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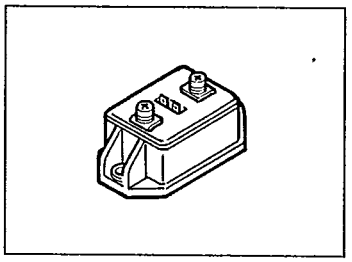
SIMOPAC® MOSFET Module

BSM 121 AR (C)

V_{DS} = 200 V
I_D = 130 A
$R_{DS(on)}$ = 20 mΩ



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

Type	Ordering code
BSM 121 AR (C)	C67076-S1014-A2

Maximum Ratings

Parameter	Symbol	Values	Unit
Drain-source voltage	V_{DS}	200	V
Drain-gate voltage, R_{GS} = 20 kΩ	V_{DGR}	200	
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current, T_C = 25 °C	I_D	130	A
Pulsed drain current, T_C = 25 °C	I_{Dpuls}	390	
Operating and storage temperature range	T_j T_{stg}	 – 55 ... + 150	°C
Total power dissipation, T_C = 25 °C	P_{tot}	700	W
Thermal resistance Chip - case Case - heat sink	 $R_{th\ JC}$ $R_{th\ CH}$	 ≤ 0.18 ≤ 0.05	K/W
Isolation 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 Outlines.
[2]) Isolation 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.

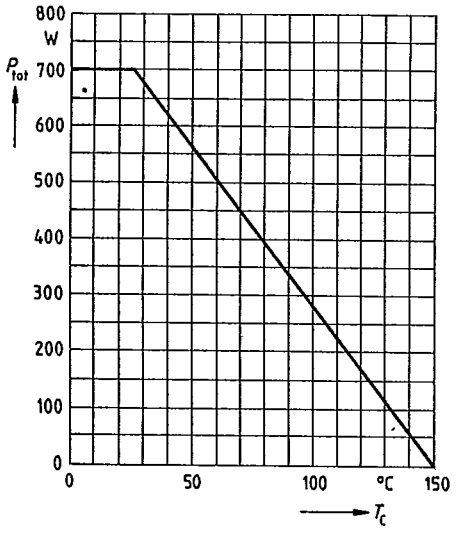
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static characteristics					
Drain-source breakdown voltage $V_{GS} = 0$, $I_D = 0.25$ mA	$V_{(BR)DSS}$	200	–	–	V
Gate threshold voltage $V_{DS} = V_{GS}$, $I_D = 1$ mA	$V_{GS(th)}$	2.1	3.0	4.0	
Zero gate voltage drain current $V_{DS} = 200$ V, $V_{GS} = 0$ $T_j = 25$ °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, $I_D = 80$ A	$R_{DS(on)}$	–	18	20	mΩ
Dynamic characteristics					
Forward transconductance $V_{DS} \geq 2 \times I_D \times R_{DS(on)max.}$, $I_D = 80$ A	g_{fs}	60	75	–	S
Input capacitance $V_{GS} = 0$, $V_{DS} = 25$ V, $f = 1$ MHz	C_{iss}	–	10	13	nF
Output capacitance $V_{GS} = 0$, $V_{DS} = 25$ V, $f = 1$ MHz	C_{oss}	–	3	4.5	
Reverse transfer capacitance $V_{GS} = 0$, $V_{DS} = 25$ V, $f = 1$ MHz	C_{rss}	–	0.7	1.0	
Turn-on time t_{on}, ($t_{on} = t_{d(on)} + t_r$) $V_{CC} = 100$ V, $V_{GS} = 10$ V, $I_D = 80$ A, $R_{GS} = 3.3$ Ω	$t_{d(on)}$	–	120	–	ns
	t_r	–	60	–	
Turn-off time t_{off}, ($t_{off} = t_{d(off)} + t_f$) $V_{CC} = 100$ V, $V_{GS} = 10$ V, $I_D = 80$ A, $R_{GS} = 3.3$ Ω	$t_{d(off)}$	–	240	–	
	t_f	–	40	–	

Electrical Characteristics (continued)
at $T_j = 25$ °C, unless otherwise specified. T-39-15

