SIEMENS

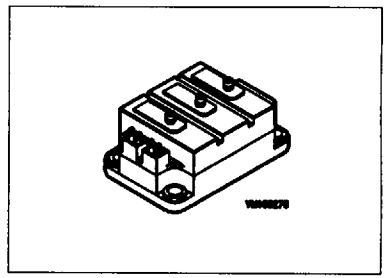
BSM 100 GB 160 D

IGBT Module®

100gb16a.doc

V_{CE}= 1600 V
I_C =2* 135 A at T_C =25°C
I_C = 2* 100 A at T_C =80°C

- Power module
- Half-bridge
- Including fast free-wheel diodes
- Package with insulated metal base plate



Half-bridge			
Type	**Ordering code**	**Type**	**Ordering code**
BSM 100 GB 160D	C67076-A2112-A2		

Maximum Ratings

Parameter		Symbol	Values	Unit
Collector emitter voltage		V_{CE}	1600	V
Collector gate voltage, R_{GE}=20kΩ		V_{CGR}	1600	
Gate-Emitter voltage		V_{GE}	±20	
Continuous collector current	T_C=25°C	I_C	135	A
	T_C=80°C		100	
Pulsed collector current	T_C=25°C	$I_{C\,puls}$	270	
	T_C=80°C		200	
Operating and storage temperature range		T_j, T_{stg}	-55...+150	°C
Power dissipation, T_C = 25°C		P_{tot}	1000	W
Thermal resistance, chip-case		R_{thJC}	≤0.13	K/W
Insulation test voltage[1], t=1min.		V_{is}	4000	V_{ac}
Creepage distance		-	20	mm
Clearance		-	11	
DIN humidity category, DIN 40 040		-	F	--
IEC climatic category, DIN IEC 68-1		-	55/150/56	

[1] Insulation test voltage between collector and metal base plate referred to standard climate 23/50 in acc.with DIN 50 014, IEC,para.492.1.

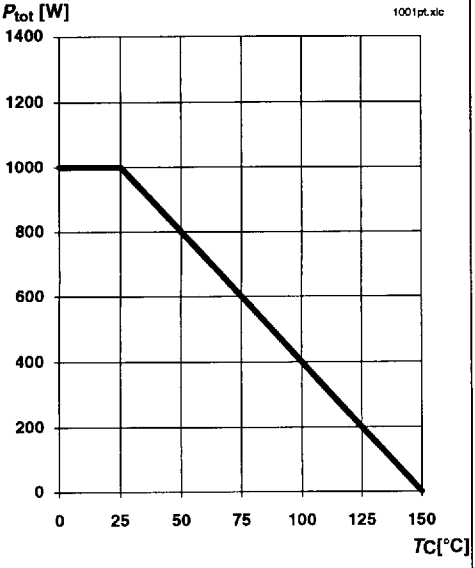
Electrical Characteristics

Parameter and conditions at T_j = 25 °C, unless otherwise specified	Symbol	Values			Unit
		min	typ	max	
Static Characteristics					
Collector-emitter breakdown voltage V_{GE} =0,I_C=2mA	$V_{(BR)CES}$	1600	-	-	V
Gate threshold voltage V_{GE}=V_{CE},I_C=8mA	$V_{GE(th)}$	4.8	5.5	6.2	
Collector-emitter saturation voltage V_{GE}=15V,I_C=100 A	$V_{CE(sat)}$				
T_j =25°C		--	3.5	--	
T_j =125°C		--	4.2	--	
T_j =150°C		--	4.4	--	
Zero gate voltage collector current V_{CE}=1600V,V_{GE}=0V	I_{CES}				µA
T_j =25°C		--	1000	--	
T_j =125°C		--	4500	--	
Gate-emitter leakage current V_{GE}=25V,V_{CE}=0V	I_{CES}	--	--	100	nA
AC Characteristics					
Forward transconductance V_{CE}=20V,I_C=100 A	g_{fs}	36	--	--	S
Input capacitance V_{CE}=25V,V_{GE}=0V,f=1MHz	C_{iss}	--	16	--	nF
Output capacitance V_{CE}=25V,V_{GE}=0V,f=1MHz	C_{oss}	--	1.3	--	
Reverse transfer capacitance V_{CE}=25V,V_{GE}=0V,f=1MHz	C_{rss}	--	0.5	--	

