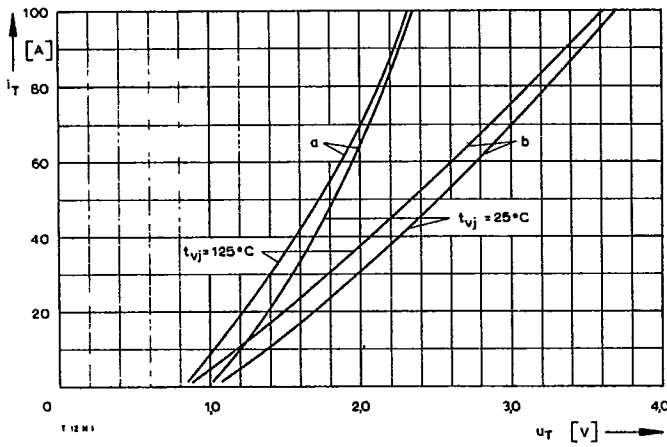
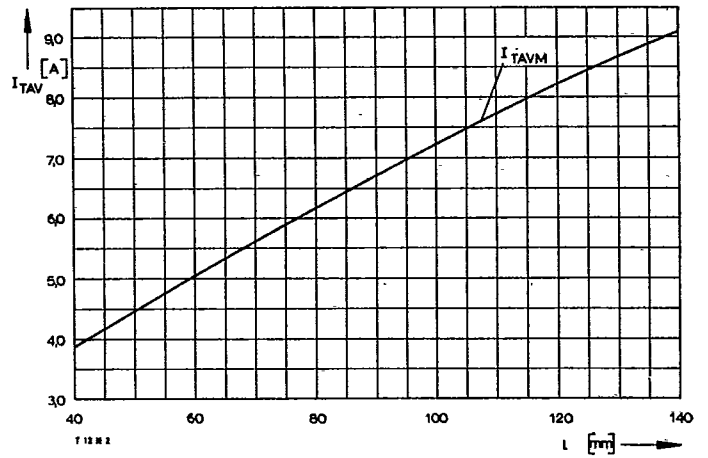


