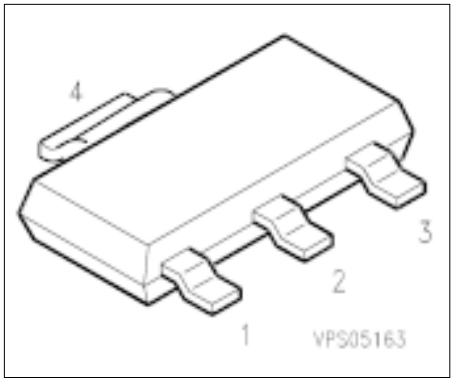
SIPMOS® Small-Signal Transistor

BSP 149

- V_{DS} 200 V
- I_D 0.48 A
- $R_{DS(on)}$ 3.5 Ω
- N channel
- Depletion mode
- High dynamic resistance
- Available grouped in $V_{GS(th)}$



Type	Ordering Code	Tape and Reel Information	Pin Configuration				Marking	Package
			1	2	3	4		
BSP 149	Q67000-S071	E6327: 1000 pcs/reel	G	D	S	D	BSP 149	SOT-223

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	
ESD Sensitivity (HBM) as per MIL-STD 883	–	Class 1	
Continuous drain current, T_A = 28 °C	I_D	0.48	A
Pulsed drain current, T_A = 25 °C	$I_{D\ puls}$	1.44	
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 10	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} = – 3 V, I_D = 0.25 mA	$V_{(BR)DSS}$	200	–	–	V
Gate threshold voltage V_{DS} = 3 V, I_D = 1 mA	$V_{GS(th)}$	– 1.8	– 1.2	– 0.7	
Drain-source cutoff current V_{DS} = 200 V, V_{GS} = – 3 V T_j = 25 °C T_j = 125 °C	I_{DSS}	 – –	 – –	 0.2 200	µA
Gate-source leakage current V_{GS} = 20 V, V_{DS} = 0	I_{GSS}	–	10	100	nA
Drain-source on-resistance V_{GS} = 0 V, I_D = 0.03 A	$R_{DS(on)}$	–	2.5	3.5	Ω
Dynamic Characteristics					
Forward transconductance $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$, I_D = 0.48 A	g_{fs}	0.4	0.75	–	S
Input capacitance V_{GS} = 0, V_{DS} = 25 V, f = 1 MHz	C_{iss}	–	500	670	pF
Output capacitance V_{GS} = 0, V_{DS} = 25 V, f = 1 MHz	C_{oss}	–	40	60	
Reverse transfer capacitance V_{GS} = 0, V_{DS} = 25 V, f = 1 MHz	C_{rss}	–	12	20	
Turn-on time t_{on}, ($t_{on} = t_{d(on)} + t_r$) V_{DD} = 30 V, V_{GS} = – 2 ... + 5 V, R_{GS} = 50 Ω, I_D = 0.29 A	$t_{d(on)}$	–	7	10	ns
	t_r	–	20	30	
Turn-off time t_{off}, ($t_{off} = t_{d(off)} + t_f$) V_{DD} = 30 V, V_{GS} = – 2 ... + 5 V, R_{GS} = 50 Ω, I_D = 0.29 A	$t_{d(off)}$	–	60	80	
	t_f	–	50	65	

