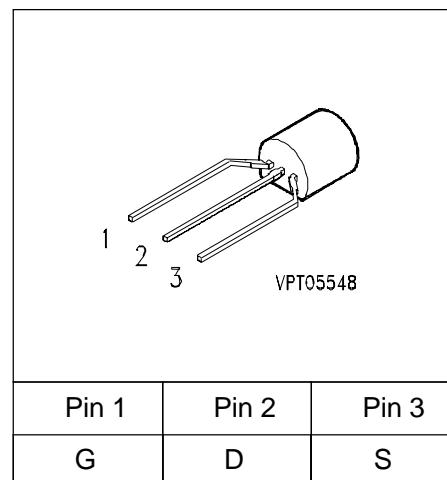


BSS 89

SIPMOS® Small-Signal Transistor

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



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 $R_{GS} = 20\text{ k}\Omega$	V_{DGR}	240	
Gate source voltage	V_{GS}	± 20	
ESD Sensitivity (HBM) as per MIL-STD 883		Class 1	
Continuous drain current $T_A = 25\text{ }^\circ\text{C}$	I_D	0.3	A
DC drain current, pulsed $T_A = 25\text{ }^\circ\text{C}$	I_{Dpuls}	1.2	
Power dissipation $T_A = 25\text{ }^\circ\text{C}$	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 $T_j = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

Static Characteristics

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

Electrical Characteristics, at $T_j = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

Dynamic Characteristics

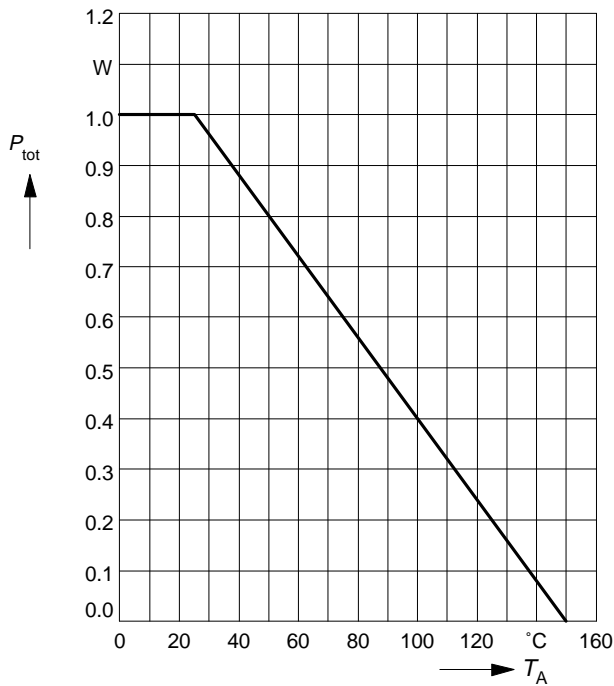
Transconductance $V_{DS} \geq 2 \cdot I_D \cdot R_{DS(on)max}$, $I_D = 0.3\text{ A}$	g_{fs}	0.14	0.33	-	S
Input capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$	C_{iss}	-	115	155	pF
Output capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$	C_{oss}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

Electrical Characteristics, at $T_j = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Reverse Diode					
Inverse diode continuous forward current $T_A = 25\text{ }^{\circ}\text{C}$	I_S	-	-	0.3	A
Inverse diode direct current,pulsed $T_A = 25\text{ }^{\circ}\text{C}$	I_{SM}	-	-	1.2	
Inverse diode forward voltage $V_{GS} = 0\text{ V}, I_F = 0.6\text{ A}$	V_{SD}	-	0.9	1.4	V

