Maximum Ratings / Höchstzulässige Werte

Parameter	Condition		Symbol	Datasheet values	Unit
				max.	
Transistor Inverter **Transistor Wechselrichter**					
Collector-emitter break down voltage Kollektor-Emitter-Sperrspannung			V_{CE}	600	V
DC collector current Kollektor-Dauergleichstrom	T_j=150°C	T_h=80°C,	I_C	22	A
Repetitive peak collector current Periodischer Kollektorspitzenstrom	t_p=1ms	T_h=80°C	I_{cpuls}	44	A
Power dissipation per IGBT Verlustleistung pro IGBT	T_j=150°C	T_h=80°C	P_{tot}	42	W
Gate-emitter peak voltage Gate-Emitter-Spitzenspannung			V_{GE}	±20	V
SC withstand time Kurzschlußverhalten	Tj=125°C Vce=390V	V_{GE}=15V	t_{SC}	3	us
Diode Inverter **Diode Wechselrichter**					
DC forward current Dauergleichstrom	T_j=150°C	T_h=80°C,	I_F	15,5	A
Repetitive peak forward current Periodischer Spitzenstrom	t_p=1ms	T_h=80°C	I_{FRM}	31	A
Power dissipation per Diode Verlustleistung pro Diode	T_j=150°C	T_h=80°C	P_{tot}	24	W
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
Insulation properties **Modulisolation**					
Insulation voltage Isolationsspannung		t=1min	V_{is}	4000	Vdc
Creepage distance Kriechstrecke				min 12,7	mm
Clearance Luftstrecke				min 12,7	mm

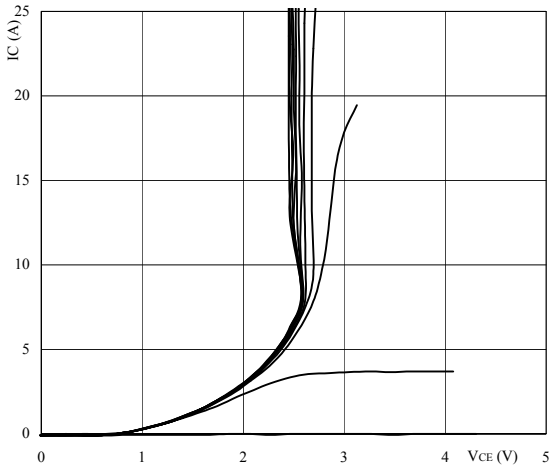
Rupert-Mayer-Str. 44, D81359 München
power.switches@tycoelectronics.com

