

Elektrische Eigenschaften

Electrical properties

Höchstzulässige Werte

Maximum permissible values

V_{DRM}, V_{RRM}	Periodische Vorwärts- und Rückwärts-Sperrspannung	repetitive peak forward off-state and reverse voltages	400...1800	V
I_{TRMSM}	Effektiver Durchlaßstrom	RMS on-state current	700	A
I_{TAVM}	Dauergrenzstrom	average on-state current	$t_C = 85^\circ C$ 358 $t_C = 69^\circ C$ 445	A
I_{TRM}	Periodischer Spitzenstrom	repetitive peak on-state current	4200	A
I_{TSM}	Stoßstrom-Grenzwert	surge current	$t_p = 10 \text{ ms}, t_{vj} \leq 45^\circ C$ 5200 $t_p = 10 \text{ ms}, t_{vj} = t_{vj \text{ max}}$ 4600	A
$\int i^2 dt$	Grenzlastintegral	$\int i^2 dt$ -value	$t_p = 10 \text{ ms}, t_{vj} \leq 45^\circ C$ 135000 $t_p = 10 \text{ ms}, t_{vj} = t_{vj \text{ max}}$ 106000	A ² s
$(di/dt)_{cr}$	Kritische Stromsteilheit	critical rate of rise of on-state current	nicht periodisch/non repetitive 800	A/ μs
$(dv/dt)_{cr}$	Kritische Spannungssteilheit	critical rate of rise of off-state voltage	Dauerbetrieb/continuous operation, $i_{TM} = 1200 \text{ A}$, $v_L = 10 \text{ V}, I_G = 1 \text{ A}, di_G/dt = 1 \text{ A}/\mu s$ $v_D = 67\% V_{DRM}, t_{vj} = t_{vj \text{ max}}$ 5. Kennbuchstabe/5th letter C 150 5. Kennbuchstabe/5th letter F 400 1000	V/ μs

Charakteristische Werte

Characteristic values

V_T	Obere Durchlaßspannung	max. on-state voltage	$t_{vj} = t_{vj \text{ max}}, I_T = 1200 \text{ A}$	2,07	V
$V_{(TO)}$	Schleusenspannung	threshold voltage	$t_{vj} = t_{vj \text{ max}}$	0,85	V
r_T	Ersatzwiderstand	slope resistance	$t_{vj} = t_{vj \text{ max}}$	0,9	m Ω
V_{GT}	Obere Zündspannung	max. gate trigger voltage	$t_{vj} = 25^\circ C, v_D = 6 \text{ V}, R_A = 5 \Omega$	2	V
I_{GT}	Oberer Zündstrom	max. gate trigger current	$t_{vj} = 25^\circ C, v_D = 6 \text{ V}, R_A = 5 \Omega$	200	mA
	Unterer Zündstrom	min. gate trigger current	$t_{vj} = t_{vj \text{ max}}, v_D = 6 \text{ V}, R_A = 5 \Omega$	10	mA
I_H	Oberer Haltestrom	max. holding current	$t_{vj} = 25^\circ C, v_D = 6 \text{ V}, R_A = 5 \Omega$	300	mA
I_L	Oberer Einraststrom	max. latching current	$t_{vj} = 25^\circ C, v_D = 6 \text{ V}, R_{GK} \geq 10 \Omega$	1,2	A
I_D, I_R	Oberer Vorwärts- und Rückwärts-Sperrstrom	max. forward off-state and reverse currents	$I_G = 1 \text{ A}, di_G/dt = 1 \text{ A}/\mu s, t_q = 20 \mu s$ $t_{vj} = t_{vj \text{ max}}, v_D = V_{DRM} (V_R = V_{RRM})$	50	mA
t_{gd}	Oberer Zündverzug	max. gate controlled delay time	$I_G = 1 \text{ A}, di_G/dt = 1 \text{ A}/\mu s$	3	μs
t_q	Typische Freiwerdezeit	typical turn-off time	Prüfbedingungen/test conditions 3.4.3.4	250	μs
C_{null}	Typische Nullkapazität	typical zero capacitance	$t_{vj} = 25^\circ C, f = 10 \text{ kHz}$	4	nF

Thermische Eigenschaften

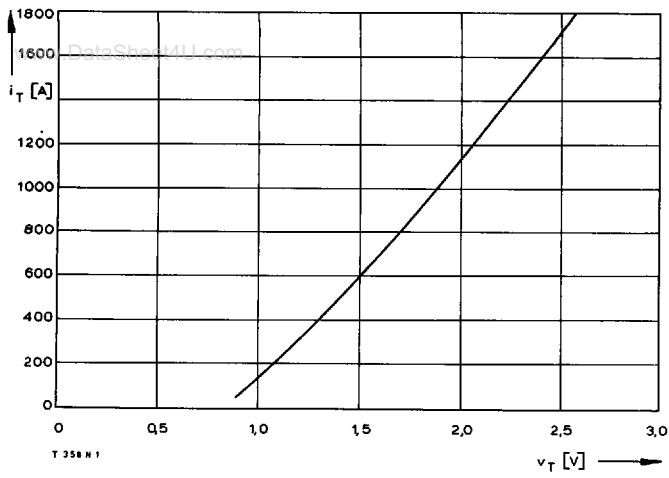
Thermal properties

R_{thJC}	Innere Wärmewiderstand für beidseitige Kühlung	thermal resistance, junction to case for two-sided cooling	$\theta = 180^\circ el, \text{ sinus}$ DC	$\leq 0,068^\circ C/W$ $\leq 0,065^\circ C/W$
$R_{thJC(A)}$	für anodenseitige Kühlung	for anode-sided cooling	$\theta = 180^\circ el, \text{ sinus}$ DC	$\leq 0,113^\circ C/W$ $\leq 0,11^\circ C/W$
$R_{thJC(K)}$	für kathodenseitige Kühlung	for cathode-sided cooling	$\theta = 180^\circ el, \text{ sinus}$ DC	$\leq 0,159^\circ C/W$ $\leq 0,156^\circ C/W$
R_{thCK}	Wärmewiderstand für einen Übergang zwischen Gehäuse und Kühlkörper	single sided thermal resistance, case to heatsink		0,03 $^\circ C/W$
$t_{vj \text{ max}}$	Höchstzul. Sperrschichttemperatur	max. junction temperature		125 $^\circ C$
$t_{vj \text{ op}}$	Betriebstemperatur	operating temperature		- 40 $^\circ C$...+125 $^\circ C$
t_{stg}	Lagertemperatur	storage temperature		- 40 $^\circ C$...+140 $^\circ C$

