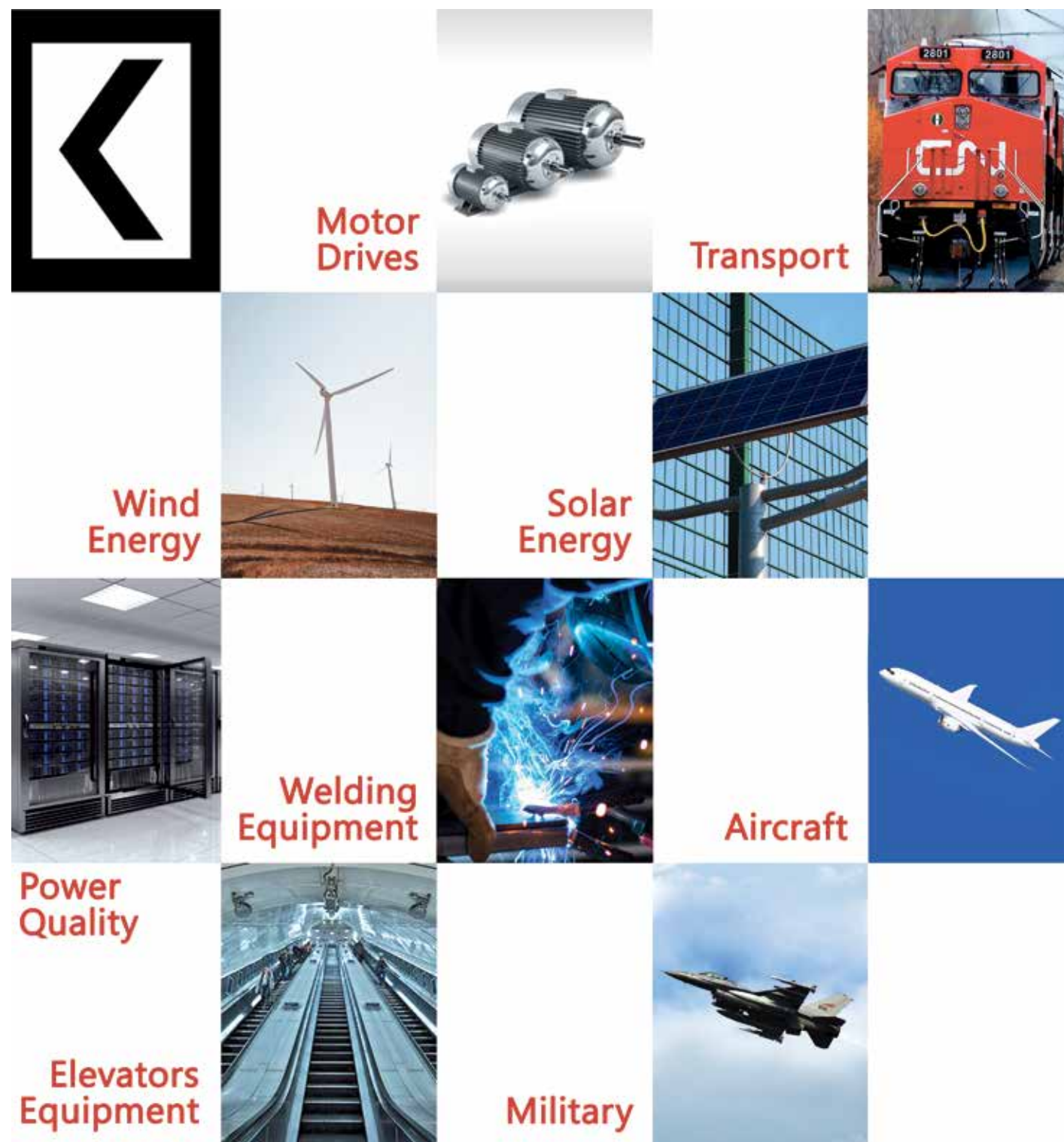
 **KUBARA** **LAMINA**

High Power Semiconductors
Microwave Products

Applications



KUBARA LAMINA

The tradition of KUBARA LAMINA dates back to 1957 in which Zakłady Lamp Nadawczych LAMINA was established. After numerous ownership transformations, the company is now a joint stock company called KUBARA LAMINA S.A.

Over the past 60 years, KUBARA LAMINA has played a pivotal part in the development of power semiconductor devices: diodes, thyristors, insulated modules, power bloks.

KUBARA LAMINA is one of the leading suppliers of power semiconductors with production facilities in Poland. Applications include: power supplies, power quality, transport equipment, renewable energies (wind, solar) automation technologies, welding, elevators equipment and military.

The second important department is the production of microwave product, above all, microwave tubes used in transmitter modules of radiolocation stations and related R & D Center.

We are the partner in the power electronics market. For long term mutual benefits we deliver first-class performance in everything we do. We make our business grow sustainably and profitably. We are a partner for our customer in order to understand their challenges and provide answers and valuable help for the tasks they undertake.

PRODUCT GROUPS

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Power Modules



KUBARA LAMINA thyristor / diode modules are offered in a variety of dual topologies for almost all phase control for rectifier applications.

The product class offers a product range with voltages from 400 V up to 1800 V and a current range from 100 A to 1000 A. The target applications for the thyristor, thyristor/diode or diode modules include input rectifiers for inverters or UPS systems, soft start applications and control system. Thanks to the comprehensive product range, the optimal solution for each applications can be found.

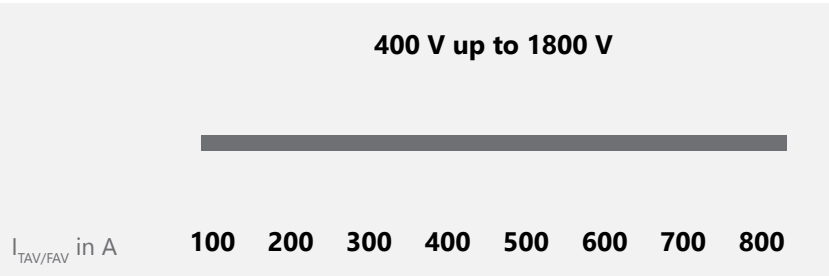
Key features

- Over 60 years of market experience
- Wide power and topology range
- 400 V up to 1800 V
- 100 A up to 1000 A

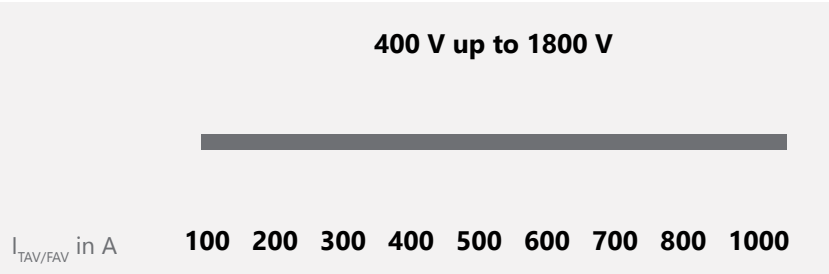
Further information: www.kubaralamina.com

Power Modules

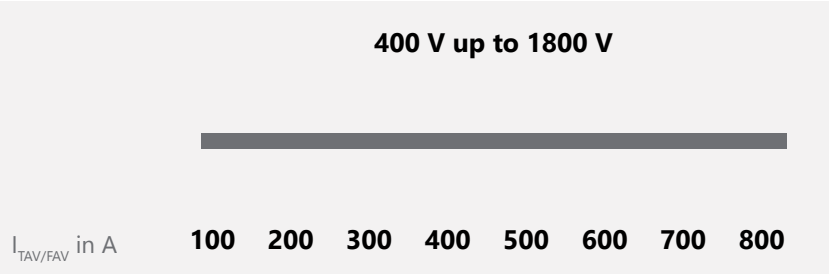
Thyristor Modules



Diode Modules



Diode - Thyristor Modules

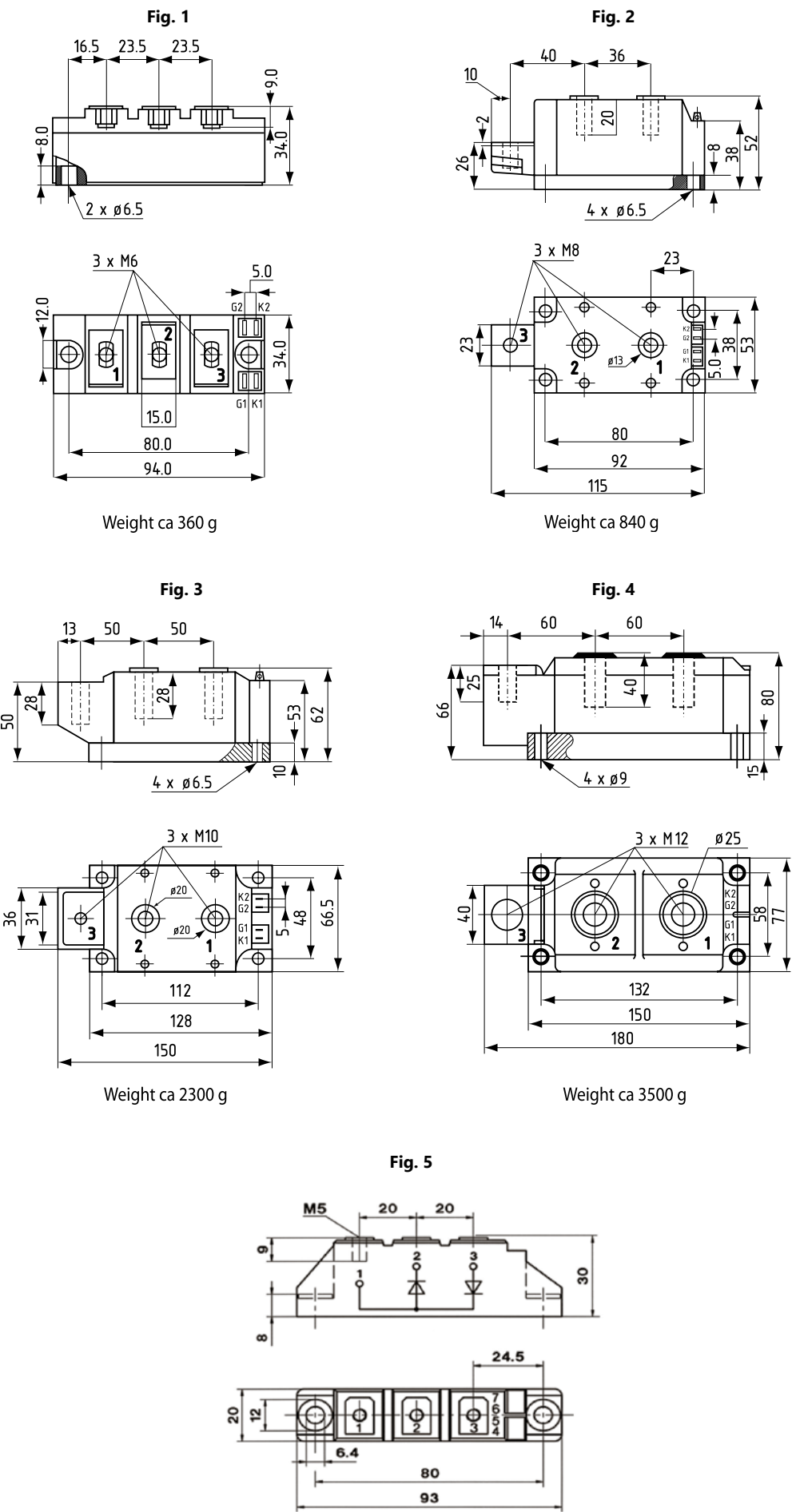


Power Modules

DUAL THYRISTOR MODULES																
Type	$I_{T(AV)} / T_c$ (A) / (°C)	I_{TSM} 10 ms (kA)	I^2t 10 ms (kA²s)	$U_{DRM} U_{RRM}$ $T_j = 125\text{ °C}$ (V)	$I_{DRM} I_{RRM}$ $T_j = 125\text{ °C}$ (V)	$U_{T(TO)}$ $T_j = 125\text{ °C}$ (V)	r_T $T_j = 125\text{ °C}$ (mΩ)	U_{TM} / I_{TM} $T_j = 25\text{ °C}$ (V) / (A)	I_{GT} (mA)	U_{GT} (V)	du/dt (min.) (V/μs)	R_{thjc} DC (°C/W)	R_{thcr} DC (°C/W)	$T_{jmin} - T_{jmax}$ (°C)	Conf.	Fig.
MT_-100	106/85	2,25	25	400-1600	20	0,9	2,0	1,65/300	100	3	320	0,28	0,2	-40...+125	Tab. 1	5
MT_-150	150/85	4,2	88	400-1600	20	0,915	1,4	1,7/625	150	3	320	0,17	0,1	-40...+125	Tab. 1	1
MT_-170	170/85	5	125	400-1600	20	0,83	1,03	1,4/625	150	3	320	0,17	0,1	-40...+125	Tab. 1	1
MT_-260	260/85	7	245	400-1600	30	0,84	0,67	1,7/1500	150	3	320	0,11	0,04	-40...+125	Tab. 2	2
MT_-300	300/85	8	320	400-1600	30	0,7	0,55	1,4/1500	150	3	320	0,11	0,04	-40...+125	Tab. 2	2
MT_-500	500/85	17	1445	400-1800	60	0,7	0,44	1,31/1500	200	3	320	0,06	0,02	-40...+125	Tab. 2	3
*MT_-800	800/85	28	4100	400-1600	60	0,78	0,18	1,25/1500	200	3	320	0,06	0,02	-40...+125	Tab. 2	4

THYRISTOR - DIODE, DIODE - THYRISTOR MODULES																
Type	$I_{T(AV)} / T_c$ (A) / (°C)	I_{TSM} 10 ms (kA)	I^2t 10 ms (kA²s)	$U_{DRM} U_{RRM}$ $T_j = 125\text{ °C}$ (V)	$I_{DRM} I_{RRM}$ $T_j = 125\text{ °C}$ (V)	$U_{T(TO)}$ $T_j = 125\text{ °C}$ (V)	r_T $T_j = 125\text{ °C}$ (mΩ)	U_{TM} / I_{TM} $T_j = 25\text{ °C}$ (V) / (A)	I_{GT} (mA)	U_{GT} (V)	du/dt (min.) (V/μs)	R_{thjc} DC (°C/W)	R_{thcr} DC (°C/W)	$T_{jmin} - T_{jmax}$ (°C)	Conf.	Fig.
MH_-100	106/85	2,25	25	400-1600	20	0,9	2,00	1,7/300		3	320	0,28	0,2	-40...+125	Tab. 1	5
MH_-150	150/85	4,2	88	400-1600	20	0,915	1,4	1,7/625	150	3	320	0,17	0,1	-40...+125	Tab. 1	1
MH_-170	170/85	5	125	400-1600	20	0,83	1,03	1,4/625	150	3	320	0,17	0,1	-40...+125	Tab. 1	1
MH_-260	260/85	7	245	400-1600	30	0,84	0,67	1,7/1500	150	3	320	0,11	0,04	-40...+125	Tab. 2	2
MH_-300	300/85	8	320	400-1600	30	0,7	0,55	1,4/1500	150	3	320	0,11	0,04	-40...+125	Tab. 2	2
MH_-500	500/85	17	1445	400-1800	60	0,7	0,44	1,31/1500	200	3	320	0,06	0,02	-40...+125	Tab. 2	3
*MH_-800	800/85	28	4100	400-1600	60	0,78	0,18	1,25/1500	200	3	320	0,05	0,02	-40...+125	Tab. 2	4

DUAL DIODE MODULES													
Type	I _{TA(V)} / T _c (A) / (°C)	I _{FSM} 10 ms (kA)	i ² t 10 ms (kA²·s)	U _{RRM} T _j =125 °C (V)	I _{RRM} T _j =125 °C (mA)	U _{FTO} T _j =150 °C (V)	r _F T _j =150 °C (mΩ)	U _{FM} / I _{FM} T _j =25 °C (V) / (A)	R _{thjc} DC (°C/W)	R _{thcr} DC (°C/W)	T _{jmin} -T _{jmax} (°C)	Conf.	Fig.
MD_-100	106/85	2,5	31	400-1600	5	0,85	1,3	1,35/300	0,35	0,2	-40...+125	Tab. 1	5
MD_-170	170/100	5	125	400-1600	30	0,85	1,6	1,85/800	0,18	0,1	-40...+150	Tab. 1	1
MD_-200	200/100	5,5	150	400-1600	30	0,71	1,22	1,6/800	0,18	0,1	-40...+150	Tab. 1	1
MD_-410	410/100	10	500	400-1600	30	0,71	0,3	1,2/1500	0,11	0,04	-40...+150	Tab. 2	2
MD_-470	470/100	11	605	400-1600	30	0,62	0,227	1,1/1500	0,11	0,04	-40...+150	Tab. 2	2
MD_-660	660/100	18	1620	400-1800	50	0,6	0,3	1,1/1500	0,065	0,02	-40...+150	Tab. 2	3
*MD_-1000	1000/100	30	4200	400-1600	50	0,62	0,164	1,1/1500	0,05	0,02	-40...+150	Tab. 2	4



Tab. 1				Tab. 2			
Conf. code	MD	MH	MT	Conf. code	MD	MH	MT
A				A			
B				B			
C				C			
D				D			
E				E			
F				F			
K				K			
L				L			
1				1			
2				2			
3				3			
4				4			
5				5			
6				6			
7				7			
8				8			

2

DISCRETES

Discretes

Discrete components are used in a wide variety of applications. Particular benefits are achieved whenever high current, uncommon topologies, natural cooling or resistance to harsh conditions are required.

The KUBARA LAMINA portfolio includes diodes and thyristors in stud, flat and capsule housings.

Key features

- Standard and fast recovery types
- Stud and disc types
- Compact case with high current capability
- Recommended for forced air and water cooling

Discretes – Diodes _____ 16

Discretes – Thyristors _____ 24

Further information: www.kubaralamina.com

Discrete diodes - KUBARA LAMINA offers diodes in three packaging styles: stud (screw) diodes, flat diodes and capsule type.

The line includes medium current diodes up to 70 A, standard rectifiers with current ratings up to 8000 A, fast rectifiers up to 1500 A.

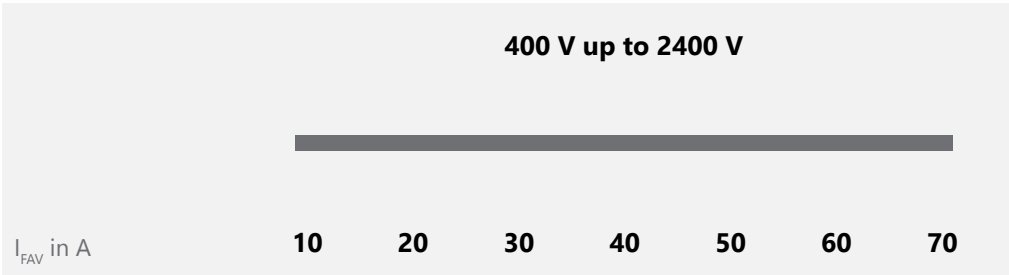
Typicall applications:
all-purpose rectifiers, battery chargers, electroplating, free-wheeling diodes, high-voltage rectifiers, electrostatic filtres, blocking diodes and others.

