

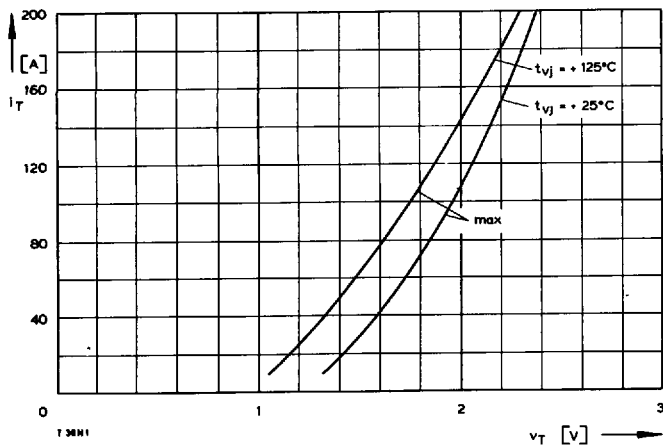
T-25-17

| Typenreihe/Type range     |                                                   | T 36 N                                                 | 200* | 400 | 600 | 800 | 1000 | 1100 | 1200                                                                                                                                       | 1400*                                                                                                    |
|---------------------------|---------------------------------------------------|--------------------------------------------------------|------|-----|-----|-----|------|------|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| 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 |      |     |     |     |      |      | 200...1400                                                                                                                                 | V                                                                                                        |
| $I_{TRMSM}$               | Effektiver Durchlaßstrom                          | RMS on-state current                                   |      |     |     |     |      |      | 65                                                                                                                                         | A                                                                                                        |
| $I_{TAVM}$                | Dauergrenzstrom                                   | average on-state current                               |      |     |     |     |      |      | $t_C = 85^{\circ}\text{C}$<br>$t_C = 76^{\circ}\text{C}$                                                                                   | 36<br>41<br>A<br>A                                                                                       |
| $I_{TRM}$                 | Periodischer Spitzenstrom                         | repetitive peak on-state current                       |      |     |     |     |      |      | $t_p = 10\text{ ms}, t_{vj} = 45^{\circ}\text{C}$                                                                                          | 390<br>A                                                                                                 |
| $I_{TSM}$                 | Stoßstrom-Grenzwert                               | surge current                                          |      |     |     |     |      |      | $t_p = 10\text{ ms}, t_{vj} = t_{vj\text{ max}}$                                                                                           | 980<br>A                                                                                                 |
| $\int i^2 dt$             | Grenzlastintegral                                 | $\int i^2 dt$ -value                                   |      |     |     |     |      |      | $t_p = 10\text{ ms}, t_{vj} = 45^{\circ}\text{C}$                                                                                          | 850<br>A                                                                                                 |
| $(di/dt)_{cr}$            | Kritische Stromsteilheit                          | critical rate of rise of on-state current              |      |     |     |     |      |      | $t_p = 10\text{ ms}, t_{vj} = t_{vj\text{ max}}$                                                                                           | 4800<br>A <sup>2</sup> s                                                                                 |
| $(dv/dt)_{cr}$            | Kritische Spannungssteilheit                      | critical rate of rise of off-state voltage             |      |     |     |     |      |      | nicht periodisch/non repetitive                                                                                                            | 3600<br>A <sup>2</sup> s                                                                                 |
|                           |                                                   |                                                        |      |     |     |     |      |      | Dauerbetrieb/continuous operation, $i_{TM} = 200\text{ A}$ ,<br>$v_L = 8\text{ V}, i_G = 0,6\text{ A}, di_G/dt = 0,6\text{ A}/\mu\text{s}$ | 600<br>A/ $\mu\text{s}$                                                                                  |
|                           |                                                   |                                                        |      |     |     |     |      |      | $V_D = 67\% V_{DRM}, t_{vj} = t_{vj\text{ max}}$                                                                                           | 120<br>A/ $\mu\text{s}$                                                                                  |
|                           |                                                   |                                                        |      |     |     |     |      |      | 5. Kennbuchstabe/5th letter C                                                                                                              | 400<br>V/ $\mu\text{s}$                                                                                  |
|                           |                                                   |                                                        |      |     |     |     |      |      | 5. Kennbuchstabe/5th letter F                                                                                                              | 1000<br>V/ $\mu\text{s}$                                                                                 |
| Charakteristische Werte   |                                                   | Characteristic values                                  |      |     |     |     |      |      |                                                                                                                                            |                                                                                                          |
| $V_T$                     | Obere Durchlaßspannung                            | max. on-state voltage                                  |      |     |     |     |      |      | $t_{vj} = 25^{\circ}\text{C}, i_T = 150\text{ A}$                                                                                          | 2,2<br>V                                                                                                 |
| $V_{(TO)}$                | Schleusenspannung                                 | threshold voltage                                      |      |     |     |     |      |      | $t_{vj} = t_{vj\text{ max}}$                                                                                                               | 1<br>V                                                                                                   |
| $r_T$                     | Ersatzwiderstand                                  | slope resistance                                       |      |     |     |     |      |      | $t_{vj} = t_{vj\text{ max}}$                                                                                                               | 6,2<br>m $\Omega$                                                                                        |
| $V_{GT}$                  | Obere Zündspannung                                | max. gate trigger voltage                              |      |     |     |     |      |      | $t_{vj} = 25^{\circ}\text{C}, V_D = 6\text{ V}, R_A = 5\text{ }\Omega$                                                                     | 2,5<br>V                                                                                                 |
| $I_{GT}$                  | Oberer Zündstrom                                  | max. gate trigger current                              |      |     |     |     |      |      | $t_{vj} = 25^{\circ}\text{C}, V_D = 6\text{ V}, R_A = 5\text{ }\Omega$                                                                     | 150<br>mA                                                                                                |
|                           | Unterer Zündstrom                                 | min. gate trigger current                              |      |     |     |     |      |      | $t_{vj} = t_{vj\text{ max}}, V_D = 6\text{ V}, R_A = 5\text{ }\Omega$                                                                      | 5<br>mA                                                                                                  |
