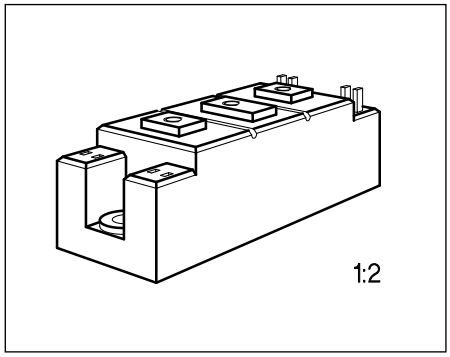
SIEMENS

SIMOPAC® Module — BSM 254 F

V_{DS} = 500 V
I_D = 2 × 35 A
$R_{DS(on)}$ = 0.17 Ω

- Power module
- Half-bridge
- FREDFET
- N channel
- Enhancement mode
- Package with insulated metal base plate
- Package outline/Circuit diagram: 2a[1)]



Type	Ordering Code
BSM 254 F	C67076-A1150-A2

Maximum Ratings

Parameter	Symbol	Values	Unit
Drain-source voltage	V_{DS}	500	V
Drain-gate voltage, R_{GS} = 20 kΩ	V_{DGR}	500	
Gate-source voltage	V_{GS}	± 20	
Continuous drain current, T_C = 25 ˚C	I_D	35	A
Pulsed drain current, T_C = 25 ˚C	$I_{D\ puls}$	140	
Operating and storage temperature range	T_j, T_{stg}	– 55 … + 150	˚C
Power dissipation, T_C = 25 ˚C	P_{tot}	400	W
Thermal resistance Chip-case	$R_{th\ JC}$	≤ 0.31	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.

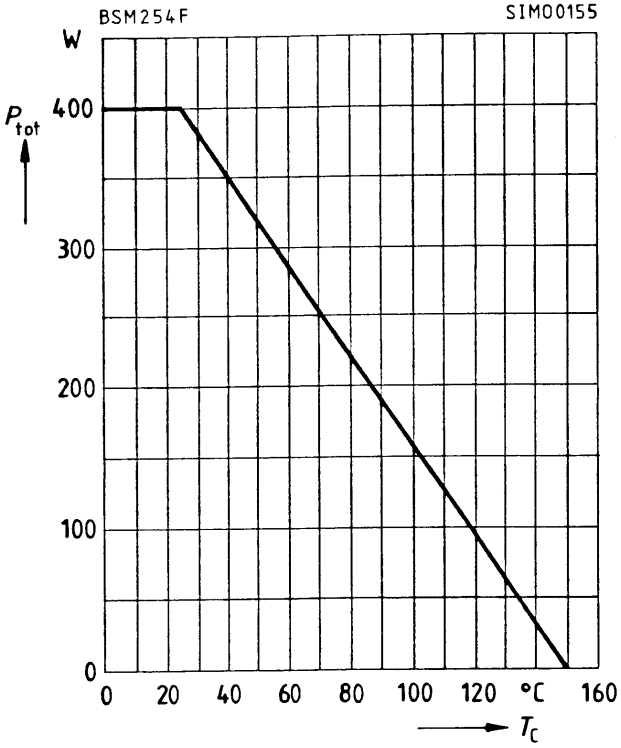
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Drain-source breakdown voltage V_{GS} = 0, I_D = 0.25 mA	$V_{(BR)DSS}$	500	–	–	V
Gate threshold voltage V_{GS} = V_{DS}, I_D = 1 mA	$V_{GS(th)}$	2.1	3.0	4.0	
Zero gate voltage drain current V_{DS} = 500 V, V_{GS} = 0 T_j = 25 ˚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 = 22 A	$R_{DS(on)}$	–	0.14	0.17	Ω
Dynamic Characteristics					
Forward transconductance $V_{DS} \geq 2 \times I_D \times R_{DS(on)max.}$, I_D = 22 A	g_{fs}	13	20	–	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}	–	1.3	1.9	
Reverse transfer capacitance V_{GS} = 0, V_{DS} = 25 V, f = 1 MHz	C_{rss}	–	0.48	0.7	
Turn-on time t_{on} (t_{on} = $t_{d\ (on)}$ + t_r) V_{CC} = 250 V, V_{GS} = 10 V I_D = 22 A, R_{GS} = 3.3 Ω	$t_{d\ (on)}$	–	40	–	ns
	t_r	–	30	–	
Turn-off time t_{off} (t_{off} = $t_{d\ (off)}$ + t_f) V_{CC} = 250 V, V_{GS} = 10 V I_D = 22 A, R_{GS} = 3.3 Ω	$t_{d\ (off)}$	–	70	–	
	t_f	–	55	–	

