Maximum Ratings / Höchstzulässige Werte

at Tj=25°C, unless otherwise specified

Parameter	Condition		Symbol	Value	Unit
Input Rectifier Bridge **Gleichrichterbrücke**					
Repetitive peak reverse voltage Periodische Rückw. Spitzensperrspannung			V_{RRM}	1600	V
DC forward current Dauergleichstrom	T_J=140°C,	T_C=25°C T_C=80°C	I_d	274 184	A
Surge forward current Stoßstrom Grenzwert	tp=10ms tp=10ms	T_J=25°C T_J=150°C	I_{FSM}	750 600	A
Energypulse (sin 50Hz) Grenzlastintegral	tp=10ms tp=10ms	T_J=25°C T_J=150°C	I^2t	2810 1800	A2s
Transistor Inverter **Transistor Wechselrichter**					
Collector-emitter break down voltage Kollektor-Emitter-Sperrspannung			V_{CE}	600	V
DC collector current Kollektor-Dauergleichstrom	T_J=140°C,	T_C=25°C T_C=80°C	I_C	106 70	A A
Repetitive peak collector current Periodischer Kollektorspitzenstrom	T_J=140°C, tp=1ms	T_C=25°C T_C=80°C	I_{Cpuls}	212 140	A
Power dissipation per IGBT Verlustleistung pro IGBT	T_J=140°C,	T_C=25°C T_C=80°C	P_{tot}	303 158	W
Gate-emitter peak voltage Gate-Emitter-Spitzenspannung			V_{GE}	±20	V
Diode Inverter **Diode Wechselrichter**					
DC forward current Dauergleichstrom	T_J=140°C,	T_C=25°C T_C=80°C	I_F	122 78	A
Repetitive peak forward current Periodischer Spitzenstrom	T_J=140°C, tp=1ms	T_C=25°C T_C=80°C	I_{FRM}	243 157	A
I^2t Grenzlastintegral			I^2t	300 120	A²s
Transistor Brake-Chopper **Transistor Brems-Chooper**					
Collector-emitter voltage Kollektor-Emitter-Sperrspannung			V_{CES}	600	V
DC collector current Kollektor-Dauergleichstrom	T_J=140°C,	T_C=25°C T_C=80°C	I_C	70 46	A
Repetitive peak collector current Periodischer Kollektorspitzenstrom	T_J=140°C, tp=1ms	T_C=25°C T_C=80°C	I_{Cpuls}	140 92	A
Power dissipation Verlustleistung	T_J=140°C,	T_C=25°C T_C=80°C	P_{tot}	195 102	W
Gate-emitter peak voltage Gate-Emitter-Spitzenspannung			V_{GE}	±20	V
Diode Brake-Chopper **Diode Brems-Chopper**					
DC forward current Dauergleichstrom	T_J=140°C,	T_C=25°C T_C=80°C	I_F	52 34	A
Repetitive peak forward current Periodischer Spitzenstrom	T_J=140°C, tp=1ms	T_C=25°C T_C=80°C	I_{FRM}	105 68	A

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Maximum Ratings / Höchstzulässige Werte

at Tj=25°C, unless otherwise specified

Parameter	Condition	Symbol	Value	Unit
Thermal properties **Thermische Eigenschaften**				
max. Chip temperature max. Chiptemperatur		T_{jmax}	150	°C
Storage temperature Lagertemperatur		T_{stg}	-40…+125	°C
Operation temperature Betriebstemperatur		T_{op}	-40…+125	°C
Thermal resistance, chip to case Wärmewiderstand Chip-Bodenplatte	Diode Rectifier	R_{thJC}	0,52	K/W
	Transistor Inverter	R_{thJC}	0,38	K/W
	Diode Inverter	R_{thJC}	0,59	K/W
	Transistor Brake	R_{thJC}	0,59	K/W
	Diode Brake	R_{thJC}	1,28	K/W
Insulation properties **Modulisolation**				
Insulation test voltage Isolationsspannung	t=1min	V_{is}	4000	Vdc
Creepage distance Kriechstrecke			12,7	mm
Clearance Luftstrecke			12,7	mm

