SIEMENS

SIPMOS ® Small-Signal Transistor

- N channel
- Enhancement mode
- Logic Level
- $V_{GS(th)}$ = 0.8...2.0V

	Pin 1	Pin 2	Pin 3
	G	D	S

Type	V_{DS}	I_D	$R_{DS(on)}$	Package	Marking
BSS 89	240 V	0.3 A	6 Ω	TO-92	SS89

Type	Ordering Code	Tape and Reel Information
BSS 89	Q62702-S519	E6288
BSS 89	Q62702-S619	E6296
BSS 89	Q62702-S385	E6325

Maximum Ratings

Parameter	Symbol	Values	Unit
Drain source voltage	V_{DS}	240	V
Drain-gate voltage R_{GS} = 20 kΩ	V_{DGR}	240	
Gate source voltage	V_{GS}	± 14	
Gate-source peak voltage, aperiodic	V_{gs}	± 20	
Continuous drain current T_A = 25 °C	I_D	0.3	A
DC drain current, pulsed T_A = 25 °C	I_{Dpuls}	1.2	
Power dissipation T_A = 25 °C	P_{tot}	1	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 [1]	R_{thJA}	≤ 125	K/W
DIN humidity category, DIN 40 040		E	
IEC climatic category, DIN IEC 68-1		55 / 150 / 56	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

Static Characteristics

Parameter	Symbol	min.	typ.	max.	Unit
Drain- source breakdown voltage $V_{GS} = 0$ V, $I_D = 0.25$ mA, $T_j = 25$ °C	$V_{(BR)DSS}$	240	-	-	V
Gate threshold voltage $V_{GS}=V_{DS}$, $I_D = 1$ mA	$V_{GS(th)}$	0.8	1.5	2	
Zero gate voltage drain current	I_{DSS}				µA
$V_{DS} = 240$ V, $V_{GS} = 0$ V, $T_j = 25$ °C		-	0.1	1	
$V_{DS} = 240$ V, $V_{GS} = 0$ V, $T_j = 125$ °C		-	10	100	
$V_{DS} = 60$ V, $V_{GS} = 0$ V, $T_j = 25$ °C		-	-	0.2	
Gate-source leakage current	I_{GSS}				nA
$V_{GS} = 20$ V, $V_{DS} = 0$ V		-	10	100	
Drain-Source on-state resistance	$R_{DS(on)}$				Ω
$V_{GS} = 10$ V, $I_D = 0.3$ A		-	4.5	6	
$V_{GS} = 4.5$ V, $I_D = 0.3$ A		-	5.3	10	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Transconductance $V_{DS} \geq 2 * I_D * R_{DS(on)max}$, $I_D = 0.3$ A	g_{fs}	0.14	0.33	-	S
Input capacitance $V_{GS} = 0$ V, $V_{DS} = 25$ V, $f = 1$ MHz	C_{iss}	-	115	155	pF
Output capacitance $V_{GS} = 0$ V, $V_{DS} = 25$ V, $f = 1$ MHz	C_{oss}	-	15	25	
Reverse transfer capacitance $V_{GS} = 0$ V, $V_{DS} = 25$ V, $f = 1$ MHz	C_{rss}	-	8	12	
Turn-on delay time $V_{DD} = 30$ V, $V_{GS} = 10$ V, $I_D = 0.28$ A $R_G = 50$ Ω	$t_{d(on)}$	-	5	8	ns
Rise time $V_{DD} = 30$ V, $V_{GS} = 10$ V, $I_D = 0.28$ A $R_G = 50$ Ω	t_r	-	10	15	
Turn-off delay time $V_{DD} = 30$ V, $V_{GS} = 10$ V, $I_D = 0.28$ A $R_G = 50$ Ω	$t_{d(off)}$	-	30	40	
Fall time $V_{DD} = 30$ V, $V_{GS} = 10$ V, $I_D = 0.28$ A $R_G = 50$ Ω	t_f	-	20	27	