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

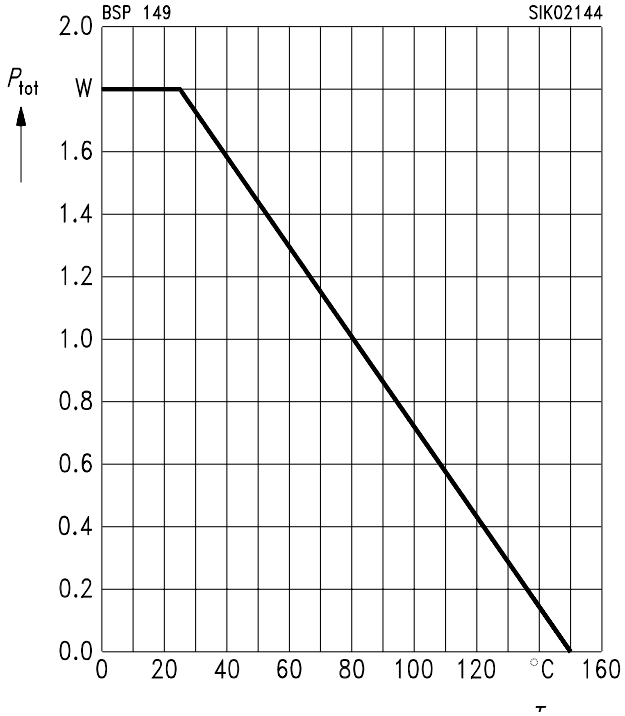
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Reverse Diode					
Continuous reverse drain current T_A = 25 °C	I_S	–	–	0.48	A
Pulsed reverse drain current T_A = 25 °C	I_{SM}	–	–	1.44	
Diode forward on-voltage I_F = 0.96 A, V_{GS} = 0	V_{SD}	–	0.9	1.2	V

$V_{GS(th)}$ Grouping	Symbol	Limit Values		Unit	Test Condition
		min.	max.		
Range of $V_{GS(th)}$	$\Delta V_{GS(th)}$	–	0.15	V	–
Threshold voltage selected in groups [1]:	$V_{GS(th)}$				V_{D1} = 0.2 V; V_{D2} = 3 V; I_D = 1 mA
P		– 0.95	– 0.80	V	
R		– 1.08	– 0.93	V	
S		– 1.21	– 1.06	V	
T		– 1.34	– 1.19	V	
U		– 1.47	– 1.32	V	
V		– 1.60	– 1.45	V	
W		– 1.73	– 1.58	V	

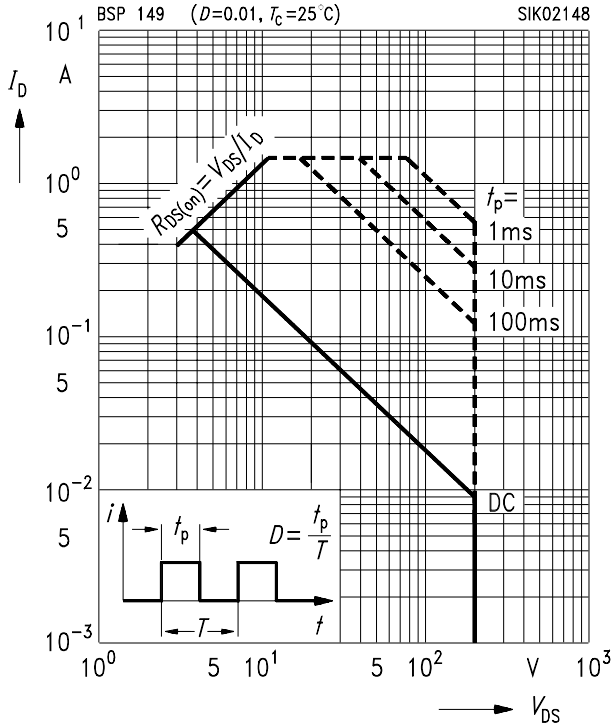
1) A specific group cannot be ordered separately.
Each reel only contains transistors from one group.