| $I_H$                     | Oberer Haltestrom                                 | max. holding current                                   |      |     |     |     |      |      | $t_{vj} = 25^{\circ}\text{C}, V_D = 6\text{ V}, R_A = 5\text{ }\Omega$                                                                     | 200<br>mA                                                                                                |
| $I_L$                     | Oberer Einraststrom                               | max. latching current                                  |      |     |     |     |      |      | $t_{vj} = 25^{\circ}\text{C}, V_D = 6\text{ V}, R_{GK} \geq 20\text{ }\Omega$                                                              | 600<br>mA                                                                                                |
| $i_D, i_R$                | Oberer Vorwärts- und Rückwärts-Sperrstrom         | max. forward off-state and reverse currents            |      |     |     |     |      |      | $i_G = 0,6\text{ A}, di_G/dt = 0,6\text{ A}/\mu\text{s}, t_g = 10\text{ }\mu\text{s}$                                                      |                                                                                                          |
| $t_{gd}$                  | Oberer Zündverzug                                 | max. gate controlled delay time                        |      |     |     |     |      |      | $t_{vj} = t_{vj\text{ max}}, V_D = V_{DRM} (V_R = V_{RRM})$                                                                                | 10<br>mA                                                                                                 |
| $t_q$                     | Typische Freiwerdezeit                            | typical turn-off time                                  |      |     |     |     |      |      | $i_G = 0,6\text{ A}, di_G/dt = 0,6\text{ A}/\mu\text{s}$                                                                                   | 1,2<br>$\mu\text{s}$                                                                                     |
| $C_{null}$                | Typische Nullkapazität                            | typical zero capacitance                               |      |     |     |     |      |      | Prüfbedingungen/test conditions 3.4.3.4                                                                                                    | 60<br>$\mu\text{s}$                                                                                      |
|                           |                                                   |                                                        |      |     |     |     |      |      | $t_{vj} = 25^{\circ}\text{C}, f = 10\text{ kHz}$                                                                                           | 700<br>pF                                                                                                |
| Thermische Eigenschaften  |                                                   | Thermal properties                                     |      |     |     |     |      |      |                                                                                                                                            |                                                                                                          |
| $R_{thJC}$                | Innerer Wärmewiderstand                           | thermal resistance, junction to case                   |      |     |     |     |      |      | $\Theta = 180^{\circ}\text{el, sinus}$                                                                                                     | $\leq 0,72^{\circ}\text{C}/\text{W}$                                                                     |
| $t_{vj\text{ max}}$       | Höchstzul. Sperrschichttemperatur                 | max. junction temperature                              |      |     |     |     |      |      | DC                                                                                                                                         | $\leq 0,68^{\circ}\text{C}/\text{W}$                                                                     |
| $t_{vj\text{ op}}$        | Betriebstemperatur                                | operating temperature                                  |      |     |     |     |      |      |                                                                                                                                            | 125 $^{\circ}\text{C}$                                                                                   |
| $t_{stg}$                 | Lagertemperatur                                   | storage temperature                                    |      |     |     |     |      |      |                                                                                                                                            | - 40 $^{\circ}\text{C}$ ...+125 $^{\circ}\text{C}$<br>- 40 $^{\circ}\text{C}$ ...+130 $^{\circ}\text{C}$ |
| Mechanische Eigenschaften |                                                   | Mechanical properties                                  |      |     |     |     |      |      |                                                                                                                                            |                                                                                                          |
|                           | Si-Element glaspassiviert, gelötet                | Si-pellet glass-passivated, soldered                   |      |     |     |     |      |      |                                                                                                                                            |                                                                                                          |
| G                         | Gewicht                                           | weight                                                 |      |     |     |     |      |      |                                                                                                                                            | 22 g                                                                                                     |
| M                         | Anzugsdrehmoment                                  | tightening torque                                      |      |     |     |     |      |      |                                                                                                                                            | 4 Nm                                                                                                     |
|                           | Maßbilder C/U                                     | outlines C/U                                           |      |     |     |     |      |      | DIN 41892-202 C 3/TO 65                                                                                                                    | Seite/page 238                                                                                           |
|                           | Kriechstrecke                                     | creepage distance                                      |      |     |     |     |      |      |                                                                                                                                            | 2 mm                                                                                                     |
|                           | Feuchtklasse                                      | humidity classification                                |      |     |     |     |      |      | DIN 40040                                                                                                                                  | C                                                                                                        |
|                           | Schüttelfestigkeit                                | vibration resistance                                   |      |     |     |     |      |      | $f = 50\text{ Hz}$                                                                                                                         | 5x9,81 m/s <sup>2</sup>                                                                                  |

