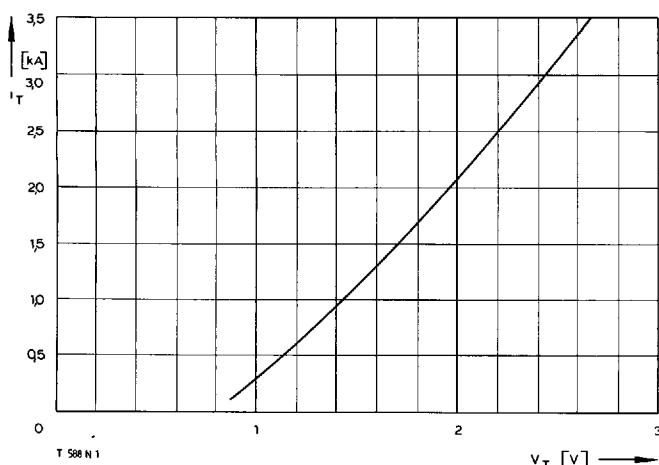
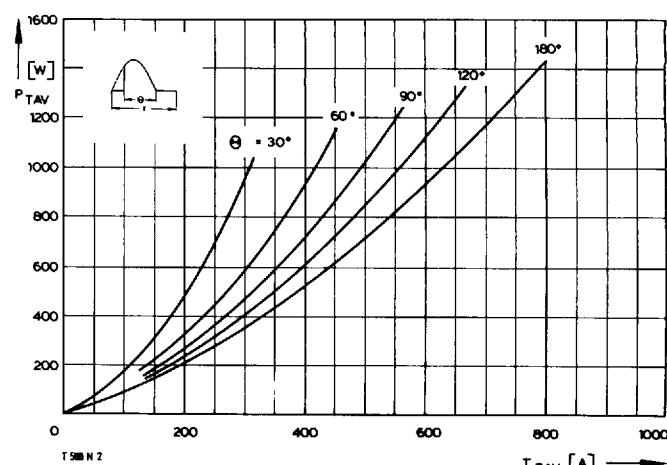


T-25-20

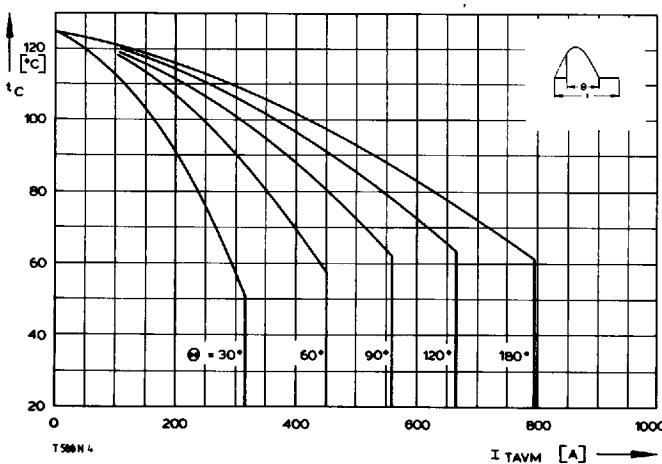
Type series/Type range		T 588 N	400	600	800	1000	1100	1200	1400	1600	1800
Elektrische Eigenschaften		Electrical properties									
Höchstzulässige Werte		Maximum permissible values									
V_{DRM} , V_{RRM}	Periodische Vorwärts- und Rückwärts-Spitzenspannung	repetitive peak forward off-state and reverse voltages								400...1800	V
I_{TRMSM}	Effektiver Durchlaßstrom	RMS on-state current								1250	A
I_{TAVM}	Dauergrenzstrom	average on-state current	$t_C = 85^\circ\text{C}$							588	A
			$t_C = 61^\circ\text{C}$							795	A
I_{TRM}	Periodischer Spitzenstrom	repetitive peak on-state current								7,5	kA
I_{TSM}	Stoßstrom-Grenzwert	surge current	$t_p = 10 \text{ ms}, t_{vj} \leq 45^\circ\text{C}$							9,4	kA
			$t_p = 10 \text{ ms}, t_{vj} = t_{vj \max}$							8	kA
$\int i^2 dt$	Grenzlastintegral	$\int i^2 dt$ -value	$t_p = 10 \text{ ms}, t_{vj} \leq 45^\circ\text{C}$							442000	A ² s
			$t_p = 10 \text{ ms}, t_{vj} = t_{vj \max}$							320000	A ² s
$(di/dt)_{cr}$	Kritische Stromsteilheit	critical rate of rise of on-state current	nicht periodisch/non repetitive							1000	A/ μ s
			Dauerbetrieb/continuous operation, $i_{TM} = 2,4 \text{ kA}$,							200	A/ μ s
$(dv/dt)_{cr}$	Kritische Spannungssteilheit	critical rate of rise of off-state voltage	$i_G = 1 \text{ A}, di_G/dt = 1 \text{ A}/\mu\text{s}$							400	V/ μ s
			$v_D = 67\% V_{DRM}, t_{vj} = t_{vj \max}$							1000	V/ μ s
			5. Kennbuchstabe/5th letter C								
			5. Kennbuchstabe/5th letter F								
Charakteristische Werte		Characteristic values									
V_T	Obere Durchlaßspannung	max. on-state voltage	$t_{vj} = t_{vj \max}, i_T = 2,4 \text{ kA}$							2,15	V
$V_{(TO)}$	Schleusenspannung	threshold voltage	$t_{vj} = t_{vj \max}$							0,8	V
r_T	Ersatzwiderstand	slope resistance	$t_{vj} = t_{vj \max}$							0,5	m Ω
V_{GT}	Obere Zündspannung	max. gate trigger voltage	$t_{vj} = 25^\circ\text{C}, v_D = 6 \text{ V}, R_A = 5 \Omega$							2,2	V
I_{GT}	Oberer Zündstrom	max. gate trigger current	$t_{vj} = 25^\circ\text{C}, v_D = 6 \text{ V}, R_A = 5 \Omega$							250	mA
	Unterer Zündstrom	min. gate trigger current	$t_{vj} = t_{vj \max}, v_D = 6 \text{ V}, R_A = 5 \Omega$							10	mA
I_H	Oberer Haltestrom	max. holding current	$t_{vj} = 25^\circ\text{C}, v_D = 6 \text{ V}, R_A = 5 \Omega$							300	mA
I_L	Oberer Einraststrom	max. latching current	$t_{vj} = 25^\circ\text{C}, v_D = 6 \text{ V}, R_{AK} \geq 10 \Omega$							1,2	A
i_D, i_R	Oberer Vorwärts- und Rückwärts-Sperrstrom	max. forward off-state and reverse currents	$i_G = 1 \text{ A}, di_G/dt = 1 \text{ A}/\mu\text{s}, t_g = 20 \mu\text{s}$							50	mA
t_{gd}	Oberer Zündverzug	max. gate controlled delay time	$t_{vj} = t_{vj \max}, v_D = V_{DRM} (v_R = V_{RRM})$							4	μ s
t_q	Typische Freiwerdezeit	typical turn-off time	$i_G = 1 \text{ A}, di_G/dt = 1 \text{ A}/\mu\text{s}$							250	μ s
C_{null}	Typische Nullkapazität	typical zero capacitance	Prüfbedingungen/test conditions 3.4.3.4							5	nF
			$t_{vj} = 25^\circ\text{C}, f = 10 \text{ kHz}$								
Thermische Eigenschaften		Thermal properties									
R_{thJC}	Innerer Wärmewiderstand für beidseitige Kühlung	thermal resistance, junction to case for two-sided cooling	$\Theta = 180^\circ\text{el}, \sinus$							$\leq 0,045^\circ\text{C}/\text{W}$	
			DC							$\leq 0,041^\circ\text{C}/\text{W}$	
$R_{thJC(A)}$	für anodenseitige Kühlung	for anode-sided cooling	$\Theta = 180^\circ\text{el}, \sinus$							$\leq 0,074^\circ\text{C}/\text{W}$	
			DC							$\leq 0,07^\circ\text{C}/\text{W}$	
$R_{thJC(K)}$	für kathodenseitige Kühlung	for cathode-sided cooling	$\Theta = 180^\circ\text{el}, \sinus$							$\leq 0,104^\circ\text{C}/\text{W}$	
			DC							$\leq 0,1^\circ\text{C}/\text{W}$	
R_{thCK}	Wärmewiderstand für einen Übergang zwischen Gehäuse und Kühlkörper	single sided thermal resistance, case to heatsink								0,015°C/W	
	Höchstzul. Sperrsichttemperatur	max. junction temperature								125°C	
$t_{vj \max}$	Betriebstemperatur	operating temperature								$-40^\circ\text{C} \dots +125^\circ\text{C}$	
$t_{vj op}$	Lagertemperatur	storage temperature								$-40^\circ\text{C} \dots +140^\circ\text{C}$	
Mechanische Eigenschaften		Mechanical properties									
G	Gewicht	weight								100 g	
F	Anpreßkraft	clamping force								8...12 kN	
	Maßbild	outline								Seite/page 240	
	Kriechstrecke	creepage distance								17 mm	
	Feuchtekategorie	humidity classification								C	
	Schüttelfestigkeit	vibration resistance	$DIN 40040$							$5 \times 9,81 \text{ m/s}^2$	
			$f = 50 \text{ Hz}$								