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

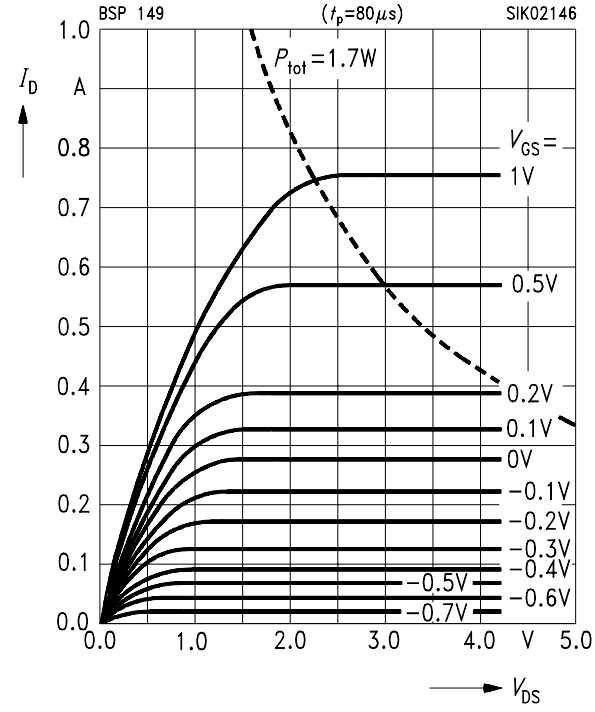
Total power dissipation $P_{tot} = f(T_A)$



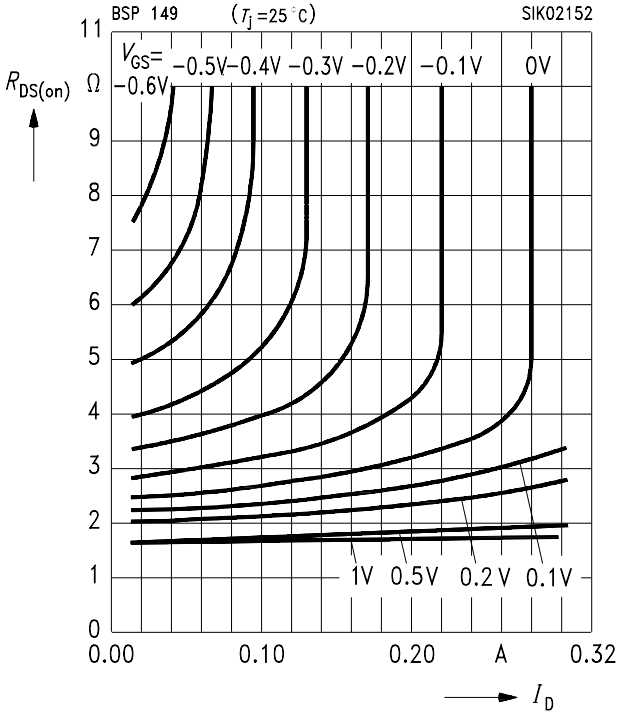
Safe operating area $I_D = f(V_{DS})$
parameter: D = 0.01, T_C = 25 °C



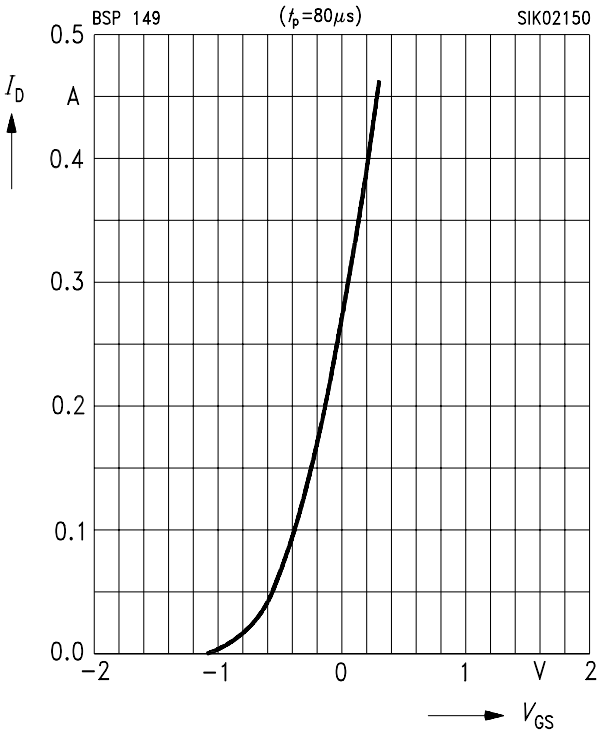
Typ. output characteristics $I_D = f(V_{DS})$
parameter: t_p = 80 µs



