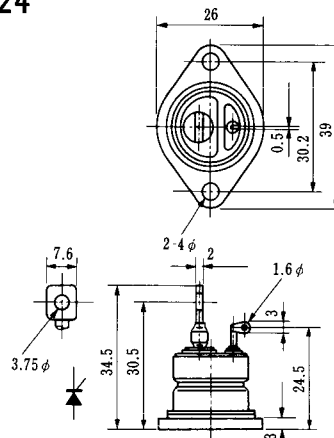
H-22



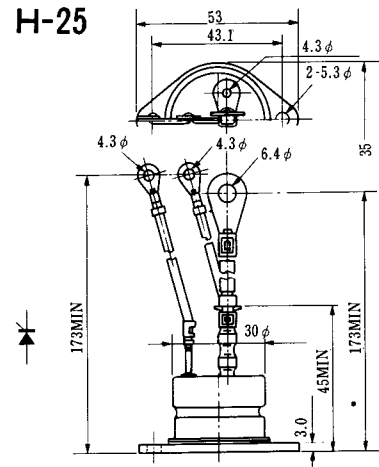
H-23



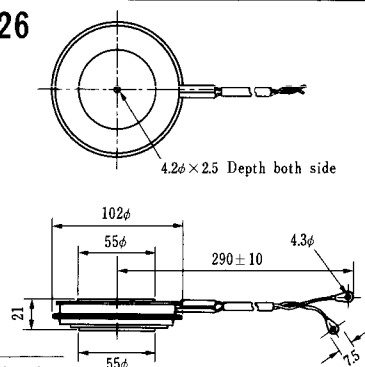
H-24



H-25

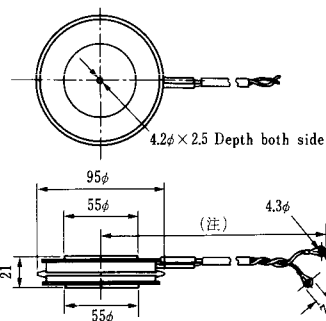


H-26



Type	Direction of polarity
CA12	

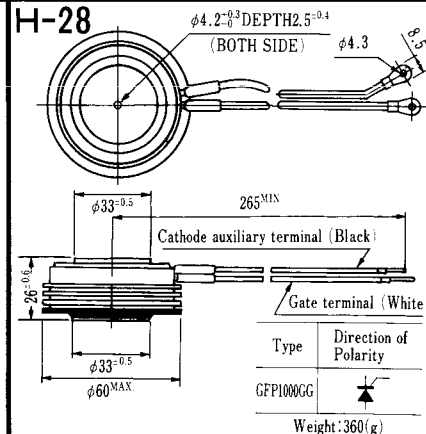
H-27



Type	Direction of polarity
CF11V	

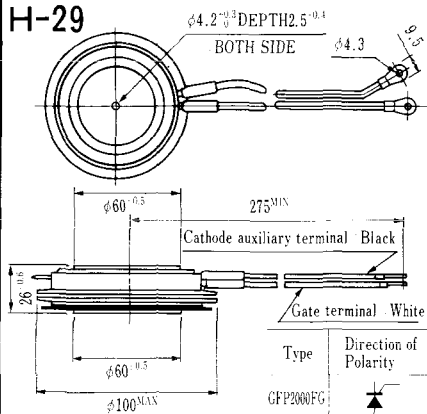
(注) CC11V: 400 $\pm$ 10
CF11V: 250 $\pm$ 10

H-28



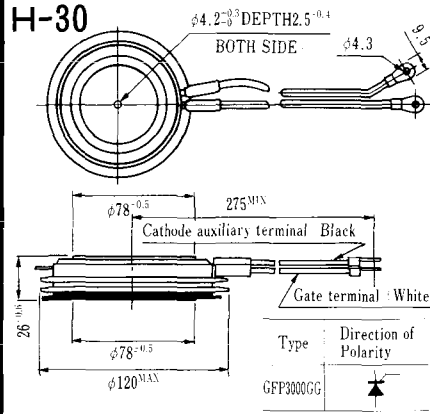
Note: The thickness is a dimension in press at the rated mounting force.

H-29



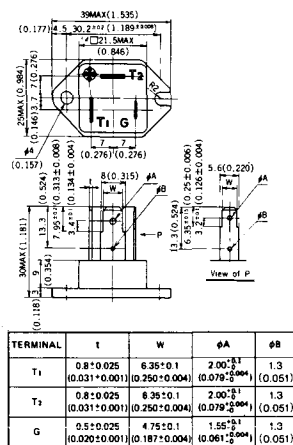
Note : The thickness is a dimension in press at the rated mounting force.

H-30



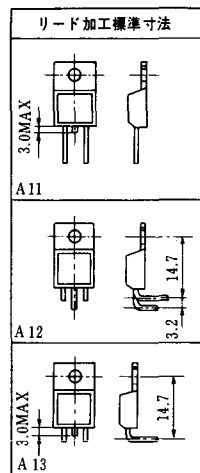
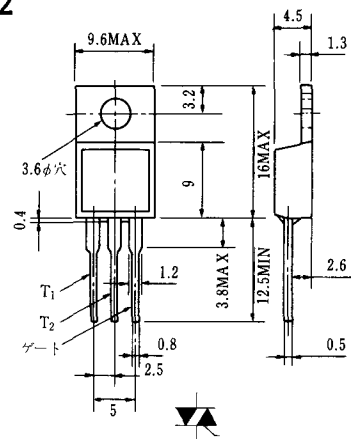
Note : The thickness is a dimension in press at the rated mounting force.

HT-1

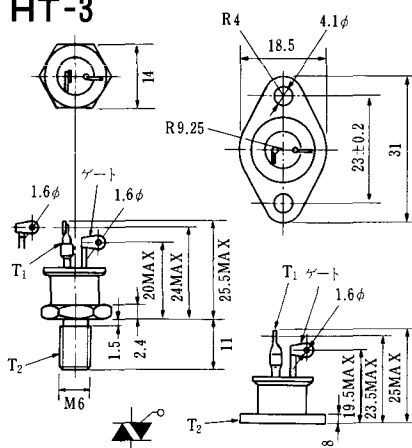


Unit in mm (inch)