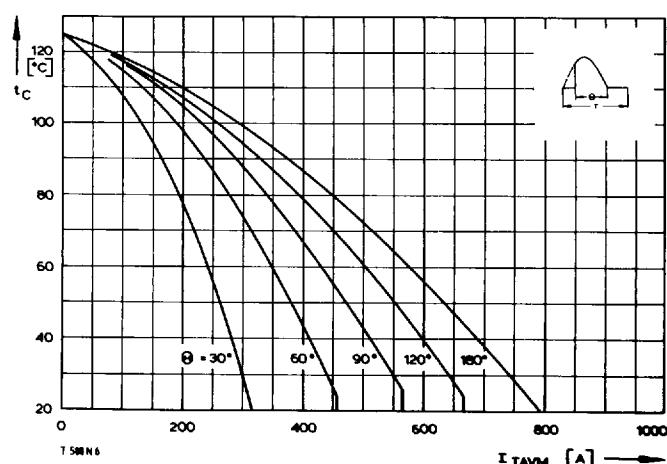
Bild/Fig. 1
Grenzdurchlaßkennlinie bei $t_{vj\max}$
Max. on-state characteristic at $t_{vj\max}$



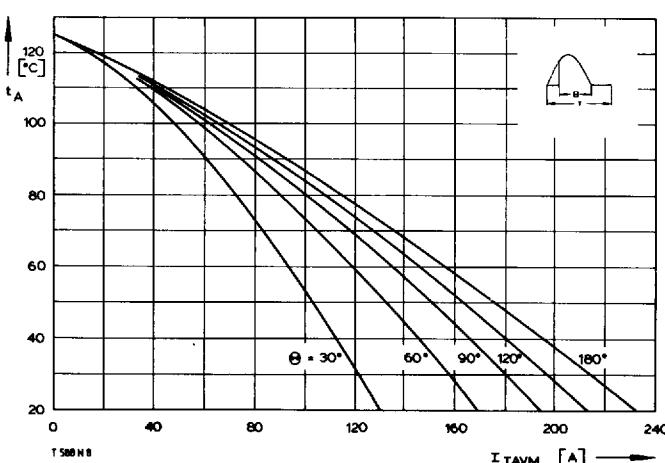
Bild/Fig. 2
Durchlaßverlustleistung P_{TAV} /On-state power loss P_{TAV}
Parameter: Stromflußwinkel θ /current conduction angle θ



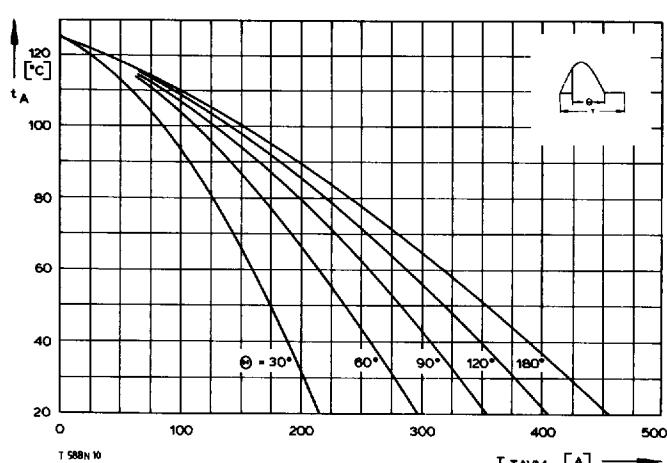
Bild/Fig. 3
Höchstzulässige Gehäusetemperatur t_C bei beidseitiger Kühlung
Maximum allowable case temperature t_C at two-sided cooling