Parameter and conditions at T_j = 25 °C, unless otherwise specified	Symbol	Values			Unit
		min	typ	max	
Switching Characteristics, Inductive Load					
at T_J=125°C					
Turn on delay time V_{CC}=1200V,V_{GE}=+15V,I_C=100 A $R_{G(on)}$=33Ω	$t_{d(on)}$	--	0.85	--	µs
Rise time V_{CC}=1200V,V_{GE}=+15V,I_C=100 A $R_{G(on)}$=33Ω	t_r	--	0.3	--	µs
Turn off delay time V_{CC}=1200V,V_{GE}=-15V,I_C=100 A $R_{G(off)}$=3.3Ω	$t_{d(off)}$	--	2.5	--	µs
Fall time V_{CC}=1200V,V_{GE}=-15V,I_C=100 A $R_{G(off)}$=3.3Ω	t_f	--	0.15	--	µs
Free-Wheel Diode					
Diode forward voltage I_F=100 A,V_{GE}=0V T_j=25°C T_j=125°C	V_F	 --	 4.2	 --	V
		--	3.8	--	
Reverse recovery time I_F=100 A,V_R=-1200V V_{GE}=0V,di_F/dt=-1000A/µs T_j=125°C	t_{rr}	 --	 0.5	 --	µs
Reverse recovery Charge I_F=100 A,V_R=-1200V V_{GE}=0V,di_F/dt=-1000A/µs T_j=125°C	Q_{rr}	 --	 50	 --	µC
Thermal resistance Chip-Case	R_{thJC}	--	--	0.5	K/W

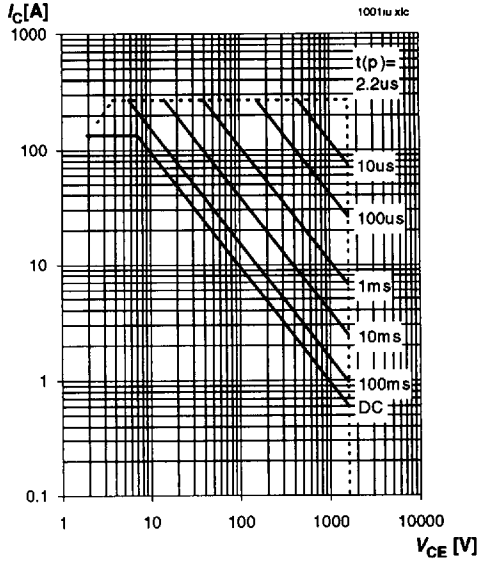
Power dissipation

$P_{tot} = f(T_C)$



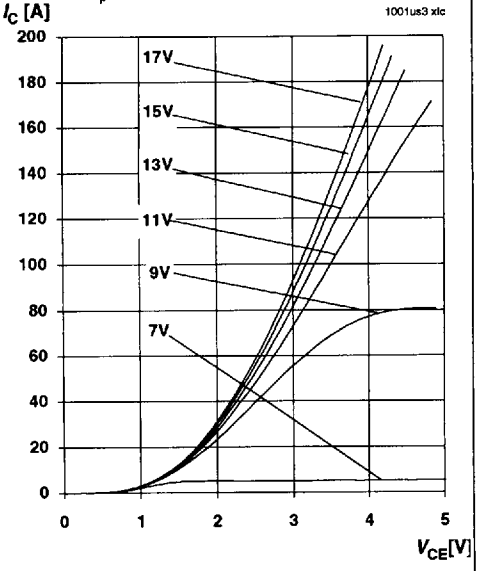
Safe operating area $I_C = f(V_{CE})$

parameter:single pulse, T_C=25°C, $T_J \leq 150°C$



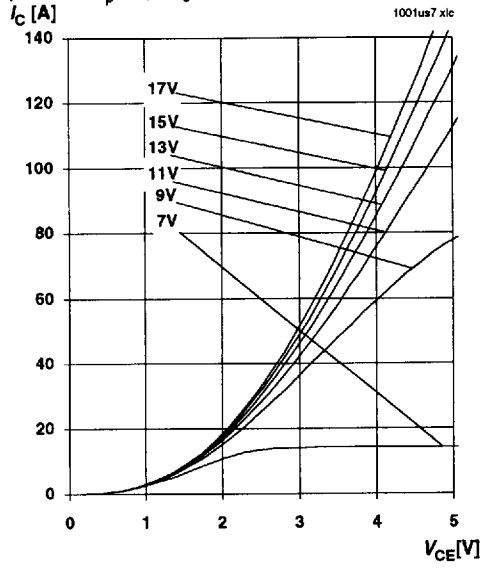
Typ output characteristics $I_C = f(V_{CE})$