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

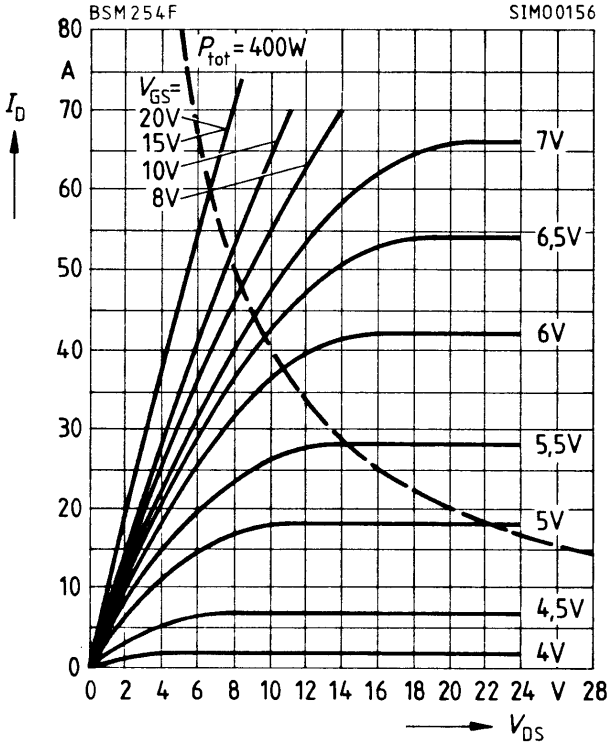
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Fast-recovery reverse diode					
Continuous reverse drain current T_C = 25 ˚C	I_S	– 	– 	35 	A
Pulsed reverse drain current T_C = 25 ˚C	I_{SM}	– 	– 	140 	
Diode forward on-voltage I_F = 70 A , V_{GS} = 0	V_{SD}	– 	1.2 	1.6 	V
Reverse recovery time $I_F = I_S$, di_F/dt = 100 A/ µs, V_R = 100 V T_j = 25 ˚C T_j = 150 ˚C	t_{rr}	 – –	 200 350	 280 500	ns
Reverse recovery charge $I_F = I_S$, di_F/dt = 100 A/ µs, V_R = 100 V T_j = 25 ˚C T_j = 150 ˚C	Q_{rr}	 – –	 1.5 8.5	 2.5 12	µC
Repetitive peak reverse current $I_F = I_S$, di_F/dt = 100 A/ µs, V_R = 100 V T_j = 25 ˚C T_j = 150 ˚C	I_{RRM}	 – –	 12 28	 – –	A

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

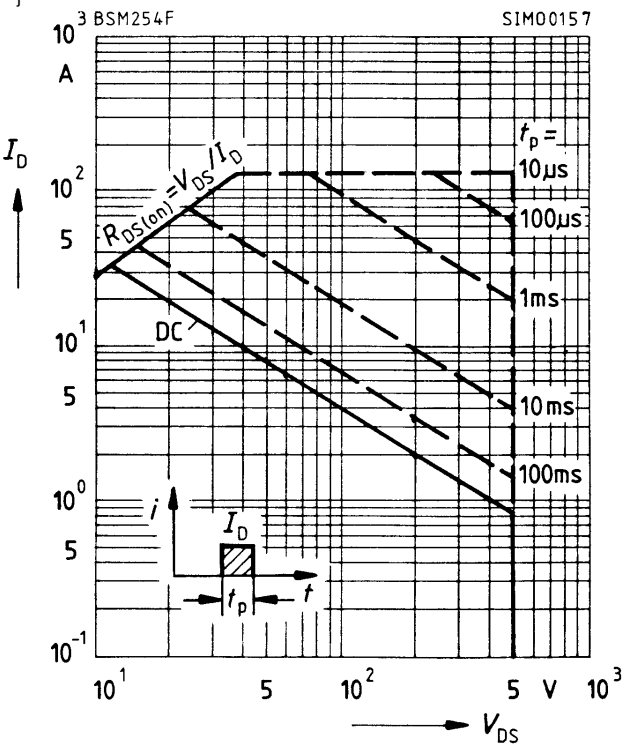
Power dissipation $P_{tot} = f(T_C)$
parameter: T_j = 150 ˚C



