**Key Parameters**

$V_{DRM} / V_{RRM}$	1800V
$I_{TAVM}$	4040A ( $T_C=85\text{ }^\circ\text{C}$ )
$I_{TSM}$	57000A
$V_{TO}$	0,80V
$r_T$	0,080m $\Omega$
$R_{thJC}$	7,1 KW
Clamping Force	42...95kN
Max. Diameter	120 mm
Contact Diameter	86 mm
Height	26,5 mm



For type designation please refer to actual short form catalog

<http://www.ifbip.com/catalog>

**Merkmale**

- Volle Sperrfähigkeit 50/60Hz über einen weiten Temperaturbereich
- Hohe DC Sperrstabilität
- Hohe Stoßstrombelastbarkeit
- Industrie-Standard-Gehäuse

**Features**

- Full blocking 50/60Hz over a wide range temperature range
- High DC blocking stability
- High surge current capability
- Industrial standard package

**Typische Anwendungen**

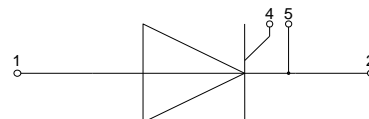
- Sanftanlasser
- Mittelspannungsumrichter
- Gleichrichter für Antriebsapplikationen

**Typical Applications**

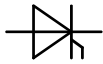
- Soft starter
- Medium voltage converters
- Rectifier for drives applications



content of customer DMX code	DMX code digit	DMX code digit quantity
serial number	1..7	7
SP material number	8..16	9
datecode (production day)	17..18	2
datecode (production year)	19..20	2
datecode (production month)	21..22	2
vT class (optional)	23..26	4
QR class (optional)	27..30	4



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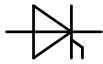
**Elektrische Eigenschaften / Electrical properties**  
Höchstzulässige Werte / Maximum rated values

Periodische Vorwärts- und Rückwärts-Spitzensperrspannung repetitive peak forward off-state and reverse voltages	$T_{vj} = -40^{\circ}\text{C} \dots T_{vj \max}$	$V_{\text{DRM}}, V_{\text{RRM}}$	1800	V
Vorwärts-Stosspitzensperrspannung non-repetitive peak forward off-state voltage	$T_{vj} = -40^{\circ}\text{C} \dots T_{vj \max}$	$V_{\text{DSM}}$	1800	V
Rückwärts-Stosspitzensperrspannung non-repetitive peak reverse voltage	$T_{vj} = +25^{\circ}\text{C} \dots T_{vj \max}$	$V_{\text{RSM}}$	1900	V
Durchlassstrom-Grenzeffektivwert maximum RMS on-state current	$T_C = 85^{\circ}\text{C}$	$I_{\text{TRMS}}$	6350	A
Dauergrenzstrom average on-state current	$T_C = 85^{\circ}\text{C}$	$I_{\text{TAVM}}$	4040	A
Dauergrenzstrom average on-state current	$T_C = 55^{\circ}\text{C}, \theta = 180^{\circ}\sin, t_p = 10\text{ms}$	$I_{\text{TAVM}}$	5490	A
Durchlaßstrom-Effektivwert RMS on-state current		$I_{\text{TRMS}}$	8620	A
Stossstrom-Grenzwert surge current	$T_{vj} = 25^{\circ}\text{C}, t_p = 10\text{ms}$ $T_{vj} = 125^{\circ}\text{C}, t_p = 10\text{ms}$ $T_{vj} = T_{vj \max}, t_p = 10\text{ms}$	$I_{\text{TSM}}$	67000 60000 57000	A A A
Grenzlastintegral $I^2t$ -value	$T_{vj} = 25^{\circ}\text{C}, t_p = 10\text{ms}$ $T_{vj} = 125^{\circ}\text{C}, t_p = 10\text{ms}$ $T_{vj} = T_{vj \max}, t_p = 10\text{ms}$	$I^2t$	24500 18000 16245	$10^3 \text{ A}^2\text{s}$ $10^3 \text{ A}^2\text{s}$ $10^3 \text{ A}^2\text{s}$
Kritische Stromsteilheit critical rate of rise of on-state current	DIN IEC 60747-6 $f = 50\text{Hz}, i_{\text{GM}} = 1\text{A}, di_{\text{G}}/dt = 1\text{A}/\mu\text{s}$	$(di_{\text{T}}/dt)_{\text{cr}}$	200	$\text{A}/\mu\text{s}$
Kritische Spannungssteilheit critical rate of rise of off-state voltage	$T_{vj} = T_{vj \max}, V_{\text{D}} = 0,67 V_{\text{DRM}}$ 5.Kennbuchstabe / 5 <sup>th</sup> letter F	$(dv_{\text{D}}/dt)_{\text{cr}}$	1000	$\text{V}/\mu\text{s}$

