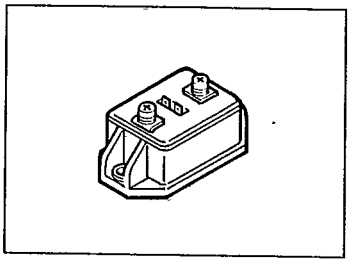
SIMOPAC® MOSFET Module

BSM 191 F (C)

V_{DS} = 1000 V
I_D = 28 A
$R_{DS(on)}$ = 0.42 Ω



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

Type	Ordering code
BSM 191 F (C)	C67076-A1053-A2

Maximum Ratings

Parameter	Symbol	Values	Unit
Drain-source voltage	V_{DS}	1000	V
Drain-gate voltage, R_{GS} = 20 kΩ	V_{DGR}	1000	
Gate-source voltage	V_{GS}	± 20	
Continuous drain current, T_C = 25 °C	I_D	28	A
Pulsed drain current, T_C = 25 °C	I_{Dpuls}	110	
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	$V_{(BR)DSS}$	1000	–	–	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 $V_{DS} = 1000$ 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, $I_D = 18$ A	$R_{DS(on)}$	–	0.38	0.42	Ω
Dynamic characteristics					
Forward transconductance $V_{DS} \geq 2 \times I_D \times R_{DS(on)max.}$, $I_D = 18$ A	g_{fs}	15	22	–	S
Input capacitance $V_{GS} = 0$, $V_{DS} = 25$ V, $f = 1$ MHz	C_{oss}	–	22	30	nF
Output capacitance $V_{GS} = 0$, $V_{DS} = 25$ V, $f = 1$ MHz	C_{oss}	–	1.0	1.5	
Reverse transfer capacitance $V_{GS} = 0$, $V_{DS} = 25$ V, $f = 1$ MHz	C_{rss}	–	0.36	0.5	
Turn-on time t_{on}, ($t_{on} = t_{d(on)} + t_r$) $V_{CC} = 500$ V, $V_{GS} = 10$ V, $I_D = 18$ A, $R_{GS} = 3.3$ Ω	$t_{d(on)}$	–	60	–	ns
	t_r	–	30	–	
Turn-off time t_{off}, ($t_{off} = t_{d(off)} + t_f$) $V_{CC} = 500$ V, $V_{GS} = 10$ V, $I_D = 18$ A, $R_{GS} = 3.3$ Ω	$t_{d(off)}$	–	350	–	
	t_f	–	60	–	

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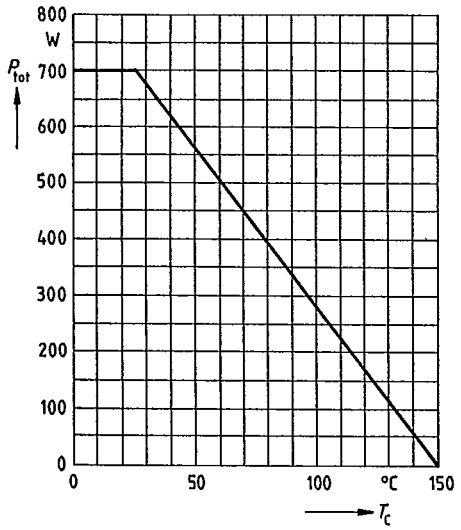
Electrical Characteristics (continued)
at $T_j = 25$ °C, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Fast-recovery reverse diode					
Continuous reverse drain current $T_C = 25$ °C	I_S	–	–	28	A
Pulsed reverse drain current $T_C = 25$ °C	I_{DS}	–	–	110	
Diode forward on-voltage[1]) $I_F = 56$ A, $V_{GS} = 0$	V_{SD}	–	1.2	1.6	V
Reverse recovery time $I_F = I_S$, $di_F/dt = 100$ A/µs, $V_R = 100$ V	t_{rr}	–	300	–	ns
Reverse recovery charge $I_F = I_S$, $di_F/dt = 100$ A/µs, $V_R = 100$ V	Q_{rr}	–	1.8	–	µC

