Datenblatt / Data sheet

Netz-Thyristor-Modul
Phase Control Thyristor Module

TZ600N

Infineon Technologies Bipolar GmbH & Co. KG

Key Parameters

V_{DRM} / V_{RRM}	1200V - 1600V
I_{TAVM}	600A (T_C=85°C)
I_{TSM}	17000A
V_{T0}	0,9V
r_T	0,27mΩ
R_{thJC}	0,062K/W
Base plate	50mm

For type designation please refer to actual short form catalog

http://www.ifbip.com/catalog

Merkmale

- Druckkontakt-Technologie für hohe Zuverlässigkeit
- Industrie-Standard-Gehäuse
- Elektrisch isolierte Bodenplatte

Features

- Pressure contact technology for high reliability
- Industrial standard package
- Electrically insulated base plate

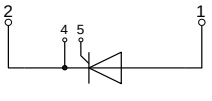
Typische Anwendungen

- Sanftanlasser
- Gleichrichter für Antriebsapplikationen
- Kurzschließer-Applikationen
- Leistungssteller
- Gleichrichter für UPS
- Batterieladegleichrichter
- Statische Umschalter
- Bypass-Schalter

Typical Applications

- Soft starter
- Rectifier for drives applications
- Crowbar applications
- Power controllers
- Rectifiers for UBS
- Battery chargers
- Static switches
- Bypass swich

content of customer DMX code	DMX code digit	DMX code digit quantity
serial number	1..5	5
SAP material number	6..12	7
Internal production order number	13..20	8
datecode (production year)	21..22	2
datecode (production week)	23..24	2



TZ

www.ifbip.com
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TZ600N

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°C... $T_{vj\,max}$	V_{DRM},V_{RRM}	1200 1400 1600	V V
Vorwärts-Stoßspitzensperrspannung non-repetitive peak forward off-state voltage	T_{vj} = -40°C... $T_{vj\,max}$	V_{DSM}	1200 1400 1600	V V
Rückwärts-Stoßspitzensperrspannung non-repetitive peak reverse voltage	T_{vj} = +25°C... $T_{vj\,max}$	V_{RSM}	1300 1500 1700	V
Durchlaßstrom-Grenzeffektivwert maximum RMS on-state current		I_{TRMSM}	1050	A
Dauergrenzstrom average on-state current	T_C = 85°C T_C = 77°C	I_{TAVM}	600 669	A A
Stoßstrom-Grenzwert surge current	T_{vj} = 25 °C, t_P = 10 ms T_{vj} = $T_{vj\,max}$, t_P = 10 ms	I_{TSM}	17.000 14.000	A A
Grenzlastintegral I²t-value	T_{vj} = 25 °C, t_P = 10 ms T_{vj} = $T_{vj\,max}$, t_P = 10 ms	I²t	1.445.000 980.000	A²s A²s
Kritische Stromsteilheit critical rate of rise of on-state current	DIN IEC 747-6 f = 50 Hz, i_{GM} = 1 A, di_G/dt = 1 A/µs	$(di_T/dt)_{cr}$	200	A/µs
Kritische Spannungssteilheit critical rate of rise of off-state voltage	T_{vj} = $T_{vj\,max}$, v_D = 0,67 V_{DRM} 6.Kennbuchstabe / 6th letter F	$(dv_D/dt)_{cr}$	1000	V/µs

Charakteristische Werte / Characteristic values

Durchlaßspannung on-state voltage	T_{vj} = $T_{vj\,max}$, i_T = 1700 A	v_T	max. 1,53	V
Schleusenspannung threshold voltage	T_{vj} = $T_{vj\,max}$	$V_{(TO)}$	0,9	V
Ersatzwiderstand slope resistance	T_{vj} = $T_{vj\,max}$	r_T	0,27	mΩ
Zündstrom gate trigger current	T_{vj} = 25°C, v_D = 6 V	I_{GT}	max. 250	mA
Zündspannung gate trigger voltage	T_{vj} = 25°C, v_D = 6 V	V_{GT}	max. 2,2	V
Nicht zündender Steuerstrom gate non-trigger current	T_{vj} = $T_{vj\,max}$, v_D = 6 V T_{vj} = $T_{vj\,max}$, v_D = 0,5 V_{DRM}	I_{GD}	max. 10 max. 5	mA mA
Nicht zündende Steuerspannung gate non-trigger voltage	T_{vj} = $T_{vj\,max}$, v_D = 0,5 V_{DRM}	V_{GD}	max. 0,25	V
Haltestrom holding current	T_{vj} = 25°C, v_D = 6 V, R_A = 5 Ω	I_H	max. 300	mA
Einraststrom latching current	T_{vj} = 25°C, v_D = 6 V, R_{GK} ≥ 10 Ω i_{GM} = 1 A, di_G/dt = 1 A/µs, t_g = 20 µs	I_L	max. 1500	mA
Vorwärts- und Rückwärts-Sperrstrom forward off-state and reverse current	T_{vj} = $T_{vj\,max}$ v_D = V_{DRM}, v_R = V_{RRM}	i_D, i_R	max. 140	mA
Zündverzug gate controlled delay time	DIN IEC 747-6 T_{vj} = 25 °C,i_{GM} = 1 A, di_G/dt = 1 A/µs	t_{gd}	max. 4	µs

prepared by:	A. Glunz		date of publication:	2018.07.16
approved by:	M. Stelte		revision:	3.4

Elektrische Eigenschaften / Electrical properties

Charakteristische Werte / Characteristic values

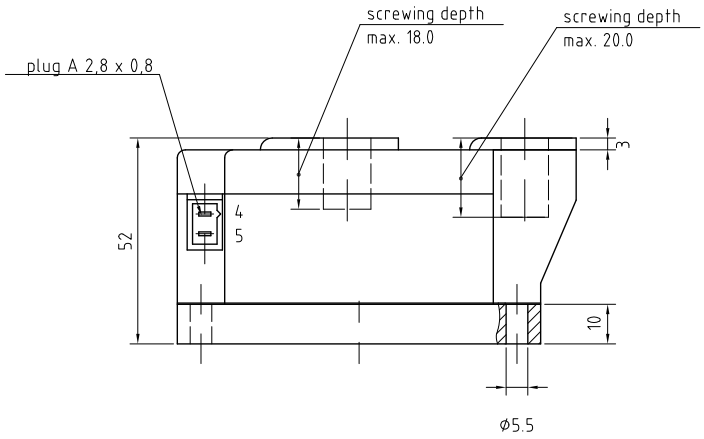
Freiwerdezeit circuit commutated turn-off time	$T_{vj} = T_{vj\,max}$, $i_{TM} = I_{TAVM}$ v_{RM} = 100 V, v_{DM} = 0,67 V_{DRM} dv_D/dt = 20 V/µs, $-di_T/dt$ = 10 A/µs 5.Kennbuchstabe / 5th letter O	t_q	typ. 250	µs
Isolations-Prüfspannung insulation test voltage	RMS, f = 50 Hz, t = 1 min RMS, f = 50 Hz, t = 1 sec	V_{ISOL}	3,0 3,6	kV kV