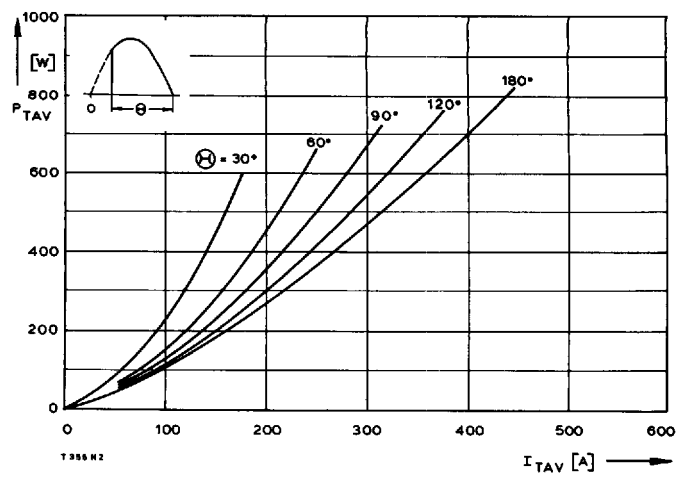
Mechanische Eigenschaften

Mechanical properties

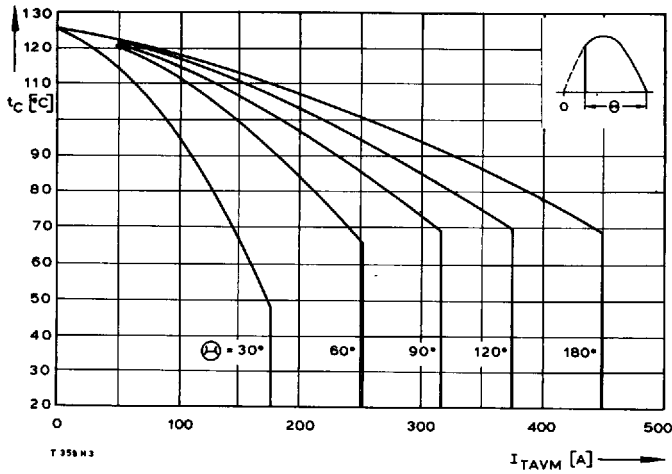
G	Gewicht	weight		70 g
F	Anpreßkraft	clamping force		4...6 kN
	Maßbild	outline	DIN 41814-151 A 4	Seite/page 240
	Kriechstrecke	creepage distance		17 mm
	Feuchtklasse	humidity classification	DIN 40040	C
	Schüttelfestigkeit	vibration resistance	f = 50 Hz	5x981 m/s ²



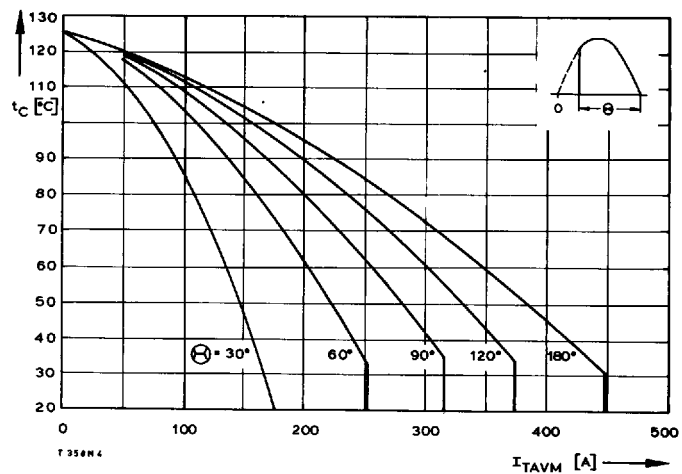
Bild/Fig. 1
Grenzdurchlaßkennlinie bei $t_{vj \max}$
Max. on-state characteristic at $t_{vj \max}$



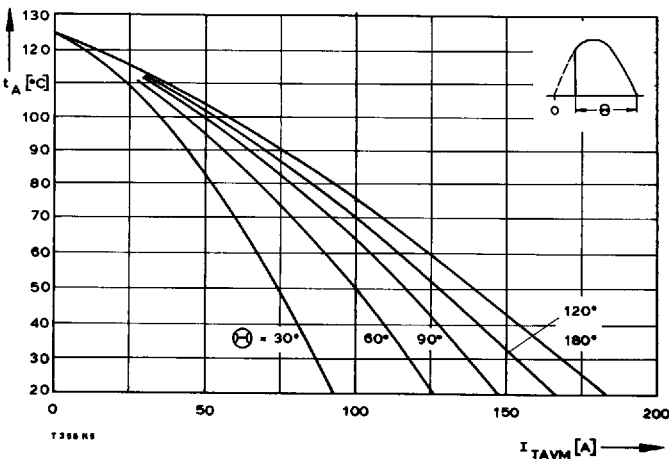
Bild/Fig. 2
Durchlaßverlustleistung P_{TAV} /On-state power loss P_{TAV}
Parameter: Stromflußwinkel θ /current conduction angle θ



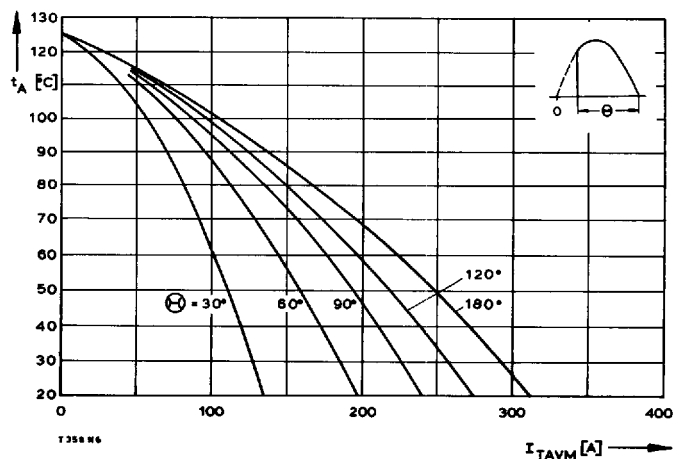
Bild/Fig. 3
Höchstzulässige Gehäusetemperatur t_c bei beidseitiger Kühlung
Maximum allowable case temperature t_c at two-sided cooling