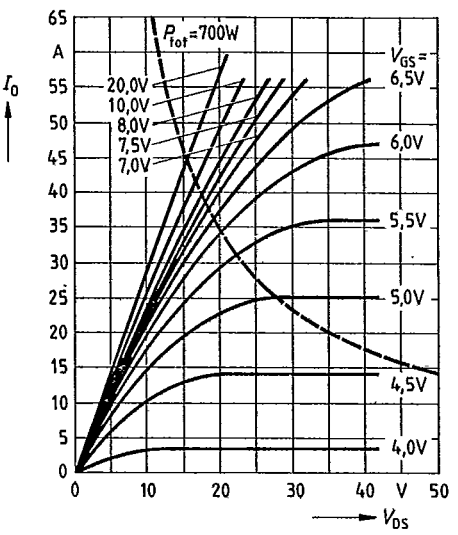
[1]) upon request

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

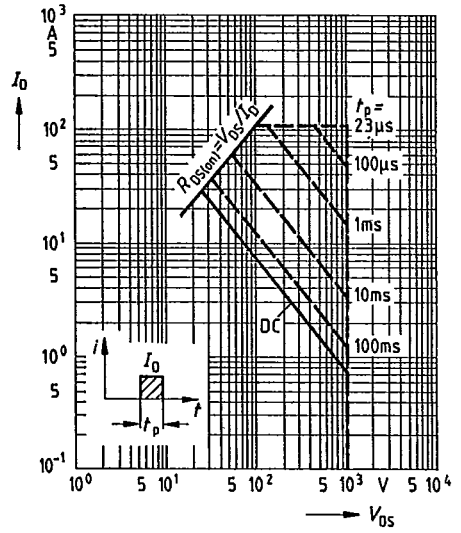
Power dissipation $P_{tot} = f(T_C)$
parameter: $T_j = 150$ °C



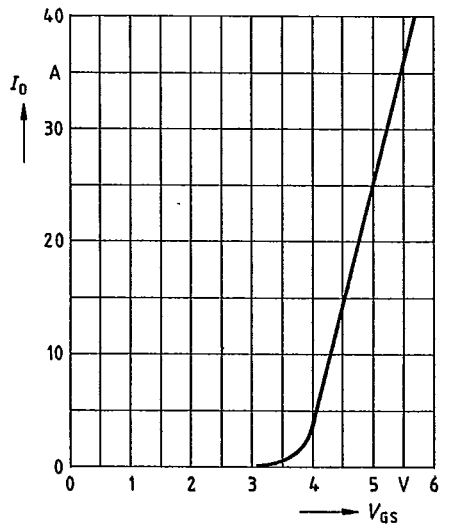
Typ. output characteristics $I_D = f(V_{DS})$
Parameter: $t_p = 80$ µs



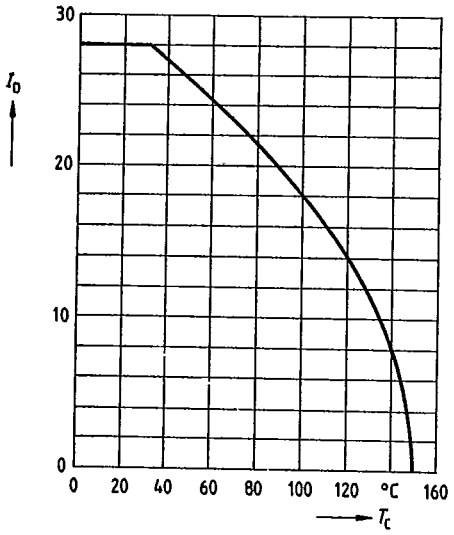
Safe operating area $I_D = f(V_{DS})$
Parameter: single pulse, $T_C = 25$ °C,
$T_j \leq 150$ °C



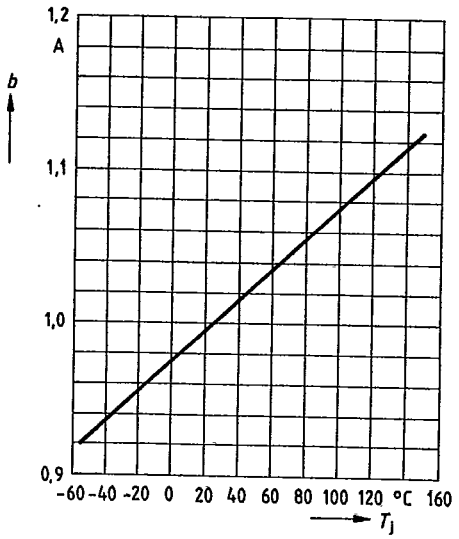
Typ. transfer characteristic $I_D = f(V_{GS})$
Parameter: $t_p = 80$ µs, $V_{DS} = 25$ V



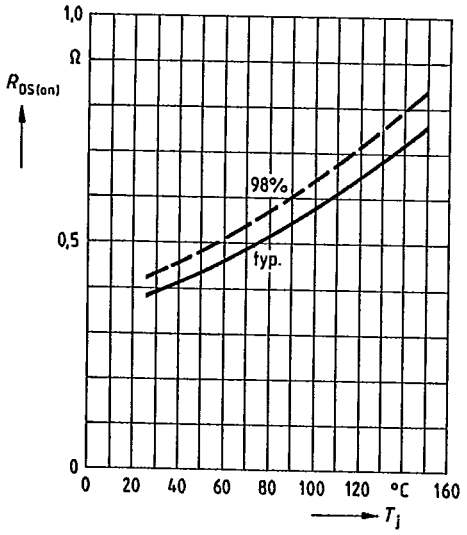
Continuous drain current $I_D = f(T_C)$
Parameter: $V_{GS} \geq 10$ V, $T_j = 150$ °C