Thermische Eigenschaften / Thermal properties

Innerer Wärmewiderstand thermal resistance, junction to case	pro Modul / per Module, Θ = 180° sin pro Modul / per Module, DC	R_{thJC}	max. 0,065 max. 0,062	°C/W °C/W
Übergangs-Wärmewiderstand thermal resistance, case to heatsink	pro Modul / per Module	R_{thCH}	max. 0,02	°C/W
Höchstzulässige Sperrschichttemperatur maximum junction temperature		$T_{vj\,max}$	135	°C
Betriebstemperatur operating temperature		$T_{c\,op}$	-40...+135	°C
Lagertemperatur storage temperature		T_{stg}	-40...+140	°C

Mechanische Eigenschaften / Mechanical properties

Gehäuse, siehe Anlage case, see annex			Seite 4 page 4	
Si-Element mit Druckkontakt Si-pellet with pressure contact				
Innere Isolation internal insulation			AlN	
Anzugsdrehmoment für mechanische Anschlüsse mounting torque	Toleranz / Tolerance ± 15%	M1	5	Nm
Anzugsdrehmoment für elektrische Anschlüsse terminal connection torque	Toleranz / Tolerance ± 10%	M2	12	Nm
Steueranschlüsse control terminals	DIN 46 244		A 2,8 x 0,8	
Gewicht weight		G	typ. 900	g
Kriechstrecke creepage distance			15	mm
Schwingfestigkeit vibration resistance	f = 50 Hz		50	m/s²
	file-No.		E 83335	


screwing depth
max. 18.0
screwing depth
max. 20.0
plug A 2,8 x 0,8
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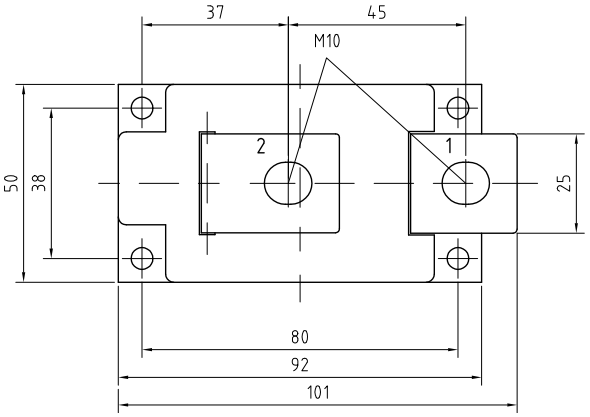
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M10
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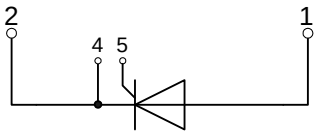

2
1
4
5

TZ

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

Pos. n	1	2	3	4	5	6	7
R_{thn} [°C/W]	0,00137	0,00486	0,0114	0,0223	0,0221		
τ_n [s]	0,00076	0,0086	0,101	0,56	3,12		

Analytische Funktion / Analytical function:

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

Luftselbstkühlung / Natural cooling
3 Module pro Kühlkörper / 3 modules per heatsink
Kühlkörper / Heatsink type: KM17 (90W)

Analytische Elemente des transienten Wärmewiderstandes Z_{thCA}
Analytical elements of transient thermal impedance Z_{thCA}

Pos. n	1	2	3	4	5	6	7
R_{thn} [°C/W]	0,796	0,005	0,041				
τ_n [s]	1420	912	12				

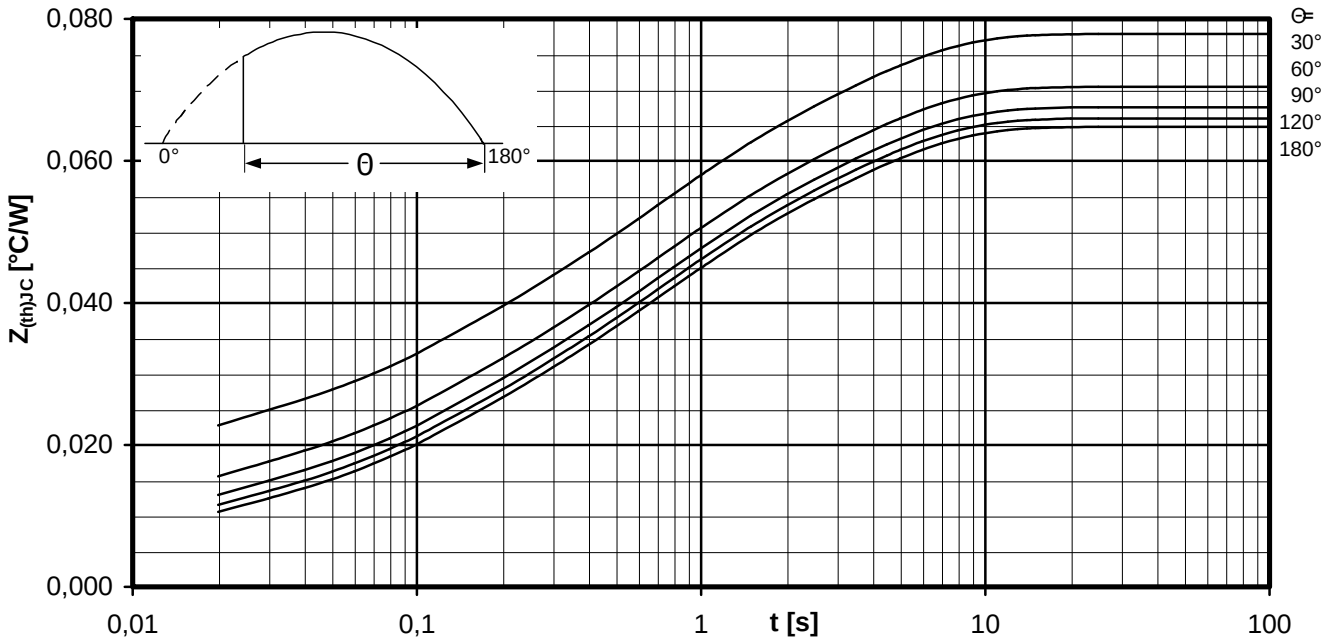
Verstärkte Kühlung / Forced cooling
3 Module pro Kühlkörper / 3 modules per heatsink
Kühlkörper / Heatsink type: KM17 (Papst 4650N)

Analytische Elemente des transienten Wärmewiderstandes Z_{thCA}
Analytical elements of transient thermal impedance Z_{thCA}

Pos. n	1	2	3	4	5	6	7
R_{thn} [°C/W]	0,239	0,0435	0,0075				
τ_n [s]	497	31,8	6,4				

Analytische Funktion / Analytical function:

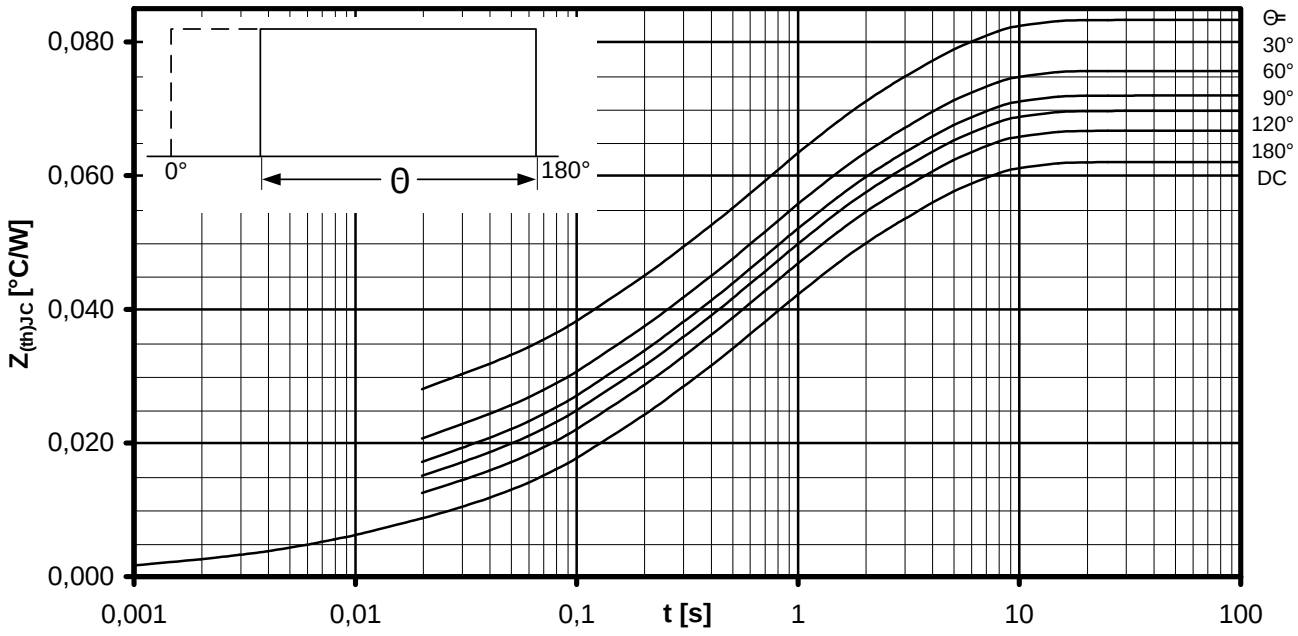
$$Z_{thCA} = \sum_{n=1}^{n_{max}} R_{thn} \left[1 - e^{\frac{-t}{\tau_n}} \right]$$



Transienter innerer Wärmewiderstand je Zweig / Transient thermal impedance per arm $Z_{thJC} = f(t)$

Sinusförmiger Strom / Sinusoidal current

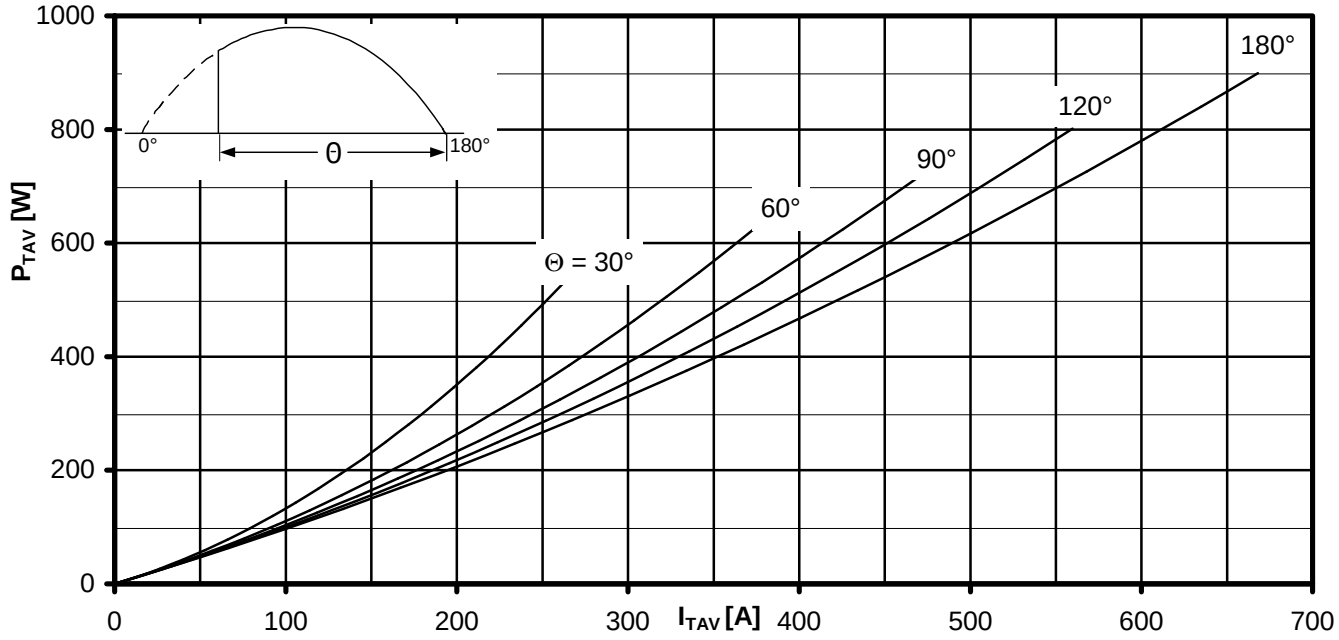
Parameter: Stromflußwinkel Θ / Current conduction angle Θ



Transienter innerer Wärmewiderstand je Zweig / Transient thermal impedance per arm $Z_{thJC} = f(t)$

Rechteckförmiger Strom / Rectangular current

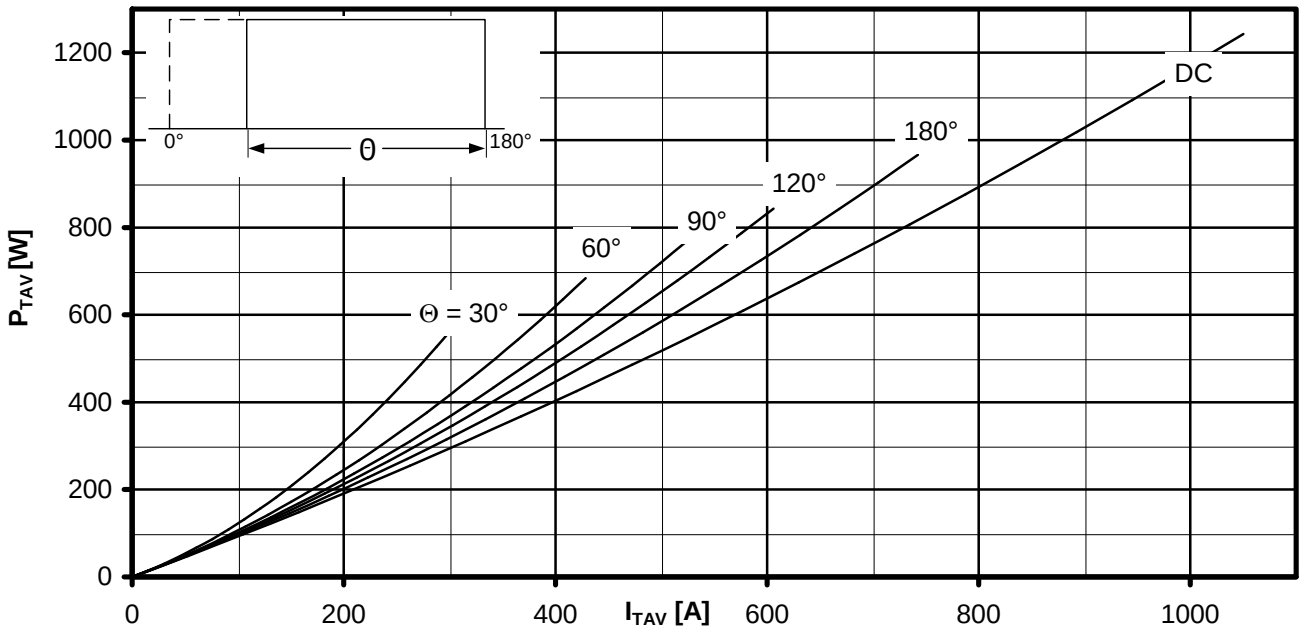
Parameter: Stromflußwinkel Θ / Current conduction angle Θ