Discrete diodes

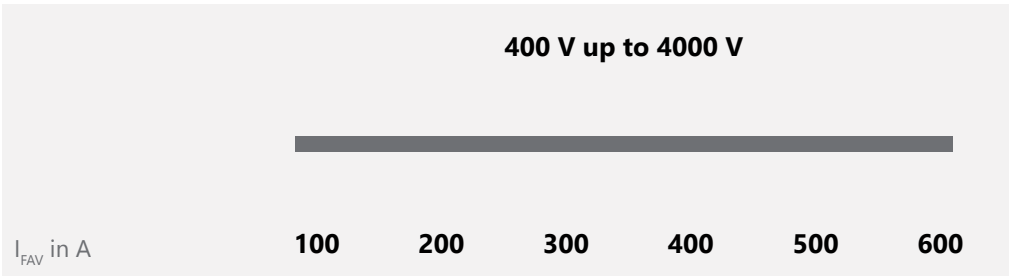
Stud and flat type diodes	18
Capsule	19
Fast recovery diodes	20
Medium current diodes	20

Further information: www.kubaralamina.com

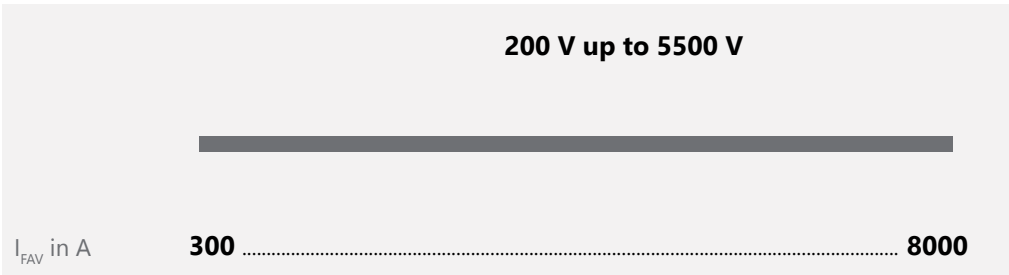
Medium Current Rectifying Diodes



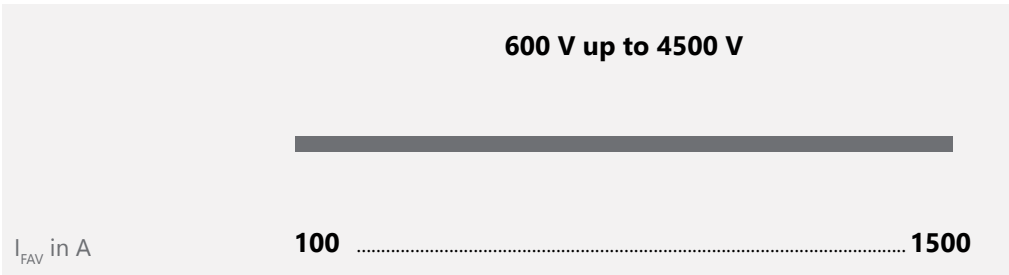
Rectifying Diodes - Stud & Flat Type



Rectifying Diodes - Capsule Type



Fast Recovery Diodes



Discrete Diodes

RECTIFYING DIODES - STUD AND FLAT TYPE														
Type	$I_{F(AV)} / T_c$ (A) / (°C)	I_{FSM} 10 ms (kA)	I^2t 10 ms (kA ² s)	U_{RRM} $T_j = T_{jmax}$ (V)	I_{RRM} $T_j = T_{jmax}$ (V)	$U_{F(RO)}$ $T_j = T_{jmax}$ (V)	r_F $T_j = T_{jmax}$ (mΩ)	U_{FM} / I_{FM} $T_j = 25\text{ °C}$ (V) / (A)	R_{thjc} DC (°C/W)	R_{thcr} DC (°C/W)	$T_{jmin} - T_{jmax}$ (°C)	Clamping force or mounting torque	Weight (g)	Fig.
D51-100	100/125	2,1	22	1800-2000	20	1,2	2,37	2,20/470	0,25	0,12	-40...+175	14,0-17,0 Nm	125	3,4
D52-100	100/140	2,1	22	400-1200	20	1,2	2,37	2,20/470	0,25	0,12	-40...+190	14,0-17,0 Nm	125	5,6
D52-100	100/125	2,1	22	1400-1600	20	1,2	2,37	2,20/470	0,25	0,12	-40...+175	14,0-17,0 Nm	125	5,6
D52-150	150/120	2,7	36	400-1200	20	1,05	1,66	1,80/470	0,25	0,12	-40...+190	14,0-17,0 Nm	125	5,6
D52-150	150/105	2,7	36	1400-1600	20	1,05	1,66	1,80/470	0,25	0,12	-40...+175	14,0-17,0 Nm	125	5,6
D52-200	200/110	2,9	42	400-1200	20	0,9	1,07	1,45/470	0,25	0,12	-40...+190	14,0-17,0 Nm	125	5,6
D52-200	200/95	2,9	42	1400-1600	20	0,9	1,07	1,45/470	0,25	0,12	-40...+175	14,0-17,0 Nm	125	5,6
D61-200, D64-200	200/130	5	125	1800-3200	50	0,72	1,85	1,80/800	0,12	0,1	-40...+175	Dia D61 i D62	240,18	7,10
D61-250, D64-250	250/125	5,5	150	1800-3200	50	0,7	1,22	1,60/800	0,12	0,1	-40...+175	280-32,0 Nm,	240,18	7,10
D61-320, D64-320	320/110	6,3	198	1800-2600	50	0,69	0,99	1,40/800	0,12	0,1	-40...+175	3,5 kN dla D64 i	240,18	7,10
D61-400, D64-400	400/110	7	245	1800-2000	50	0,62	0,563	1,20/800	0,12	0,1	-40...+175	28,0-32,0 Nm for D61 and D62 3,5 kN for d64 and D66	240,18	7,10
D62-200, D66-200	200/145	5	125	400-1200	50	0,72	1,85	1,80/800	0,12	0,1	-40...+190		260,2	8,11
D62-200, D66-200	200/130	5	125	1400-1600	50	0,72	1,85	1,80/800	0,12	0,1	-40...+175		260,2	8,11
D62-250, D66-250	250/140	5,5	150	400-1200	50	0,7	1,22	1,60/800	0,12	0,1	-40...+190		260,2	8,11
D62-250, D66-250	250/125	5,5	150	1400-1600	50	0,7	1,22	1,60/800	0,12	0,1	-40...+175		260,2	8,11
D62-320, D66-320	320/125	6,3	198	400-1200	50	0,69	0,99	1,40/800	0,12	0,1	-40...+190		260,2	8,11
D62-320, D66-320	320/110	6,3	198	1400-1600	50	0,69	0,99	1,40/800	0,12	0,1	-40...+175		260,2	8,11
D62-400, D66-400	400/125	7	245	400-1200	50	0,62	0,563	1,20/800	0,12	0,1	-40...+190		260,2	8,11
D62-400, D66-400	400/110	7	245	1400-1600	50	0,62	0,563	1,20/800	0,12	0,1	-40...+175		260,2	8,11
D71-300, D74-300	300/115	6,3	200	2000-4000	50	1,1	0,9	2,15/1500	0,1	0,04	-40...+175		38,0-41,0 Nm for D71; 5,5 kN for D74	500,45
D71-450, D74-450	450/125	7,7	300	400-1200	50	0,72	0,51	1,60/1500	0,1	0,04	-40...+190	500,45		9,12
D71-450, D74-450	450/110	7,7	300	1400-3200	50	0,72	0,51	1,60/1500	0,10	0,04	-40...+175	500,45		9,12
D71-500, D74-500	500/125	10	500	400-1200	50	0,62	0,45	1,30/1500	0,1	0,04	-40...+190	500,45		9,12
D71-500, D74-500	500/110	10	500	1400-2200	50	0,62	0,45	1,30/1500	0,1	0,04	-40...+175	500,45		9,12
D71-600, D74-600	600/115	10,5	551	400-1200	50	0,63	0,34	1,20/1500	0,1	0,04	-40...+190		500,45	9,12

Discrete Diodes

RECTIFYING DIODES - CAPSULE TYPE													
Type	$I_{F(AV)} / T_c$ (A) / (°C)	I_{FSM} 10 ms (kA)	I^2t 10 ms (kA²s)	U_{RRM} $T_j = T_{jmax}$ (V)	I_{RRM} $T_j = T_{jmax}$ (V)	$U_{F(RO)}$ $T_j = T_{jmax}$ (V)	r_F $T_j = T_{jmax}$ (mΩ)	U_{FM} / I_{FM} $T_j = 25\text{ °C}$ (V) / (A)	R_{thjc} DC (°C/W)	$T_{jmin} - T_{jmax}$ (°C)	Clamping force	Weight (g)	Fig.
D63-300	300/140	5	125	400-1200	50	0,95	0,85	1,70/800	0,095	-40...+190	4,5-6,2 kN	60	13
D63-300	300/125	5	125	1400-3200	50	0,95	0,85	1,70/800	0,095	-40...+175	4,5-6,2 kN	60	13
D63-400	400/125	5,5	150	400-1200	50	0,85	0,72	1,50/800	0,095	-40...+190	4,5-6,2 kN	60	13
D63-400	400/110	5,5	150	1400-3200	50	0,85	0,72	1,50/800	0,095	-40...+175	4,5-6,2 kN	60	13
D63-600	600/95	6,4	204	400-1200	50	0,68	0,57	1,20/800	0,095	-40...+190	4,5-6,2 kN	60	13
D73-500	500/115	6,4	204	2200-4400	50	0,8	0,61	1,80/1500	0,07	-40...+175	9,0-11,0 kN	280	15
D73-800	800/95	7,7	300	400-1200	50	0,7	0,426	1,60/1500	0,07	-40...+190	9,0-11,0 kN	280	15
D73-800	800/80	7,7	300	1400-3200	50	0,7	0,426	1,60/1500	0,07	-40...+175	9,0-11,0 kN	280	15
D75-1100	1100/75	9	405	1400-2400	30	0,763	0,48	1,38/1500	0,04	-40...+175	9,0-11,0 kN	85	14
D75-1400	1400/75	11	605	400-1200	30	0,76	0,308	1,20/1500	0,04	-40...+190	9,0-11,0 kN	85	14
D83-1000	1000/80	11,4	650	400-4400	50	0,87	0,73	1,70/1500	0,032	-40...+175	12,0-14,0 kN	280	15
D83-1200	1200/100	14,8	1090	1600-3200	50	0,82	0,33	1,35/1500	0,032	-40...+175	12,0-14,0 kN	280	15
D83-1400	1400/85	15,8	1250	400-2000	50	0,78	0,3	1,25/1500	0,032	-40...+175	12,0-14,0 kN	280	15
D83-1600	1600/90	16,7	1400	400-1200	50	0,77	0,191	1,10/1500	0,032	-40...+175	12,0-14,0 kN	280	15
D95-1600	1600/95	20	2000	3200-4400	100	0,77	0,375	1,30/1500	0,02	-40...+175	22,5-25,0 kN	480	16
D95-1800	1800/130	25	3125	400-2000	100	0,81	0,162	1,20/1500	0,02	-40...+190	22,5-25,0 kN	480	16
D95-1800	1800/115	25	3125	2200-3200	100	0,81	0,162	1,20/1500	0,02	-40...+175	22,5-25,0 kN	480	16
D95-2200	2200/110	28	3920	400-2000	100	0,8	0,154	1,10/1500	0,02	-40...+190	22,5-25,0 kN	480	16
D95-2200	2200/95	28	3920	2200-3000	100	0,8	0,154	1,10/1500	0,02	-40...+175	22,5-25,0 kN	480	16
D95-2500	2500/85	31	4800	1600-2400	100	0,62	0,164	1,05/1500	0,02	-40...+175	22,5-25,0 kN	480	16
D95-3000	3000/105	35	6125	200-1200	100	0,7	0,082	1,00/1500	0,02	-40...+190	22,5-25,0 kN	480	16
D95T- 3000	3000/60	31	4800	1400- 2200	100	0,612	0,164	1,02/1500	0,02	-40...+180	22,5-25,0 kN	480	16
DB3-3500	3500/85	46	10580	5000-5500	100	0,71	0,17	1,39/4000*	0,012	-40...+170	35,0- 45,0 kN	1400	17
DB3-4000	4000/85	50	12250	3800-4500	100	0,8	0,118	1,27/4000*	0,012	-40...+175	35,0-45,0 kN	1400	17
DB3-5000	5000/85	62	19200	2000-3200	100	0,706	0,071	0,98/4000*	0,012	-40...+175	35,0-45,0 kN	1400	17
DB5-4000	4000/85	50	12500	3800-4500	100	0,8	0,118	1,27/4000*	0,010	-40...+175	35,0-45,0 kN	1400	18
DB5-5500	5500/85	62	19200	2000-3200	100	0,706	0,071	0,98/4000*	0,010	-40...+175	35,0-45,0 kN	1400	18
DB5-7200	7200/85	75	28000	1200-1600	100	0,704	0,048	0,90/4000*	0,010	-40...+190	35,0-45,0 kN	1130	18
DB5-8000	8000/85	77	29600	1000-1200	100	0,67	0,041	0,85/4000*	0,010	-40...+190	35,0-45,0 kN	1130	18

Discrete Diodes

FAST RECOVERY DIODES															Type	$I_{F(AV)} / T_c$ (A) / (°C)	I_{FSM} 10 ms (kA)	I^2t 10 ms (kA²s)	U_{RRM} $T_j = T_{jmax}$ (V)	I_{RRM} $T_j = T_{jmax}$ (V)	$U_{F(TO)}$ $T_j = T_{jmax}$ (V)	r_F $T_j = T_{jmax}$ (mΩ)	U_{FM} / I_{FM} $T_j = 25 °C$ (V) / (A)	t_{rr} $T_j = 25 °C$ (μs)	R_{thjc} DC (°C/W)	R_{thcr} DC (°C/W)	$T_{jmin} - T_{jmax}$ (°C)	Clamping force or moun- ting torque (g)	Weight	Fig.
															R52-100	100/75	2,2	24	600-1400	30	1,30	1,90	1,9/314	1,0-2,0	0,25	0,12	-40...+125	14,0-17,0 Nm	125	5
															R61-150	150/75	3,5	61	1600-2400	30	1,3	1,9	2,0/800	2	0,17	0,1	-40...+125	28,0-32,0 Nm	250	7
															R61-200	200/70	3,5	61	1600-2000	30	1,3	1,9	1,8/800	3,2	0,17	0,1	-40...+125	28,0-32,0 Nm	250	7
															R61-250	250/85	4,5	100	800-1600	30	0,83	0,62	1,35/800	2	0,12	0,1	-40...+125	28,0-32,0 Nm	250	7
															R63-300	300/65	3,5	61	800-1200	30	1,1	0,98	1,85/800	1,0-2,0	0,095	0,02	-40...+125	4,5-6,2 kN	60	13
															R63-300	300/65	3,5	61	1600-2400	30	1,1	0,98	1,85/800	2	0,095	0,02	-40...+125	4,5-6,2 kN	60	13
															R63-400	400/55	4,5	100	800-1200	30	1,08	0,68	1,60/800	2	0,095	0,02	-40...+125	4,5-6,2 kN	60	13
															R73-200	200/115	3,2	51	3400-4500	50	1,4	2,54	4,50/1500	5	0,06	0,02	-40...+150	9,0-11,0 kN	280	15
															R73-470	470/95	6,5	210	2400-2600	50	1	0,665	1,90/1500	4	0,06	0,02	-40...+150	9,0-11,0 kN	280	15
															R75-600	600/95	7	245	800-1200	50	1,09	0,65	1,80/1500	2	0,04	0,02	-40...+150	9,0-11,0 kN	85	14
															R75-600	600/95	7	245	1400-1600	50	1,09	0,65	1,80/1500	2,0-3,2	0,04	0,02	-40...+150	9,0-11,0 kN	85	14
															R75-800	800/85	9,5	450	800-1200	50	0,9	0,46	1,50/1500	2	0,04	0,02	-40...+150	9,0-11,0 kN	85	14
															R75-800	800/85	9,5	450	1400-1600	50	0,9	0,46	1,50/1500	3,2	0,04	0,02	-40...+150	9,0-11,0 kN	85	14
															R83-400	400/100	6	180	3000-4000	50	0,9	0,46	3,50/1500	5	0,037	0,02	-40...+150	12,0-14,0 kN	280	15
															R83-600	600/100	10	500	1600-2400	50	0,9	0,46	2,00/1500	4	0,037	0,02	-40...+150	12,0-14,0 kN	280	15
															R83-800	800/90	12,5	780	800-1600	50	1,03	0,4	1,70/1500	2	0,037	0,02	-40...+150	12,0-14,0 kN	280	15
															R95-900	900/70	14	980	2200-3000	100	1,03	0,4	3,00/1500	4	0,023	0,005	-40...+150	22,5-25,0 kN	480	16
															R95-900	900/70	14	980	3200-3600	100	1,03	0,4	3,00/1500	5	0,023	0,005	-40...+150	22,5-25,0 kN	480	16
															R95-1100	1100/70	17,3	1500	1600-2400	100	1,03	0,4	2,30/1500	5	0,023	0,005	-40...+150	22,5-25,0 kN	480	16
															R95-1500	1500/94	19	1800	1600-1800	100	0,98	0,193	1,35/1500	2	0,02	0,005	-40...+150	22,5-25,0 kN	480	16

MEDIUM CURRENT RECTIFYING DIODES															Type	$I_{F(AV)} / T_c$ (A) / (°C)	I_{FSM} 10 ms (kA)	I^2t 10 ms (kA²s)	U_{RRM} $T_j = T_{jmax}$ (V)	I_{RRM} $T_j = T_{jmax}$ (V)	$U_{F(TO)}$ $T_j = T_{jmax}$ (V)	r_F $T_j = T_{jmax}$ (mΩ)	U_{FM} / I_{FM} $T_j = 25 °C$ (V) / (A)	R_{thjc} DC (°C/W)	$T_{jmin} - T_{jmax}$ (°C)	Mounting torque (Nm)	Weight (g)	Fig.
															D22-10	10/105	0,19	0,19	100-1600	6	1,15	14	1,50/31,4	2	-25...+140	1,2-1,5	7	1
															D22-16	16/105	0,25	0,312	100-1400	8	1,15	8	1,70/50	2	-25...+160	1,2-1,5	7	1
															D22-20	20/110	0,275	0,378	100-1400	8	1,15	7	1,50/50	1,5	-25...+160	1,2-1,5	7	1
															D22-25	25/120	0,275	0,378	100-1400	8	1,15	7	1,50/50	1,5	-25...+190	1,2-1,5	7	1
															D42-32	32/100	0,5	1,25	100-1400	6	1	7	1,70/100	0,9	-25...+150	2,0-2,5	18	2
															D42-40	40/95	0,6	1,8	100-1400	6	1	4	1,40/100	0,9	-25...+150	2,0-2,5	18	2
															D42-50	50/100	0,8	3,2	100-1400	5	0,95	4,5	1,80/200	0,6	-25...+150	2,0-2,5	18	2
															D42-60	60/100	0,85	3,6	100-1400	5	0,8	3,1	1,40/200	0,6	-25...+150	2,0-2,5	18	2
															D42-70	70/100	0,95	4,5	100-1400	10	0,8	2,3	1,35/200	0,55	-25...+150	2,0-2,5	18	2

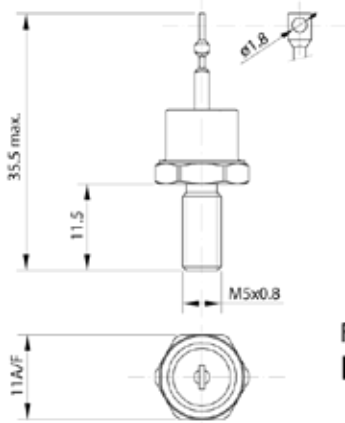


Fig. 1
D22

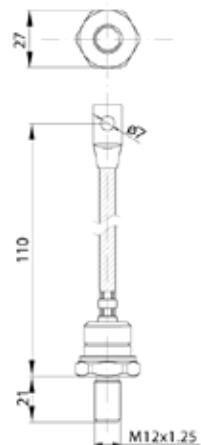


Fig. 3
D51
DAA

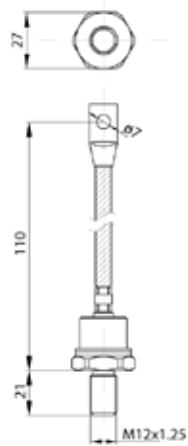


Fig. 5
D52, R52
DAA

Diodes D22 and D42 are produced in accordance with the figure (the type of external lead is not marked)

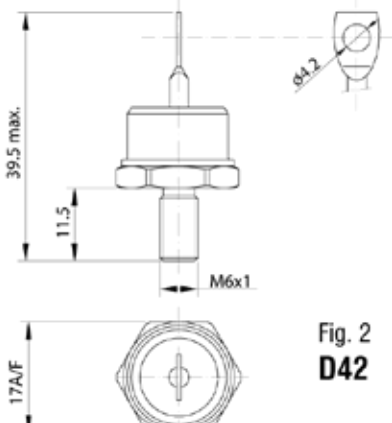


Fig. 2
D42

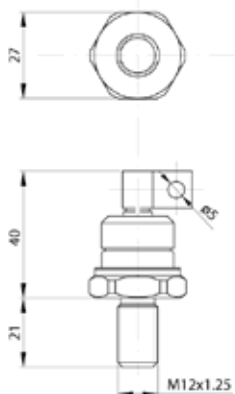


Fig. 4
D51
DA1

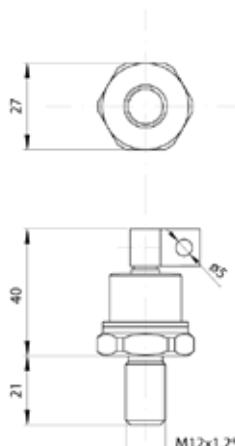


Fig. 6
D52
DA1

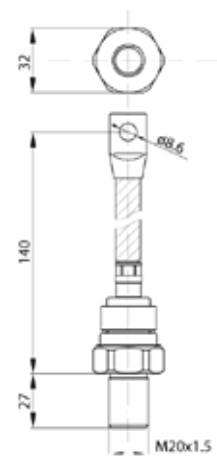


Fig. 7
D61, R61
ABA

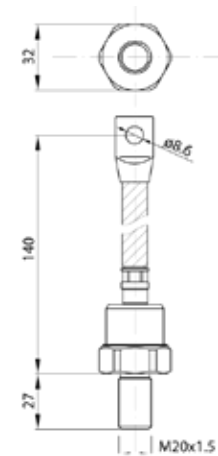


Fig. 8
D62
ABA

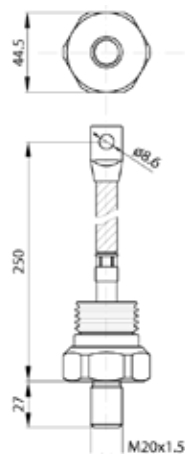


Fig. 9
D71
KCA

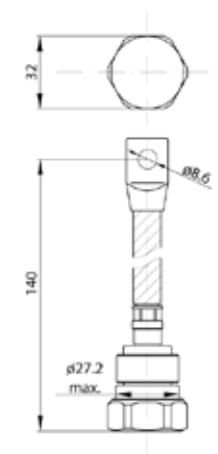


Fig. 10
D64
1BA

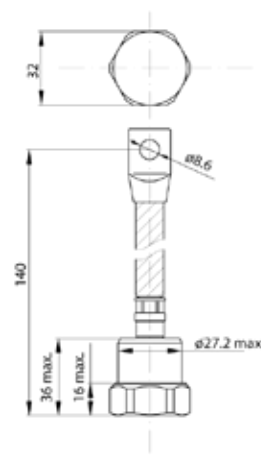


Fig. 11
D66
1BA

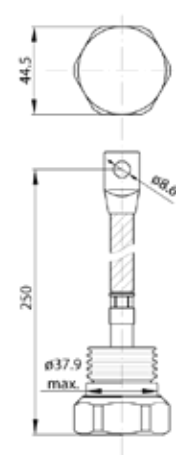


Fig. 12
D74
1CA

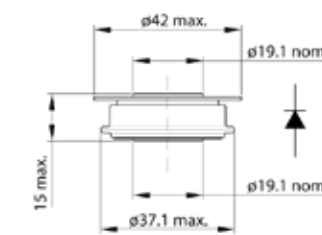


Fig. 13
D63, R63

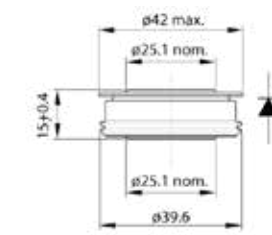


Fig. 14
D75, R75

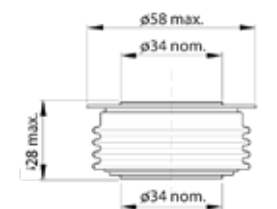


Fig. 15
D73, D83, R73, R83

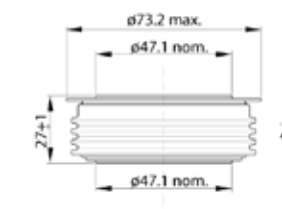


Fig. 16
D95, D95T, R95

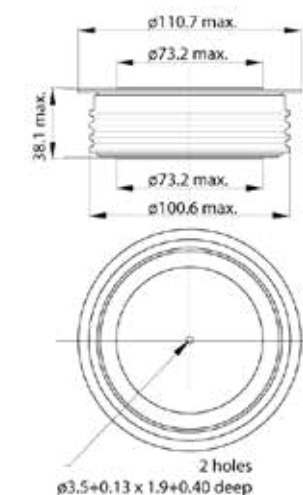


Fig. 17
DB3

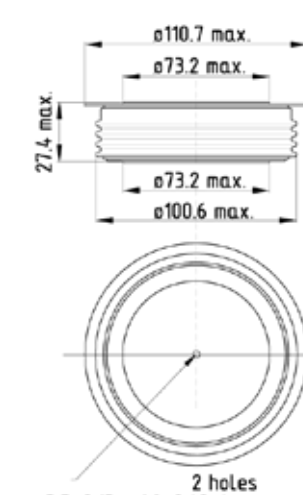


Fig. 18
DB5

Discrete thyristors – KUBARA LAMINA's are available as stud (screw) flat types that are suitable for applications which require robustness and easy assembly, plus capsule (disc) type for high ratings up to 1900 A.