Charakteristische Werte / Characteristic values

Durchlassspannung on-state voltage	$T_{vj} = T_{vj \max}, i_{\text{T}} = 6\text{kA}$	$V_{\text{T}}$	max. 1,28	V
Schleusenspannung threshold voltage	$T_{vj} = T_{vj \max}$	$V_{(\text{TO})}$	max 0,80	V
Ersatzwiderstand slope resistance	$T_{vj} = T_{vj \max}$	$r_{\text{T}}$	max 0,08	$\text{m}\Omega$
Durchlasskennlinie on-state characteristic $v_{\text{T}} = A + B \cdot i_{\text{T}} + C \cdot \ln(i_{\text{T}} + 1) + D \cdot \sqrt{i_{\text{T}}}$	$T_{vj} = T_{vj \max}$	A= B= C= D=	6,028E-01 3,721E-05 -3,117E-03 6,284E-03	
Zündstrom gate trigger current	$T_{vj} = 25^{\circ}\text{C}, V_{\text{D}} = 12\text{V}$	$I_{\text{GT}}$	max. 250	$\text{mA}$
Zündspannung gate trigger voltage	$T_{vj} = 25^{\circ}\text{C}, V_{\text{D}} = 12\text{V}$	$V_{\text{GT}}$	max. 2,5	V
Nicht zündender Steuerstrom gate non-trigger current	$T_{vj} = T_{vj \max}, V_{\text{D}} = 12\text{V}$ $T_{vj} = T_{vj \max}, V_{\text{D}} = 0,5 V_{\text{DRM}}$	$I_{\text{GD}}$	max. 10 max. 5	$\text{mA}$ $\text{mA}$
Nicht zündende Steuerspannung gate non-trigger voltage	$T_{vj} = T_{vj \max}, V_{\text{D}} = 0,5 V_{\text{DRM}}$	$V_{\text{GD}}$	max. 0,25	V
Haltestrom holding current	$T_{vj} = 25^{\circ}\text{C}, V_{\text{D}} = 12\text{V}$	$I_{\text{H}}$	max. 300	$\text{mA}$
Einraststrom latching current	$T_{vj} = 25^{\circ}\text{C}, V_{\text{D}} = 12\text{V}, R_{\text{GK}} \geq 10\Omega$ $i_{\text{GM}} = 1\text{A}, di_{\text{G}}/dt = 1\text{A}/\mu\text{s}, t_{\text{g}} = 20\mu\text{s}$	$I_{\text{L}}$	max. 1500	$\text{mA}$
Vorwärts- und Rückwärts-Sperrstrom forward off-state and reverse current	$T_{vj} = T_{vj \max}$ $V_{\text{D}} = V_{\text{DRM}}, V_{\text{R}} = V_{\text{RRM}}$	$i_{\text{D}}, i_{\text{R}}$	max. 500	$\text{mA}$
Zündverzug gate controlled delay time	DIN IEC 60747-6 $T_{vj} = 25^{\circ}\text{C}, i_{\text{GM}} = 1\text{A}, di_{\text{G}}/dt = 1\text{A}/\mu\text{s}$	$t_{\text{gd}}$	max. 4	$\mu\text{s}$

