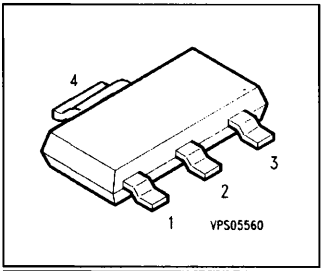
SIPMOS® Small-Signal Transistor

- N channel
- Enhancement mode
- $V_{GS(th)}$ = 1.5 ...2.5 V



Pin 1	Pin 2	Pin 3	Pin 4
G	D	S	D

Type	V_{DS}	I_D	$R_{DS(on)}$	Package	Marking
BSP 125	600 V	0.12 A	45 Ω	SOT-223	BSP 125

Type	Ordering Code	Tape and Reel Information
BSP 125	Q62702-S654	E6327
BSP 125	Q67000-S284	E6433

Maximum Ratings

Parameter	Symbol	Values	Unit
Drain source voltage	V_{DS}	600	V
Drain-gate voltage R_{GS} = 20 kΩ	V_{DGR}	600	
Gate source voltage	V_{GS}	± 14	
Gate-source peak voltage,aperiodic	V_{gs}	± 20	
Continuous drain current T_A = 39 °C	I_D	0.12	A
DC drain current, pulsed T_A = 25 °C	I_{Dpuls}	0.48	
Power dissipation T_A = 25 °C	P_{tot}	1.7	W

Maximum Ratings

Parameter	Symbol	Values	Unit
Chip or operating temperature	T_j	-55 ... + 150	°C
Storage temperature	T_{stg}	-55 ... + 150	
Thermal resistance, chip to ambient air	R_{thJA}	≤ 72	K/W
Therminal resistance, junction-soldering point [1]	R_{thJS}	≤ 12	
DIN humidity category, DIN 40 040		E	
IEC climatic category, DIN IEC 68-1		55 / 150 / 56	

1) Transistor on epoxy pcb 40 mm x 40 mm x 1,5 mm with 6 cm^2 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 V, I_D = 0.25 mA, T_j = 25 °C	$V_{(BR)DSS}$	600	-	-	V
Gate threshold voltage V_{GS}=V_{DS}, I_D = 1 mA	$V_{GS(th)}$	1.5	2	2.5	
Zero gate voltage drain current V_{DS} = 600 V, V_{GS} = 0 V, T_j = 25 °C V_{DS} = 600 V, V_{GS} = 0 V, T_j = 125 °C	I_{DSS}	- -	10 8	100 50	nA µA
Gate-source leakage current V_{GS} = 20 V, V_{DS} = 0 V	I_{GSS}	-	10	100	nA
Drain-Source on-state resistance V_{GS} = 10 V, I_D = 0.12 A	$R_{DS(on)}$	-	30	45	Ω

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

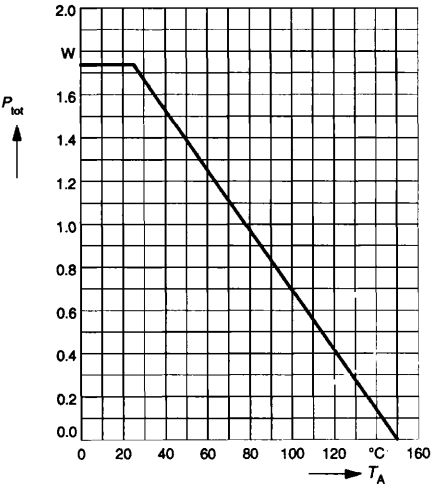
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Transconductance $V_{DS} \geq 2 \cdot I_D \cdot R_{DS(on)max}$, I_D = 0.12 A	g_{fs}	0.06	0.18	-	S
Input capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{iss}	-	95	130	pF
Output capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{oss}	-	9	14	
Reverse transfer capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{rss}	-	4	6	
Turn-on delay time V_{DD} = 30 V, V_{GS} = 10 V, I_D = 0.21 A R_{GS} = 50 Ω	$t_{d(on)}$	-	5	8	ns
Rise time V_{DD} = 30 V, V_{GS} = 10 V, I_D = 0.21 A R_{GS} = 50 Ω	t_r	-	10	15	
Turn-off delay time V_{DD} = 30 V, V_{GS} = 10 V, I_D = 0.21 A R_{GS} = 50 Ω	$t_{d(off)}$	-	16	21	
Fall time V_{DD} = 30 V, V_{GS} = 10 V, I_D = 0.21 A R_{GS} = 50 Ω	t_f	-	15	20	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Reverse Diode					
Inverse diode continuous forward current $T_A = 25$ °C	I_S	-	-	0.12	A
Inverse diode direct current,pulsed $T_A = 25$ °C	I_{SM}	-	-	0.48	
Inverse diode forward voltage $V_{GS} = 0$ V, $I_F = 0.24$ A, $T_j = 25$ °C	V_{SD}	-	0.9	1.3	V
Reverse recovery time $V_R = 30$ V, $I_F = I_S$, $di_F/dt = 100$ A/µs	t_{rr}	-	300	-	ns
Reverse recovery charge $V_R = 30$ V, $I_F = I_S$, $di_F/dt = 100$ A/µs	Q_{rr}	-	0.82	-	µC

