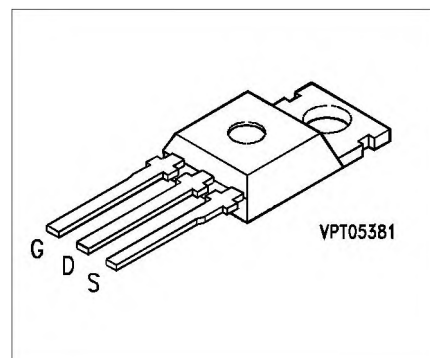


SIPMOS® Power Transistor

BUZ 171

- P channel
- Enhancement mode
- Avalanche rated



Type	V_{DS}	I_D	$R_{DS(on)}$	Package ¹⁾	Ordering Code
BUZ 171	- 50 V	- 8.0 A	0.3 Ω	TO-220 AB	C67078-S1450-A2

Maximum Ratings

Parameter	Symbol	Values	Unit
Continuous drain current, $T_C = 30\text{ }^\circ\text{C}$	I_D	- 8.0	A
Pulsed drain current, $T_C = 25\text{ }^\circ\text{C}$	$I_{D\text{ puls}}$	- 32	
Avalanche energy, single pulse $I_D = - 8.0\text{ A}$, $V_{DD} = - 25\text{ V}$, $R_{GS} = 25\text{ }\Omega$ $L = 1.88\text{ mH}$, $T_j = 25\text{ }^\circ\text{C}$	E_{AS}	120	mJ
Gate-source voltage	V_{GS}	± 20	V
Power dissipation, $T_C = 25\text{ }^\circ\text{C}$	P_{tot}	40	W
Operating and storage temperature range	T_j, T_{stg}	- 55 ... + 150	$^\circ\text{C}$
Thermal resistance, chip-case	R_{thJC}	≤ 3.1	K/W
DIN humidity category, DIN 40 040		E	-
IEC climatic category, DIN IEC 68-1		55/150/56	

1) See chapter Package Outlines.

Electrical Characteristics

at $T_j = 25\text{ °C}$, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

Static characteristics

Drain-source breakdown voltage $V_{GS} = 0\text{ V}$, $I_D = -0.25\text{ mA}$	$V_{(BR)DSS}$	- 50	-	-	V
Gate threshold voltage $V_{GS} = V_{DS}$, $I_D = -1\text{ mA}$	$V_{GS(th)}$	- 2.1	- 3.0	- 4.0	
Zero gate voltage drain current $V_{DS} = -50\text{ V}$, $V_{GS} = 0\text{ V}$ $T_j = 25\text{ °C}$ $T_j = 125\text{ °C}$	I_{DSS}	-	- 20 - 100	- 250 - 1000	μA
Gate-source leakage current $V_{GS} = -20\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}	-	- 10	- 100	nA
Drain-source on-resistance $V_{GS} = -10\text{ V}$, $I_D = -5.0\text{ A}$	$R_{DS(on)}$	-	0.25	0.3	Ω

Dynamic characteristics

Forward transconductance $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$, $I_D = -5.0\text{ A}$	g_{fs}	1.5	2.3	-	S
Input capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = -25\text{ V}$, $f = 1\text{ MHz}$	C_{iss}	-	850	1300	pF
Output capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = -25\text{ V}$, $f = 1\text{ MHz}$	C_{oss}	-	350	550	
Reverse transfer capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = -25\text{ V}$, $f = 1\text{ MHz}$	C_{rss}	-	130	200	
Turn-on time t_{on} , ($t_{on} = t_{d(on)} + t_r$) $V_{DD} = -30\text{ V}$, $V_{GS} = -10\text{ V}$, $I_D = -2.9\text{ A}$, $R_{GS} = 50\text{ }\Omega$	$t_{d(on)}$	-	20	30	ns
	t_r	-	60	95	
Turn-off time t_{off} , ($t_{off} = t_{d(off)} + t_f$) $V_{DD} = -30\text{ V}$, $V_{GS} = -10\text{ V}$, $I_D = -2.9\text{ A}$, $R_{GS} = 50\text{ }\Omega$	$t_{d(off)}$	-	70	90	
	t_f	-	55	75	