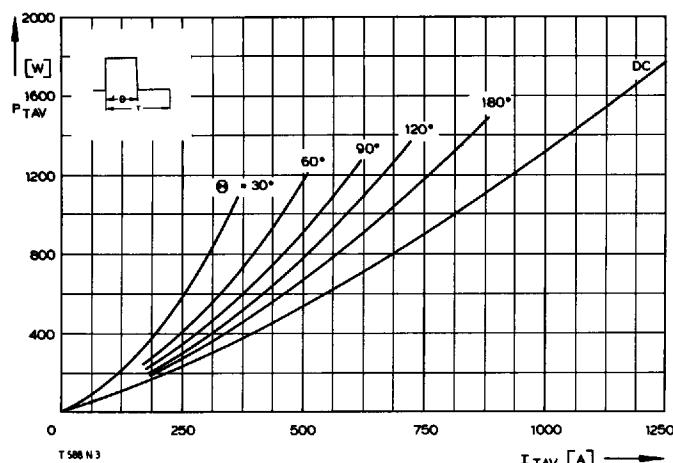
Bild/Fig. 4
Höchstzulässige Gehäusetemperatur t_C bei anodenseitiger Kühlung
Maximum allowable case temperature t_C at anode sided cooling



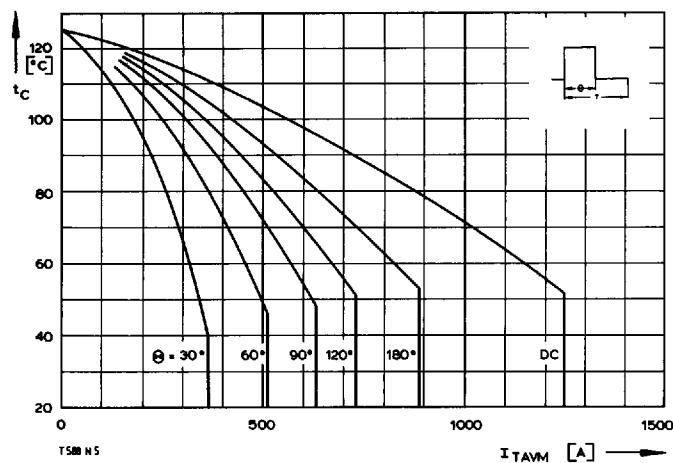
Bild/Fig. 5
Höchstzulässige Kühlmitteltemperatur t_A bei beidseitiger Luftseldkühlung,
Kühlkörper K 0,36 S.
Maximum allowable cooling medium temperature t_A at natural two-sided cooling,
heatsink type K 0.36 S.



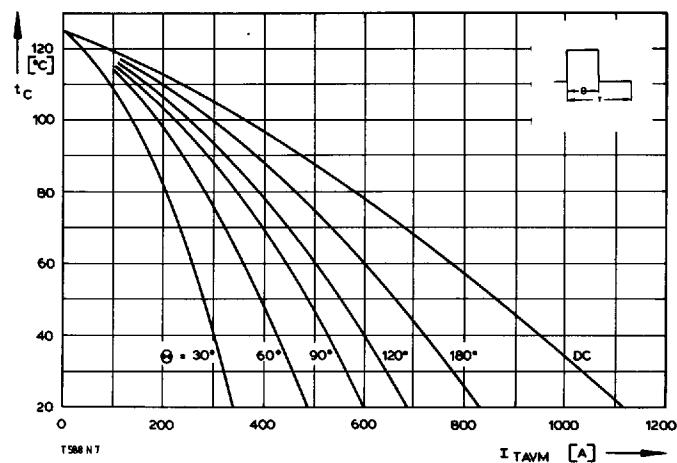
Bild/Fig. 6
Höchstzulässige Kühlmitteltemperatur t_A bei verstärkter beidseitiger Luftkühlung,
Kühlkörper K 0,12 F, $V_L = 50$ l/s.
Maximum allowable cooling medium temperature t_A at forced two-sided cooling,
heatsink type K 0.12 F, $V_L = 50$ l/s.



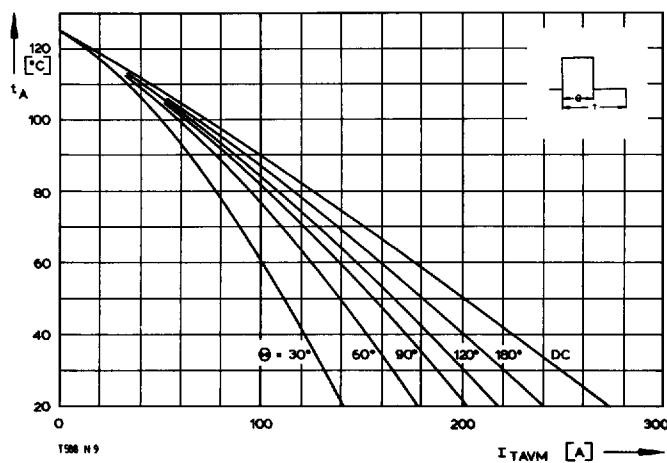
Bild/Fig. 7
Durchlaßverlustleistung P_{TAV} /On-state power loss P_{TAV}
Parameter: Stromflußwinkel θ /current conduction angle θ



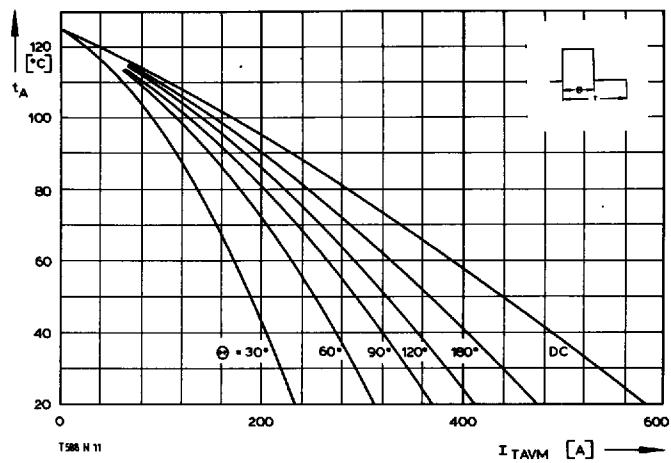
Bild/Fig. 8
Höchstzulässige Gehäusetemperatur t_C bei beidseitiger Kühlung
Maximum allowable case temperature t_C at two-sided cooling



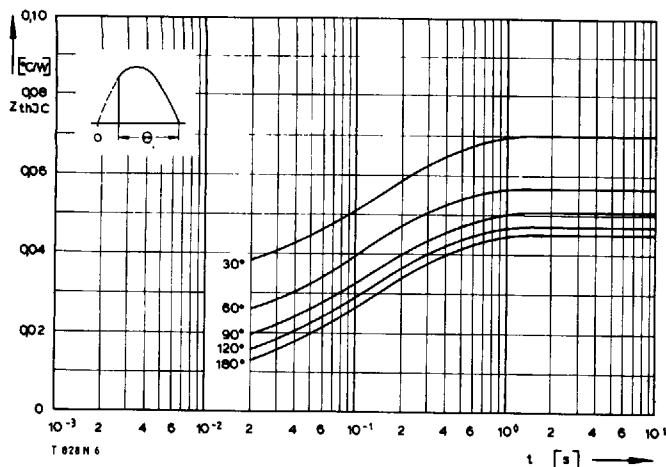
Bild/Fig. 9
Höchstzulässige Gehäusetemperatur t_C bei anodenseitiger Kühlung
Maximum allowable case temperature t_C at anode sided cooling