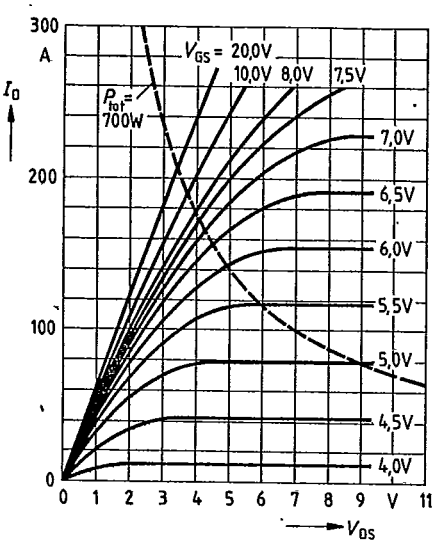
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Reverse diode					
Continuous reverse drain current $T_C = 25$ °C	I_S	–	–	130	A
Pulsed reverse drain current $T_C = 25$ °C	I_{SM}	–	–	390	
Diode forward on-voltage $I_F = 260$ A, $V_{GS} = 0$	V_{SD}	–	1.05	1.4	V
Reverse recovery time $I_F = I_S$, $di_F/dt = 100$ A/µs, $V_R = 100$ V	t_{rr}	–	400	–	ns
Reverse recovery charge $I_F = I_S$, $di_F/dt = 100$ A/µs, $V_R = 100$ V	Q_{rr}	–	4.3	–	µC

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

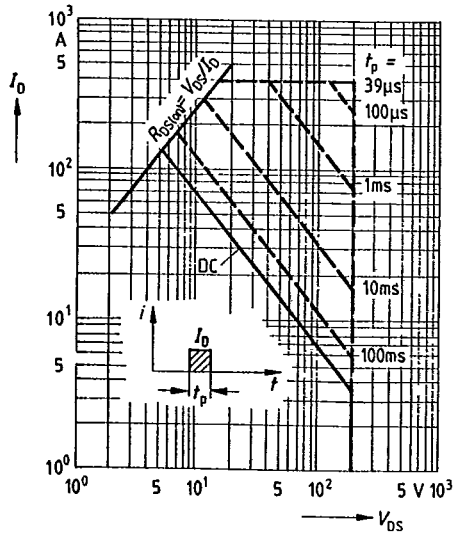
Power dissipation $P_{tot} = f(T_C)$
parameter: $T_j \leq 150$ °C



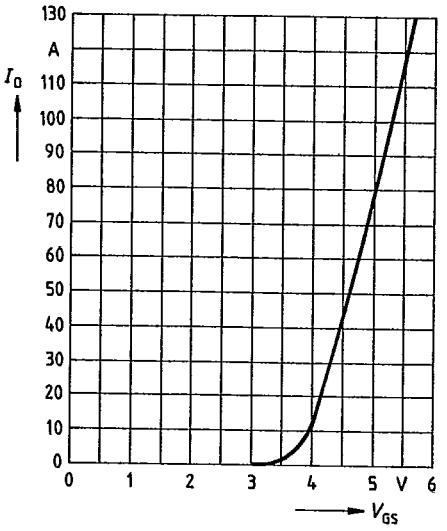
Typical output characteristics $I_D = f(V_{DS})$
parameter: 80 µs pulse test



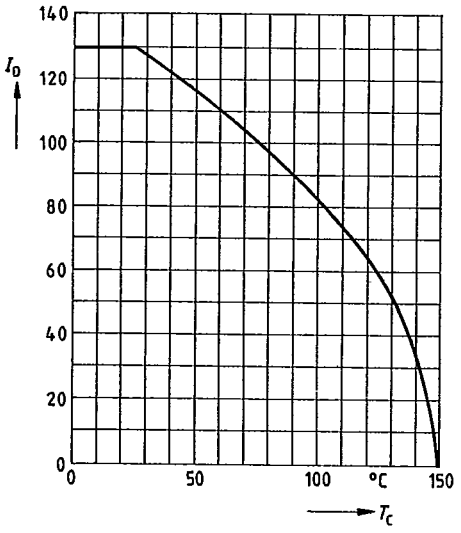
Safe operating area $I_D = f(V_{DS})$
parameter: single pulse, $T_C = 25$ °C, $T_j \leq 150$ °C



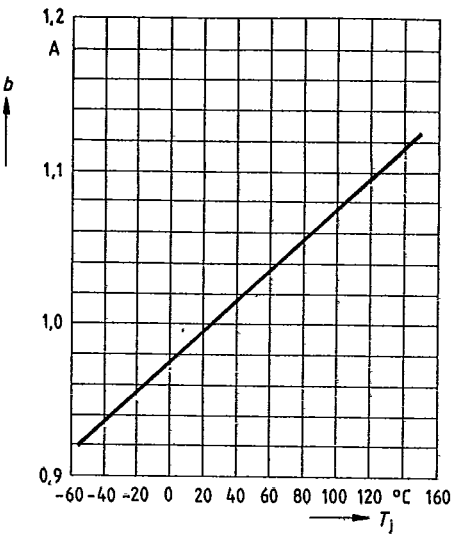
Typical transfer characteristic $I_D = f(V_{GS})$
parameter: 80 µs pulse test, $V_{DS} = 25$ V