prepared by:	HR	date of publication:	2022-05-09
approved by:	MS	revision:	3.1



Technische Information /  
technical information



**Netz-Thyristor**  
**Phase Control Thyristor**

**T3841N18TOF**

Infineon Technologies Bipolar  
GmbH & Co. KG

**Elektrische Eigenschaften / Electrical properties**  
Charakteristische Werte / Characteristic values

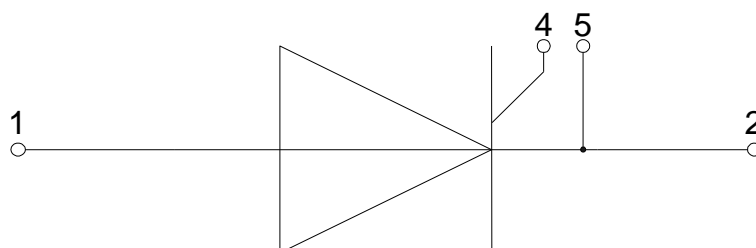
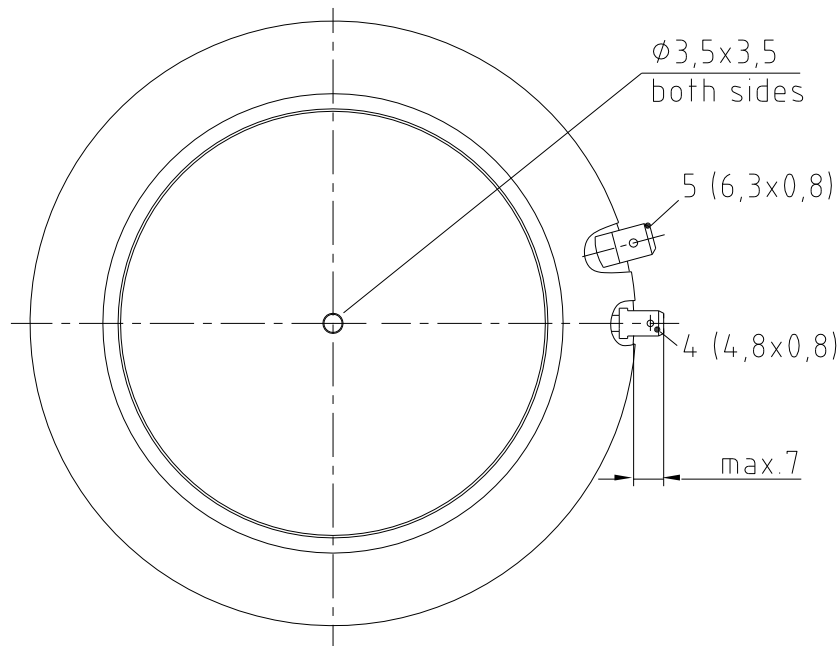
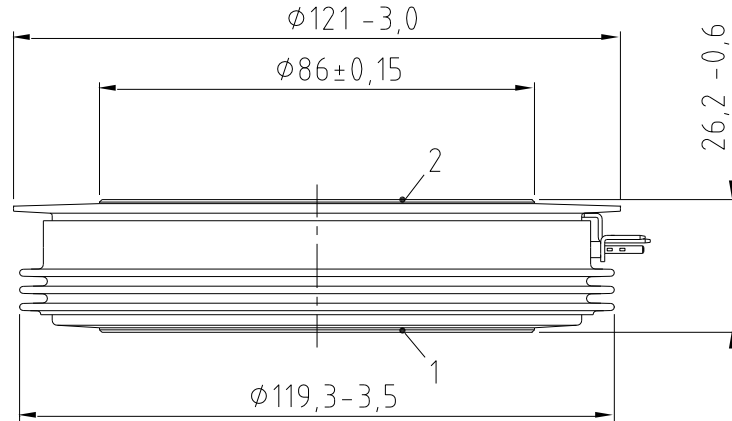
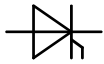
Freiwerdezeit circuit commutated turn-off time	$T_{vj} = T_{vj\max}, i_{TM} = I_{TAVM}$ $V_{RM} = 100\text{ V}, V_{DM} = 0,67 V_{DRM}$ $dv_D/dt = 20\text{ V}/\mu\text{s}, -di_T/dt = 10\text{ A}/\mu\text{s}$ 4.Kennbuchstabe / 4 <sup>th</sup> letter O	$t_q$	typ. 250	$\mu\text{s}$
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**Thermische Eigenschaften / Thermal properties**

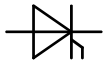
Innerer Wärmewiderstand thermal resistance, junction to case	<u>Kühlfläche / cooling surface</u> beidseitig / two-sided, $\theta = 180^\circ\text{sin}$ beidseitig / two-sided, DC	$R_{thJC}$	max. 7,74 max. 7,1	K/kW K/kW
Übergangs-Wärmewiderstand thermal resistance, case to heatsink	<u>Kühlfläche / cooling surface</u> beidseitig / two-sides einseitig / single-sides	$R_{thCH}$	max. 2,5 max. 5,0	K/kW K/kW
Höchstzulässige Sperrschichttemperatur maximum junction temperature		$T_{vj\max}$	135	$^\circ\text{C}$
Betriebstemperatur operating temperature		$T_{c\text{op}}$	-40...+135	$^\circ\text{C}$
Lagertemperatur storage temperature		$T_{stg}$	-40...+150	$^\circ\text{C}$

**Mechanische Eigenschaften / Mechanical properties**

Gehäuse, siehe Anlage case, see annex			Seite 4 page 4	
Si-Element mit Druckkontakt Si-pellet with pressure contact				
Anpresskraft clamping force		F	42...95	kN
Steueranschlüsse control terminals	Gate (flat) Gate (round, based on AMP 60598) Kathode / cathode		A 4,8x0,8 $\varnothing 1,5$ A 6,3x0,8	mm mm mm
Gewicht weight		G	typ. 1500	g
Kriechstrecke creepage distance			33	mm
Schwingfestigkeit vibration resistance	f = 50 Hz		50	m/s <sup>2</sup>



- 1:** Anode / Anode
- 2:** Kathode / Cathode
- 4:** Gate
- 5:** Hilfskathode/  
Auxiliary Cathode

