SIEMENS

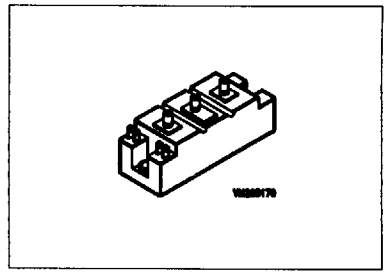
BSM 50 GB 160 D

IGBT Module®

500gb16a.doc

V_{CE}= 1600 V
I_C =2* 70 A at T_C =25°C
I_C = 2* 50 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 50 GB 160D	C67076-A2111-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	70	A
	T_C=80°C		50	
Pulsed collector current	T_C=25°C	$I_{C\ puls}$	140	
	T_C=80°C		100	
Operating and storage temperature range		T_j, T_{stg}	-55...+150	°C
Power dissipation, T_C = 25°C		P_{tot}	500	W
Thermal resistance, chip-case		R_{thJC}	≤0.25	K/W
Insulation test voltage[1], t=1min.		V_{is}	4000	Vac
Creepage distance		-	16	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

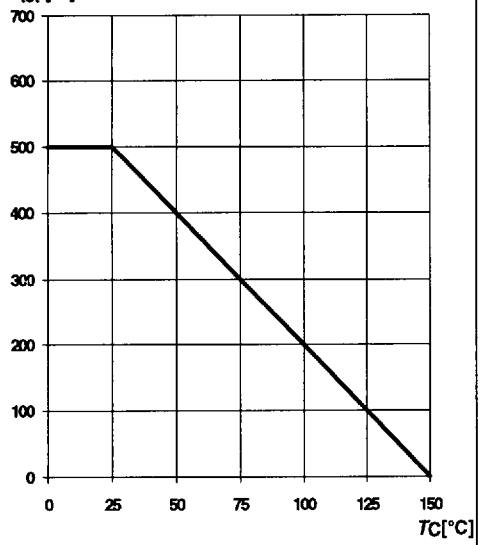
Parameter and conditions at T_j = 25 °C, unless otherwise specified	Symbol	Values			Unit
		min	typ	max	
Static Characteristics					
Collector-emitter breakdown voltage V_{GE} =0,I_C=1mA	$V_{(BR)CES}$	1600	-	-	V
Gate threshold voltage V_{GE}=V_{CE},I_C=4mA	$V_{GE(th)}$	4.8	5.5	6.2	
Collector-emitter saturation voltage V_{GE}=15V,I_C=50 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		--	500	--	
T_j =125°C		--	4500	--	
Gate-emitter leakage current V_{GE}=25V,V_{CE}=0V	I_{GES}	--	--	100	nA
AC Characteristics					
Forward transconductance V_{CE}=20V,I_C=50 A	g_{fs}	18	--	--	S
Input capacitance V_{CE}=25V,V_{GE}=0V,f=1MHz	C_{iss}	--	8	--	nF
Output capacitance V_{CE}=25V,V_{GE}=0V,f=1MHz	C_{oss}	--	0.64	--	
Reverse transfer capacitance V_{CE}=25V,V_{GE}=0V,f=1MHz	C_{rss}	--	0.25	--	

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=50 A $R_{G(on)}$=47Ω	$t_{d(on)}$	--	0.35	--	µs
Rise time V_{CC}=1200V,V_{GE}=+15V,I_C=50 A $R_{G(on)}$=47Ω	t_r	--	0.15	--	µs
Turn off delay time V_{CC}=1200V,V_{GE}=-15V,I_C=50 A $R_{G(off)}$=3.3Ω	$t_{d(off)}$	--	0.6	--	µs
Fall time V_{CC}=1200V,V_{GE}=-15V,I_C=50 A $R_{G(off)}$=3.3Ω	t_f	--	0.05	--	µs
Free-Wheel Diode					
Diode forward voltage I_F=50 A,V_{GE}=0V T_j=25°C T_j=125°C	V_F	 -- --	 4.2 3.8	 -- --	V
Reverse recovery time I_F=50 A,V_R=-1200V V_{GE}=0V,di_F/dt=-500A/µs T_j=125°C	t_{rr}	 --	 0.5	 --	µs
Reverse recovery Charge I_F=50 A,V_R=-1200V V_{GE}=0V,di_F/dt=-500A/µs T_j=125°C	Q_{rr}	 --	 25	 --	µC
Thermal resistance Chip-Case	R_{thJC}	--	--	0.9	K/W