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

Sinusförmiger Strom / Sinusoidal current Strombelastung je Zweig / Current load per arm

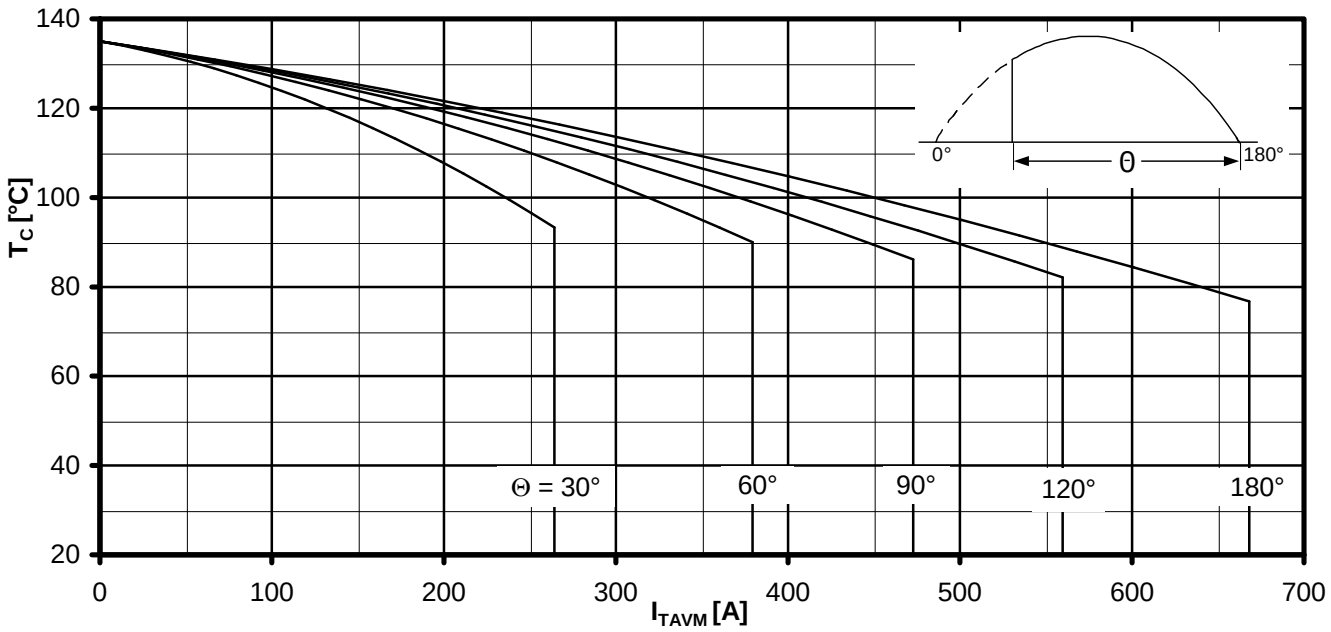
Parameter: Stromflußwinkel / Current conduction angle Θ



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

Rechteckförmiger Strom / Rectangular current Strombelastung je Zweig / Current load per arm

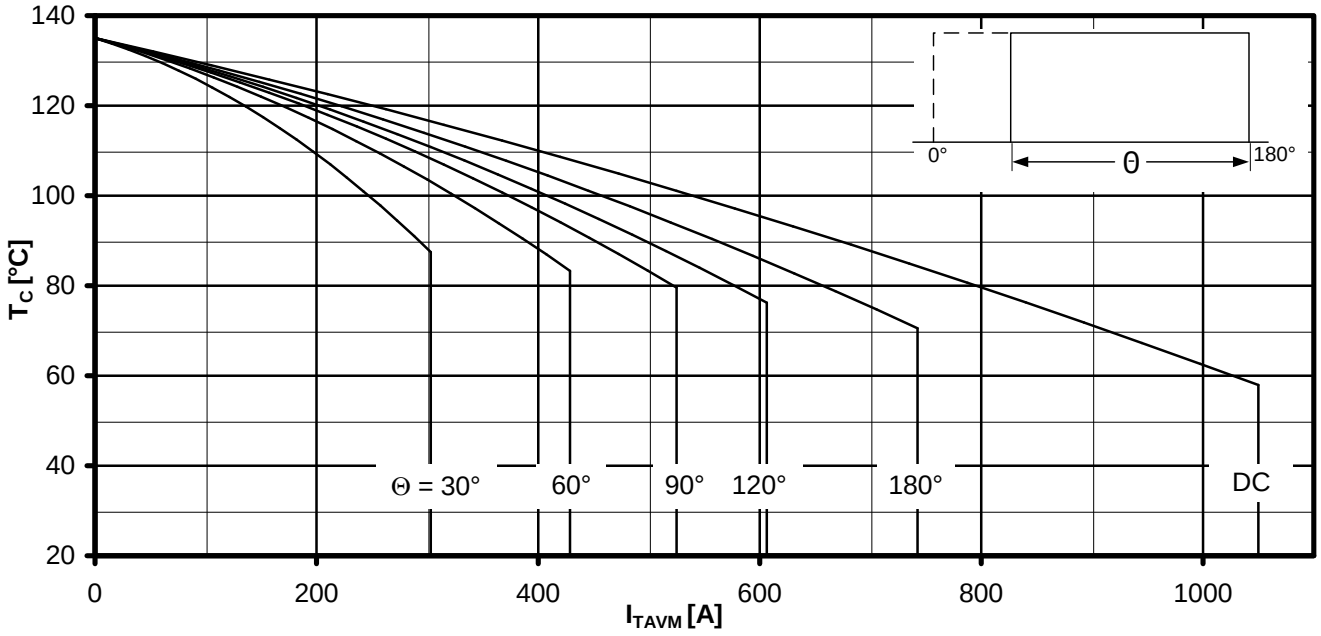
Parameter: Stromflußwinkel / Current conduction angle Θ



Höchstzulässige Gehäusetemperatur / Maximum allowable case temperature $T_C = f(I_{TAVM})$

Sinusförmiger Strom / Sinusoidal current Strombelastung je Zweig / Current load per arm

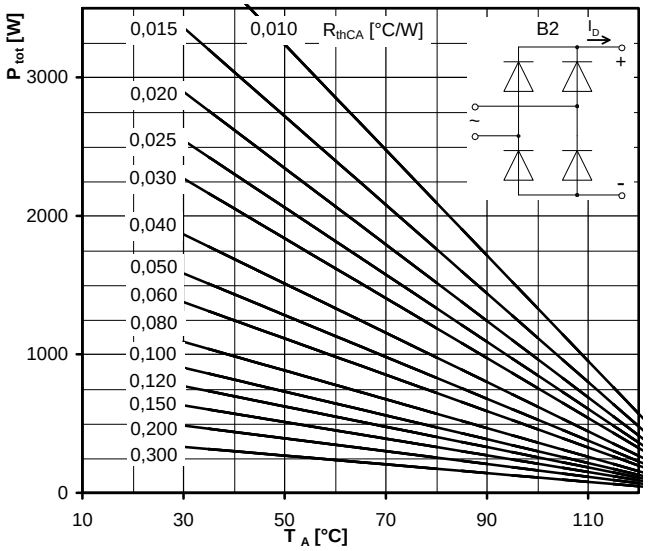
Parameter: Stromflußwinkel Θ / Current conduction angle Θ