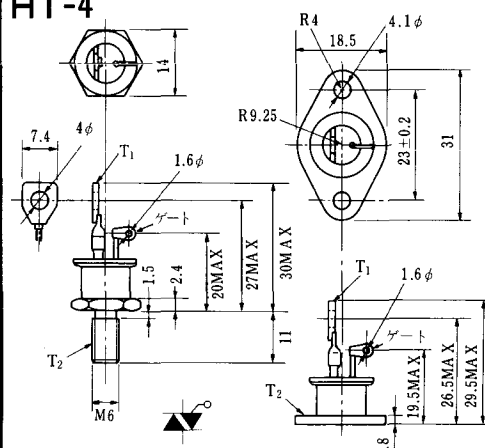
HT-2



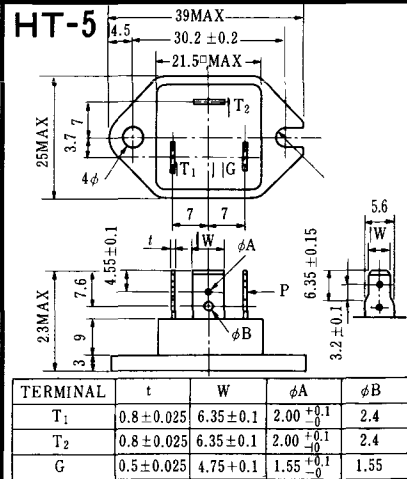
HT-3



HT-4

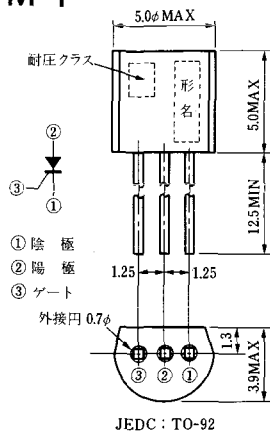


HT-5

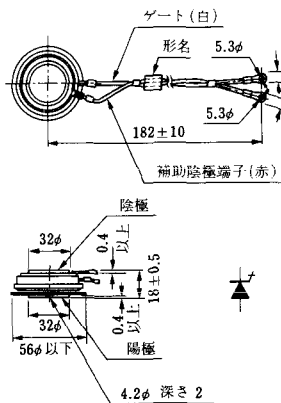


《寸法図単位：mm》

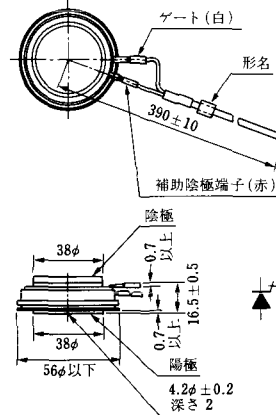
M-1



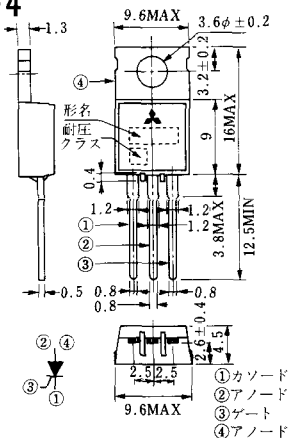
M-2



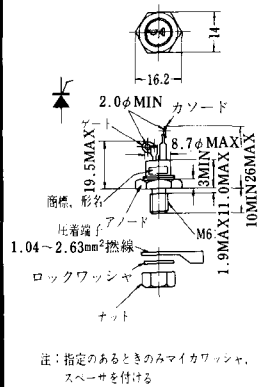
M-3



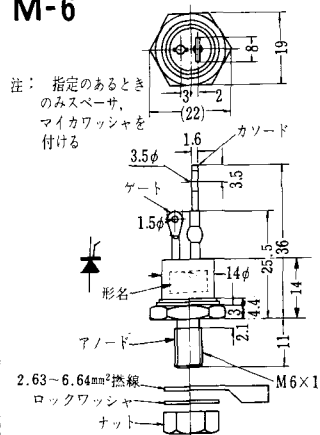
M-4



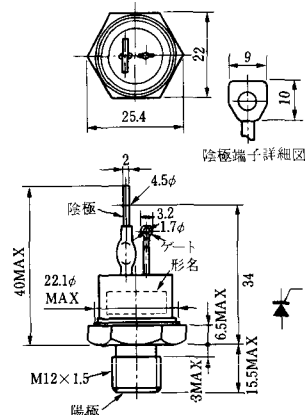
M-5



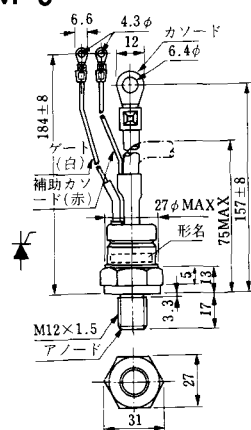
M-6



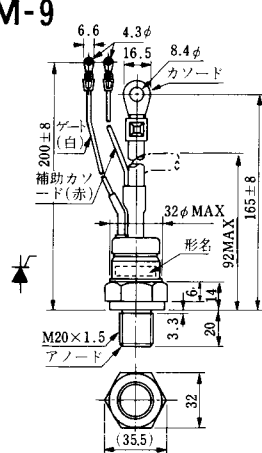
M-7



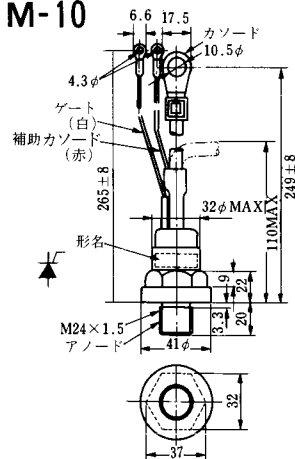
M-8



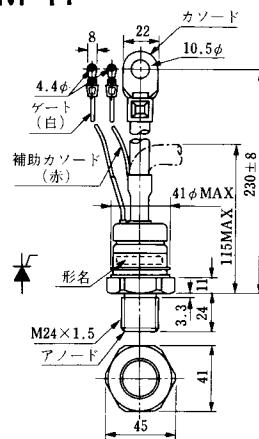
M-9



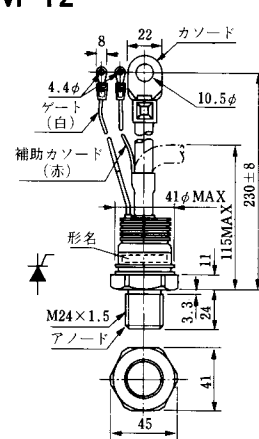
M-10



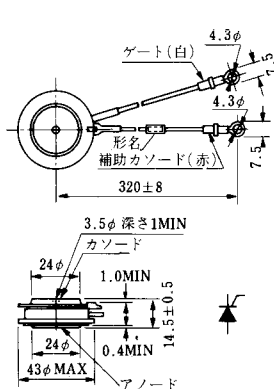
M-11



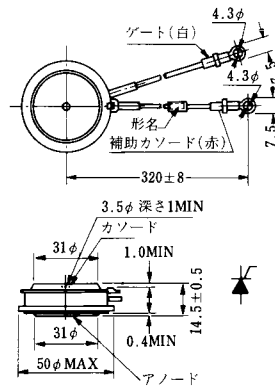
M-12



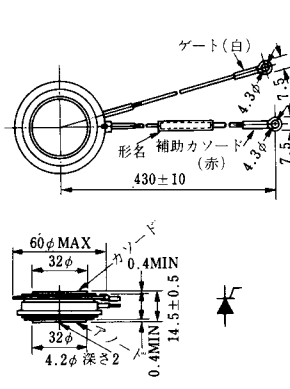
M-13



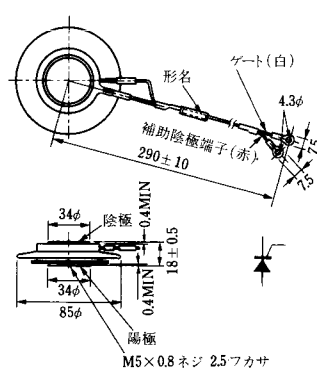
M-14



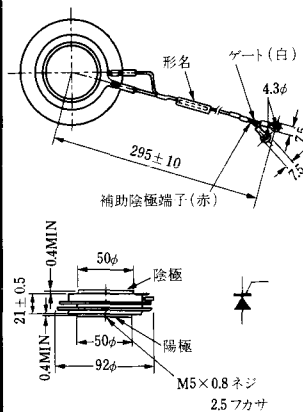
M-15



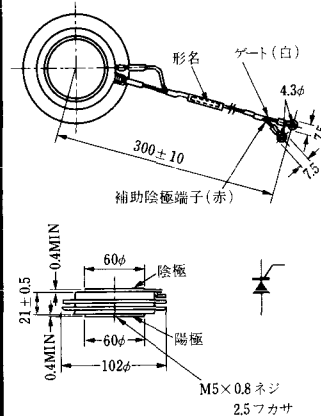
M-16



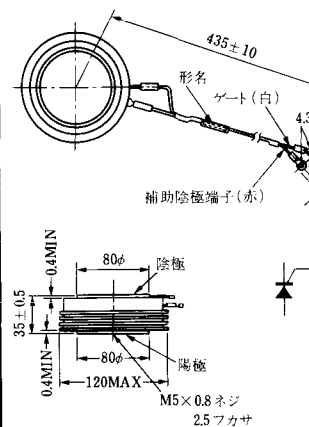
M-17



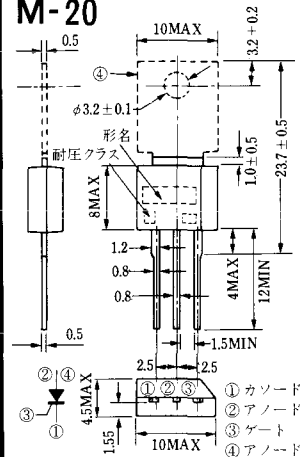
M-18



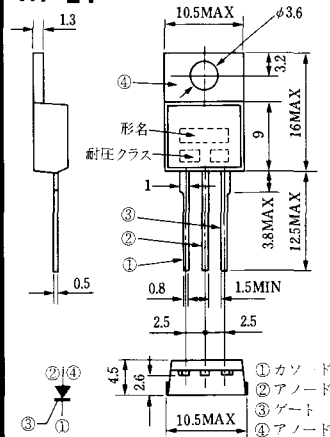
M-19



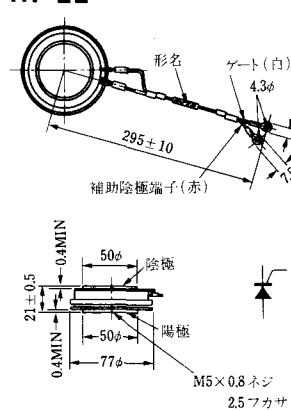
M-20



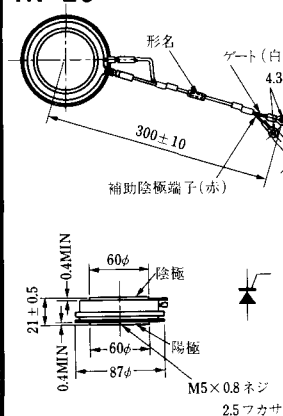
M-21



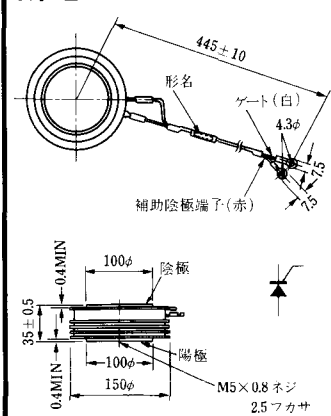
M-22



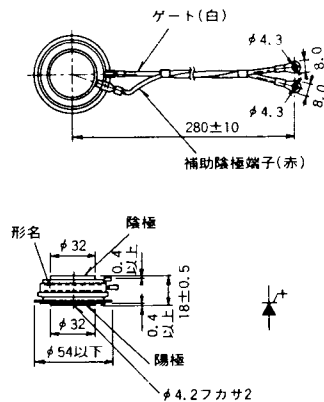
M-23



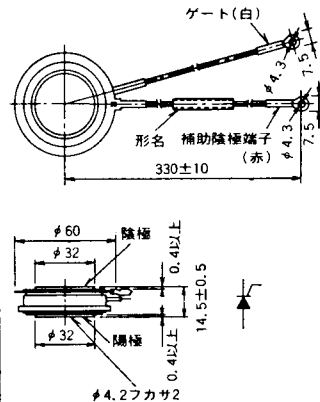
M-24



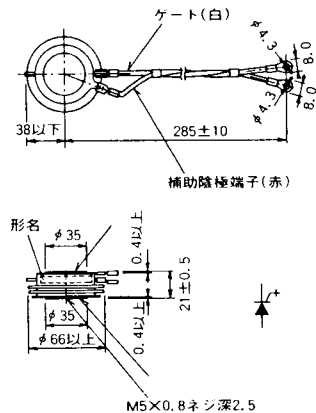
M-25



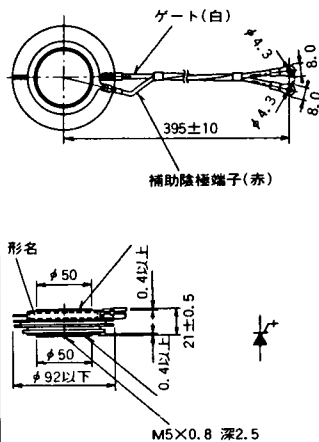
M-26



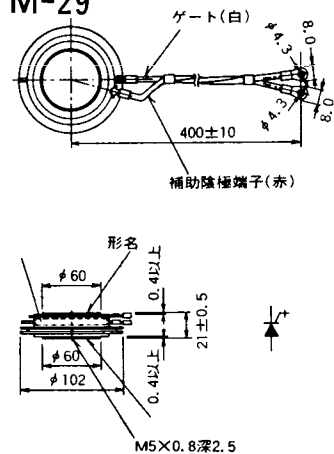
M-27



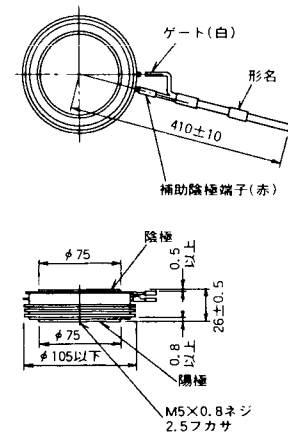
M-28



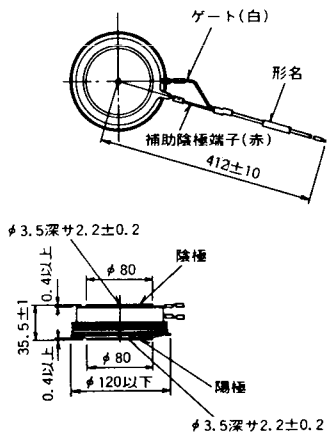
M-29



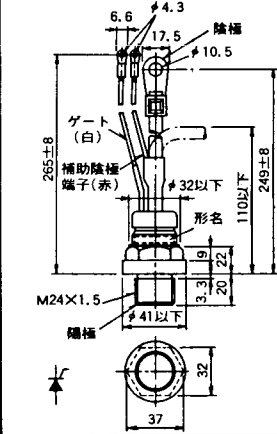
M-30



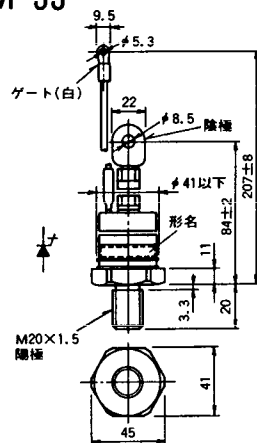
M-31



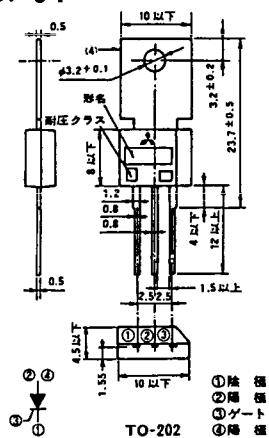
M-32



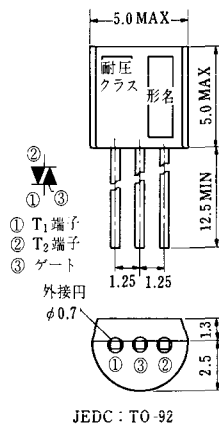
M-33



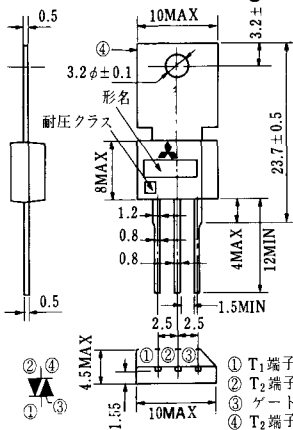
M-34



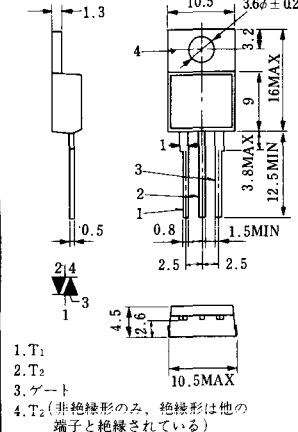
MT-1



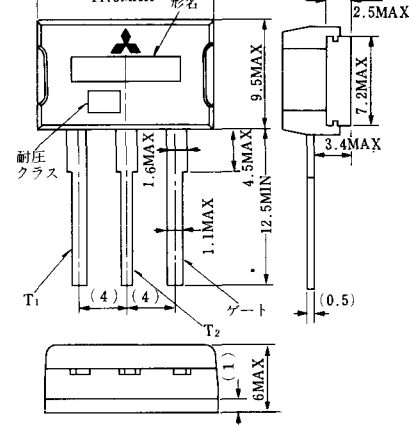
MT-2



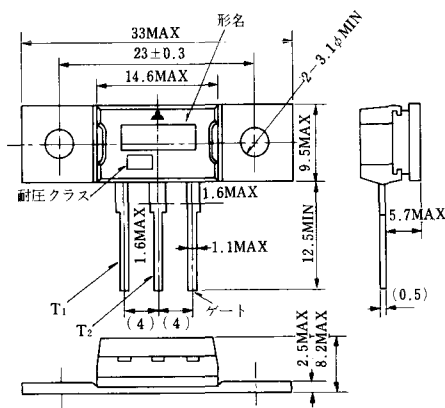
MT-3



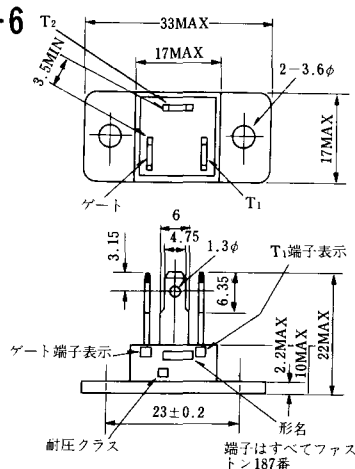
MT-4



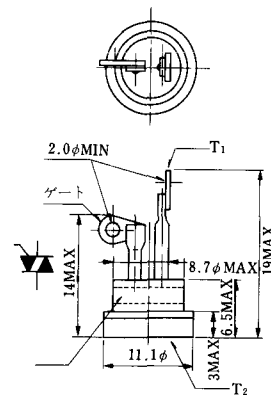
MT-5



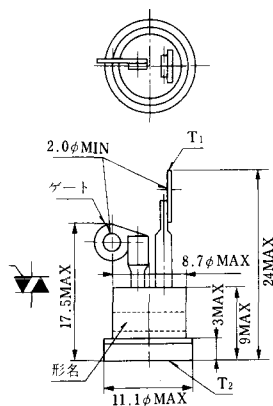
MT-6



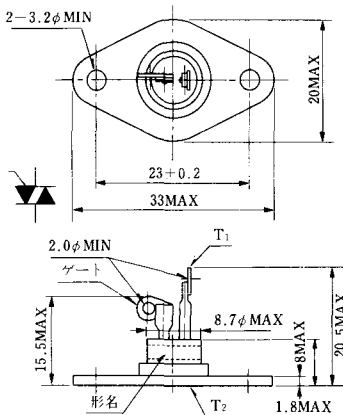
MT-7



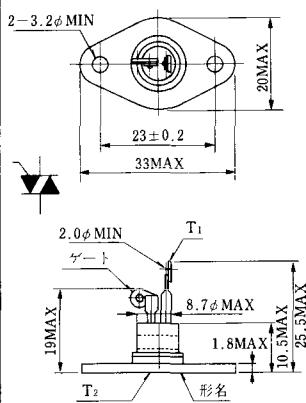
MT-8



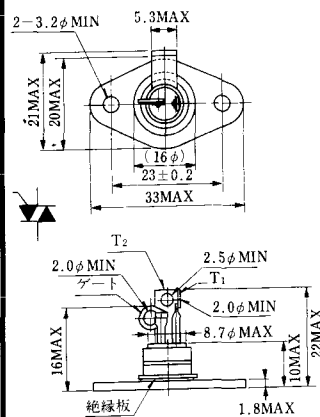
MT-9



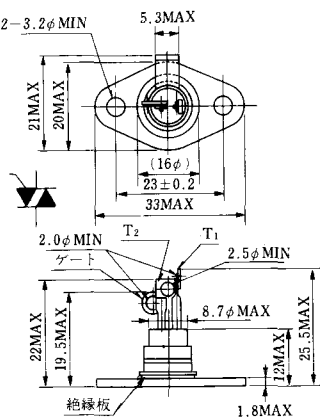
MT-10



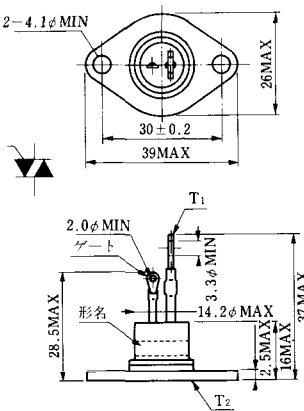
MT-11



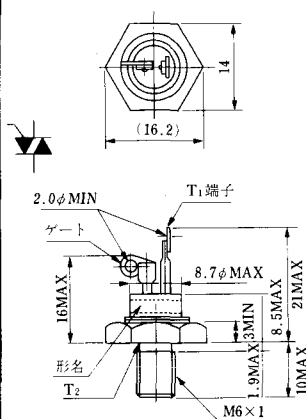
MT-12



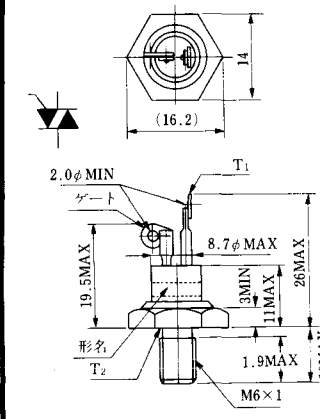
MT-13



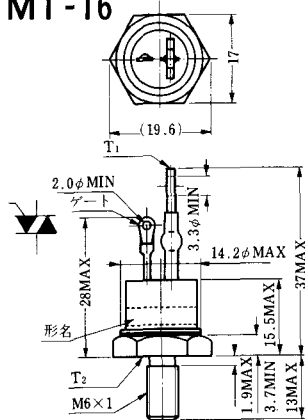
MT-14



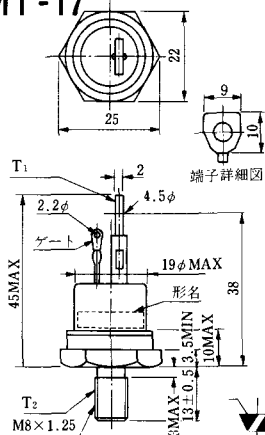
MT-15



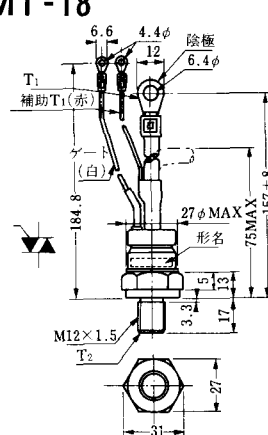
MT-16



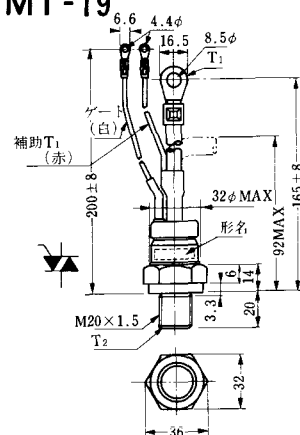
MT-17



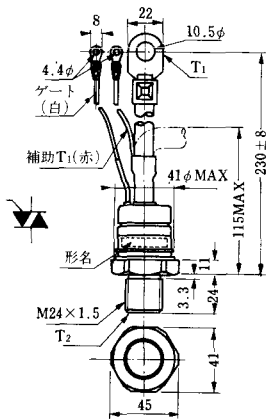
MT-18



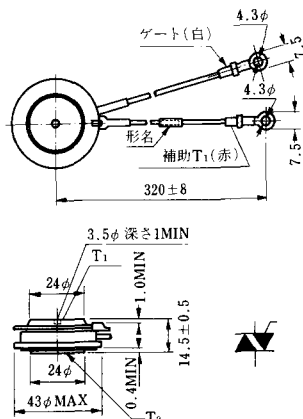
MT-19



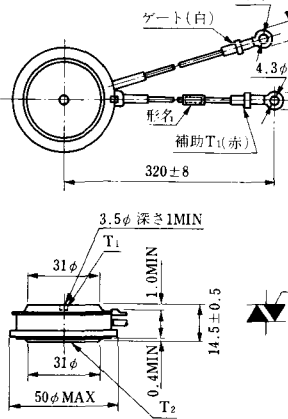
MT-20



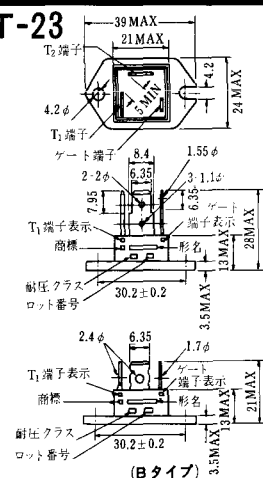
MT-21



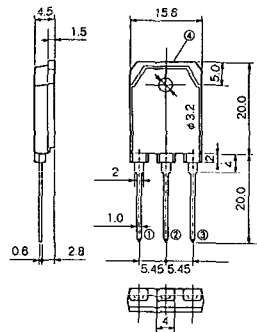
MT-22



MT-23

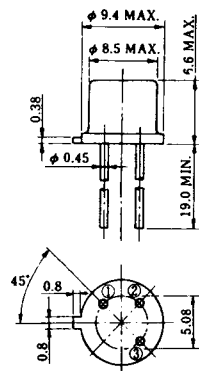


MT-24



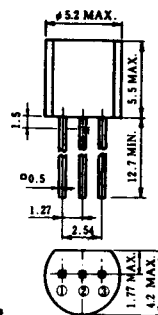
- ① T1 端子
 - ② T2 端子
 - ③ ゲート端子
 - ④ T2 端子
- TO - 3P