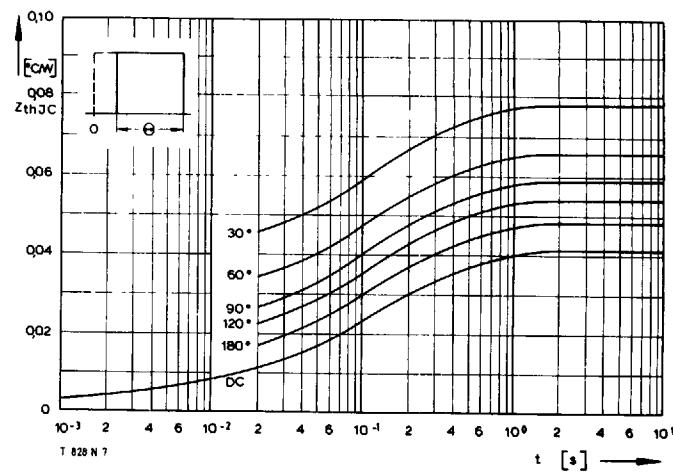
Bild/Fig. 10
Höchstzulässige Kühlmittelttemperatur t_A bei beidseitiger Luftselbstkühlung,
Kühlkörper K 0,36 S.
Maximum allowable cooling medium temperature t_A at natural two-sided cooling,
heatsink type K 0.36 S.



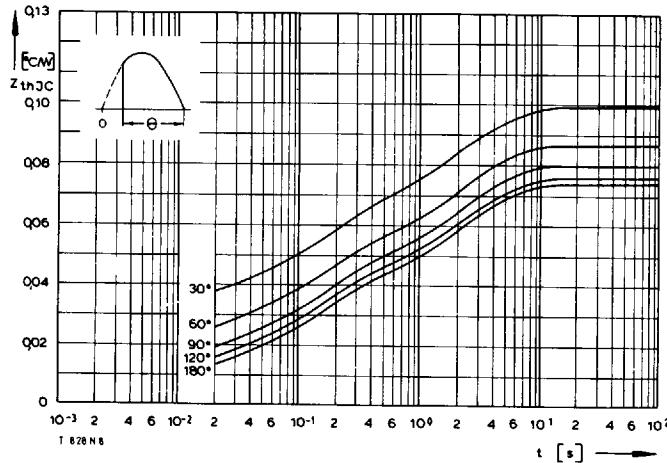
Bild/Fig. 11
Höchstzulässige Kühlmittelttemperatur t_A bei verstärkter beidseitiger Luftkühlung,
Kühlkörper K 0,12 F, $V_L = 50$ l/s.
Maximum allowable cooling medium temperature t_A at forced two-sided cooling,
heatsink type K 0.12 F, $V_L = 50$ l/s.



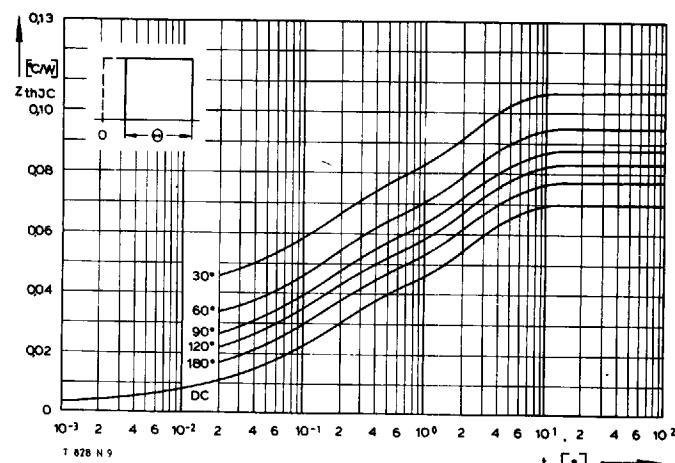
Bild/Fig. 12
Transienter innerer Wärmewiderstand Z_{thJC}
Transient thermal impedance, junction case, Z_{thJC}
beidseitige Kühlung/two-sided cooling



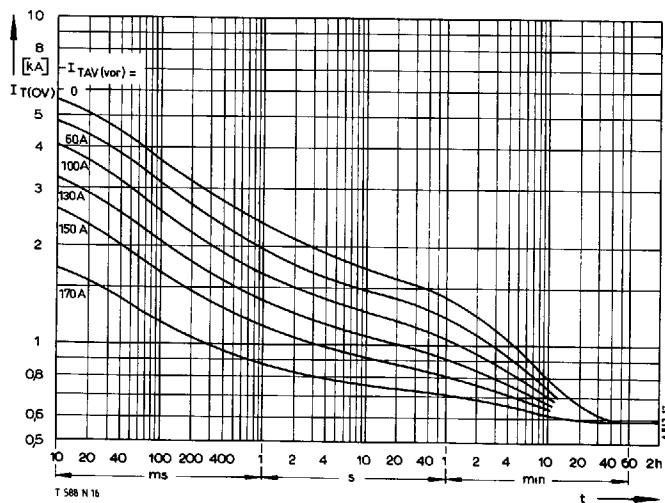
Bild/Fig. 13
Transienter innerer Wärmewiderstand Z_{thJC}
Transient thermal impedance, junction case, Z_{thJC}
beidseitige Kühlung/two-sided cooling



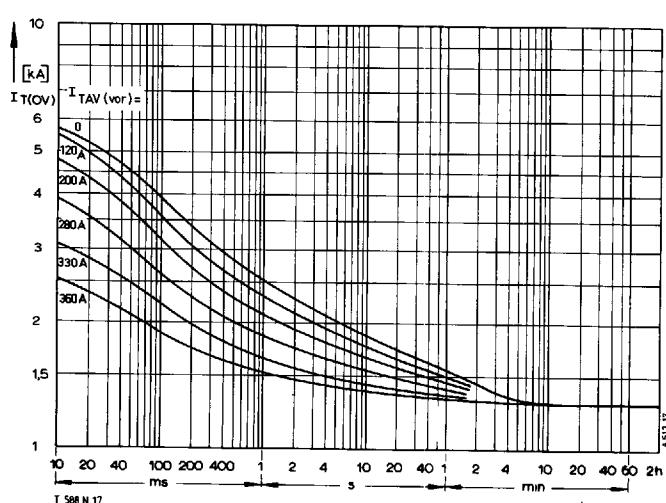
Bild/Fig. 14
Transienter innerer Wärmewiderstand Z_{thJC}
Transient thermal impedance, junction case, Z_{thJC}
anodenseitige Kühlung/anode sided cooling