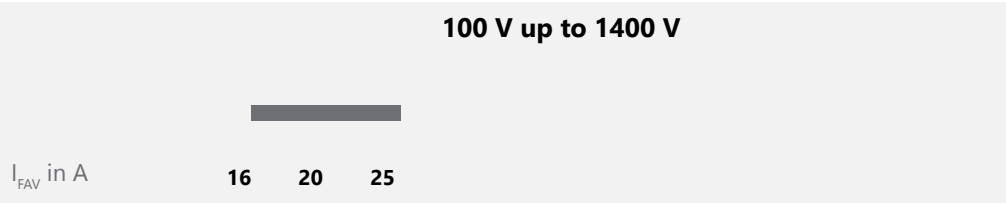
Typicall applications: soft-starters, resistance heating, static switches, battery charges, welding equipment, static exitation and others.

Discrete thyristors

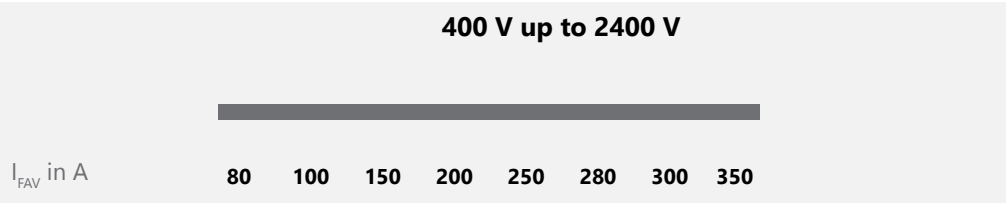
Medium current thyristors	26
Stud and flat type thyristors	26
Capsule thyristors	27
Fast switching thyristors	28
Inverter thyristors	29

Further information: www.kubaralamina.com

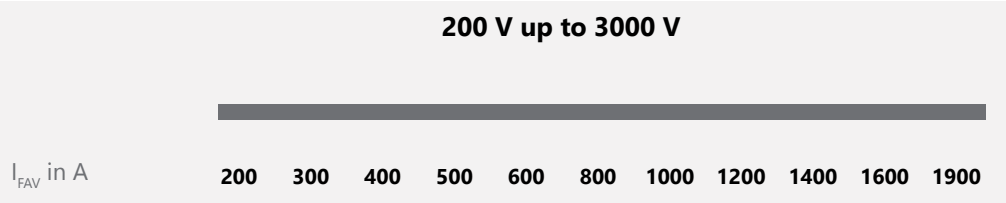
Medium Current Thyristors



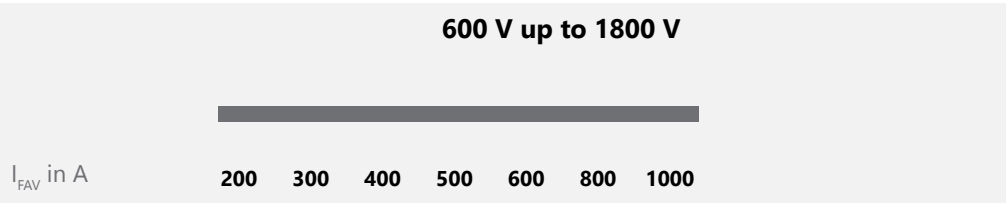
Thyristors Stud & Flat Type



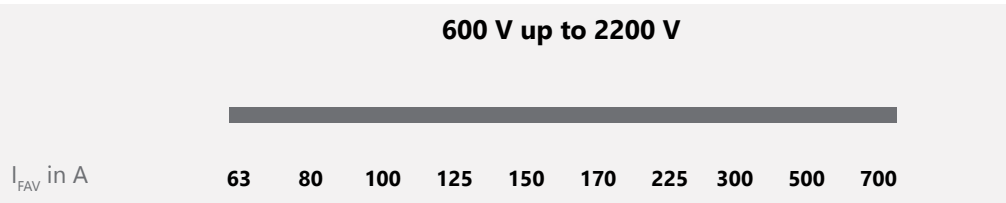
Thyristors Capsule Type



Inverter Thyristors



Fast Switching Thyristors



Discrete Thyristors

MEDIUM CURRENT THYRISTORS																
Type	$I_{T(AV)} / T_c$ (A) / (°C)	I_{TSM} 10 ms (kA)	I^2t 10 ms (kA ² s)	U_{DRM} / U_{RRM} $T_j = T_{jmax}$ (V)	I_{DRM} / I_{RRM} $T_j = T_{jmax}$ (mA)	$U_{T(RO)}$ $T_j = T_{jmax}$ (V)	r_T $T_j = T_{jmax}$ (mΩ)	U_{TM} / I_{TM} $T_j = 25\text{ }^{\circ}\text{C}$ (V) / (A)	I_{GT} (mA)	U_{GT} (V)	du/dt (min.) (V/μs)	R_{thjc} DC (°C/W)	$T_{jmin} - T_{jmax}$ (°C)	Mounting torque (Nm)	Weight (g)	Fig.
T32-16	16/90	0,3	0,45	100-1400	7	1,15	19	2,10/50	75	3	100	1	-25...+125	2,0-2,5	14	1
T32-20	20/85	0,35	0,62	100-1400	7	1,15	13	1,85/50	75	3	100	1	-25...+125	2,0-2,5	14	1
T32-25	25/80	0,35	0,62	100-1400	7	1,15	8	1,50/50	75	3	100	1	-25...+125	2,0-2,5	14	1

THYRISTORS - STUD & FLAT BASE TYPE																		
Type	$I_{T(AV)} / T_c$ (A) / (°C)	I_{TSM} 10 ms (kA)	I^2t 10 ms (kA ² s)	U_{DRM} / U_{RRM} $T_j=125^{\circ}C$ (V)	I_{DRM} / I_{RRM} $T_j=125^{\circ}C$ (mA)	$U_{T(RO)}$ $T_j=125^{\circ}C$ (V)	r_T $T_j=125^{\circ}C$ (mΩ)	U_{TM} / I_{TM} $T_j=25^{\circ}C$ (V) / (A)	I_{GT} (mA)	U_{GT} (V)	t_q (typ.) (μs)	du_g/dt (min.) (V/μs)	R_{thjc} DC (°C/W)	R_{thcr} DC (°C/W)	$T_{jmin} - T_{jmax}$ (°C)	Clamping force or mo- unting torque	Weight (g)	Fig.
T51-80	80/90	1,45	10,5	1400-1600	10	0,93	3,2	2,2/500	150	3	150	320	0,25	0,12	-40...+125		125	2,3
T51-100	100/85	1,6	12,8	1400-1600	10	0,82	2,3	1,80/500	150	3	100	320	0,25	0,12	-40...+125	14,0-17,0 Nm	125	2,3
T52-80	80/90	1,45	10,5	400-1200	10	0,93	3,2	2,2/500	150	3	100	320	0,25	0,12	-40...+125		125	4,5
T52-100	100/85	1,6	12,8	400-1200	10	0,82	2,3	1,80/500	150	3	100	320	0,25	0,12	-40...+125		125	4,5
T61-150; T64-150	150/95	3,6	65	1400-1600	22	1,26	1,5	2,00/625	150	3	150	320	0,1	0,075	-40...+125		28,0-32,0 Nm for T61 and T62; 3,5kN for T64 and T66	250
T61-200; T64-200	200/90	4,2	88	1400-2000	22	0,91	1,4	1,70/625	150	3	150	320	0,1	0,075	-40...+125	250		6,9
T61-250; T64-250	250/85	5	125	1400-1600	22	0,84	0,96	1,40/625	150	3	150	320	0,1	0,075	-40...+125	200		6,9
T62-150; T64-150	150/95	3,6	65	400-1200	22	1,26	1,5	2,00/625	150	3	100	320	0,1	0,075	-40...+125	38,0-41,0 Nm for T71 ; 5,5kN dlaT74		250
T62-200; T66-200	200/90	4,2	88	400-1200	22	0,91	1,4	1,70/625	150	3	100	320	0,1	0,075	-40...+125		250	7,10
T62-250; T66-250	250/85	5	125	400-1200	22	0,84	0,96	1,40/625	150	3	100	320	0,1	0,075	-40...+125		200	7,10
T62-280; T66-280	280/90	6,4	205	400-600	22	0,78	0,5	1,20/625	150	3	100	320	0,1	0,075	-40...+125		200	7,10
T71-250; T74-250	250/75	6,3	200	1200-2400	33	1,13	1	2,60/1500	200	3	250	320	0,1	0,05	-40...+125		500	8,11
T71-300; T74-300	300/70	7,6	290	400-2400	33	1,02	0,8	2,20/1500	200	3	250	320	0,1	0,05	-40...+125		500	8,11
T71-350; T74-350	350/70	9,1	415	400-2400	33	0,86	0,6	1,80/1500	200	3	200	320	0,1	0,05	-40...+125		450	8,11

Discrete Thyristors

THYRISTORS - CAPSULE TYPE																		
Type	$I_{T(AV)} / T_c$ (A) / (°C)	I_{TSM} 10 ms (kA)	I^2t 10 ms (kA ² s)	$U_{DRM} U_{RRM}$ $T_j=125\text{ °C}$ (V)	$I_{DRM} I_{RRM}$ $T_j=125\text{ °C}$ (mA)	$U_{T(RO)}$ $T_j=125\text{ °C}$ (V)	r_T $T_j=125\text{ °C}$ (mΩ)	U_{TM} / I_{TM} $T_j=25\text{ °C}$ (V) / (A)	I_{GT} (mA)	U_{GT} (V)	t_g (typ.) (μs)	du_g/dt (min.) (V/μs)	R_{thjc} DC (°C/W)	R_{thcr} DC (°C/W)	$T_{jmin}-T_{jmax}$ (°C)	Clamping force	Weight (g)	Fig.
T63-200	200/90	3,6	65	400-2200	22	1,24	1,6	2,05/625	150	3	250	320	0,08	0,02	-40...+125	4,5-6,5 kN	60	12
T63-250	250/85	4	80	400-2200	22	1,15	1,15	1,85/625	150	3	250	320	0,08	0,02	-40...+125	4,5-6,5 kN	60	12
T63-300	300/80	4,5	101	400-1800	22	1,1	0,86	1,55/625	150	3	200	320	0,08	0,02	-40...+125	4,5-6,5 kN	60	12
T63-400	400/65	4,7	110	400-1600	22	0,95	0,8	1,40/625	150	3	200	320	0,08	0,02	-40...+125	4,5-6,5 kN	60	12
T63-500	500/65	6,3	200	200-600	22	0,76	0,46	1,15/625	150	3	150	320	0,08	0,02	-40...+125	4,5-6,5 kN	60	12
T73-450	450/70	7,6	290	400-2400	33	1	0,8	2,20/1500	200	3	250	320	0,06	0,02	-40...+125	9,0-11,0 kN	280	14
T73-550	550/65	9,1	415	400-2400	33	0,86	0,6	1,80/1500	200	3	200	320	0,06	0,02	-40...+125	9,0-11,0 kN	280	14
T73-600	600/60	9,1	415	400-2400	33	0,85	0,55	1,70/1500	200	3	150	320	0,06	0,02	-40...+125	9,0-11,0 kN	280	14
T75-650	650/65	8,1	330	400-2000	30	0,93	0,71	2,00/1500	150	3	150	320	0,04	0,02	-40...+125	9,0-11,0 kN	85	13
T75-700	700/65	8,8	386	400-2000	30	0,87	0,6	1,80/1500	150	3	150	320	0,04	0,02	-40...+125	9,0-11,0 kN	85	13
T75-750	750/65	9,5	450	400-1600	30	0,89	0,48	1,70/1500	150	3	150	320	0,04	0,02	-40...+125	9,0-11,0 kN	85	13
T75-980	980/65	11,4	650	200-800	30	0,8	0,23	1,21/1500	150	3	100	320	0,04	0,02	-40...+125	9,0-11,0 kN	85	13
T83-630	630/70	10,2	520	400-2400	50	1,25	0,8	2,10/1500	200	3	200	320	0,032	0,02	-40...+125	12,0-14,0 kN	280	14
T83-800	800/70	13	845	400-2400	50	0,99	0,49	1,70/1500	200	3	200	320	0,032	0,02	-40...+125	12,0-14,0 kN	280	14
T83-900	900/70	13,2	870	400-2000	50	0,97	0,34	1,45/1500	200	3	200	320	0,032	0,02	-40...+125	12,0-14,0 kN	280	14
T83-1000	1000/80	18	1620	200-1200	60	0,79	0,2	1,25/1500	200	3	150	320	0,032	0,02	-40...+125	12,0-14,0 kN	280	14
T95-800	800/80	17	1445	1800-3000	100	1,22	0,5	1,95/1500	200	3	200	320	0,023	0,01	-40...+125	22,5-25,0 kN	480	15
T95-1000	1000/70	20	2000	400-2400	100	1,15	0,415	1,75/1500	200	3	200	320	0,023	0,01	-40...+125	22,5-25,0 kN	480	15
T95-1250	1250/70	22	2400	400-2400	100	1,1	0,214	1,40/1500	200	3	150	320	0,023	0,01	-40...+125	22,5-25,0 kN	480	15
T95-1400	1400/75	24	2880	400-2400	100	0,83	0,214	1,35/1500	200	3	150	320	0,021	0,01	-40...+125	22,5-25,0 kN	480	15
T95-1600	1600/70	27	3600	200-1600	100	0,78	0,18	1,20/1500	200	3	100	320	0,021	0,01	-40...+125	22,5-25,0 kN	480	15
T95-1900	1900/60	30	4500	200-1200	100	0,73	0,16	1,10/1500	200	3	100	320	0,021	0,01	-40...+125	22,5-25,0 kN	480	15

Discrete Thyristors

FAST SWITCHING THYRISTORS																			
Type	$I_{T(AV)} / T_c$ (A) / (°C)	I_{TSM} 10 ms (kA)	I^2t 10 ms (kA ² s)	$U_{DRM} U_{RRM}$ $T_j = 125\text{ °C}$ (V)	$I_{DRM} I_{RRM}$ $T_j = 125\text{ °C}$ (mA)	$U_{T(TO)}$ $T_j = 125\text{ °C}$ (V)	r_f $T_j = 125\text{ °C}$ (mΩ)	U_{TM} / I_{TM} $T_j = 25\text{ °C}$ (V) / (A)	I_{GT} (mA)	U_{GT} (V)	tq (μs)	di_f/dt (A/μs)	du_f/dt (min.) (V/μs)	R_{thjc} DC (°C/W)	R_{ther} DC (°C/W)	$T_{jmin} - T_{jmax}$ (°C)	Clamping force or moun- ting torque	Weight (g)	Fig.
F51-63	63/80	1,08	5,8	1600	10			3,15/500	150	3	32	150	320	0,25	0,12	-40...+125	14,0-17,0 Nm	125	2,3
F52-63	63/80	1,08	5,8	800	10			3,15/500	150	3	12,5	150	320	0,25	0,12	-40...+125	14,0-17,0 Nm	125	4,5
F52-63	63/80	1,08	5,8	1000	10			3,15/500	150	3	16	150	320	0,25	0,12	-40...+125	14,0-17,0 Nm	125	4,5
F52-63	63/80	1,08	5,8	1200	10			3,15/500	150	3	20	150	320	0,25	0,12	-40...+125	14,0-17,0 Nm	125	4,5
F52-80	80/75	1,26	7,9	800	10			2,50/500	150	3	20	150	320	0,25	0,12	-40...+125	14,0-17,0 Nm	125	4,5
F52-80	80/75	1,26	7,9	1200	10			2,50/500	150	3	25	150	320	0,25	0,12	40...+125	14,0-17,0 Nm	125	4,5
F52-100	100/70	1,45	10,5	600	10			2,00/500	150	3	25	150	320	0,25	0,12	-40...+125	14,0-17,0 Nm	125	4,5
F52-100	100/70	1,45	10,5	800	10			2,00/500	150	3	32	150	320	0,25	0,12	-40...+125	14,0-17,0 Nm	125	4,5
F61-125	125/85	3,6	65	1600	22			2,10/625	150	3	40	150	320	0,1	0,075	-40...+125	28,0-32,0 Nm	250	6
F61-125	125/85	3,6	65	2000-2200	22			2,10/625	150	3	63	150	320	0,1	0,075	-40...+125	28,0-32,0 Nm	250	6
F62-150	150/85	4	80	800	22			1,90/625	150	3	12,5	150	320	0,1	0,075	-40...+125	28,0-32,0 Nm	250	7
F62-150	150/85	4	80	1000-1200	22			1,90/625	150	3	16	150	320	0,1	0,075	-40...+125	28,0-32,0 Nm	250	7
F62-170	170/85	4,2	88	800-1200	22	1,00	1,18	1,70/625	150	3	20	150	320	0,1	0,075	-40...+125	28,0-32,0 Nm	250	7
F71-225	225/80	6,1	186	1200	33			2,25/1500	200	3	20	150	320	0,1	0,05	-40...+125	38,-41,0 Nm	500	8
F71-225	225/80	6,1	186	1600	33			2,25/1500	200	3	40	150	320	0,1	0,05	-40...+125	38,-41,0 Nm	500	8
F71-300	300/70	7,4	274	600-800	33	1,14	0,70	2,00/1500	200	3	20	150	320	0,1	0,05	-40...+125	38,-41,0 Nm	500	8
F71-300	300/70	7,4	274	1200	33	1,14	0,70	2,00/1500	200	3	25	150	320	0,1	0,05	-40...+125	38,-41,0 Nm	500	8
F63-200	200/85	3,1	48	1600	22			2,35/625	150	3	40	150	320	0,08	0,02	-40...+125	4,5-6,5 kN	60	12
F63-200	200/85	3,1	48	2000-2200	22			2,35/625	150	3	63	150	320	0,08	0,02	-40...+125	4,5-6,5 kN	60	12
F63-250	250/78	3,6	65	800	22			2,10/625	150	3	10	150	320	0,08	0,02	-40...+125	4,5-6,5 kN	60	12
F63-250	250/78	3,6	65	1000	22			2,10/625	150	3	12,5	150	320	0,08	0,02	-40...+125	4,5-6,5 kN	60	12
F63-250	250/78	3,6	65	1200	22			2,10/625	150	3	16	150	320	0,08	0,02	-40...+125	4,5-6,5 kN	60	12
F63-300	300/70	4	80	800-1200	22			1,90/625	150	3	20	150	320	0,08	0,02	-40...+125	4,5-6,5 kN	60	12
F73-500	500/70	8	320	800	33			2,10/1500	200	3	20	200	320	0,06	0,02	-40...+125	9,0-11,0 kN	280	14
F75-500	500/70	7,2	260	800	30			2,30/1500	150	3	20	200	320	0,04	0,02	-40...+125	9,0-11,0 kN	85	13
F75-500	500/70	7,2	260	1200	30			2,30/1500	150	3	25	200	320	0,04	0,02	-40...+125	9,0-11,0 kN	85	13
F75-500	500/70	7,2	260	1600	30			2,30/1500	150	3	40	200	320	0,04	0,02	-40...+125	9,0-11,0 kN	85	13
F75-700	700/70	8,5	361	400-800	30			1,70/1500	150	3	20	200	320	0,04	0,02	-40...+125	9,0-11,0 kN	85	13