Power dissipation

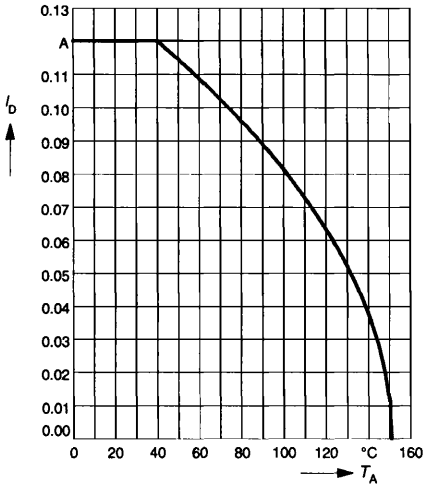
$P_{tot} = f(T_A)$



Drain current

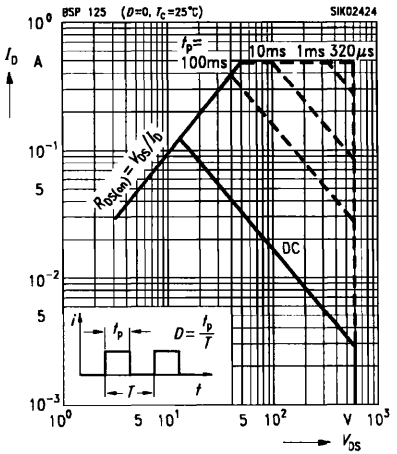
$I_D = f(T_A)$

parameter: $V_{GS} \geq 10$ V



Safe operating area $I_D = f(V_{DS})$

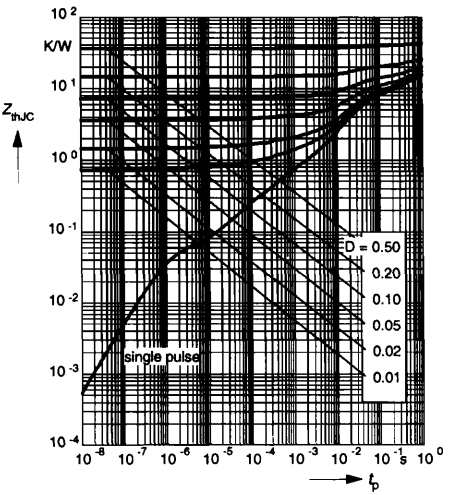
parameter : $D = 0$, $T_C = 25$°C



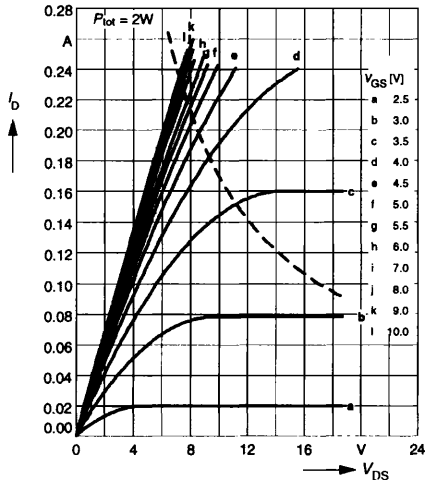
Transient thermal impedance

$Z_{th\,JA} = f(t_p)$

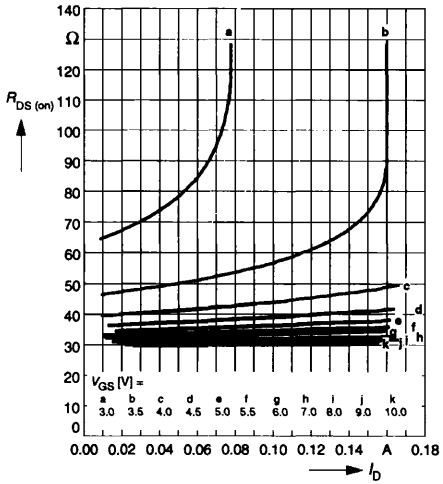