N-1



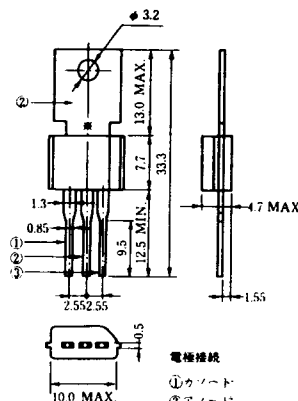
電極接続
① カソード
② ゲート
③ アノード

N-2



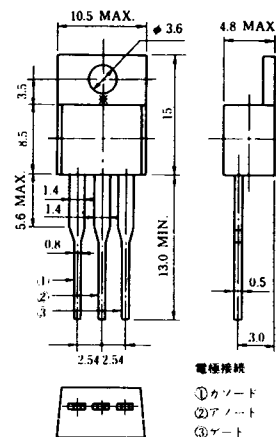
電極接続
① カソード
② ゲート
③ アノード

N-3



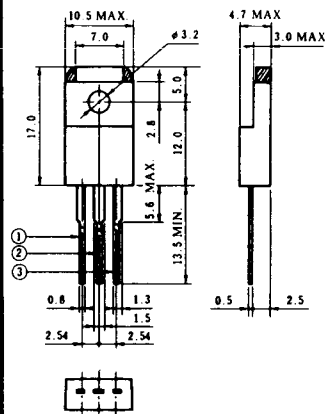
電極接続
① カソード
② アノード
③ ゲート

N-4

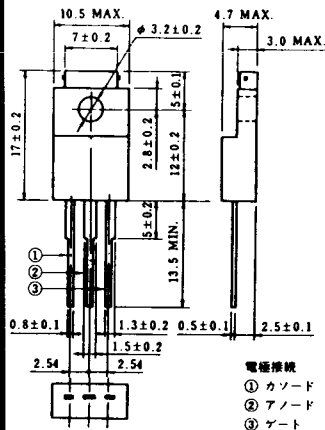


電極接続
① カソード
② アノード
③ ゲート

N-5

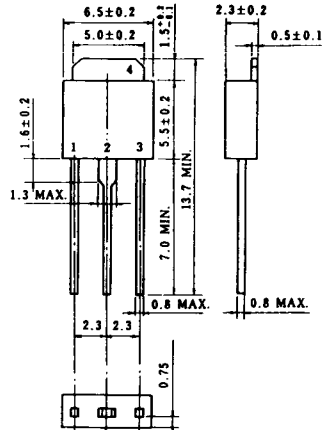


N-6

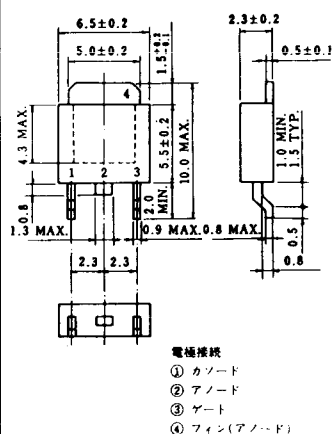


電極接続
① カソード
② アノード
③ ゲート

N-7

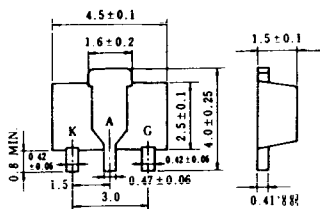


N-8



電極接続
① カソード
② アノード
③ ゲート
④ フィン (アノード)

N-9



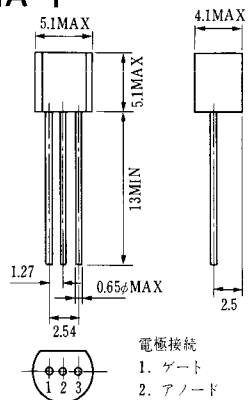
電極接続

K : カソード

A : アノード

G : ゲート

NA-1

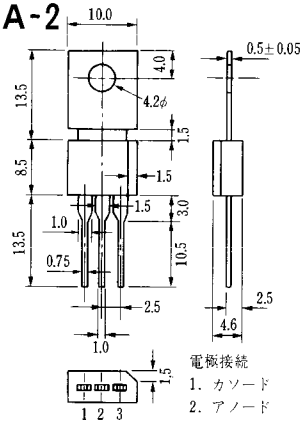


電極接続

1. ゲート
2. アノード
3. カソード

JEDEC: TO-92

NA-2

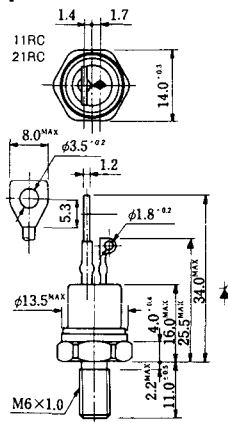


電極接続

1. カソード
2. アノード
3. ゲート

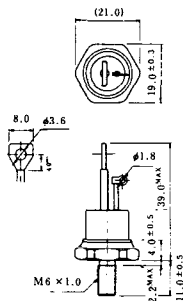
JEDEC: TO-202AA

NI-1



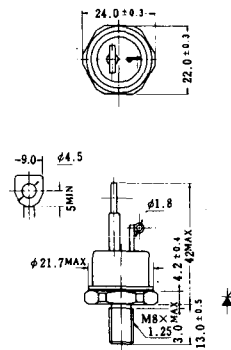
NI-2

29RD



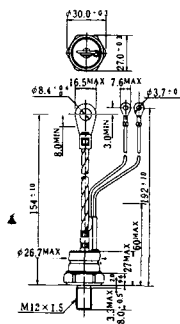
NI-3

39RC
59RC
39RF
59RF



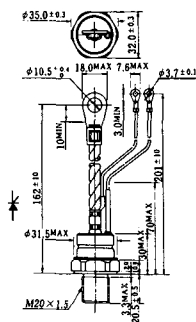
NI-4

68RP, 88RP, 108RP, 68RS,
88RS, 78RT, 88RLD, 88RLE,
88RLF, 88RLG, 88RLH, 108RLE



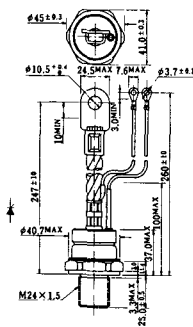
NI-5

158RP, 208RP, 128RS, 178RS,
158RT, 178RLD, 178RLE,
178RLF, 178RLG, 178RLH,
208RLE



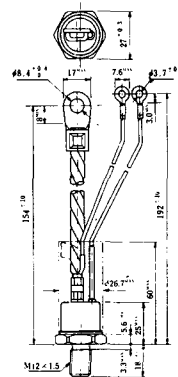
NI-6

308RP, 408RP, 508RP, 278RS,
358RS, 258RT, 258RLD, 258RLG,
258RLH, 308RLE, 308RLF,
358RLE



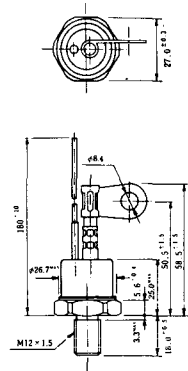
NI-7

89RW $\frac{1}{2}$ L
129RW $\frac{1}{2}$ L



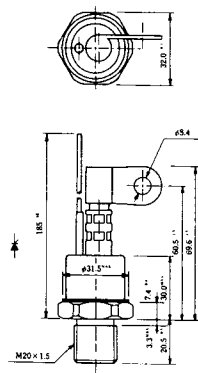
NI-8

89RW
129RW



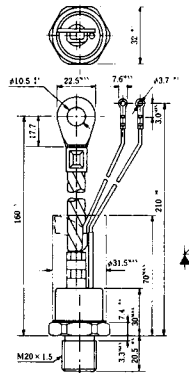
NI-9

259RW
309RW



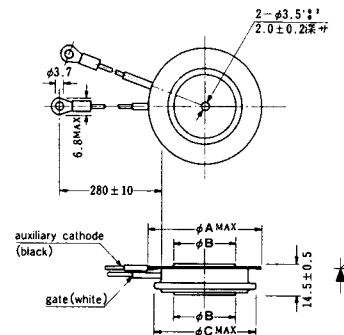
NI-10

259RW_JL
309RW_JL



NI-11

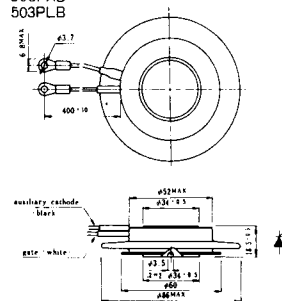
103PA
253PA
503PA
553PA
803PA
103PLE
103PLG
103PLH
203PLG
253PLE
253PLH
353PLG
403PLE
403PLH



型名	103PA, 103PLE, 103PLG, 103PLH	253PA, 203PLG, 253PLE, 253PLH	503PA, 553PA, 353PLG, 403PLE, 403PLH	803PA
寸法				
A	40	46	55.5	55.5
B	16	22	30	32
C	36	42	50.5	50.5

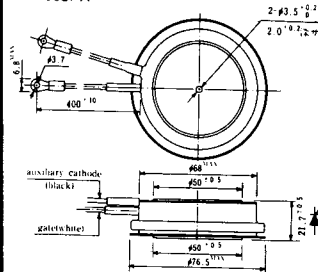
NI-12

403PAB
503PAB
503PLB



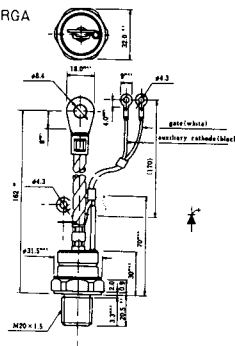
NI-13

1003PA
1003PAB
1003PLF
1003PLH
1503PA



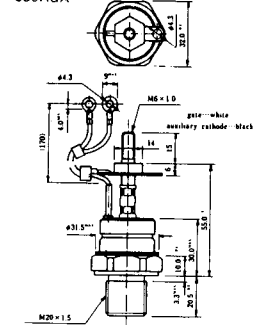
NI-14

358RGA



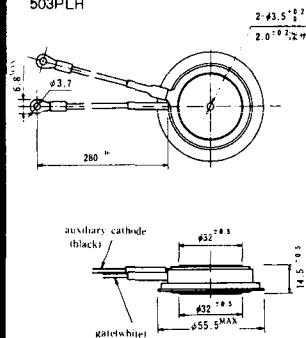
NI-15

359RGA



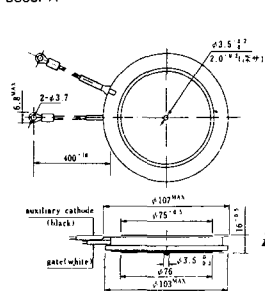
NI-16

503PLF
503PLH



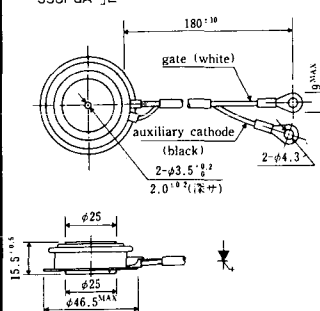
NI-17

3003PA



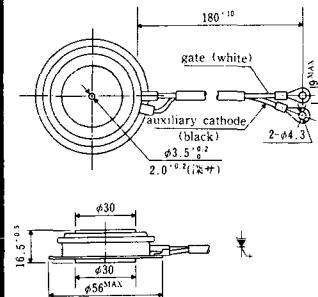
NI-18

353PGA「E



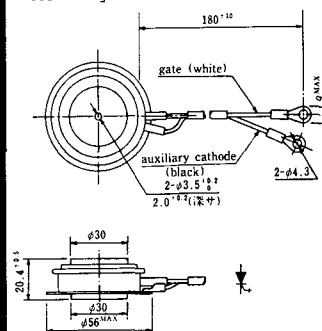
NI-19

603PGA, 603PGA「A, 803PGA



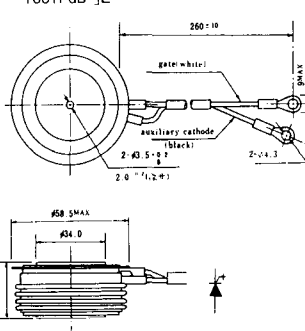
NI-20

603PGA「E



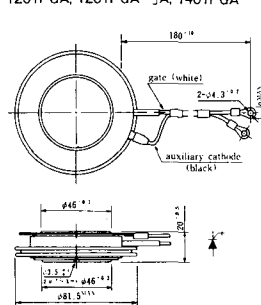
NI-21

1001PGB「E



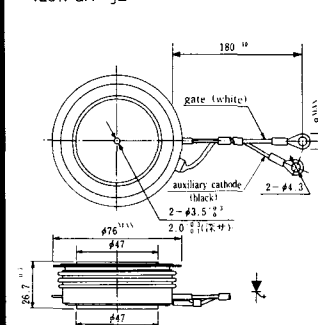
NI-22

1201PGA, 1201PGA「A, 1401PGA



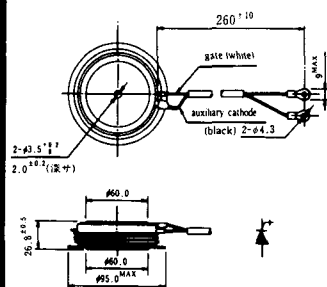
NI-23

1201PGA「E



NI-24

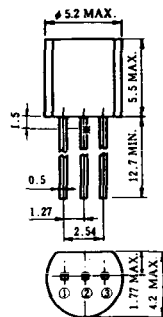
2001PGB¹ J E



NI-25

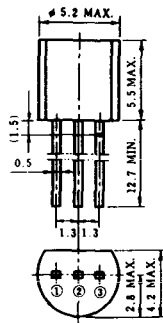
NI-26

NT-1



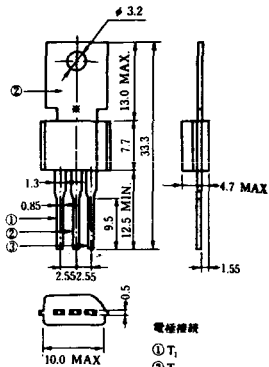
電極接続
① T_1
② ゲート
③ T_2

NT-2



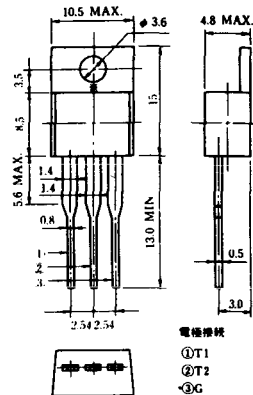
電極接続
① T_1
② ゲート
③ T_2

NT-3



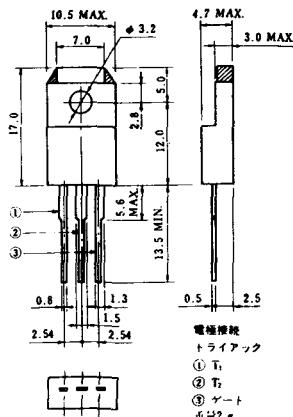
電極接続
① T_1
② T_2
③ ゲート

NT-4



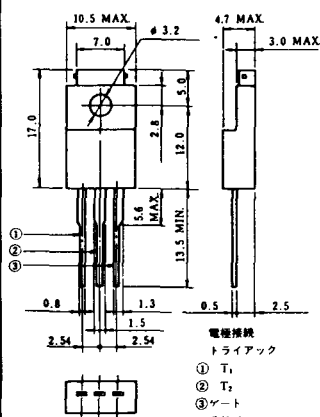
電極接続
① T_1
② T_2
③ G

NT-5



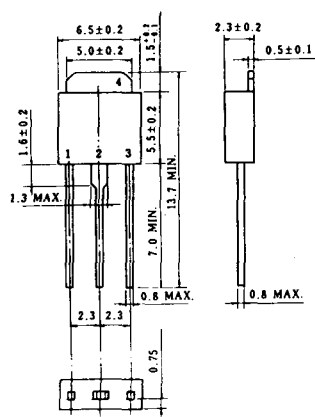
電極接続
トリアック
① T_1
② T_2
③ ゲート
※ 2g

NT-6

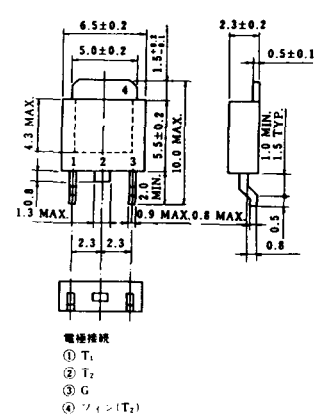


電極接続
トリアック
① T_1
② T_2
③ ゲート
※ 2g

NT-7

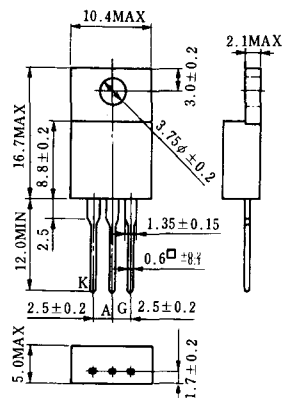


NT-8

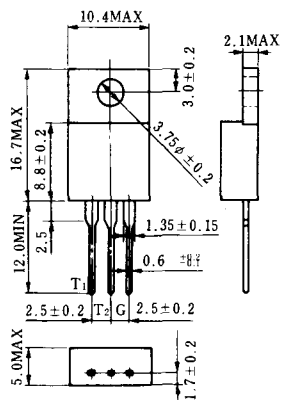


電極接続
① T_1
② T_2
③ G
④ T_1 (T_2)