Discrete Thyristors

INVERTER THYRISTOR																			
Type	$I_{T(AV)} / T_c$ (A) / (°C)	I_{TSM} 10 ms (kA)	I^2t 10 ms (kA²s)	$U_{DRM}^* U_{RRM}$ $T_j=125\text{ °C}$ (V)	$I_{DRM}^* I_{RRM}$ $T_j=125\text{ °C}$ (mA)	$U_{T(RO)}$ $T_j=125\text{ °C}$ (V)	r_T $T_j=125\text{ °C}$ (mΩ)	U_{TM} / I_{TM} $T_j=25\text{ °C}$ (V) / (A)	I_{GT} (mA)	U_{GT} (V)	t_q (μs)	di_T/dt (A/μs)	du_T/dt (min.) (V/μs)	R_{thjc} DC (°C/W)	$T_{jmin}-T_{jmax}$ (°C)	Clamping force, mounting torque	Weight (g)	Fig.	
P71-225	225/80	6,1	186	1200	33			2,25/1500	200	3	25	250	320	0,1	0,05	-40... +125	38,0-41,0 Nm	500	8
P71-225	225/80	6,1	186	1600	33			2,25/1500	200	3	25	250	320	0,1	0,05		38,0-41,0 Nm	500	8
P71-300	300/75	7,4	274	600-800	33			2,00/1500	200	3	20	250	320	0,1	0,05		38,0-41,0 Nm	500	8
P71-300	300/75	7,4	274	1200-1400	33			2,00/1500	200	3	20	250	320	0,1	0,05		38,0-41,0 Nm	500	8
P73-500	500/70	8	320	800-1200	33			2,10/1500	200	3	20	250	320	0,06	0,02	-40... +125	9,0-11,0 kN	280	14
P75-600	600/55(Th)	7	245	1400-1600	30	1,37	0,62	2,2/1500	300	3	32	400	320	0,04Th	0,01		9,0-11,0 kN	85	13
P75-700	700/55(Th)	9,2	423	800-1200	30	1,14	0,475	1,90/1500	300	3	25	400	320	0,04Th	0,01		9,0-11,0kN	85	13
P83-500	500/80	8	320	1600	50	1,35	0,65	2,30/1500	200	3	40	400	320	0,037	0,02		12,0-14,0 kN	280	14
P83-600	600/75	9,6	460	800-1200	50	1,2	0,52	2,00/1500	200	3	20	400	320	0,037	0,02	-40... +125	12,0-14,0 kN	280	14
P83-600	600/75	9,6	460	1400	50	1,2	0,52	2,00/1500	200	3	32	400	320	0,037	0,02		12,0-14,0 kN	280	14
P95-900	900/75	15	1125	1600-1800	100	1,37	0,37	1,85/1500	200	3	63	300	320	0,023	0,01		22,5-25,0 kN	480	15
P95-1000	1000/75	15	1125	800-1000	100	1,33	0,27	1,80/1500	200	3	20	300	320	0,023	0,01		22,5-25,0 kN	480	15
P95-1000	1000/75	15	1125	1200-1400	100	1,33	0,27	1,80/1500	200	3	20	300	320	0,023	0,01	22,5-25,0 kN	480	15	

Discrete Thyristors

Discrete Thyristors

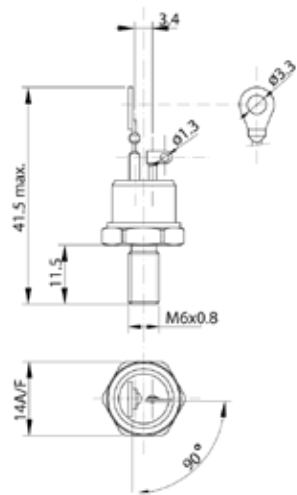


Fig. 1
T32

Thyristors T 32 are produced in accordance with the figure (the type of lead is not marked)

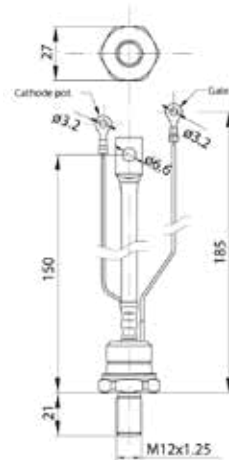


Fig. 2
T51, F51
DXA

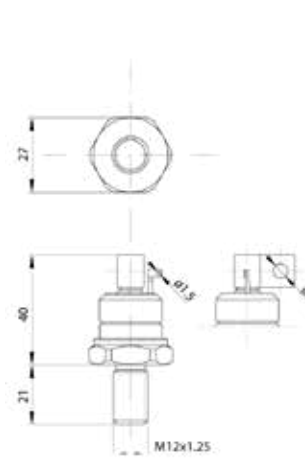


Fig. 3
T51, F51
DX1



Fig. 9
T64
1YG

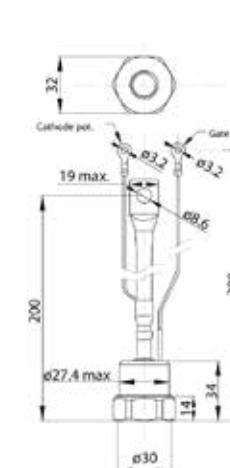


Fig. 10
T66
1YG

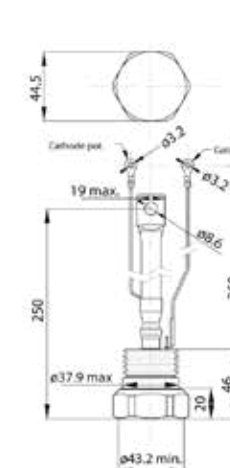


Fig. 11
T74
1ZA

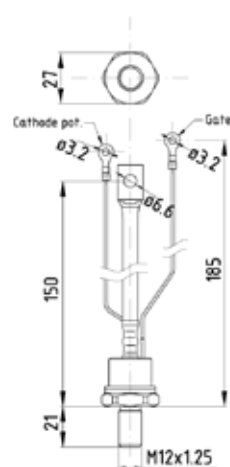


Fig. 4
T52, F52
DXA

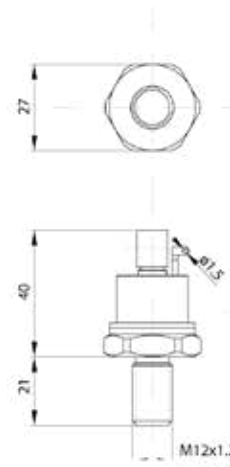


Fig. 5
T52, F52
DX1

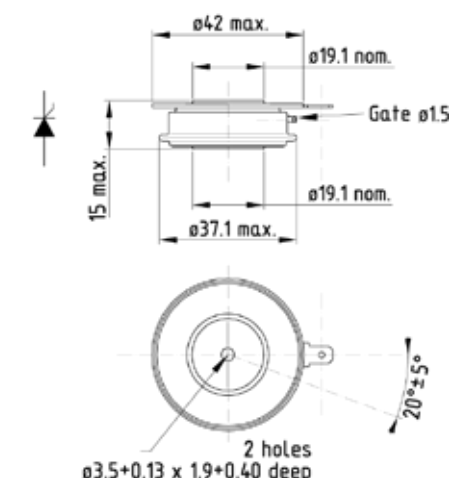


Fig. 12
T63, F63

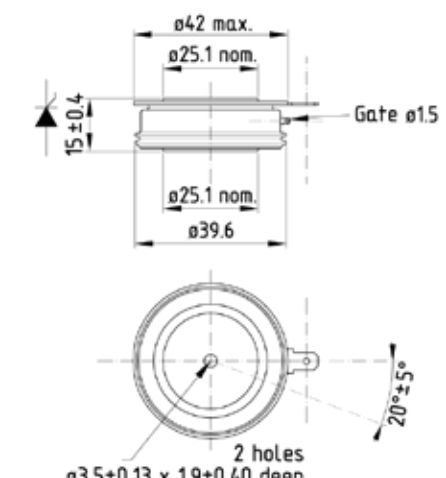


Fig. 13
T75, F75, P75



Fig. 6
T61, F61
AYG

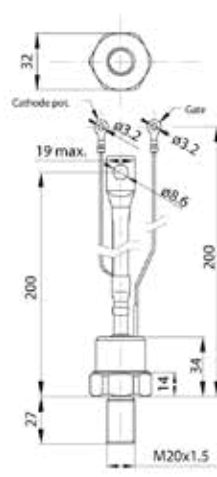


Fig. 7
T62, F62
AYG



Fig. 8
T71, P71, F71
KZA

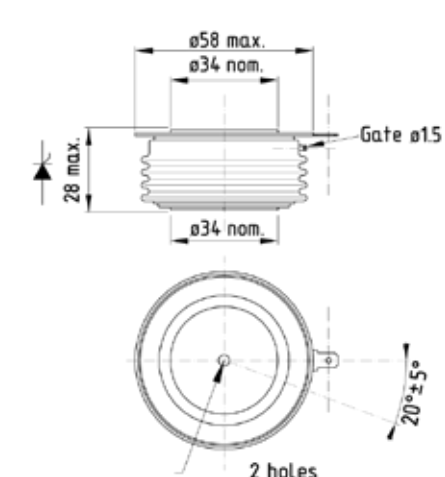


Fig. 14
T73, F73, P73, T83, P83

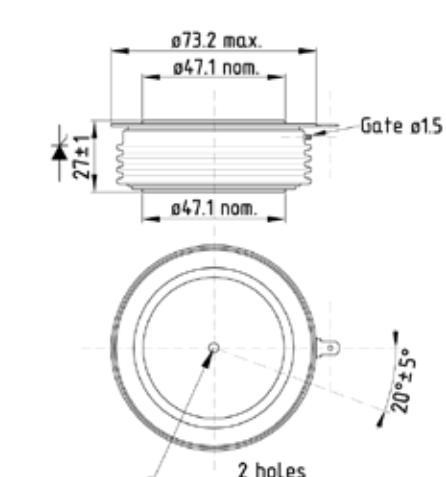


Fig. 15
T95, P95

3

**POWER ELECTRONICS
EQUIPMENT**

Power Electronics Equipment

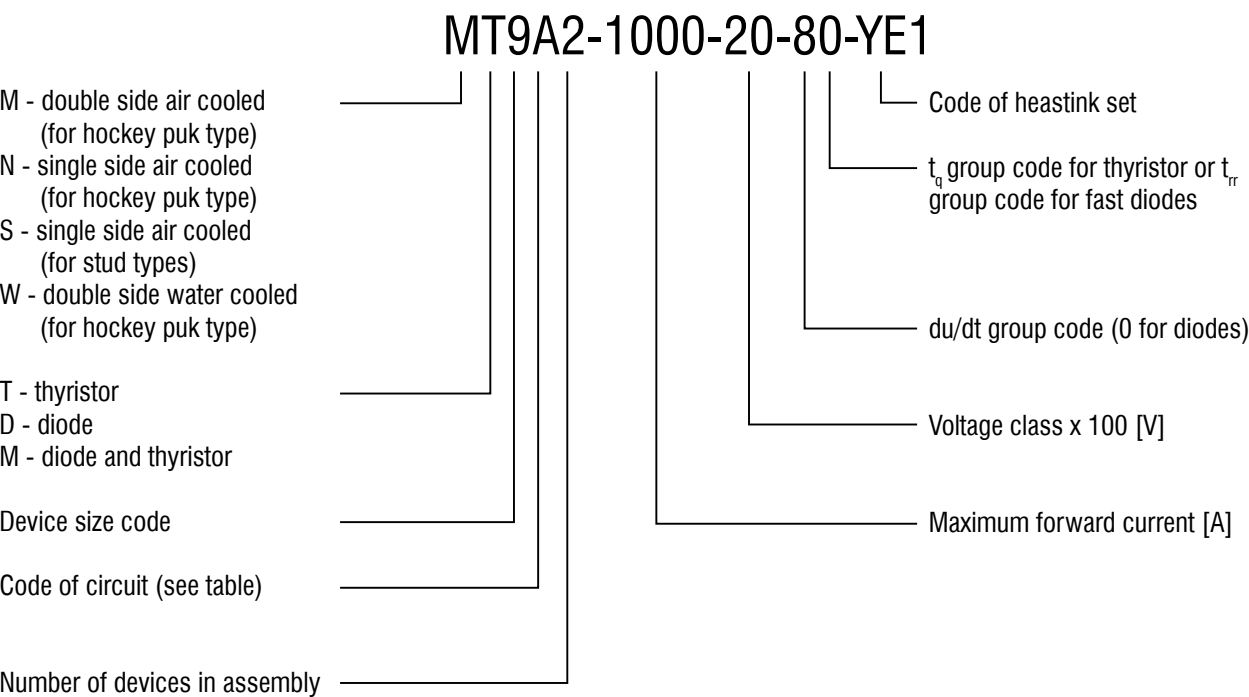
In addition to the discrete product lines, Kubara Lamina offers a design, build and refurbishment service for power electronics equipment subassemblies.

Kubara Lamina provides support for customers requiring more than the basic semiconductor and utilises the skills of our power electronics, mechanical and electronic engineers.



Further information: www.kubaralamina.com

Marking system



Assemblies type				
Code	D	T	M	Circuit type
A.K				single devices (diode, thyristor)
A				short circuited anodes
C				series connection with centertap
K				short-circuited cathodes
Q				anti-parallel connection
R				parallel connection
S				series connection
J				1 φ bridge
M				3 φ bridge

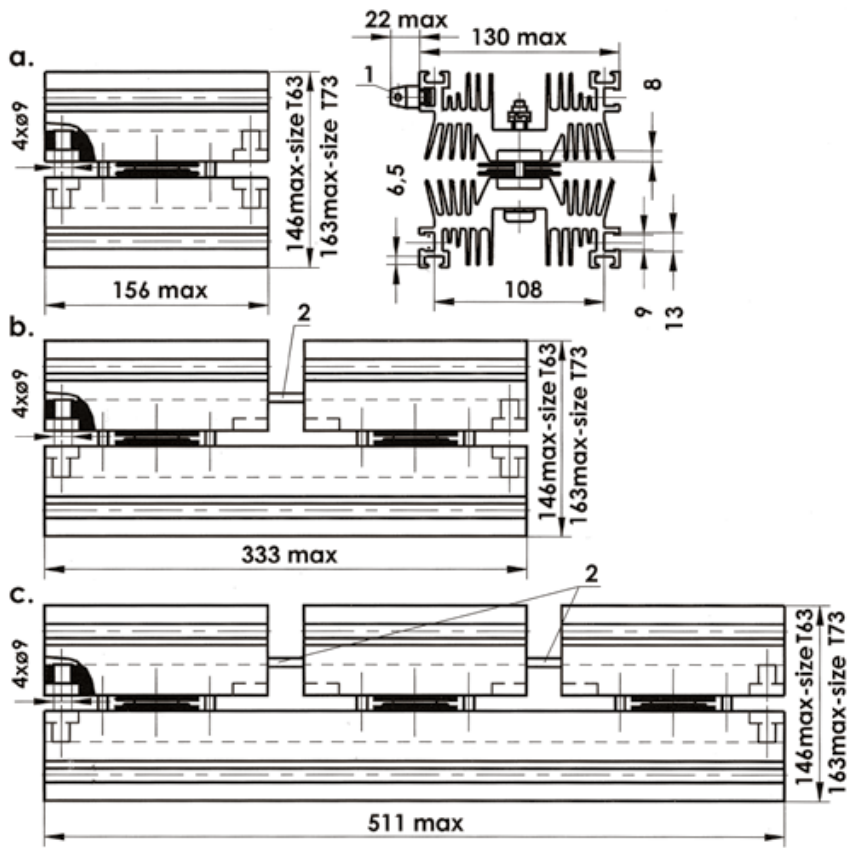


Fig. 1
Assemblies with RU-type heatsink air cooled

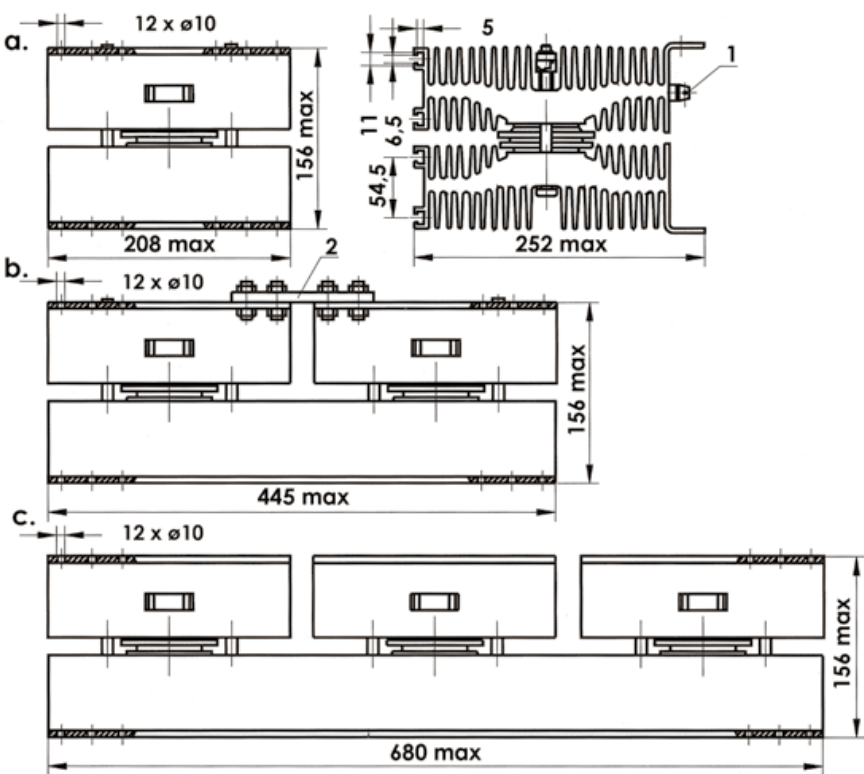


Fig. 2
Assemblies with RY-type heatsink air cooled

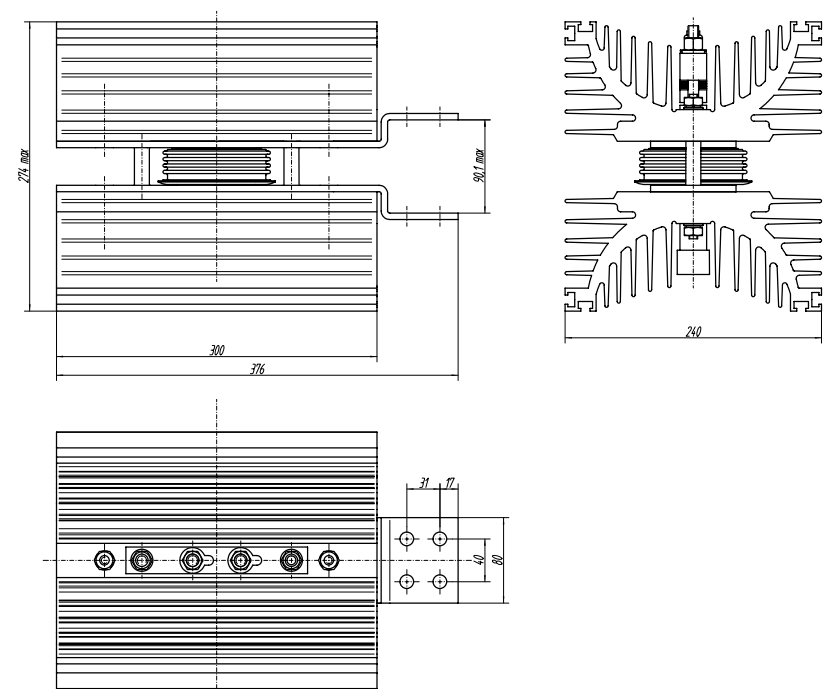


Fig. 3
Assemblies with RR300 – type heatsink

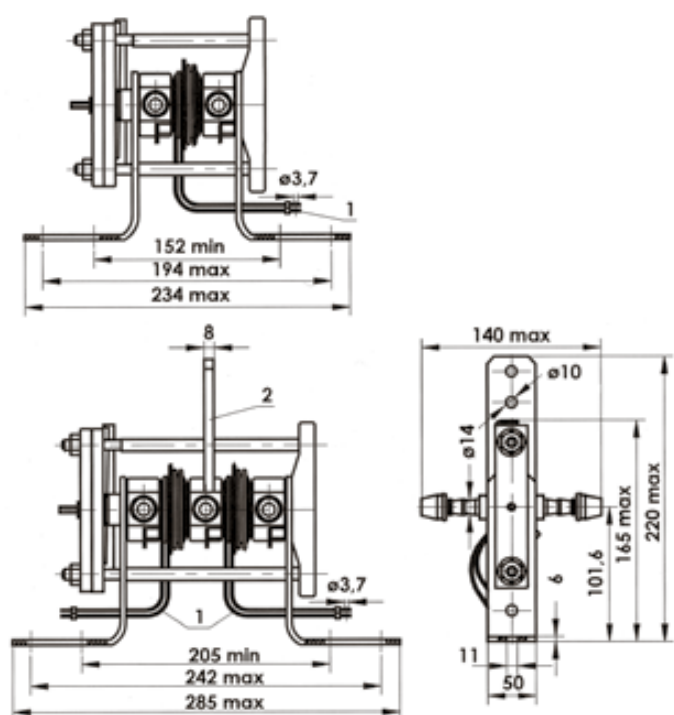


Fig. 4
Assemblies with W48-type heatsink water cooled

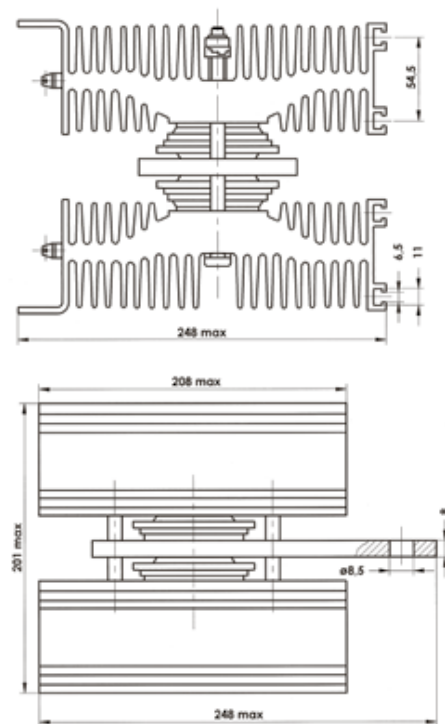
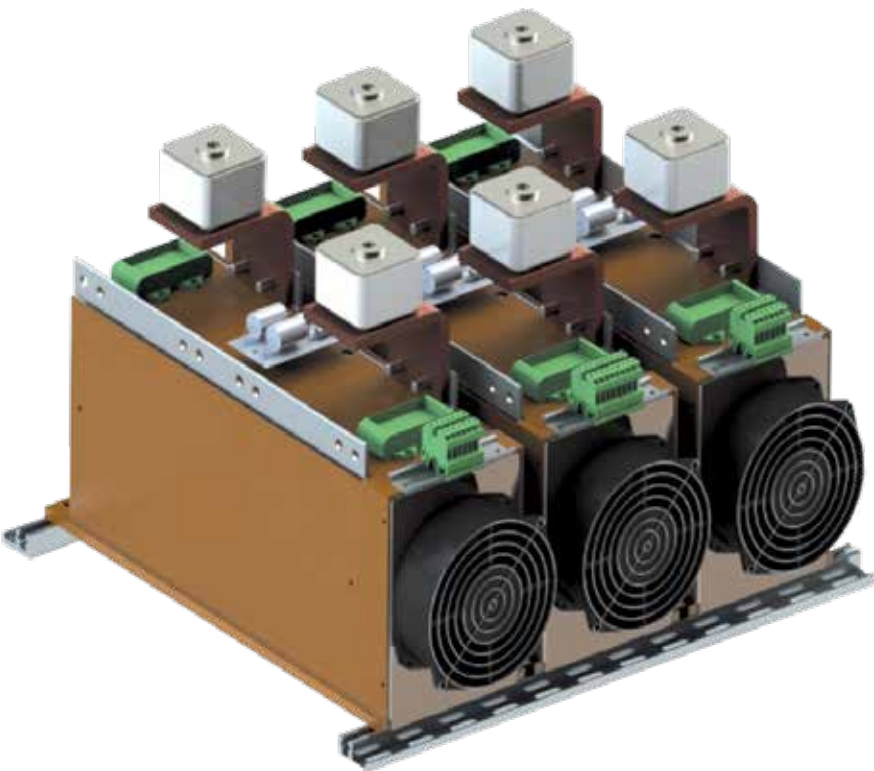