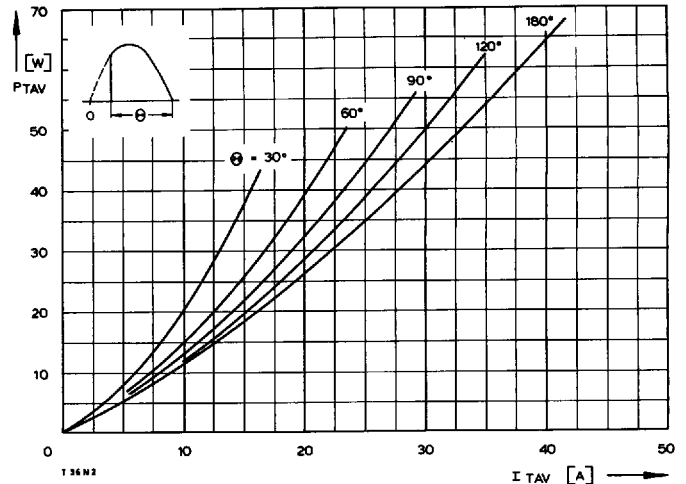
\* Für größere Stückzahlen bitte Liefertermin erfragen/Delivery for larger quantities on request

## T36 N

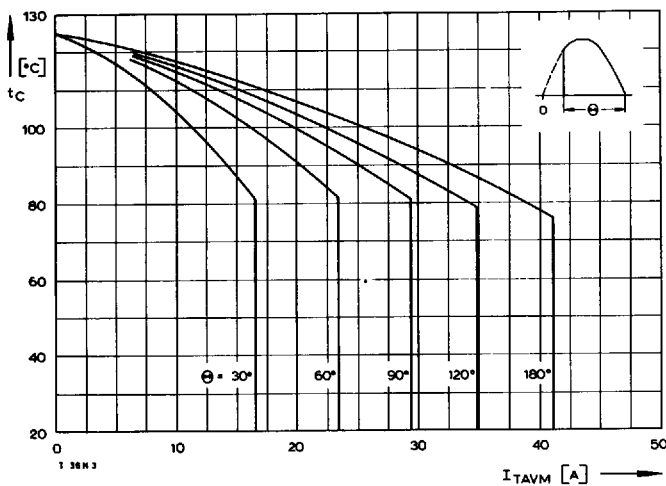
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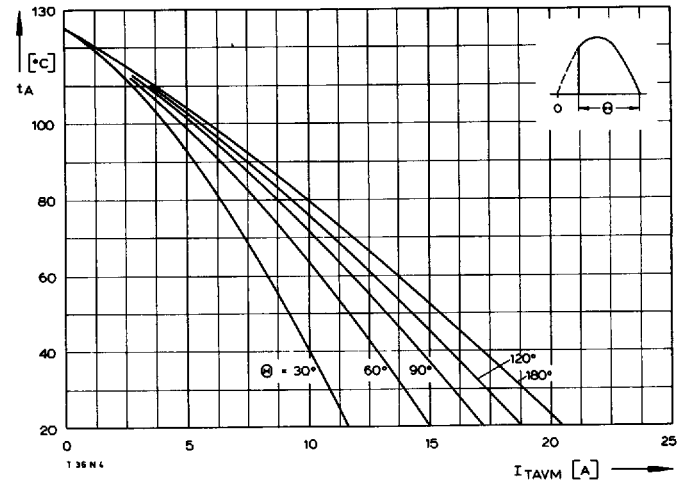
Bild/Fig. 1  
Durchlaßkennlinien/On-state characteristics



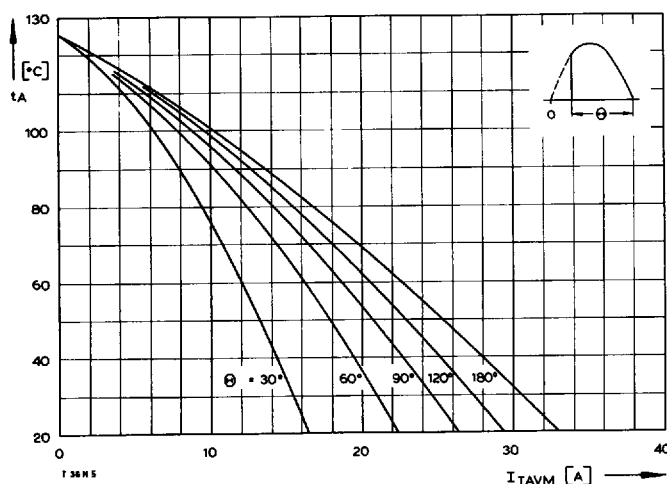
Bild/Fig. 2  
Durchlaßverlustleistung  $P_{TAV}$ /On-state power dissipation  $P_{TAV}$   
Parameter: Stromflußwinkel  $\theta$ /current conduction angle  $\theta$



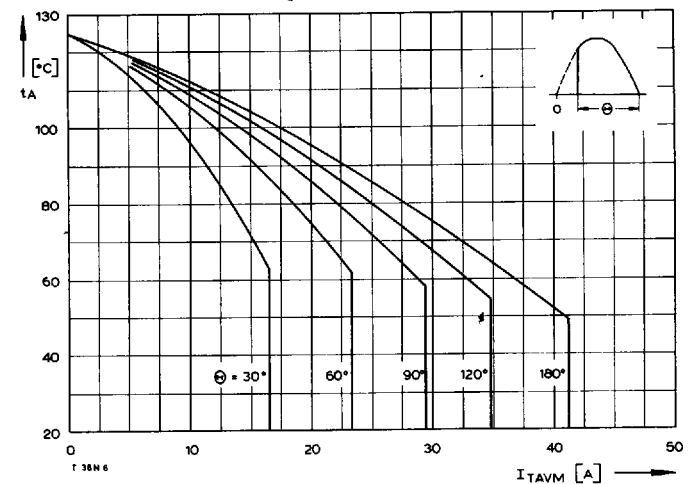
Bild/Fig. 3  
Höchstzulässige Gehäusetemperatur  $t_c$   
Maximum allowable case temperature  $t_c$



Bild/Fig. 4  
Höchstzulässige Kühlmitteltemperatur  $t_A$  bei Luftselbstkühlung,  
Kühlkörper KL 21.  
Maximum allowable cooling medium temperature  $t_A$  at natural cooling,  
heatsink type KL 21.