Characteristic values / Charakteristische Werte

at Tj=25°C, unless otherwise specified

Parameter	Symbol	Condition	T (°C)	RG (Ω)	VGE (V)	VCE (V)	IF (A)	IC (A)	Value min.	Value typ.	Value max.	Unit
Input Rectifier Bridge **Gleichrichter**												
Forward voltage Durchlasspannung			TJ=25°C				150			1,28		V
Threshold voltage Schleusenspannung			TJ=25°C							0,8		V
Slope resistance Ersatzwiderstand			TJ=25°C							6		mΩ
Reverse current Sperrstrom		VR=VRmax	TJ=25°C TJ=125°C								0,05 4,5	mA
Transistor Inverter, inductive load **Transistor Wechselrichter**												
Gate threshold voltage Gate-Schwellenspannung	VGE(th)		Tj=25°C			VGE		0,0015	4,5		6,5	V
Collector-emitter saturation voltage Kollektor-Emitter Sättigungsspannung	VCE(sat)		Tc=25°C Tj=125°C		15			75		1,8 2	2,45	V
Collector-emitter cut-off current Kollektor-Emitter Reststrom	ICES		Tc=25°C Tj=125°C		0	600					3	mA
Gate-emitter leakage current Gate-Emitter Reststrom	IGES		Tj=25°C		20	0					350	nA
Turn-on delay time Einschaltverzögerungszeit	td(on)		TJ=25°C TJ=125°C	10	15	300		75		49 45		ns
Rise time Anstiegszeit	tr		TJ=25°C TJ=125°C	10	15	300		75		43 41		ns
Turn-off delay time Abschaltverzögerungszeit	td(off)		TJ=25°C TJ=125°C	10	15	300		75		390 420		ns
Fall time Fallzeit	tf		TJ=25°C TJ=125°C	10	15	300		75		37 39		ns
Turn-on energy loss per pulse Einschaltverlustenergie pro Puls	Eon		TJ=125°C	10	15	300		75		3,2		mWs
Turn-off energy loss per pulse Abschaltverlustenergie pro Puls	Eoff		TJ=125°C	10	15	300		75		2,8		mWs
SC Data Kurzschlussverhalten	ISC	tp≤10µs	TJ≤125°C							tbd		A
Input capacitance Eingangskapazität	Cies	f=1MHz	TJ=25°C		0	25				3,3		nF
Diode Inverter **Diode Wechselrichter**												
Diode forward voltage Durchlassspannung	VF		TJ=25°C TJ=125°C				75		1,1	1,3	1,7	V
Peak reverse recovery current Rückstromspitze			TJ=25°C TJ=125°C							tbd		
Reverse recovered charge Sperrverzögerungsladung	Qrr		TJ=125°C			300	100			12,4		µC
Reverse recovery energy Abschaltenergie pro Puls			TJ=25°C TJ=125°C							tbd		mWs
Reverse recovery time Sperrverzögerungszeit	trr		TJ=125°C			300	100			200		ns
Transistor Brake-Chopper **Transistor Brems-Chooper**												
Gate threshold voltage Gate-Schwellenspannung	VGE(th)		Tj=25°C			VGE		0,001	4,5		6,5	V
Collector-emitter saturation voltage Kollektor-Emitter Sättigungsspannung	VCE(sat)		Tj=25°C Tj=125°C		15			37,5		1,7 1,9	2,85	V
Input capacitance Eingangskapazität	Cies	f=1MHz	Tj=25°C		0	25				1,6		nF
Collector-emitter cut-off current Kollektor-Emitter Reststrom	ICES		Tc=25°C Tj=125°C		0	600					1,5	mA
Gate-emitter leakage current Gate-Emitter Reststrom	IGES		Tj=25°C		20	0				250		nA
Diode Brake-Chopper **Diode Brems-Chopper**												
Diode forward voltage Durchlassspannung	VF		TJ=25°C				37,5		1,1	1,6	1,95	V
NTC-Thermistor **NTC-Widerstand**												
Rated resistance Nennwiderstand	R25		Tc=25°C							22		kΩ
Deviation of R100 Abweichung von R100	ΔR/R	R100=1486Ω	Tc=100°C						-5		5	%
Power dissipation Verlustleistung	P		Tc=25°C								210	mW
B-value B-Wert	B(25/100)	Tolerance=±3								4000		K

