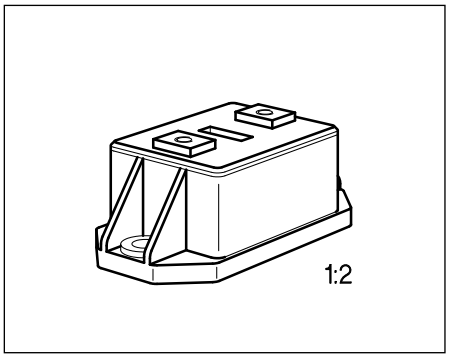
SIEMENS

SIMOPAC® Module — BSM 101 AR

V_{DS} = 50 V
I_D = 200 A
$R_{DS(on)}$ = 3.0 mΩ

- Power module
- Single switch
- N channel
- Enhancement mode
- Package with insulated metal base plate
- Package outline/Circuit diagram: 1[1)]



Type	Ordering Code
BSM 101 AR	C67076-S1018-A2

Maximum Ratings

Parameter	Symbol	Values	Unit
Drain-source voltage	V_{DS}	50	V
Drain-gate voltage, R_{GS} = 20 kΩ	V_{DGR}	50	
Gate-source voltage	V_{GS}	± 20	
Continuous drain current, T_C = 105 ˚C	I_D	200	A
Pulsed drain current, T_C = 105 ˚C	$I_{D\ puls}$	600	
Operating and storage temperature range	T_j, T_{stg}	– 55 … + 150	˚C
Power dissipation, T_C = 25 ˚C	P_{tot}	700	W
Thermal resistance, chip-case	R_{thJC}	≤ 0.18	K/W
Insulation test voltage[2)], t = 1 min.	V_{is}	2500	V_{ac}
Creepage distance, drain-source	–	16	mm
Clearance, drain-source	–	11	
DIN humidity category, DIN 40 040	–	F	–
IEC climatic category, DIN IEC 68-1	–	55/150/56	

1) See chapter Package Outline and Circuit Diagrams.
2) Insulation test voltage between drain 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.

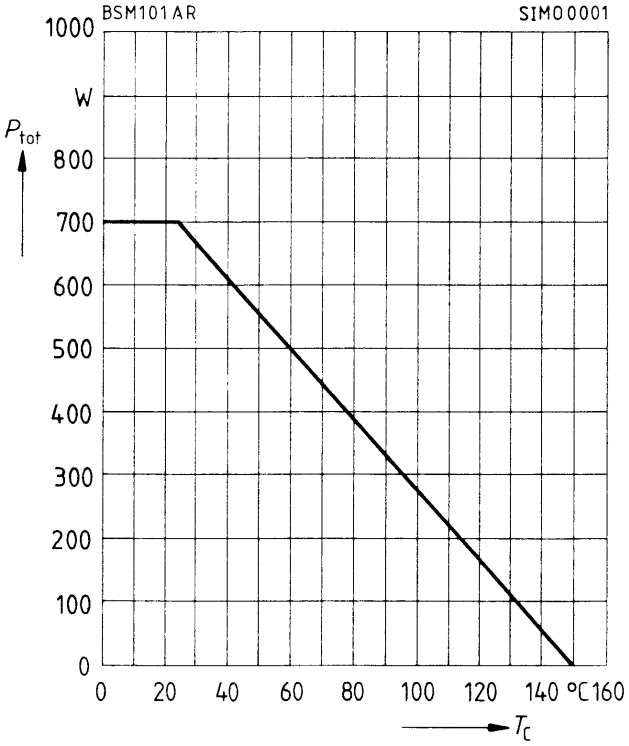
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Drain-source breakdown voltage V_{GS} = 0, I_D = 0.25 mA	$V_{(BR)DSS}$	50	–	–	V
Gate threshold voltage V_{GS} = V_{DS}, I_D = 1 mA	$V_{GS(th)}$	2.1	3.0	4.0	
Zero gate voltage drain current V_{DS} = 50 V, V_{GS} = 0 T_j = 25 ˚C T_j = 125 ˚C	I_{DSS}	 – –	 50 300	 250 1000	µA
Gate-source leakage current V_{GS} = 20 V, V_{DS} = 0	I_{GSS}	–	10	100	nA
Drain-source on-state resistance V_{GS} = 10 V, I_D = 200 A	$R_{DS(on)}$	–	2.6	3.0	mΩ
Dynamic Characteristics					
Forward transconductance $V_{DS} \geq 2 \times I_D \times R_{DS(on)\ max.}$, I_D = 200 A	g_{fs}	156	200	–	S
Input capacitance V_{GS} = 0, V_{DS} = 25 V, f = 1 MHz	C_{iss}	–	18	24	nF
Output capacitance V_{GS} = 0, V_{DS} = 25 V, f = 1 MHz	C_{oss}	–	9	12	
Reverse transfer capacitance V_{GS} = 0, V_{DS} = 25 V, f = 1 MHz	C_{rss}	–	3	4	
Turn-on Time t_{on} (t_{on} = $t_{d\ (on)}$ + t_r) V_{CC} = 40 V, V_{GS} = 10 V I_D = 200 A, R_G = 3.3 Ω	$t_{d\ (on)}$	–	280	–	ns
	t_r	–	220	–	
Turn-off Time t_{off} (t_{off} = $t_{d\ (off)}$ + t_f) V_{CC} = 40 V, V_{GS} = 10 V I_D = 200 A, R_G = 3.3 Ω	$t_{d\ (off)}$	–	220	–	
	t_f	–	60	–	