T12 N

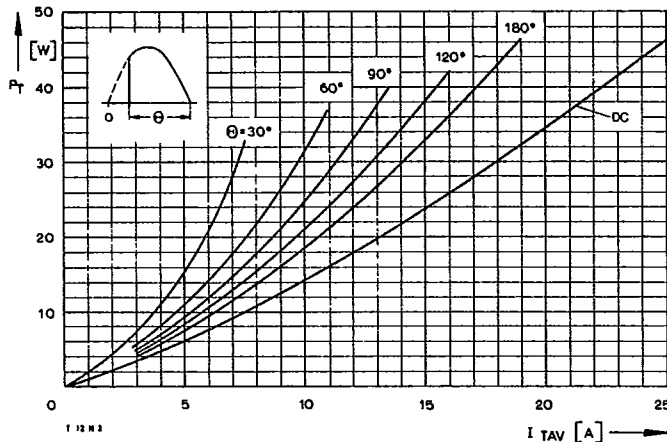
| Typenreihe/Type range | T12 N | 400 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 | |
|----------------------------------|--|--|-----|-----|-----|-----|------|--|---|--|
| Elektrische Eigenschaften | | Electrical properties | | | | | | | | |
| Höchstzulässige Werte | | Maximum permissible values | | | | | | | | |
| U_{DRM}, U_{RRM} | Periodische Vorwärts- und Rückwärts-Spitzensperrspannung | repetitive peak forward off-state and reverse voltages | | | | | | 400...1200 | V | |
| I_{TRMSM} | Effektiver Durchlaßstrom | RMS on-state current | | | | | | 30 | A | |
| I_{TAVM} | Dauergrenzstrom | average on-state current | | | | | | $t_C = 85^\circ\text{C}$ $t_C = 50^\circ\text{C}$ | 12 19 | A A |
| I_{TRM} | Periodischer Spitzenstrom | repetitive peak on-state current | | | | | | 180 | A | |
| I_{TSM} | Stoßstrom-Grenzwert | surge current | | | | | | $t = 10\text{ ms}, t_M = 45^\circ\text{C}$ $t = 10\text{ ms}, t_M = 125^\circ\text{C}$ | 220 200 | A A |
| $\int i^2 dt$ | Grenzlastintegral | $\int i^2 dt$ -value | | | | | | $t = 10\text{ ms}, t_M = 45^\circ\text{C}$ $t = 10\text{ ms}, t_M = 125^\circ\text{C}$ | 240 200 | A ² s A ² s |
| $(di/dt)_{cr}$ | Kritische Stromsteilheit | critical rate of rise of on-state current | | | | | | nicht periodisch/non repetitive Dauerbetrieb/continuous operation, $I_{TM} = 120\text{ A}$ Steuergenerator/pulse generator: $U_L = 8\text{ V}, I_K = 0,25\text{ A}, di_K/dt \geq 0,25\text{ A}/\mu\text{s}$ | 300 60 | A/ μs A/ μs |
| $(du/dt)_{cr}$ | Kritische Spannungssteilheit | critical rate of rise of off-state voltage | | | | | | $U_D = 67\% U_{DRM}$ 5. Kennbuchstabe/5th letter B 5. Kennbuchstabe/5th letter E 5. Kennbuchstabe/5th letter C | 50 200 400 | V/ μs V/ μs V/ μs |
| Charakteristische Werte | | Characteristic values | | | | | | | | |
| U_T | Obere Durchlaßspannung | max. on-state voltage | | | | | | $t_M = 25^\circ\text{C}, I_T = 60\text{ A}$ | 2,75 | V |
| $U_{(TO)}$ | Schleusenspannung | threshold voltage | | | | | | $t_M = 125^\circ\text{C}$ | 1,2 | V |
| r_T | Ersatzwiderstand | slope resistance | | | | | | $t_M = 125^\circ\text{C}$ | 26 | m Ω |
| U_{GT} | Obere Zündspannung | max. gate trigger voltage | | | | | | $t_M = 25^\circ\text{C}, U_D = 6\text{ V}, R_A = 10\ \Omega$ | 2 | V |
| I_{GT} | Oberer Zündstrom | max. gate trigger current | | | | | | $t_M = 25^\circ\text{C}, U_D = 6\text{ V}, R_A = 10\ \Omega$ | 50 | mA |
| | Unterer Zündstrom | min. gate trigger current | | | | | | $t_M = 125^\circ\text{C}, U_D = 6\text{ V}, R_A = 10\ \Omega$ | 0,5 | mA |
| I_H | Oberer Haltestrom | max. holding current | | | | | | $t_M = 25^\circ\text{C}, U_D = 6\text{ V}, R_A = 10\ \Omega$ | 100 | mA |
| I_L | Oberer Einraststrom | max. latching current | | | | | | $t_M = 25^\circ\text{C}, U_D = 6\text{ V}, R_{GK} \geq 20\ \Omega$ | 280 | mA |
| I_D, I_R | Oberer Vorwärts- und Rückwärts-Sperrstrom | max. forward off-state and reverse currents | | | | | | Steuergenerator/pulse generator: $I_G = 0,25\text{ A}, di_G/dt = 0,5\text{ A}/\mu\text{s}$ | 5 | mA |
| t_{gd} | Oberer Zündverzug | max. gate controlled delay time | | | | | | Prüfbedingungen Seite/test conditions page 21 $t_M = 125^\circ\text{C}, U_D = U_{DRM} (U_R = U_{RRM})$ | 1,8 | μs |
| t_q | Typische Freierdezeit | typical turn-off time | | | | | | | 60 | μs |
| C_{null} | Typische Nullkapazität | typical zero capacitance | | | | | | $t_M = 25^\circ\text{C}, f = 10\text{ kHz}$ | 250 | pF |
| Thermische Eigenschaften | | Thermal properties | | | | | | | | |
| R_{thJC} | Innerer Wärmewiderstand | thermal resistance, junction to case | | | | | | $\Theta = 180^\circ\text{el, sinus}$ DC | $\leq 1,6\ ^\circ\text{C}/\text{W}$ $\leq 1,31^\circ\text{C}/\text{W}$ | |
| | Betriebstemperatur | operating temperature | | | | | | | -40°C...+125°C | |
| | Lagertemperatur | storage temperature | | | | | | | -40°C...+130°C | |
| Mechanische Eigenschaften | | Mechanical properties | | | | | | | | |
| | Si-Element glaspassiviert, gelötet | Si-pellet glass-passivated, soldered | | | | | | | | |
| G | Gewicht, Bauform C/R/U | weight, case design C/R/U | | | | | | | 12...20 g | |
| M | Anzugsdrehmoment | tightening torque | | | | | | | 2 Nm | |
| | Maßbilder | outlines | | | | | | | Seite/page 232 | |
| | Kriechstrecke | creepage distance | | | | | | | 2 mm | |
| | Feuchteklasse | humidity classification | | | | | | DIN 40040 | C | |
| | Schüttelfestigkeit | vibration resistance | | | | | | $f = 50\text{ Hz}$ | 5x9,81 m/s ² | |