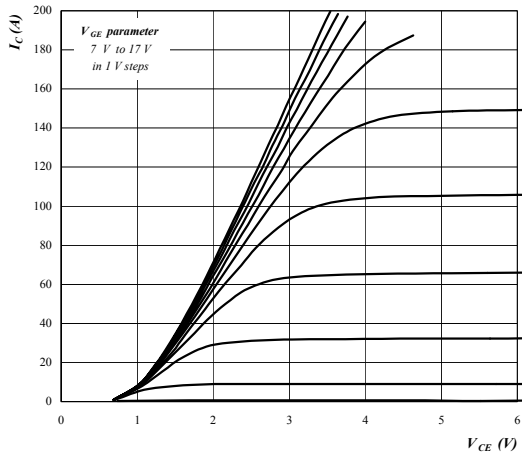
Output inverter

Typ. output characteristics

Output Inverter IGBT

$I_C = f(V_{CE})$

parameter: t_p = 250 ms, T_j = 25 °C

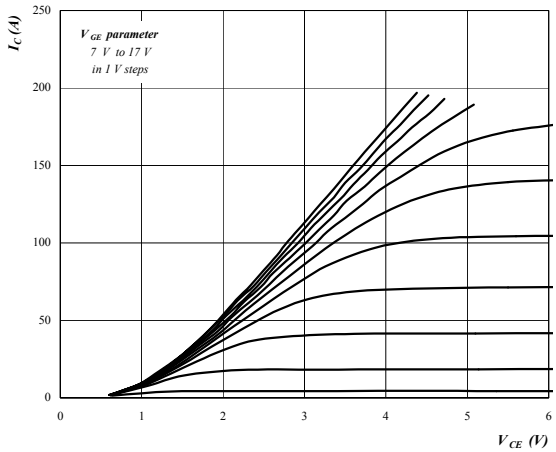


Typ. output characteristics

Output Inverter IGBT

$I_C = f(V_{CE})$

parameter: t_p = 250 ms, T_j = 125 °C

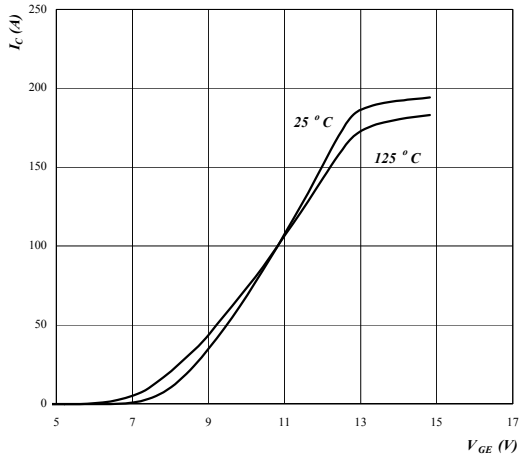


Typ. transfer characteristics

Output Inverter IGBT

$I_C = f(V_{GE})$

parameter: t_p = 250 ms, V_{CE} = 20 V

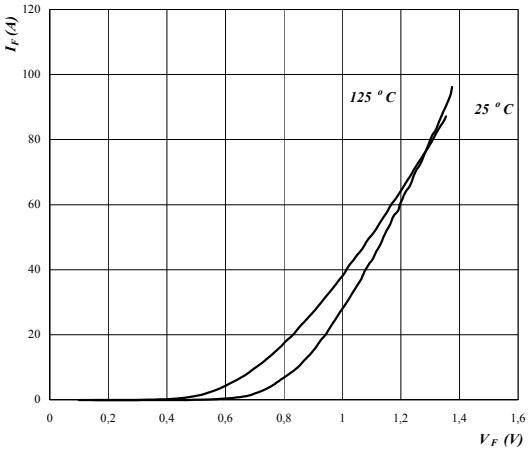


Typ. diode characteristics

Output Inverter FRED

$I_F = f(V_F)$

parameter: t_p = 250 ms



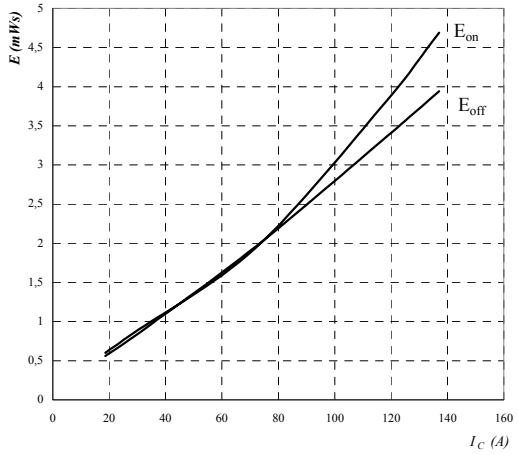
Output inverter

Typ. Switching losses

Output inverter IGBT

