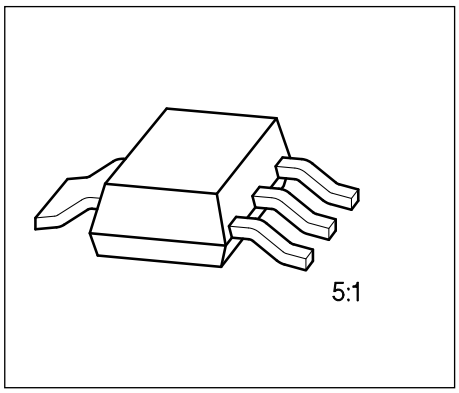
SIEMENS

SIPMOS® Small-Signal Transistor — BSP 17

- V_{DS} 50 V
- I_D 3.2 A
- $R_{DS(on)}$ 0.1 Ω
- N channel
- Enhancement mode
- Avalanche rated



Type	Ordering Code	Tape and Reel Information	Pin Configuration				Marking	Package
			1	2	3	4		
BSP 17	Q67000-S220	E6327: 1000 pcs/reel	G	D	S	D	BSP 17	SOT-223

Maximum Ratings

Parameter	Symbol	Values	Unit
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current, T_A = 27 ˚C	I_D	3.2	A
Pulsed drain current, T_A = 25 ˚C	$I_{D\,puls}$	12.8	
Avalanche current, limited by $T_{j\,max}$	I_{AR}	3.2	
Avalanche energy, periodic limited by $T_{j\,max}$	E_{AR}	1	mJ
Avalanche energy, single pulse I_D = 3.2 A, V_{DD} = 25 V, R_{GS} = 25 Ω L = 586 µH, T_j = 25 ˚C	E_{AS}	6	
Max. power dissipation, T_A = 25 ˚C	P_{tot}	1.8	W
Operating and storage temperature range	T_j, T_{stg}	– 55 … + 150	˚C

Thermal resistance [1]	chip-ambient chip-soldering point	R_{thJA} R_{thJS}	70 6	K/W
DIN humidity category, DIN 40 040		–	E	–
IEC climatic category, DIN IEC 68-1		–	55/150/56	

[1] Transistor on epoxy pcb 40 mm × 40 mm × 1.5 mm with 6 cm² copper area for drain connection.

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}	 – –	 0.1 10	 1.0 100	µA
Gate-source leakage current V_{GS} = 20 V, V_{DS} = 0	I_{GSS}	–	10	100	nA
Drain-source on-resistance V_{GS} = 10 V, I_D = 3.2 A	$R_{DS(on)}$	–	0.09	0.1	Ω
Dynamic Characteristics					
Forward transconductance $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$, I_D = 3.2 A	g_{fs}	2.5	5.2	–	S
Input capacitance V_{GS} = 0, V_{DS} = 25 V, f = 1 MHz	C_{iss}	–	450	600	pF
Output capacitance V_{GS} = 0, V_{DS} = 25 V, f = 1 MHz	C_{oss}	–	220	350	
Reverse transfer capacitance V_{GS} = 0, V_{DS} = 25 V, f = 1 MHz	C_{rss}	–	85	150	
Turn-on time t_{on}, (t_{on} = $t_{d(on)}$ + t_r) V_{DD} = 30 V, V_{GS} = 10 V, R_{GS} = 50 Ω, I_D = 3 A	$t_{d(on)}$	–	20	30	ns
	t_r	–	40	60	
Turn-off time t_{off}, (t_{off} = $t_{d(off)}$ + t_f) V_{DD} = 30 V, V_{GS} = 10 V, R_{GS} = 50 Ω, I_D = 3 A	$t_{d(off)}$	–	55	70	
	t_f	–	40	55	