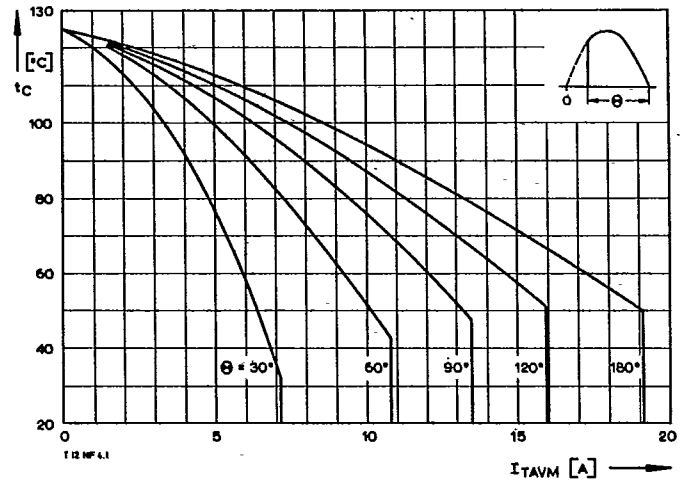
Bild/Fig. 1
Durchlaßkennlinien/On-state characteristics
a – Typische Kennlinien/typical characteristics
b – Grenzkennlinien/limiting characteristics



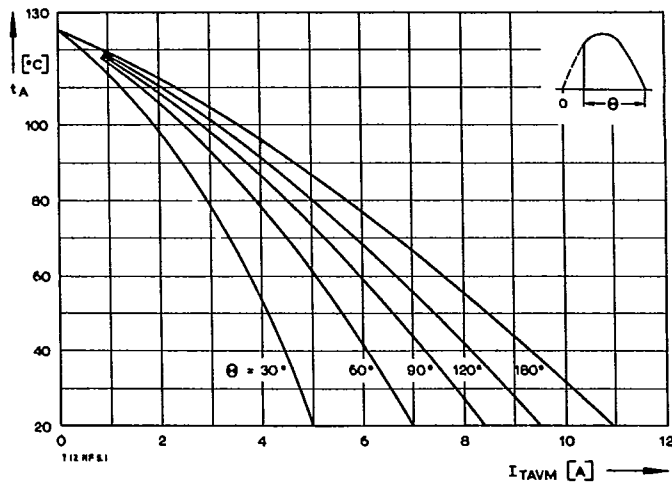
Bild/Fig. 2
Dauergrenzstrom I_{TAVM} in Abhängigkeit von der Kantenlänge l eines quadratischen Kühlbleches bei Luftselbstkühlung, $t_A = 45^\circ\text{C}$.
Limiting mean on-state current I_{TAVM} versus edge length l of a square cooling fin at natural cooling, $t_A = 45^\circ\text{C}$.



Bild/Fig. 3
Durchlaßverlustleistung P_T /On-state power loss P_T
Parameter: Stromflußwinkel Θ /current conduction angle Θ

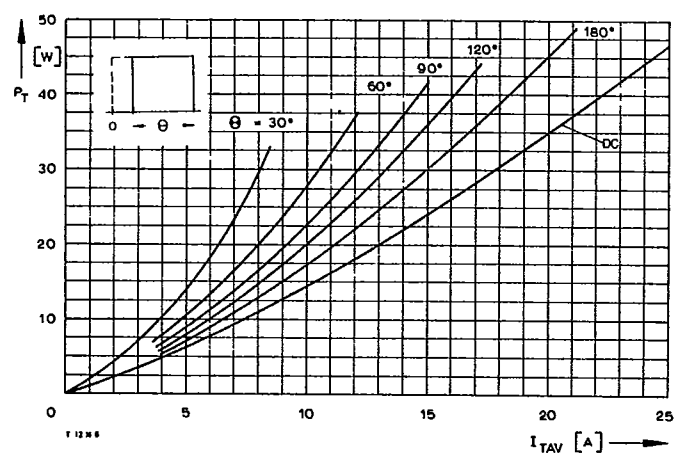


Bild/Fig. 4
Höchstzulässige Gehäusetemperatur t_C
Maximum allowable case temperature t_C