Bild/Fig. 15
Transienter innerer Wärmewiderstand Z_{thJC}
Transient thermal impedance, junction case, Z_{thJC}
anodenseitige Kühlung/anode sided cooling

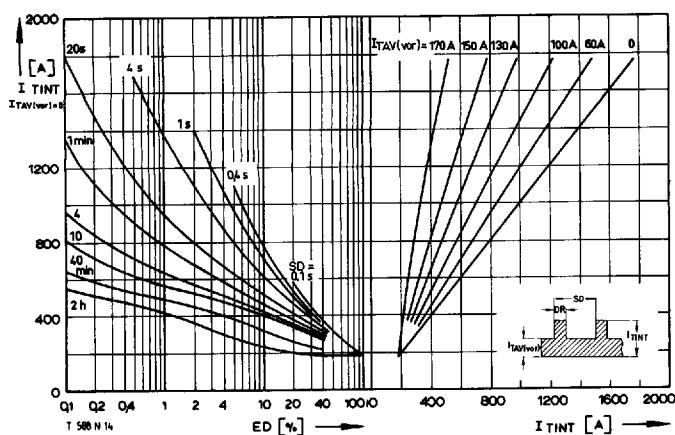


Bild/Fig. 16
Überstrom $I_{T(OV)}$ bei beidseitiger Luftselbstkühlung, $t_A = 45^\circ\text{C}$,
Kühlkörper K 0.36 S.
Overload on-state current $I_{T(OV)}$ at natural two-sided cooling, $t_A = 45^\circ\text{C}$,
heat sink type K 0.36 S.
Parameter: Vorlaststrom/pre-load current $I_{TAV(vor)}$



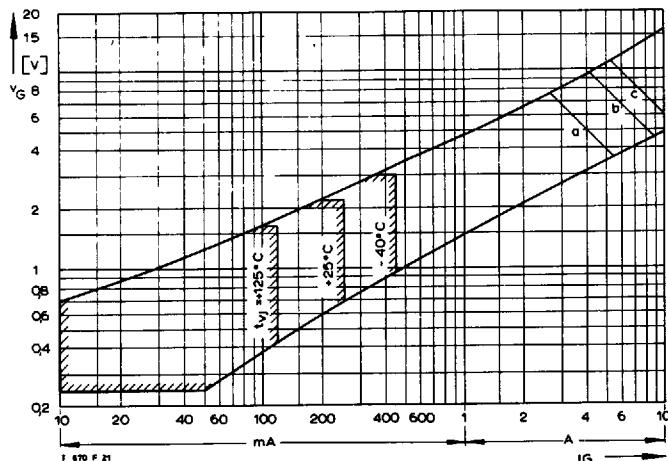
Bild/Fig. 17
Überstrom $I_{T(OV)}$ bei verstärkter beidseitiger Luftkühlung, $t_A = 35^\circ\text{C}$,
Kühlkörper K 0.12 F, $V_L = 50$ l/s.
Overload on-state current $I_{T(OV)}$ at forced two-sided cooling, $t_A = 35^\circ\text{C}$,
heat sink type K 0.12 F, $V_L = 50$ l/s.
Parameter: Vorlaststrom/pre-load current $I_{TAV(vor)}$

T 588 N



Bild/Fig. 18

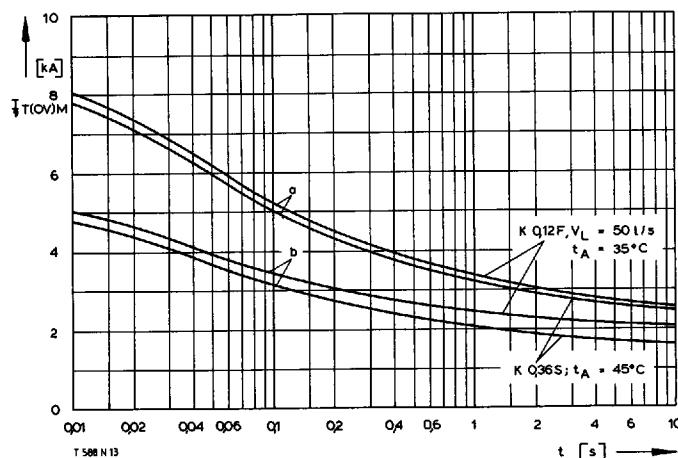
Höchstzulässiger Durchlaßstrom I_{TINT} bei Aussetzbetrieb und beidseitiger Luftselbstkühlung, $t_A = 45^\circ\text{C}$, Kühlkörper K 0,36 S.
Limiting on-state current I_{TINT} during intermittent operation at natural two-sided cooling, $t_A = 45^\circ\text{C}$, heatsink type K 0,36 S.
Parameter: Spieldauer/cycle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



Bild/Fig. 20

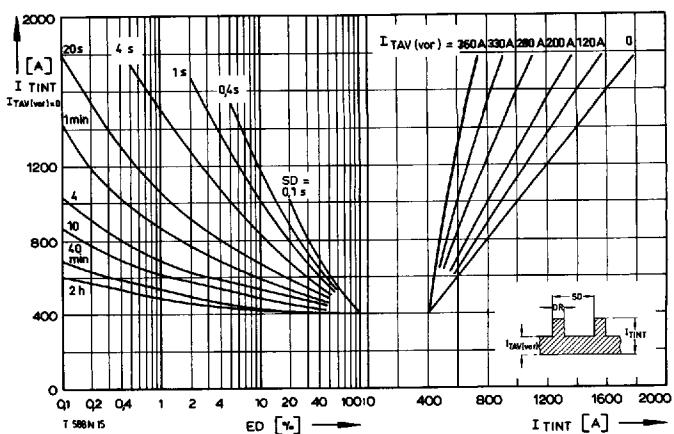
Zündbereich und Spitzensteuerleistung bei $V_D \geq 6$ V.
Gate characteristic and peak gate power dissipation at $V_D \geq 6$ V.
Parameter:

	a	b	c	
Steuerimpulsdauer/Pulse duration t_g	[ms]	10	1	0,5
Höchstzulässige Spitzensteuerleistung/ Maximum allowable peak gate power	[W]	20	40	60