Power dissipation

$P_{tot} = f(T_C)$

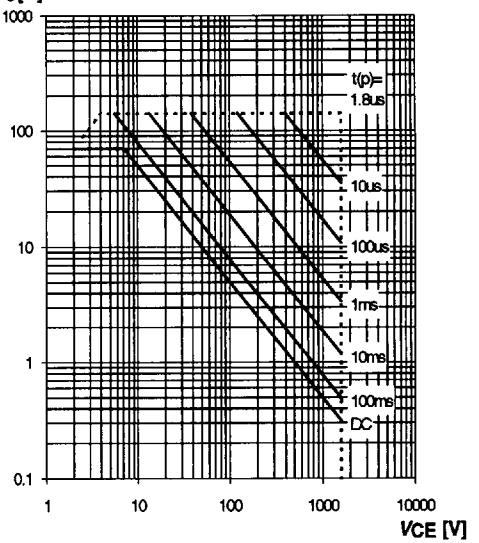
P_{tot} [W]



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

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

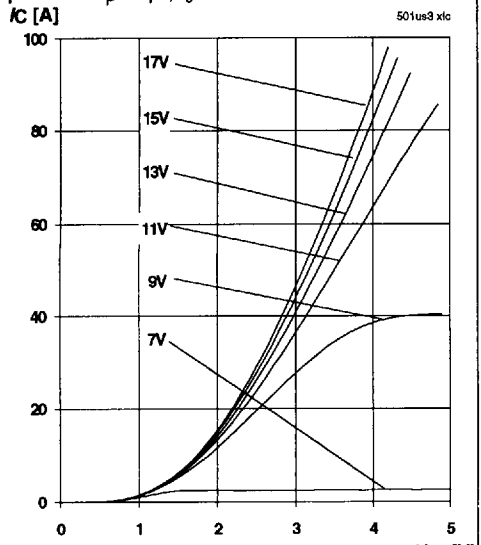
I_C[A]



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

parameter:tp=80µs; T_J=25°C

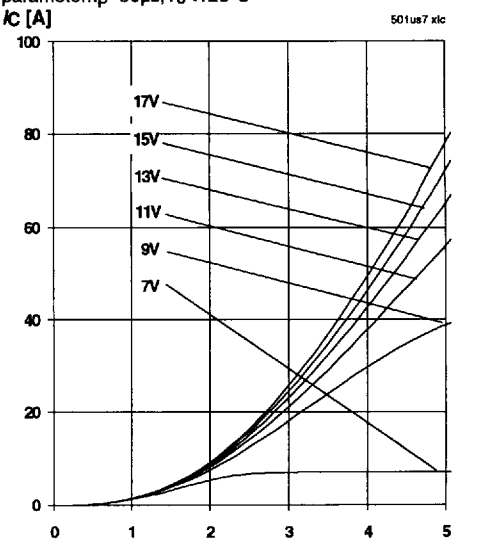
I_C [A]



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

parameter:tp=80µs; T_J<125°C

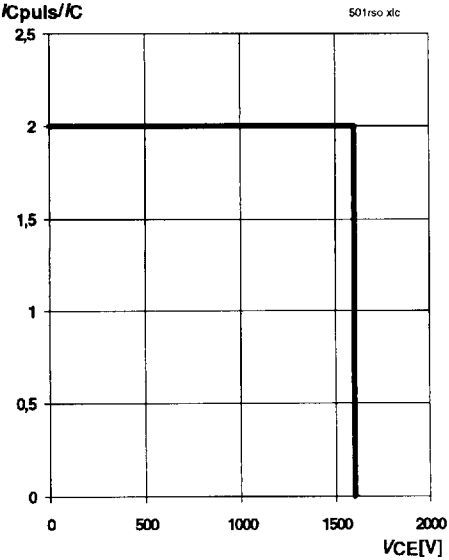
I_C [A]