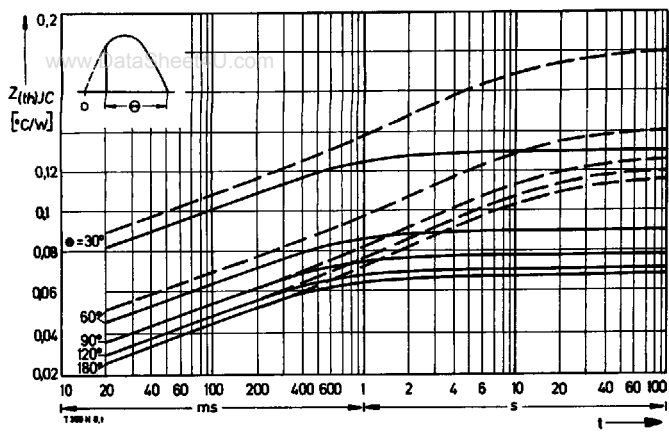
Bild/Fig. 4
Höchstzulässige Gehäusetemperatur t_c bei anodenseitiger Kühlung
Maximum allowable case temperature t_c at anode sided cooling



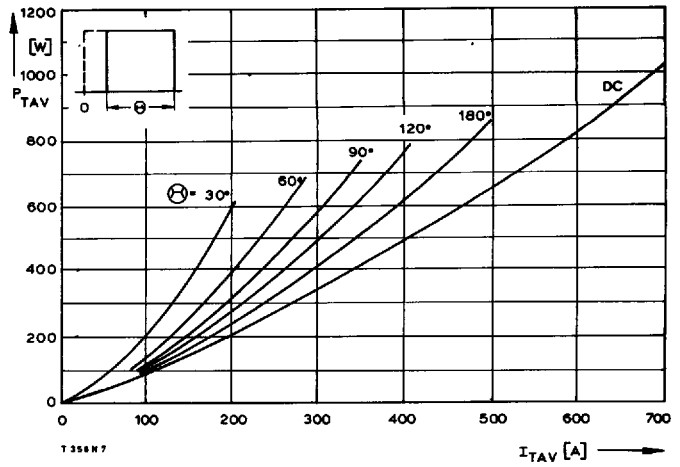
Bild/Fig. 5
Höchstzulässige Kühlmitteltemperatur t_A bei beidseitiger Luftselbstkühlung,
Kühlkörper K 0,36 S.
Maximum allowable cooling medium temperature t_A at natural two-sided cooling,
heatsink type K 0.36 S.



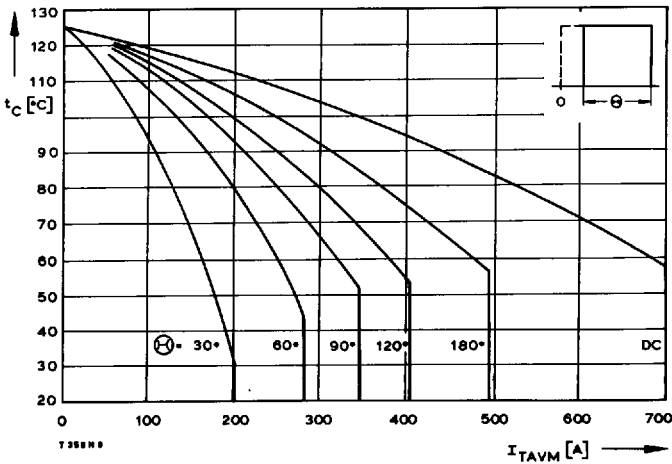
Bild/Fig. 6
Höchstzulässige Kühlmitteltemperatur t_A bei verstärkter beidseitiger Luftkühlung,
Kühlkörper K 0,12 F, $V_L = 50$ l/s.
Maximum allowable cooling medium temperature t_A at forced two-sided cooling,
heatsink type K 0.12 F, $V_L = 50$ l/s.



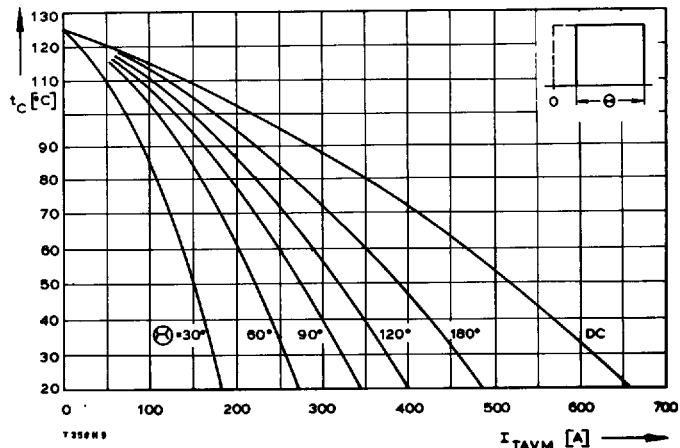
Bild/Fig. 7
 Transient inner thermal impedance $Z_{th(jc)}$
 Transient thermal impedance, junction case, $Z_{th(jc)}$
 - - - - - anodenseitige Kühlung/anode sided cooling
 ————— beidseitige Kühlung/two-sided cooling



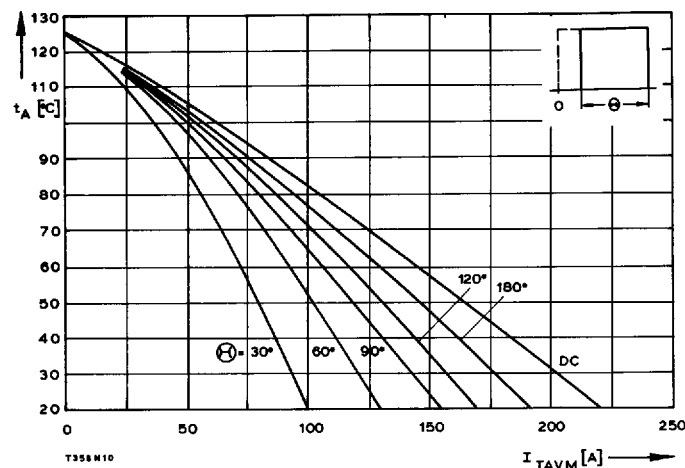
Bild/Fig. 8
 Durchlaßverlustleistung P_{TAV} /On-state power loss P_{TAV}
 Parameter: Stromflußwinkel θ /current conduction angle θ