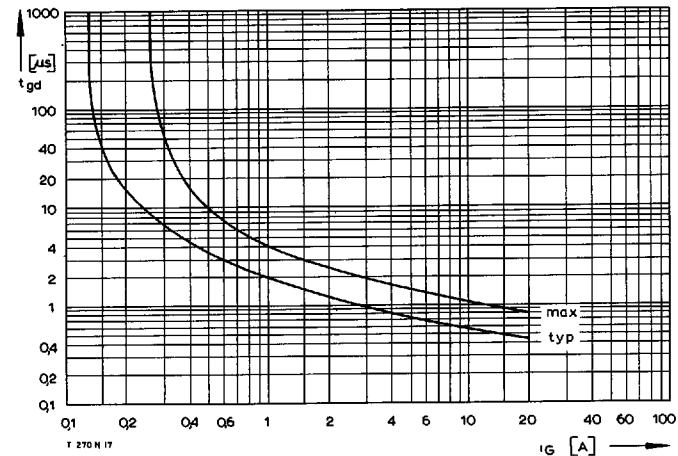
Bild/Fig. 22

Grenzstrom $I_{T(OV)M}$ bei beidseitiger Kühlung, Kühlkörper K 0,36 S und K 0,12 F.
Limiting overload on-state current $I_{T(OV)M}$ at two-sided cooling,
heatsink type K 0,36 S and K 0,12 F.
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}



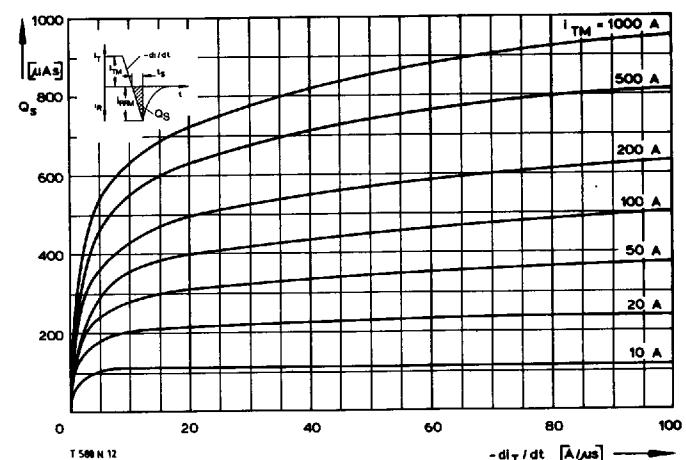
Bild/Fig. 19

Höchstzulässiger Durchlaßstrom I_{TINT} bei Aussetzbetrieb und verstärkter beidseitiger Luftkühlung, $t_A = 35^\circ\text{C}$, Kühlkörper K 0,12 F, $V_L = 50$ V/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, $V_L = 50$ V/s.
Parameter: Spieldauer/cycle duration SD
Vorlaststrom/pre-load current $I_{TAV(vor)}$



Bild/Fig. 21

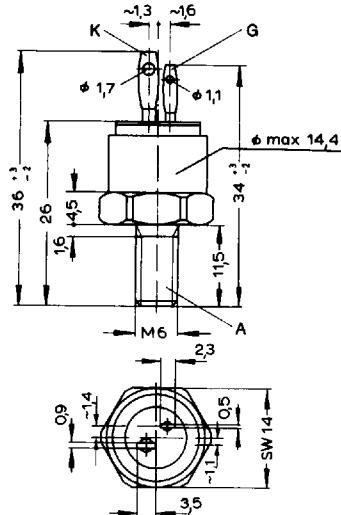
Zündverzug t_{gd} bei $I_{TM} = 100$ A, $t_{ij} = 25^\circ\text{C}$.
Gate controlled delay time t_{gd} at $I_{TM} = 100$ A, $t_{ij} = 25^\circ\text{C}$.



Bild/Fig. 23

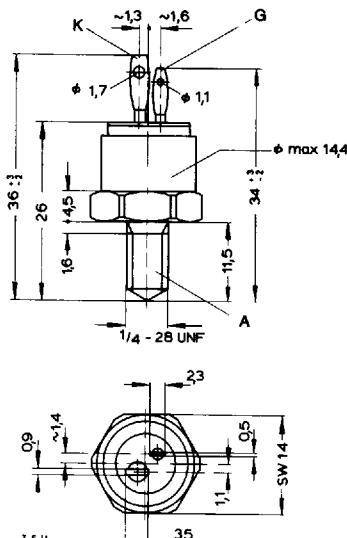
Nachlaufladung Q_S in Abhängigkeit von der abkommunizierenden Stromsteilheit $-di_T/dt$ bei $t_{ij} \text{ max}$.
Lag charge Q_S versus the rate of decay of the forward on-state current $-di_T/dt$ at $t_{ij} \text{ max}$.