Reverse biased safe opererating area

$I_C = f(V_{CE})$, parameter: $T_J = 150°C$

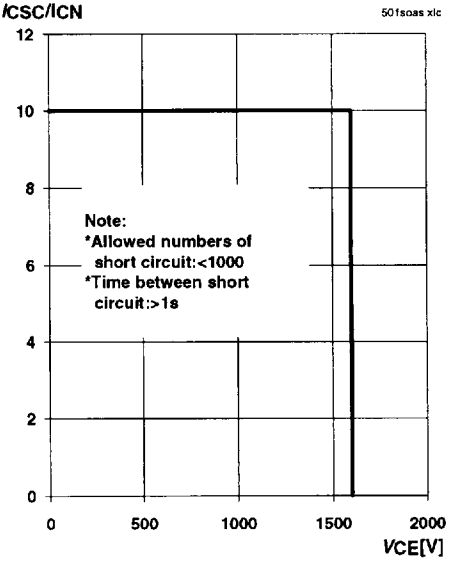
$V_{GE} = 15V$, $R_g(off) = 3.3\Omega$



Safe operating area,SHORT CIRCUIT

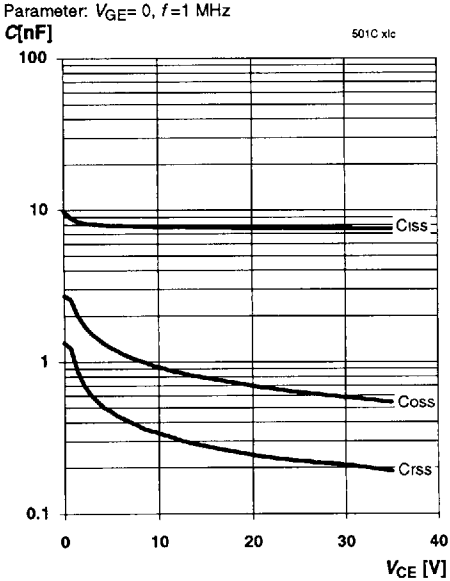
$I_C = f(V_{CE})$, $V_{GE} = \pm 15V$, $T_J \leq 150°C$

$t_{SC} \leq 10\mu s$, $L < 50nH$



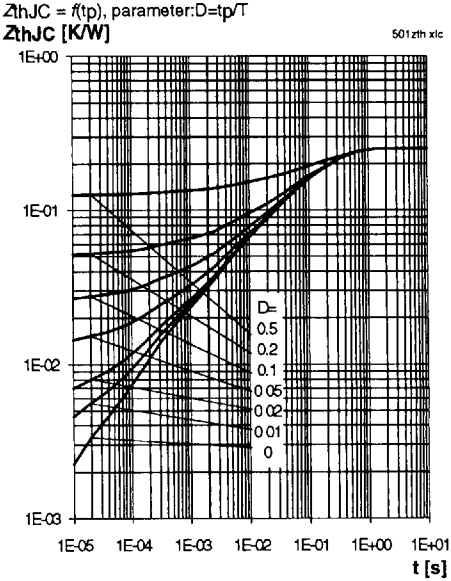
Typ. capacitances

Parameter: $V_{GE} = 0$, $f = 1$ MHz

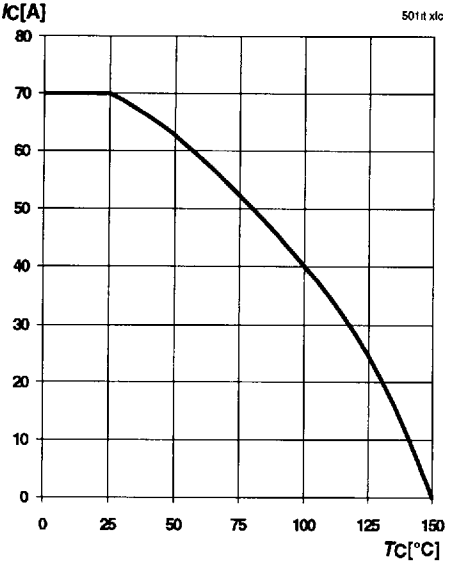


Transient thermal impedance

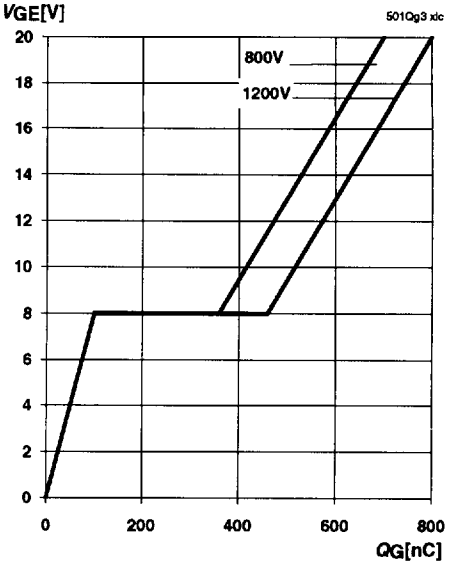
$Z_{thJC} = f(t_p)$, parameter: $D = t_p/T$



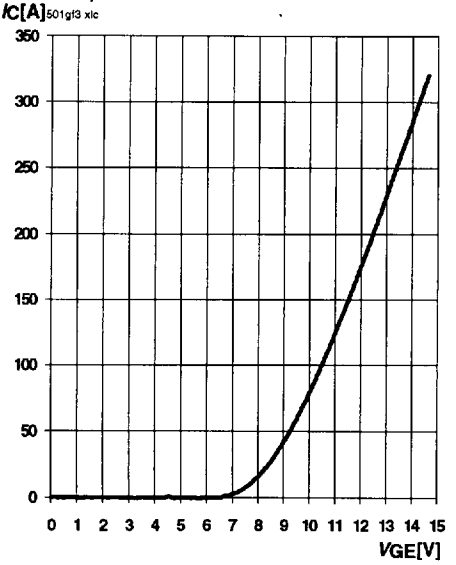
Collector current $I_C = f(T_C)$
parameter: $V_{GE} \geq 15V$, $T_J = 150°$