parameter:t_p=80µs; T_J=25°C



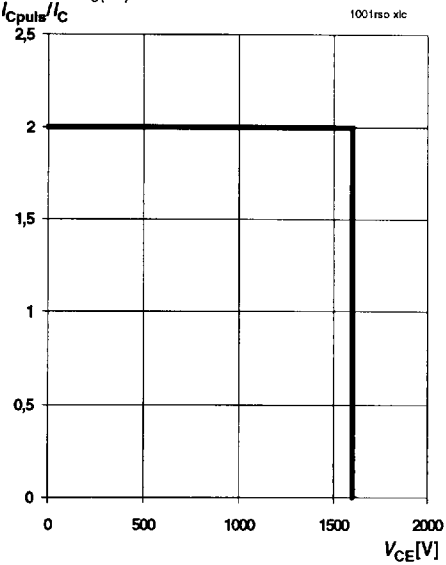
Typ output characteristics $I_C = f(V_{CE})$

parameter:t_p=80µs; T_J<125°C



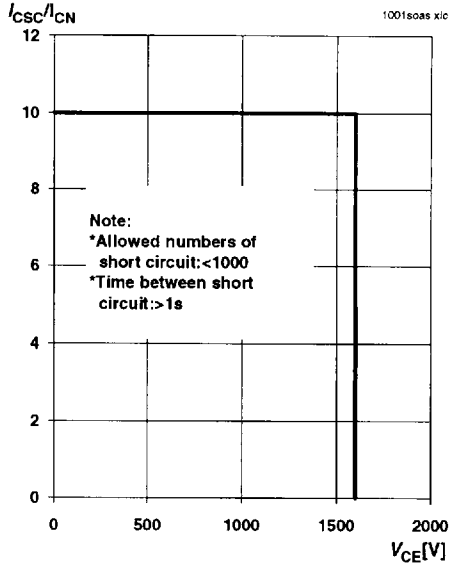
Reverse biased safe opererating area

$I_C=f(V_{CE})$,parameter: T_J=150°C
V_{GE}=15V, $R_{g(off)}$=3.3Ω



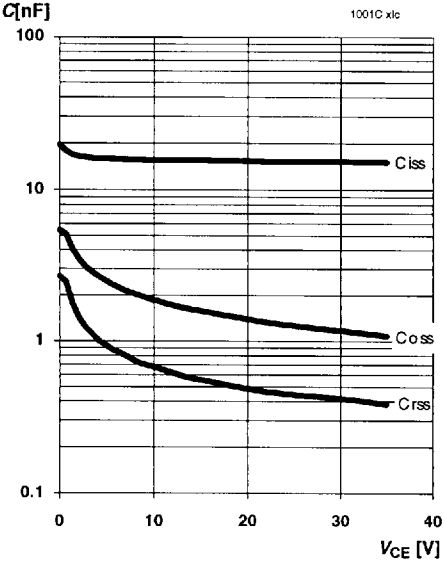
Safe operating area,SHORT CIRCUIT

$I_C=f(V_{CE})$, V_{GE}=±15V, T_J≤150°C