Electrical Characteristics (cont'd)
at T_j = 25 ˚C, unless otherwise specified.

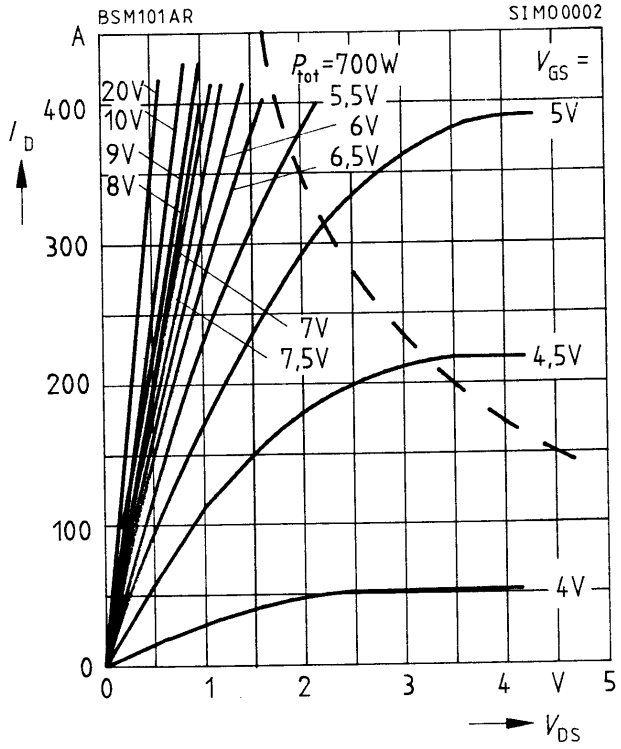
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Reverse diode					
Continuous reverse drain current T_C = 25 ˚C	I_S	–	–	200	A
Pulsed reverse drain current T_C = 25 ˚C	I_{SM}	–	–	600	
Diode forward on-voltage I_F = 400 A , V_{GS} = 0	V_{SD}		1.25	1.6	V
Reverse recovery time $I_F = I_S$, di_F/dt = 100 A/µs, V_R = 30 V	t_{rr}		400	–	ns
Reverse recovery charge $I_F = I_S$, di_F/dt = 100 A/µs, V_R = 30 V	Q_{rr}		3.5		µC