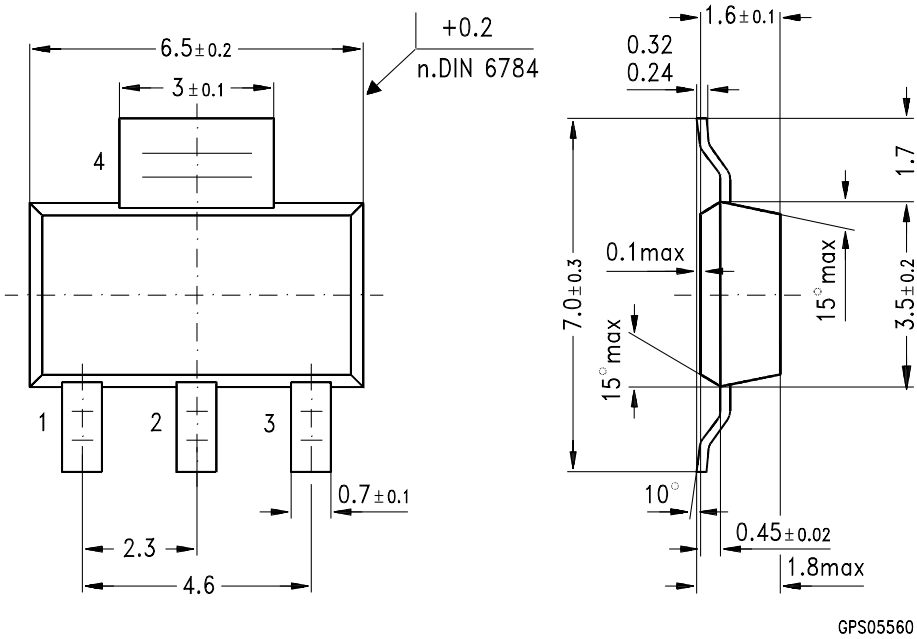
Electrical Characteristics (cont'd)

at T_j = 25 °C, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Reverse Diode					
Continuous reverse drain current	I_S	–	–	3.2	A
Pulsed source current	I_{SM}	–	–	12.8	
Diode forward on-voltage I_F = 6.4 A, V_{GS} = 0	V_{SD}	–	1.05	1.2	V
Reverse recovery time V_R = 30 V, $I_F = I_S$, di_F/dt = 100 A/µs	t_{rr}	–	40	–	ns
Reverse recovery charge V_R = 30 V, $I_F = I_S$, di_F/dt = 100 A/µs	Q_{rr}	–	0.04	–	µC