t_{sc}≤10µs, L<50nH



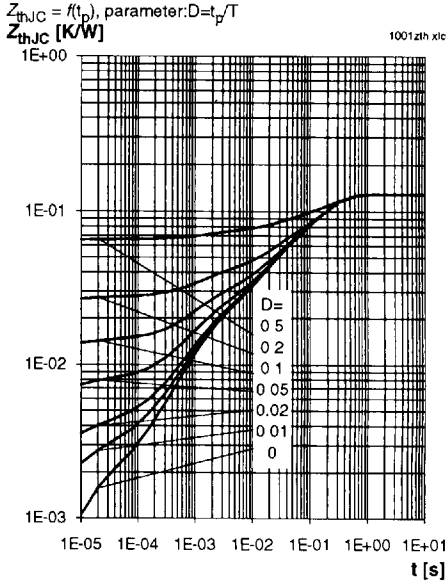
Typ. capacitances

Parameter. V_{GE}= 0, f=1 MHz

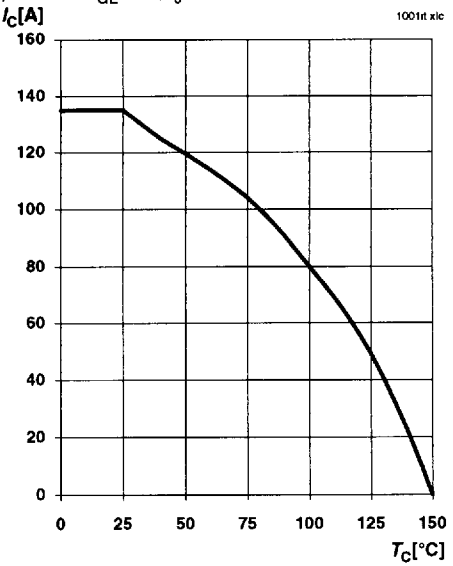


Transient thermal impedance

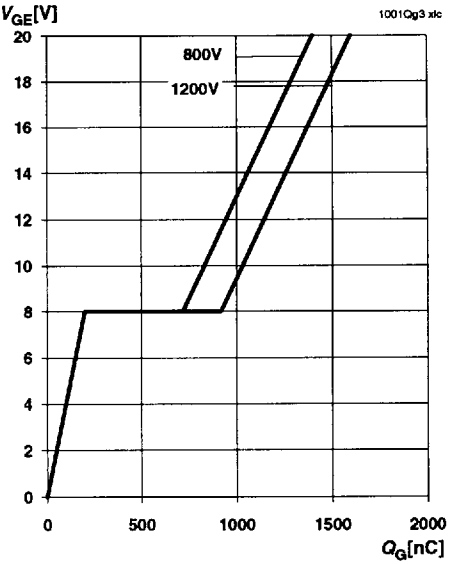
$Z_{thJC} = f(t_p)$, parameter:D=t_p/T



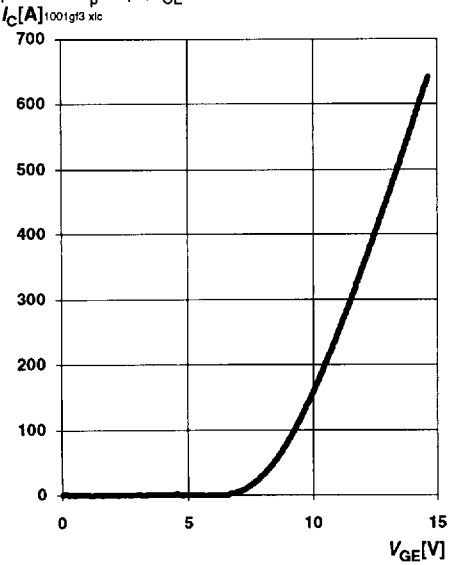
Collector current $I_C = f(T_C)$
parameter: $V_{GE} \geq 15V, T_J = 150°$