Electrical Characteristics, at $T_j = 25°C$, unless otherwise specified
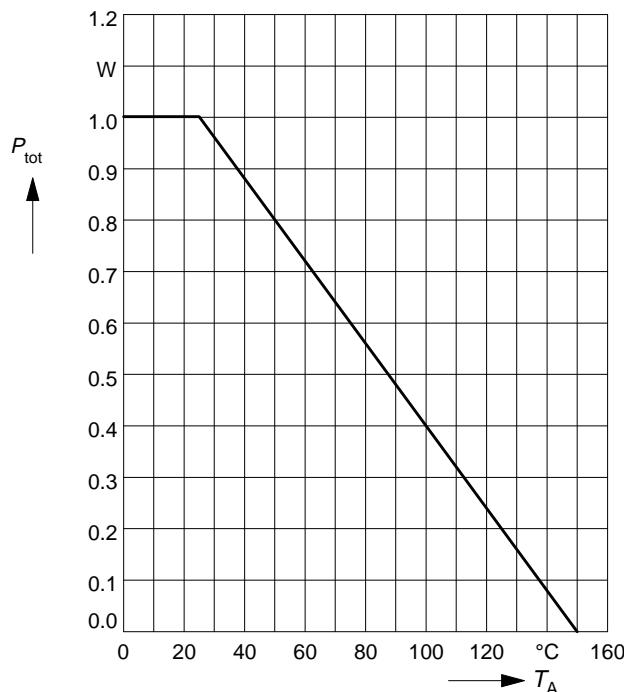
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Reverse Diode					
Inverse diode continuous forward current $T_A = 25 °C$	I_S	-	-	0.3	A
Inverse diode direct current,pulsed $T_A = 25 °C$	I_{SM}	-	-	1.2	
Inverse diode forward voltage $V_{GS} = 0$ V, $I_F = 0.6$ A	V_{SD}	-	0.9	1.4	V
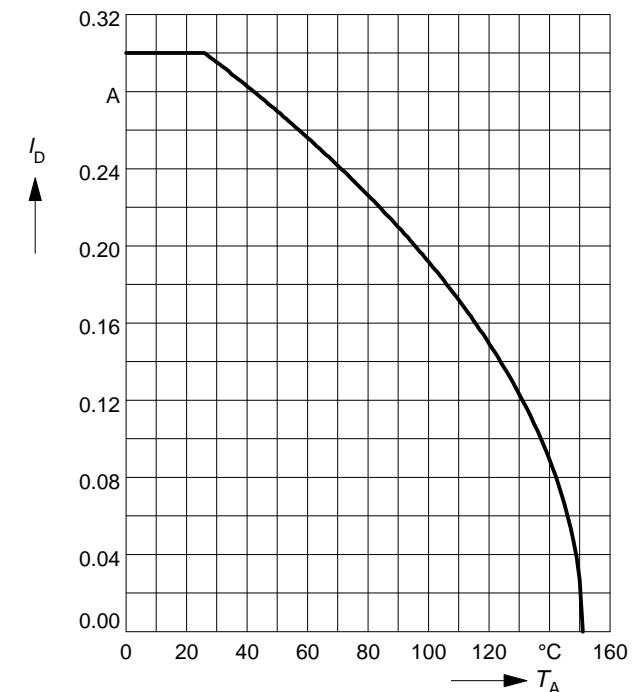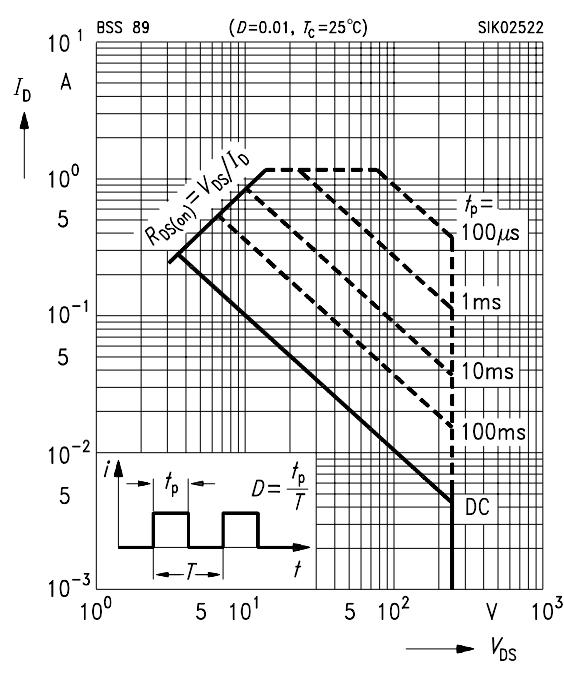
Power dissipation