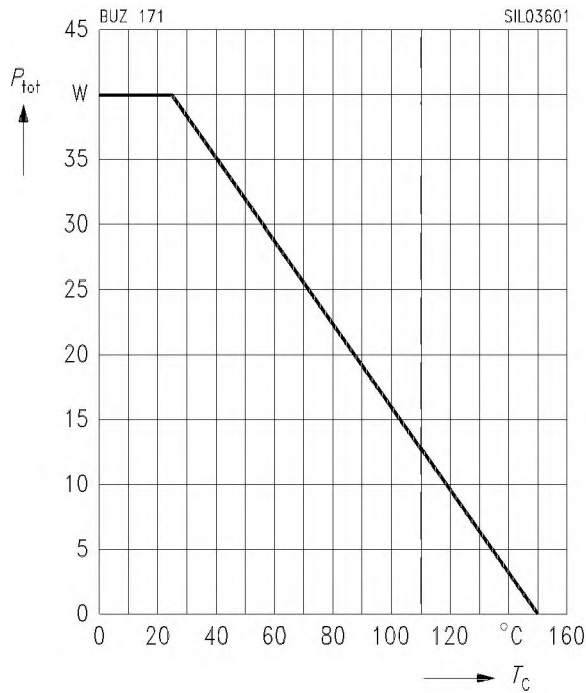
Electrical Characteristics (cont'd)at $T_j = 25\text{ °C}$, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Reverse diode					
Continuous reverse drain current $T_C = 25\text{ °C}$	I_S	–	–	– 8.0	A
Pulsed reverse drain current $T_C = 25\text{ °C}$	I_{SM}	–	–	– 32	
Diode forward on-voltage $I_S = -16\text{ A}$, $V_{GS} = 0\text{ V}$	V_{SD}	–	– 1.0	– 1.7	V
Reverse recovery time $V_R = -30\text{ V}$, $I_F = I_S$, $di_F / dt = -100\text{ A}/\mu\text{s}$	t_{rr}	–	90	–	ns
Reverse recovery charge $V_R = -30\text{ V}$, $I_F = I_S$, $di_F / dt = -100\text{ A}/\mu\text{s}$	Q_{rr}	–	0.23	–	μC

