SIEMENS

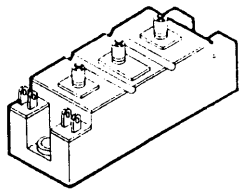
877-311

IGBT Module
Preliminary Data

BSM 75 GB 100 D
BSM 75 GAL 100 D

V_{CE} = **1000 V**
I_C = **2 × 75 A / 1 × 75 A**

- Power module
- Half-bridge / Chopper
- Including fast free-wheel diodes
- Package with insulated metal base plate
- Package outline / Circuit diagram: 2b, 2c[1)]



VM205170

Half-bridge		Chopper	
Type	**Ordering Code**	**Type**	**Ordering Code**
BSM 75 GB 100 D	C67076-A2104-A2	BSM 75 GAL 100 D	C67076-A2003-A2

Maximum Ratings

Parameter	Symbol	Values	Unit
Collector-emitter voltage	V_{CE}	1000	V
Collector-gate voltage, R_{GE} = 20 kΩ	V_{CGR}	1000	
Gate-emitter voltage	V_{GE}	± 20	
Continuous collector current, T_C = 80 °C	I_C	75	A
Pulsed collector current, T_C = 80 °C	$I_{C\,puls}$	150	
Operating and storage temperature range	T_j T_{stg}	– 55 ... + 150	°C
Power dissipation, T_C = 25 °C	P_{tot}	625	W
Thermal resistance Chip - case	$R_{th\,JC}$	≤ 0.2	K/W
Insulation test voltage[2)], t = 1 min.	V_{is}	2500	V_{ac}
Creepage distance	–	16	mm
Clearance	–	11	
DIN humidity category, DIN 40 040	–	F	–
IEC climatic category, DIN IEC 68-1	–	55/150/56	

1) See chapter Package Outlines and Circuit Diagrams
2) Insulation test voltage between collector and base plate referred to standard climate 23/50 in acc. with DIN 50 014, IEC 146, para. 492.1.

Electrical Characteristics

at T_j = 25 °C, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static characteristics					
Collector-emitter breakdown voltage V_{GE} = 0, I_C = 1.4 mA	$V_{(BR)CES}$	1000	–	–	V
Gate threshold voltage V_{GE} = V_{CE}, I_C = 5 mA	$V_{GE(th)}$	4.5	5.5	6.5	
Collector-emitter saturation voltage V_{GE} = 15 V, I_C = 75 A T_j = 25 °C T_j = 150 °C	$V_{CE(sat)}$	 – –	 2.8 4.0	 3.3 4.5	
Zero gate voltage collector current V_{CE} = 1000 V, V_{GE} = 0 T_j = 25 °C T_j = 125 °C	I_{CES}	 – –	 – –	 1400 –	µA
Gate-emitter leakage current V_{GE} = 20 V, V_{CE} = 0	I_{GES}	–	–	100	nA
AC characteristics					
Forward transconductance V_{CE} = 20 V, I_C = 75 A	g_{fs}	27	40	–	S
Input capacitance V_{CE} = 25 V, V_{GE} = 0, f = 1 MHz	C_{iss}	–	11000	14600	pF
Output capacitance, V_{GS} = 0, V_{CE} = 25 V, V_{GE} = 0, f = 1 MHz	C_{oss}	–	850	–	
Reverse transfer capacitance V_{CE} = 25 V, V_{GE} = 0, f = 1 MHz	C_{rss}	–	350	–	