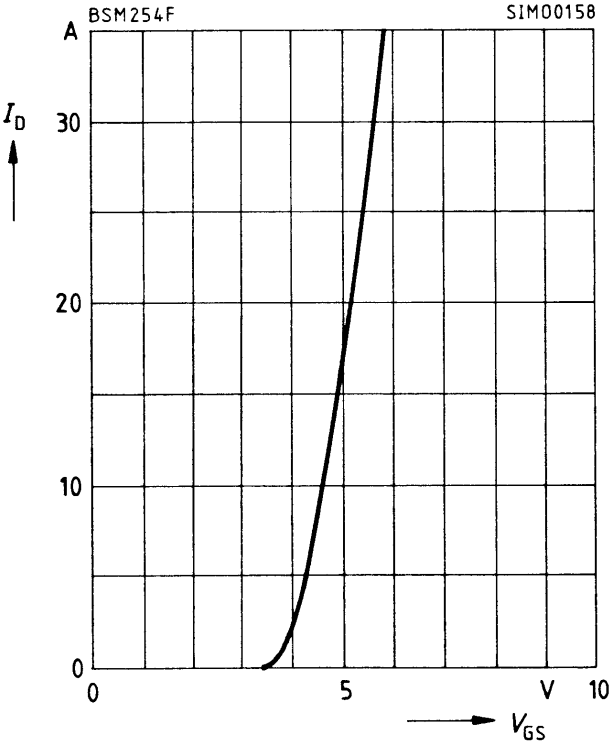
Typ. output characteristics $I_D = f(V_{DS})$
parameter: t_p = 80 µs



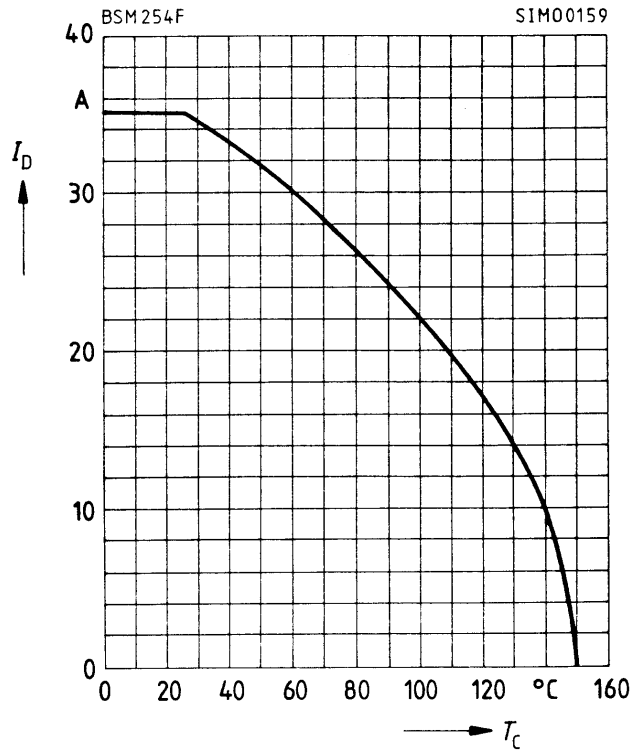
Safe operating area $I_D = f(V_{DS})$
parameter: single pulse, T_C = 25 ˚C
$T_j \leq$ 150 ˚C



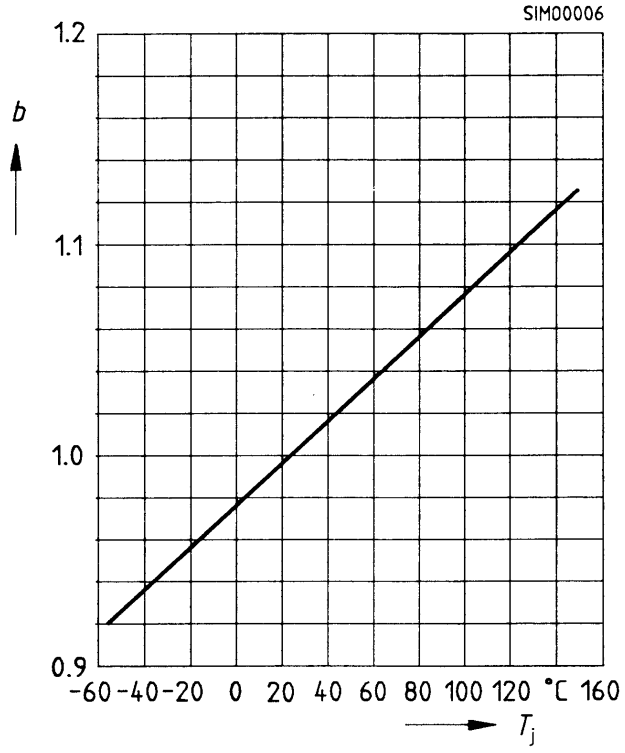
Typ. transfer characteristic $I_D = f(V_{GS})$
parameter: t_p = 80 µs , V_{DS} = 25 V