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

Total power dissipation

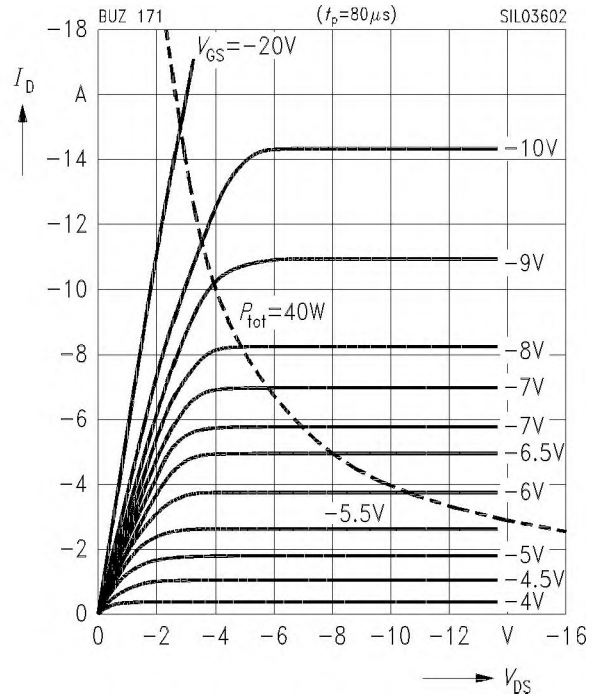
$$P_{\text{tot}} = f(T_C)$$



Typ. output characteristics

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

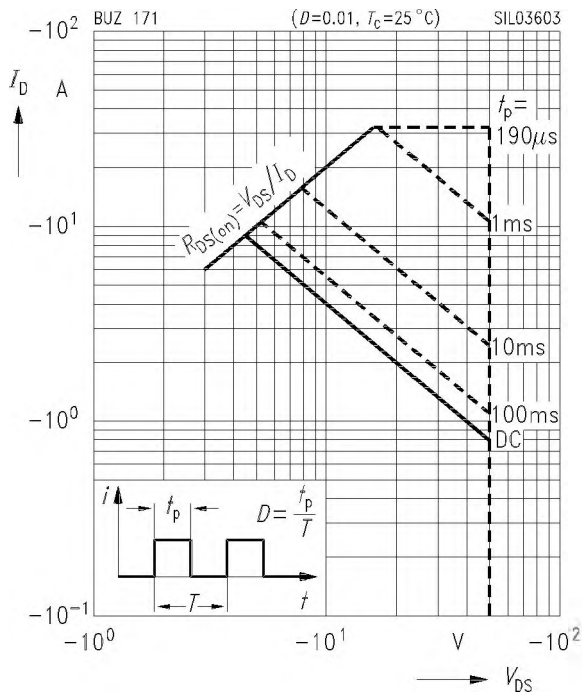
parameter: $t_p = 80 \mu\text{s}$



Safe operating area

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

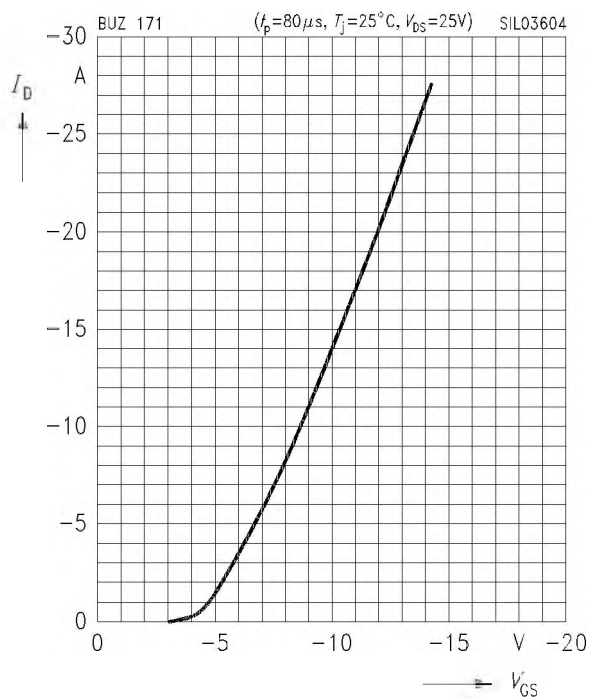
parameter: $D = 0.01$, $T_C = 25^\circ\text{C}$



Typ. transfer characteristics

$$I_D = f(V_{\text{GS}})$$

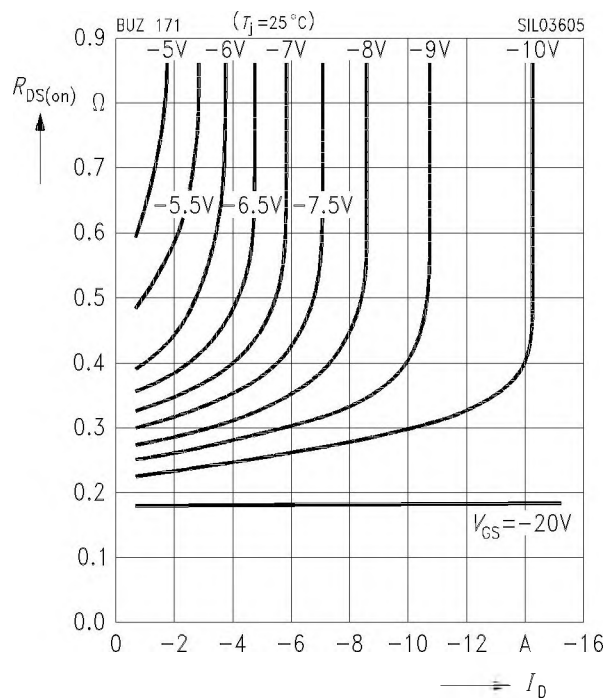
parameter: $t_p = 80 \mu\text{s}$, $V_{\text{DS}} = 25 \text{ V}$