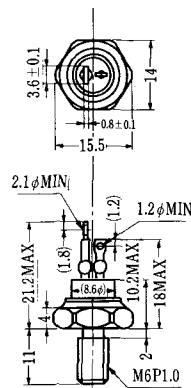
S-1



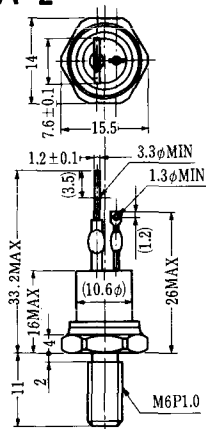
ST-1



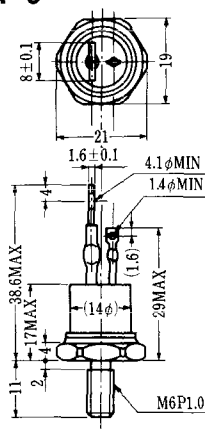
SA-1



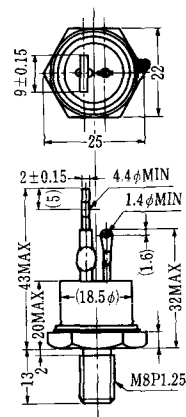
SA-2



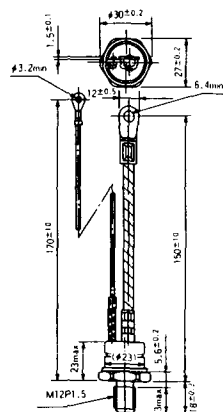
SA-3



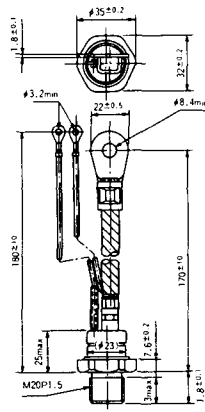
SA-4



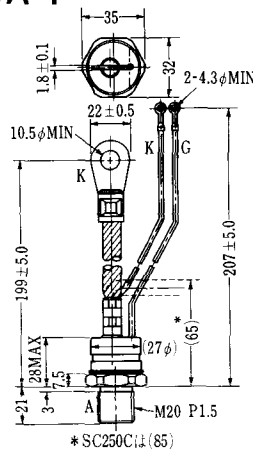
SA-5



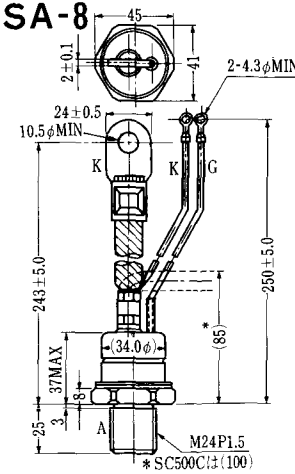
SA-6



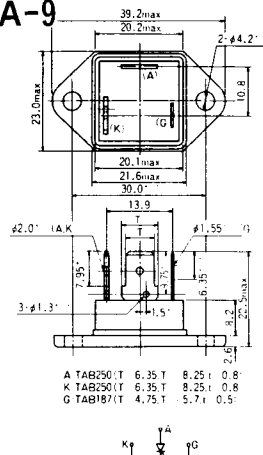
SA-7



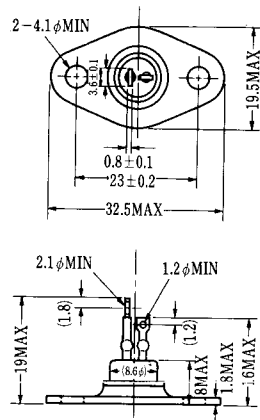
SA-8



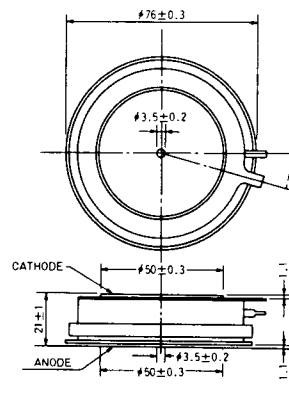
SA-9



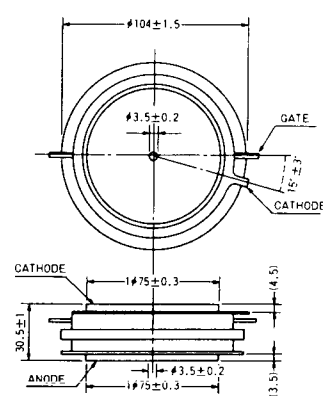
SA-10



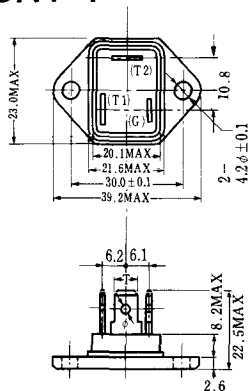
SA-11



SA-12

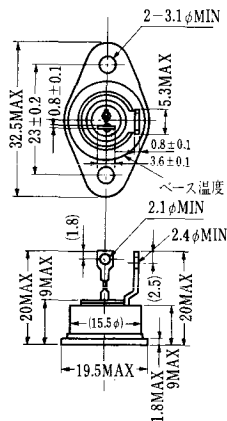


SAT-1

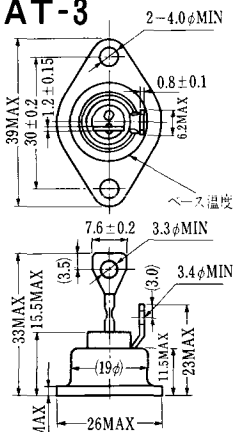


T1端子:ファストン250($T=6.35$, $t=0.8$, $\phi=1.65$)
T2端子:ファストン250($T=6.35$, $t=0.8$, $\phi=1.65$)
G端子:ファストン187($T=4.75$, $t=0.5$, $\phi=1.3$)

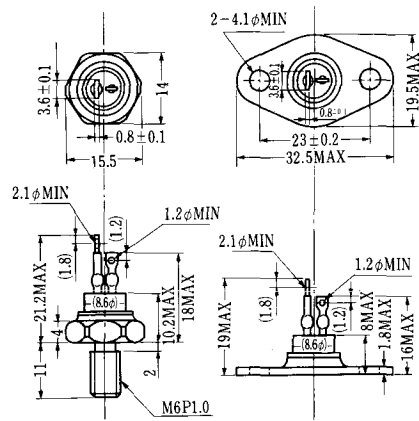
SAT-2



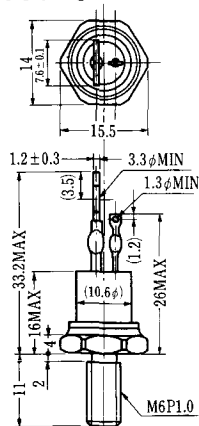
SAT-3



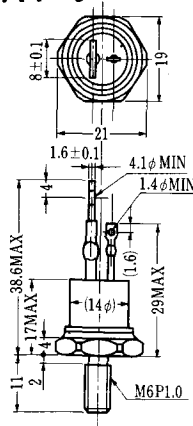
SAT-4



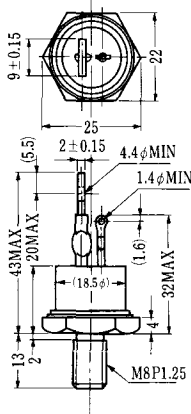
SAT-5



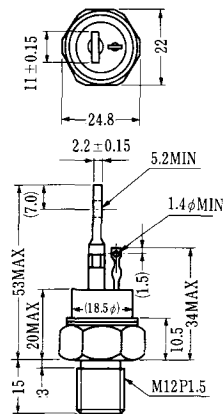
SAT-6



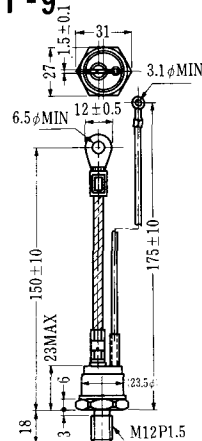
SAT-7



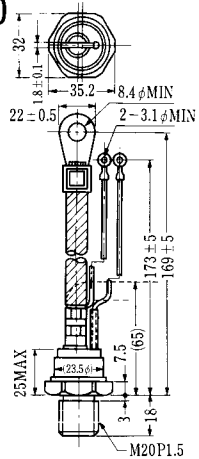
SAT-8



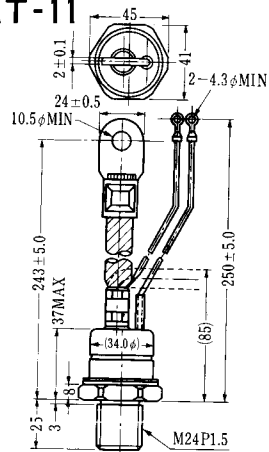
SAT-9.



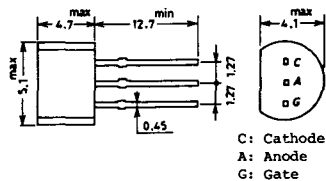
SAT-10



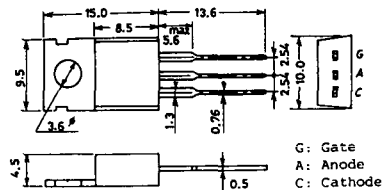
SAT-11



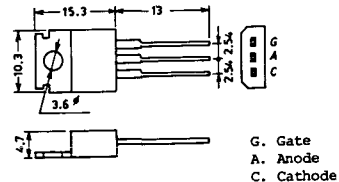
SY-1(1096A)



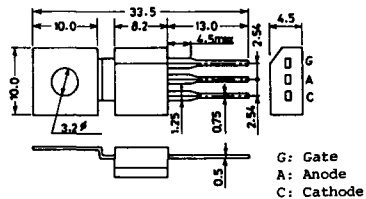
SY-2(1151)



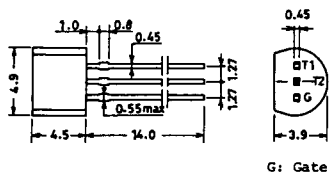
SY-3(1104)



SY-4(1150)

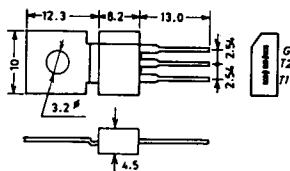


1097A

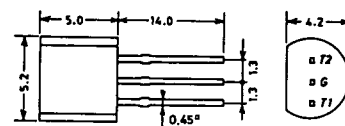


G: Gate

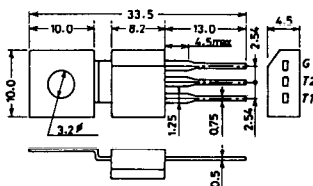
1102



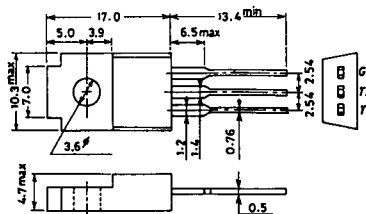
1141



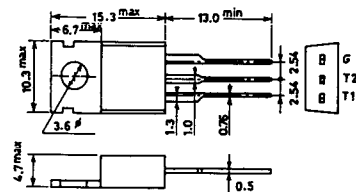
1142



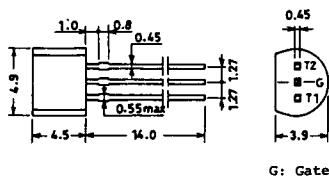
1144



1155

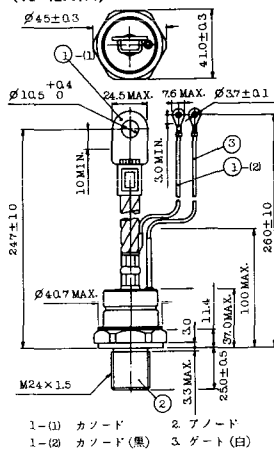


1192A

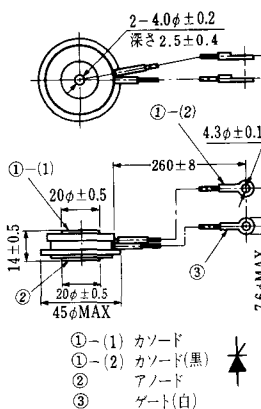


G: Gate

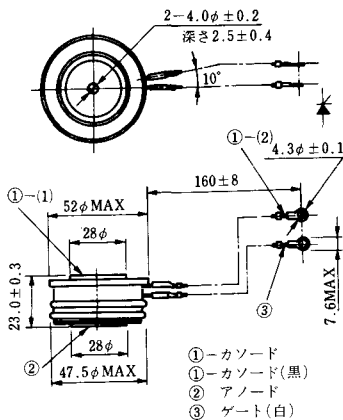
T-17 (13-42A1A)



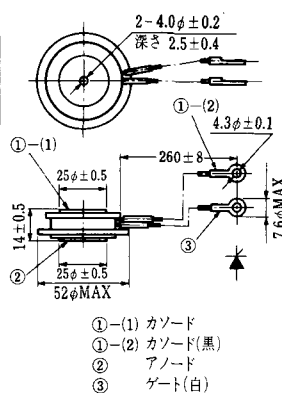
T-18 (13-45D1A)



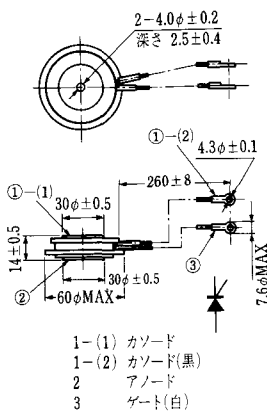
T-19 (13-52B1A)



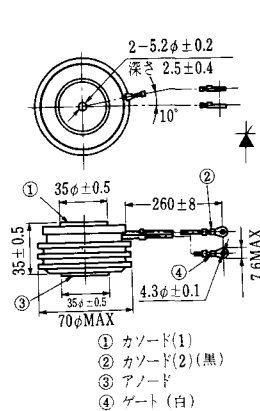
T-20 (13-52C1A)



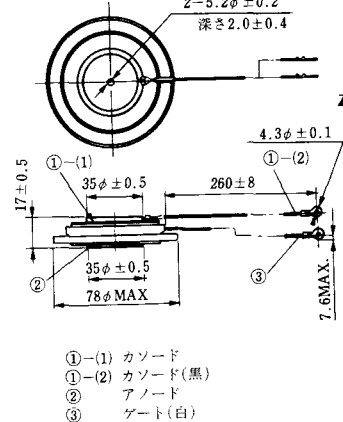
T-21 (13-60A1A)



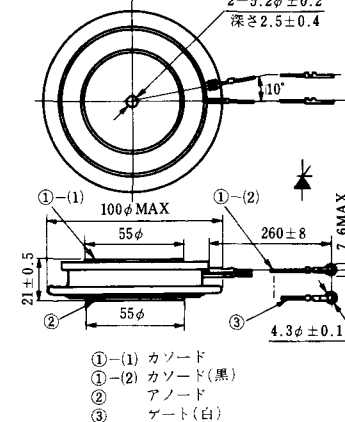
T-22 (13-70C1A)



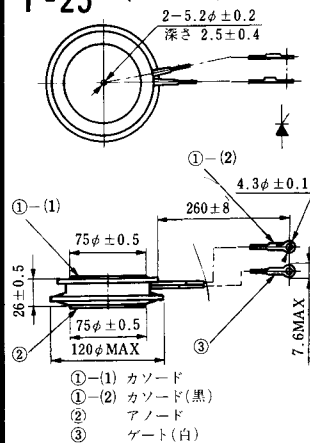
T-23 (13-78A1A)



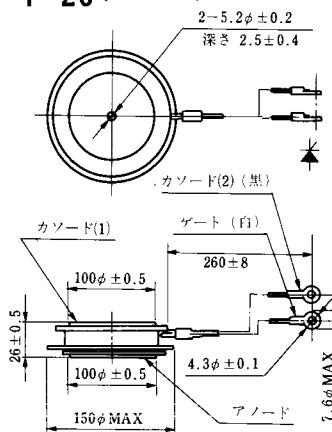
T-24 (13-100C1A)



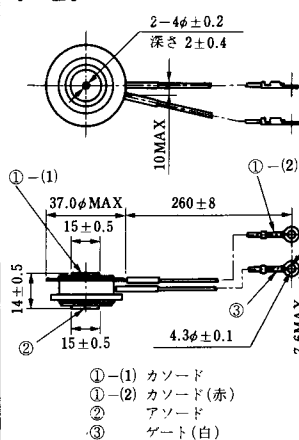
T-25 (13-120A2A)



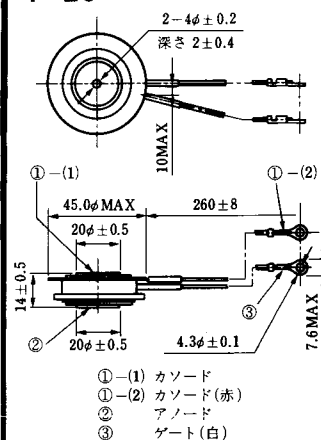
T-26 (13-150A1A)



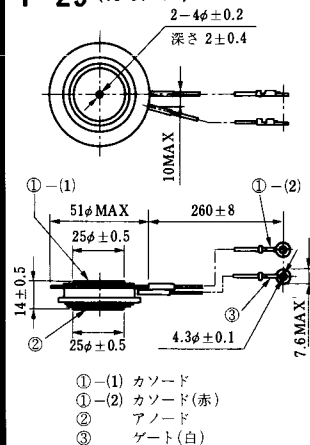
T-27 (13-37A1A)