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

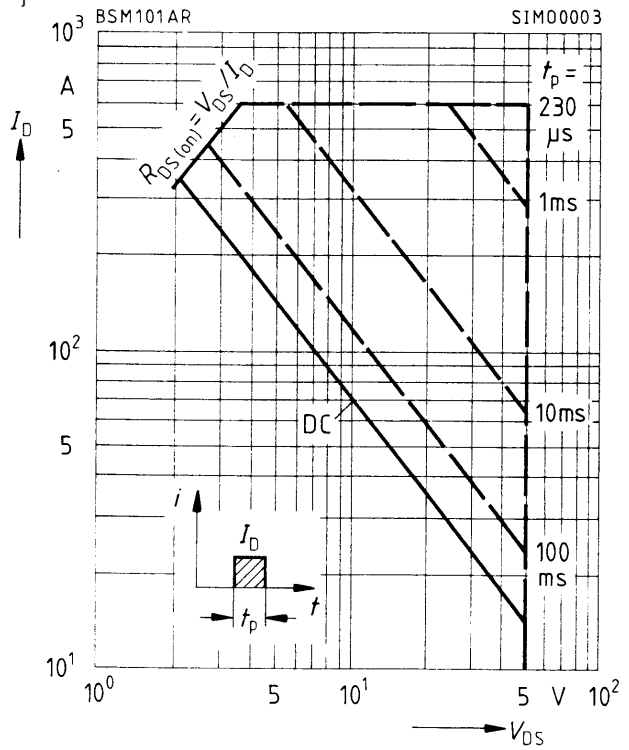
Power dissipation $P_{tot} = f(T_C)$
parameter: T_j = 150 °C



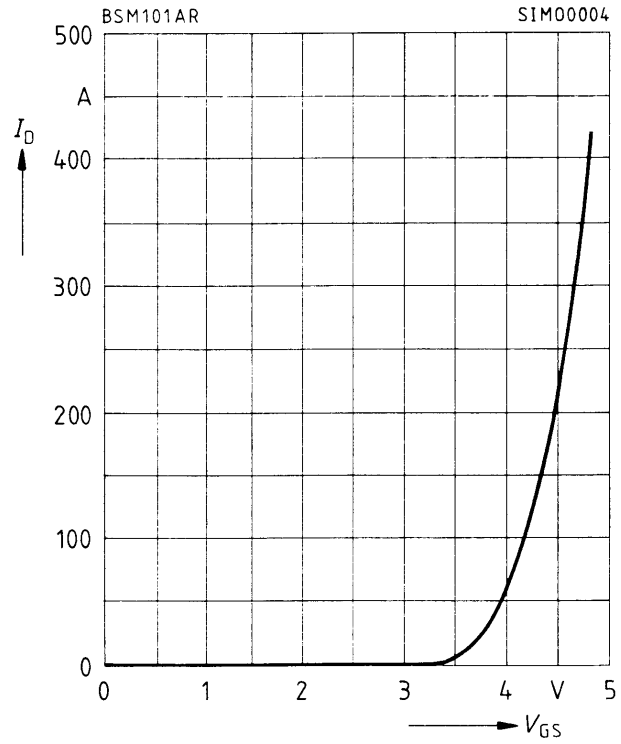
Typ. output characteristics $I_D = f(V_{DS})$
parameter: = 80 µs pulse test