Characteristic values

Description	Symbol	Conditions					Datasheet values			Unit
		T(C°)	Other conditions (Rgon-Rgoff)	VGE(V) VGS(V)	VR(V) VCE(V) VDS(V)	IC(A) IF(A) Id(A)	Min	Typ	Max	
Transistor Inverter, inductive load **Transistor Wechselrichter**										
Gate emitter threshold voltage Gate-Schwellenspannung	$V_{GE(th)}$	Tj=25°C Tj=125°C	VCE=VGE			0,00025		5,6		V
Collector-emitter saturation voltage Kollektor-Emitter Sättigungsspannung	$V_{CE(sat)}$	Tj=25°C Tj=125°C		15		12		2,5 1,8	2,75	V
Collector-emitter cut-off Kollektor-Emitter Reststrom	I_{CES}	Tj=25°C Tj=125°C		0	600				0,25 2	mA
Gate-emitter leakage current Gate-Emitter Reststrom	I_{GES}	Tj=25°C Tj=125°C		25	0				300	nA
Turn-on delay time Einschaltverzögerungszeit	$t_{d(on)}$	Tj=25°C Tj=125°C	Rgon=12 Ohm Rgoff=2 Ohm	15	300	12		17		ns
Rise time Anstiegszeit	t_r	Tj=25°C Tj=125°C	Rgon=12 Ohm Rgoff=2 Ohm	15	300	12		8		ns
Turn-off delay time Abschaltverzögerungszeit	$t_{d(off)}$	Tj=25°C Tj=125°C	Rgon=12 Ohm Rgoff=2 Ohm	15	300	12		80		ns
Fall time Fallzeit	t_f	Tj=25°C Tj=125°C	Rgon=12 Ohm Rgoff=2 Ohm	15	300	12		29		ns
Turn-on energy loss per pulse Einschaltverlustenergie pro Puls	E_{on}	Tj=25°C Tj=125°C	Rgon=12 Ohm Rgoff=2 Ohm	15	300	12		0,155		mWs
Turn-off energy loss per pulse Abschaltverlustenergie pro Puls	E_{off}	Tj=25°C Tj=125°C	Rgon=12 Ohm Rgoff=2 Ohm	15	300	12		0,133		mWs
Input capacitance Eingangskapazität	C_{ies}	Tj=25°C Tj=125°C	f=1MHz	0	25			1,2		nF
Output capacitance Ausgangskapazität	C_{oss}	Tj=25°C Tj=125°C	f=1MHz	0	25			0,15		nF
Reverse transfer capacitance Rückwirkungskapazität	C_{rss}	Tj=25°C Tj=125°C	f=1MHz	0	25			0,05		nF
Gate charge Gate Ladung	Q_{Gate}	Tj=25°C Tj=125°C		15	300	12		78	96	nC
Thermal resistance chip to heatsink per chip Wärmewiderstand Chip-Kühlkörper pro Chip	R_{thJH}		Thermal grease thickness≤50um Warmeleitpaste Dicke≤50um λ = 0,61 W/mK					1,7		K/W
Diode Inverter **Diode Wechselrichter**										
Diode forward voltage Durchlaßspannung	V_F	Tj=25°C Tj=125°C				12		1,92 1,48	2,3	V
Peak reverse recovery current Rückstromspitze	I_{RM}	Tj=25°C Tj=125°C	Rgon=12Ohm	15	300	12		22,7		A
Reverse recovery time Sperreverzögerungszeit	t_{rr}	Tj=25°C Tj=125°C	Rgon=12Ohm	15	300	12		50		ns
Reverse recovered charge Sperrverzögerungsladung	Q_{rr}	Tj=25°C Tj=125°C	Rgon=12Ohm	15	300	12		0,55		uC
Reverse recovered energy Sperrverzögerungsenergie	Erec	Tj=25°C Tj=125°C	Rgon=12Ohm	15	300	12		0,089		mWs
Thermal resistance chip to heatsink per chip Wärmewiderstand Chip-Kühlkörper pro Chip	R_{thJH}		Thermal grease thickness≤50um Warmeleitpaste Dicke≤50um λ = 0,61 W/mK					3,0		K/W
NTC-Thermistor **NTC-Widerstand**										
Rated resistance Nennwiderstand	R_{25}	Tj=25°C	Tol. ±5%				9,5	10	10,5	kOhm
Deviation of R100 Abweichung von R100	$D_{R/R}$	Tc=100°C	R100=1503Ohm					3,4		%/K
Power dissipation given Epcos-Typ Verlustleistung Epcos-Typ angeben	P	Tj=25°C							210	mW
B-value B-Wert	$B_{(25/100)}$	Tj=25°C	Tol. ±3%					4500		K

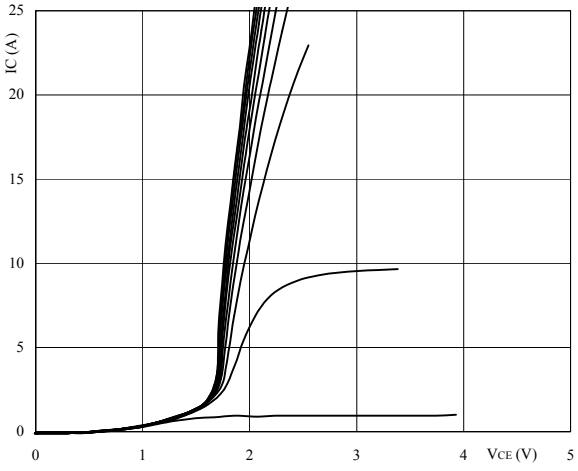
Output inverter

Figure 1. Typical output characteristics
Output inverter IGBT
Ic= f(VCE)