$P_{tot} = f(T_A)$
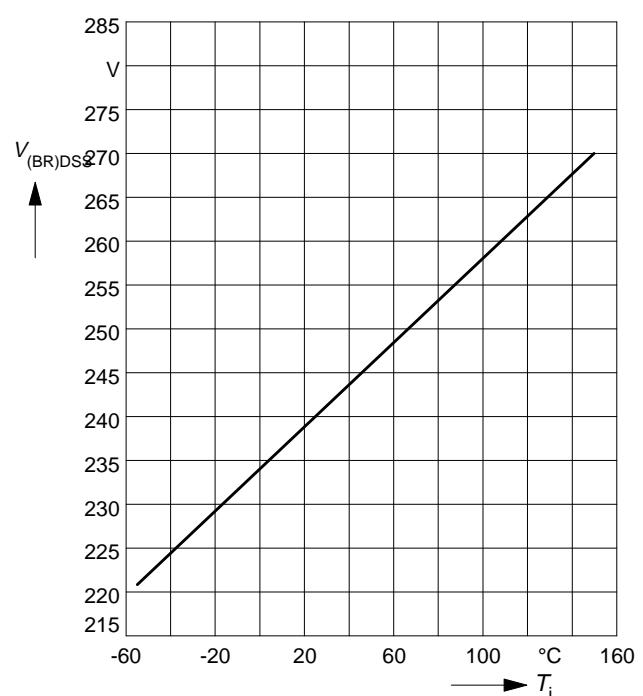
Drain current

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

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

parameter : $D = 0.01$, $T_C = 25°C$

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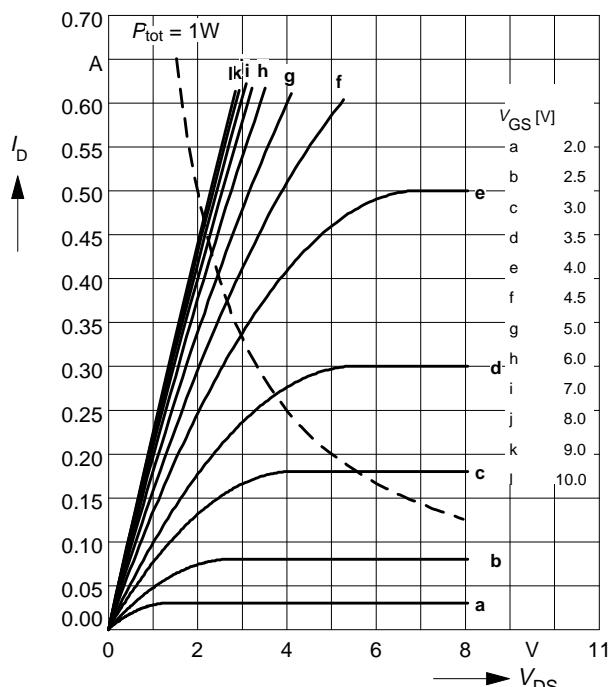
$V_{(BR)DSS} = f(T_j)$

Typ. output characteristics
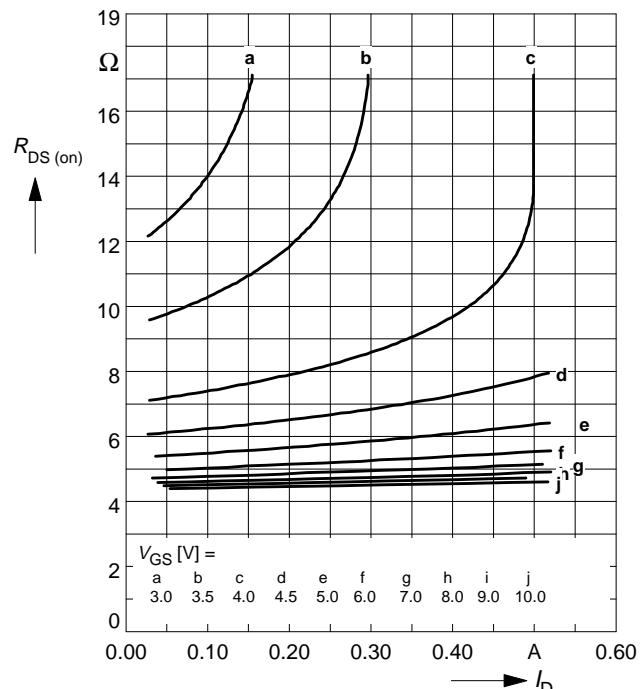
$I_D = f(V_{DS})$