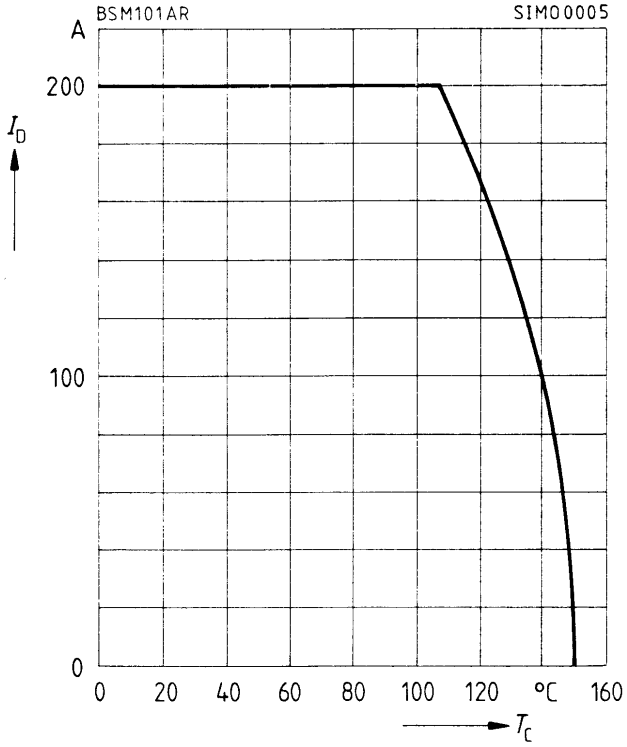
Safe operating area $I_D = f(V_{DS})$
parameter: single pulse, T_C = 25 °C,
$T_j \leq 150$ °C



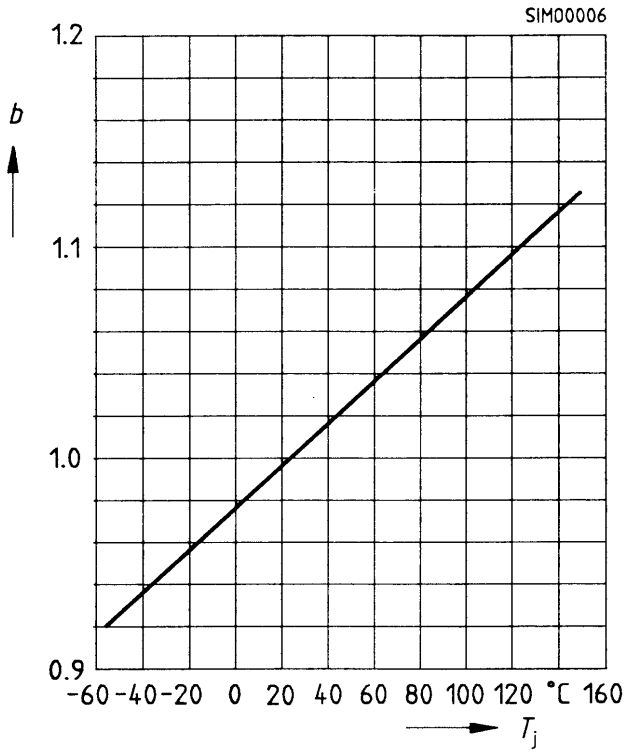
Typ. transfer characteristic $I_D = f(V_{GS})$
parameter: = 80 µs pulse test, V_{DS} = 25 V



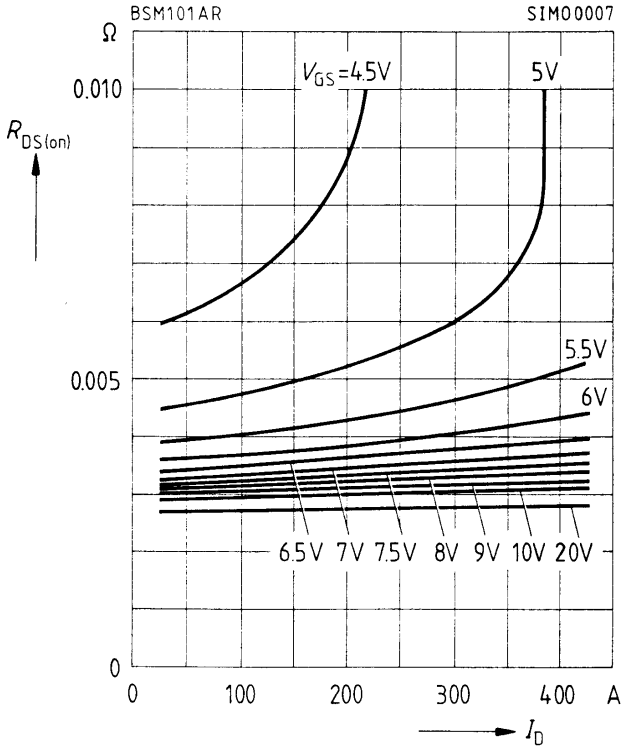
Continuous drain-source current
$I_D = f(T_C)$
parameter: $V_{GS} \geq 10$ V, $T_j = 150$ ℃