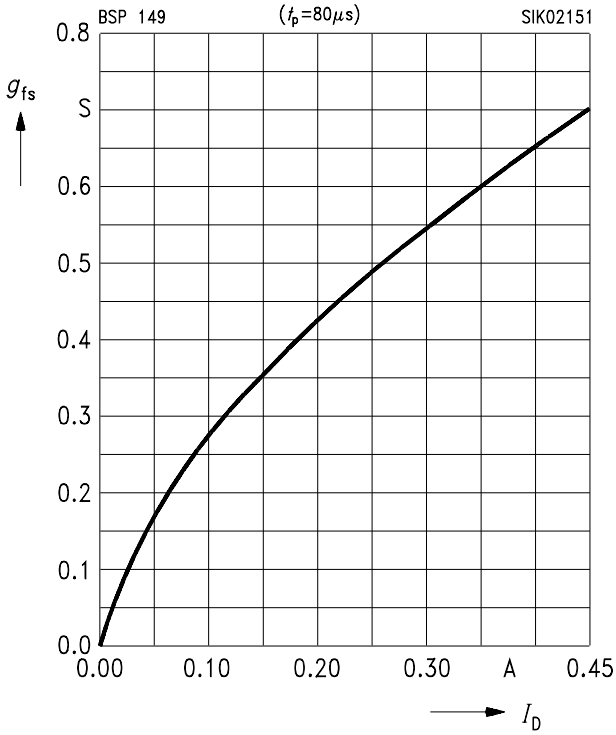
Typ. drain-source on-resistance
$R_{DS(on)} = f(I_D)$
parameter: V_{GS}



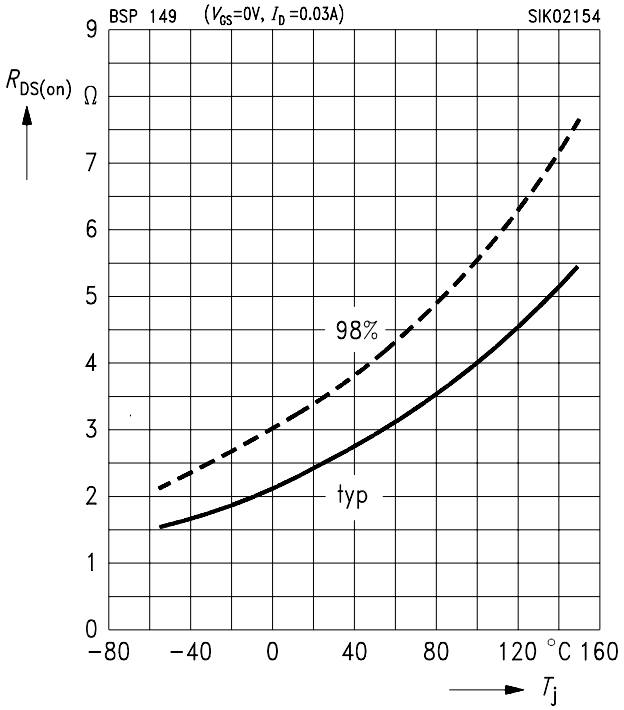
Typ. transfer characteristics $I_D = f(V_{GS})$
parameter: t_p = 80 µs, $V_{DS} \geq 2 \times I_D \times R_{DS(on)max.}$