Package Outline

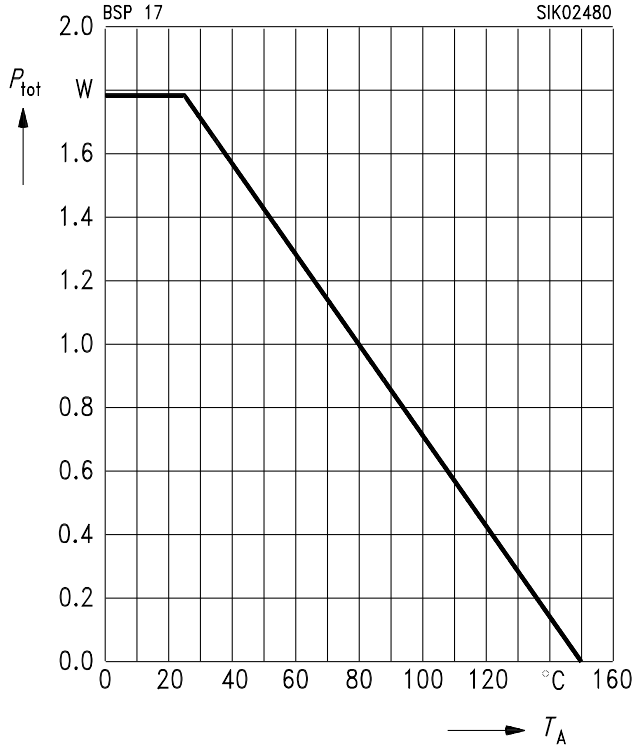
SOT-223



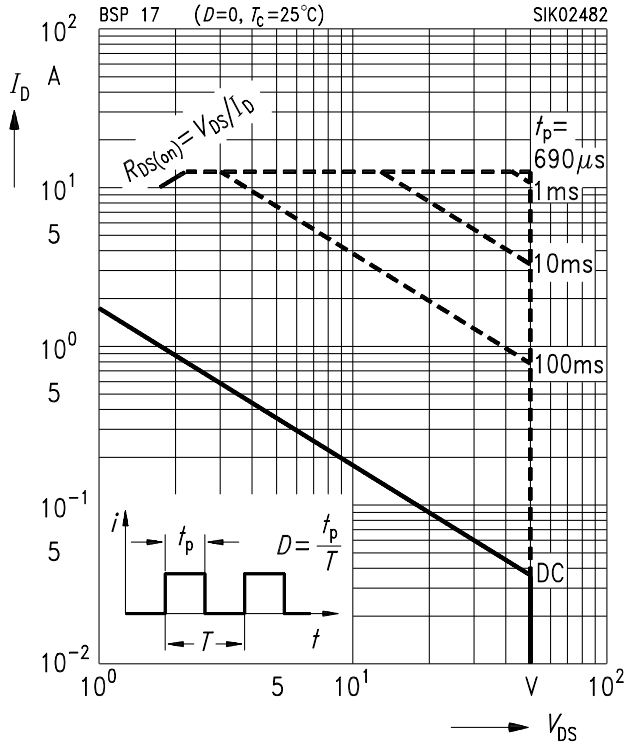
Dimensions in mm

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

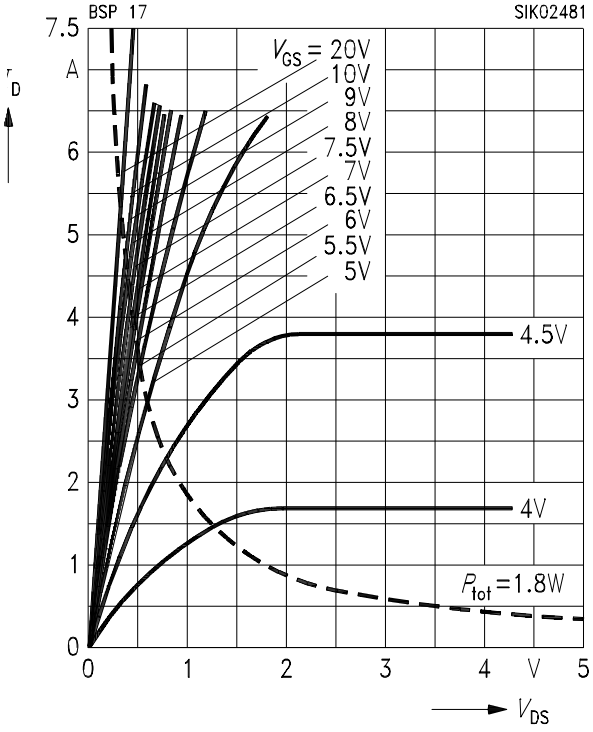
Total power dissipation $P_{tot} = f(T_A)$



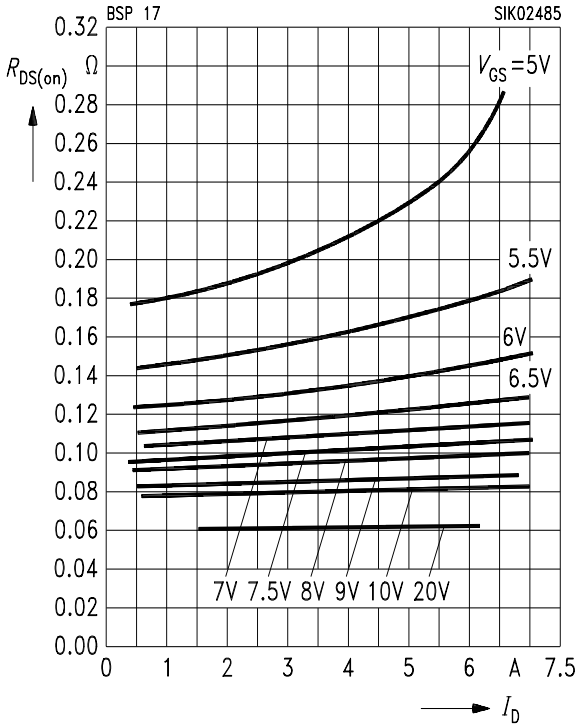
Safe operating area $I_D = f(V_{DS})$
parameter: D = 0, T_C = 25 ˚C