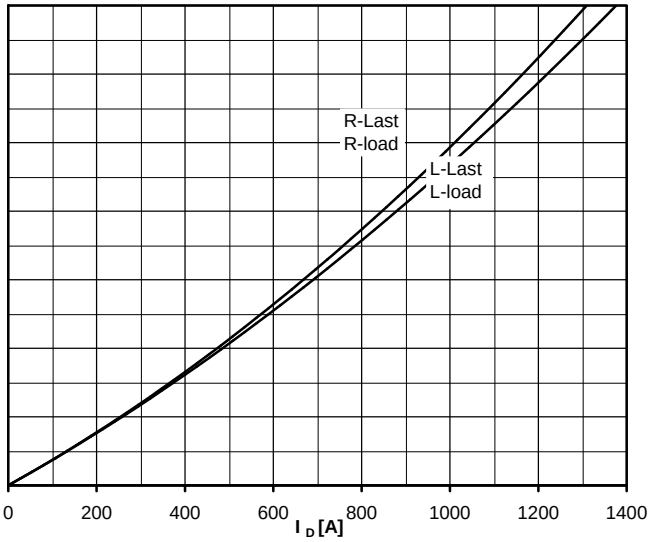


Höchstzulässige Gehäusetemperatur / Maximum allowable case temperature $T_C = f(I_{TAVM})$

Rechteckförmiger Strom / Rectangular current Strombelastung je Zweig / Current load per arm

Parameter: Stromflußwinkel Θ / Current conduction angle Θ



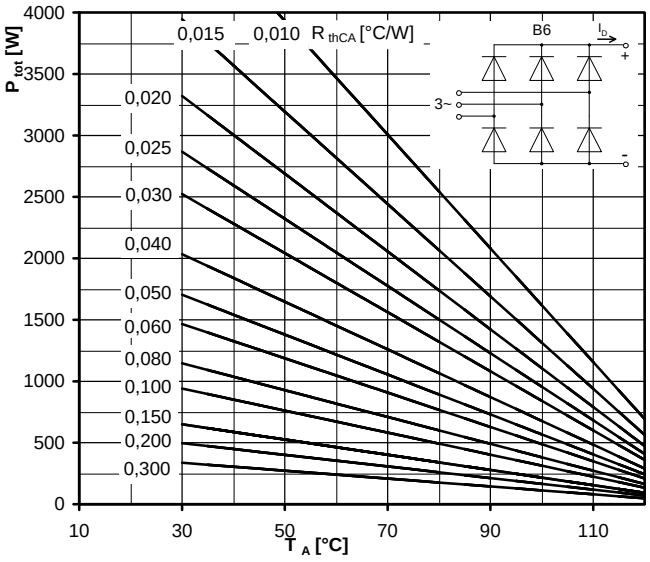


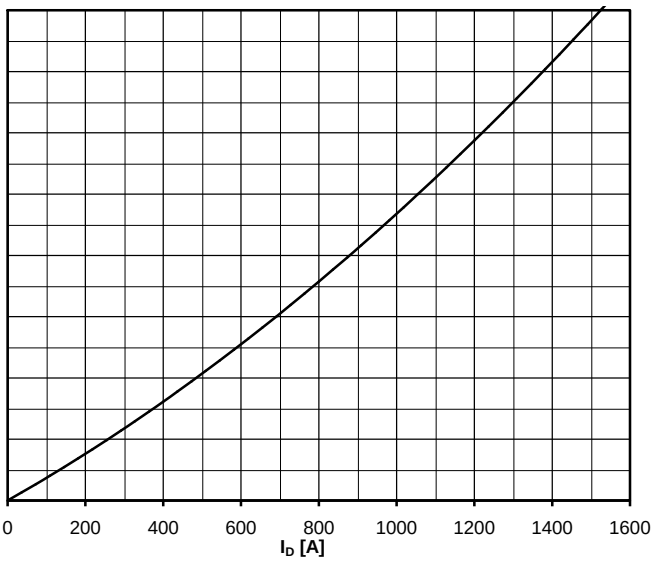
Höchstzulässiger Ausgangsstrom / Maximum rated output current I_D

B2- Zweipuls-Brückenschaltung / Two-pulse bridge circuit

Gesamtverlustleistung der Schaltung / Total power dissipation at circuit P_{tot}

Parameter:
Wärmewiderstand zwischen den Gehäusen und Umgebung / Thermal resistance cases to ambient R_{thCA}



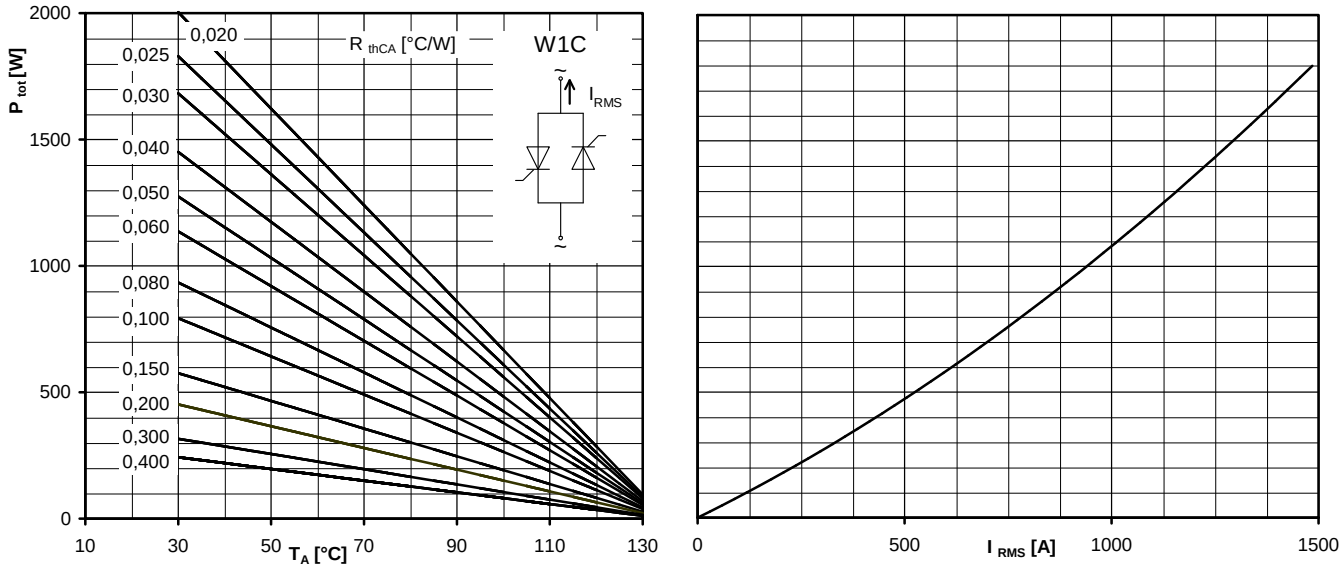


Höchstzulässiger Ausgangsstrom / Maximum rated output current I_D

B6- Sechspuls-Brückenschaltung / Six-pulse bridge circuit

Gesamtverlustleistung der Schaltung / Total power dissipation at circuit P_{tot}

Parameter:
Wärmewiderstand zwischen den Gehäusen und Umgebung / Thermal resistance cases to ambient R_{thCA}