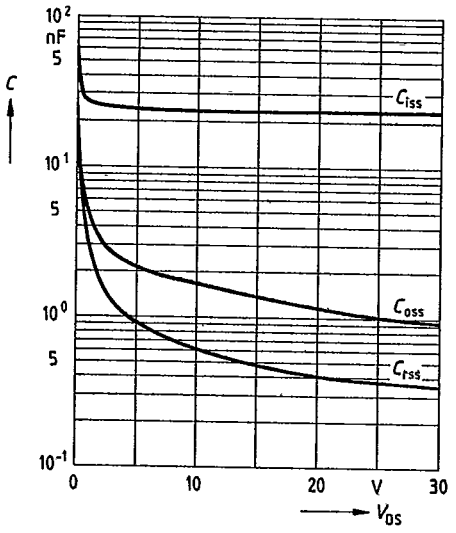
$V_{(BR)DSS}$ $(T_j) = b \times V_{(BR)DSS}$ (25 °C)



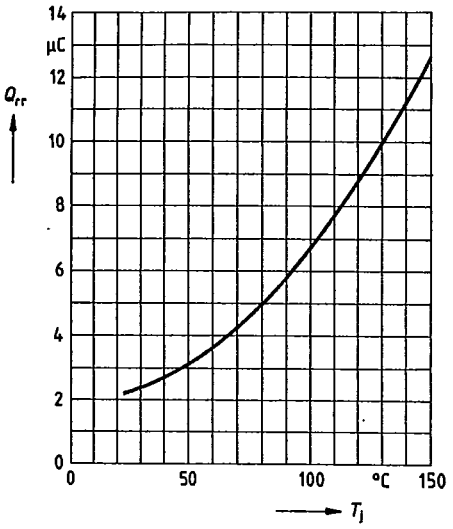
Drain-source on-state resistance
$R_{DS\,(on)} = f(T_j)$
Parameter: $I_D = 18$ A, $V_{GS} = 10$ V
(spread)



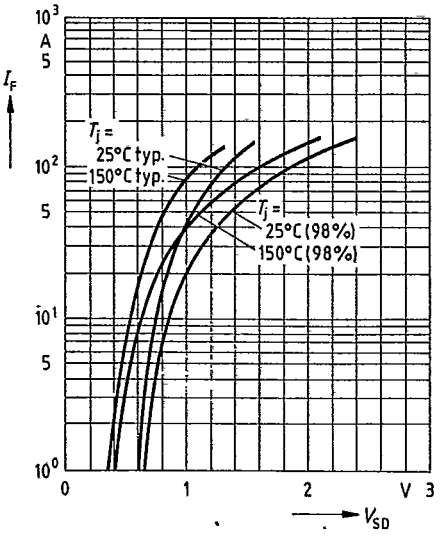
Typ. capacitances $C = f(V_{DS})$
Parameter: $V_{GS} = 0$, $f = 1$ MHz



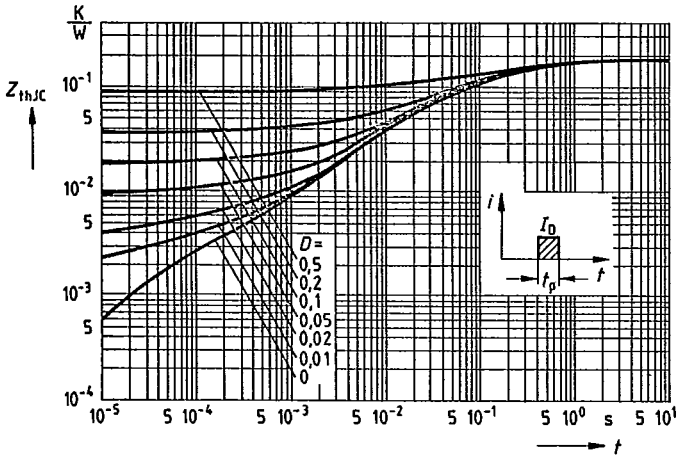
Typ. reverse recovery charge $Q_{rr} = f(T_j)$
Parameter: di_F/dt = 100 A/µs,
I_F = 28 A, V_R = 100 V



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



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



Typ. gate charge $V_{GS} = f(Q_{Gate})$
Parameter: $I_{D\,puls} = 42$ A