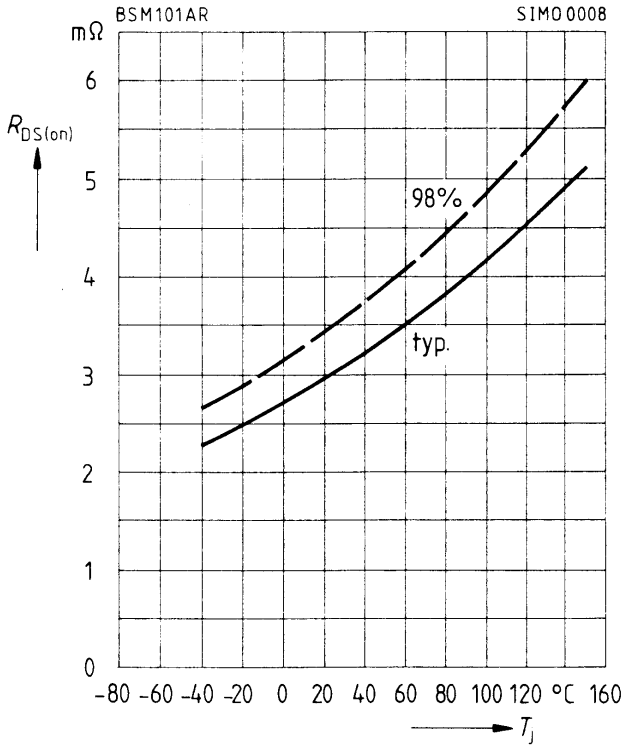
Drain-source breakdown voltage
$V_{(BR)DSS} = b \times V_{(BR)DSS}$ **(25 ℃)**



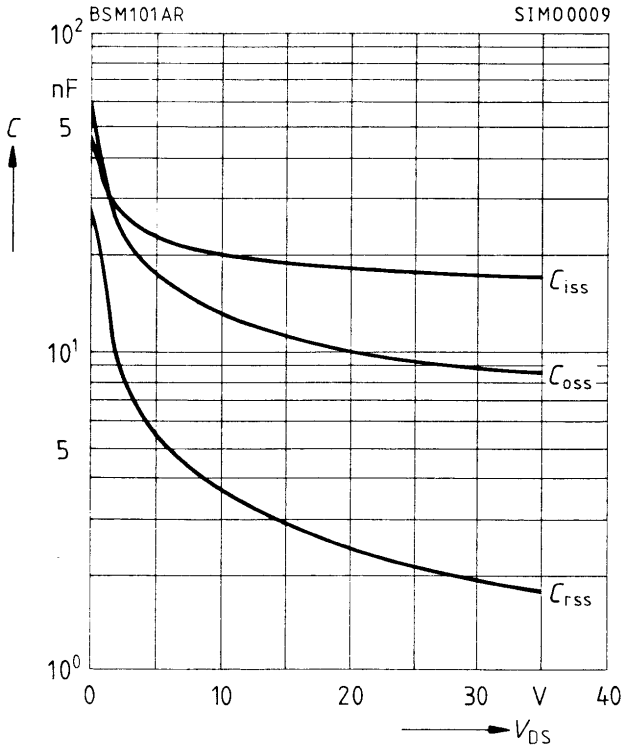
Drain source on-state resistance
$R_{DS(on)} = f(I_D)$
parameter: V_{GS}