Fig. 5
„N” type assembly with two RY-type heatsinks

3 - PHASE THYRISTOR RECTIFIER - RT 1 (CAPSULE TYPE)



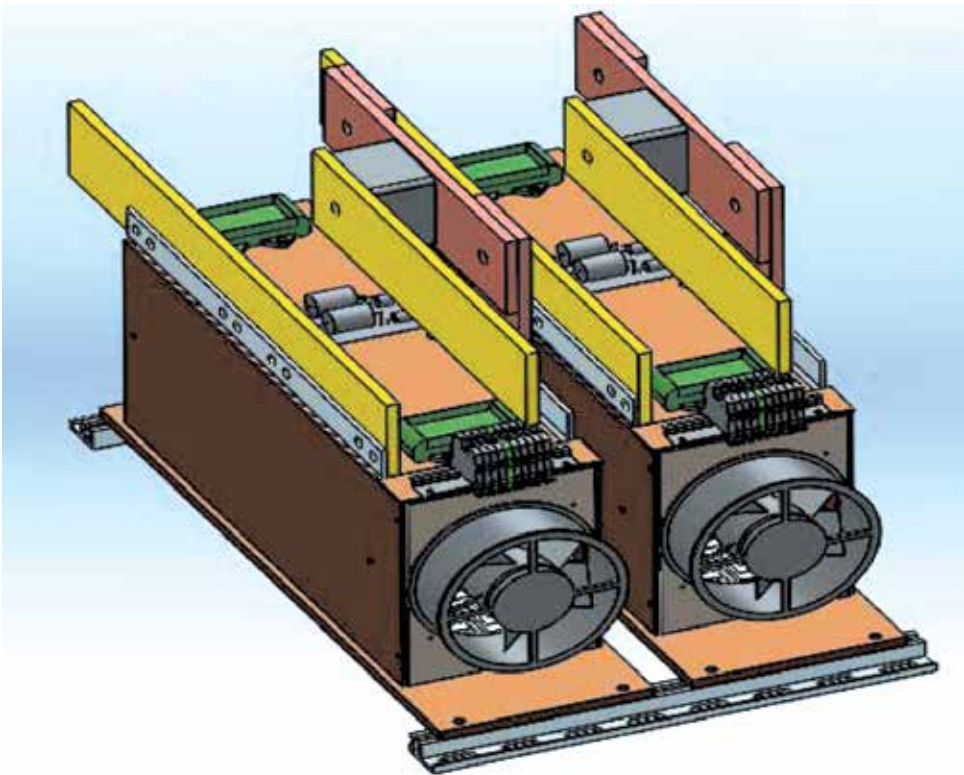
TECHNICAL DATA	
Power supply	3x400V, 50 Hz / 60 Hz
Output voltage	0 ÷ 540V DC
Nominal current	1680 A DC
Voltage control range	0-100 %
Thyristor protection	Method phase
	Short-circuit ultra fast fuse
	Overvoltage RC mufflers
	Temperature sensor PT100
Cooling system	3 pcs. (own fans)
Cover IP protection	IP00
Test voltage of insulation	2,5kV/60 s
Install position	hanged
Operation range temperature	0°C , +40°C
Storage range temperature	0°C ÷ +55°C
Relative Humidity	to 90% (non condensation)
Dimension H x W x D	585x600x385 [mm]
Weight	80 kg

3 - PHASE THYRISTOR RECTIFIER - RT 2 (THYRISTOR MODULES)



TECHNICAL DATA	
Power supply	3x400V, 50 Hz / 60 Hz
Output voltage	0 ÷ 540V DC
Nominal current	1400 A DC
Voltage control range	0-100 %
Thyristor protection	Method phase
	Short-circuit ultra fast fuse
	Overvoltage RC mufflers
	Temperature sensor PT100
	Temperature switch 80° ±5°C
Cooling system	3 pcs. (own fans)
Cover IP protection	IP00
Test voltage of insulation	2,5kV/60 s
Install position	hanged
Operation range temperature	0°C , +40°C
Storage range temperature	0°C ÷ +55°C
Relative Humidity	to 90% (non condensation)
Dimension H x W x D	420X390X250 [mm]
Weight	50 kg

1,2,3 – phase THYRISTOR SWITCH – TS



TECHNICAL DATA	
Power supply	3x400V, 50 Hz
Nominal current	1700 A AC
Coolin system	fans
Operation range temperature	0°C - +40°C
Storage range temperature	0°C - +55°C
Insulation test	2,5 kV
Cover IP protection	IP00
Dimension H x W x D	630x400x425 [mm]
Weight	60 kg

Machines and Testers Constructions



In addition to the discrete product lines, Kubara Lamina offers design and build of testers for diodes, thyristors measurement and devices for industry automation. Kubara Lamina provides support for customers requiring more than the basic semiconductor and utilises the skills of our power electronics, mechanical and electronic engineers.

Further information: www.kubaralamina.com

Qrr test equipment of a reverse recovery charge
in the power thyristors and power diodes

Tester specifications

Type	T.QRR.4000
supply voltage	3x400VAC; 50/60Hz
phase current consumption	12A max
short time power consumption	3kVA
temperature operating	15°C - 40°C
relative humidity (operating)	10% - 90%
dimensions (LxWxH) mm	1177x1365x2470
weight	300kg

Parameters of a test current

waveform shape	trapezoid
current rise (front of a waveform)	ap. 5-14A/μs
set up current back	100-4000A
set up current pulse duration	100-1000μs
set up current fall rate di/dt (voltage and a coil tap)	5-200A/μs
linearity di/dt	better then 10%
maximum value of a measured reverse current Ir	600A
maximum value of a reverse current measurement time	100μs
gate current of a tested thyristor	500mA
impulse duration	40μs

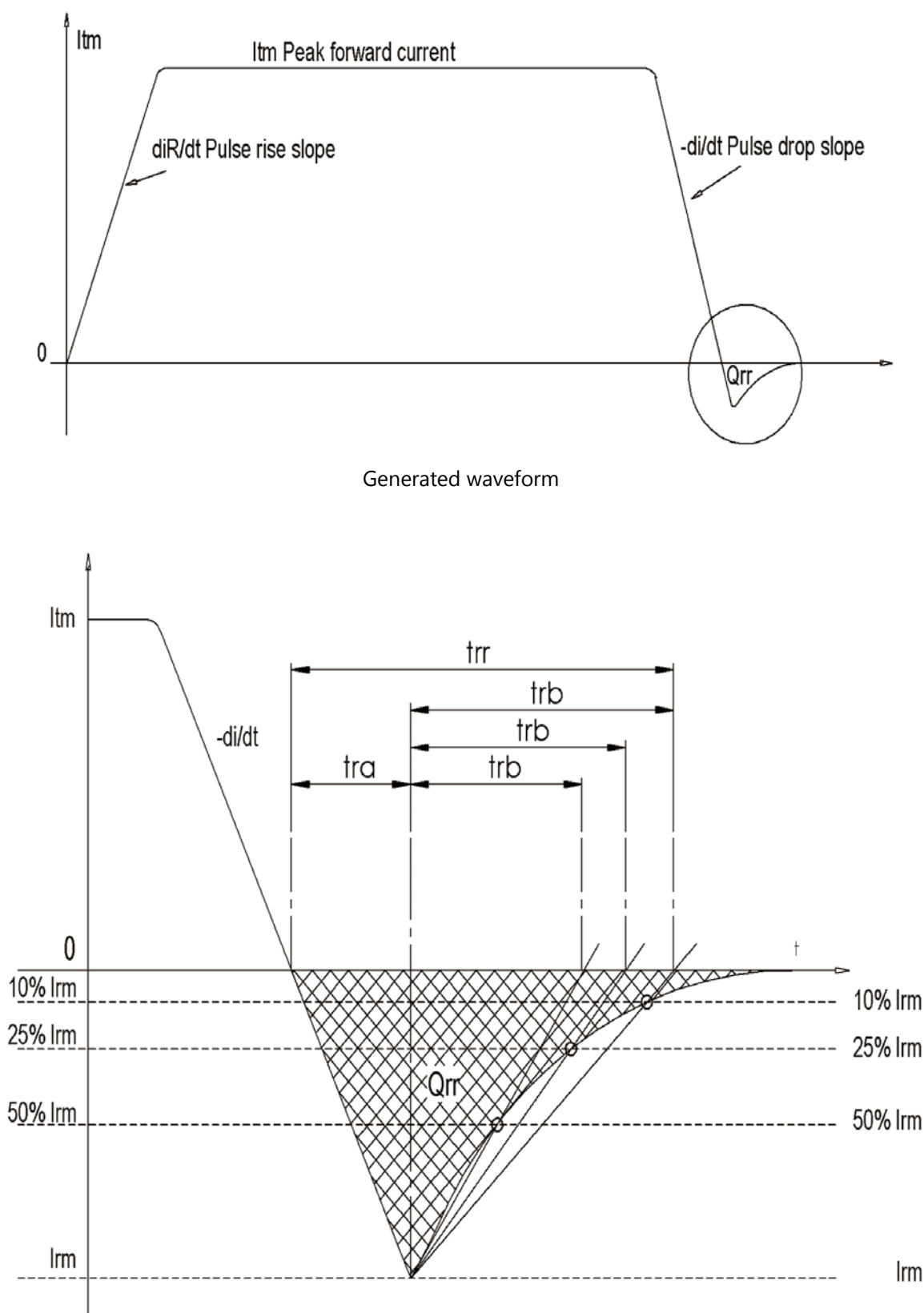
Measurements and results presentation

Reverse current waveform diagram on the monitor	
Calculated value of a Qrr as an integral of waveform on the monitor	in μC
Calculated value according to the definition 1 (10%)	in μC
Calculated value according to the definition 2 (25%)	in μC
Calculated value according to the definition 3 (50%)	in μC
Measurements trr (tra+trb)	in μs

Equipment tester

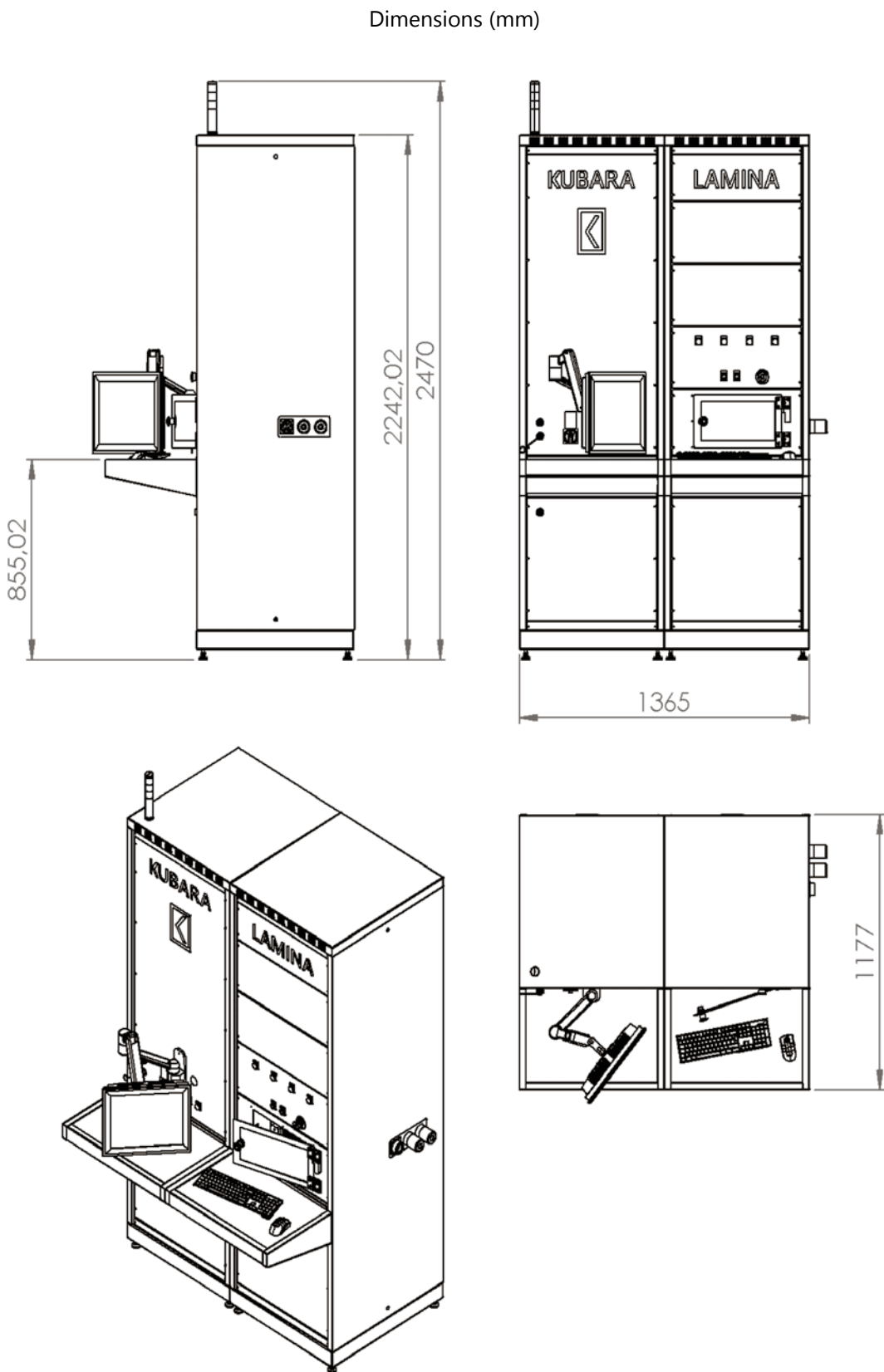
- The tester is equipped with a PC and monitor
Can work with another computer, an external database and barcode reader
- Connection to the press, the ability to communicate with the press via RS-232
- Light Tower operating status tester
- Connection to the press, the ability to communicate with the press via RS-232
- Light Tower operating status tester





Generated waveform

Figure showing measured QRR



Power diodes overload tester TB2

Tester specifications

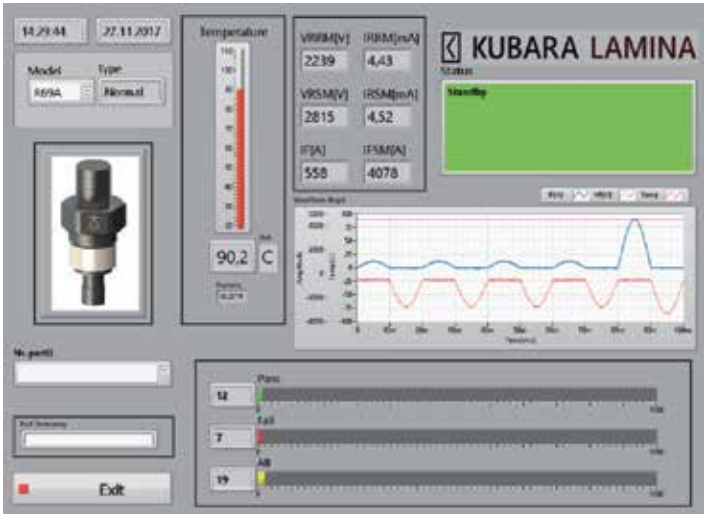
Type	TB2
supply voltage	2x400VAC; 50/60Hz
phase current consumption	12,5A continuous current, (40A/10ms)
short time power consumption	5kVA, (16kVA/10ms)
water cooling	5 ÷ 20 l/min
pressure	6 atm.
temperature operating	15°C - 40°C
relative humidity (operating)	10% - 90%
operating system	Windows 10 64bit
socket diodes	integrated
dimensions (LxWxH)	1210x1300x2150mm
weight	400kg

Parameters of a test current and voltage

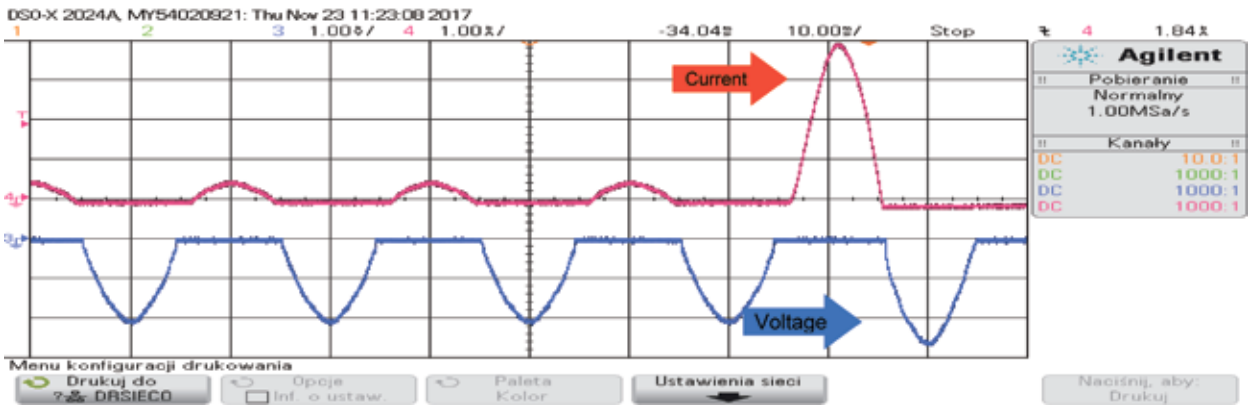
waveform shape	sinus
set up current (heating) VF1	100-600A peak (40 ÷ 90 sec.)
set up current (overload) VF2	4000A peak (10ms)
set up voltage VR1	100-5000V peak (40 ÷ 90 sec.)
set up voltage VR2	100-5000V peak (10ms)
measured reverse current IRRM	1 ÷ 170mA
Continuous temperature measurement of the diode	10°C ÷ 110°C
diode temperature at overload current	90°C