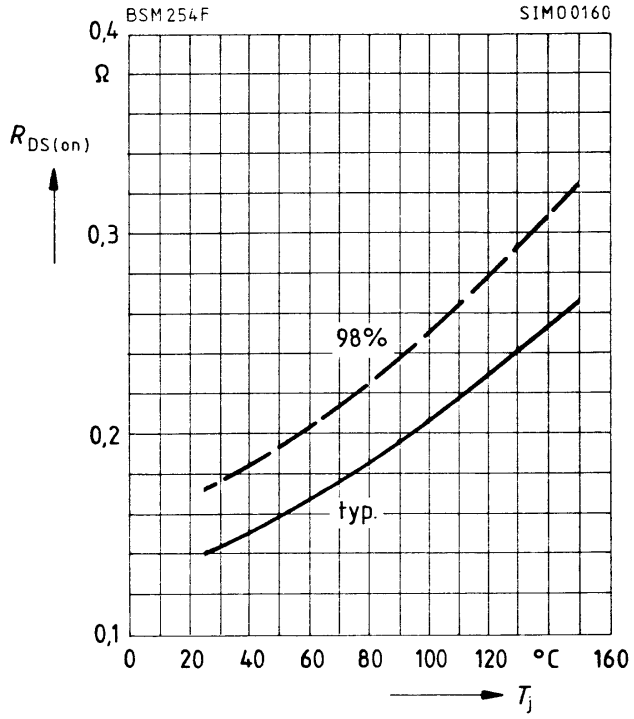
Drain current $I_D = f(T_C)$
parameter: $V_{GS} \geq 10$ V, T_j = 150 ˚C



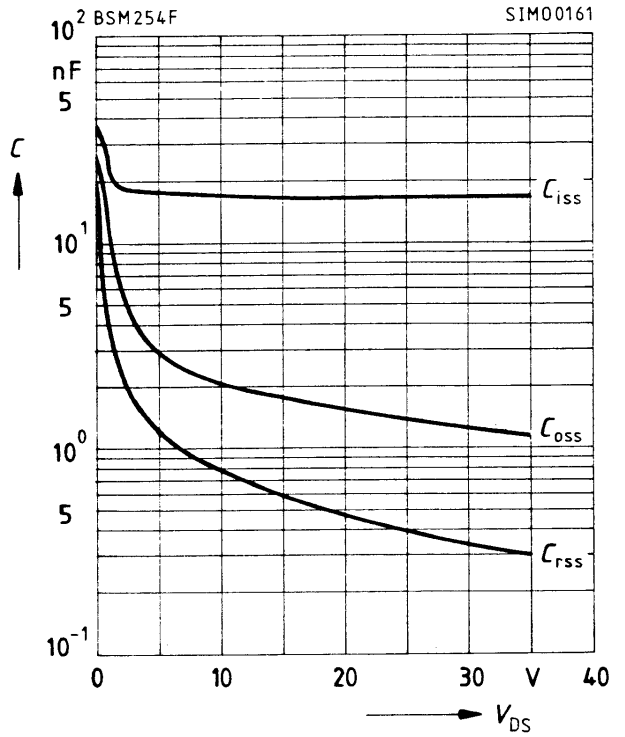
Drain-source breakdown voltage
$V_{(BR)DSS}(T_j) = b \times V_{(BR)DSS}$ **(25 ˚C)**



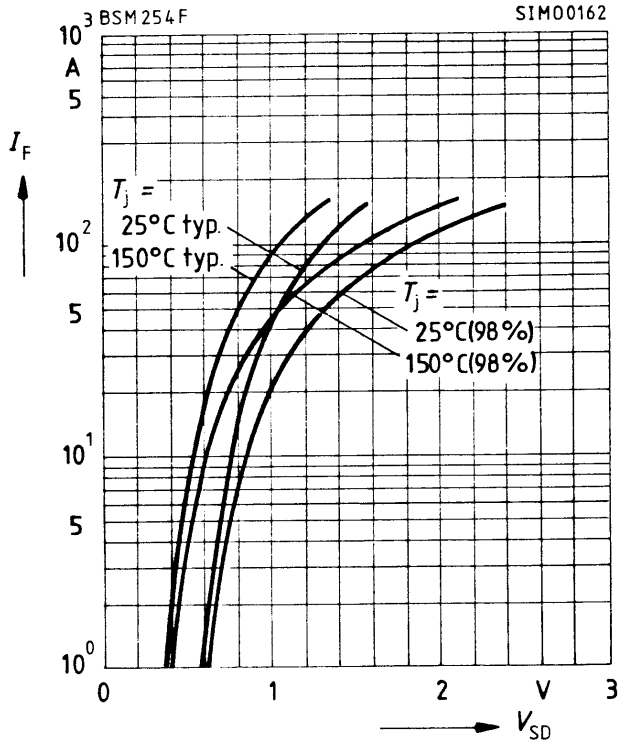
Drain source on-state resistance
$R_{DS(on)} = f(T_j)$
parameter: I_D = 22 A; V_{GS} = 10 V, (spread)