$E = f(I_C)$, inductive load, $T_j = 25\ ^oC$

par.: $V_{CE} = 300$ V, $V_{GE} = 15$ V, $R_G = 10$ W

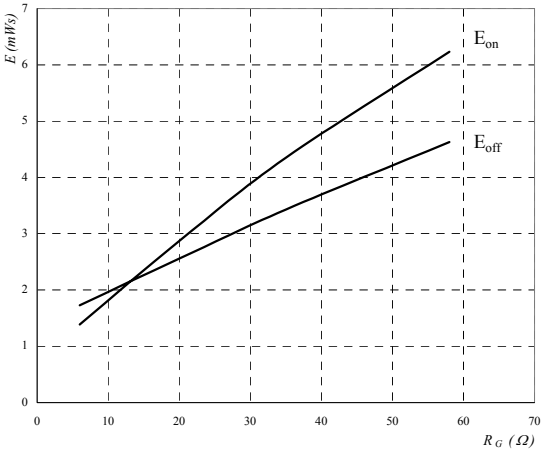


Typ. Switching losses

Output inverter IGBT

$E = f(R_G)$, inductive load, $T_j = 25\ ^oC$

par.: $V_{CE} = 300$ V, $V_{GE} = 15$ V, $I_C = 75$ A

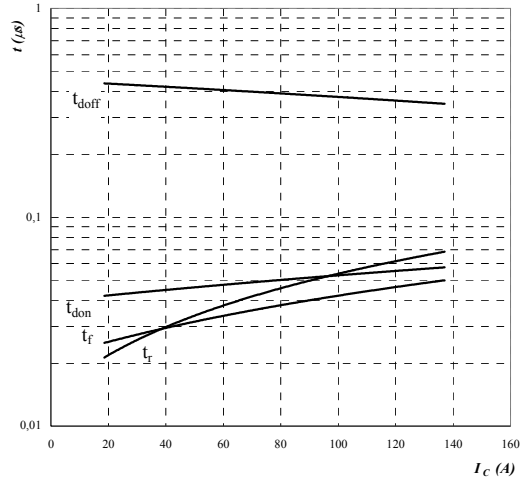


Typ. Switching time

Output inverter IGBT

$t = f(I_C)$, inductive load, $T_j = 25\ ^oC$

par.: $V_{CE} = 300$ V, $V_{GE} = 15$ V, $R_G = 10$ W

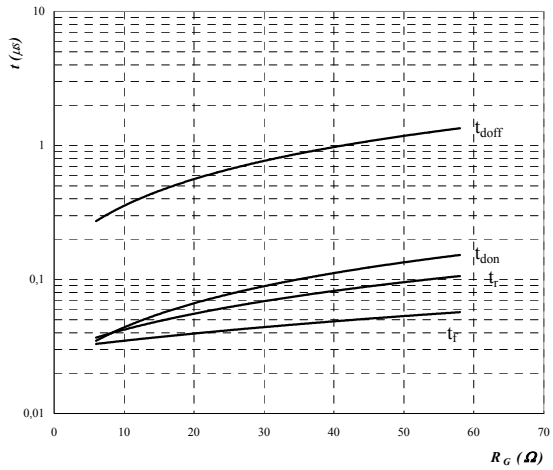


Typ. Switching time

Output inverter IGBT

$t = f(R_G)$, inductive load, $T_j = 25\ ^oC$

par.: $V_{CE} = 300$ V, $V_{GE} = 15$ V, $I_C = 75$A



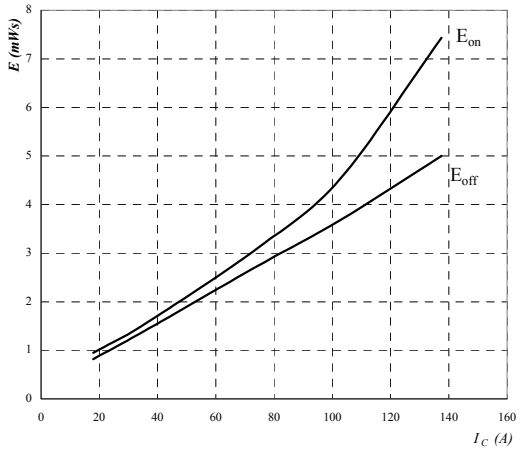
Output inverter

Typ. Switching losses