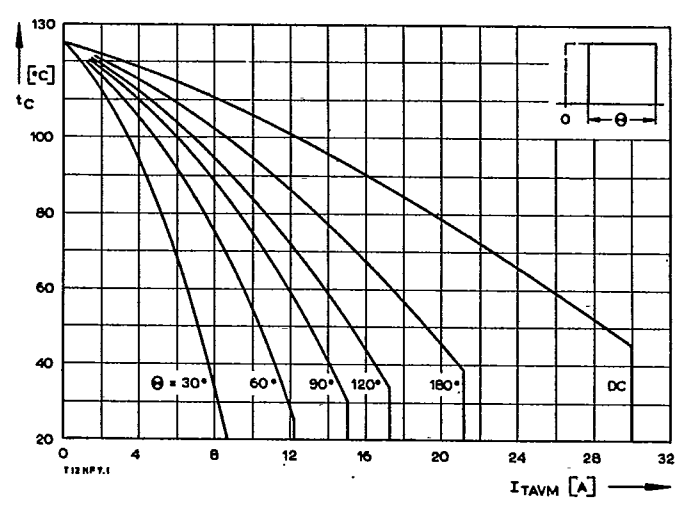


Bild/Fig. 5
Höchstzulässige Kühlmitteltemperatur t_A bei Luftselbstkühlung, Kühlkörper KL 21...
Maximum allowable cooling medium temperature t_A at natural cooling, heatsink type KL 21...

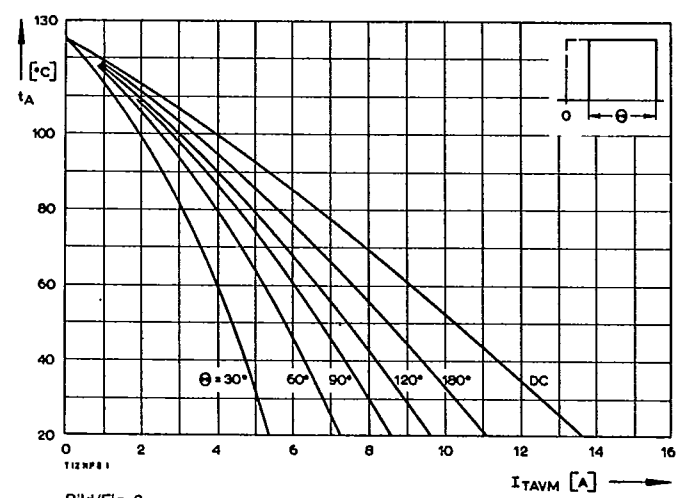
T12N



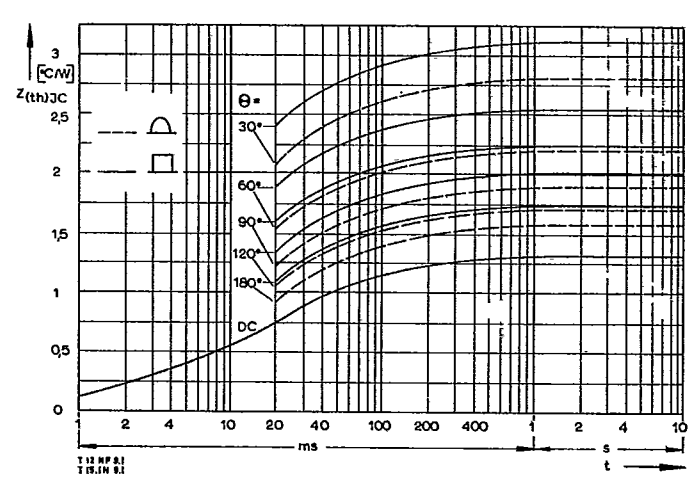
Bild/Fig. 6
Durchlaufverlustleistung P_T /On-state power loss P_T
Parameter: Stromflußwinkel Θ /current conduction angle Θ