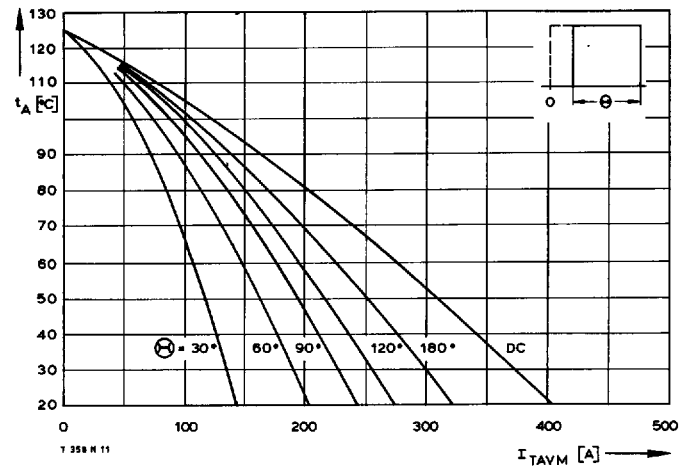
Bild/Fig. 9
 Höchstzulässige Gehäusetemperatur t_c bei beidseitiger Kühlung
 Maximum allowable case temperature t_c at two-sided cooling



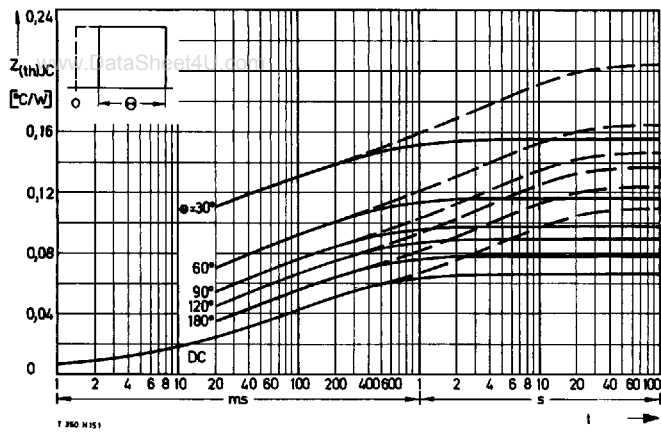
Bild/Fig. 10
 Höchstzulässige Gehäusetemperatur t_c bei anodenseitiger Kühlung
 Maximum allowable case temperature t_c at anode sided cooling



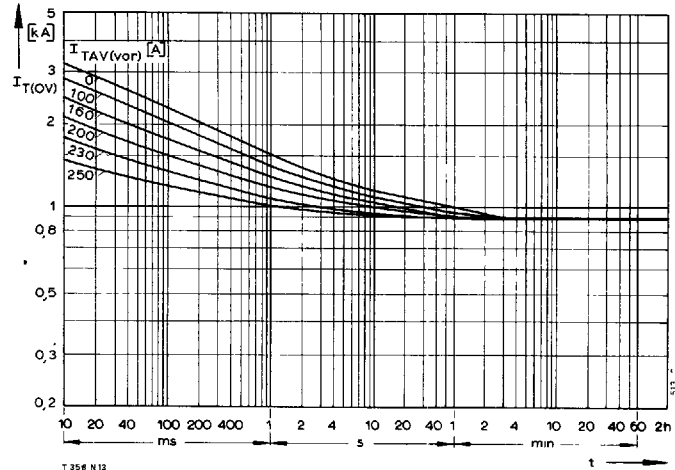
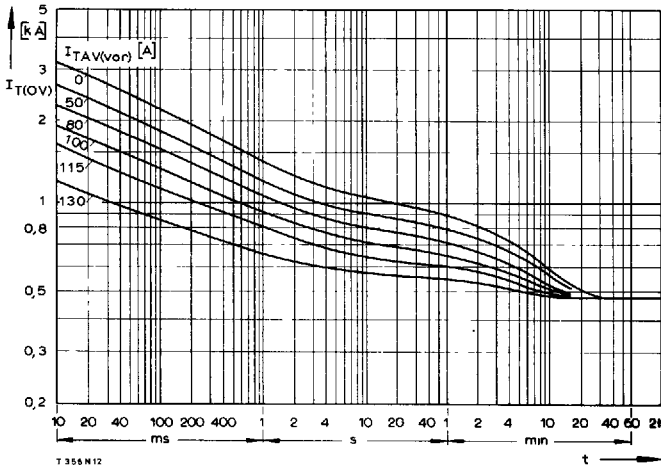
Bild/Fig. 11
 Höchstzulässige Kühlmitteltemperatur t_A bei beidseitiger Luftselbstkühlung,
 Kühlkörper K 0,36 S.
 Maximum allowable cooling medium temperature t_A at natural two-sided cooling,
 heatsink type K 0.36 S.



Bild/Fig. 12
 Höchstzulässige Kühlmitteltemperatur t_A bei verstärkter beidseitiger Luftkühlung,
 Kühlkörper K 0,12 F, $V_L = 50$ l/s.
 Maximum allowable cooling medium temperature t_A at forced two-sided cooling,
 heatsink type K 0.12 F, $V_L = 50$ l/s.

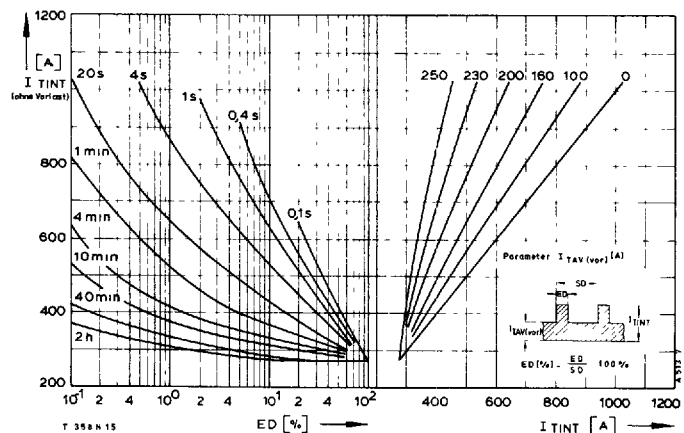
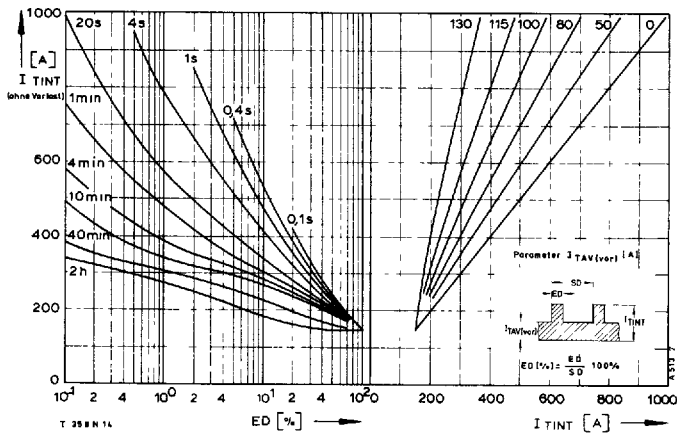