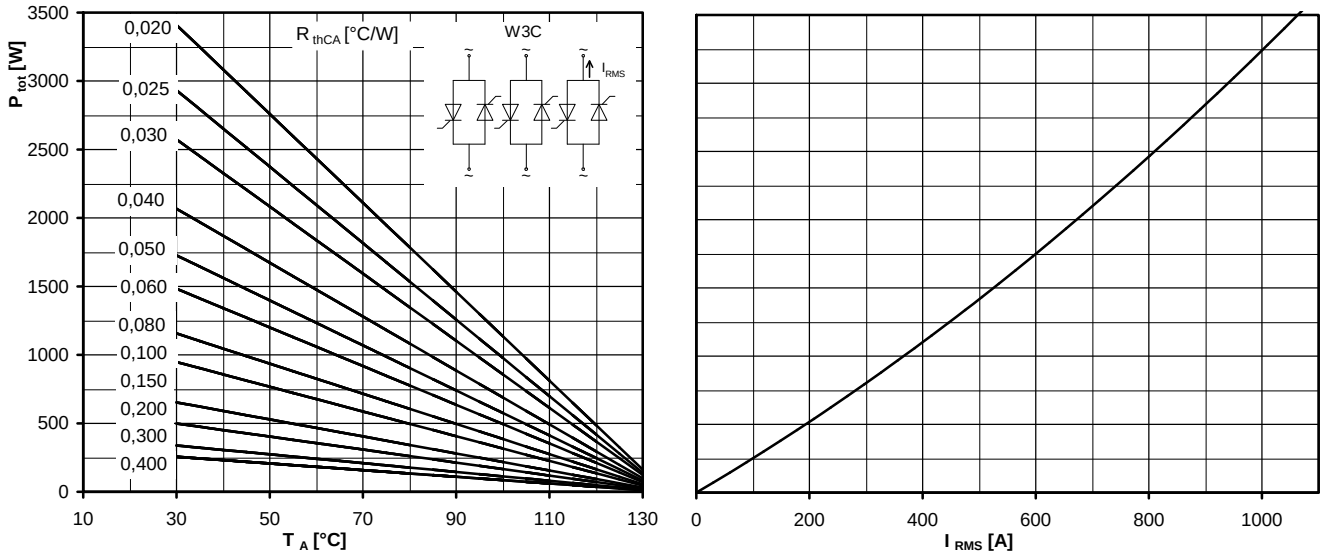


Höchstzulässiger Effektivstrom / Maximum rated RMS current I_{RMS}

W1C - Einphasen-Wechselwegschaltung / Single-phase inverse parallel circuit

Gesamtverlustleistung der Schaltung / Total power dissipation at circuit P_{tot}

Parameter:
Wärmewiderstand zwischen den Gehäuse und Umgebung / Thermal resistance case to ambient R_{thCA}