T-91-20



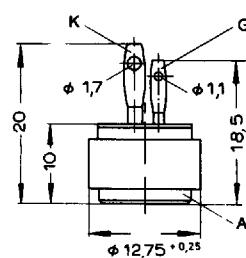
1

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



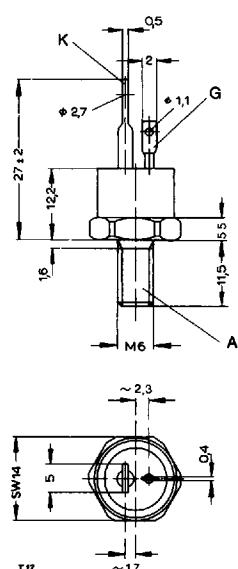
2

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



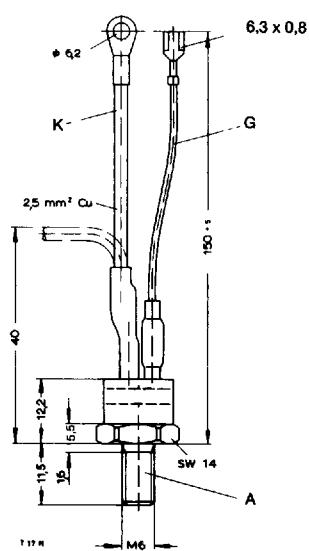
3

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



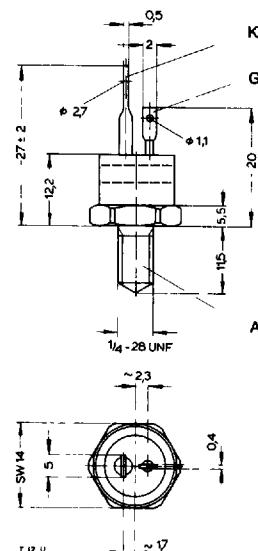
4

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



5

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

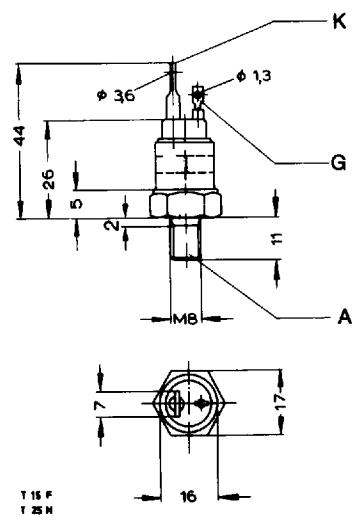


6

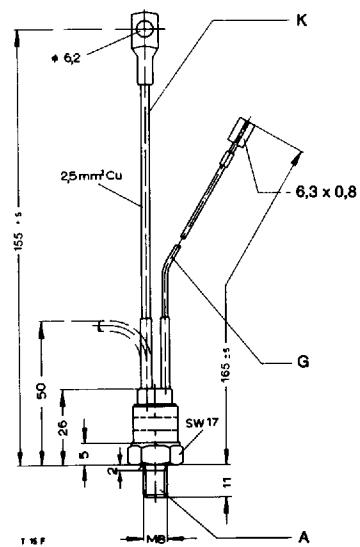
T 12 N...U
T 15.1 N...U
T 17 N...U
T 24 N...U
T 31 N...U

Maßbilder/Outlines

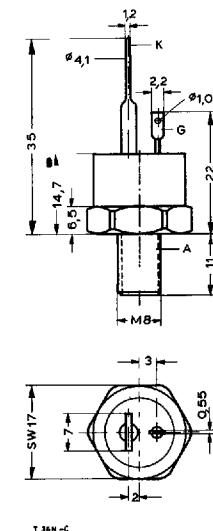
T-91-20



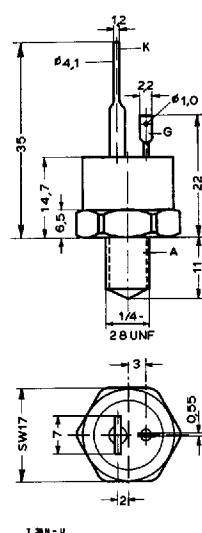
7

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

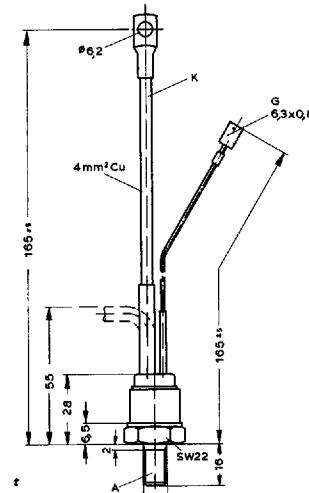
8

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

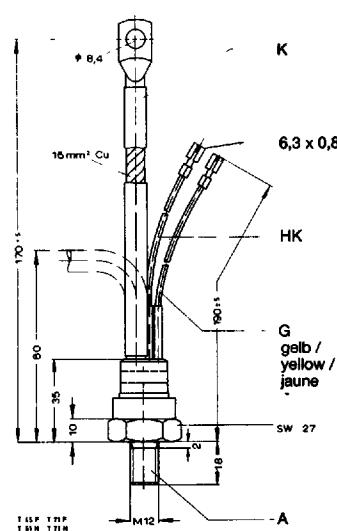
9

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

10

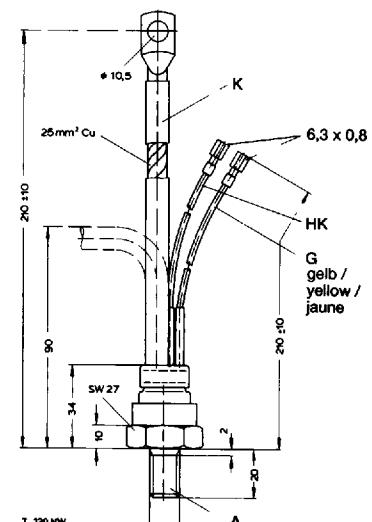
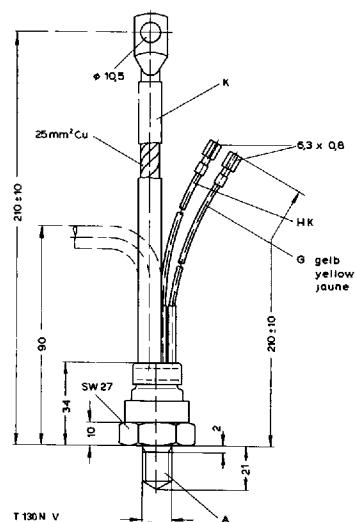
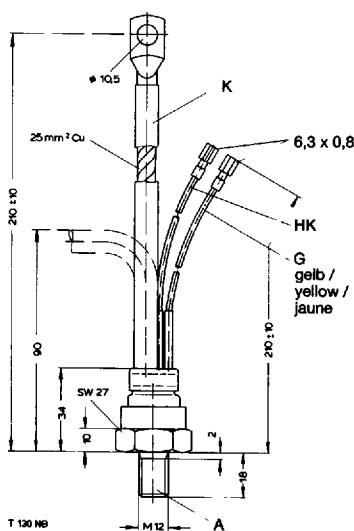
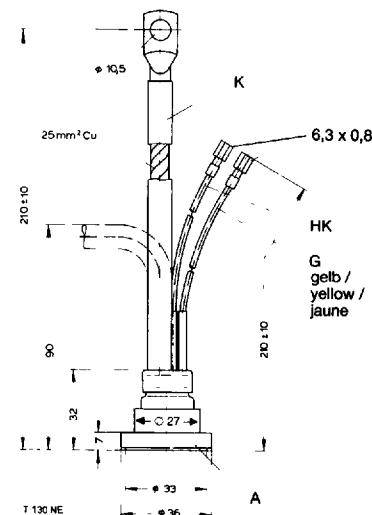
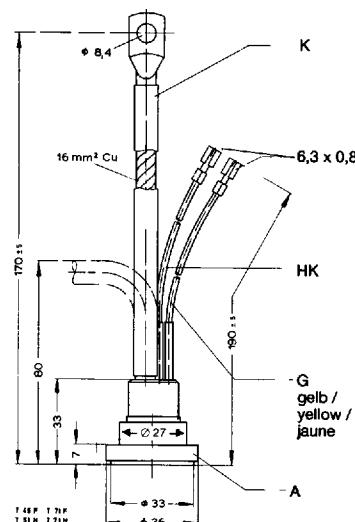
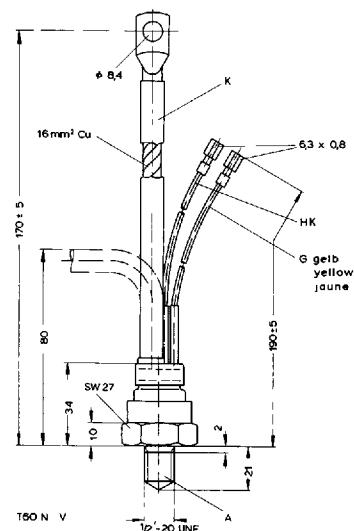
T 36 N...U
T 46 N...U