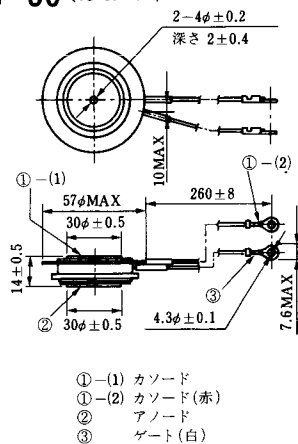
T-28 (13-45E1A)



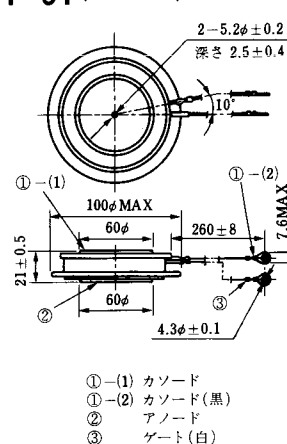
T-29 (13-51A1A)



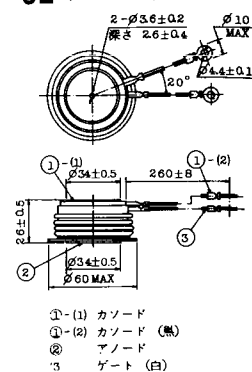
T-30 (13-57A1A)



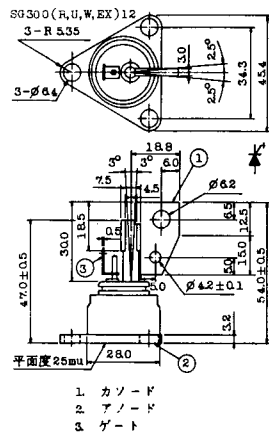
T-31 (13-100E1A)



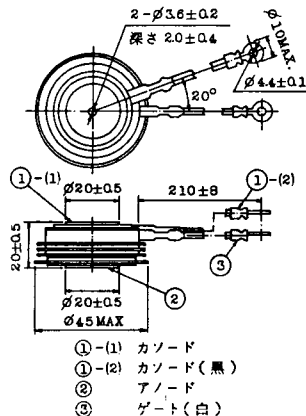
T-32 (13-60E3A)



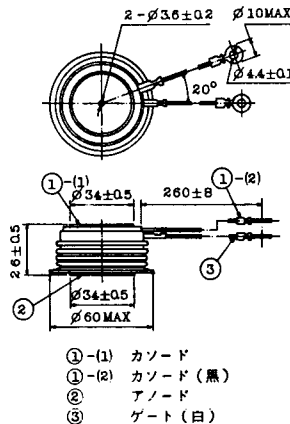
T-41 (13-28A2A)



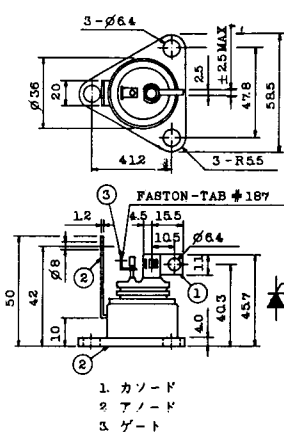
T-42 (13-45F1A)



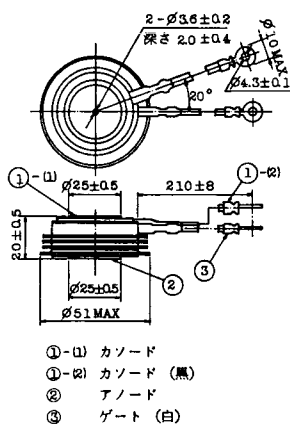
T-43 (13-60E2A)



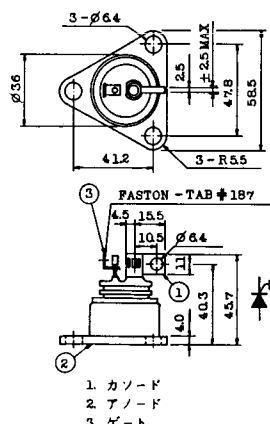
T-44 (13-36A1A)



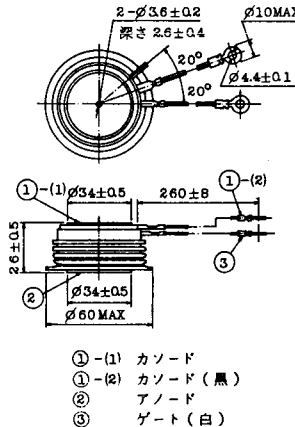
T-45 (13-51B1A)



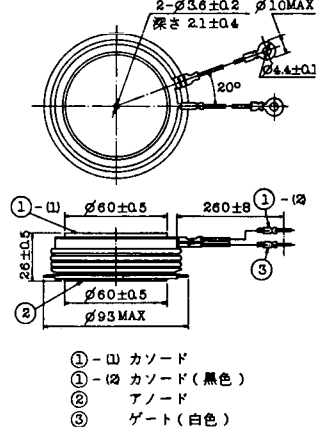
T-46 (13-36B1A)



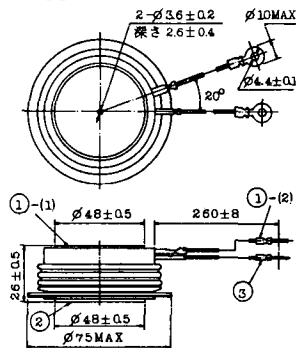
T-47 (13-60E1A)



T-48 (13-93C1A)

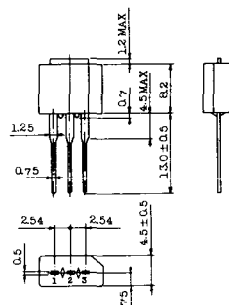


T-49 (13-75A1A)



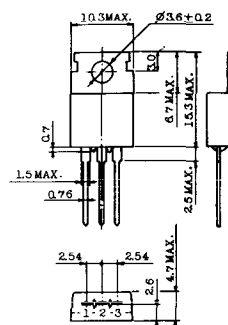
- 1-(1) カソード
1-(2) カソード (黒)
2 アノード
3 ゲート (白)

T-50 (13-10A3A)



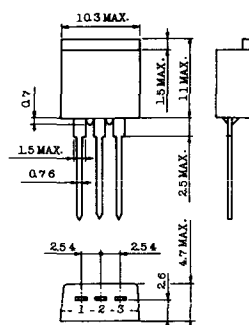
- 1 カソード
2 アノード
3 ゲート

T-51 (13-10D1A)



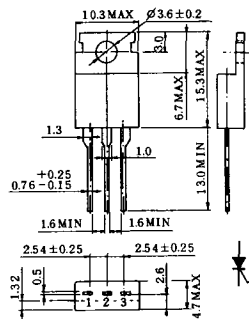
- 1 カソード
2 アノード
3 ゲート

T-52 (13-10D2A)



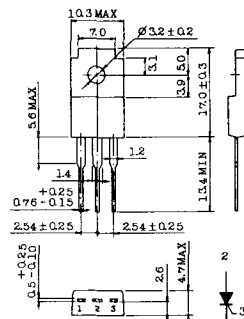
- 1 カソード
2 アノード
3 ゲート

T-53 (13-10E1B)



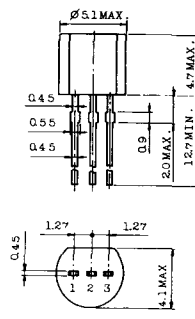
- 1 カソード
2 アノード
3 ゲート

T-54 (13-10F1B)



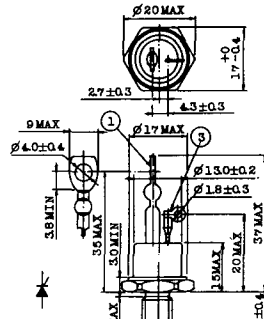
- 1 カソード
2 アノード
3 ゲート

T-55 (13-5A1D)



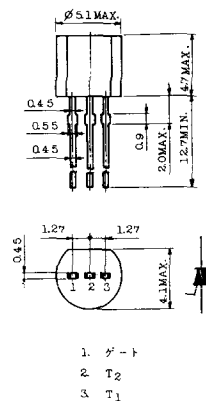
- 1 カソード
2 ゲート
3 アノード

T-56 (13-13C1A)

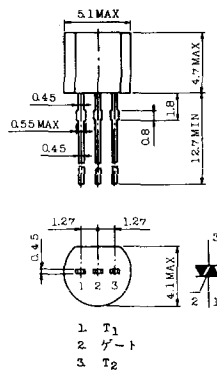


- 1 カソード
2 アノード
3 ゲート

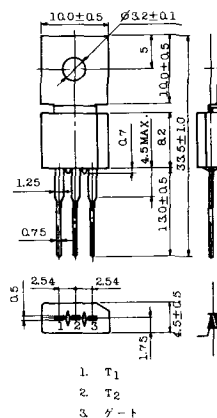
TT-1



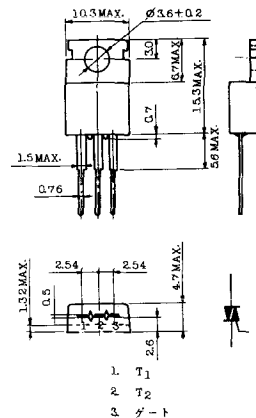
TT-2



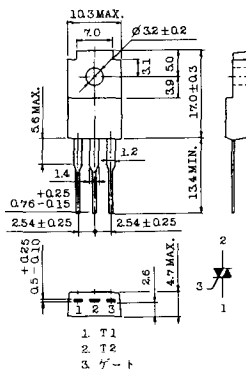
TT-3



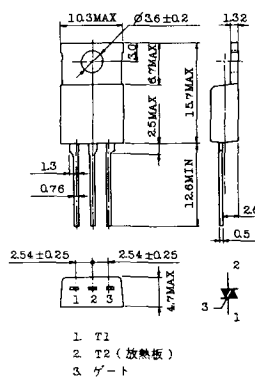
TT-4



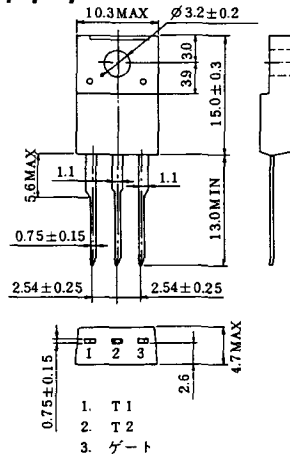
TT-5



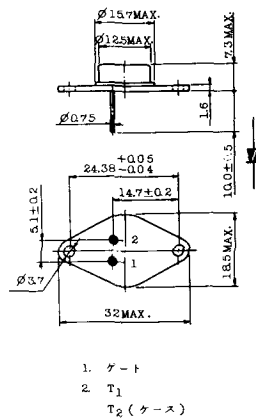
TT-6



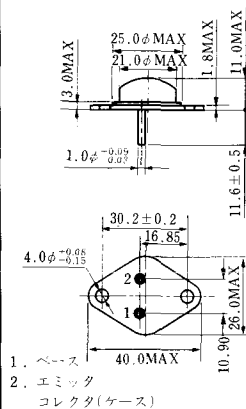
TT-7



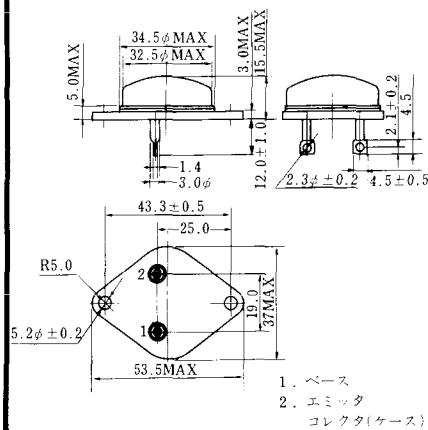
TT-8



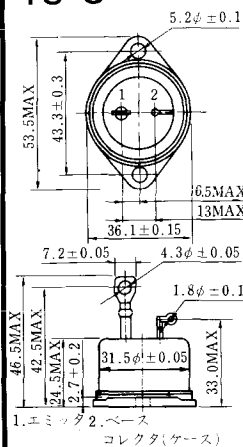
TS - 1



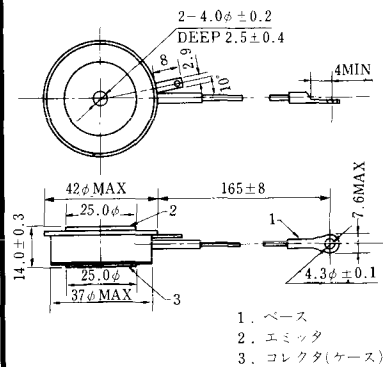
TS - 2



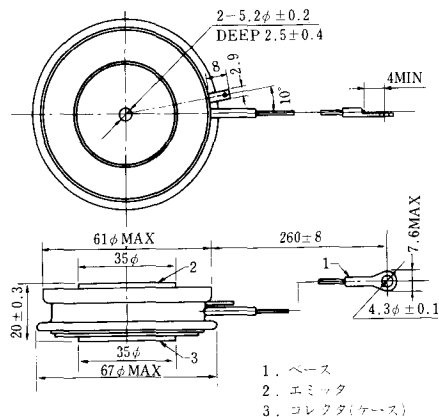
TS-3



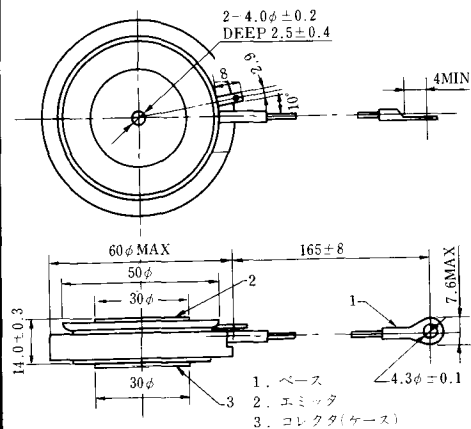
TS-4



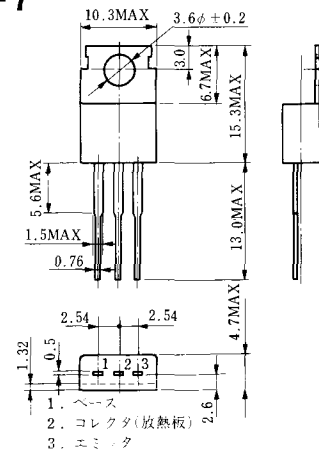
TS-5

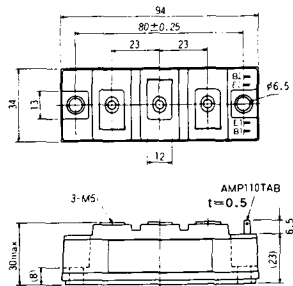
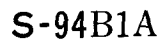
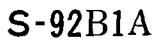
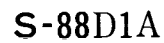
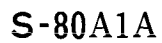