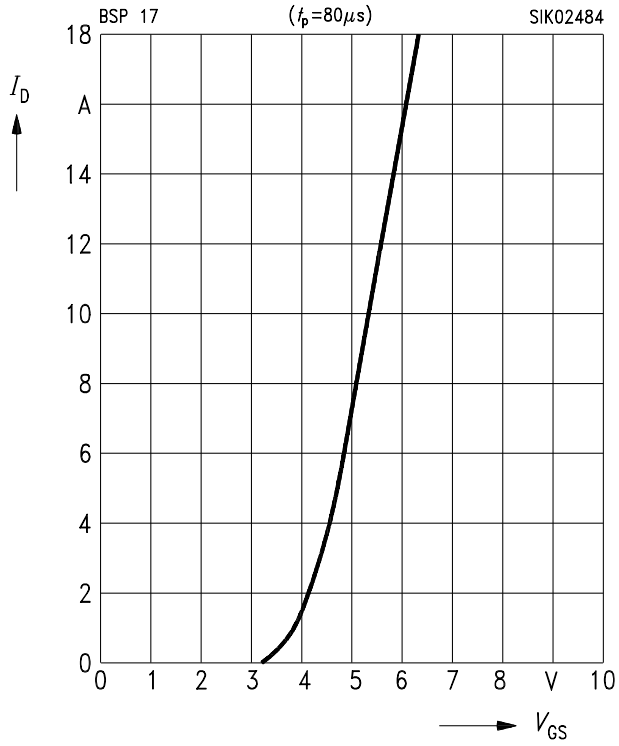
Typ. output characteristics $I_D = f(V_{DS})$
parameter: t_p = 80 µs



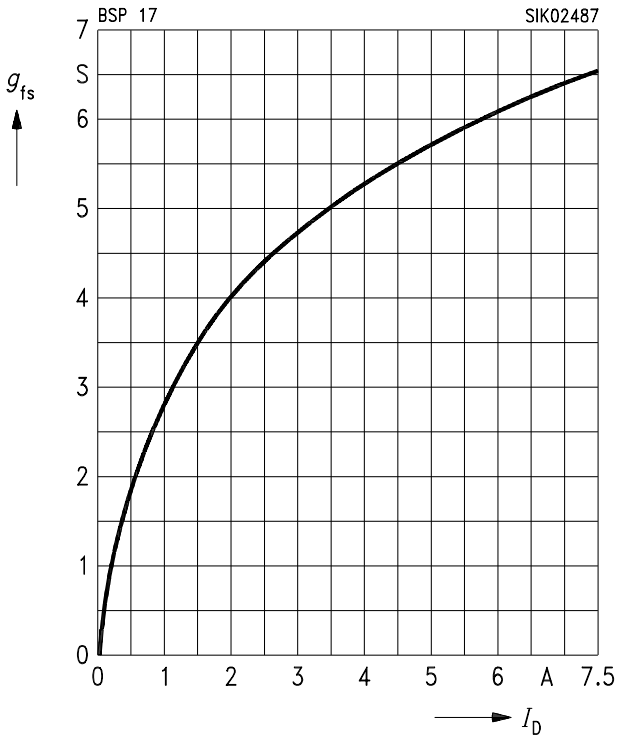
Typ. drain-source on-resistance $R_{DS(on)} = f(I_D)$
parameter: V_{GS}



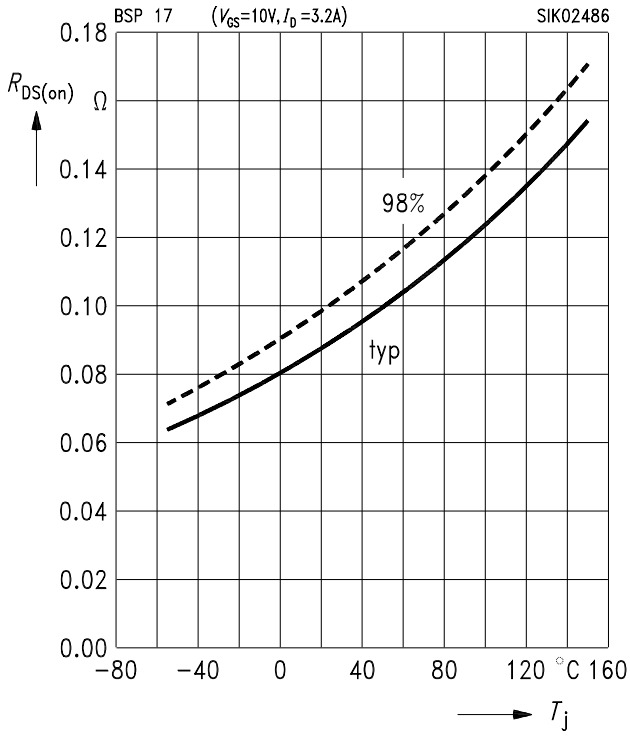
Typ. transfer characteristics $I_D = f(V_{GS})$
parameter: t_p = 80 µs, $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