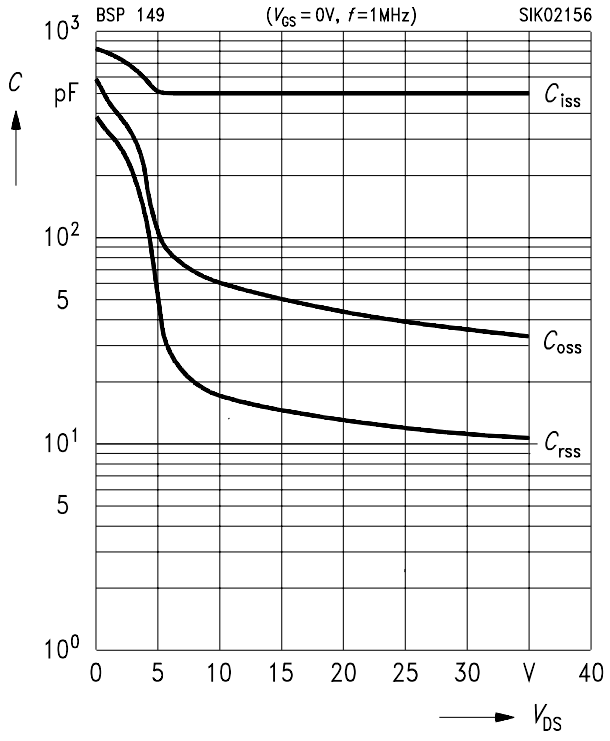
Typ. forward transconductance $g_{fs} = f(I_D)$
parameter: $V_{DS} \geq 2 \times I_D \times R_{DS(on)max.}$, t_p = 80 µs



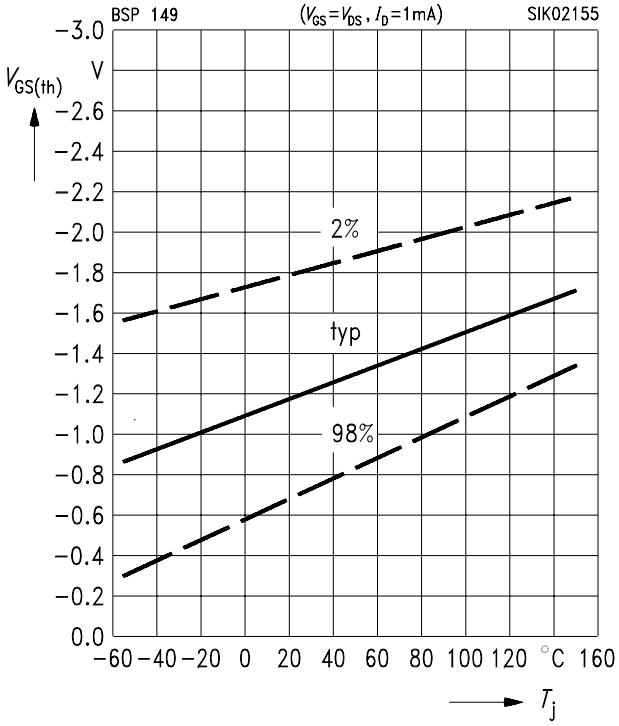
Drain-source on-resistance
$R_{DS(on)} = f(T_j)$
parameter: I_D = 0.03 A, V_{GS} = 0 V, (spread)



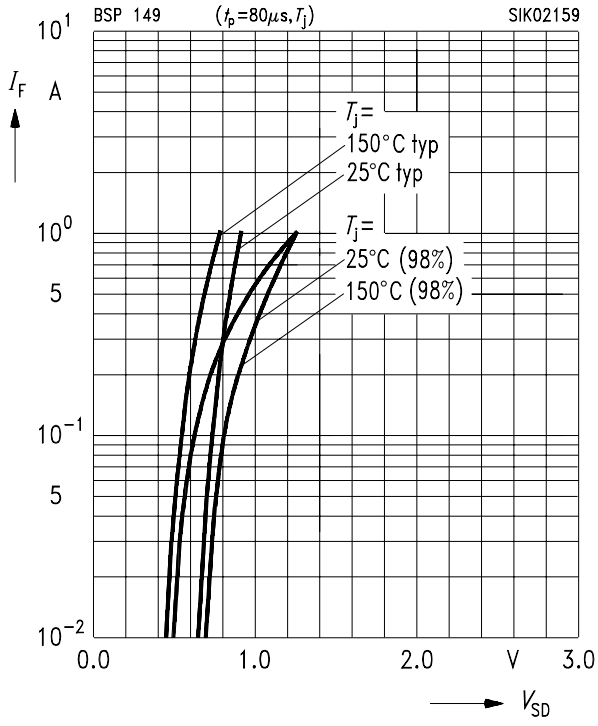
Typ. capacitances $C = f(V_{DS})$
parameter: V_{GS} = 0, f = 1 MHz