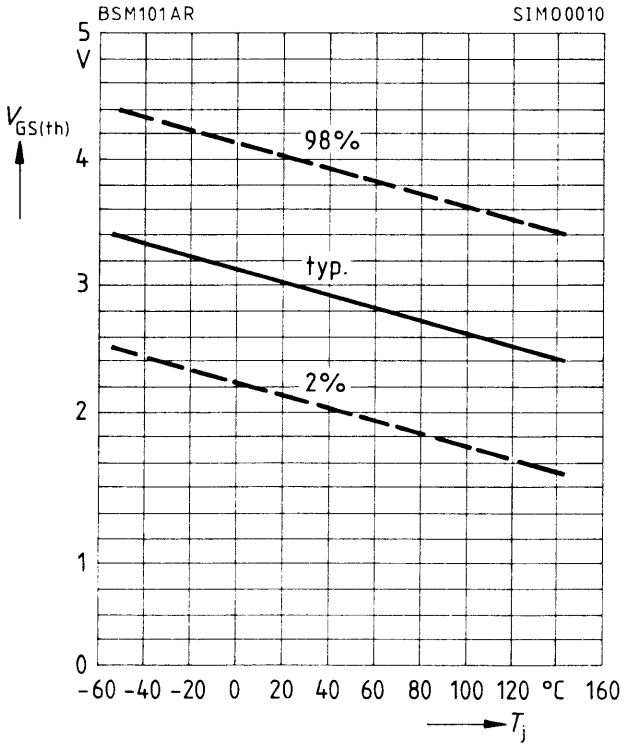
Drain source on-state resistance
$R_{DS\,(on)} = f(T_j)$
parameter: I_D = 200 A; V_{GS} = 10 V



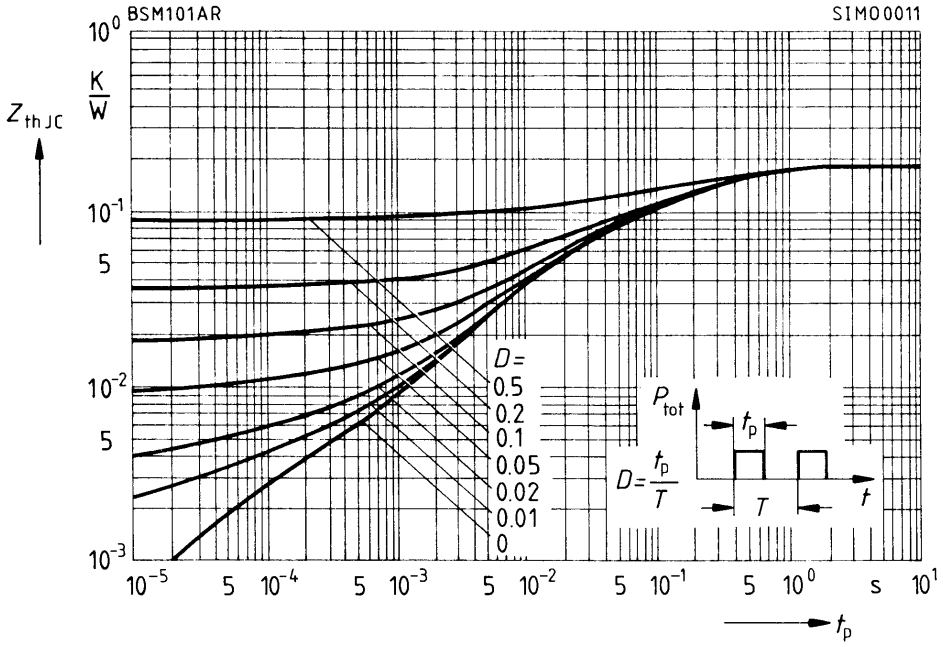
Typ. capacitances $C = f(V_{DS})$
parameter: V_{GS} = 0, f = 1 MHz



Gate threshold voltage $V_{GS(th)} = f(T_j)$
parameter: $V_{DS} = V_{GS}$, I_D = 1 mA
(spread)



Transient thermal impedance $Z_{thJC} = f(t_p)$
parameter: $D = t_p/T$



Typ. gate charge $V_{GS} = f(Q_{Gate})$
parameter: I_{Dpuls} = 330 A