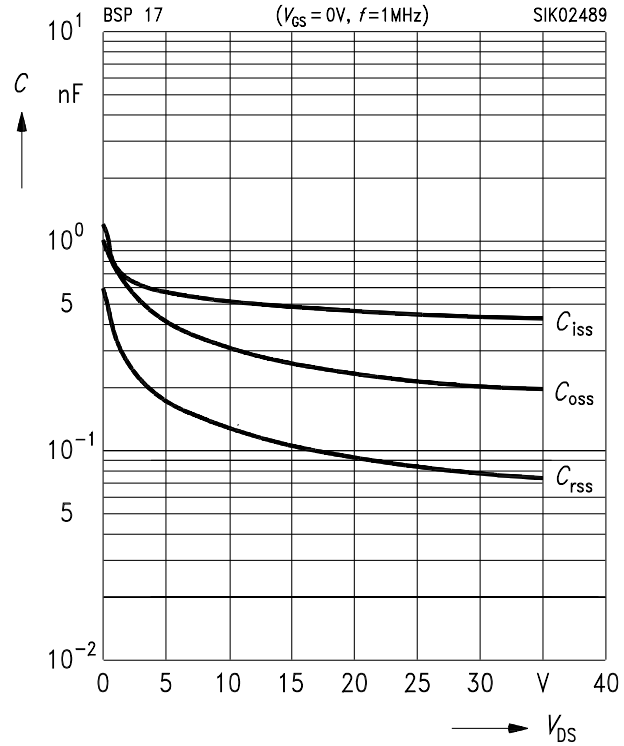
Typ. forward transconductance $g_{fs} = f(I_D)$
parameter: $V_{DS} \geq 2 \times I_D \times R_{DS(on)max.}$, t_p = 80 µs



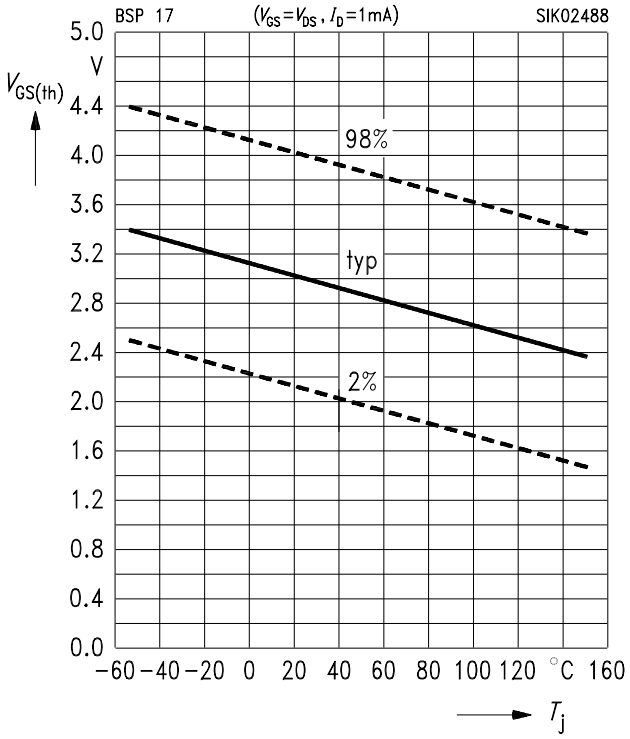
Drain-source on-resistance
$R_{DS(on)} = f(T_j)$
parameter: I_D = 3.2 A, V_{GS} = 10 V, (spread)