Equipment tester

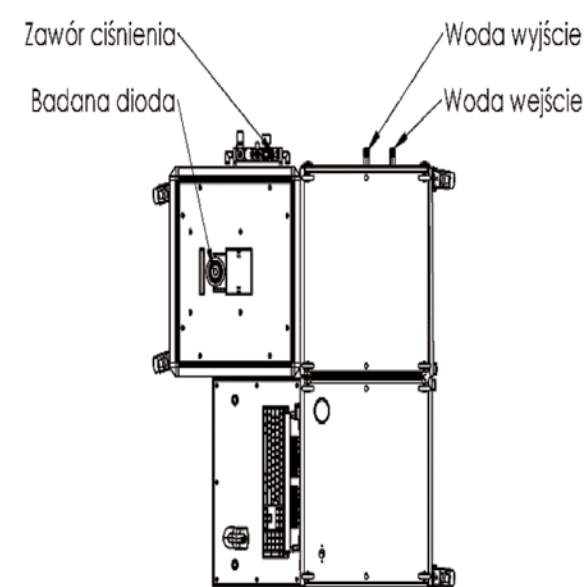
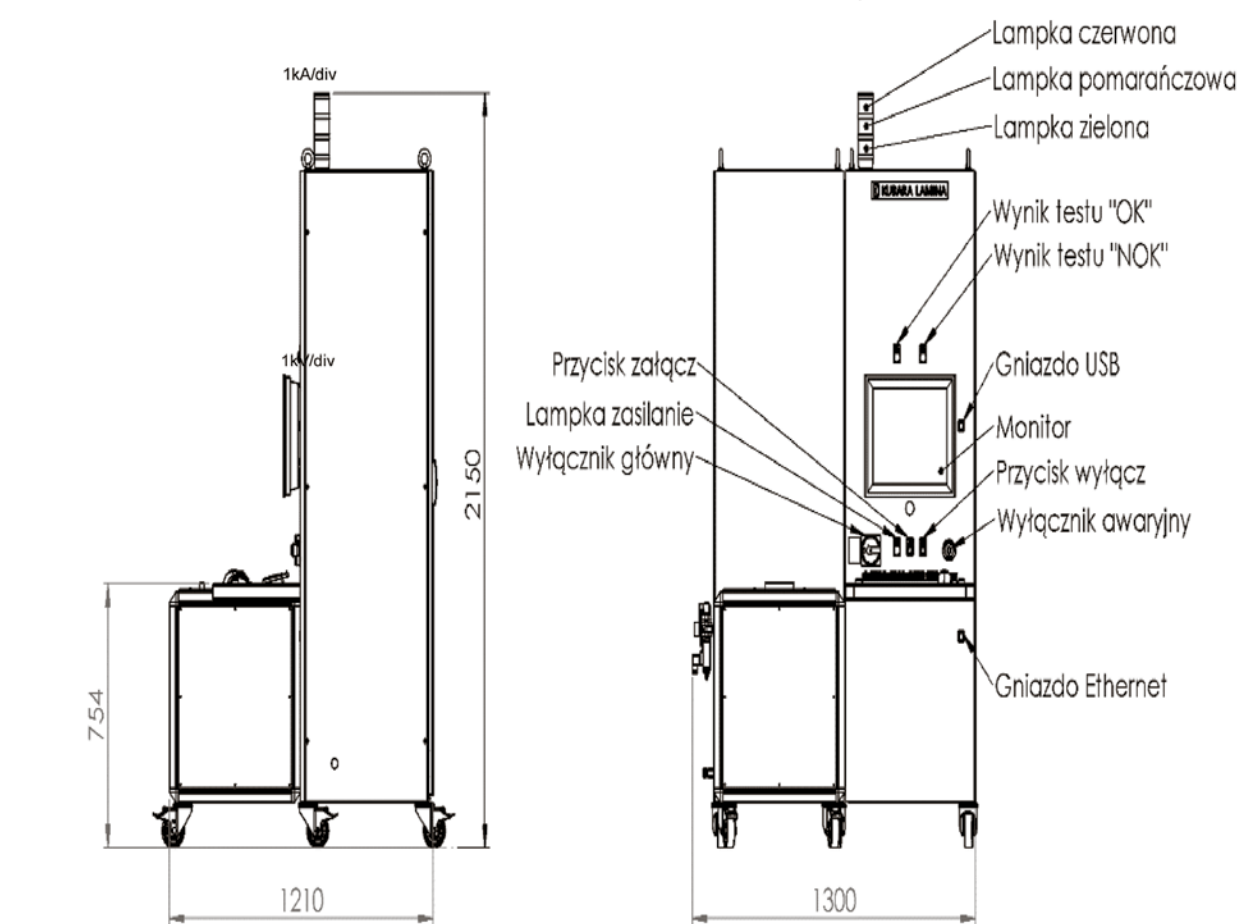
- The tester is equipped with a PC and monitor Can work with another computer, an external database and barcode reader. Light Tower operating status tester.



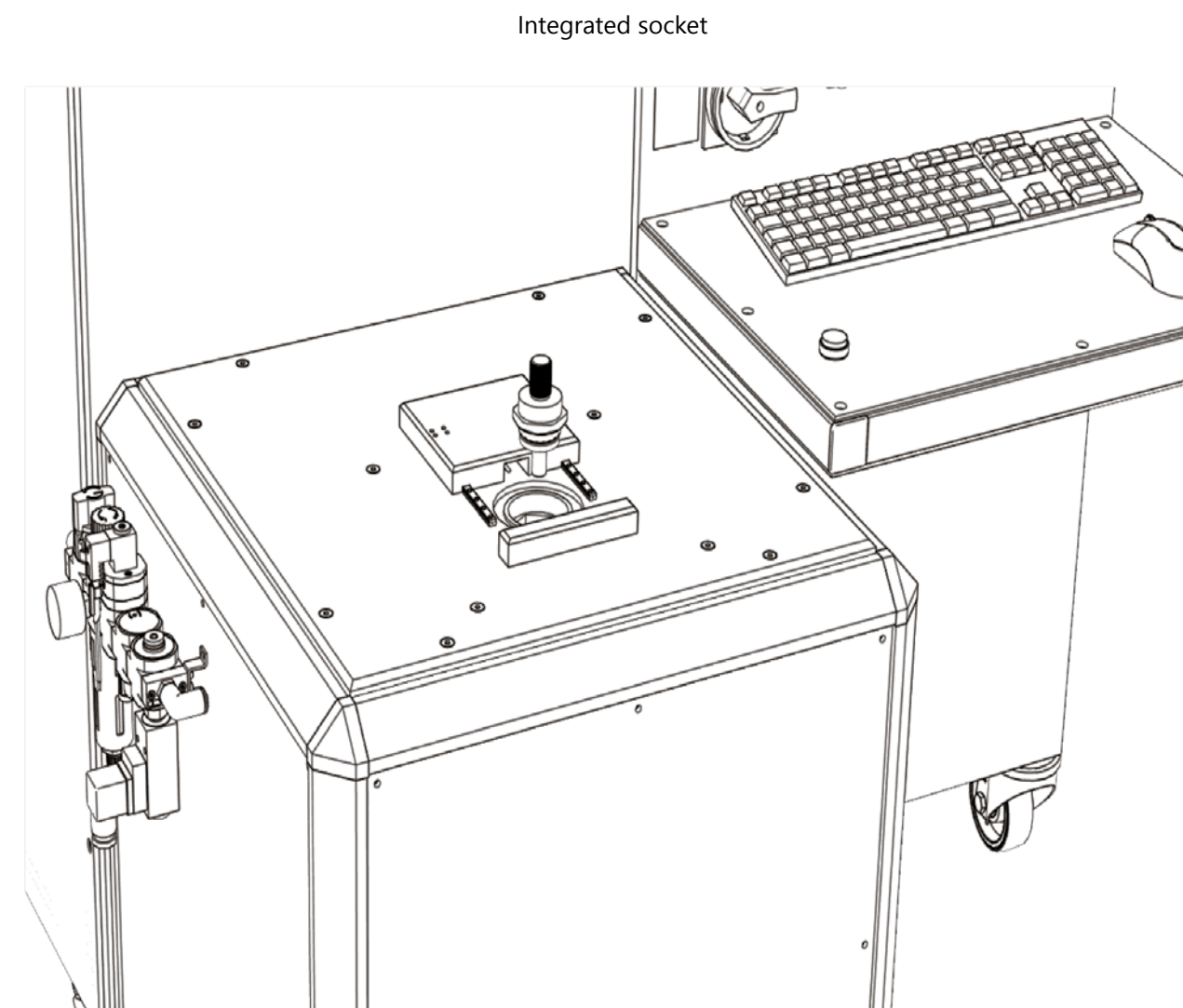
Computer screen



Generated wavefor



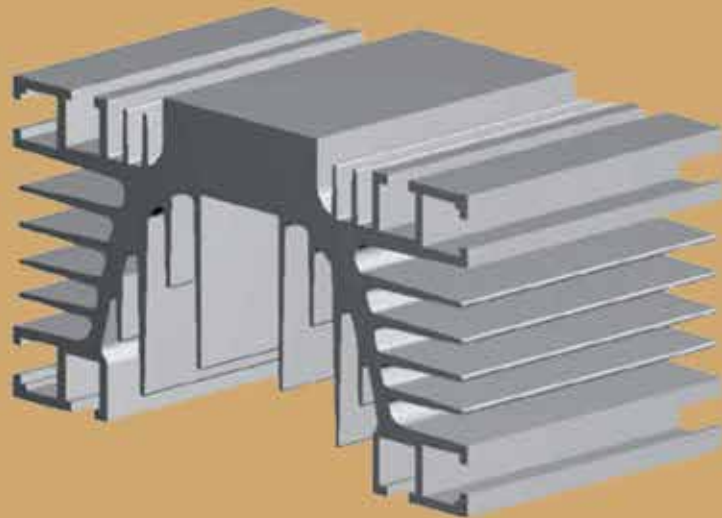
Dimensions (mm)



5

ACCESSORIES

Accessories



KUBARA LAMINA offers a wide range of heatsinks and clamp sets.

Heatsinks are available for capsule, studs and insulated base modules.

Heatsinks _____ 58

Clamp Sets _____ 61

Further information: www.kubaralamina.com

Type	Suitable for	Fig.
RP 127	Studs D51, D52, T51, T52	1
RT 230	Studs D71, T71	1
RU 152	Capsules D63, T63, T73, D75, T75, D83, T83	2
RE	Modules	3
RR300	Capsules DB3, DB5	4
W35, W35W	Capsules D63, T63, T73, D75, T75, D83, T83	5
W48	Capsules D95, T95	6
W80	Capsules DB3, DB6	7
RY205	Capsules: D95, T95	8

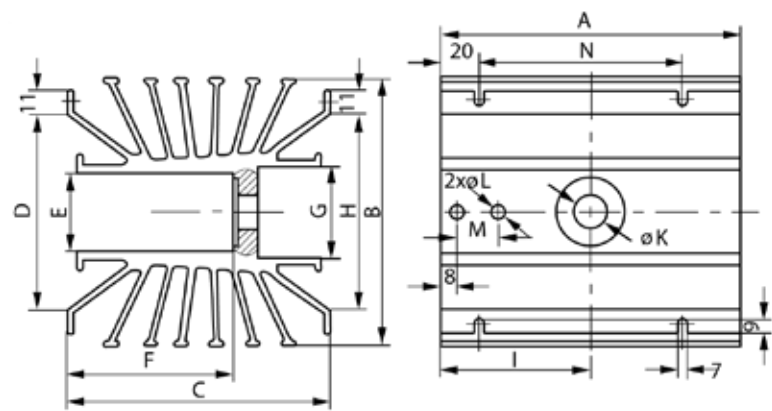


Fig. 1
Heatsink type RP127/RT230 for stud type devices: D51, D52, T51, T52, D71, T71

	A	B	C	D	E	F	G	H	I	K	L	M	N	wight
														g
RP127	127	102	102	70	30	63,5	32	70	63,5	13	7	16	80	900
RT230	230	160	160	120	48,5	93,5	54	120	115	21	9	25	160	2850

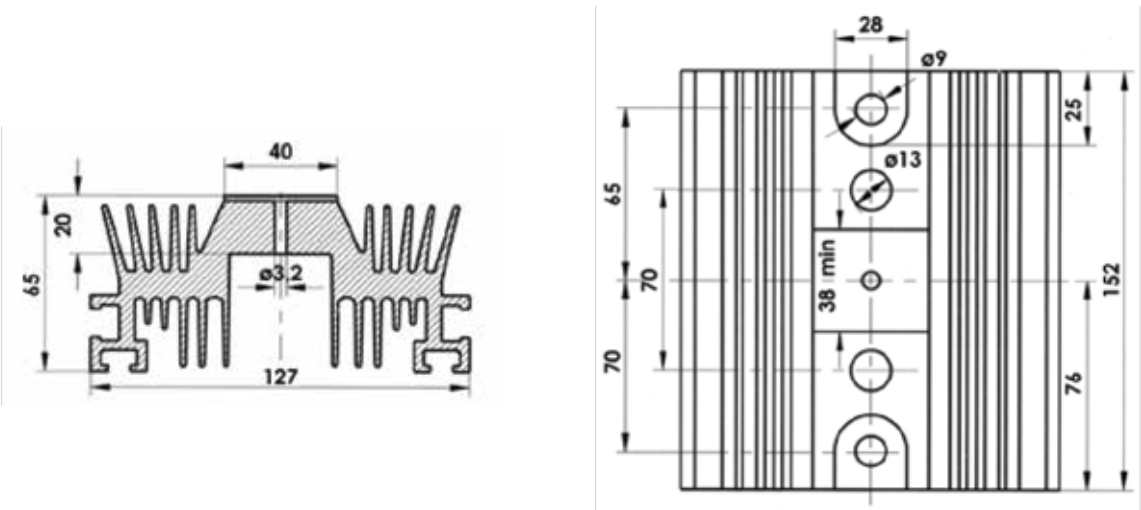


Fig. 2
Heatsink type RU152 (weight 1320g) for hockey puk devices: D63, T63, D73, T73, D75, T75, D83, T83

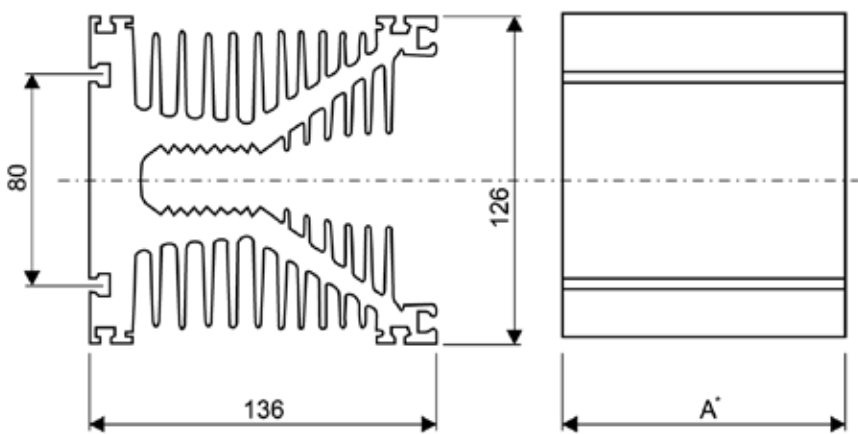


Fig. 3
Heatsink type RE for modules
A* according to customers requirements

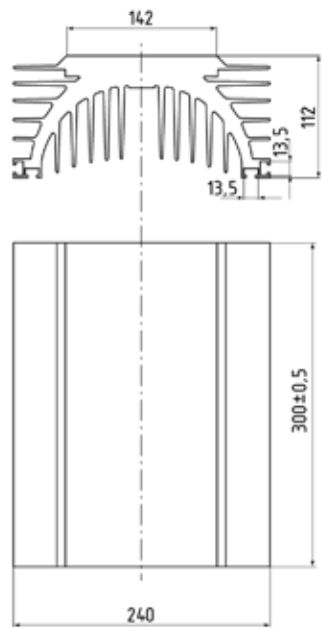


Fig. 4
Heatsink type RR300 (weight 8900 g)
for hockey puk devices: DB3, DB5

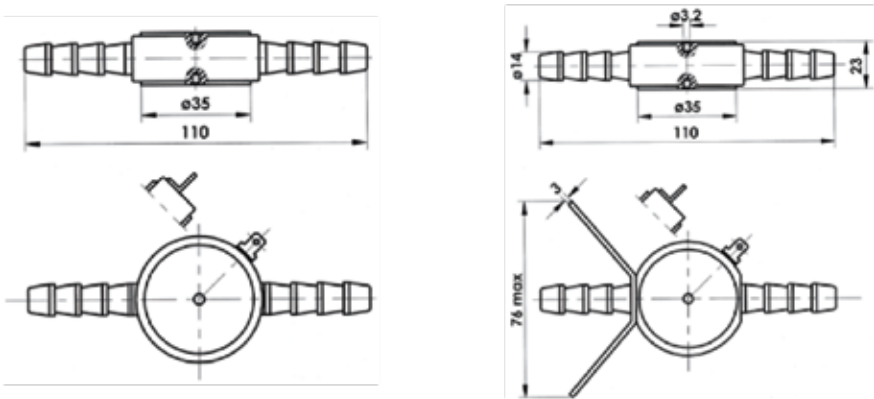


Fig. 5
Heatsink type W35 and W35W for devices: D63, T63, D75, T75, D73, T73, D83, T83

Accessories - Heatsinks

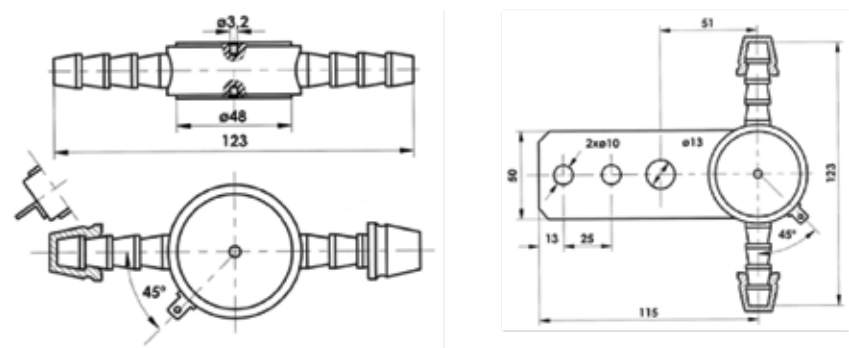


Fig. 6
Heatsink type W48 and W48W for devices: D95, T95

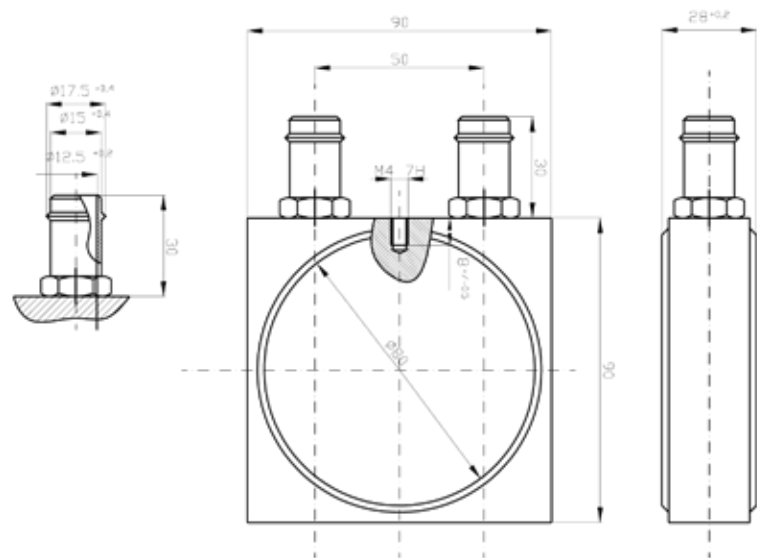


Fig. 7
Heatsink type W80 for devices: DB5, DB3

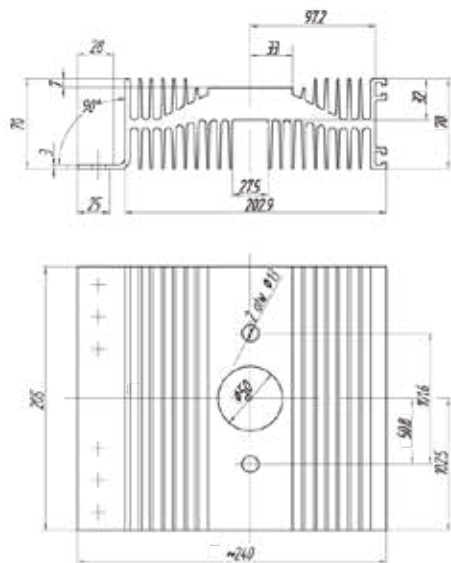


Fig. 8
Heatsink type RY205 (weight 3500g) for devices: D95, T95

Accessories - Clamp Sets

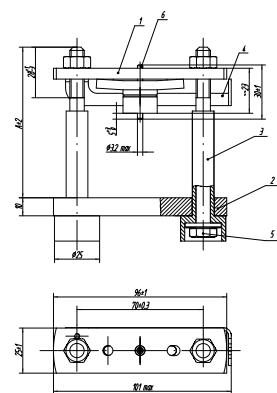


Fig. 1
Clamp set type K1
1 - spring
2 - clamping bar
3 - insulator
4 - clamping force indicator
5 - screw M8x1
6 - locating pin adapted for thermoelements
A* - according to customers requirements

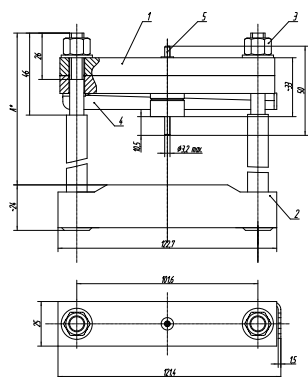


Fig. 2
Clamp set type K2
1 - spring
2 - insulator
3 - screw M8x1
4 - clamping force indicator
5 - locating pin adapted for thermoelements
A* - according to customers requirements

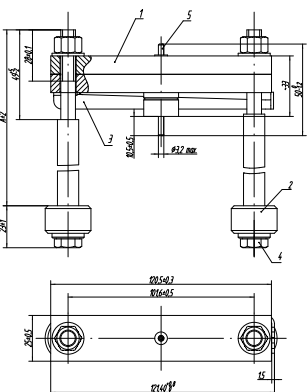


Fig. 3
Clamp set type K2A
1 - spring
2 - ceramic insulator
3 - clamping force indicator
4 - screw M8x1,25
5 - locating pin for thermoelements
A* - according to customers requirements

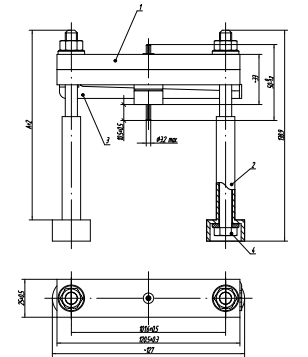


Fig. 4
Clamp set type K2B
1 - spring
2 - insulator
3 - clamping force indicator
4 - screw M8x1,25
A* - according to customers requirements

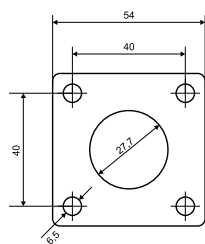


Fig. 5
Clamping plate for devices:
D64, D66, T64, T66

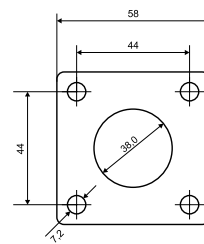


Fig. 6
Clamping plate for devices:
D74, T74

6

**MICROWAVE PRODUCTS
& RD CENTER**

Microwave Products & RD Center

From the beginning of the company's activity, one of the main areas of our business has been design and production of microwave products. Known for high-quality products and unmatched customer support, Kubara Lamina's Microwave Products Division is constantly developing and manufacturing technologically superior, competitively priced, microwave devices.