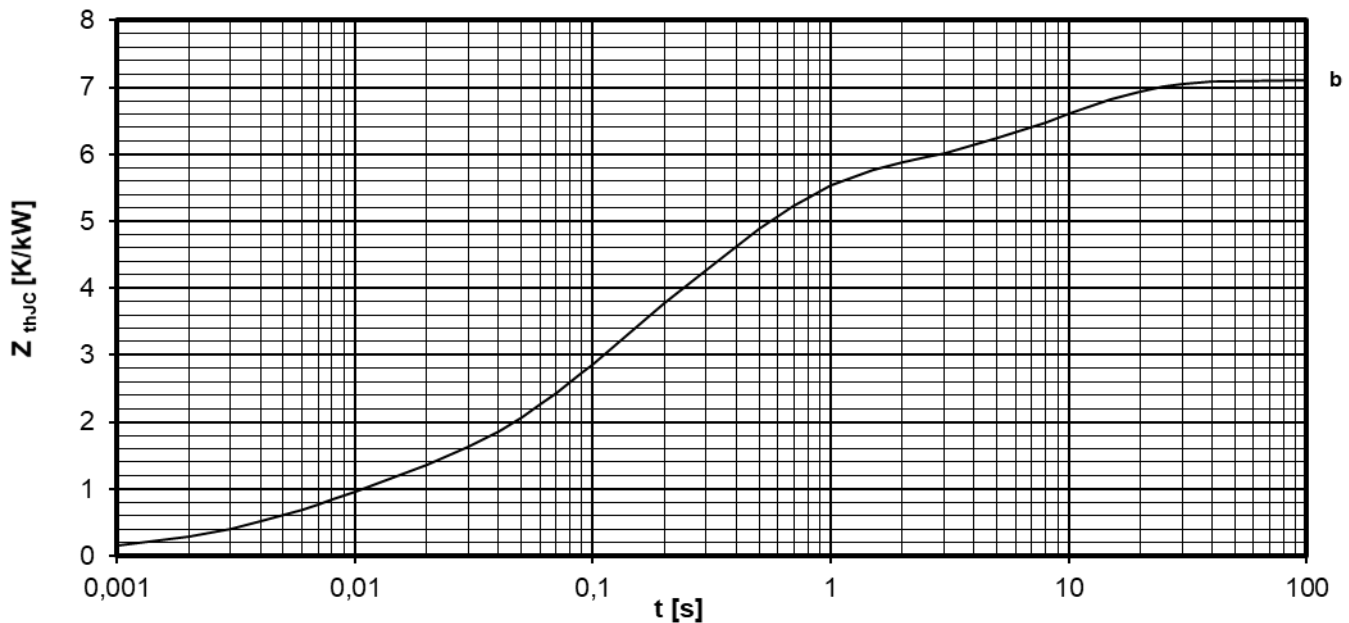


**Analytische Elemente des transienten Wärmewiderstandes  $Z_{thJC}$  für DC**  
**Analytical elements of transient thermal impedance  $Z_{thJC}$  for DC**

Kühlung / Cooling	Pos. n	1	2	3	4	5	6	7
beidseitig two-sided	$R_{thn}$ [K/kW]	1,5	3	2	1	0	0	0
	$\tau_n$ [s]	9	0,4	0,08	0,006	1	1	1

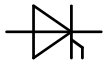
Analytische Funktion / Analytical function:

$$Z_{thJC} = \sum_{n=1}^{n_{max}} R_{thn} \left( 1 - e^{-\frac{t}{\tau_n}} \right)$$



**Transienter innerer Wärmewiderstand für DC / Transient thermal impedance for DC**  
 $Z_{thJC} = f(t)$

- a - Anodenseitige Kühlung / Anode-sided cooling
- b - Beidseitige Kühlung / Two-sided cooling
- c - Kathodenseitige Kühlung / Cathode-sided cooling