Power dissipation

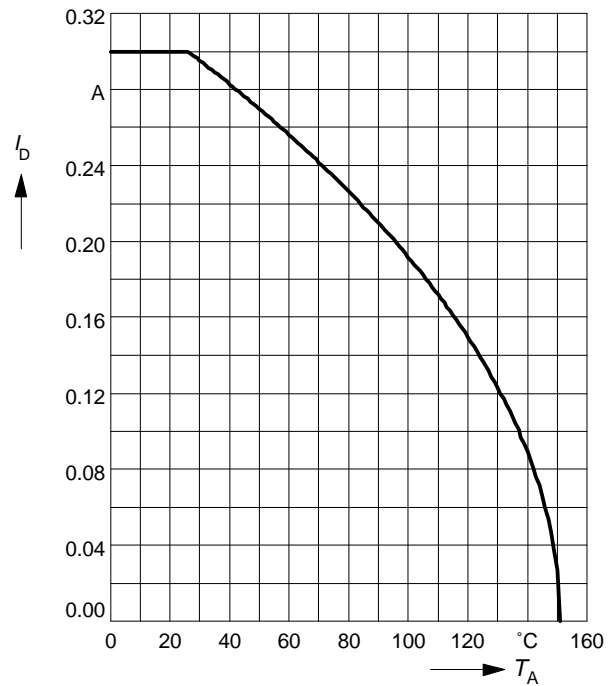
$$P_{\text{tot}} = f(T_A)$$



Drain current

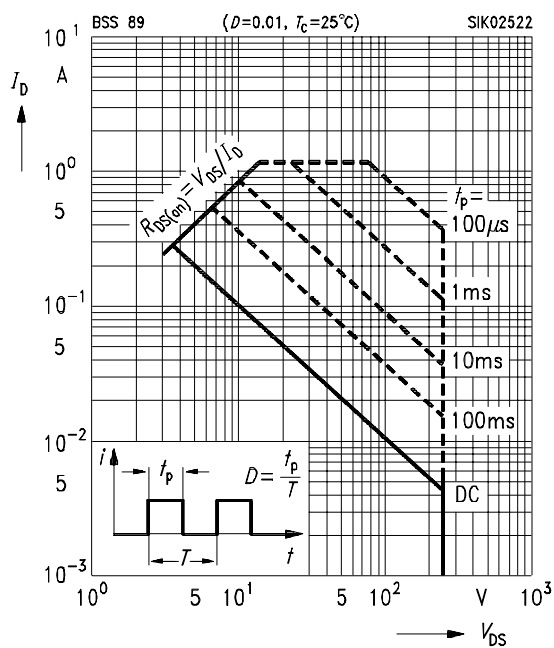
$$I_D = f(T_A)$$

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



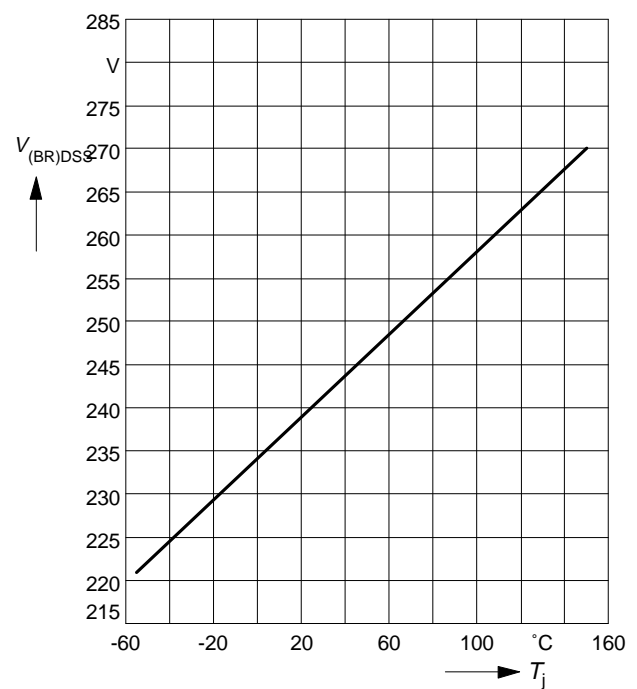
Safe operating area $I_D = f(V_{DS})$

parameter : $D = 0.01$, $T_C = 25^\circ\text{C}$



Drain-source breakdown voltage

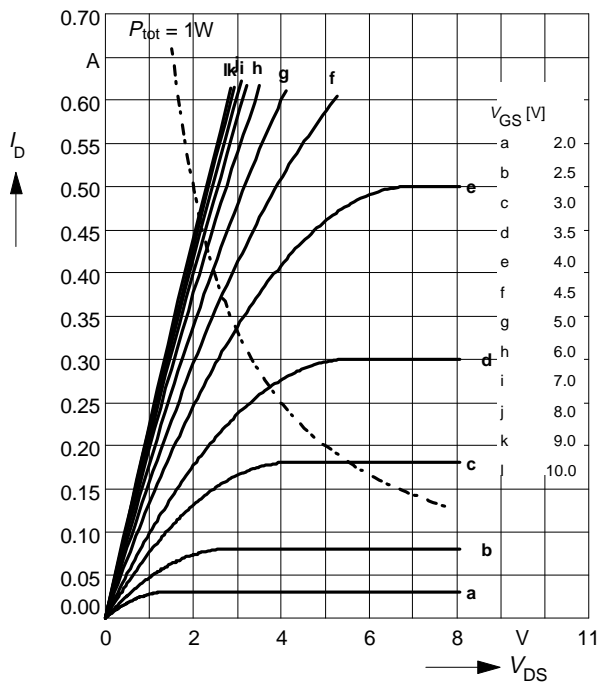
$$V_{(BR)DSS} = f(T_j)$$