Output inverter IGBT

E = f (I_C), inductive load, T_j = 125 °C

par.: V_CE = 300 V, V_GE = 15 V, R_G = 10 W

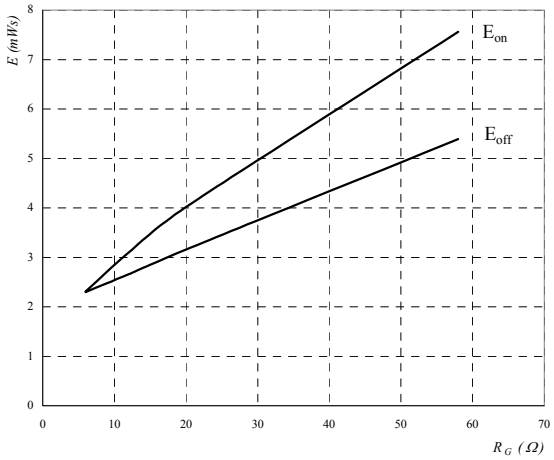


Typ. Switching losses

Output inverter IGBT

E = f (R_G), inductive load, T_j = 125 °C

par.: V_CE = 300 V, V_GE = 15 V, I_C = 75 A

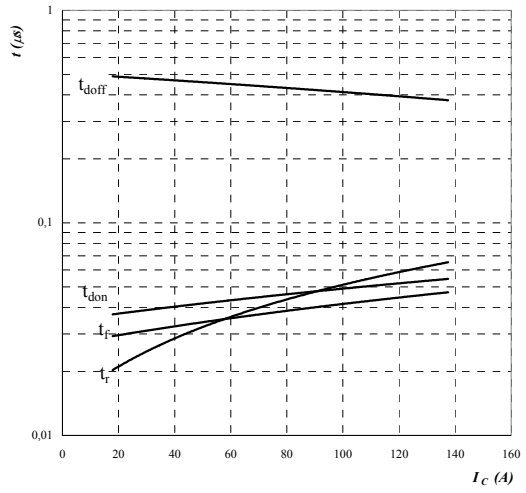


Typ. Switching time

Output inverter IGBT

t = f (I_C), inductive load, T_j = 125 °C

par.: V_CE = 300 V, V_GE = 15 V, R_G = 10 W

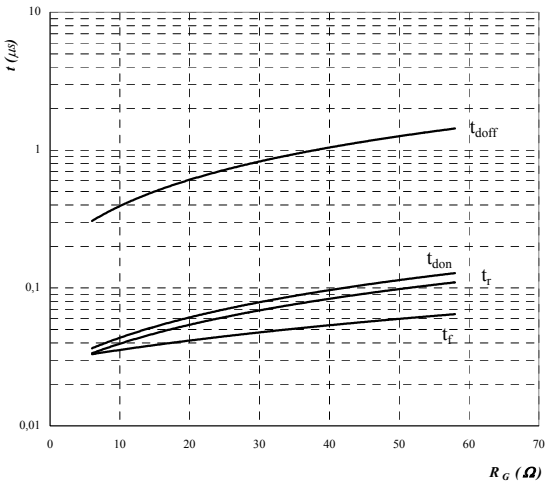


Typ. Switching time

Output inverter IGBT

t = f (R_G), inductive load, T_j = 125 °C

par.: V_CE = 300 V, V_GE = 15 V, I_C = 75A



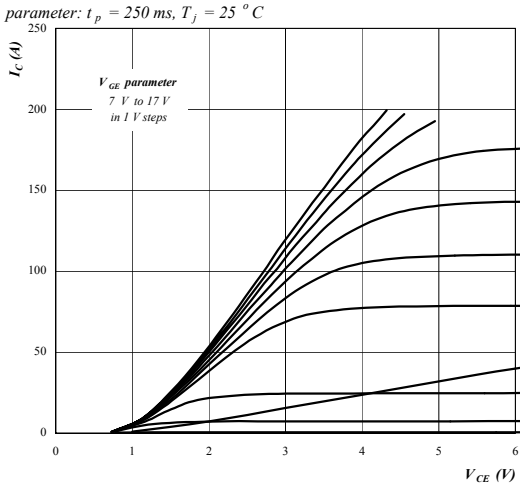
Brake chopper / Brems - Chopper

Typ. output characteristics