Bild/Fig. 13
 Transienter innerer Wärmewiderstand $Z_{(th)JC}$
 Transient thermal impedance, junction case, $Z_{(th)JC}$
 - - - - - anodenseitige Kühlung/anode sided cooling
 ————— beidseitige Kühlung/two-sided cooling



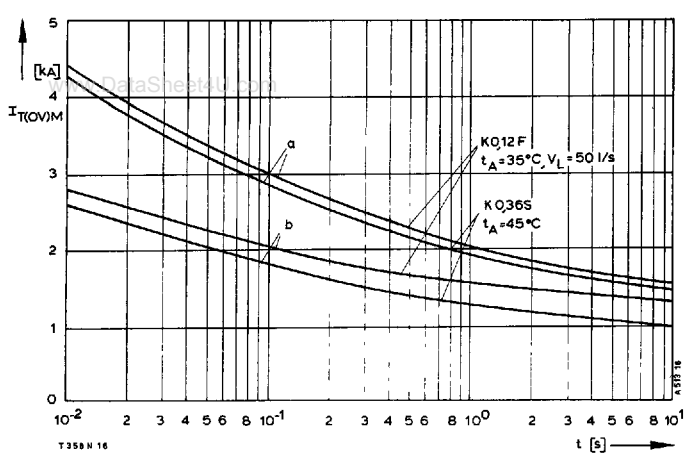
Bild/Fig. 14
 Überstrom $I_{T(OV)}$ bei beidseitiger Luftselbstkühlung, $t_A = 45^\circ\text{C}$,
 Kühlkörper K 0,36 S.
 Overload on-state current $I_{T(OV)}$ at natural two-sided cooling, $t_A = 45^\circ\text{C}$,
 heatsink type K 0.36 S.
 Parameter: Vorlaststrom/pre-load current $I_{TAV(vor)}$

Bild/Fig. 15
 Überstrom $I_{T(OV)}$ bei verstärkter beidseitiger Luftkühlung, $t_A = 35^\circ\text{C}$,
 Kühlkörper K 0,12 F, $V_L = 50$ l/s.
 Overload on-state current $I_{T(OV)}$ at forced two-sided cooling, $t_A = 35^\circ\text{C}$,
 heatsink type K 0.12 F, $V_L = 50$ l/s.
 Parameter: Vorlaststrom/pre-load current $I_{TAV(vor)}$

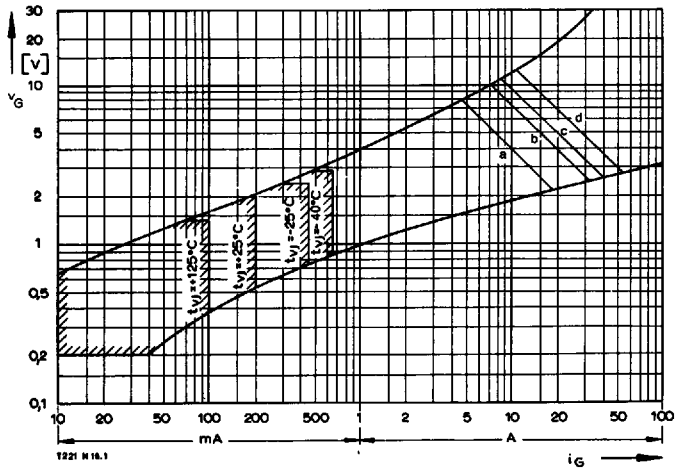


Bild/Fig. 16
 Höchstzulässiger Durchlaßstrom I_{TINT} bei Aussetzbetrieb und beidseitiger
 Luftselbstkühlung, $t_A = 45^\circ\text{C}$, Kühlkörper K 0,36 S.
 Limiting on-state current I_{TINT} during intermittent operation at natural two-sided
 cooling, $t_A = 45^\circ\text{C}$, heatsink type K 0.36 S.
 Parameter: Spieldauer/cycle duration SD
 Vorlaststrom/pre-load current $I_{TAV(vor)}$

Bild/Fig. 17
 Höchstzulässiger Durchlaßstrom I_{TINT} bei Aussetzbetrieb und verstärkter
 beidseitiger Luftkühlung, $t_A = 35^\circ\text{C}$, Kühlkörper K 0,12 F, $V_L = 50$ l/s.
 Limiting on-state current I_{TINT} during intermittent operation at forced two-sided
 cooling, $t_A = 35^\circ\text{C}$, heatsink type K 0.12 F, $V_L = 50$ l/s.
 Parameter: Spieldauer/cycle duration SD
 Vorlaststrom/pre-load current $I_{TAV(vor)}$

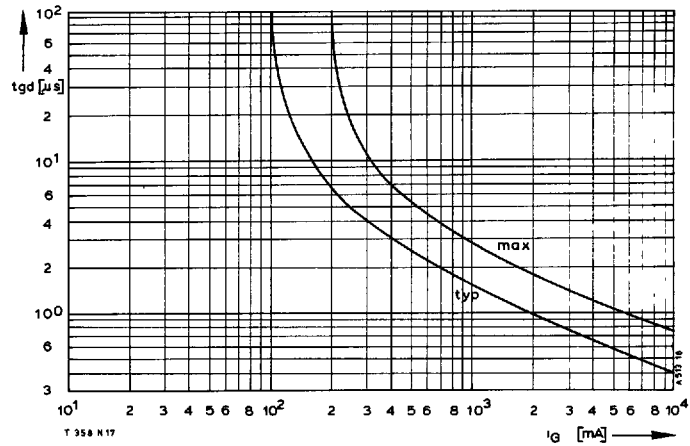


Bild/Fig. 18
 Grenzstrom $I_{T(OV)M}$ bei beidseitiger Kühlung, Kühlkörper K 0,36 S und K 0,12 F, $V_{RM} = 0,8 V_{RRM}$.
 Limiting overload on-state current $I_{T(OV)M}$ at two-sided cooling, heatsink type K 0.36 S and K 0.12 F, $V_{RM} = 0.8 V_{RRM}$.
 a – Belastung aus Leerlauf/current surge under no-load conditions
 b – Belastung im Anschluß an Betrieb mit Dauergrenzstrom I_{TAVM} / current surge occurs during operation at limiting mean on-state current rating I_{TAVM}