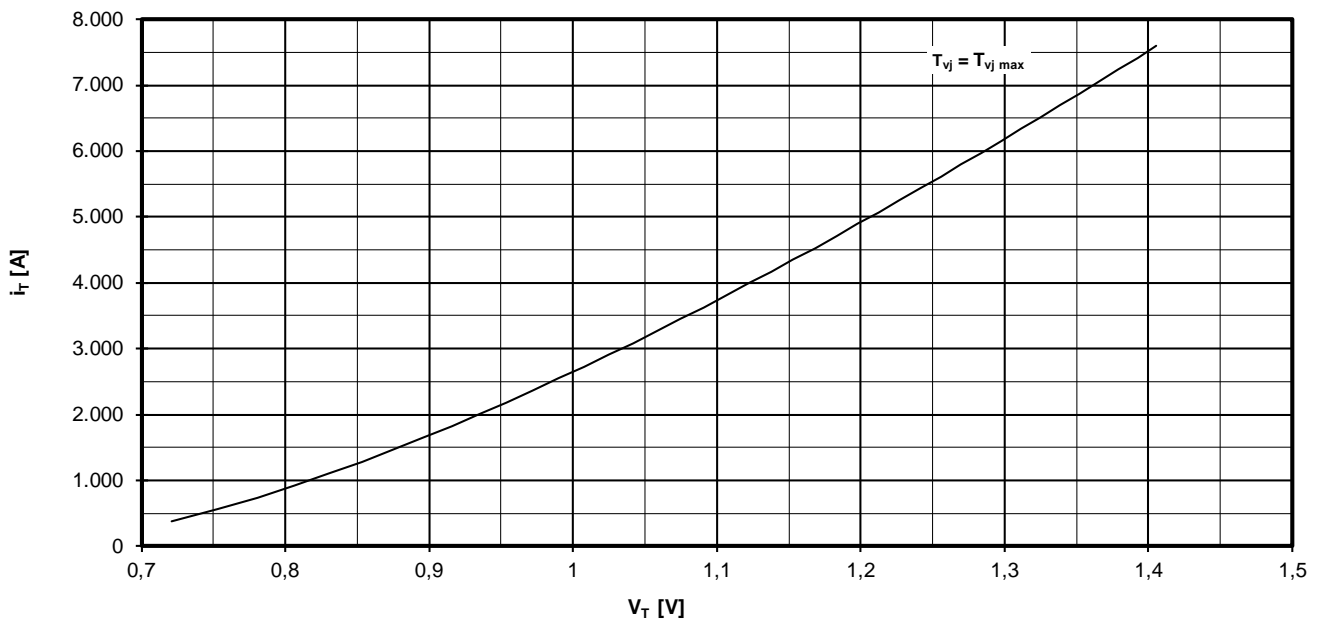
**Erhöhung des  $Z_{th DC}$  bei Sinus und Rechteckströmen mit unterschiedlichen Stromflusswinkeln  $\Theta$**   
**Rise of  $Z_{th DC}$  for sinewave and rectangular current with different current conduction angles  $\Theta$**

$$\Delta Z_{th \Theta \sin} / \Delta Z_{th \Theta \text{ rec}}$$

Kühlung / Cooling	$\Delta Z_{th \Theta \sin 180^\circ}$ [K/kW]	$\Delta Z_{th \Theta \text{ rec } 180^\circ}$ [K/kW]	$\Delta Z_{th \Theta \text{ rec } 120^\circ}$ [K/kW]	$\Delta Z_{th \Theta \text{ rec } 90^\circ}$ [K/kW]	$\Delta Z_{th \Theta \text{ rec } 60^\circ}$ [K/kW]	$\Delta Z_{th \Theta \text{ rec } 30^\circ}$ [K/kW]
beidseitig two-sided	0,6429	0,7065	1,0856	1,3214	1,5963	1,9192

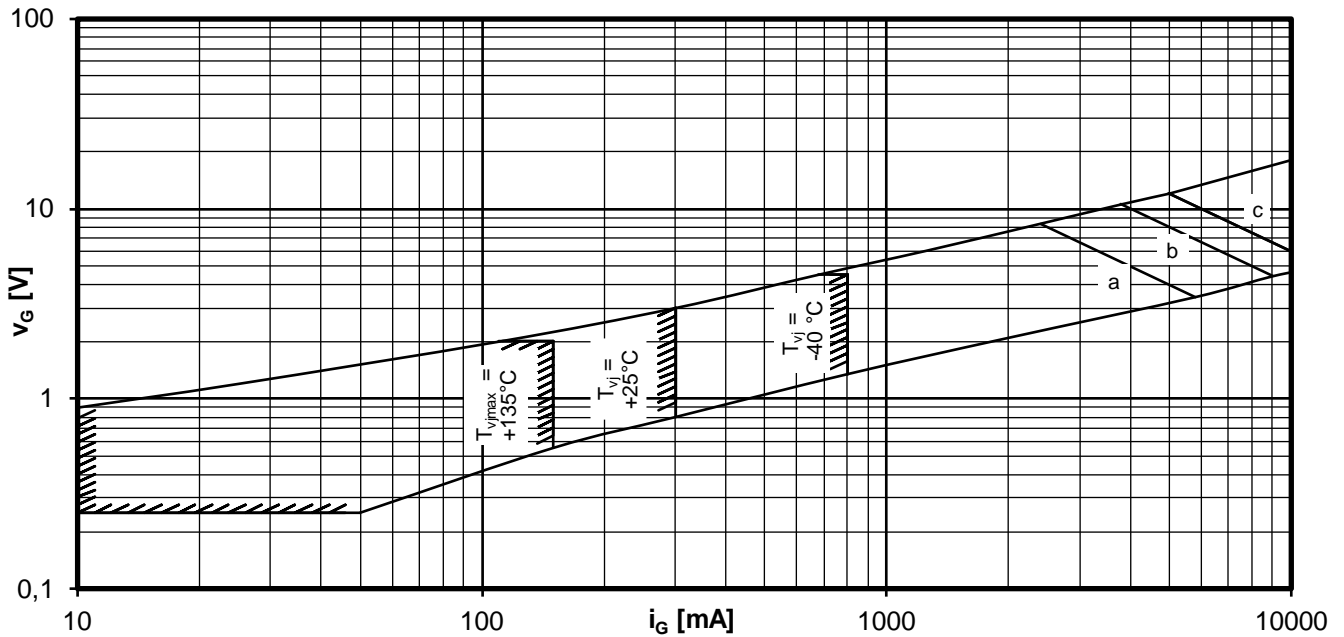
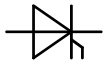
$$Z_{th \Theta \sin} = Z_{th DC} + \Delta Z_{th \Theta \sin}$$