parameter: $D = t_p / T$



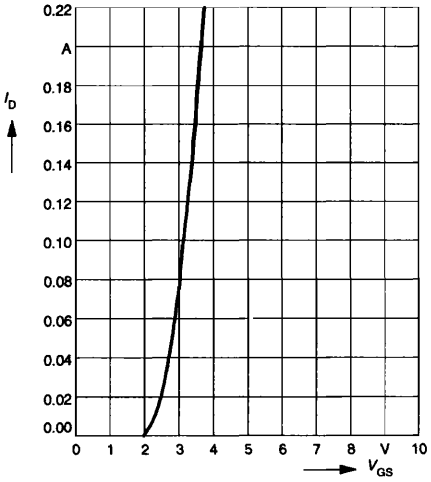
Typ. output characteristics
$I_D = f(V_{DS})$
parameter: t_p = 80 µs , T_j = 25 °C



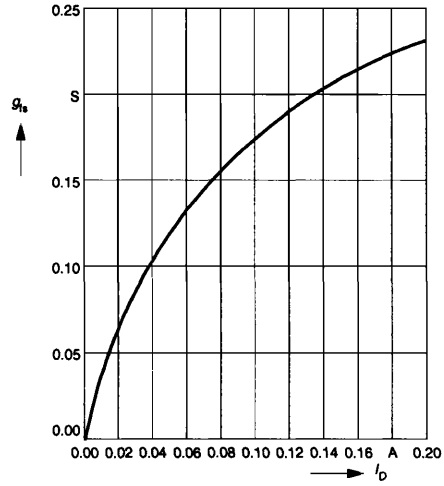
Typ. drain-source on-resistance
$R_{DS\,(on)} = f(I_D)$
parameter: t_p = 80 µs, T_j = 25 °C



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



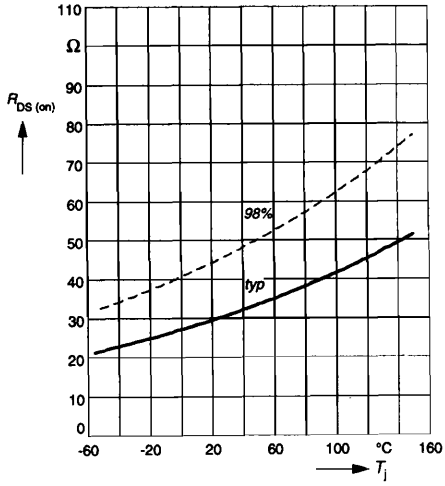
Typ. forward transconductance $g_{fs} = f(I_D)$
parameter: t_p = 80 µs,