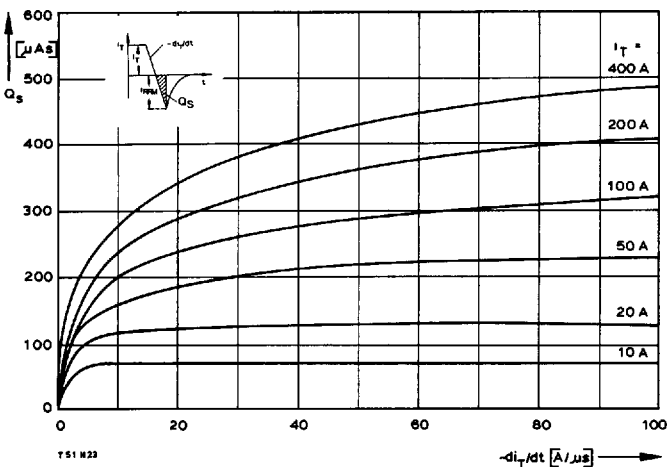


Bild/Fig. 19
 Zündbereich und Spitzensteuerleistung bei $v_D \geq 6$ V.
 Gate characteristic and peak gate power dissipation at $v_D \geq 6$ V.

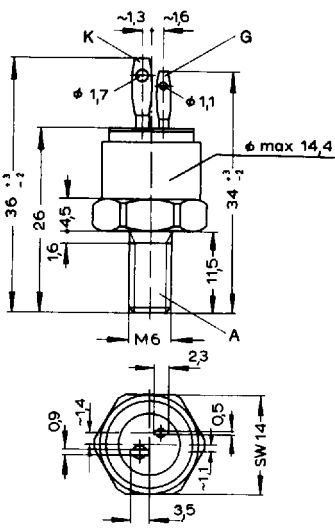
Parameter:	a	b	c	d
Steuerimpulsdauer/Pulse duration t_g	[ms] 10	1	0,5	0,1
Höchstzulässige Spitzensteuerleistung/ Maximum allowable peak gate power	[W] 40	80	100	150



Bild/Fig. 20
 Zündverzögerung t_{gd} bei $i_{TM} = 100$ A, $t_{vj} = 25^\circ\text{C}$.
 Gate controlled delay time t_{gd} at $i_{TM} = 100$ A, $t_{vj} = 25^\circ\text{C}$.

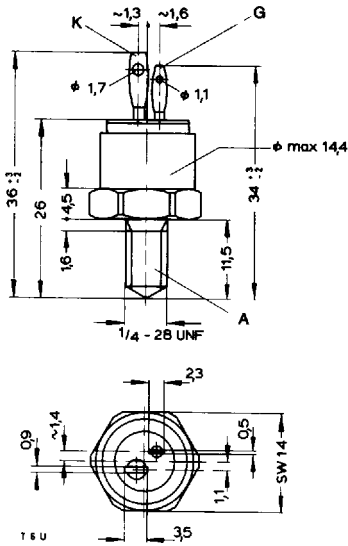


Bild/Fig. 21
 Nachlaufladung Q_S in Abhängigkeit von der abkommutierenden Stromsteilheit $-di_T/dt$ bei $t_{vj} \text{ max}$.
 Lag charge Q_S versus the rate of decay of the forward on-state current $-di_T/dt$ at $t_{vj} \text{ max}$.



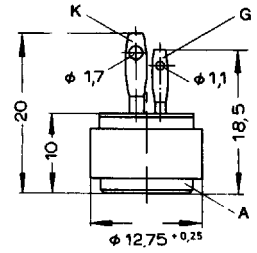
T 7 N...C
T 10 N...C
T 13 N...C

1



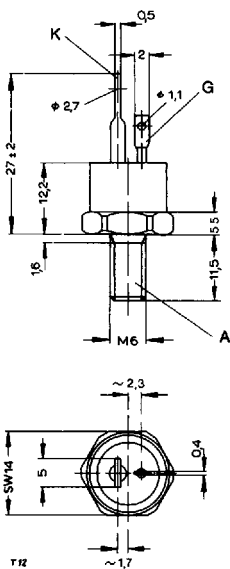
T 7 N...U
T 10 N...U
T 13 N...U

2



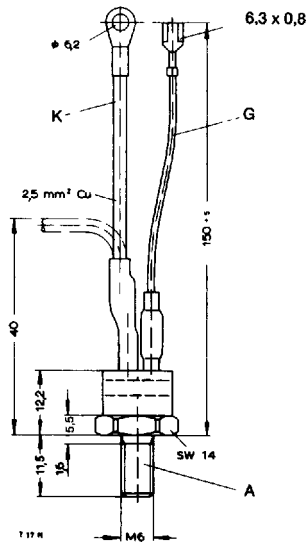
T 7 N...H
T 10 N...H
T 13 N...H

3



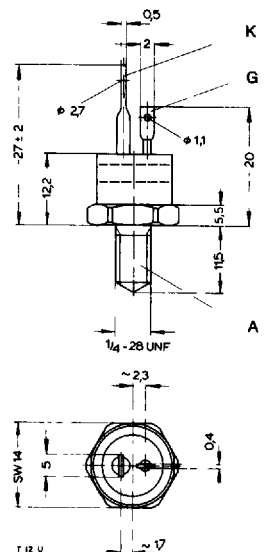
T 12 N...C
T 15.1 N...C
T 17 N...C
T 24 N...C
T 31 N...C