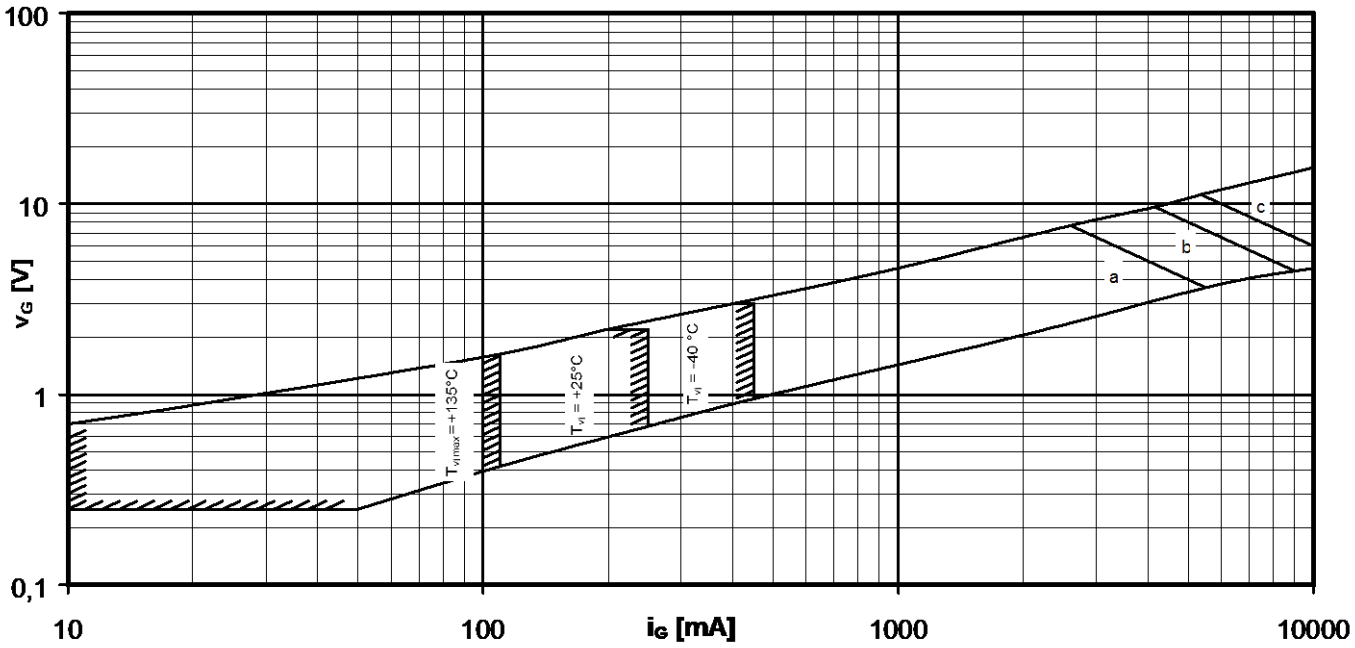


Höchstzulässiger Effektivstrom / Maximum rated RMS current I_{RMS}

W3C - Dreiphasen-Wechselwegschaltung / Three-phase inverse parallel circuit

Gesamtverlustleistung der Schaltung / Total power dissipation at circuit P_{tot}

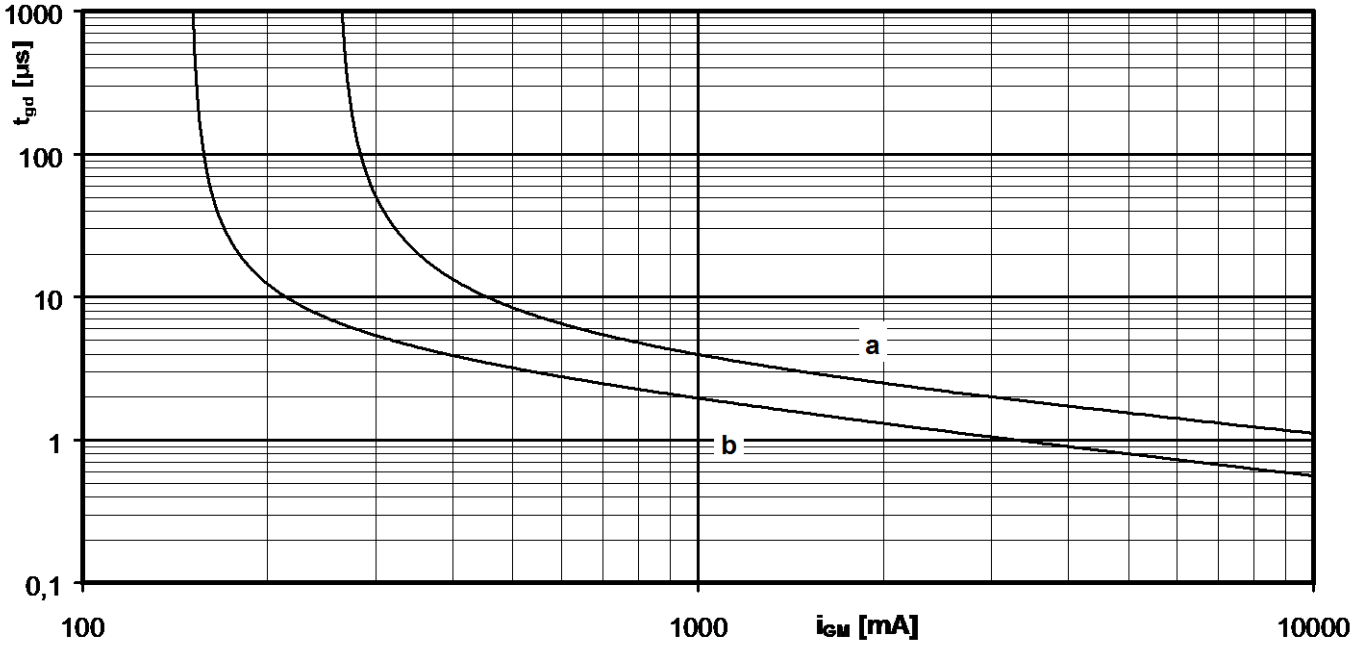
Parameter:
Wärmewiderstand zwischen den Gehäusen und Umgebung / Thermal resistance cases to ambient R_{thCA}



Steuercharakteristik $v_G = f(i_G)$ mit Zündbereichen für V_D = 6 V
Gate characteristic $v_G = f(i_G)$ with triggering area for V_D = 6 V

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

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

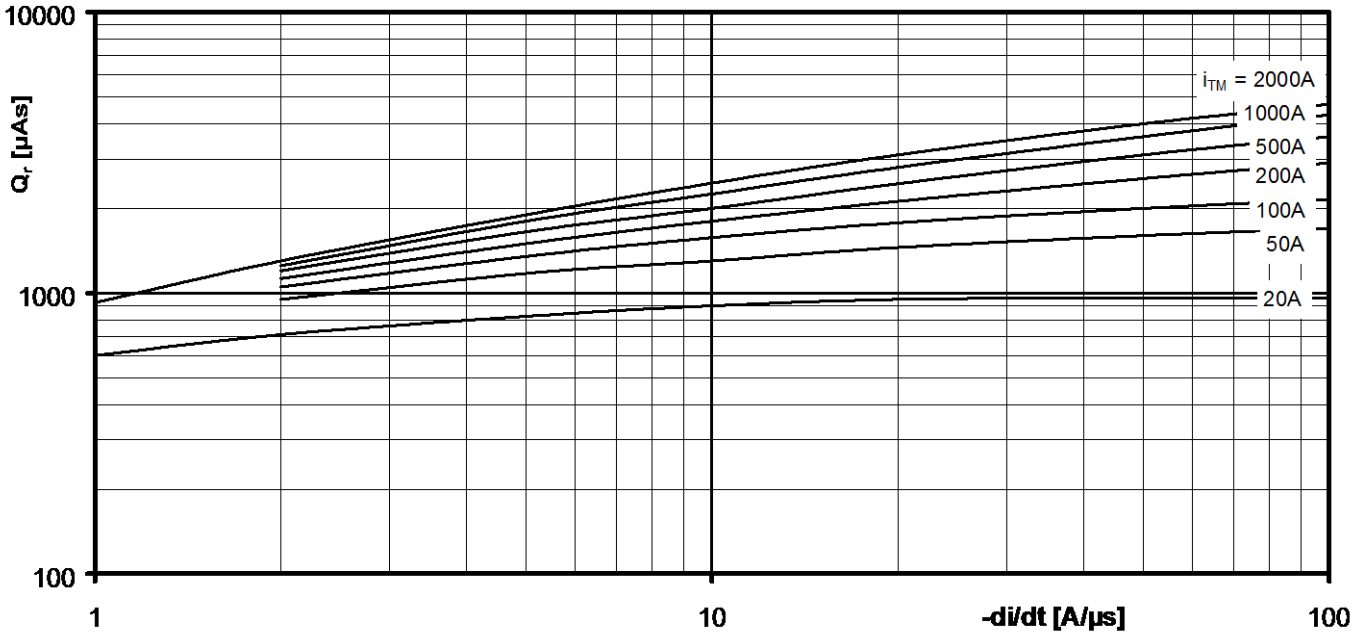


Zündverzug / Gate controlled delay time $t_{gd} = f(i_G)$

T_{vj} = 25°C, $di_G/dt = i_{GM}/1\mu s$

a - maximaler Verlauf / Limiting characteristic

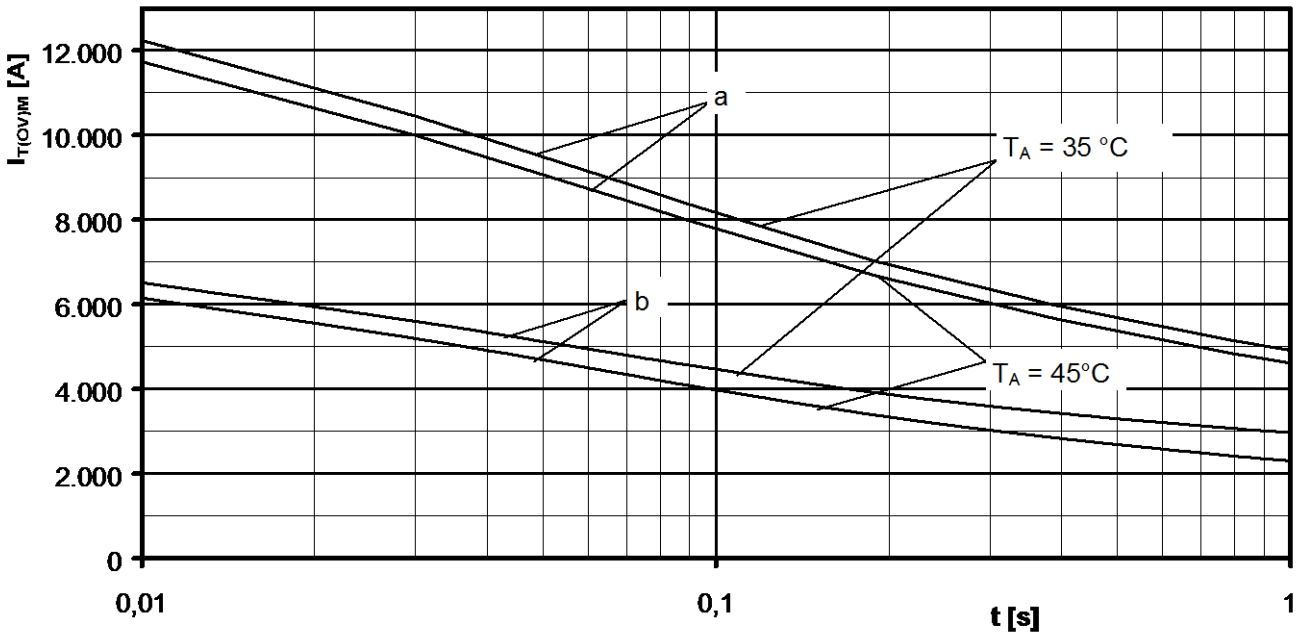
b - typischer Verlauf / Typical characteristic