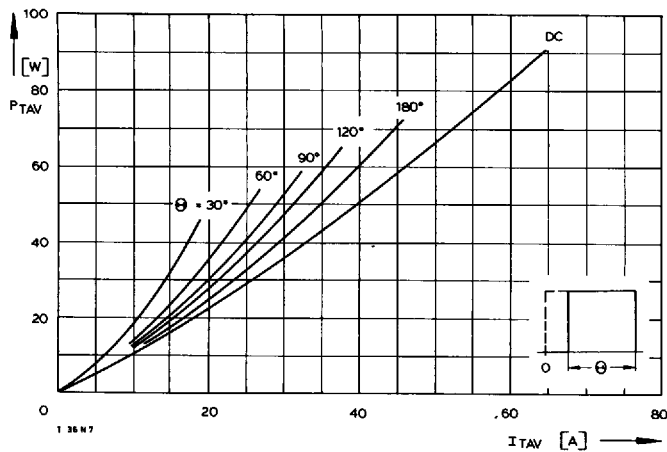


Bild/Fig. 5  
Höchstzulässige Kühlmitteltemperatur  $t_A$  bei Luftselbstkühlung,  
Kühlkörper KL 42  
Maximum allowable cooling medium temperature  $t_A$  at natural cooling,  
heatsink type KL 42



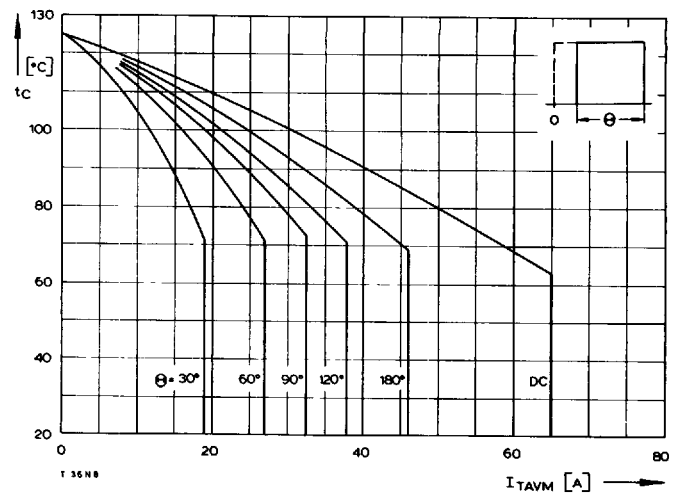
Bild/Fig. 6  
Höchstzulässige Kühlmitteltemperatur  $t_A$  bei verstärkter Luftkühlung,  
Kühlkörper KL 42  
Maximum allowable cooling medium temperature  $t_A$  at forced cooling,  
heatsink type KL 42

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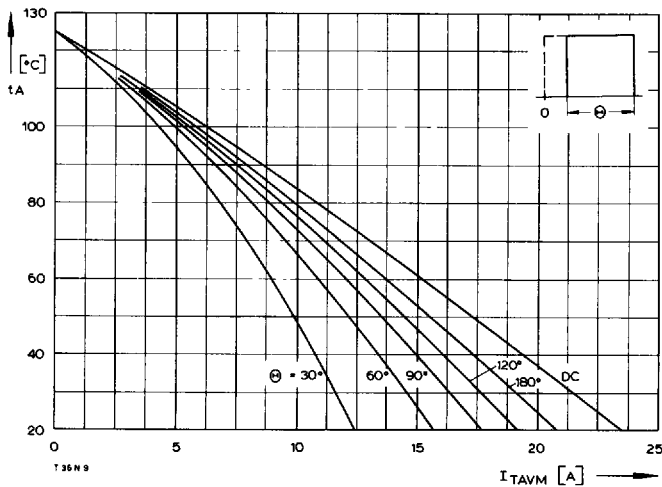
Bild/Fig. 7

Durchlaßverlustleistung  $P_{TAV}$ /On-state power dissipation  $P_{TAV}$   
 Parameter: Stromflußwinkel  $\Theta$ /current conduction angle  $\Theta$



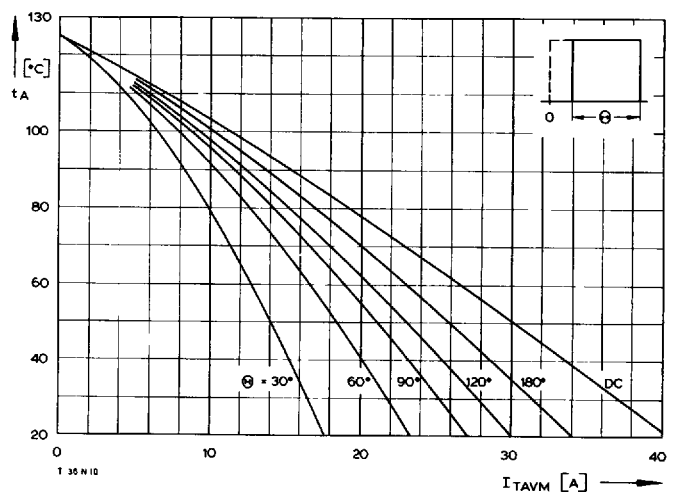
Bild/Fig. 8

Höchstzulässige Gehäusetemperatur  $t_c$   
 Maximum allowable case temperature  $t_c$