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

V_{GS} [V]	
a	2.0
b	2.5
c	3.0
d	3.5
e	4.0
f	4.5
g	5.0
h	6.0
i	7.0
j	8.0
k	9.0
l	10.0

$P_{tot} = 1W$

V_{GS} [V] =									
a	b	c	d	e	f	g	h	i	j
3.0	3.5	4.0	4.5	5.0	6.0	7.0	8.0	9.0	10.0
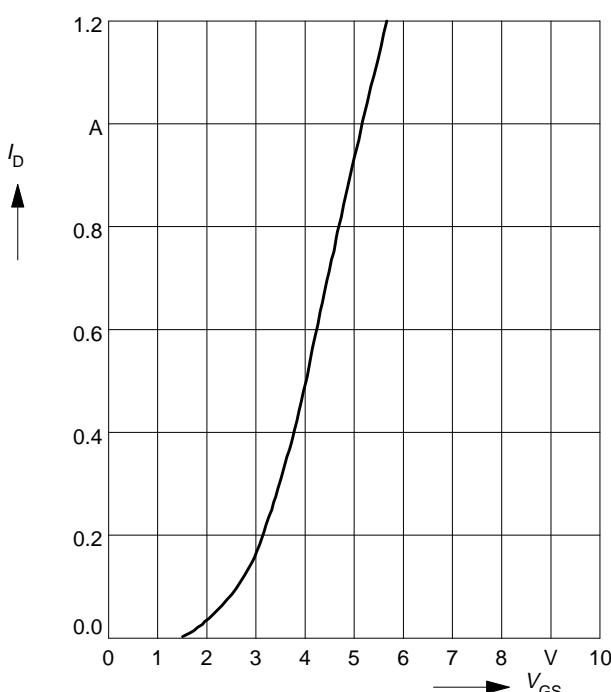
Typ. transfer characteristics $I_D = f(V_{GS})$
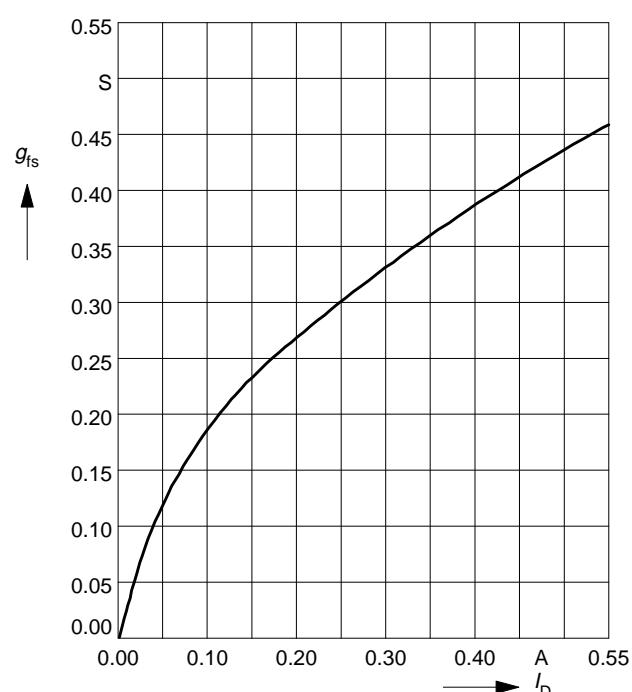
parameter: $t_p = 80$ µs