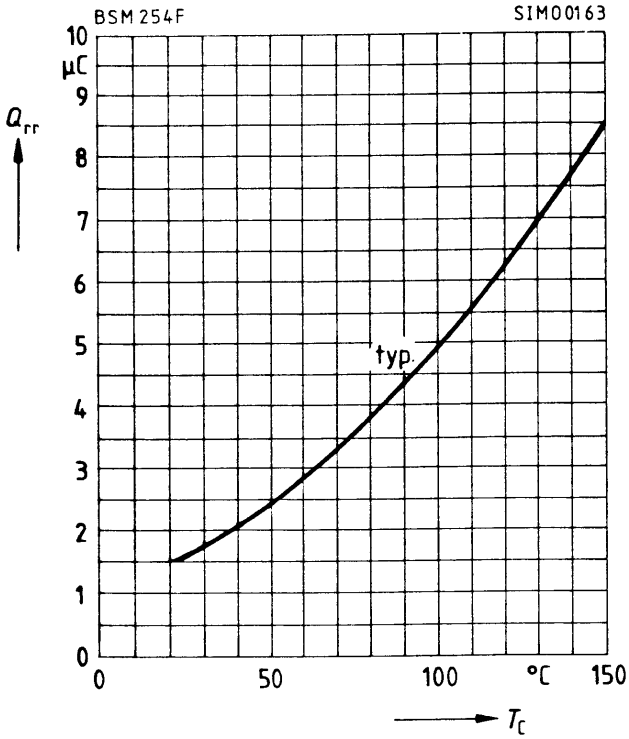
Typ. capacitances $C = f(V_{DS})$
parameter: V_{GS} = 0, f = 1 MHz (spread)



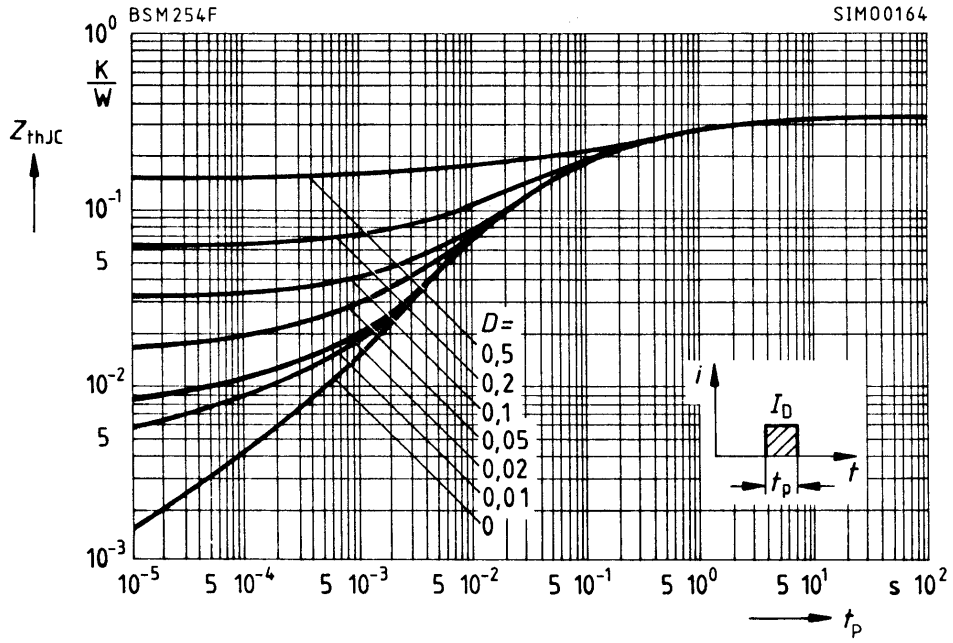
Forward characteristics
of fast-recovery reverse diode $I_F = f(V_{SD})$
parameter: T_j,t_p = 80 µs (spread)



Typ. reverse recovery charge $Q_{rr} = f(T_j)$
parameter: di/dt = 100 A/µs, I_F = 35 A
V_R = 100 V



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



Typ. gate charge $V_{GS} = f(Q_{Gate})$
parameter: I_{Dpuls} = 52.5 A