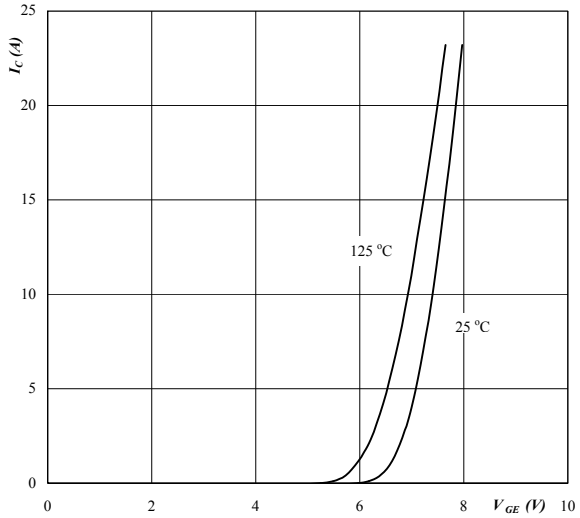
parameter: tp = 250 ms Tj = 25 °C
VGE parameter: from: 6 V to 16 V
in 1 V steps

Figure 2. Typical output characteristics
Output inverter IGBT
Ic= f(VCE)



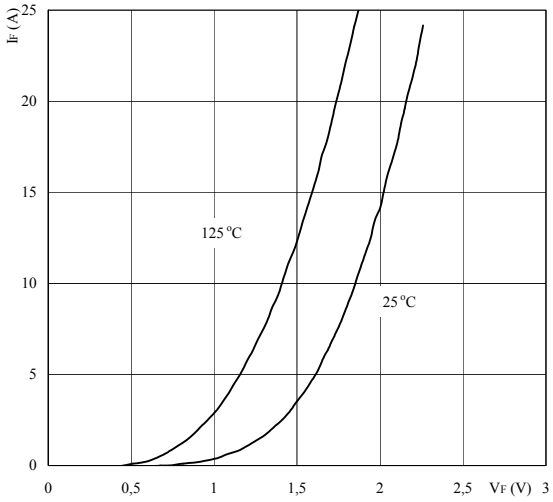
parameter: tp = 250 ms Tj = 125 °C
VGE parameter: from: 6 V to 16 V
in 1 V steps

Figure 3. Typical transfer characteristics
Output inverter IGBT
Ic= f(VGE)



parameter: tp = 250 ms VCE = 4 V

Figure 4. Typical diode forward current as a function of forward voltage
Output inverter FRED IF=f(VF)



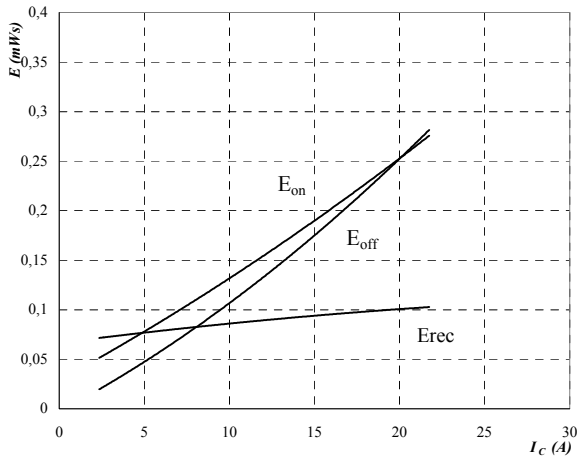
parameter: tp = 250 ms

Output inverter

Figure 5. Typical switching energy losses as a function of collector current

Output inverter IGBT

E = f (Ic)

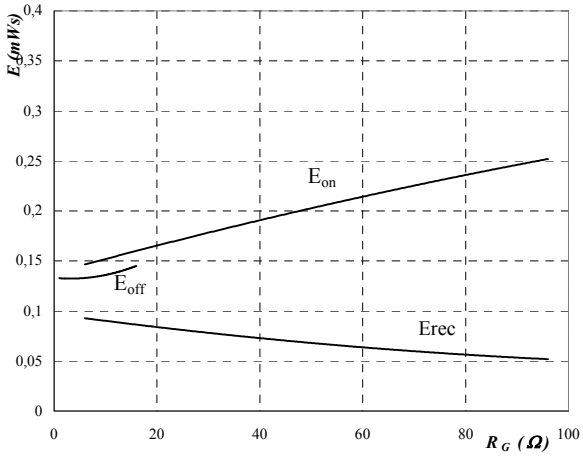


inductive load, Tj = 125 °C
V_{CE} = 300 V
V_{GE} = 15 V
$R_{Gon} = 6*R_{Goff}$ = 12 Ohm