Drain-source on-resistance

$R_{DS\,(on)} = f(T_j)$

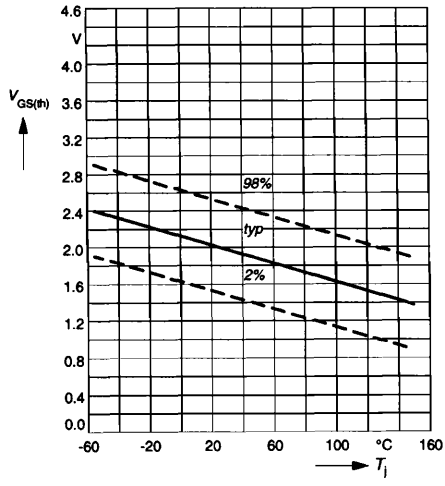
parameter: $I_D = 0.12$ A, $V_{GS} = 10$ V



Gate threshold voltage

$V_{GS\,(th)} = f(T_j)$

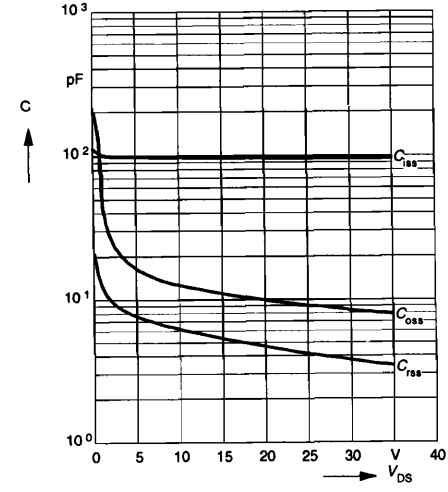
parameter: $V_{GS} = V_{DS}$, $I_D = 1$ mA



Typ. capacitances

$C = f(V_{DS})$

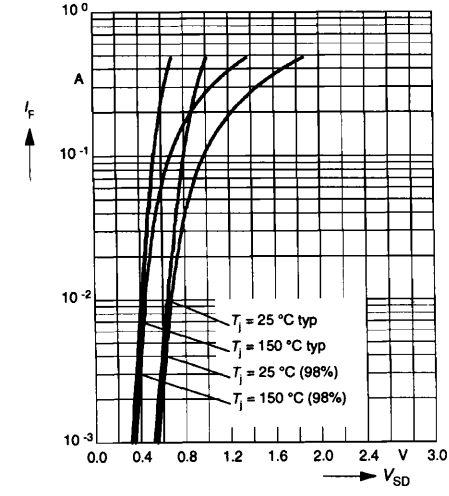
parameter: V_{GS}=0V, $f = 1$ MHz



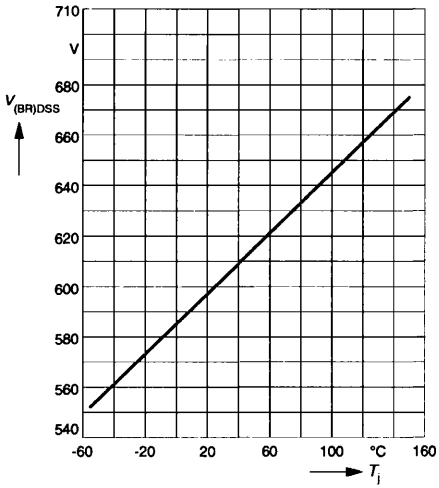
Forward characteristics of reverse diode

$I_F = f(V_{SD})$

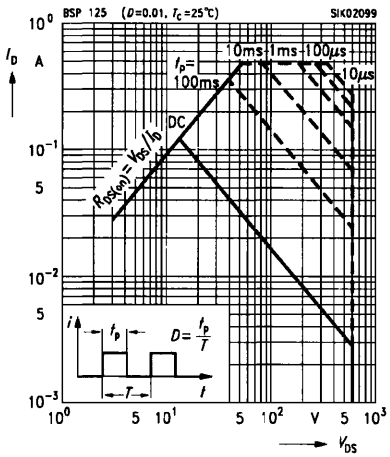
parameter: T_j, $t_p = 80$ µs



Drain-source breakdown voltage
$V_{(BR)DSS} = f(T_j)$



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



Package outlines

SOT-223

Dimensions in mm