$$Z_{th \Theta \text{ rec}} = Z_{th DC} + \Delta Z_{th \Theta \text{ rec}}$$



**Grenzdurchlasskennlinie / Limiting on-state characteristic  $i_T = f(v_T)$**

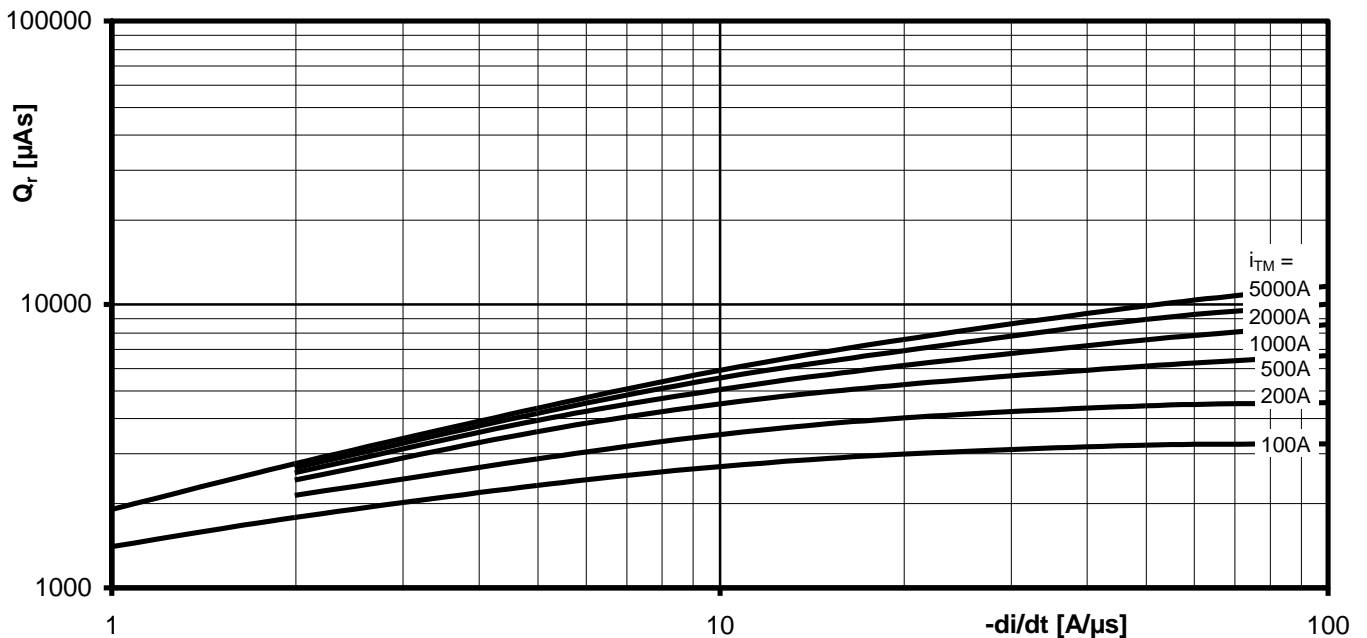
$$T_{vj} = T_{vj \text{ max}}$$



Steuercharakteristik  $v_G = f(i_G)$  mit Zündbereichen für  $V_D = 12\text{ V}$   
Gate characteristic  $v_G = f(i_G)$  with triggering area for  $V_D = 12\text{ V}$

Höchstzulässige Spitzensteuerverlustleistung / Maximum rated peak gate power dissipation  $P_{GM} = f(t_g)$  :