TS-6

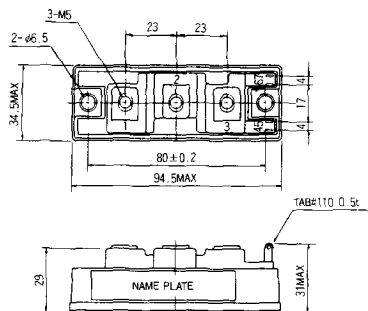


TS-7

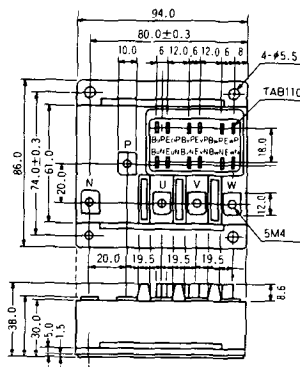




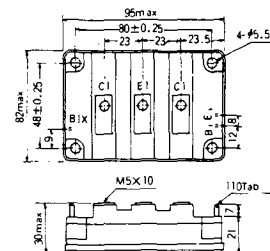
S-94B2A



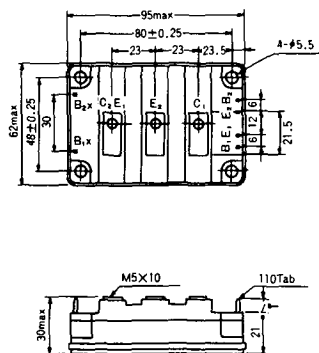
S-94D1A



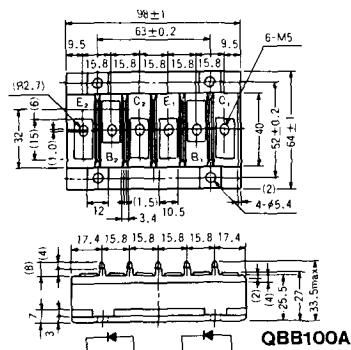
S-95A1A



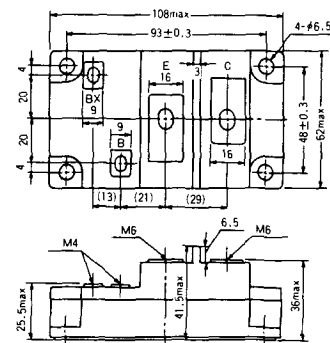
S-95B1A



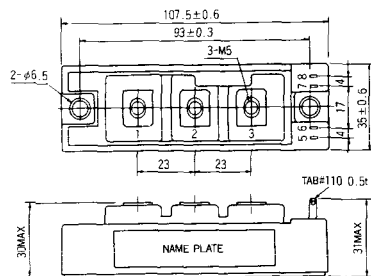
S-98B1B



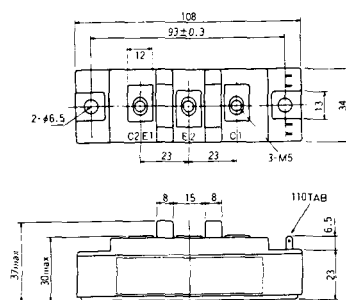
S-108A2A



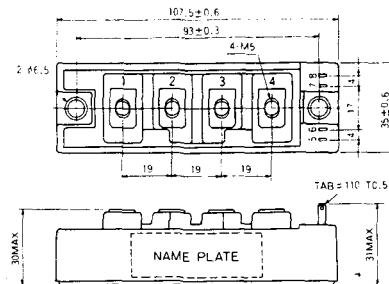
S-108B1A



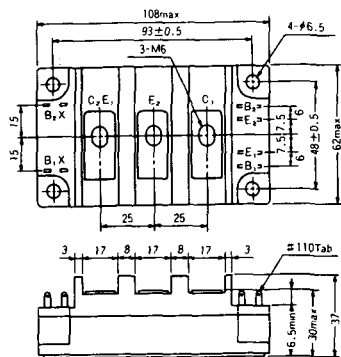
S-108B1B



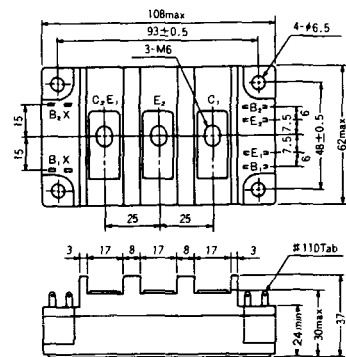
S-108B1C



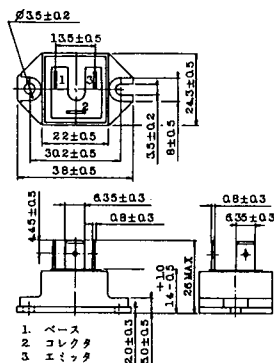
S-108B2A



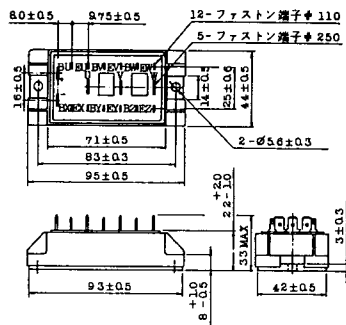
S-108B2B



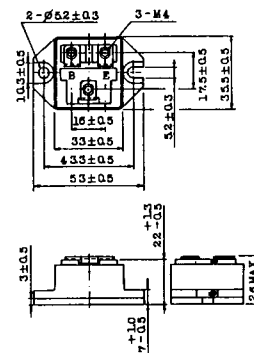
2-22B1A



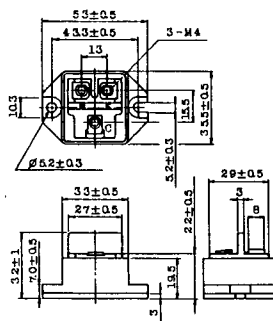
2-27A4A



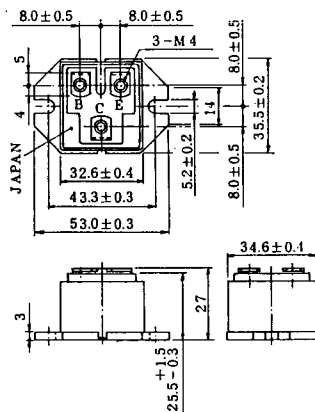
2-33C1A



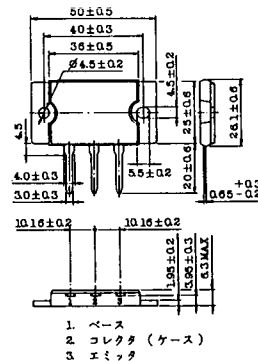
2-33D1A



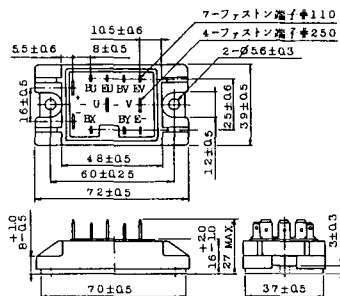
2-33F1A



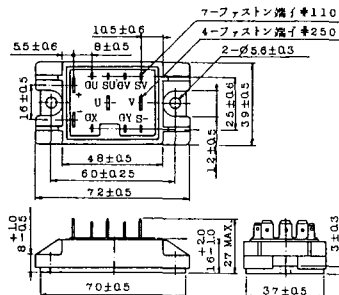
2-37A1A



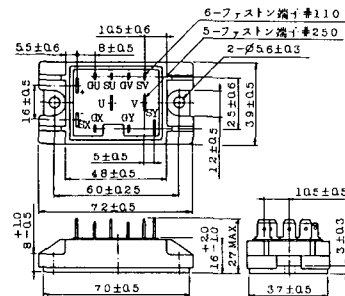
2-48A3A



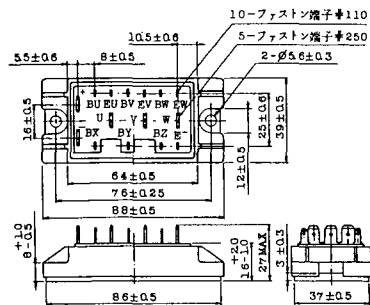
2-48A3B



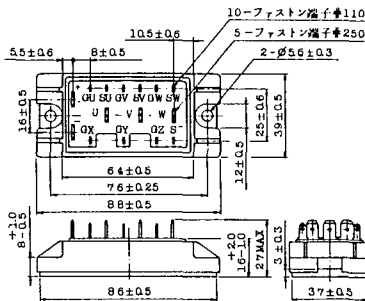
2-48A4A



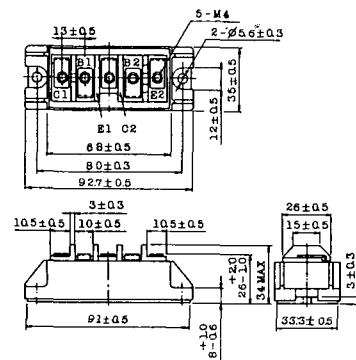
2-64A2A



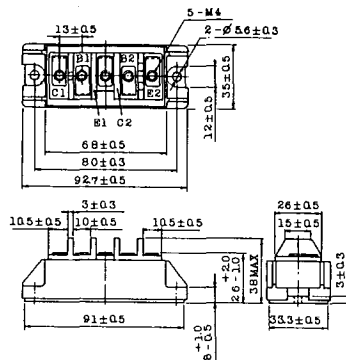
2-64A2B



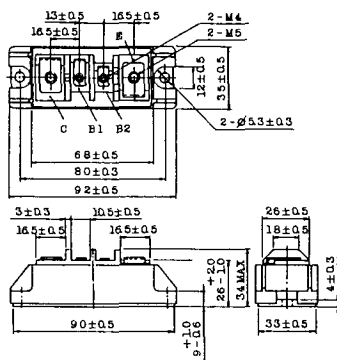
2-68A2A



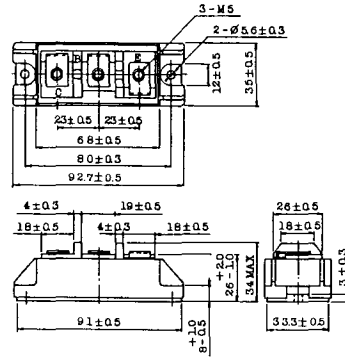
2-68B2A



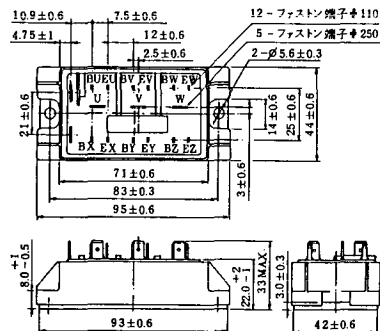
2-68C1A



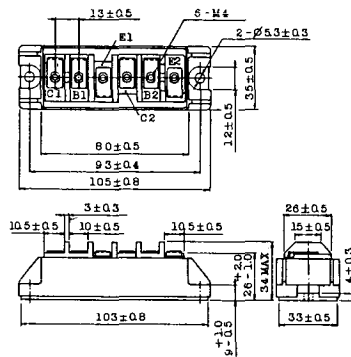
2-68D2A



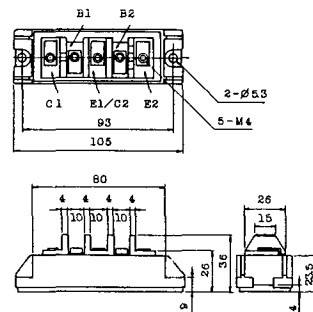
2-72A3A



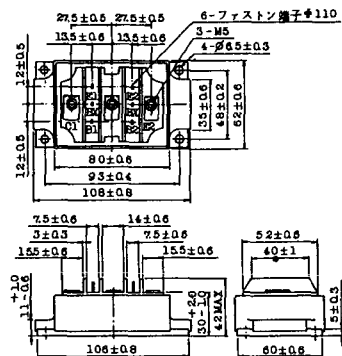
2-80A1A



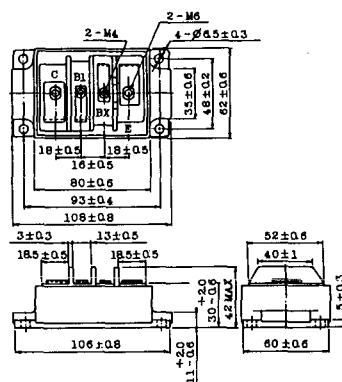
2-80B1A



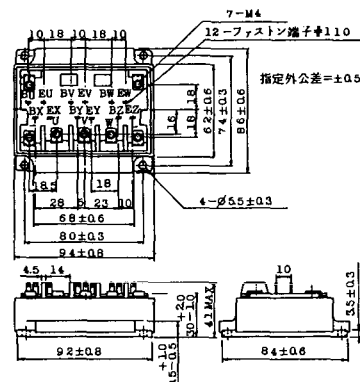
2-80C1A



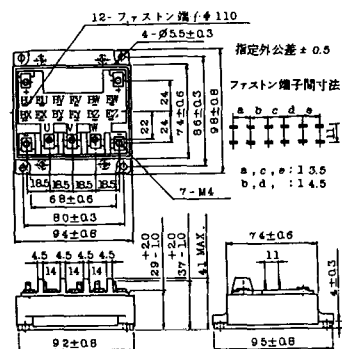
2-80D2A



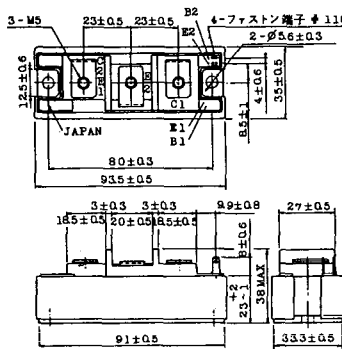
2-94A2A



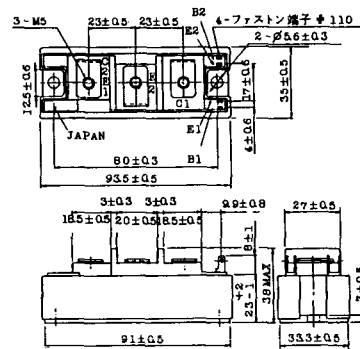
2-94B1A



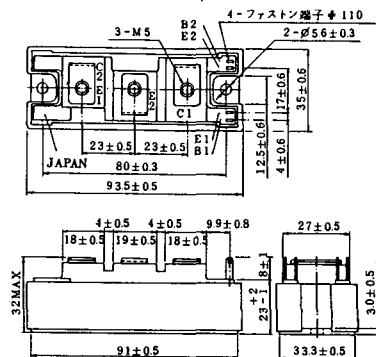
2-94C2A



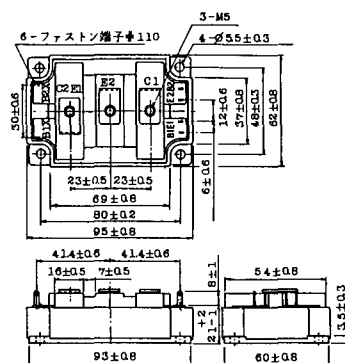
2-94C3A



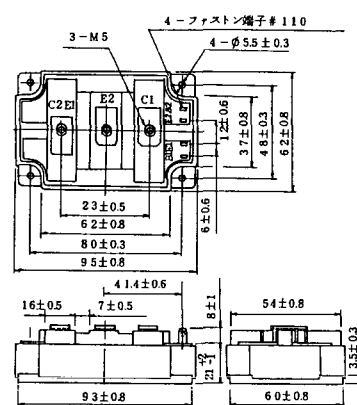
2-94D1A



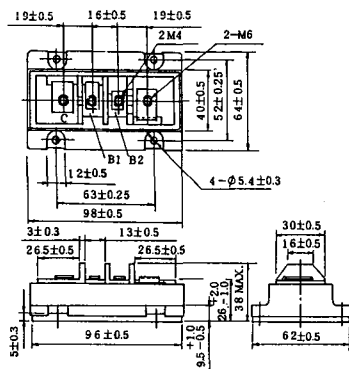
2-96A3A



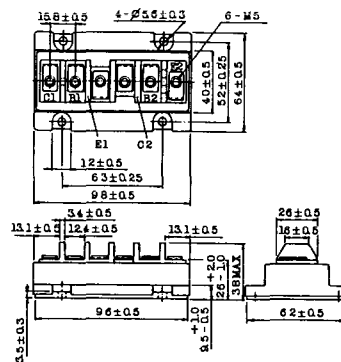
2-96A4A



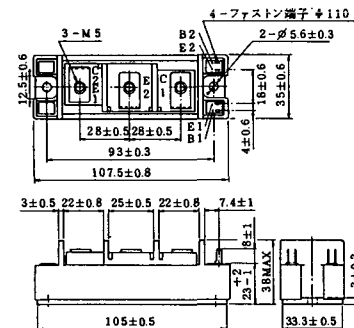
2-98B1A



2-98C2A

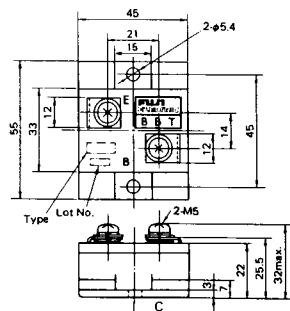


2-108A2A



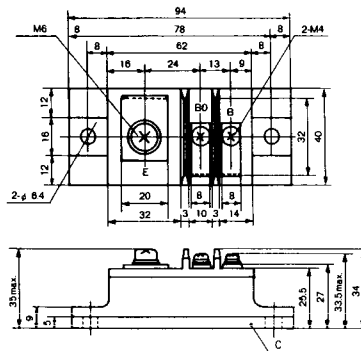
BBT-II

BBTII
1D200A-020



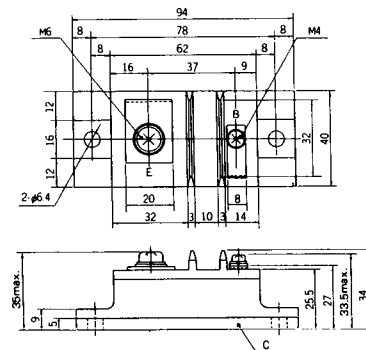
BBT-III

BBTIII
ETN31-055
ETN36-030
ETN36-030
ETN35-030



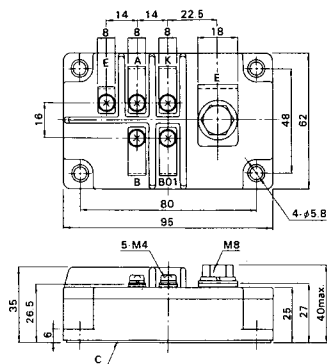
BBT-III

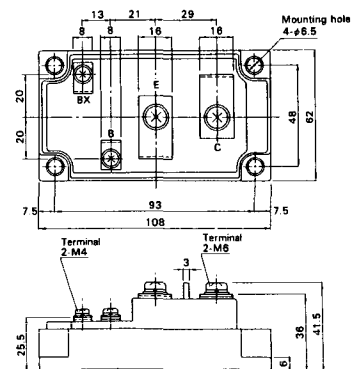
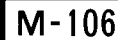
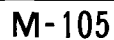
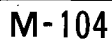
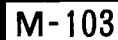
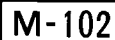
BBTIII
ETN01-055
ET1257