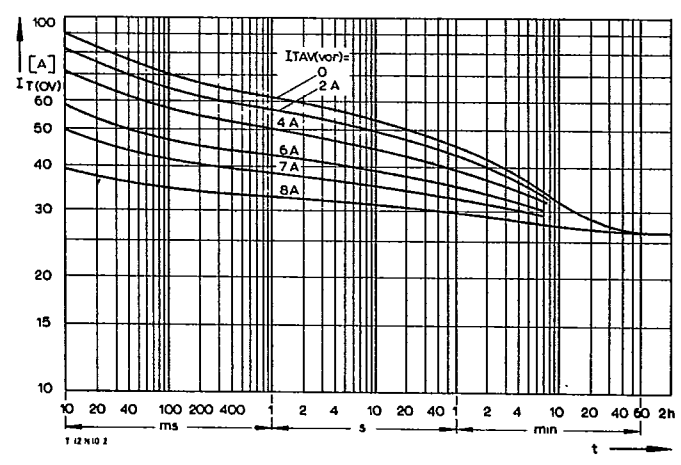
Bild/Fig. 7
Höchstzulässige Gehäusetemperatur t_c
Maximum allowable case temperature t_c



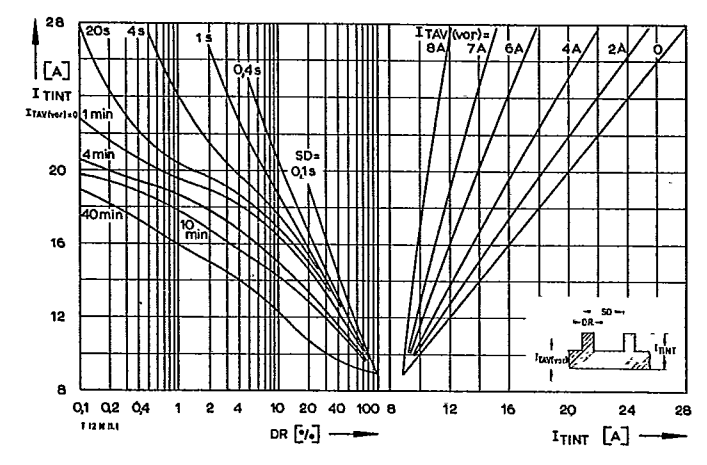
Bild/Fig. 8
Höchstzulässige Kühlmitteltemperatur t_A bei Luftselbstkühlung,
Kühlkörper KL 21...
Maximum allowable cooling medium temperature t_A at natural cooling,
heatsink type KL 21...



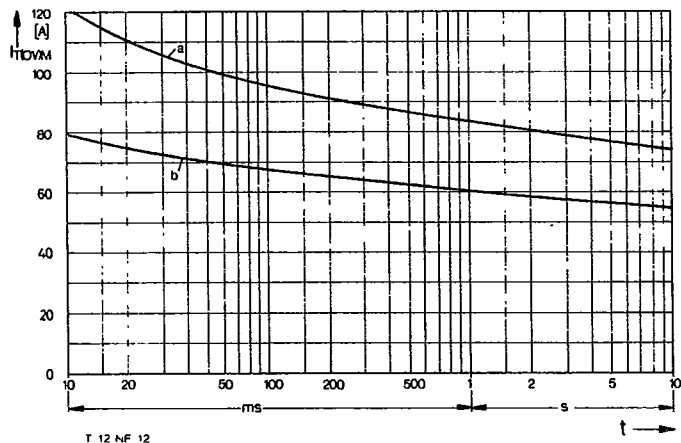
Bild/Fig. 9
Transienter innerer Wärmewiderstand $Z_{(th)JC}$ bei sinus- und rechteckförmigem
Stromverlauf.
Transient thermal impedance $Z_{(th)JC}$, junction to case at sinusoidal and
square wave current.



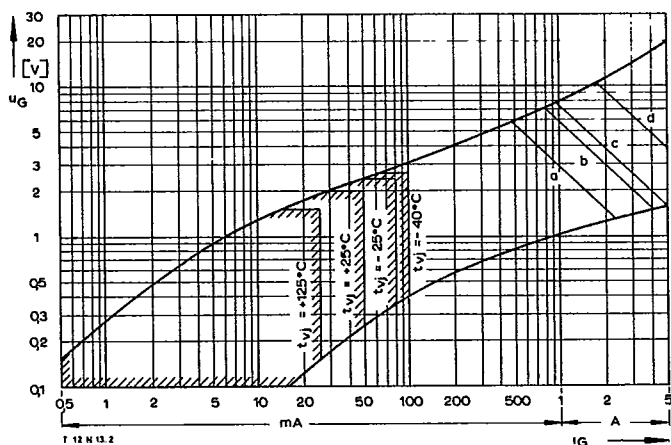
Bild/Fig. 10
Überstrom $I_{T(ov)}$ bei Luftselbstkühlung, $t_A = 45^\circ\text{C}$, Kühlkörper KL 21...
Overload on-state current $I_{T(ov)}$ at natural cooling, $t_A = 45^\circ\text{C}$,
heatsink type KL 21...
Parameter: Vorlaststrom/pre-load current $I_{TAV(vor)}$