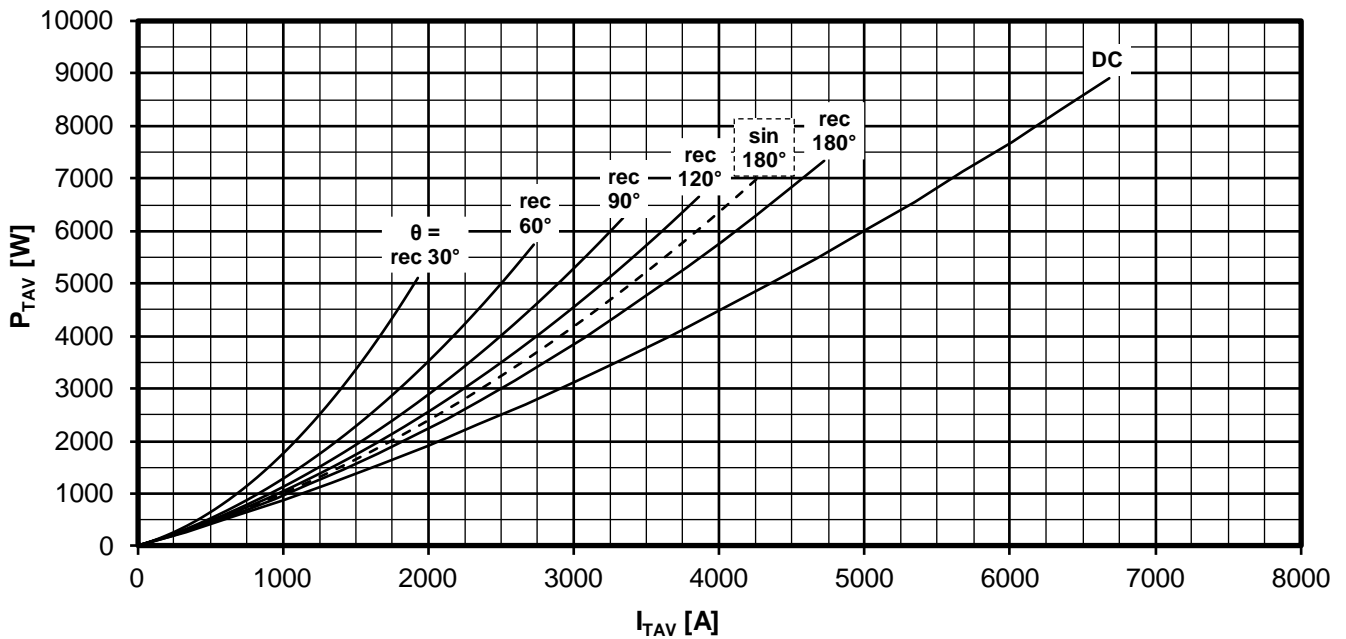
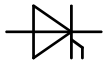
a - 20W / 10ms    b - 40W / 1ms    c - 60W / 0,5ms



Sperrverzögerungsladung / Recovered charge  $Q_r = f(di/dt)$

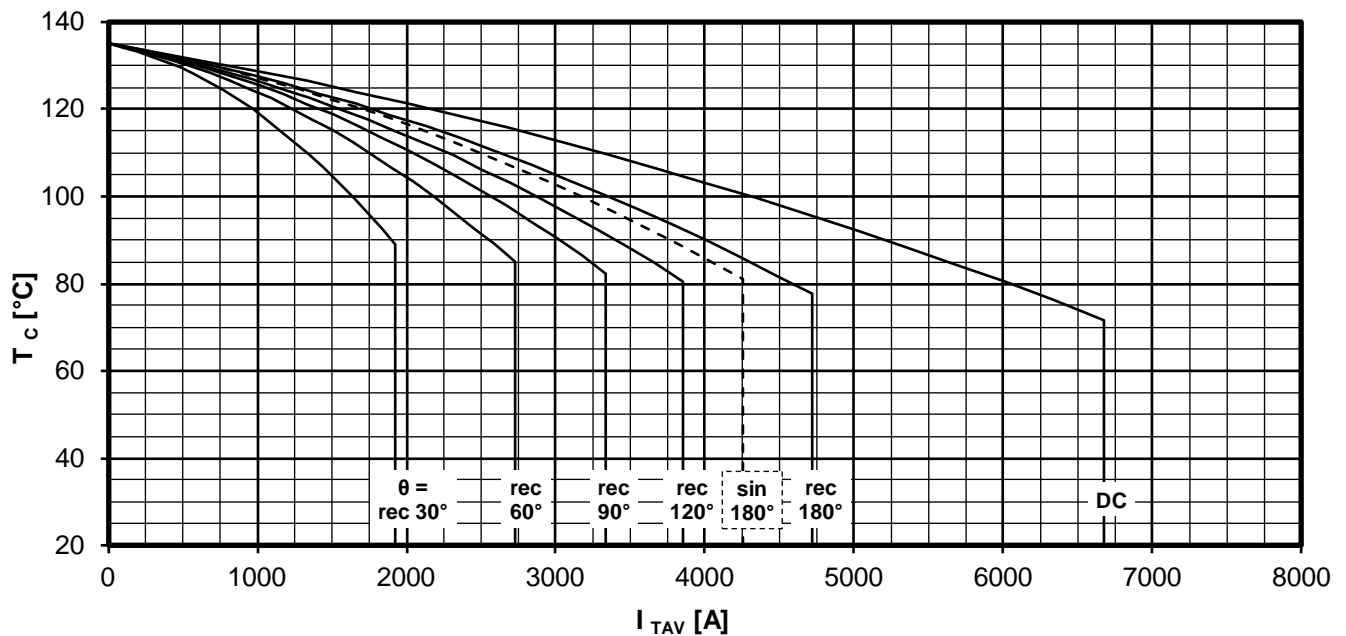
$T_{vj} = T_{vjmax}$ ,  $V_R \leq 0,5 V_{RRM}$ ,  $V_{RM} = 0,8 V_{RRM}$