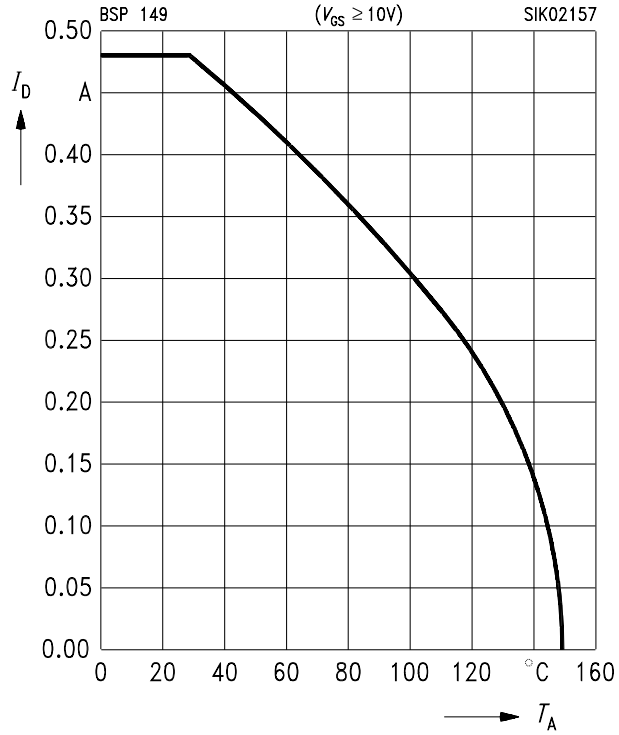
Gate threshold voltage $V_{GS(th)} = f(T_j)$
parameter: V_{DS} = 3 V, I_D = 1 mA, (spread)



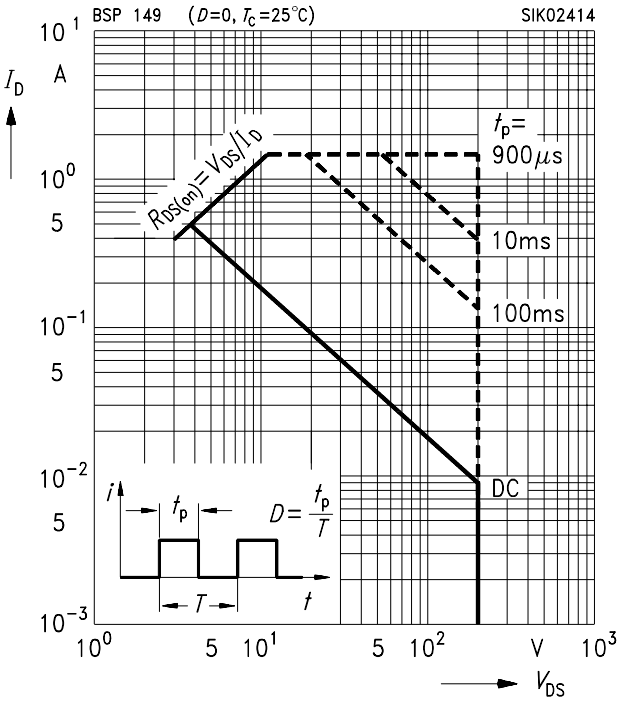
Forward characteristics of reverse diode
$I_F = f(V_{SD})$
parameter: t_p = 80 µs, T_j, (spread)



Drain current $I_D = f(T_A)$
parameter: $V_{GS} \geq 3$ V



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



Drain-source breakdown voltage

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