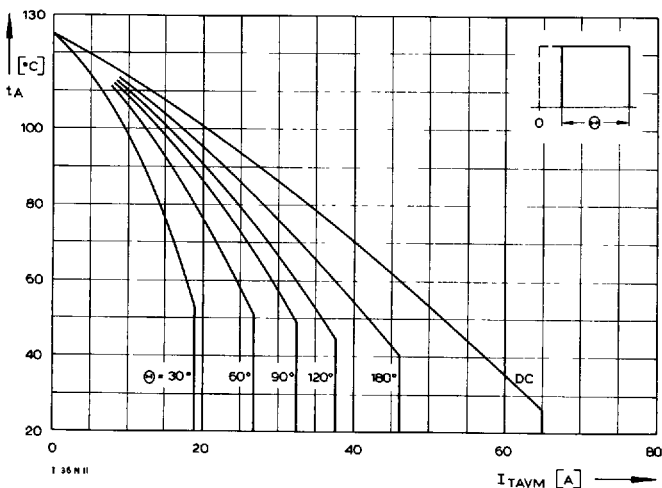
Bild/Fig. 9

Höchstzulässige Kühlmitteltemperatur  $t_A$  bei **Luftselbstkühlung**,  
 Kühlkörper KL 21.  
 Maximum allowable cooling medium temperature  $t_A$  at **natural** cooling,  
 heatsink type KL 21.



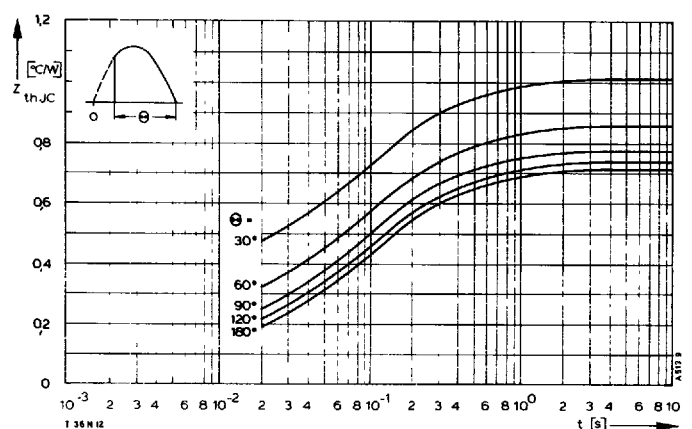
Bild/Fig. 10

Höchstzulässige Kühlmitteltemperatur  $t_A$  bei **Luftselbstkühlung**,  
 Kühlkörper KL 42  
 Maximum allowable cooling medium temperature  $t_A$  at **natural** cooling,  
 heatsink type KL 42



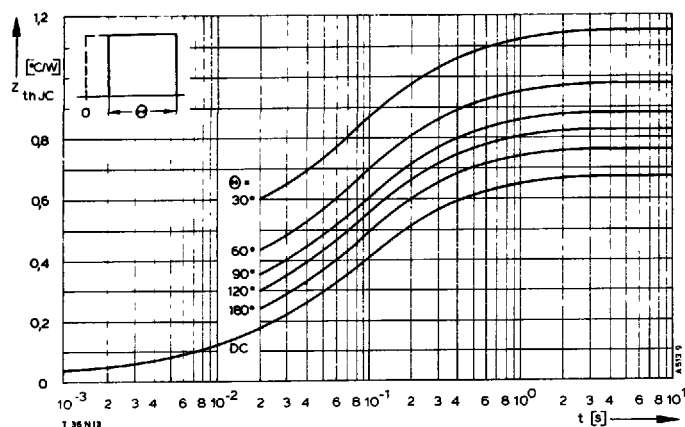
Bild/Fig. 11

Höchstzulässige Kühlmitteltemperatur  $t_A$  bei **verstärkter** Luftkühlung,  
 Kühlkörper KL 42  
 Maximum allowable cooling medium temperature  $t_A$  at **forced** cooling,  
 heatsink type KL 42