Switching Characteristics

at T_j = 125 °C

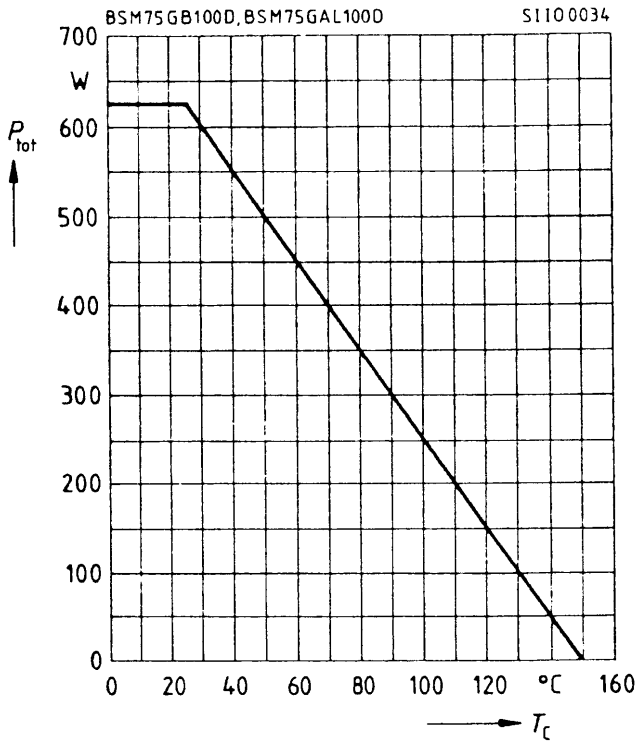
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Resistive load					
Turn-on delay time V_{CC} = 600 V, V_{GE} = 15 V, I_C = 75 A $R_{g\,(on)}$ = 3.3 Ω, $R_{g\,(off)}$ = 3.3 Ω	$t_{d\,(on)}$	–	130	–	ns
Rise time V_{CC} = 600 V, V_{GE} = 15 V, I_C = 75 A $R_{g\,(on)}$ = 3.3 Ω, $R_{g\,(off)}$ = 3.3 Ω	t_r	–	400	–	
Turn-off delay time V_{CC} = 600 V, V_{GE} = 15 V, I_C = 75 A $R_{g\,(on)}$ = 3.3 Ω, $R_{g\,(off)}$ = 3.3 Ω	$t_{d\,(off)}$	–	300	–	
Fall time V_{CC} = 600 V, V_{GE} = 15 V, I_C = 75 A $R_{g\,(on)}$ = 3.3 Ω, $R_{g\,(off)}$ = 3.3 Ω	t_f	–	400	–	
Inductive load					
Turn-off delay time V_{CC} = 600 V, V_{GE} = 15 V, I_C = 75 A $R_{g\,(on)}$ = 3.3 Ω, $R_{g\,(off)}$ = 3.3 Ω	$t_{d\,(off)}$	–	300	–	ns
Fall time V_{CC} = 600 V, V_{GE} = 15 V, I_C = 75 A $R_{g\,(on)}$ = 3.3 Ω, $R_{g\,(off)}$ = 3.3 Ω	t_f	–	200	–	
Turn-off loss ($E_{off} = E_{off\,1} + E_{off\,2}$) V_{CC} = 600 V, V_{GE} = 15 V, I_C = 75 A $R_{g\,(on)}$ = 3.3 Ω, $R_{g\,(off)}$ = 3.3 Ω	$E_{off\,1}$ $E_{off\,2}$	– –	4.5 3.5	– –	mWs

Electrical Characteristics (continued)
at T_j = 25 °C, unless otherwise specified.

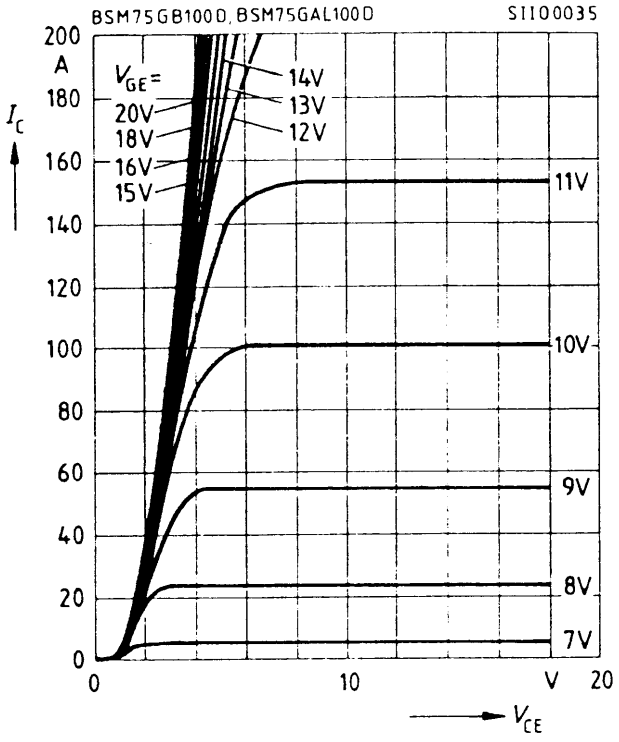
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Free-wheel diode					
Diode forward voltage I_F = 75 A, V_{GE} = 0 T_j = 25 °C T_j = 125 °C	V_F	 – –	 1.8 1.6	 2.5 –	V
Reverse recovery time I_F = 75 A, V_R = 600 V V_{GE} = 0, di_F/dt = – 800 A/µs T_j = 125 °C	t_{rr}	 –	 0.25	 –	µs
Reverse recovery charge I_F = 75 A, V_R = 600 V V_{GE} = 0, di_F/dt = – 800 A/µs T_j = 25 °C T_j = 125 °C	Q_{rr}	 – –	 3 13.5	 – –	µC
Soft factor I_F = 75 A, V_R = 600 V V_{GE} = 0, di_F/dt = – 800 A/µs T_j = 125 °C	S	 –	 1	 –	–
Thermal resistance Chip - case	R_{thJC}	 –	 –	 0.75	K/W

Characteristics at T_j = 25 °C, unless otherwise specified.