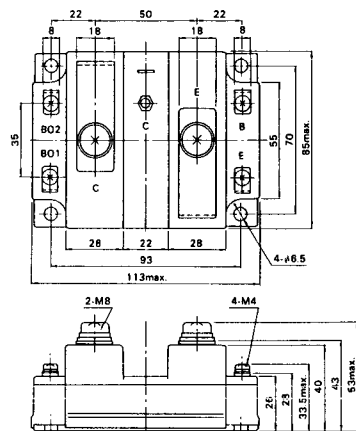
BBT-IV

BBTIV
1D500A-030

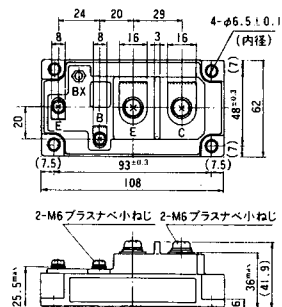




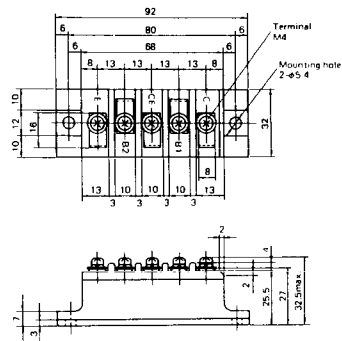
M-107



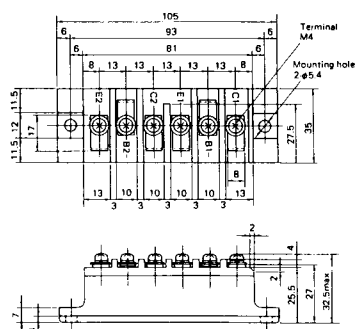
M-116



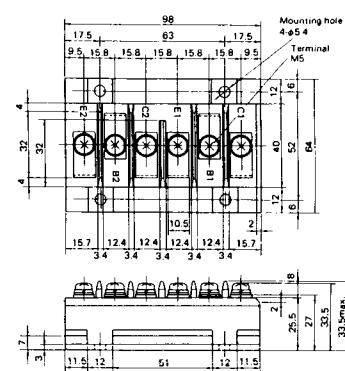
M-201



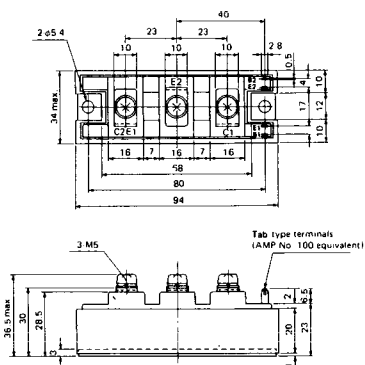
M-202



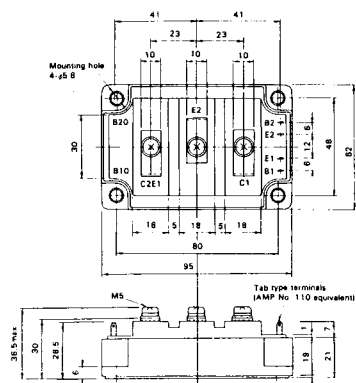
M-203



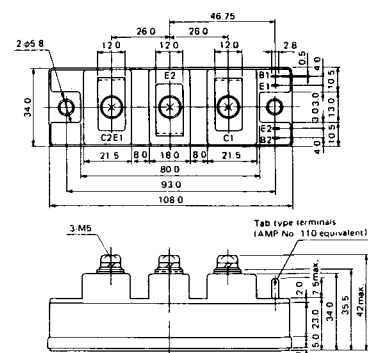
M-204



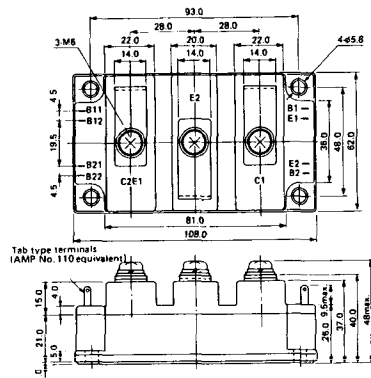
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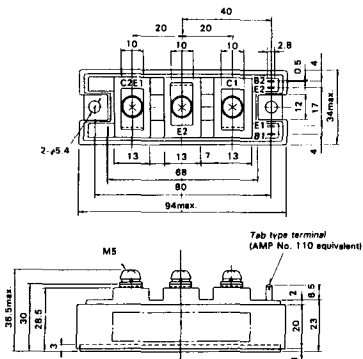
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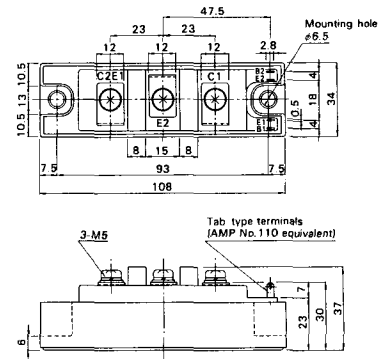
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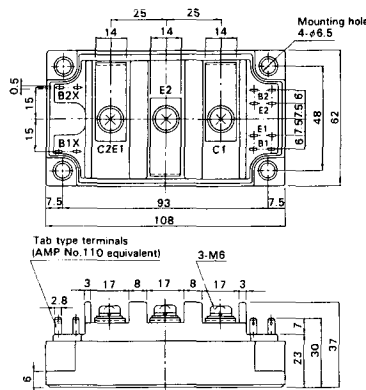
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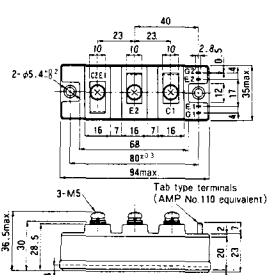
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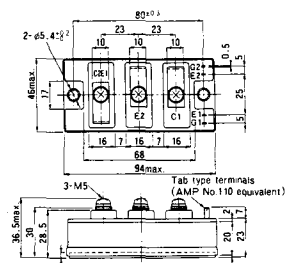
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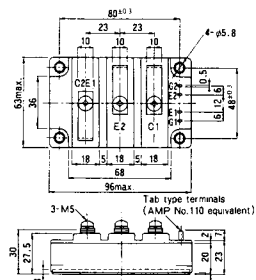
M-211



M-212

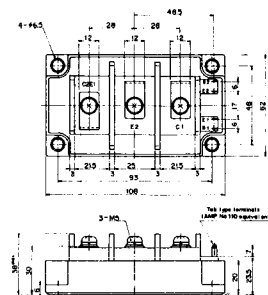


M-213

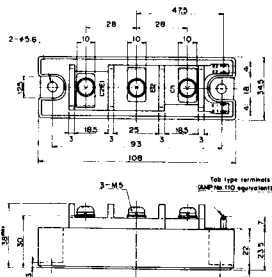


M-214

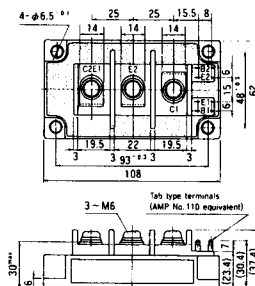
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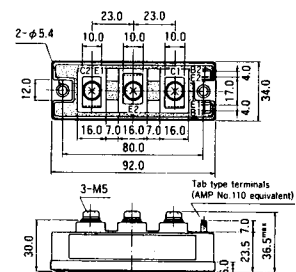
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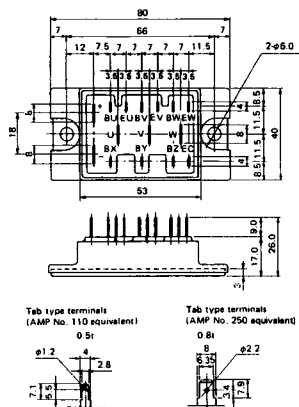
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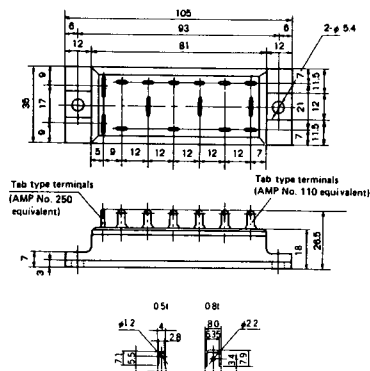
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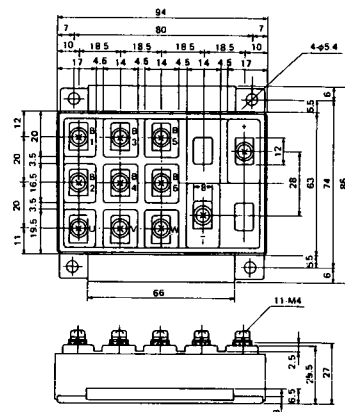
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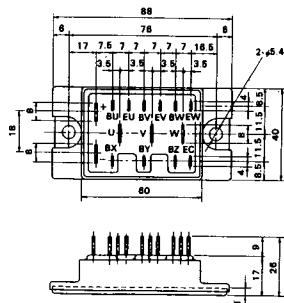
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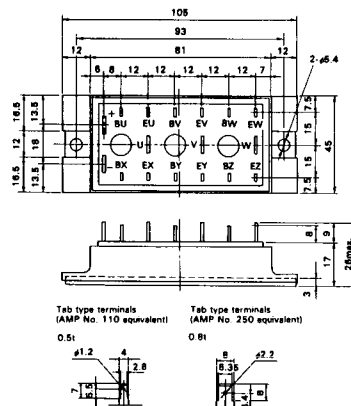
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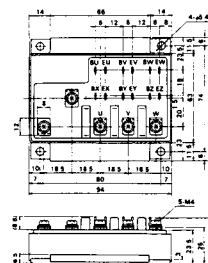
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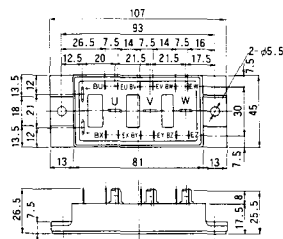
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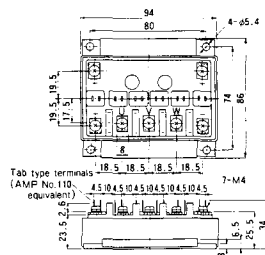
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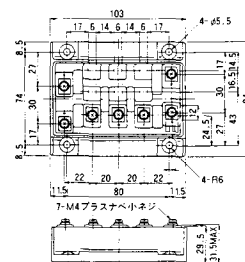
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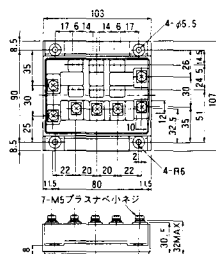
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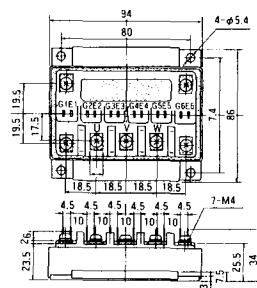
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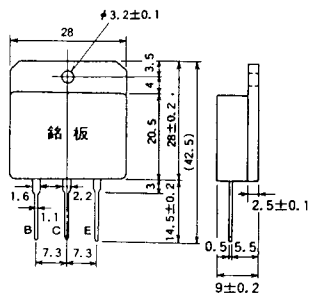
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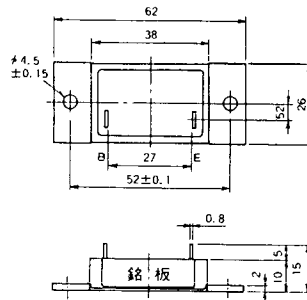
M-616



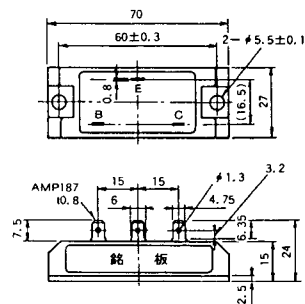
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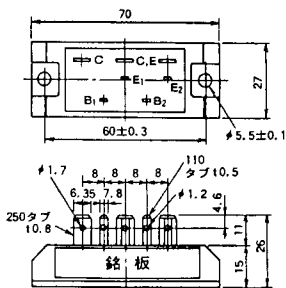
M-2A1A