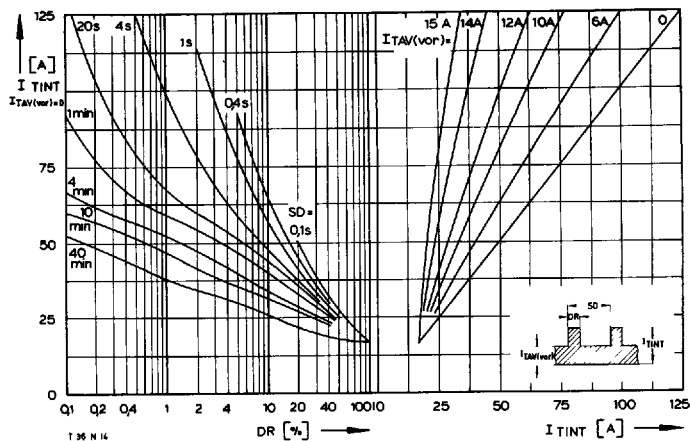


Bild/Fig. 12

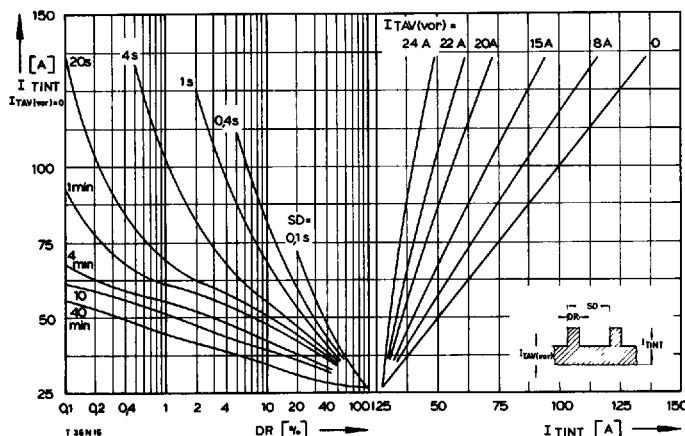
Transients innerer Wärmewiderstand  $Z_{thJC}$  bei sinusförmigem Stromverlauf.  
 Transient thermal impedance  $Z_{thJC}$ , junction to case, at sinusoidal current.



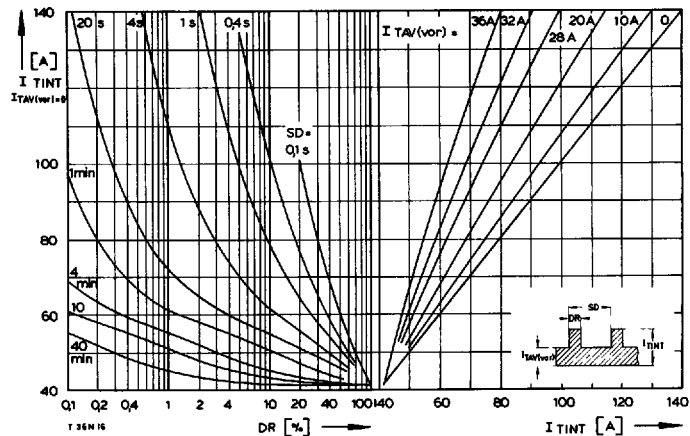
Bild/Fig. 13  
Transienter innerer Wärmewiderstand  $Z_{thJC}$  bei rechteckförmigem Stromverlauf.  
Transient thermal impedance  $Z_{thJC}$ , junction to case, at square wave current.



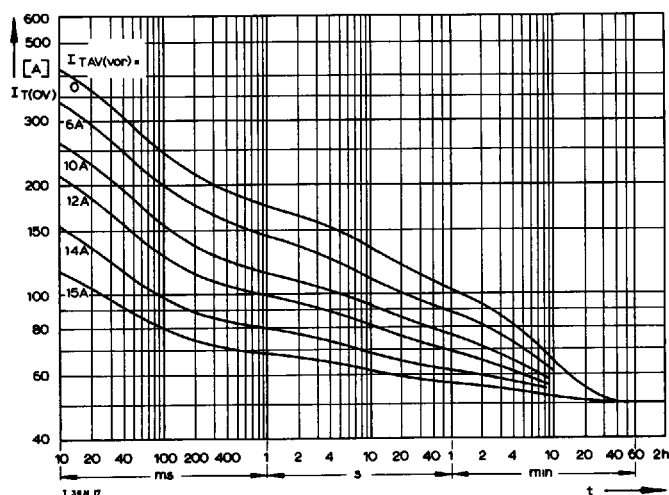
Bild/Fig. 14  
Höchstzulässiger Durchlaßstrom  $I_{TINT}$  bei Aussetzbetrieb und **Luftselbstkühlung**,  
 $t_A = 45^\circ\text{C}$ , Kühlkörper KL 21.  
Limiting on-state current  $I_{TINT}$  during intermittent operation at **natural** cooling,  
 $t_A = 45^\circ\text{C}$ , heatsink type KL 21.  
Parameter: Spieldauer/cycle duration SD  
Vorlaststrom/pre-load current  $I_{TAV(vor)}$



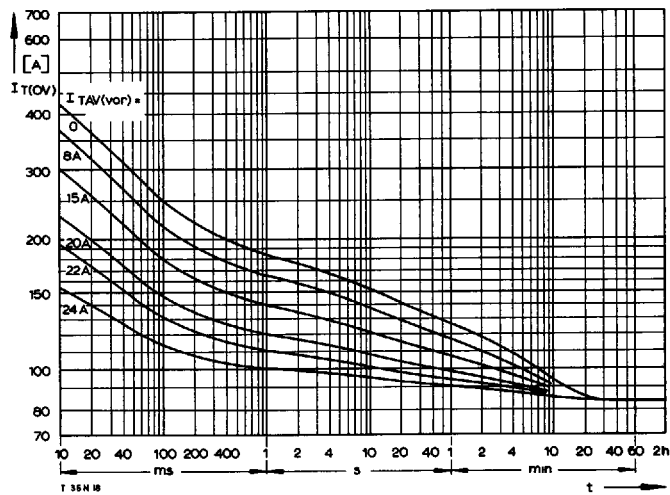
Bild/Fig. 15  
Höchstzulässiger Durchlaßstrom  $I_{TINT}$  bei Aussetzbetrieb und **Luftselbstkühlung**,  
 $t_A = 45^\circ\text{C}$ , Kühlkörper KL 42  
Limiting on-state current  $I_{TINT}$  during intermittent operation at **natural** cooling,  
 $t_A = 45^\circ\text{C}$ , heatsink type KL 42  
Parameter: Spieldauer/cycle duration SD  
Vorlaststrom/pre-load current  $I_{TAV(vor)}$