As the preferred provider of state-of-the-art microwave products Kubara Lamina's products are essential to a variety of defense and commercial applications and are utilized in countless radar, electronic countermeasure, medical, industrial, communications and scientific applications. A world-class team of highly specialized engineers and production employees ensures the highest quality of high-tech products.

Further information: www.kubaralamina.com

Kubara Lamina offers a broad array of microwave products that span the power/frequency spectrum, and its product portfolio includes:

- Crossed-field amplifiers
- Magnetrons
- TR-tubes
- Higher Order Modes Beam Line Absorbers (HOM BLA)

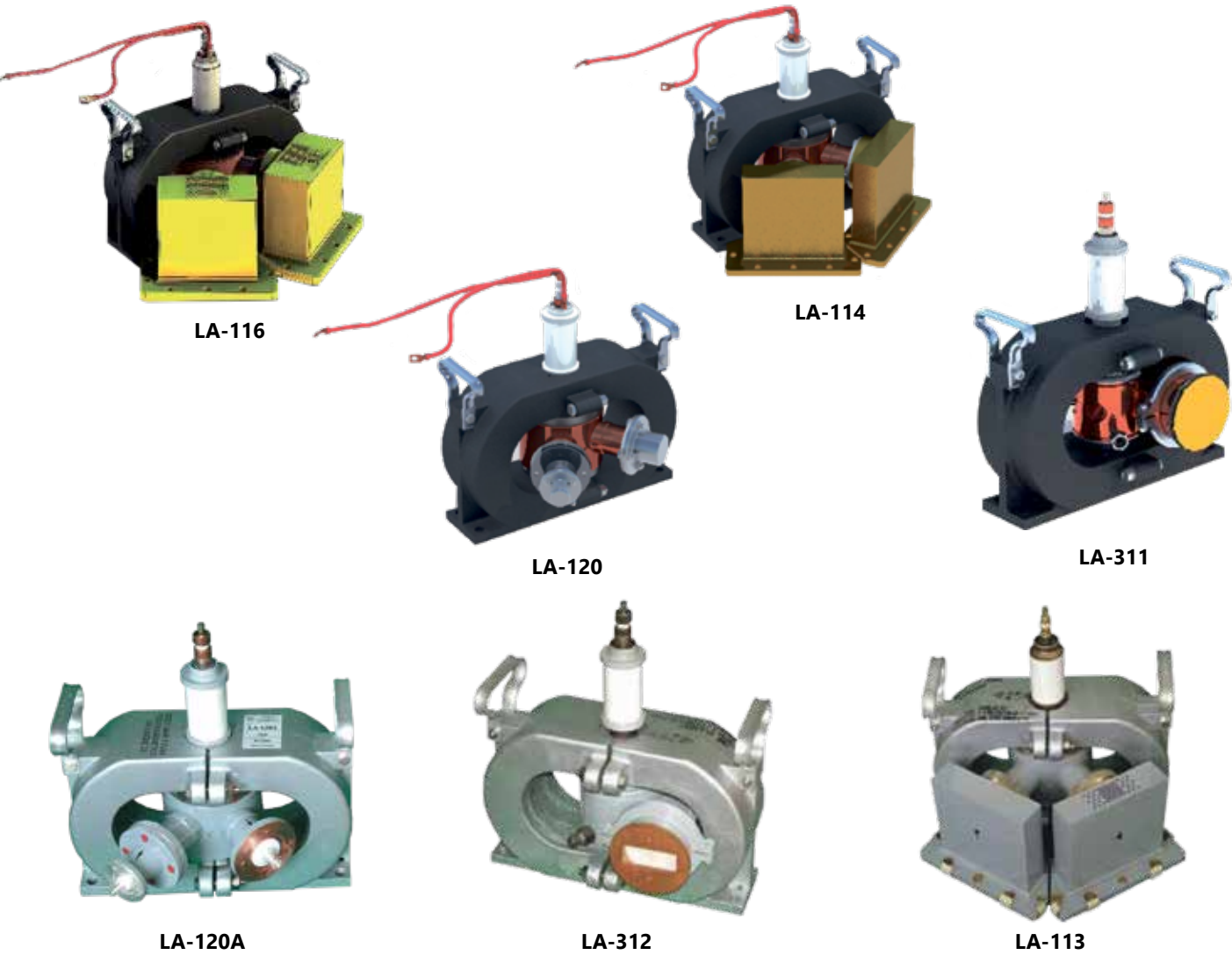
As a manufacturer of vacuum products Kubara Lamina has experience in technological processes with regarding to:

- brazing in protective atmosphere (hydrogen, brown gas)
- ceramics - metal and metal-glass connections
- technology of sintered tungsten and molybdenum powders
- generation of high vacuum, treatment of hardly treated materials, welding and galvanic applications

Crossed – field amplifiers

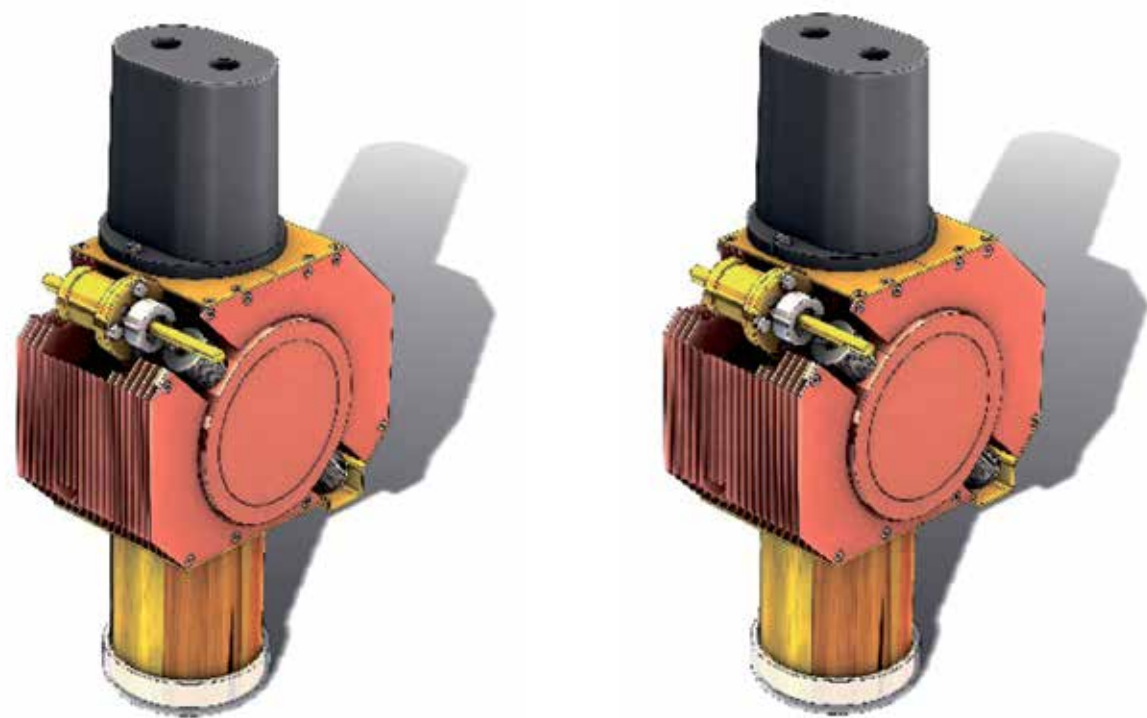
Amplifying high power tubes used in radar transmitter (L, S band)

Crossed-Field Amplifiers										
Type	Frequency	RF bandwidth	RF drive	Peak Power	Peak output power	Pulse duration	Peak anode voltage	Peak anode current	Filament voltage	Filament current
	(MHz)	(MHz)	(kW)	(kW)	(kW)	(µs)	(kV)	(A)	(V)	(A)
LM-112	L band	100	3,5	50	330	10,6	10-12	10-15	4,5-6,5	30
LM-113	L band	100	40	400	2500	10	24-29	27-32	4,6-6,8	30
LM-114	L band	100	7	100	800	12-22	12-15	13-18	5,2-6,8	30
LM-115	L band	100	75	600	4300	20	28-34	30-35	5,2-6,8	30
LA-115 bis	L band	100	550	1200	7400	20	34-41	28-35	4,5-7	30
LA-116	L band	100	40	400	7000	50	27-30	21-31	4,5-7	30
LA-120	L band	100	8	100	1500	2-12	12-15	13-18	5,2-6,8	30
SA-311	S band	200	6	90	925	10	19-24	9-12	4-6	30
SA-312	S band	200	75	520	2400	9	36-43	21-28	7-9	32
SA-313	S band	200	6	105	700	11	19-24	9-12	4-6	30
SA-314	S band	200	90	700	4400	10	40-46	27-33	7-10	32



Magnetrons

Microwave generating tubes for microwave testing stations. They also have applications in the military, industrial, medical and scientific industries. They are designed in a wide range of frequencies depending on applications: continuous wave magnetrons for S and Ku, and pulse magnetrons for L and S band.



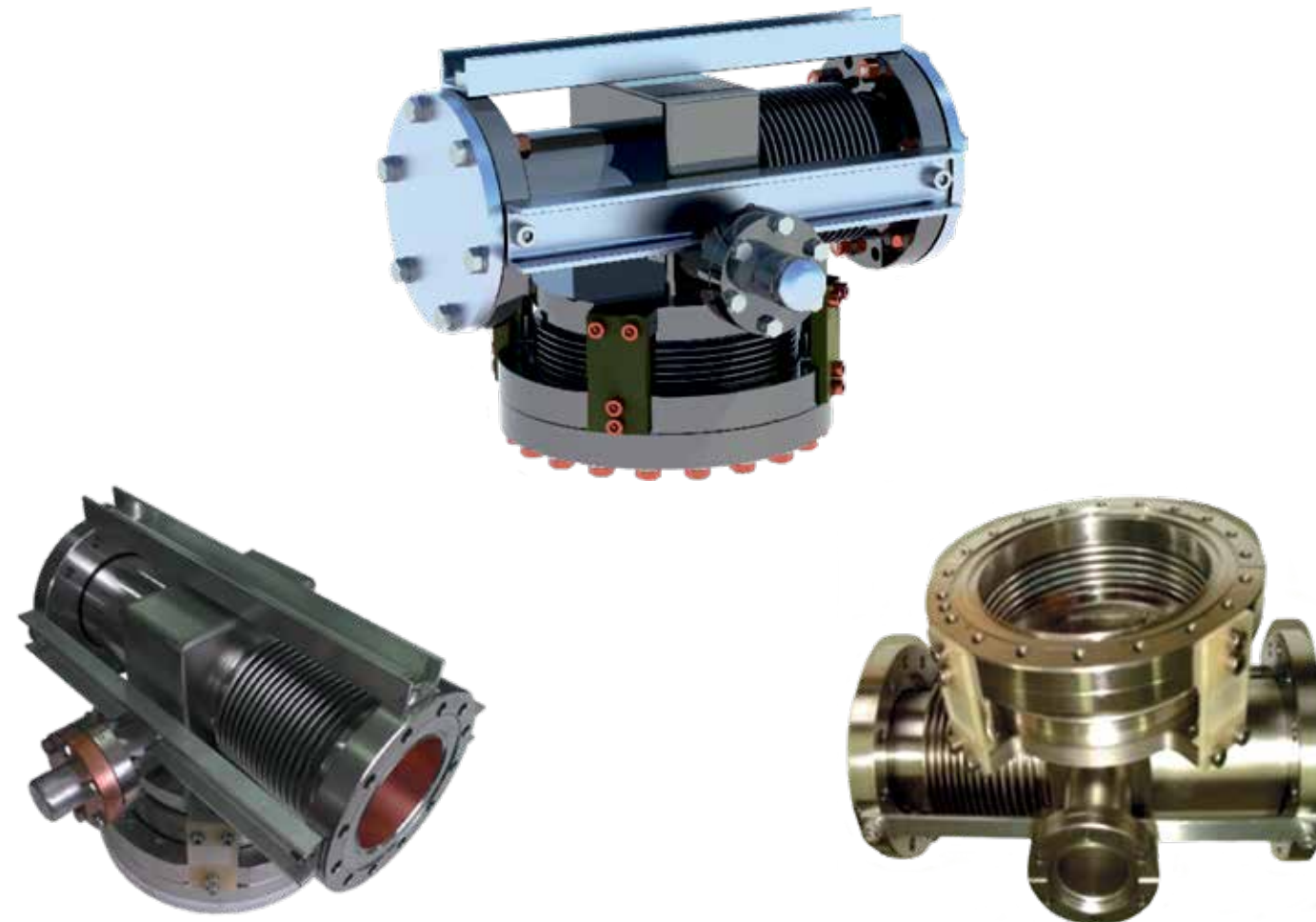
TR – tubes

(duplexer devices) – components of radar protection system

Higher Order Modes Beam Line Absorber (HOM BLA)

Beam Line Absorber technologically advanced product of Kubara Lamina for suppression of higher order modes of parasitic frequencies in an **X – ray free electron laser project (XFEL)** for **Research Centre DESY Hamburg**. The Polish part was represented by the National Centre for Nuclear Research and Kubara Lamina engineers, which engaged in production of beam line absorber for the electron LINAC of European XFEL facility.

In 2017 the DoE agency of the US government selected Kubara Lamina as supplier of some microwave subassemblies for the **Linac Coherent Light Source (LCLS-II) free electron laser** currently under development at the **SLAC lab (Stanford University, California)**. The order has come after successful accomplishment of an order for similar equipment for the European XFEL laser in Hamburg delivered jointly by National Centre for Nuclear Research and Kubara Lamina.

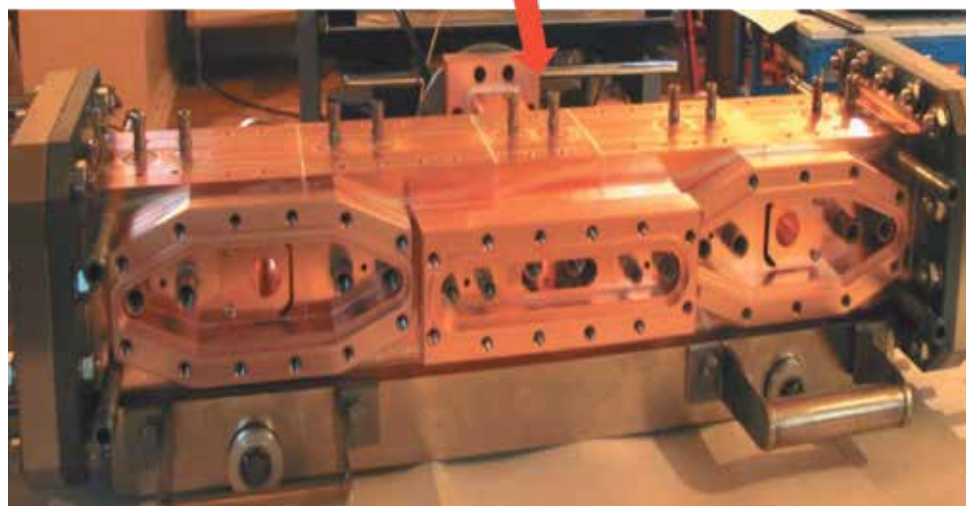


Kubara Lamina microwave products division offers products and services for scientific purposes. In this regards, an important recipient of our services is National Centre for Nuclear Research in Świerk Poland. Upon the order of the Institute, among other, the following devices have been made:

- RF Deflector
- Compressor Coupler CMP00
- Filtres for plasma technologies
- Proton accelerator section II



Compressor Coupler CMP00



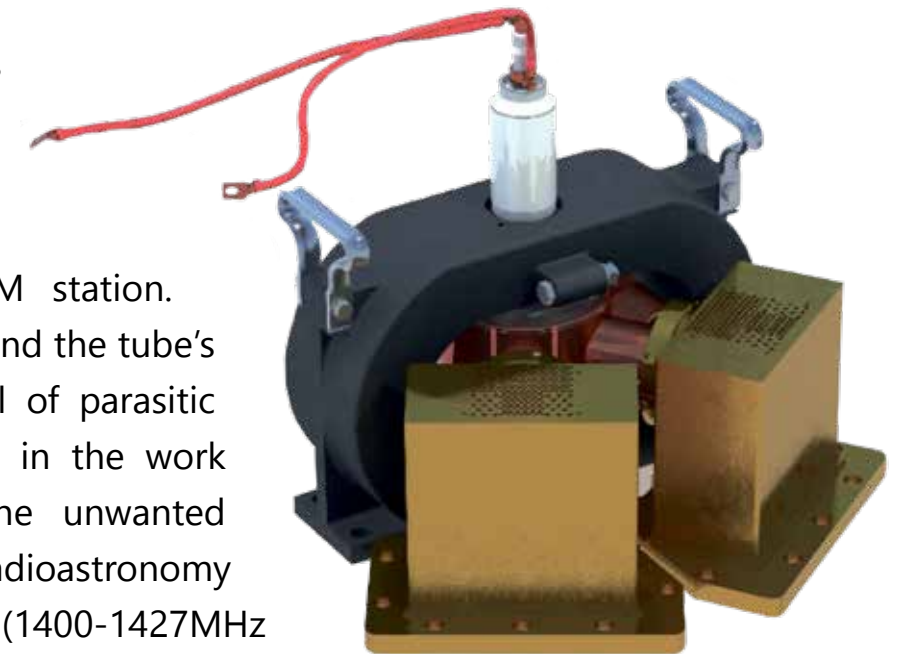
The model of middle section of proton accelerator for the treatment of cancer

The research and development activity of Kubara Lamina includes:

- LA-116 tube modernization
- High power travelling wave tube
- Vacuum circuit breaker
- Continuous wave magnetrons for 2.45 GHz (5.8 GHz)
- Pulsed-power magnetron for Ku band
- Microwave generator for S-band

LA-116 tube modernization

The company conducts development works on improving the parameters of LA-116 tubes, used in transmitters of the NUR-12M station. The aim of the works is to extend the tube's working time, lower the level of parasitic signals and broadband noise in the work band, as well as reduce the unwanted emission power level in the radioastronomy band and satellite earth tests (1400-1427MHz band).



High power travelling wave tube

High power travelling wave tubes (TWT) operating in the S-band are applicable in military radiolocation systems. The design of the S-band tube, equivalent to the tube used in TRS-15 radars, is implemented by the Kubara Lamina in cooperation with specialists from the PIT-RADWAR S.A. branch in Wrocław. In 2016, based on the initial model of the tube, the construction of the main components of the tube was detailed: the electron gun, the structure of the delay line and the collector. As a result



of the research, the construction of the delay line was modified. In 2017, the initial construction documentation for the product was developed. On its basis, the tube design has been implemented for specialist computing programs. The correctness of its operation has been pre-validated by means of electromagnetic simulations with a positive effect. In addition, the emission from the electron gun was tested in an experimental manner, also with a positive effect. All electron gun elements (ie cathode, insulating ceramics, pass-through ceramics and other elements) have been purchased, completed and are in the process of assembly of the test unit.

Vacuum circuit breaker



Pulsed-power magnetron for Ku band

Kubara Lamina designed 300W pulse magnetrons with a frequency of 14 GHz



Continuous wave magnetrons for 2.45 GHz (5.8 GHz)

Kubara lamina conducts research and development works carried out in the Company over magnetrons for a continuous wave with power of 1kW to 5kW and frequencies 2.45GHz and 5.8 GHz. These types of microwave tubes are used in many industries:

- in the food industry - for processing and drying food
- in the chemical industry - to accelerate chemical reactions
- in other industries - above all to speed up the drying processes

Microwave generator for S-band

Kubara Lamina has designed and manufactured HPM sources for the needs of a project run by the Military University of Technology. As part of the project, a high power microwave generator should be created, designed to generate single or packs of pulses with a width of individual μ s. The generator is to be based on a pulse magnetron connected to the antenna and powered from supercapacitors. The HPM generator parameters will be controlled by a computer. Currently, design works are underway on the magnetron block for the S-band, and the impulse power supply is also being designed.



**POWEREX – POWER
SEMICONDUCTOR SOLUTION**

KUBARA LAMINA

OFFICIAL DISTRIBUTOR & PARTNER



Powerex is a leading supplier of discrete devices, modules and integrated high power semiconductor solutions. Its broad product line includes IGBTs (Insulated Gate Bipolar Transistors), HVIGBTs, rectifiers, thyristors, custom power modules and assemblies.



IGBTs	80
THYRISTOR / DIODE MODULES	82
DISCRETE THYRISTORS & RECTIFIERS	85
FAST - RECOVERY DIODE MODULES	93

For more information: e-mail: marketing@kubaralamina.com

The Powerex IGBT/HVIGBT line-up of Powerex self-manufactured devices employ CSTBT (Carrier Stored Trench-Gate Bipolar Transistor) technology, supporting the reduced power loss and miniaturization required for industrial applications. Powerex HVIGBTs and HV diodes, feature highly insulating housings that offer enhanced protection by means of greater creepage and strike clearance distance for many demanding applications like medium voltage drives and auxiliary traction applications.