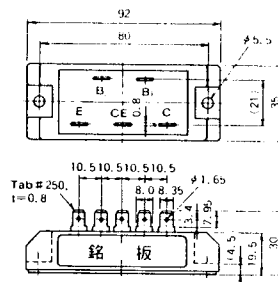
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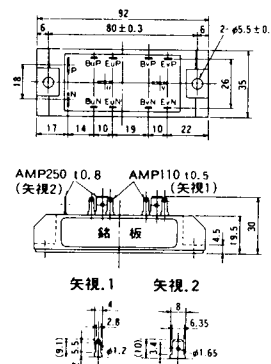
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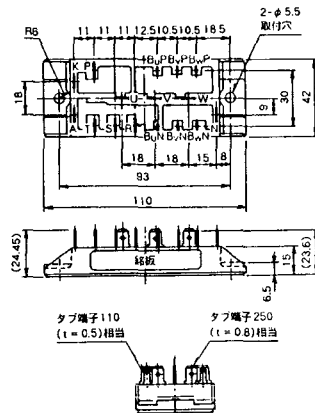
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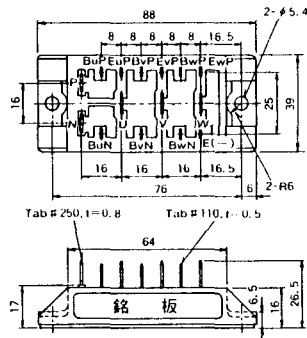
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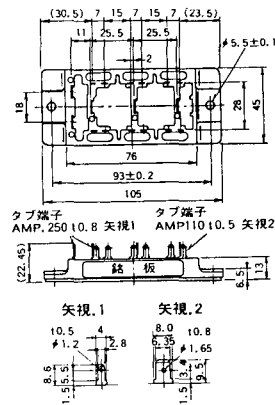
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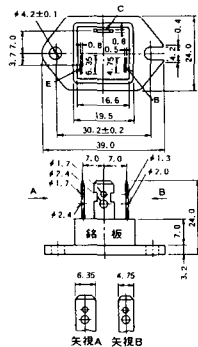
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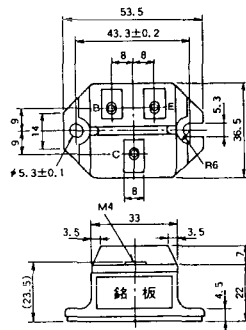
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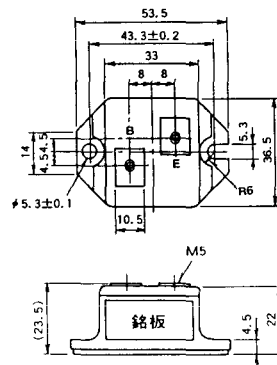
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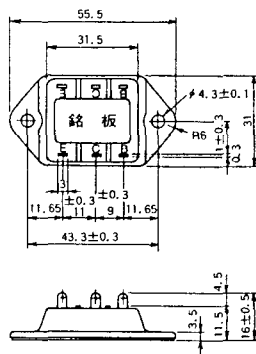
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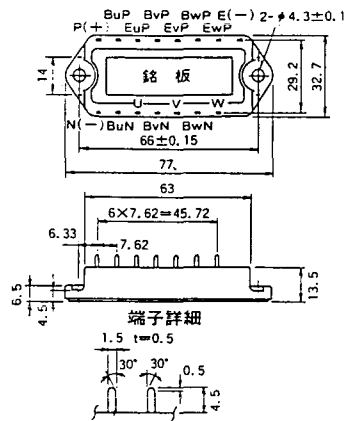
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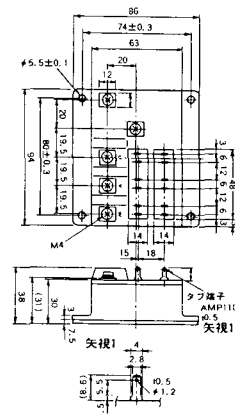
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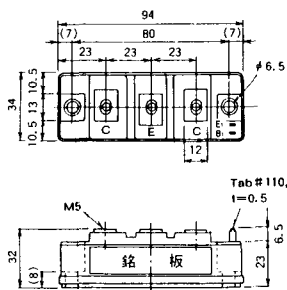
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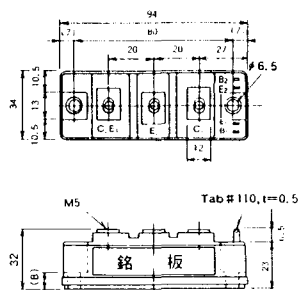
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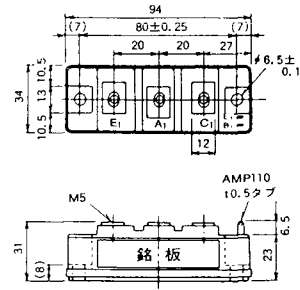
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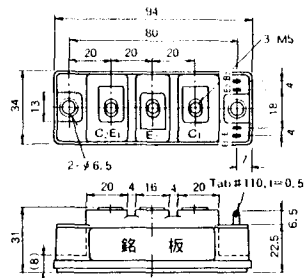
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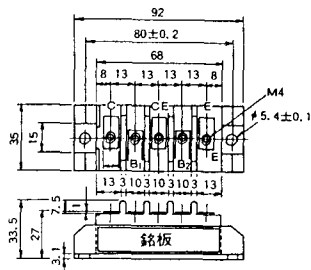
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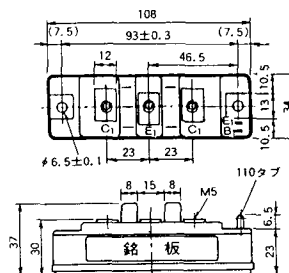
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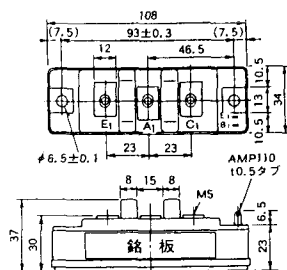
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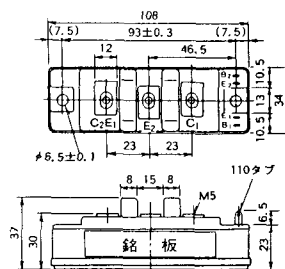
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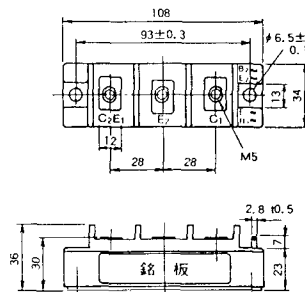
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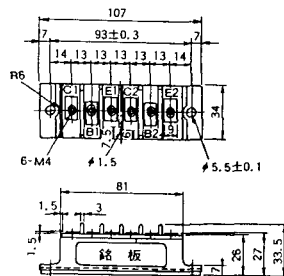
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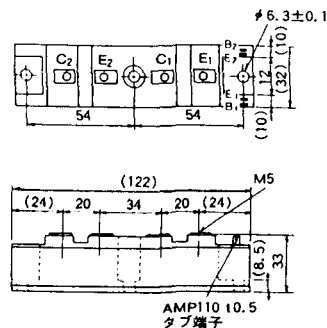
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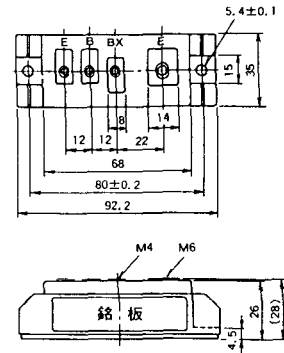
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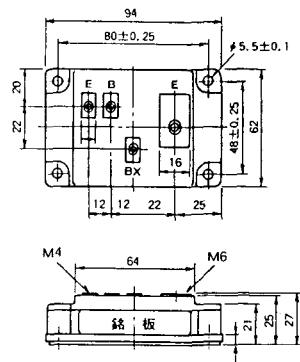
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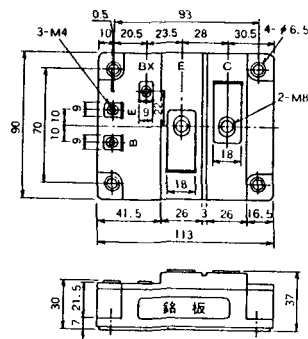
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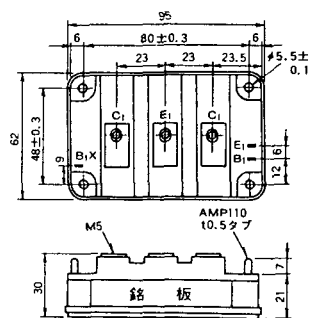
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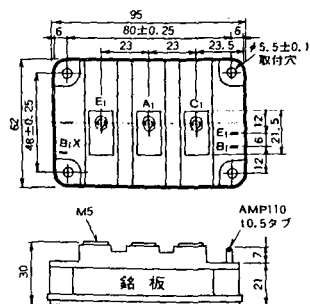
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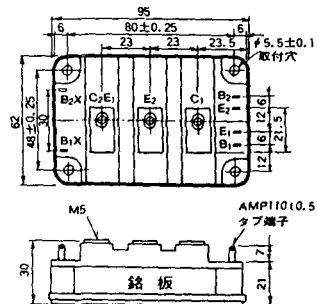
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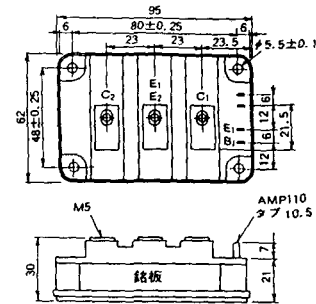
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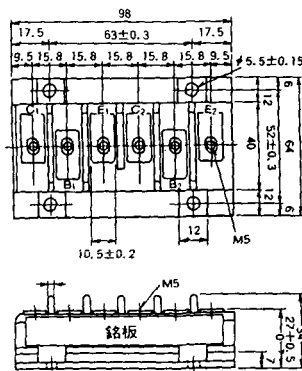
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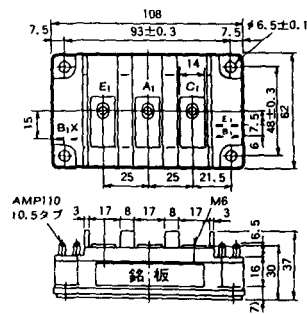
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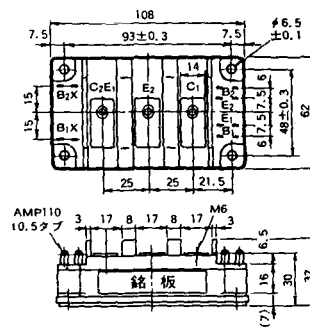
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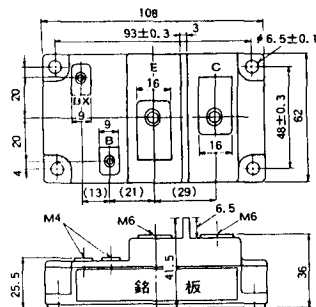
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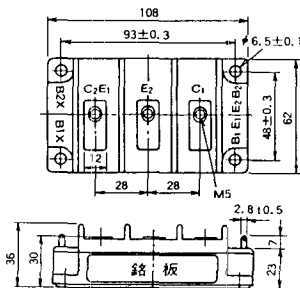
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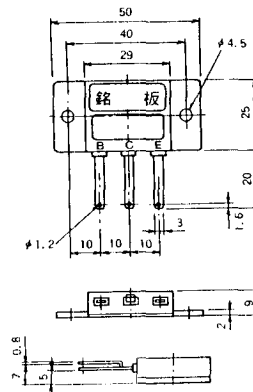
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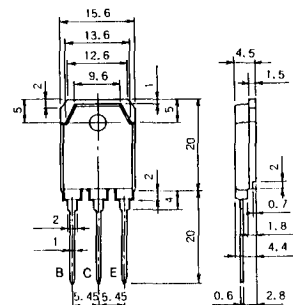
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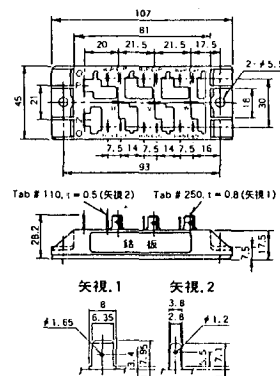
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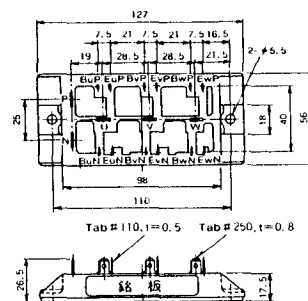
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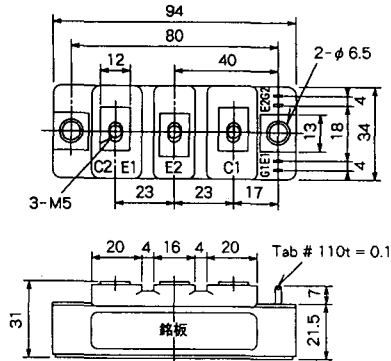
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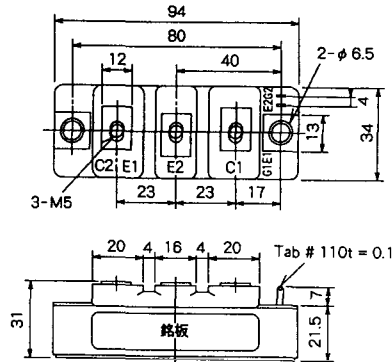
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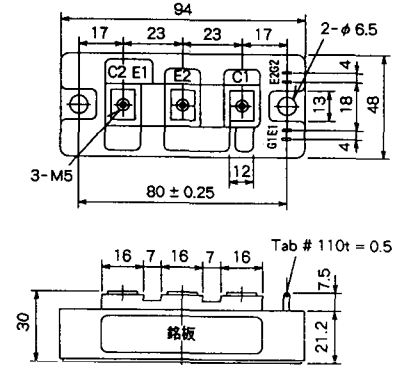
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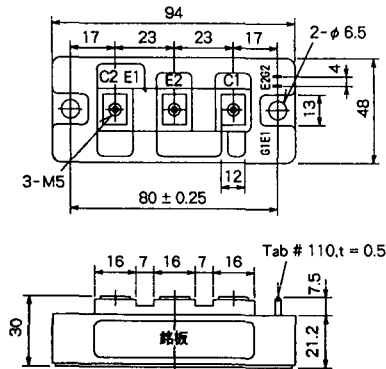
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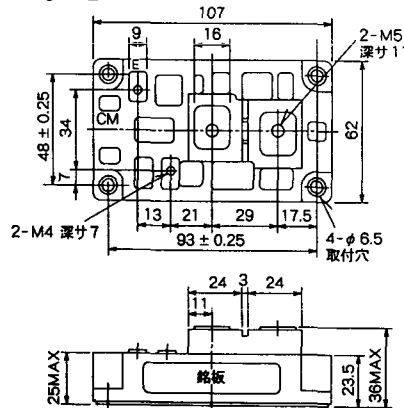
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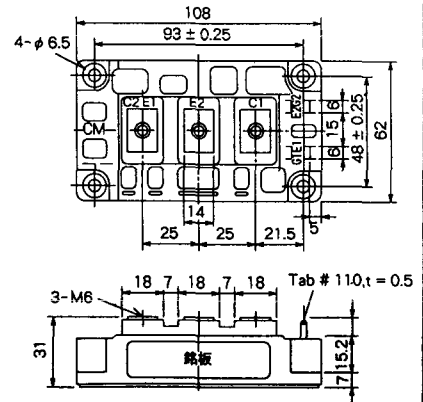
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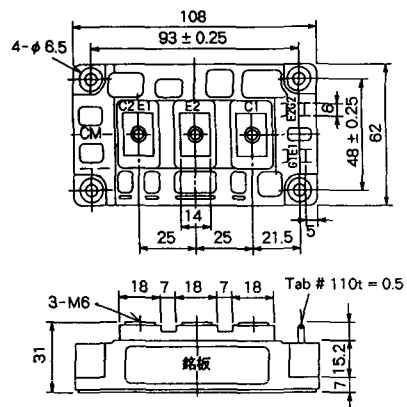
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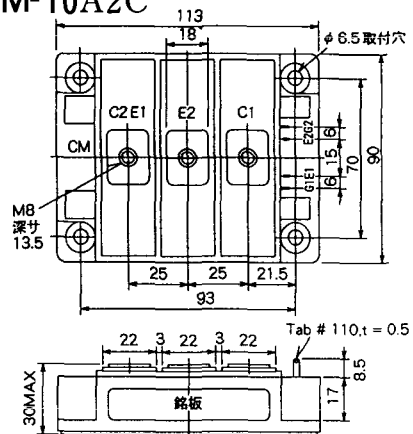
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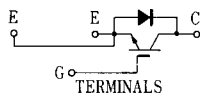
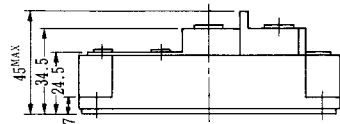
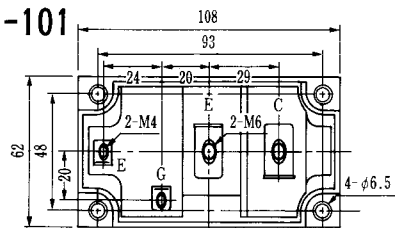
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M-10A2C



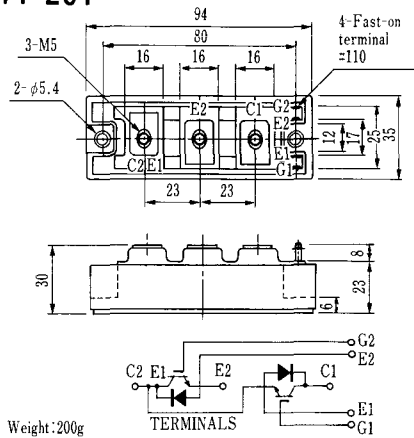
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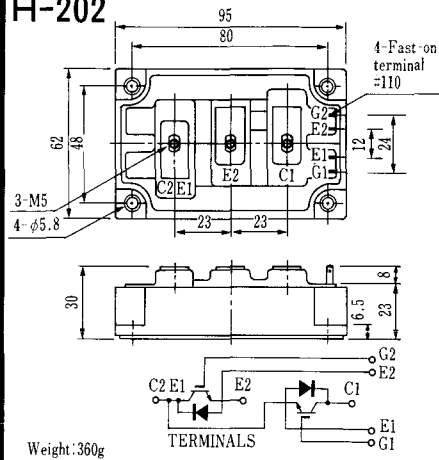
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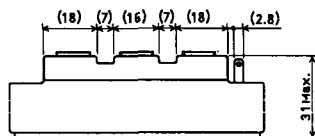
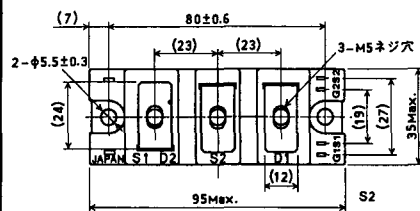
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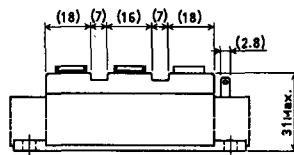
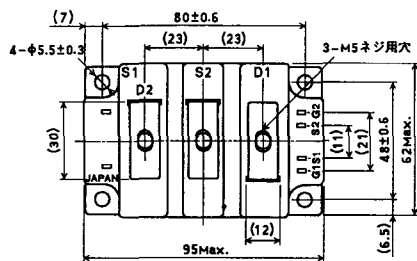
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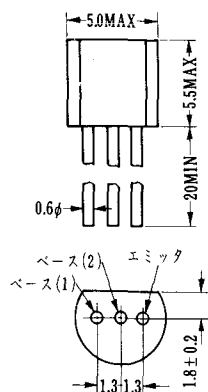
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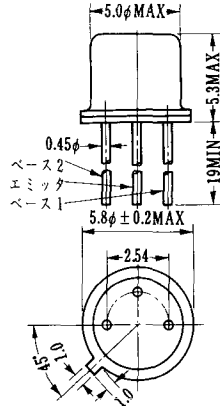
LF-K



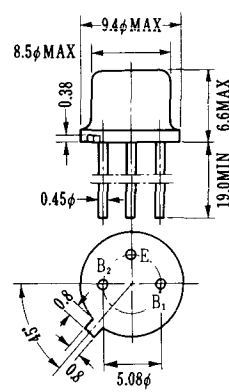
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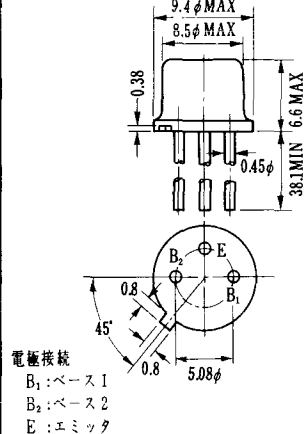
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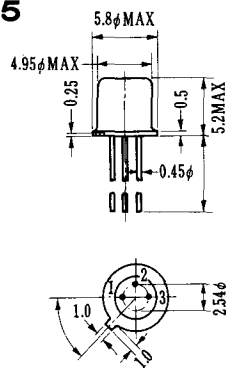
U-3



U-4

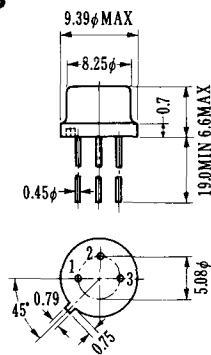


U-5



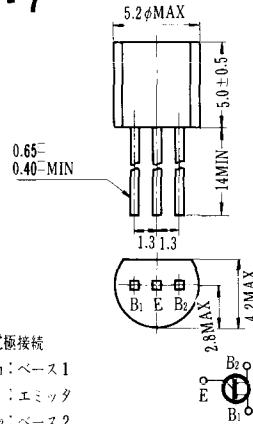
1. BASE 1
2. EMITTER
3. BASE 2 (CASE)

U-6



1. BASE (2)
2. EMITTER
3. BASE (1)

U-7



U-8