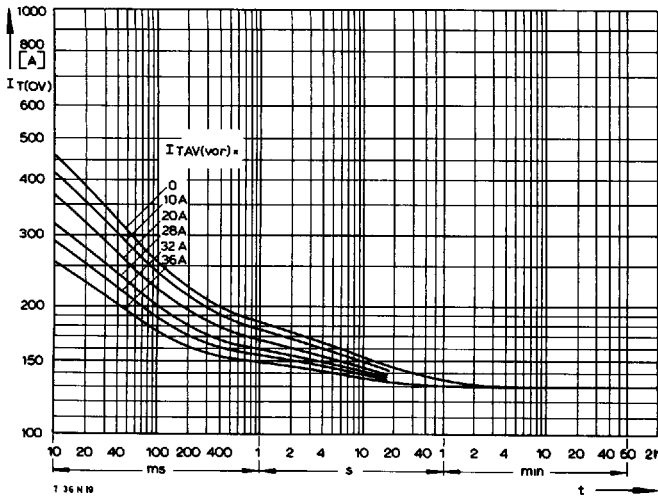
Bild/Fig. 16  
Höchstzulässiger Durchlaßstrom  $I_{TINT}$  bei Aussetzbetrieb und **verstärkter**  
**Luftkühlung**,  $t_A = 35^\circ\text{C}$ , Kühlkörper KL 42  
Limiting on-state current  $I_{TINT}$  during intermittent operation at **forced** cooling,  
 $t_A = 35^\circ\text{C}$ , heatsink type KL 42  
Parameter: Spieldauer/cycle duration SD  
Vorlaststrom/pre-load current  $I_{TAV(vor)}$



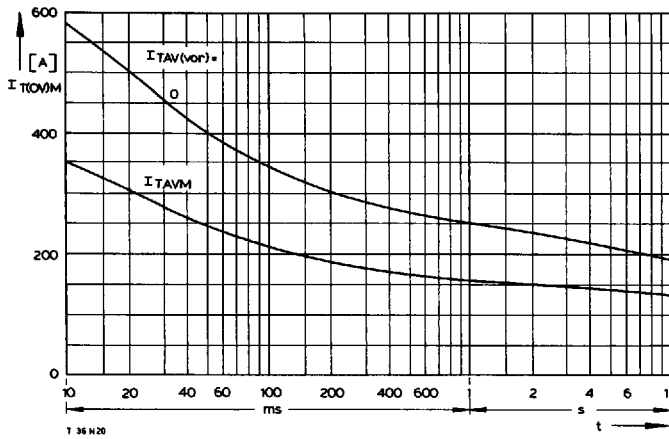
Bild/Fig. 17  
Überstrom  $I_{T(OV)}$  bei **Luftselbstkühlung**,  $t_A = 45^\circ\text{C}$ , Kühlkörper KL 21.  
Overload on-state current  $I_{T(OV)}$  at **natural** cooling,  $t_A = 45^\circ\text{C}$ ,  
heatsink type KL 21.  
Parameter: Vorlaststrom/pre-load current  $I_{TAV(vor)}$



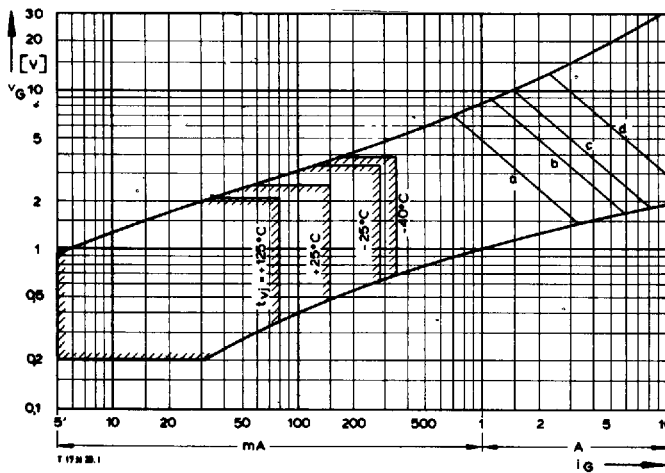
Bild/Fig. 18  
Überstrom  $I_{T(OV)}$  bei **Luftselbstkühlung**,  $t_A = 45^\circ\text{C}$ , Kühlkörper KL 42  
Overload on-state current  $I_{T(OV)}$  at **natural** cooling,  $t_A = 45^\circ\text{C}$ ,  
heatsink type KL 42  
Parameter: Vorlaststrom/pre-load current  $I_{TAV(vor)}$



**Bild/Fig. 19**  
Überstrom  $I_{T(OV)}$  bei verstärkter Luftkühlung,  $t_A = 35^\circ\text{C}$ , Kühlkörper KL 42  
Overload on-state current  $I_{T(OV)}$  at forced cooling,  $t_A = 35^\circ\text{C}$ ,  
heatsink type KL 42  
Parameter: Vorlaststrom/pre-load current  $I_{TAV(vor)}$