Bild/Fig. 11
Höchstzulässiger Durchlaststrom I_{TINT} bei Aussetzbetrieb und Luftselbstkühlung,
 $t_A = 45^\circ\text{C}$, Kühlkörper KL 21...
Limiting on-state current I_{TINT} during intermittent operation at natural cooling,
 $t_A = 45^\circ\text{C}$, heatsink type KL 21...
Parameter: Spieldauer/cycle duration SD
Vorlaststrom/pre-load current $I_{TAV(vor)}$

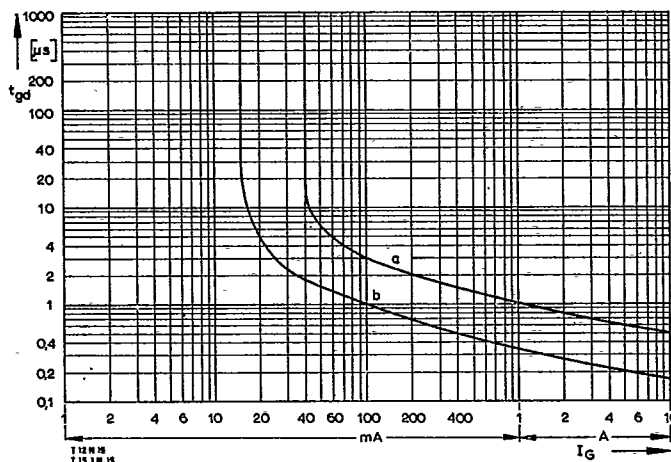


Bild/Fig. 12
 Grenzstrom $I_{T(OV)M}$ bei Luftselbstkühlung, Kühlkörper KL 21..., $u_{RM} = 0,8 U_{RRM}$.
 Limiting overcurrent on-state current $I_{T(OV)M}$ at natural cooling, heatsink type KL 21...,
 $U_{RM} = 0,8 U_{RRM}$.
 a - Belastung aus Leerlauf/current surge under no-load conditions
 b - Belastung nach Betrieb mit Dauergrenzstrom I_{TAVM} /
 Current surge occurs during operation at limiting mean on-state current I_{TAVM}

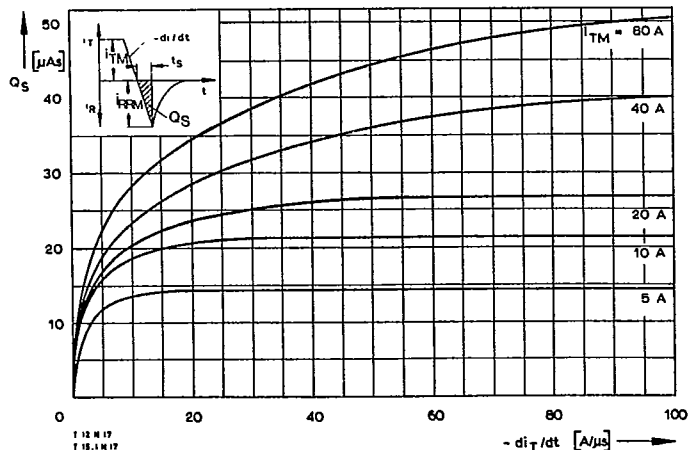


Bild/Fig. 13
 Zündbereich und Spitzensteuerleistung bei $u_D \geq 6 V$.
 Gate characteristic and peak gate power dissipation at $u_D \geq 6 V$.

| 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] 3 | 6 | 8 | 20 |



Bild/Fig. 14
 Zündverzögerung t_{gd} bei $I_{TM} = 4 A$, $t_{vj} = 25^\circ C$.
 Gate controlled delay time t_{gd} at $I_{TM} = 4 A$, $t_{vj} = 25^\circ C$.
 a - äußerster Verlauf/limiting characteristic
 b - typischer Verlauf/typical characteristic



Bild/Fig. 15
 Nachaufladung Q_S in Abhängigkeit von der abkommütierenden Stromsteilheit $-di/dt$ bei $t_{vj} = 125^\circ C$.
 Der angegebene Verlauf wird von 90% aller Thyristoren nicht überschritten.
 Lag charge Q_S versus the rate of decay of the forward on-state current $-di/dt$ at $t_{vj} = 125^\circ C$.
 These curves are valid for 90% of all thyristors.