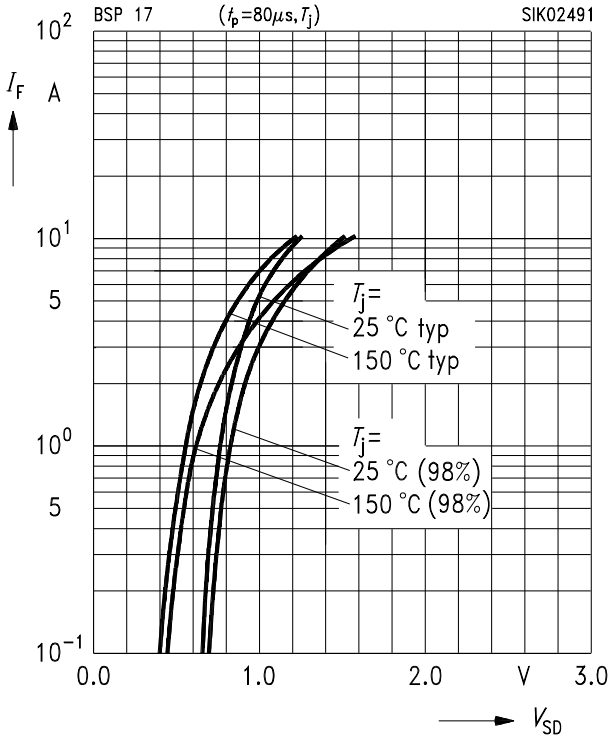
Typ. capacitances $C = f(V_{DS})$
parameter: V_{GS} = 0, f = 1 MHz



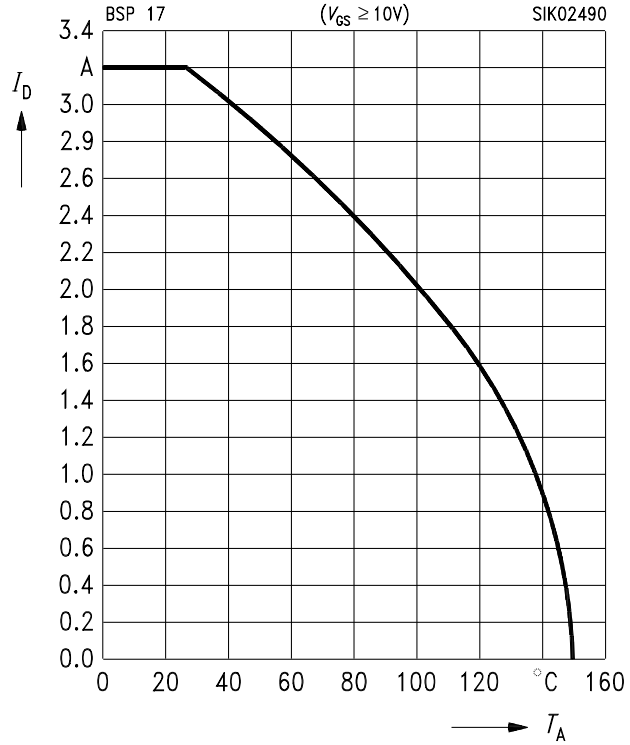
Gate threshold voltage $V_{GS(th)} = f(T_j)$
parameter: $V_{DS} = V_{GS}$, I_D = 1 mA, (spread)



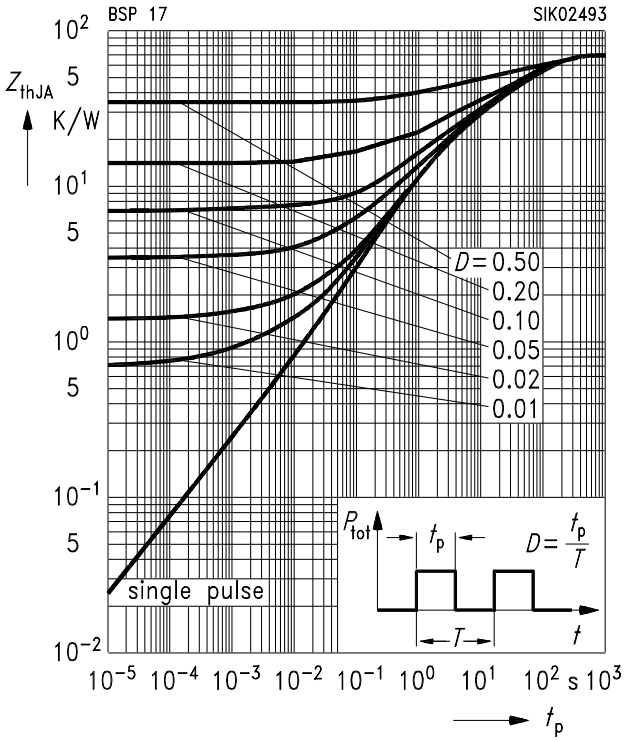
Forward characteristics of reverse diode
$I_F = f(V_{SD})$
parameter: t_p = 80 µs, T_j, (spread)