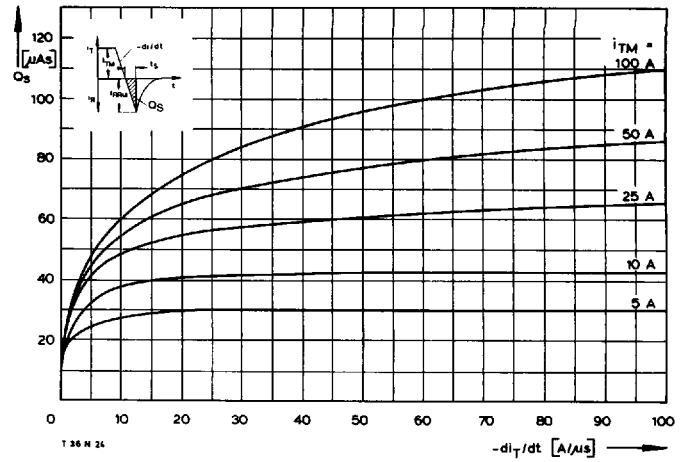


**Bild/Fig. 21**  
Grenzstrom  $I_{T(OV)}$  bei Luftselbstkühlung, Kühlkörper KL 21...,  $U_{RM} = 0,8 U_{RRM}$ .  
Limiting overload on-state current  $I_{T(OV)}$  at natural cooling, heatsink type KL 21...,  
 $U_{RM} = 0,8 U_{RRM}$ .  
 $I_{FAV(vor)} = 0$ : Belastung aus Leerlauf/current surge under no-load conditions  
 $I_{FAV(vor)} = I_{FAVM}$ : Belastung nach Betrieb mit Dauergrenzstrom  $I_{TAVM}$ /  
current surge occurs during operation at limiting mean  
on-state current rating  $I_{TAVM}$

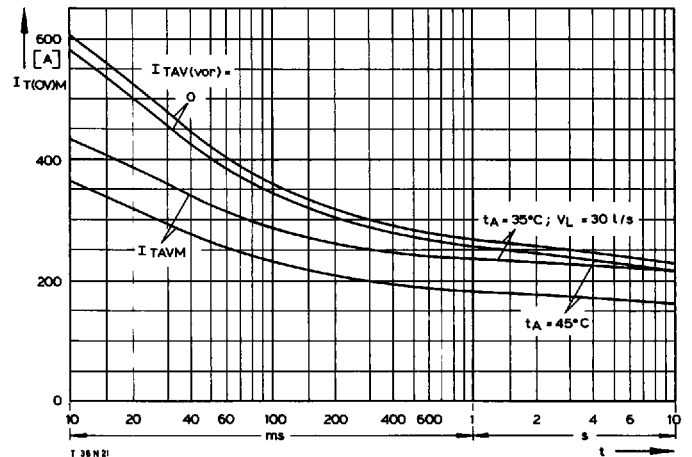


**Bild/Fig. 23**  
Zündbereich und Spitzensteuerleistung bei  $v_D \geq 6\text{ V}$   
Gate characteric  $i_G$  and peak gate power dissipation at  $v_D \geq 6\text{ V}$

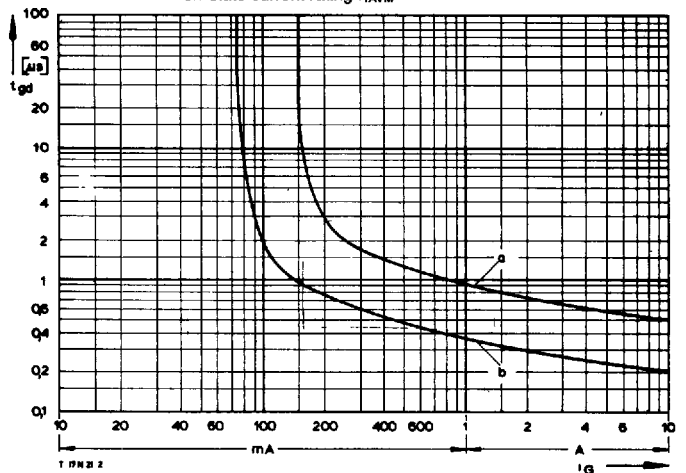
| Parameter                                                                   |    | a  | b  | c   | d   |
|-----------------------------------------------------------------------------|----|----|----|-----|-----|
| Steuerpulsdauer/Pulse duration $t_g$                                        | ms | 10 | 1  | 0,5 | 0,1 |
| Hochstzulässige Spitzensteuerleistung/<br>Maximum allowable peak gate power | W  | 5  | 10 | 15  | 13  |



**Bild/Fig. 20**  
Nachladung  $Q_S$  in Abhängigkeit von der abkumtierenden Stromsteilheit  $-di_T/dt$  bei  $t_{ij} = 125^\circ\text{C}$ .  
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  $-di_T/dt$  at  $t_{ij} = 125^\circ\text{C}$ .  
These curves are valid for 90% of all thyristors.



**Bild/Fig. 22**  
Grenzstrom  $I_{T(OV)}$  bei Luftselbstkühlung und verstärkter Luftkühlung, Kühlkörper KL 42...,  $U_{RM} = 0,8 U_{RRM}$ .  
Limiting overload on-state current  $I_{T(OV)}$  at natural cooling and forced cooling, heatsink type KL 42...,  $U_{RM} = 0,8 U_{RRM}$ .  
 $I_{FAV(vor)} = 0$ : Belastung aus Leerlauf/current surge under no-load conditions  
 $I_{FAV(vor)} = I_{FAVM}$ : Belastung nach Betrieb mit Dauergrenzstrom  $I_{TAVM}$ /  
current surge occurs during operation at limiting mean  
on-state current rating  $I_{TAVM}$



**Bild/Fig. 24**  
Zündverzögerung  $t_{gd}$  bei  $i_{TM} = 10\text{ A}$ ,  $t_{ij} = 25^\circ\text{C}$ .  
Gate controlled delay time  $t_{gd}$  at  $i_{TM} = 10\text{ A}$ ,  $t_{ij} = 25^\circ\text{C}$ .  
a - äußerster Verlauf/limiting characteristic  
b - typischer Verlauf/typical characteristic