$V_{DS} \geq 2$ x I_D x $R_{DS(on)max}$

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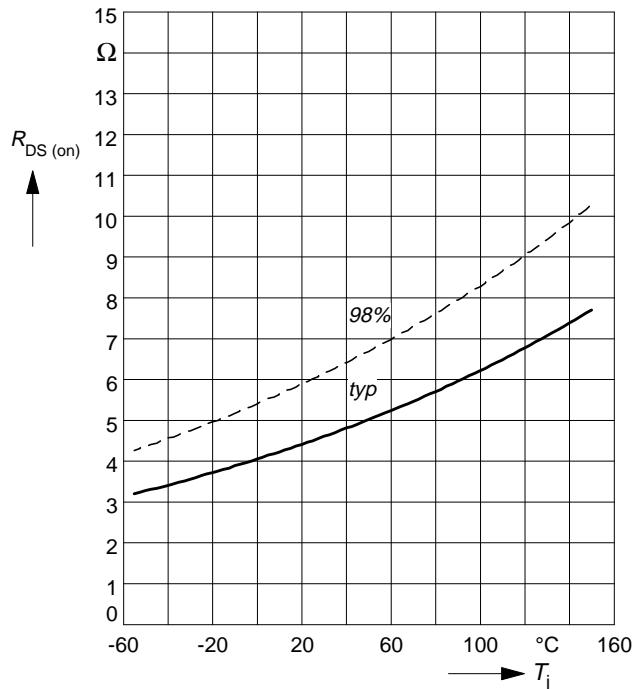
parameter: $t_p = 80$ µs,

$V_{DS} \geq 2$ x I_D x $R_{DS(on)max}$
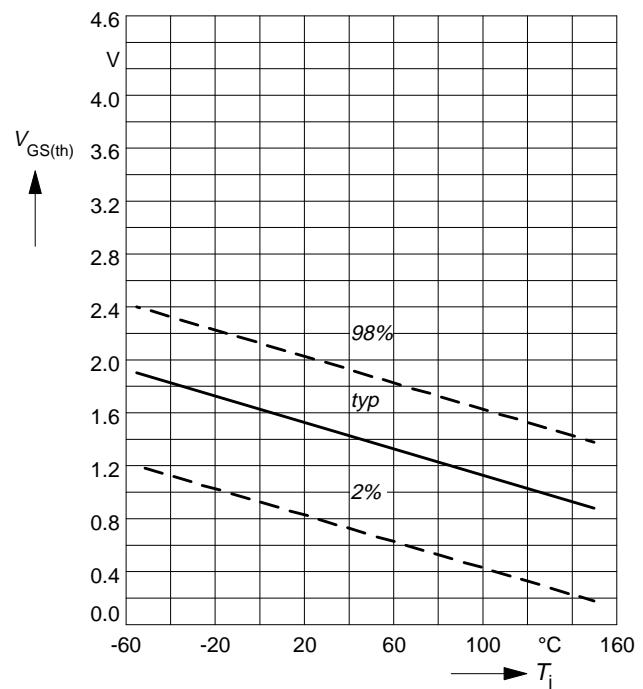
Drain-source on-resistance

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

parameter: $I_D = 0.3$ A, $V_{GS} = 10$ V
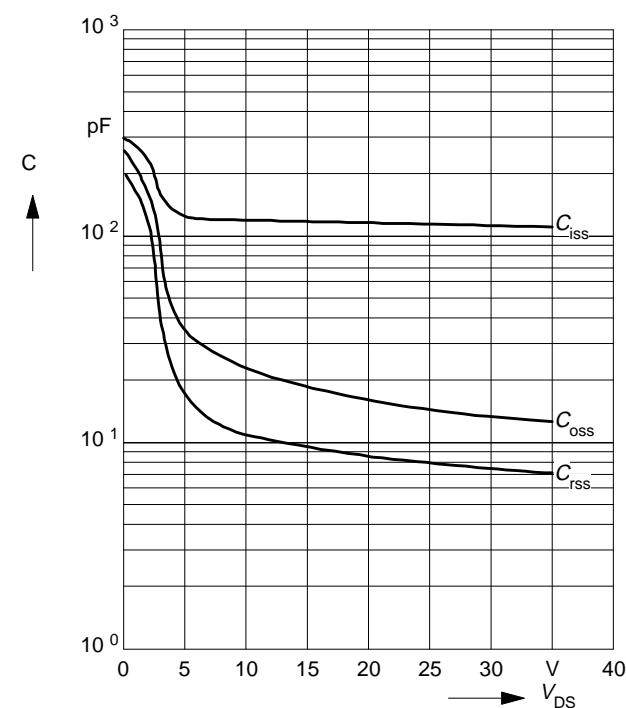
Gate threshold voltage

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

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

Typ. capacitances

$C = f(V_{DS})$

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

Forward characteristics of reverse diode

$I_F = f(V_{SD})$

parameter: T_j, $t_p = 80$ µs