Typ. drain-source on-resistance

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

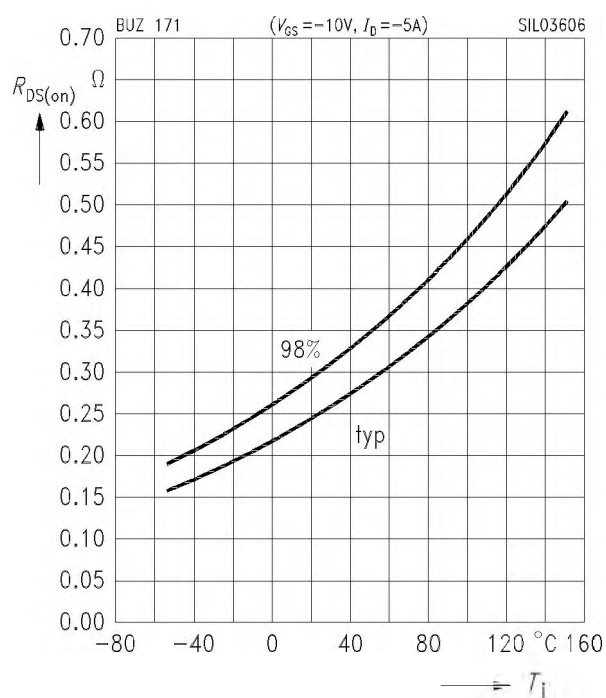
parameter: V_{GS}



Drain-source on-resistance

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

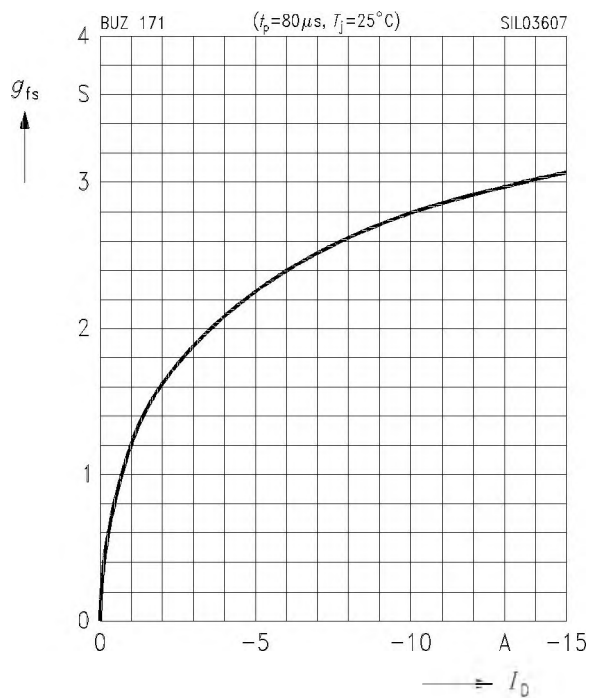
parameter: $I_D = -5\text{ A}$, $V_{GS} = -10\text{ V}$, (spread)