Applications Include:

- Electric Vehicles
- Inverters
- Medical Power Supplies
- Motor Drives
- Servo Drives
- Traction Inverters
- UPS
- Welding



IGBT / HVIGBT

IGBTs				
Part Number	Voltage	Current	Circuit Configuration	Package
QIC3320002	3300V	200A	Common Emitter	140x73mm
QIC4515002	4500V	150A	Common Emitter	140x73mm
QIC6508001	6500V	85A	Common Emitter	140x73mm
QID3310006	3300V	100A	Dual HVIGBT	140x73mm
QID3320002	3300V	200A	Dual HVIGBT	140x73mm
QID3320004	3300V	200A	Dual HVIGBT	140x73mm
QID3330001	3300V	300A	Dual HVIGBT	140x73mm
QID3340001	3300V	400A	Dual HVIGBT	140x130mm
QID3350001	3300V	500A	Dual HVIGBT	140x130mm
QID4515002	4500V	150A	Dual HVIGBT	140x73mm
QID4515004	4500V	150A	Dual HVIGBT	140x73mm
QID4520002	4500V	200A	Dual HVIGBT	140x73mm
QID6508001	6500V	85A	Dual HVIGBT	140x73mm
QIF3320002	3300V	200A	Common Collector	140x73mm
QIF4515002	4500V	150A	Common Collector	140x73mm
QIS1260015	1200V	600A	Single	121.7mm x 62mm
QIS1760002	1700V	600A	Single	110x80mm



POW-R-BLOK™

Thyristor and Diode modules from Powerex ranging from 600V to 11,000V

POW-R-BLOK™ Applications Include:

- Battery Chargers
- Induction Heating/Melting
- Medical Equipment
- Motor Controls
- Power Supplies
- UPS
- Welding



POW-R-BLOK™/POW-R-BRIK™

SCR MODULES				
Part Number	Style	Voltage	Current	Circuit Configuration
CD43	Phase Control	800 V – 1800 V	40 A – 100 A	Dual SCR
CD63	Phase Control	800 V – 2500 V	150A	Dual SCR
LD43	Phase Control	800 V – 2200 V	430 A – 500 A	Dual SCR
LDR3	Phase Control	1600V – 1800 V	500A	Dual SCR
LS43	Phase Control	800 V-2200 V	430 A – 500 A	Single SCR
ND43	Phase Control	800 V – 2000 V	210 A – 250 A	Dual SCR
PA43	Phase Control	600 V-2400 V	600 A - 700A	AC Switch
PD43	Phase Control	600 V – 2400 V	600 A – 700 A	Dual SCR
PS43	Phase Control	1200 V – 2400 V	1500 A	Single

DIODE MODULES				
Part Number	Style	Voltage	Current	Circuit Configuration
CC41	General Purpose	1000 V – 2500 V	100A	Common Cathode
CD41	General Purpose	800 V – 2500 V	100A	Dual Diode
CD61	General Purpose	800 V – 3600 V	160A	Dual Diode
CN41	General Purpose	800 V – 2500 V	100A	Common Anode
CN61	General Purpose	800 V – 3600 V	160A	Common Anode
CS41	General Purpose	800 V – 2500 V	100A	Single Diode
CS61	General Purpose	800 V – 3600 V	160A	Single Diode
LD41	General Purpose	800 V – 2400 V	600A	Dual Diode
LDR1	General Purpose	1600V – 1800 V	660A	Dual Diode
LS41	General Purpose	800 V – 2600 V	600A	Single Diode
ND41	General Purpose	600 V – 2200 V	260A - 350A	Dual Diode
NS41	General Purpose	600 V – 2200 V	260A - 350A	Single Diode
PD41	General Purpose	600 V – 4000 V	1100A	Dual Diode
PN41	General Purpose	600 V – 4000 V	1100A	Common Anode
PS41	General Purpose	600 V – 2400 V	2500A	Single
PS41	General Purpose	3600 V – 4000 V	2000A	Single Diode
PS41	General Purpose	4500 V – 5000 V	1400A	Single Diode
QRD4518001	General Purpose	4500V	180A	Dual Diode
QRD6516001	General Purpose	6500V	160A	Dual Diode

POW-R-BLOK™

SCR / DIODE MODULES				
Part Number	Style	Voltage	Current	Circuit Configuration
CD42	General Purpose	800 V – 1800 V	40 A – 90 A	SCR/Diode
CD47	General Purpose	800 V – 1800 V	90A	Diode/SCR
CD62	General Purpose	800 V – 2500 V	150A	SCR/Diode Module
LD42	General Purpose	800 V – 2200 V	430 A – 500 A	SCR/Diode
LD47	General Purpose	800 V – 1600 V	500A	Diode/SCR
ND42	General Purpose	800 V – 1800 V	210 A – 250 A	SCR/Diode
ND47	General Purpose	800 V – 1800 V	250A	Diode/SCR
PD42	General Purpose	600 V – 2200 V	600 A , 700A	SCR/Diode Module
PD47	General Purpose	600 V – 1800 V	700A	Diode/SCR



Powerex manufactures a wide range of disc and stud discrete thyristors/Silicon Controlled Rectifiers (SCRs) and stud discrete rectifiers/diodes.

Applications include:

- Battery chargers
- Flexible AC transmissions
- Induction heating
- Medical equipment
- Medium volume inverters
- Motor controls
- Power supplies
- Traction inverters
- Transportation
- UPS
- VAR generators
- Welding

General Purpose
Voltage: 100V to 6500V
Current: 100A to 12,000A

Fast Recovery
Voltage: 200V to 3600V
Current: 125A to 1500A

Phase Control SCRs
Voltage: 100V to 6500V
Current: 40A to 5000A

Inverter Grade SCRs
Voltage: 200V to 2000V
Current: 40A to 2100A

Discrete Thyristors & Rectifiers

DISCRETE THYRISTORS – PHASE CONTROL – DISC		
Part Number	Voltage	Current (A/°C)

Up to 1600V		
T620--2004DN	200 - 1600	200 / 88
T620--3004DN	200 - 1600	300 / 80
T625--3004DN	200-1200	300 / 80
T625--4004DN	200-1200	400 / 80
T7H8--6504DN	200 - 1600	650 / 65
T7H8--7504DN	200 - 1600	750 / 62
T820--9004DH	200 - 1600	900 / 70
C450--	200-1400	1640 / 65
T9G0--2403DH	400 - 800	2400 / 75
T9G0--2503DH	600 - 1200	2500 / 85
TBK7--300HHE	200 - 1600	3000 / 70
TBK5--3203DH	800 - 1600	3200 / 74
TBS7--3203DH	1200-1600	3200 / 76
TBS7--350HHE	200 - 1600	3500 / 72

Up to 2400V		
T720--3504DN	200 - 2400	350 / 77
T720--4504DN	200 - 2400	450 / 65
T720--5504DN	200 - 2400	550 / 65
T7S0--6504DN	1800 - 2400	650 / 70
T7S0--7504DN	1800 - 2400	750 / 73
T820--7504DH	200 - 2400	750 / 70
T820--8004DH	1400 - 1800	800 / 74
T9G0--1003DH	200 - 2400	1000 / 82
T9G0--1203DH	200 - 2400	1200 / 85
C451--	1400-2400	1500 / 85
TA20--1603DH	200 - 2200	1600 / 80
T9S0--1803DH	1600 - 2200	1800 / 70
TA20--1803DH	200 - 2200	1800 / 85
T9S0--2003DH	1200 - 1800	2000 / 72
C782--	2200-2500	2300 / 70
C781--	1200-2100	2500 / 72
TAS0--2603DH	1400 - 1800	2600 / 70
TDS5--5003DH	1200 - 2000	5000 / 68

Discrete Thyristors & Rectifiers

DISCRETE THYRISTORS – PHASE CONTROL - DISC		
Part Number	Voltage	Current (A/°C)

Up to 4500V		
T8K7--3503DH	3600 - 4500	350 / 76
T9K7--0802DH	3600 - 4500	800 / 79
C702--	2400-3200	1000 / 74
TAK7--1202DH	3600 - 4400	1200 / 82
C784--	3600-4500	1650 / 70
TAS7--1603DH	3200 - 4400	1650 / 70
C783--	3000-3700	1800 / 70
TAK7--1803DH	2400 - 3200	1800 / 70
TBKD--190HDH	4000 - 4500	1890 / 70
TBSD--210HDH	4000-4500	2115 / 70
TC20--2402DH	3600 - 4400	2450 / 73
TBS4--250HDH	3000 - 3600	2500 / 70
TDK4--3002DH	3600 - 4500	3070 / 70
TDK4--3302DH	3600 - 4400	3300 / 72
TDS4--3302DH	2200 - 2800	3325 / 70
TDS4--3302DH	2200 - 2800	3325 / 70
TCS4--340HDH	2200 - 2800	3400 / 70
TDS4--3402DH	3000 - 3600	3475 / 70
TDK4--3802DH	1800 - 2400	3800 / 70
TDS4--4002DH	2400 - 3000	4000 / 70
TDS4--4402DH	1800 - 2400	4400 / 70

Up to 6500V		
T8KC--3203DH	6000 - 6500	325 / 75
TAKC--1103DH	6000 - 6500	1100 / 70

Discrete Thyristors & Rectifiers

DISCRETE THYRISTORS – INVERTER FAST SWITCH - DISC		
Part Number	Voltage	Current (A/°C)
Up to 1200V		
T727--35*4DN	100 - 1200	350 / 70
T727--40*4DN	100 - 800	400 / 70
T727--48*4DN	100 - 800	475 / 70
T7S7--50*4DN	100 - 1200	500 / 70
T7S7--55*4DN	100 - 800	550 / 70
T7S7--65*4DN	100 - 800	650 / 70
Up to 1600V		
T627--15*4DN	100 - 1600	150 / 70
T627--20*4DN	100 - 1600	200 / 70
T627--25*4DN	100 - 1600	250 / 70
T727--45*4DN	100 - 1600	450 / 70
T7S7--60*4DN	100 - 1600	600 / 70
T9GH--08*2DH	100 - 1600	800 / 70
T9GH--09*2DH	100 - 1600	900 / 70
T9GH--10*2DH	100 - 1600	1000 / 70
T9GH--11*2DH	100 - 1600	1100 / 70
Up to 2000V		
C712	1200 - 2000	1000
C770	1400 - 1800	2100 / 70

Discrete Thyristors & Rectifiers

DISCRETE THYRISTORS – PHASE CONTROL - STUD		
Part Number	Voltage	Current (A/°C)
Up to 1600V		
T500--4004AQ	200 - 1600	40 / 97
T500--8004AQ	200 - 1600	80 / 75
T600--1504BT	200 - 1600	150 / 90
T600--1804BT	200 - 1600	175 / 88
T700--2504BY	200 - 1600	250 / 75
Up to 2400V		
T700--3004BY	200 - 2400	300 / 65
T700--3504BY	200 - 2400	300 / 65
DISCRETE THYRISTORS – INVERTER FAST SWITCH – STUD		
Part Number	Voltage	Current (A/°C)
Up to 1200V		
T607--13*4BT	100 - 1200	125 / 70
T707--25*4BY	100 - 1200	250 / 70
T707--28*4BY	100 - 1000	275 / 70
Up to 1600V		
T507--40*4AQ	100 - 1600	40 / 70
T507--80*4AQ	100 - 1600	80 / 70
T607--15*4BT	100 - 1600	150 / 70
T607--18*4BT	100 - 1600	175 / 70
T707--30*4BY	100 - 1600	300 / 70

Discrete Thyristors & Rectifiers

DISCRETS RECTIFIERS – GENERAL PURPOSE - DISC		
Part Number	Voltage	Current (A/°C)
Up to 1200V		
RA20--48XX	200 - 1200	4800 / 98
RBS8--70XX	200 - 600	7000 / 79
RDS8--10XX	600-1200	10000 / 90
Up to 1600V		
R720--12XXOO	200 - 1600	1200 / 106
R7S0--16XX	200 - 1600	1600 / 98
R9G0--22XX	200 - 1600	2200 / 134
RBK8--63XX	1200 - 1600	6300 / 100
RBS8--72XX	1200 - 1600	7200 / 84
RCS8--80XX	1000-1400	8000 / 84
Up to 2600V		
R620--30XXOO	200 - 2400	300 / 142
R620--40XXOO	200 - 2400	400 / 128
R620--50XXOO	200 - 2400	500 / 114
R7S0--08XX	200 - 2400	800 / 121
R720--09XXOO	200 - 2600	900 / 110
R7S0--12XX	200 - 2400	1200 / 86
R7S0--15XX	1800 - 2400	1500 / 98
R820--16XX	2000 - 2600	1600 / 82
R9G0--18XX	200 - 2400	1800 / 110
R9G0--21XX	1800 - 2200	2100 / 118
R9S0--30XX	1800 - 2600	3000 / 115
RA20--36XX	200 - 2400	3600 / 100
RBK8--50XX	1800 - 2400	5000 / 90
RBS8--56XX	1800-2400	5680 / 90
RDS8--80XX	200 - 2500	8000 / 90
Up to 6500V		
R720--06XXOO	200 - 4400	600 / 136
R820--07XX	4400 - 5200	690 / 100
R9G0--12XX	200 - 5400	1200 / 102
R9G0--14XX	6000-6500	1360 / 80
RA20--20XX	200 - 5400	2000 / 99
RA20--25XX	200 - 4200	2500 / 100
RBK8--25XX	5600 - 6500	2500 / 85
RBS8--35XX	3600-4200	3500 / 89
RBK8--40XX	200 - 3200	4000 / 82
RDk8--40XX	6000 - 6500	4000 / 68
RBS8--45XX	2200-3200	4500 / 94
RDk8--85XX	2400-3000	8500 / 90
RDS8--90XX	2400-3000	9000 / 90

Discrete Thyristors & Rectifiers

DISCRETS RECTIFIERS – GENERAL PURPOSE - STUD			
Part Number	Voltage	Current	Polarity
Up to 1600V			
R500--10XXWA	200 - 1600	100	Forward
R501--10XXWA	200 - 1600	100	Reverse
R500--15XXWA	200 - 1600	150	Forward
R501--15XXWA	200 - 1600	150	Reverse
R700--05XXUA	200 - 1600	550	Forward
R701--05XXUA	200 - 1600	550	Reverse
Up to 2600V			
R600--20XXYA	100 - 2600	200	Forward
R601--20XXYA	100 - 2600	200	Reverse
R600--25XXYA	100 - 2600	250	Forward
R601--25XXYA	100 - 2600	250	Reverse
R600--30XXYA	100 - 2600	300	Forward
R601--30XXYA	100 - 2600	300	Reverse
R700--04XXUA	200 - 2600	450	Forward
R701--04XXUA	200 - 2600	450	Reverse
Up to 4500V			
R700--03XXUA	200 - 4400	300	Forward
R701--03XXUA	200 - 4400	300	Reverse
DISCRETS RECTIFIERS – GENERAL PURPOSE - STUD			
Part Number	Voltage	Current	Polarity
Up to 2600V			
R601--30XXYA	100 - 2600	300	Reverse
R700--04XXUA	200 - 2600	450	Forward
R701--04XXUA	200 - 2600	450	Reverse
Up to 4500V			
R700--03XXUA	200 - 4400	300	Forward
R701--03XXUA	200 - 4400	300	Reverse

Discrete Thyristors & Rectifiers

DISCRETE RECTIFIERS – FAST RECOVERY – DISC		
Part Number	Voltage	Current (A/°C)

Up to 1600V		
R622--40*SOO	200 - 1600	400 / 70
R622--55*SOO	200 - 1600	550 / 70
R722--06*SOO	200 - 1600	650 / 70
R722--08*SOO	200 - 1600	800 / 70
R7S2--09*SOO	200 - 1600	900 / 70
R7S2--10*SOO	200 - 1600	1000 / 70

Up to 2600V		
R722--05*SOO	200 - 2600	500 / 70
R722--07*SOO	200 - 2600	700 / 70
R7S2--08*SOO	200 - 2600	800 / 70

Up to 3600V		
R9G2--12*SOO	200 - 3600	1200 / 70
R9G2--15*SOO	200 - 3600	1500 / 70

DISCRETE RECTIFIERS – FAST RECOVERY – STUD			
Part Number	Voltage	Current	Polarity

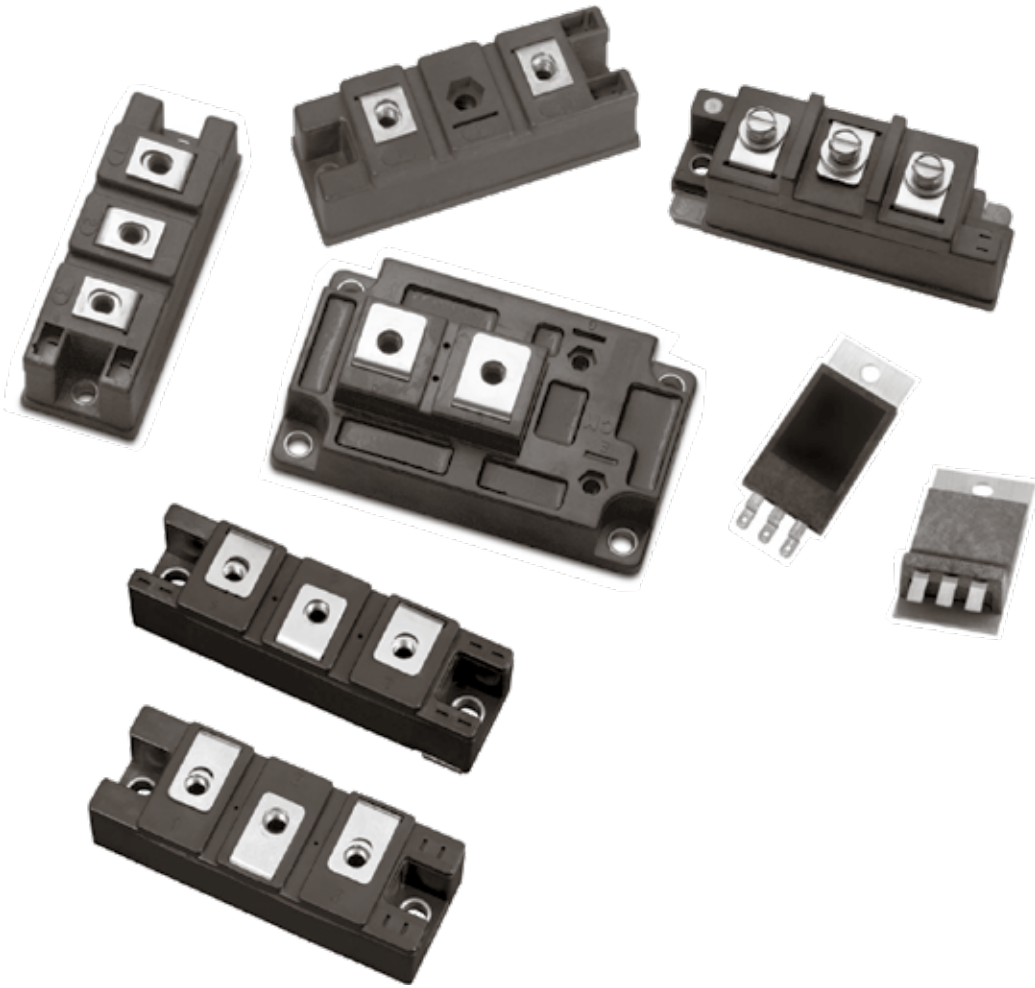
Up to 1600V			
R502__13*SWA	200 - 1400	125	Forward
R503__03*SWA	200 - 1400	125	Reverse
R502__18*SWA	200 - 1400	175	Forward
R503__18*SWA	200 - 1400	175	Reverse
R602__25*SYA	200 - 1600	250	Forward
R603__25*SYA	200 - 1600	250	Reverse
R602__35*SYA	200 - 1600	350	Forward
R603__35*SYA	200 - 1600	350	Reverse

FAST – RECOVERY DIODE MODULES		
Part	Voltage	Current

QRD3310007	3300 V	86 A
QRD3320004	3300 V	200 A
QRS061K001	600 V	420 A

Fast-Recovery Diode Modules

Powerex offers a complete line-up of high voltage, fast recovery diodes. Powerex fast recovery diode modules are designed for use in applications requiring fast switching.





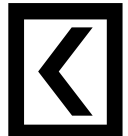
60
years

Abbreviations

Acrynom	English	Acrynom	English
di_T/dt	Critical rate of rise of on-state current (repetitive)	R_{thjc}	Thermal resistance junction to heatsink / case
Du_D/dt	Critical rate of rise of on-state voltage	R_{thcr}	Thermal resistance case to heatsink
$I_{F(AV)}$	Mean forward current	T_c	Case temperature
I_{FSM}	Surge forward current	t_q	Turn-off time
I^2t	I^2t value / for fusing	t_{rr}	Reverse recovery time
I_{FM}	Peak forward current	T_C	Case temperature
$I_{T(RMS)}$	RMS on -state current	U_{RRM}	Repetitive peak reverse voltage
I_{TM}	Peak tigger current	U_{FM}	Peak forward voltage
$I_{T(AV)}$	Mean on-state current	$U_{F(TO)}$	Threshold voltage
I_{TSM}	Surge on-state current	U_{DRM}	Repetitive peak off-state voltage
I_{GT}	Gate tigger current	U_{TM}	Peak forward voltage
r_F	Slope resisatance		



60
years

 **KUBARA LAMINA**

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Notes