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

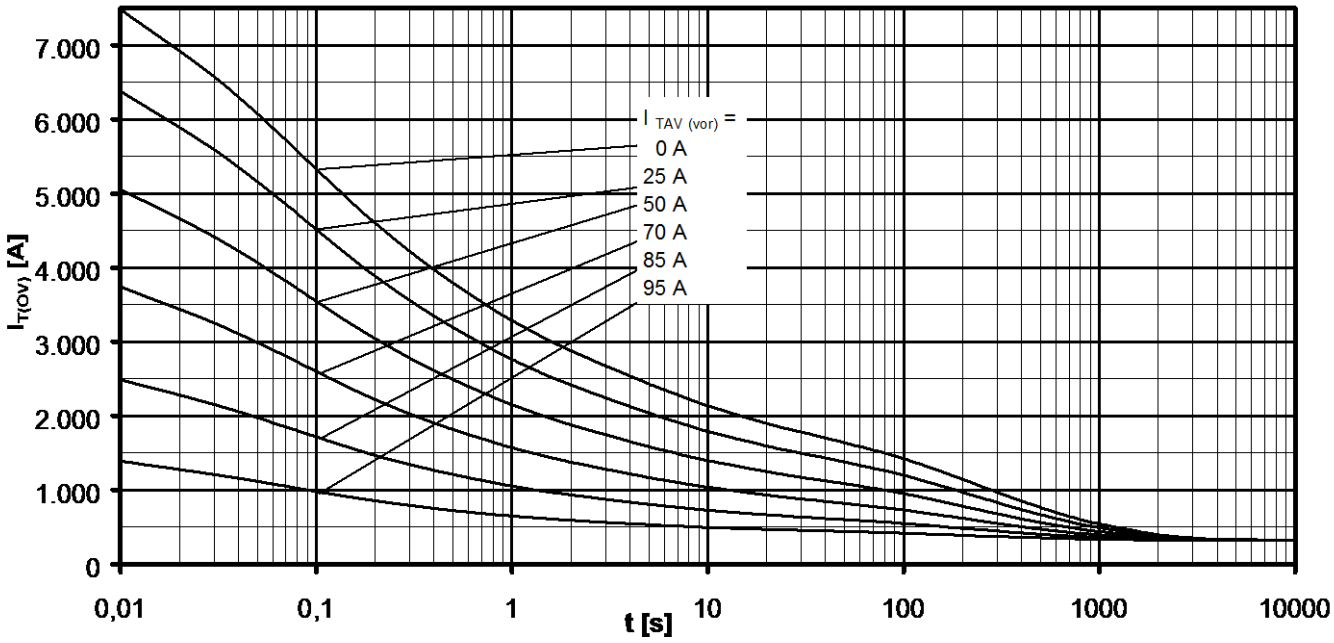
$T_{vj} = T_{vjmax}$, $v_R \leq 0{,}5\ V_{RRM}$, $v_{RM} = 0{,}8\ V_{RRM}$

Parameter: Durchlaßstrom / On-state current i_{TM}



Grenzstrom / Maximum overload on-state current $I_{T(OV)M}$ = f(t), v_{RM} = 0,8 V_{RRM}

a: Leerlauf / No-load conditions
b: nach Belastung mit I_{TAVM} / after load with I_{TAVM}
T_A = 35°C, verstärkte Luftkühlung / Forced air cooling
T_A = 45°C, Luftselbstkühlung / Natural air cooling

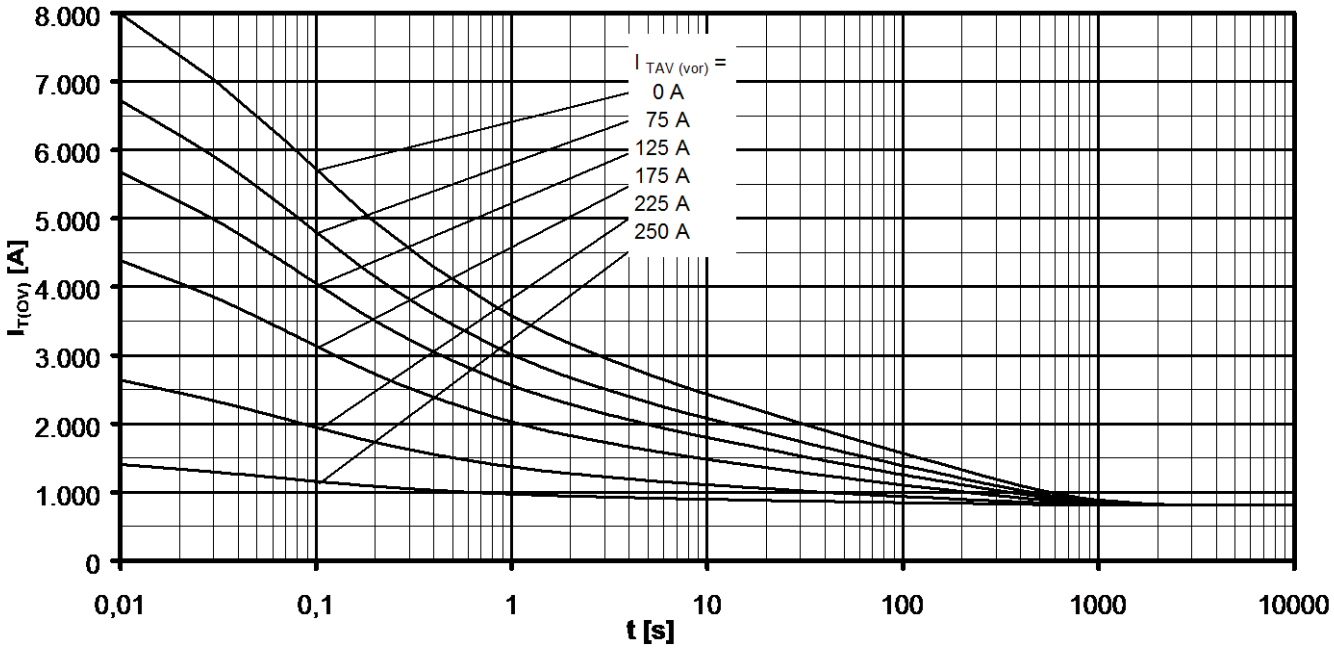


Überstrom je Zweig / Overload on-state current $I_{T(OV)}$

B6- Sechspuls-Brückenschaltung, 120° Rechteck / Six-pulse bridge circuit, 120° rectangular

Kühlkörper / Heatsink type KM17 (90W) Luftselbstkühlung bei / Natural cooling at T_A = 45°C

Parameter: Vorlaststrom je Zweig / Pre-load current per arm $I_{TAV(vor)}$



Überstrom je Zweig / Overload on-state current $I_{T(OV)}$

B6- Sechspuls-Brückenschaltung, 120° Rechteck / Six-pulse bridge circuit, 120° rectangular

Kühlkörper / Heatsink type KM17 (Papst 4650N) Verstärkte Kühlung bei / Forced cooling at T_A = 35°C

Parameter: Vorlaststrom je Zweig / Pre-load current per arm $I_{TAV(vor)}$