4



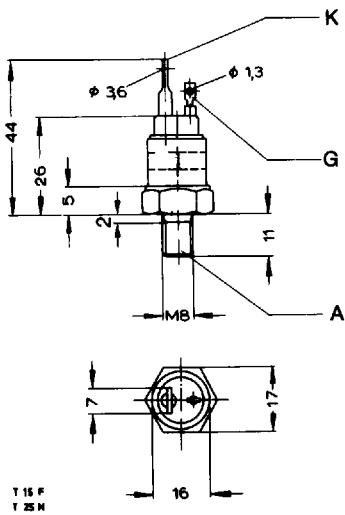
T 17 N...B
T 24 N...B
T 31 N...B

5



T 12 N...U
T 15.1 N...U
T 17 N...U
T 31 N...U

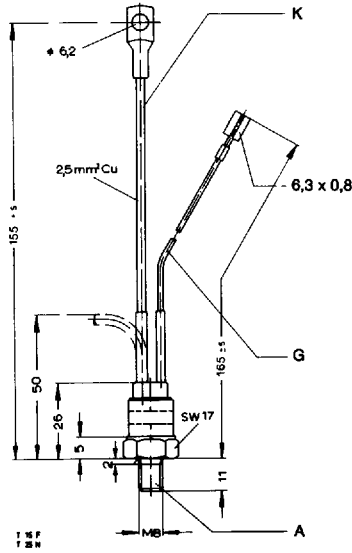
6



T 15 F
T 25 N

7

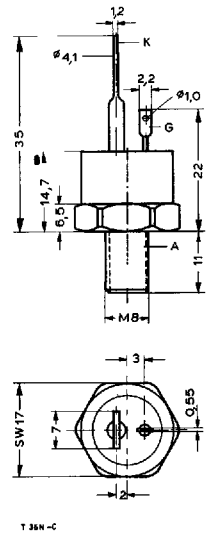
T 16 N...C
T 25 N...C



T 15 F
T 25 N

8

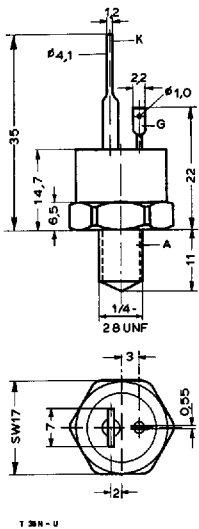
T 16 N...B
T 25 N...B



T 36 N-C

9

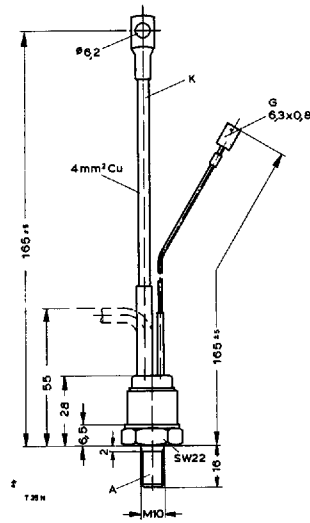
T 36 N...C
T 46 N...C



T 36 N-U

10

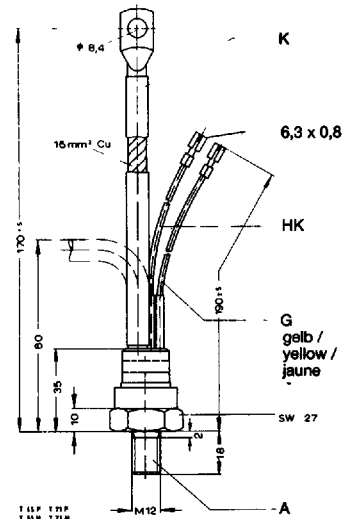
T 36 N...U
T 46 N...U



T 35 N

11

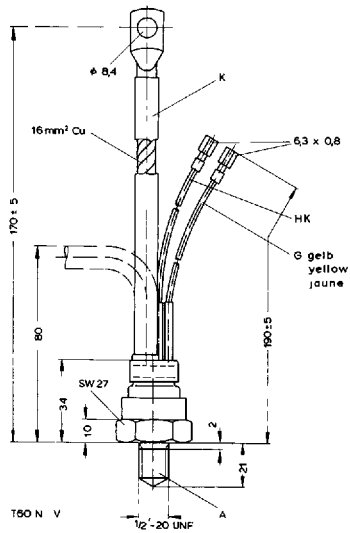
T 35 N...B
T 45 N...B



T 60 N
T 65 N
T 115 N

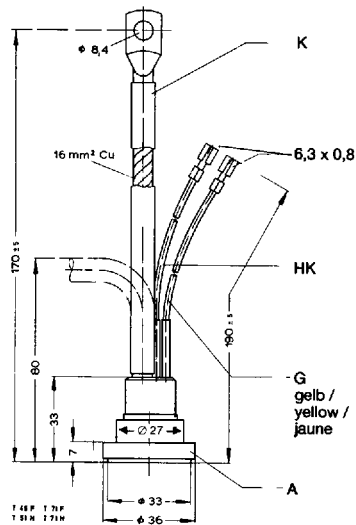
12

T 60 N...B
T 65 N...B
T 115 N...B



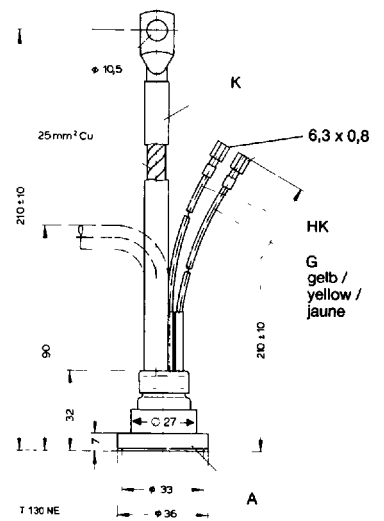
13

T 60 N...V
T 85 N...V
T 115 N...V



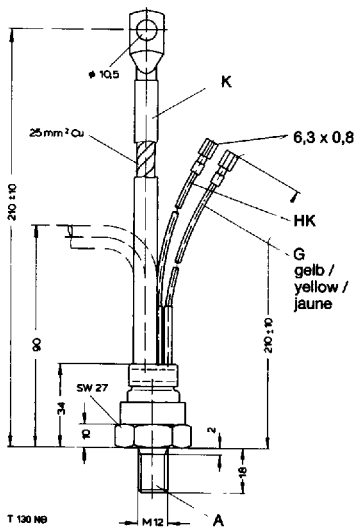
14

T 115 N...E



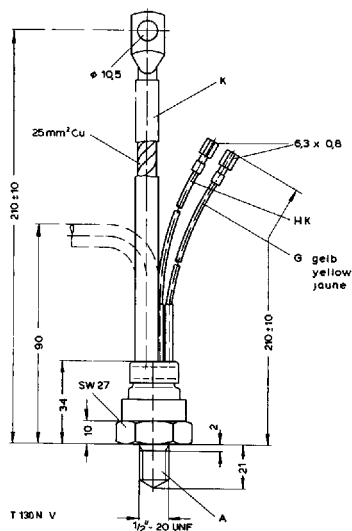
15

T 130 N...E
T 160 N...E



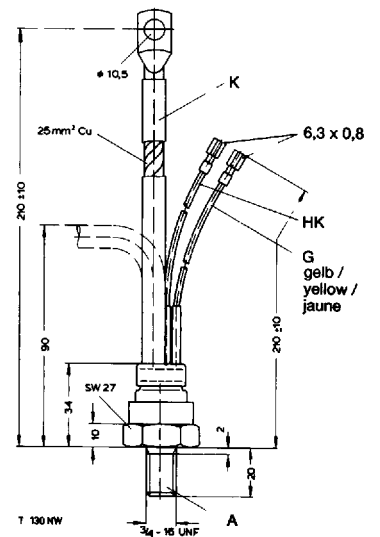
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T 130 N...B
T 160 N...B
T 210 N...B