Figure 6. Typical switching energy losses as a function of gate resistor

Output inverter IGBT

E = f (RG)

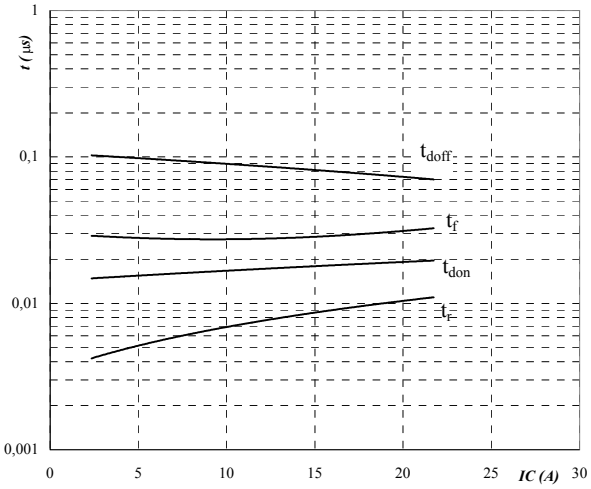


inductive load, Tj = 125 °C
V_{CE} = 300 V
V_{GE} = 15 V
Ic = 12 A

Figure 7. Typical switching times as a function of collector current

Output inverter IGBT

t = f (Ic)

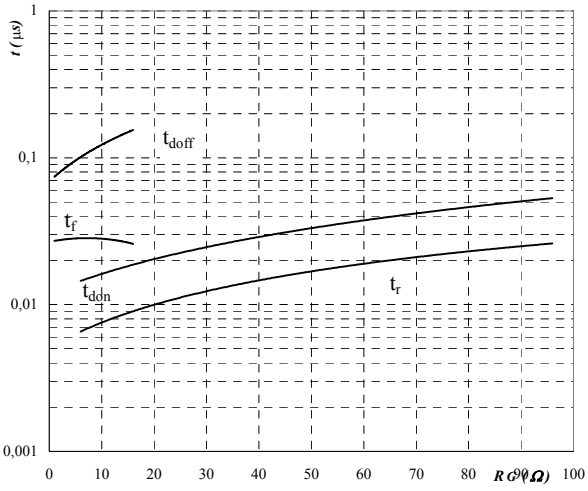


inductive load, Tj = 125 °C
V_{CE} = 300 V
V_{GE} = 15 V
$R_{Gon} = 6* R_{Goff}$ = 12 Ohm

Figure 8. Typical switching times as a function of gate resistor

Output inverter IGBT

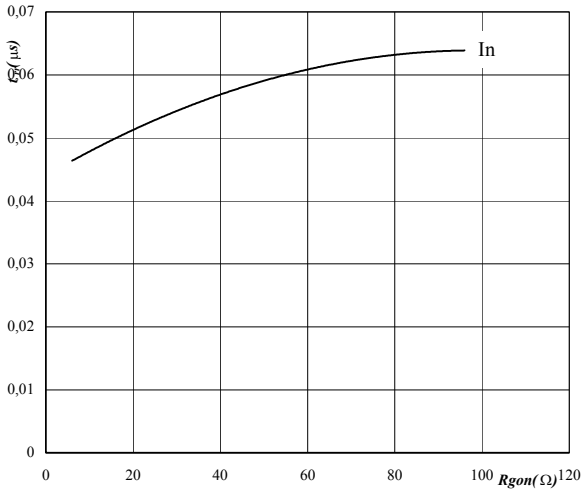
t = f (RG)