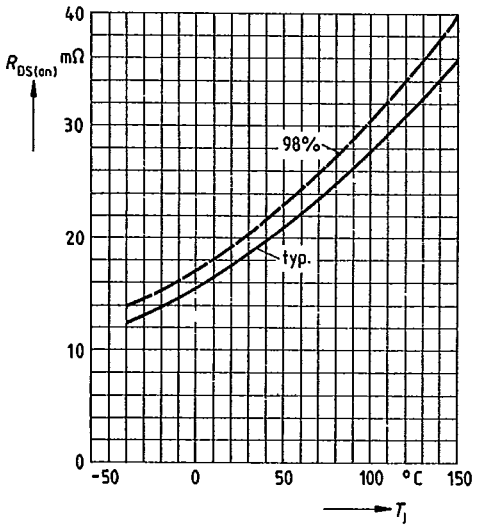
Continuous drain current $I_D = f(T_C)$
parameter: $V_{GS} \geq 10$ V, $T_j = 150$ °C



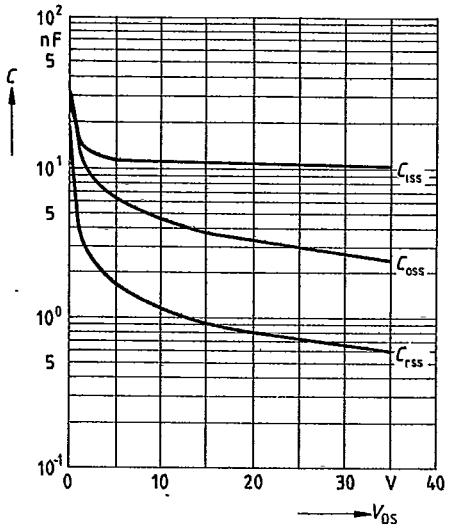
$V_{(BR)DSS}(T_j) = b \times V_{(BR)DSS}(25\ °C)$



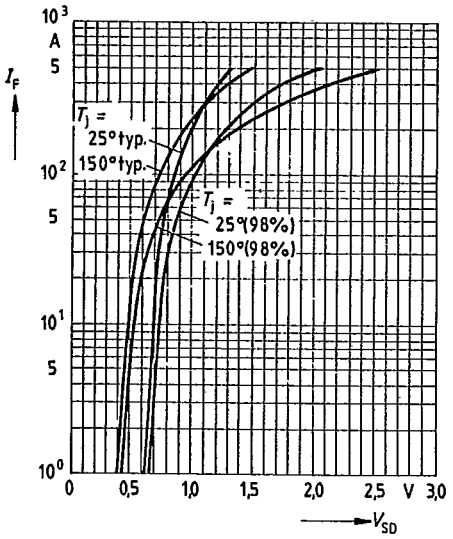
Drain source on-state resistance $R_{DS\ (on)} = f(T_j)$
parameter: $I_D = 80$ A; $V_{GS} = 10$ V
(spread)



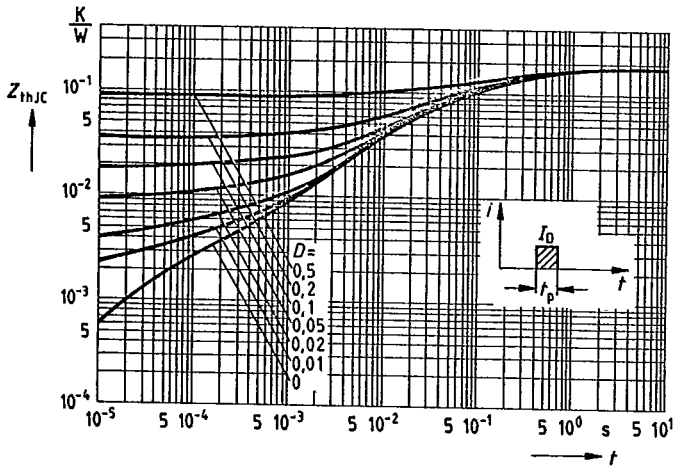
Typical capacitances $C = f(V_{DS})$
parameter: $V_{GS} = 0$, $f = 1$ MHz



Forward characteristics of reverse diode $I_F = f(V_{SD})$
parameter: T_j, t_p = 80 µs
(spread)



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



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Typ. gate charge $V_{GS} = f(Q_{Gate})$
parameter: $I_{Dpuls} = 200$ A