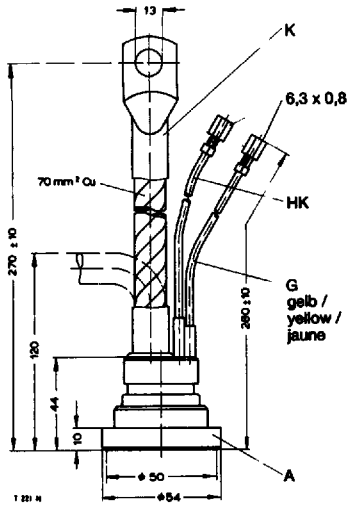
17

T 130 N...V
T 160 N...V
T 210 N...V



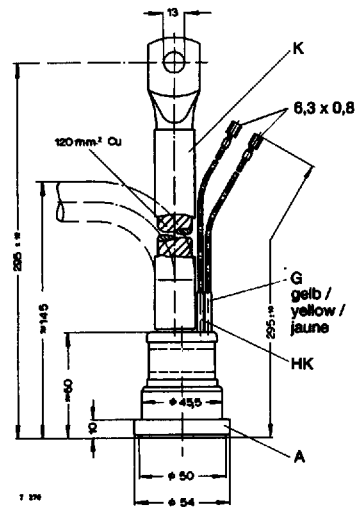
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T 130 N...W
T 160 N...W
T 210 N...W



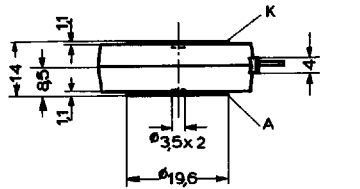
19

T 175 N
T 221 N
T 235 N
T 236 N
T 345 N



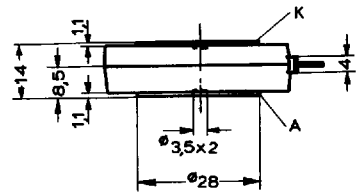
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T 270 N



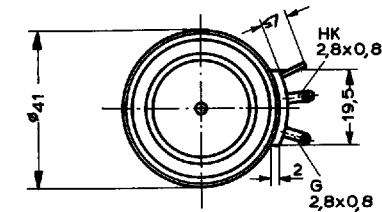
21

T 178 N
T 198 N
T 218 N
T 298 N
T 348 N
T 358 N
T 398 N



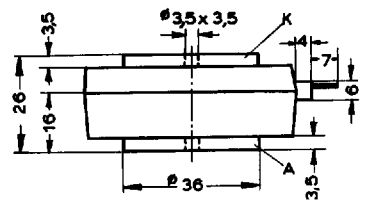
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T 308 N
T 388 N
T 508 N
T 588 N
T 828 N



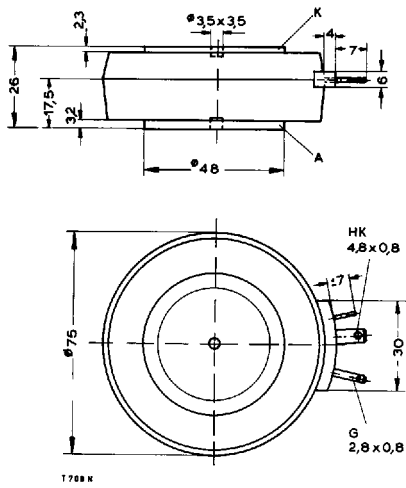
23

T 718 N
T 1258 N



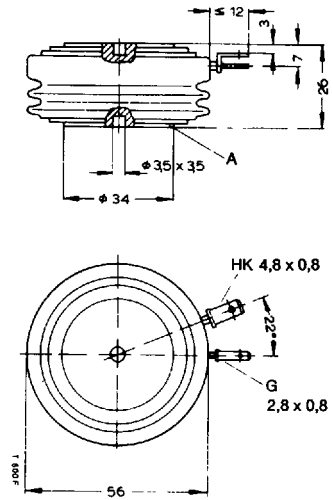
24

T 459 N
T 509 N
T 529 N
T 719 N
T 1259 N



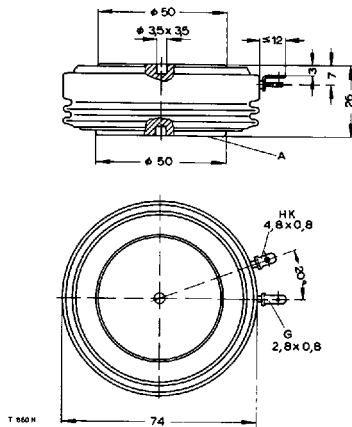
25

T 709 N
T 869 N
T 949 N
T 1059 N
T 1099 N
T 1209 N



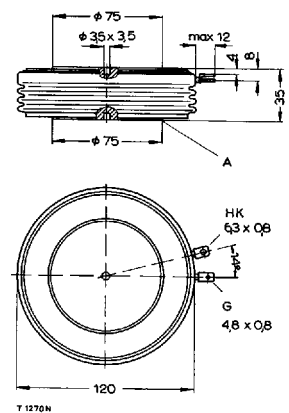
26

T 380 N



27

T 625 N
T 860 N
T 1050 N
T 1200 N



28

T 1270 N
T 1580 N
T 1900 N