Brake Circuit IGBT

$I_C = f(V_{CE})$

parameter: t_p = 250 ms, T_j = 25 °C

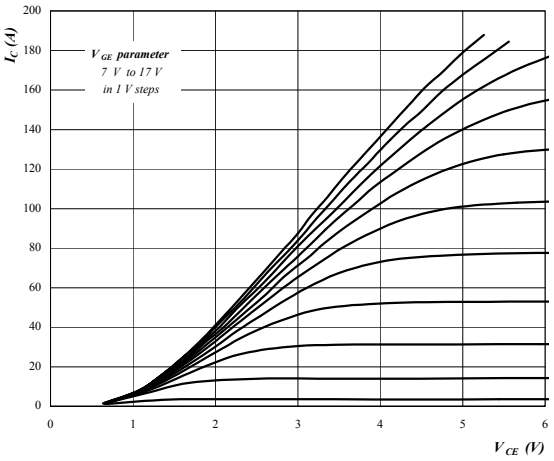


Typ. output characteristics

Brake Circuit IGBT

$I_C = f(V_{CE})$

parameter: t_p = 250 ms, T_j = 125 °C

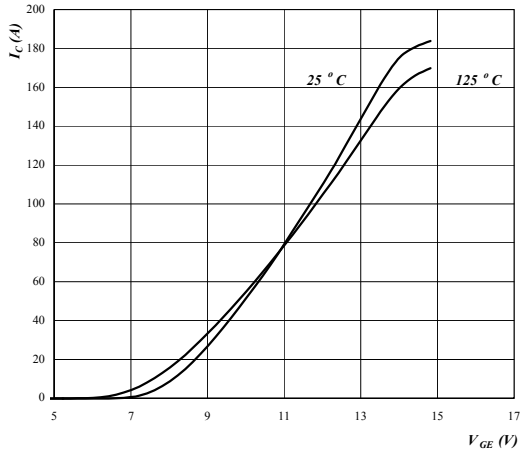


Typ. transfer characteristics

Brake Circuit IGBT

$I_C = f(V_{GE})$

parameter: t_p = 250 ms, V_{CE} = 20 V

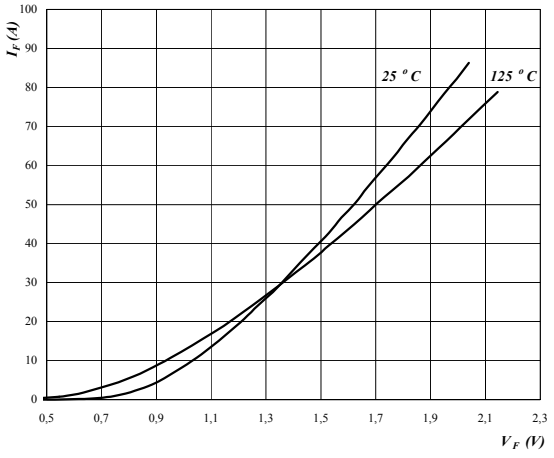


Typ. diode chararacteristics

Brake Circuit FRED

$I_F = f(V_F)$

parameter: t_p = 250 ms



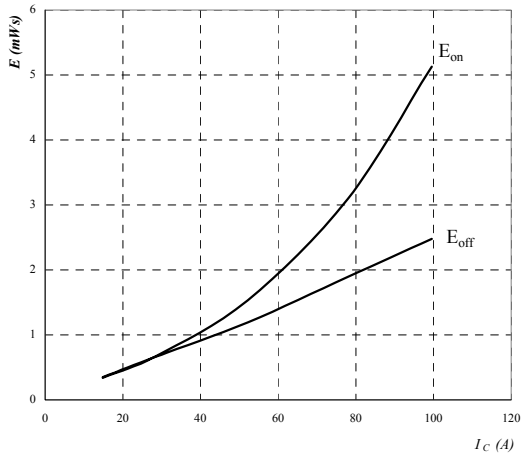
Brake chopper / Brems - Chopper

Typ. Switching losses

Brake circuit IGBT

E = f (I C), inductive load, T j = 25 ° C

par.: V CE = 300 V, V GE = 15 V, R G = 10 W