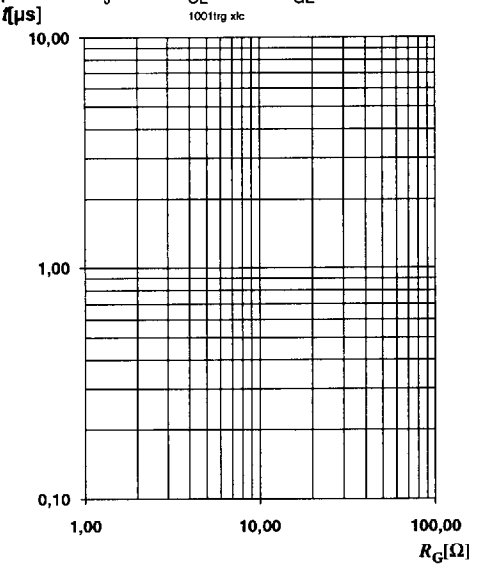
Typ. gate charge, $V_{GE} = f(Q_G)$



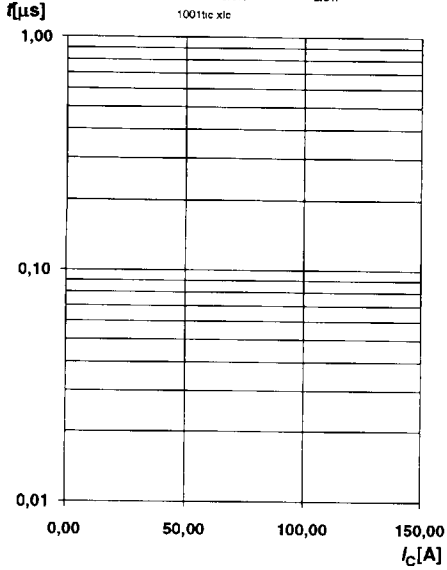
Typ. transfer characteristics $I_C = f(V_{GE})$
parameter: $t_p = 80\mu s, V_{CE} = 20V$



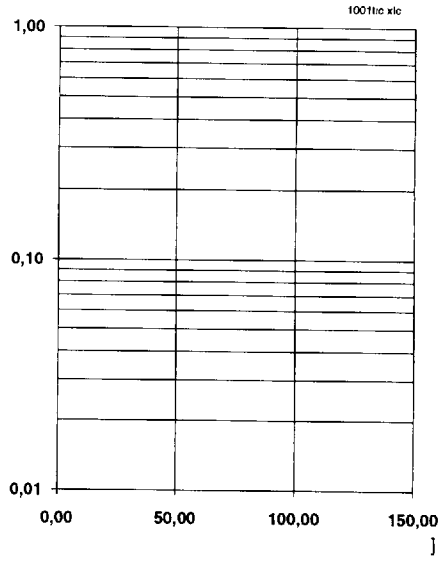
Typ. switching time $t = f(R_G)$ Inductive load
parameter: $T_J = 125°C$ $V_{CE} = 1200V$, $V_{GE} = \pm 15V$



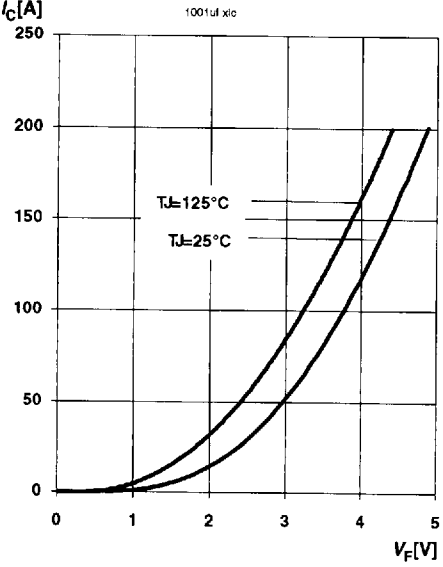
Typ.switching time $t=f(I_C)$
inductive load,parameter: $T_J=125°C$
$V_{CE}=1200V, V_{GE}=\pm15V, R_{Gon}=47\Omega, R_{Goff}=3\ 3\Omega$



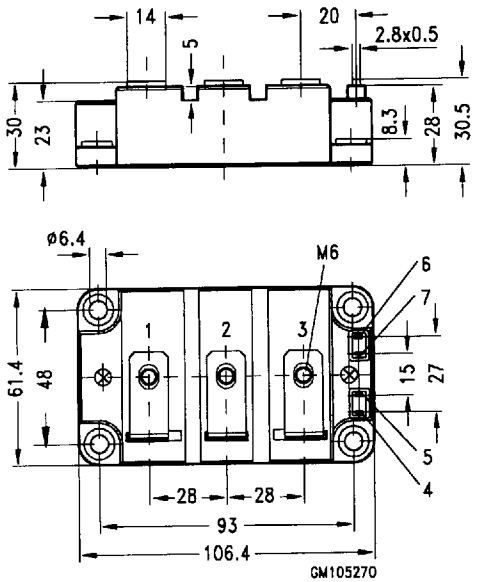
T.



Forward characteristics of fast recovery reverse diode
$I_F=f(V_F)$, **parameter:** T_J



Package Outlines and Configuration



Circuit