Typ. forward transconductance

$$g_{fs} = f(I_D)$$

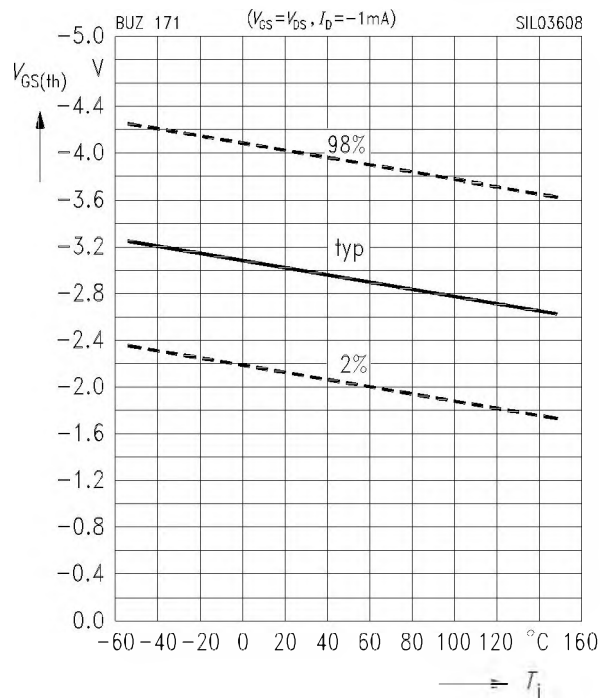
parameter: $t_p = 80\ \mu\text{s}$



Gate threshold voltage

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

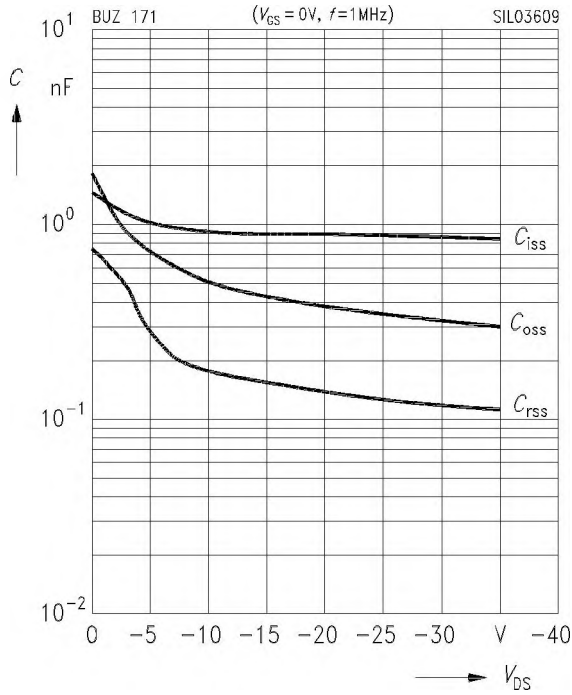
parameter: $V_{GS} = V_{DS}$, $I_D = -1\text{ mA}$, (spread)



Typ. capacitances

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

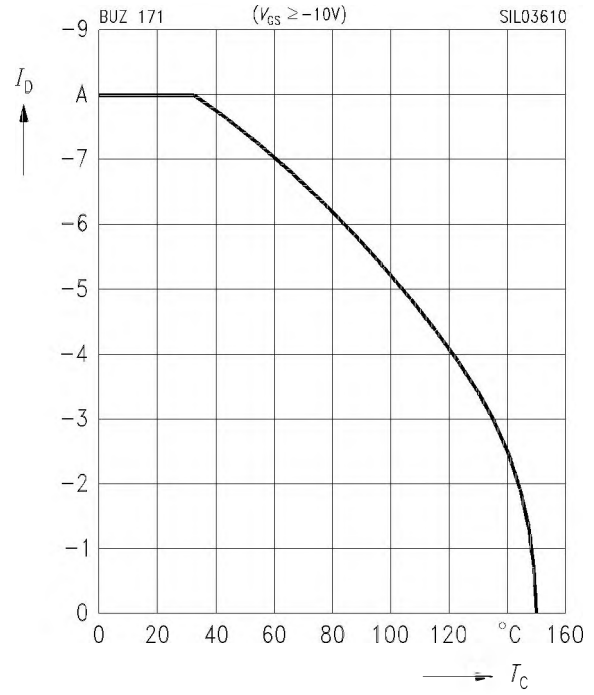
parameter: $V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$



Drain current

$$I_D = f(T_C)$$

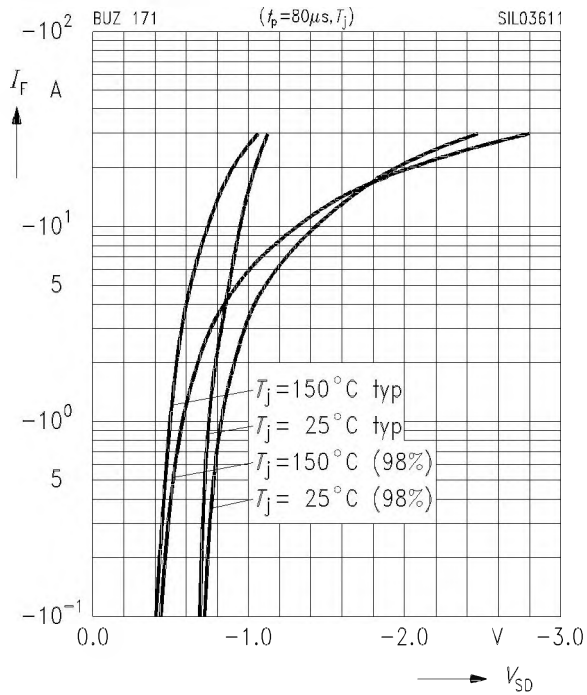
parameter: $V_{GS} \geq -10 \text{ V}$



Forward characteristics of reverse diode

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

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



Transient thermal impedance

$$Z_{thJC} = f(t_p)$$

parameter: $D = t_p / T$