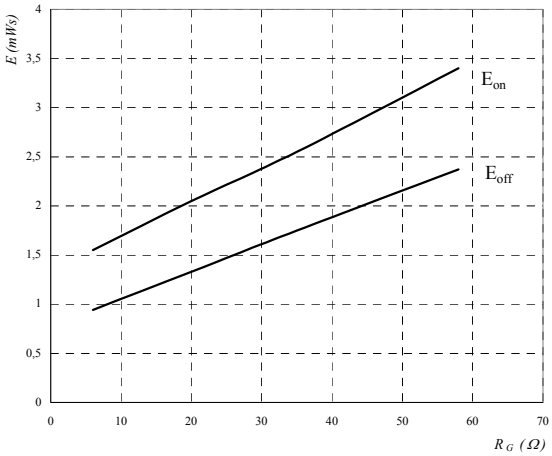


Typ. Switching losses

Brake circuit IGBT

E = f (R G), inductive load, T j = 25 ° C

par.: V CE = 300 V, V GE = 15 V, I C = 50 A

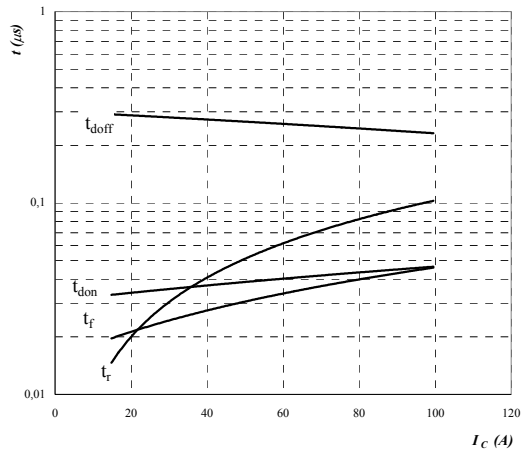


Typ. Switching time

Brake circuit IGBT

t = f (I C), inductive load, T j = 25 ° C

par.: V CE = 300 V, V GE = 15 V, R G = 10 W

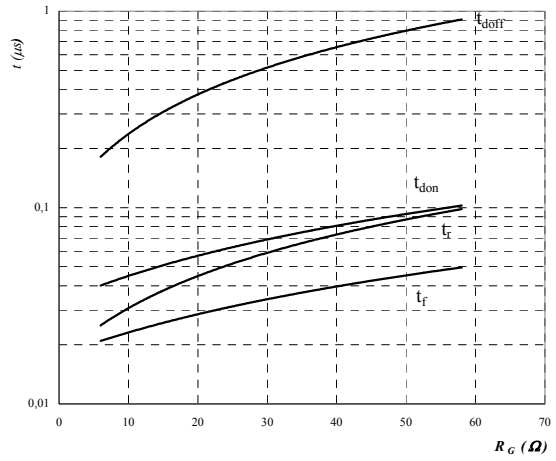


Typ. Switching time

Brake circuit IGBT

t = f (R G), inductive load, T j = 25 ° C

par.: V CE = 300 V, V GE = 15 V, I C = 50 A



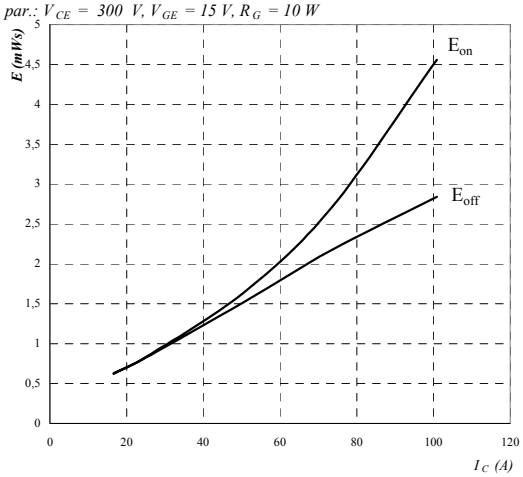
Brake chopper / Brems - Chopper

Typ. Switching losses

Brake circuit IGBT

E = f (I C), inductive load, T j = 125 ° C

par.: V CE = 300 V, V GE = 15 V, R G = 10 W

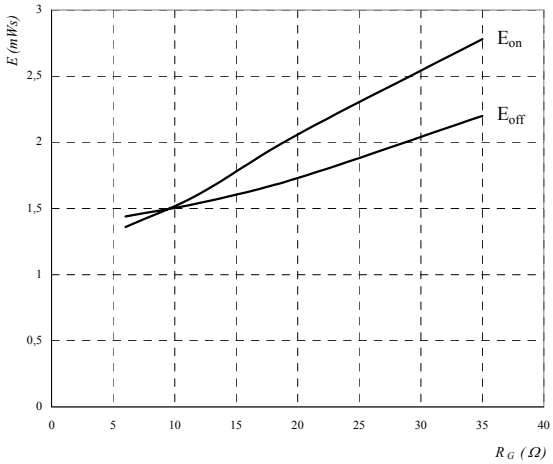