inductive load, Tj = 125 °C
V_{CE} = 300 V
V_{GE} = 15 V
Ic = 12 A

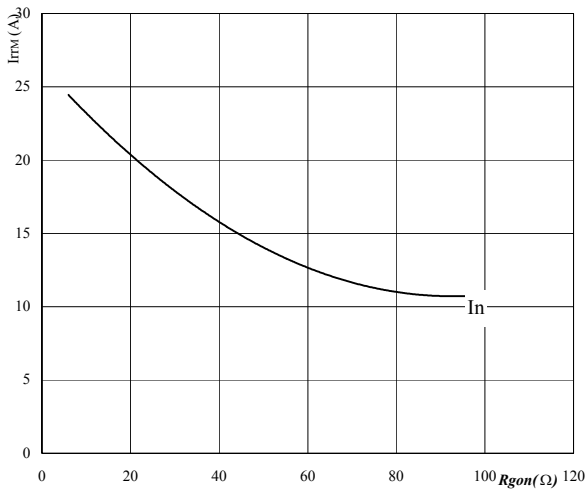
Output inverter

Figure 9. Typical reverse recovery time as a function of gate resistor
Output inverter FRED diode
trr = f (Rgon)



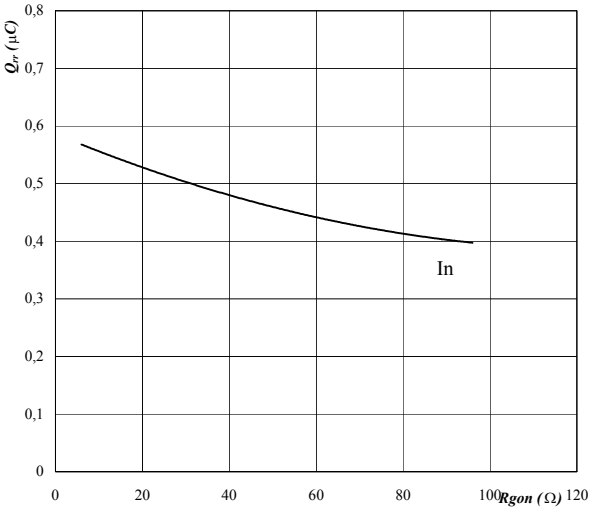
Tj = 125 °C
V_R = 300 V
In= 12 A

Figure 10. Typical reverse recovery current as a function of gate resistor
Output inverter FRED diode
IRRM = f (Rgon)



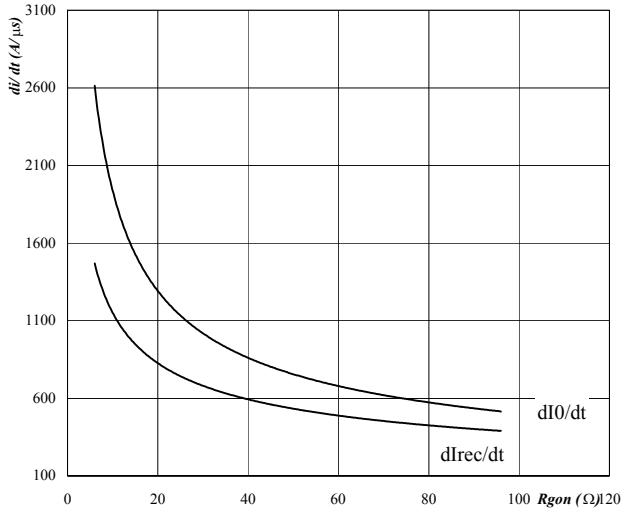
Tj = 125 °C
V_R = 300 V
In= 12 A

Figure 11. Typical reverse recovery charge as a function of gate resistor
Output inverter FRED diode
Qrr = f (Rgon)



Tj = 125 °C
V_R = 300 V
In= 12 A

Figure 12. Typical diode peak rate of fall of forward and reverse recovery current as a function of gate resistor
Output inverter FRED diode
di0/dt,dIrec/dt= f (Rgon)



Tj = 125 °C
V_R = 300 V
I_F = 12 A

Thermistor

Figure 23. Typical NTC characteristic as a function of temperature
NTC
RT / R25 = f (T)