Parameter: Durchlassstrom / On-state current  $i_{TM}$



Durchlassverlustleistung / On-state power loss  $P_{TAV} = f(I_{TAV})$

Parameter: Stromflusswinkel  $\theta$  / Current conduction angle  $\theta$

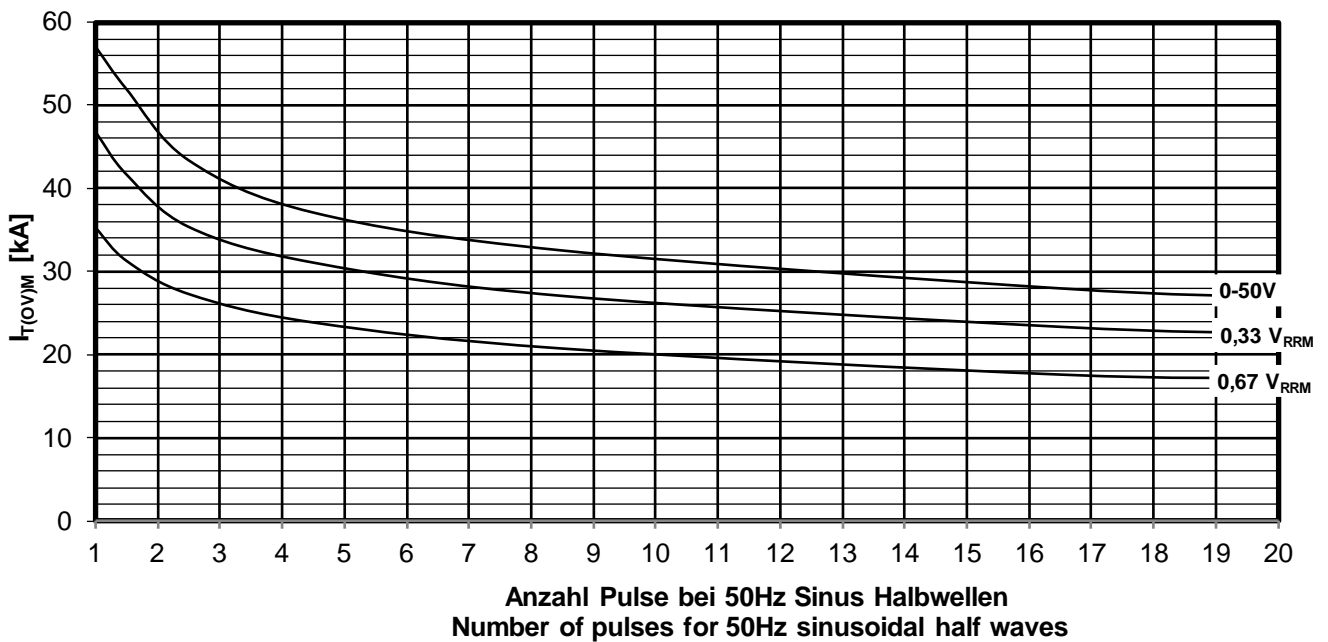
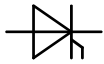


Höchstzulässige Gehäusetemperatur / Maximum allowable case temperature  $T_c = f(I_{TAV})$

Beidseitige Kühlung / Two-sided cooling

Parameter: Stromflusswinkel  $\theta$  / Current conduction angle  $\theta$





Typische Abhängigkeit des Grenzstromes  $I_{T(OV)M}$  von der Anzahl für eine Folge von Sinus Halbwellen bei 50Hz. Parameter: Rückwärtsspannung  $V_{RM}$   
Typical dependency of maximum overload on-state current  $I_{T(OV)M}$  as a number of a sequence of sinusoidal half waves at 50Hz. Parameter: peak reverse voltage  $V_{RM}$   
 $I_{T(OV)M} = f(\text{pulses}, V_{RM}) ; T_{vj} = T_{vjmax}$