Typ. Switching losses

Brake circuit IGBT

E = f (R G), inductive load, T j = 125 ° C

par.: V CE = 300 V, V GE = 15 V, I C = 50 A

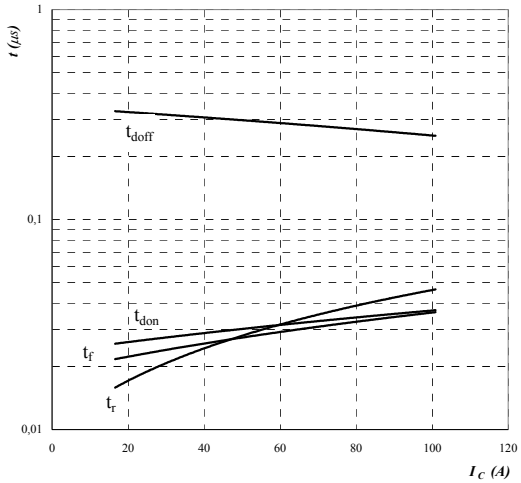


Typ. Switching time

Brake circuit IGBT

t = f (I C), inductive load, T j = 125 ° C

par.: V CE = 300 V, V GE = 15 V, R G = 10 W

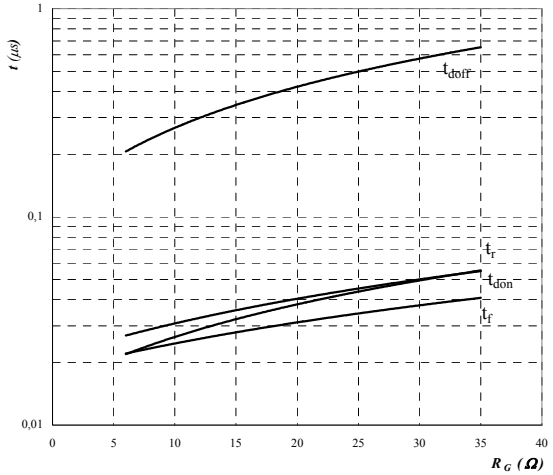


Typ. Switching time

Brake circuit IGBT

t = f (R G), inductive load, T j = 125 ° C

par.: V CE = 300 V, V GE = 15 V, I C = 50 A



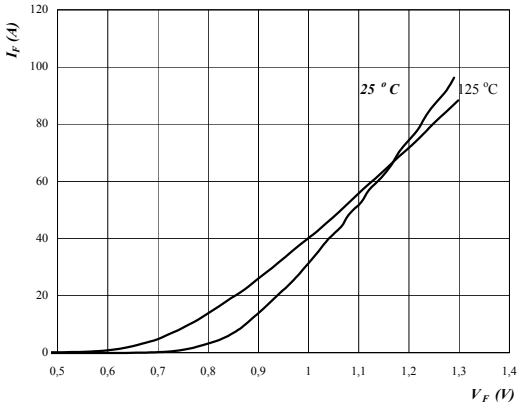
Input rectifier bridge / Eingangsgleichrichter Thermistor

Typ. diode characteristics

Input Rectifier Bridge

$I_F = f(V_F)$

parameter: t_p *= 250 ms*



NTC-typical temperature characteristic