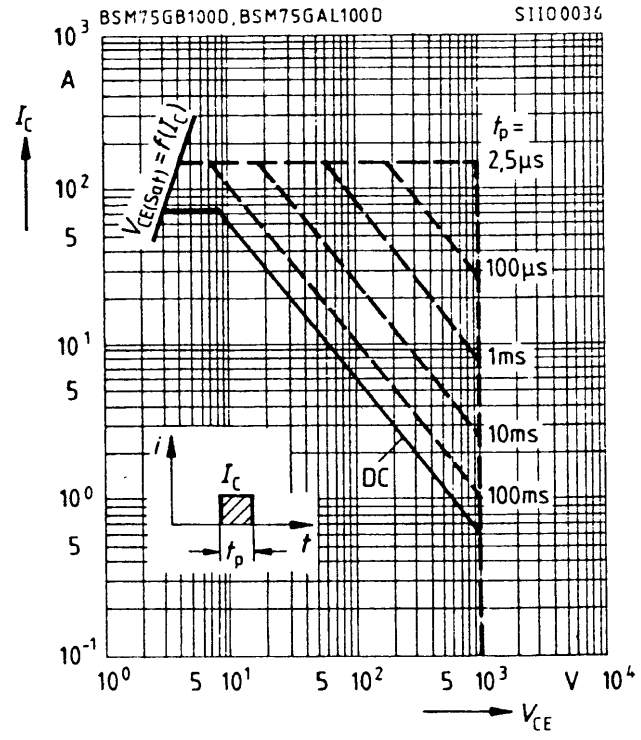
Power dissipation $P_{tot} = f(T_C)$
parameter: T_j = 150 °C



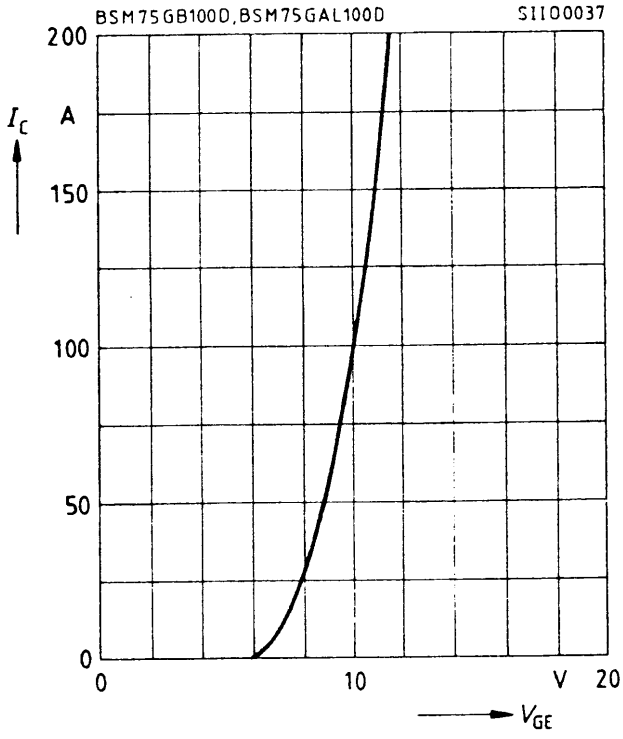
Typ. output characteristics $I_C = f(V_{CE})$
parameter: t_p = 80 µs



Safe operating area $I_C = f(V_{CE})$
parameter: single pulse, T_C = 25 °C
$T_j \leq$ 150 °C

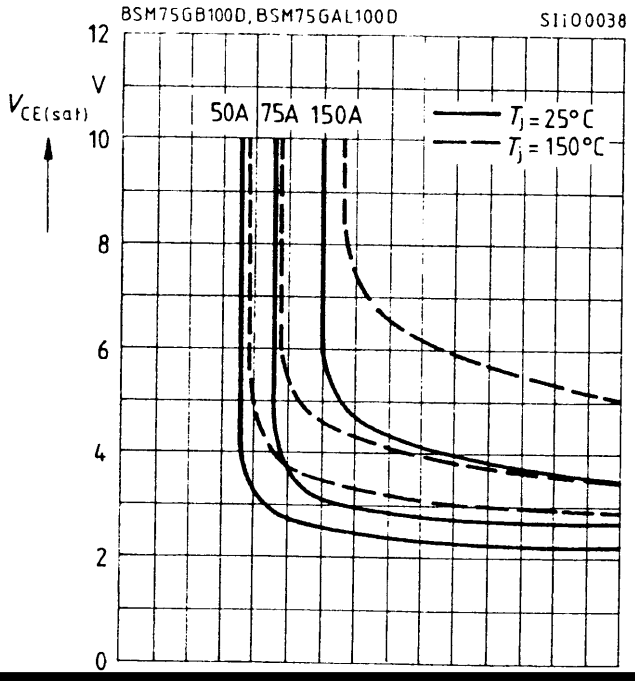


Typ. transfer characteristics $I_C = f(V_{GE})$
parameter: t_p = 80 µs, V_{CE} = 20 V



Typ. on-state characteristics

$V_{CE\,(sat)} = f\,(V_{GE})$, parameter: I_C, T_j



Collector current $I_C = f\,(T_C)$

parameter: $V_{GE} \geq 15$ V, $T_j = 150$ °C