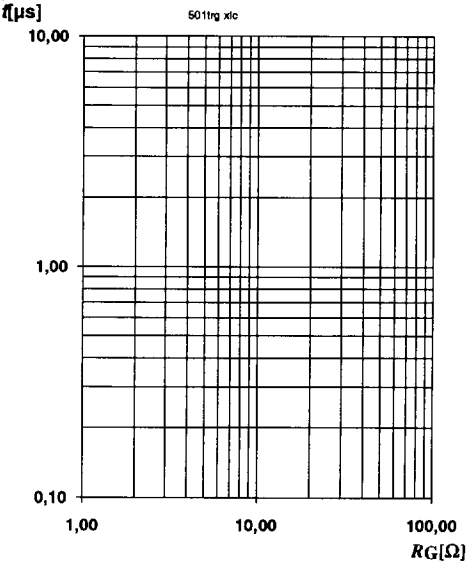
Typ. gate charge , $V_{GE}(Q_G)$



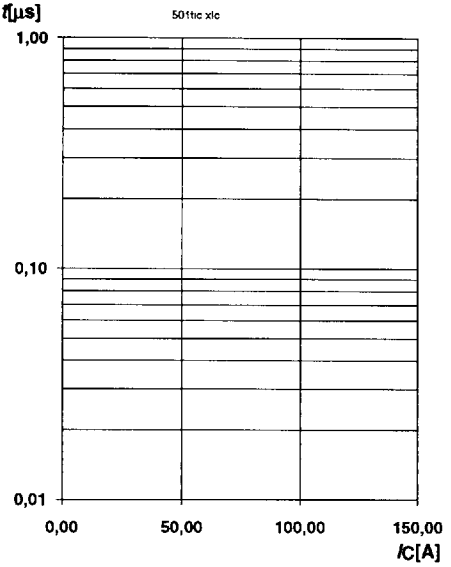
Typ. transfer characteristics $I_C = f(V_{GE})$
parameter: tp=80µs, VCE=20V



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



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



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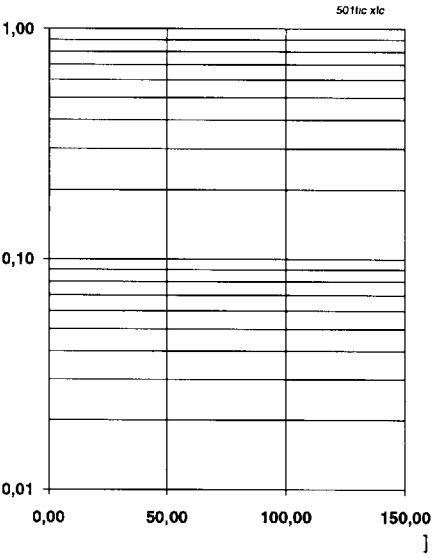
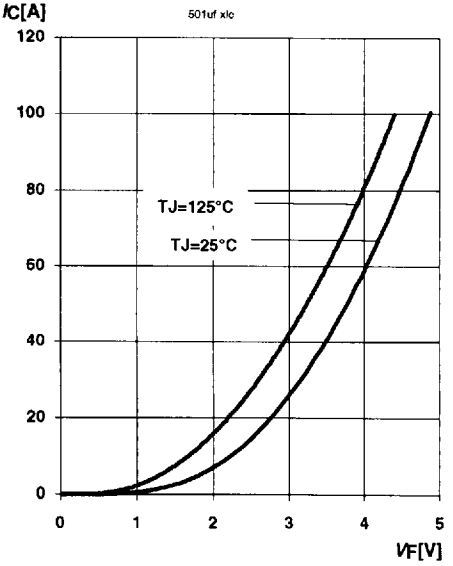
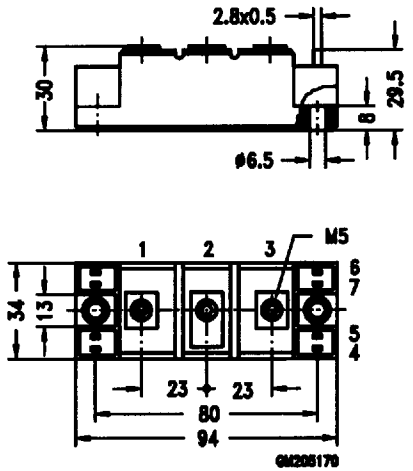


Forward characteristics of fast recovery reverse diode
$I_F=f(V_F)$, parameter: T_J



Package Outlines and Configuration



Circuit