Typ. output characteristics

$$I_D = f(V_{DS})$$

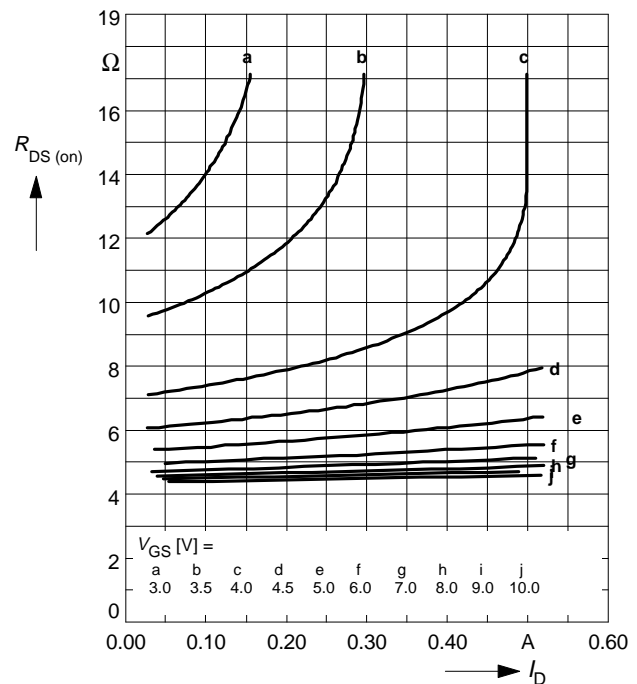
parameter: $t_p = 80 \mu s$



Typ. drain-source on-resistance

$$R_{DS(on)} = f(I_D)$$

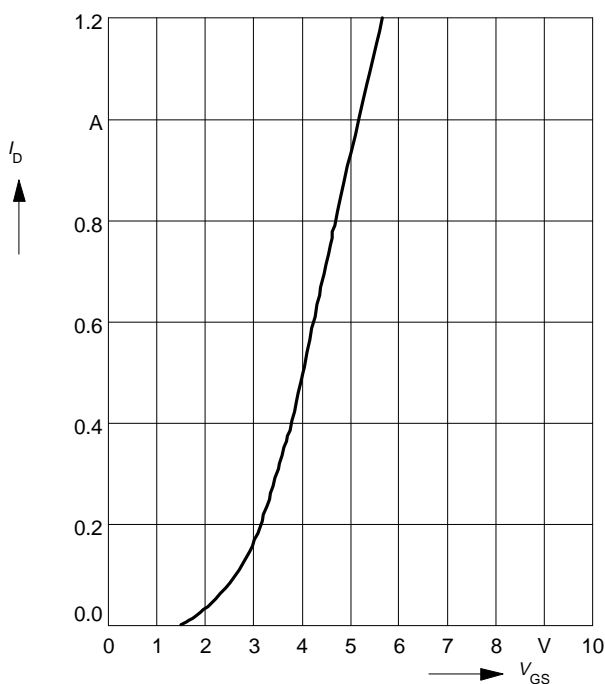
parameter: $t_p = 80 \mu s$, $T_j = 25^\circ C$



Typ. transfer characteristics $I_D = f(V_{GS})$

parameter: $t_p = 80 \mu s$

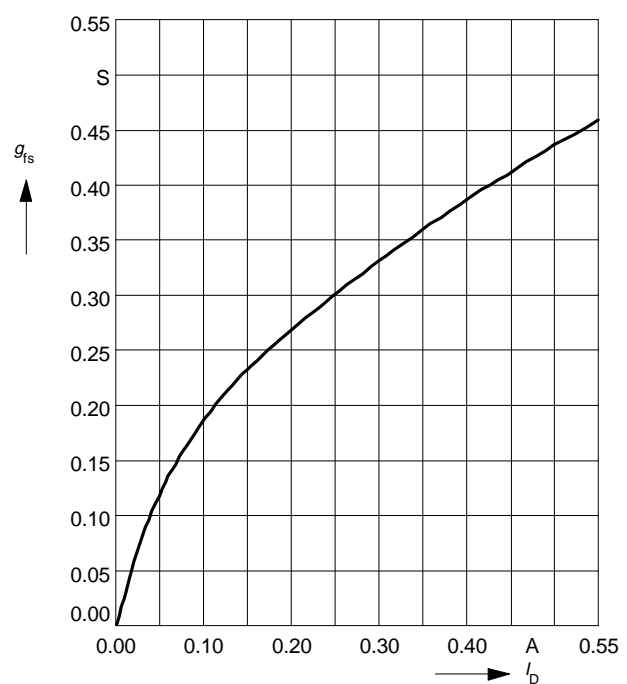
$$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$$