11

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

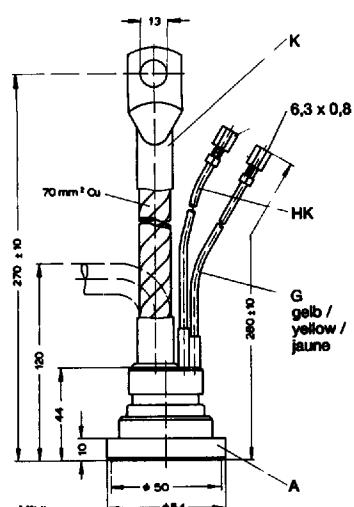
12

T 60 N...B
T 85 N...B
T 115 N...B

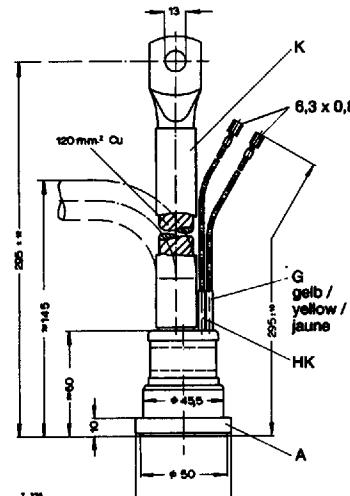


Maßbilder/Outlines

T-91-20

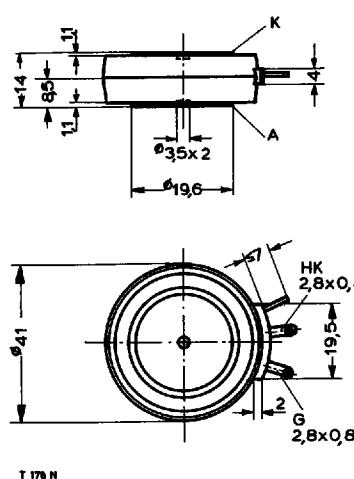


19

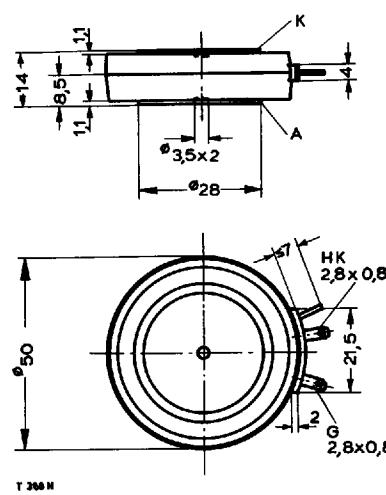
T 175 N
T 221 N
T 235 N
T 236 N
T 345 N

20

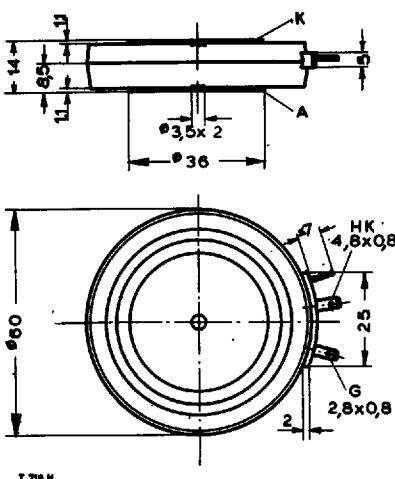
T 270 N



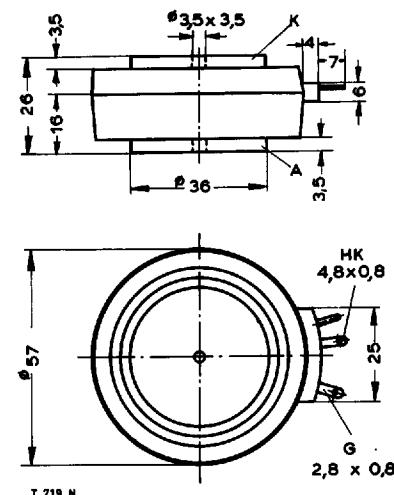
21

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

22

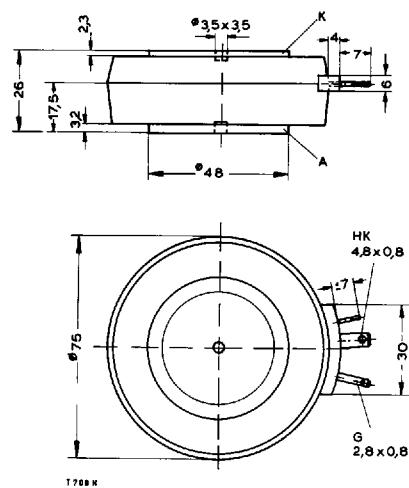
T 308 N
T 388 N
T 508 N
T 588 N
T 828 N

23

T 718 N
T 1258 N

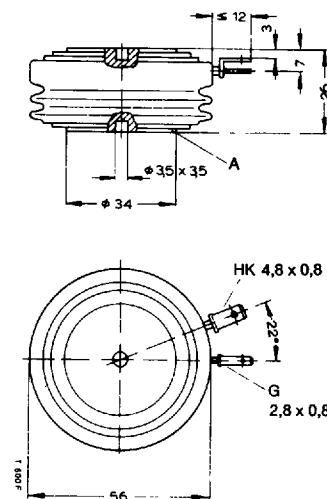
24

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



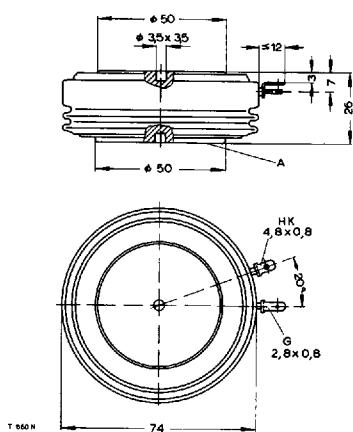
25

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



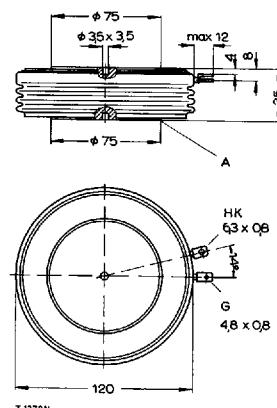
26

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