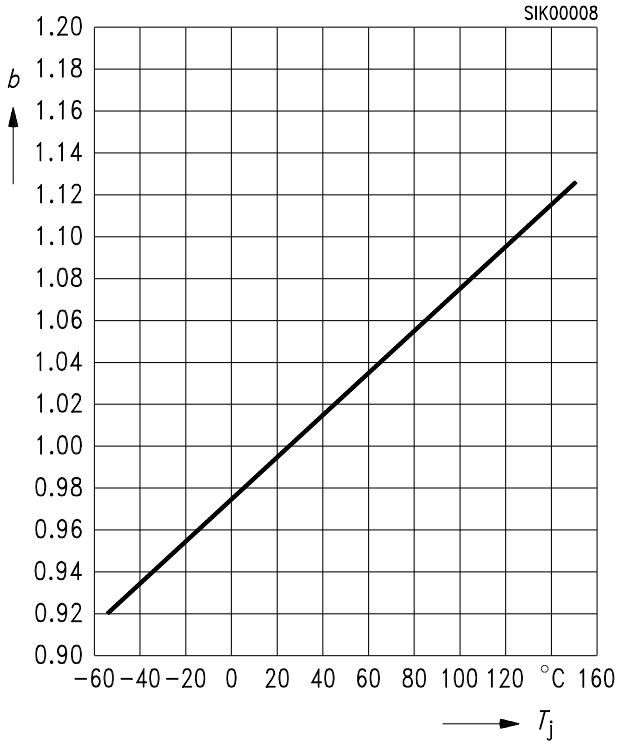
Drain current $I_D = f(T_A)$
parameter: $V_{GS} \geq 10$ V



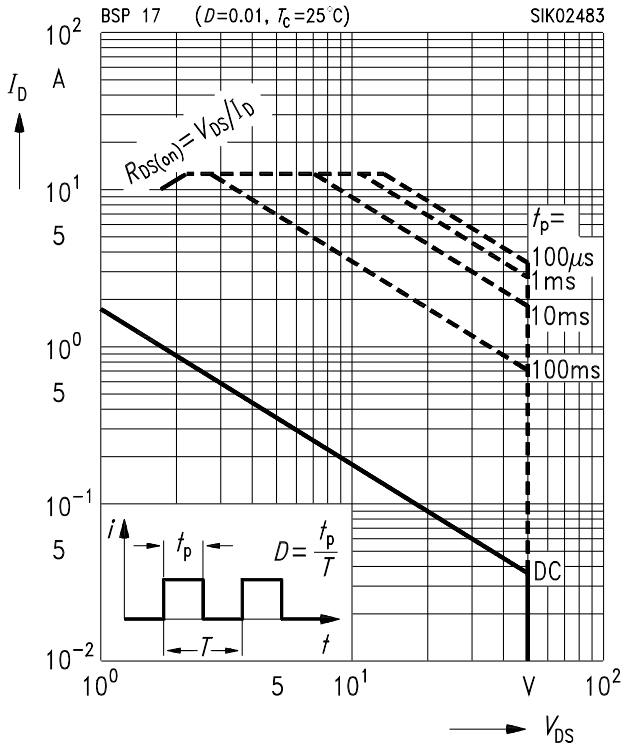
Transient thermal impedance $Z_{thJA} = f(t_p)$
parameter: $D = t_p / T$



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



Safe operating area $I_D = f(V_{DS})$
parameter: D = 0.01, T_C = 25 ℃



Avalanche energy $E_{AS} = f(T_j)$
parameter: I_D = 3.2 A, V_{DD} = 25 V,
R_{GS} = 25 Ω, L = 586 µH