Typ. forward transconductance $g_{fs} = f(I_D)$

parameter: $t_p = 80 \mu s$,

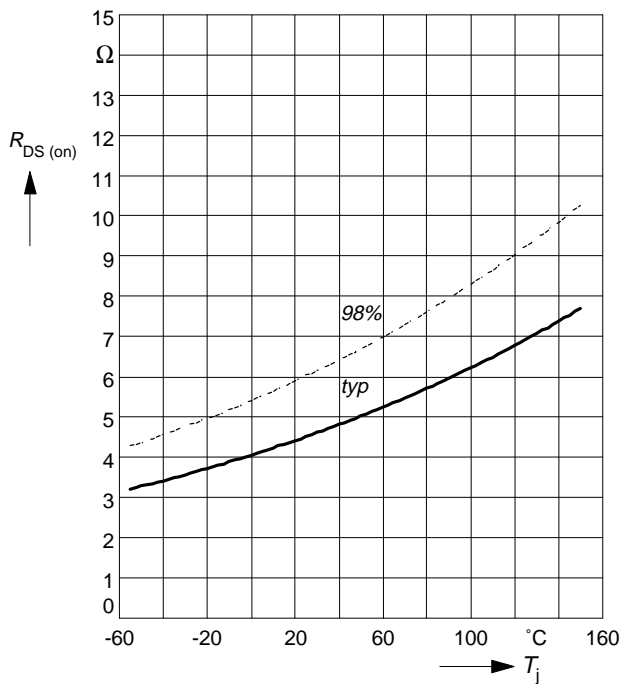
$$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$$



Drain-source on-resistance

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

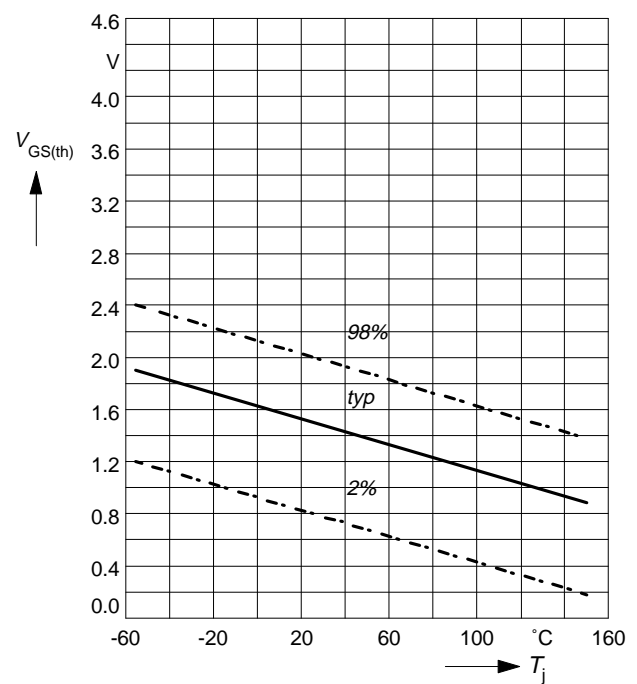
parameter: $I_D = 0.3 \text{ A}$, $V_{GS} = 10 \text{ V}$



Gate threshold voltage

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

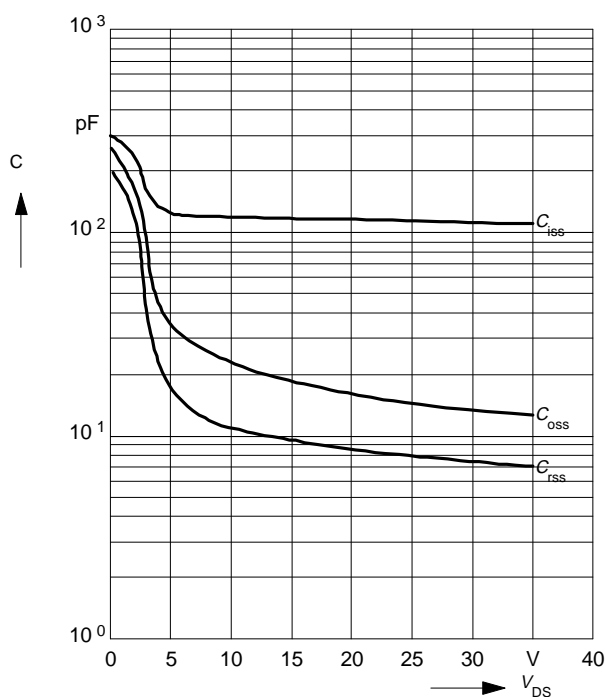
parameter: $V_{GS} = V_{DS}$, $I_D = 1 \text{ mA}$



Typ. capacitances

$$C = f(V_{DS})$$

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



Forward characteristics of reverse diode

$$I_F = f(V_{SD})$$

parameter: T_j , $t_p = 80 \mu\text{s}$

