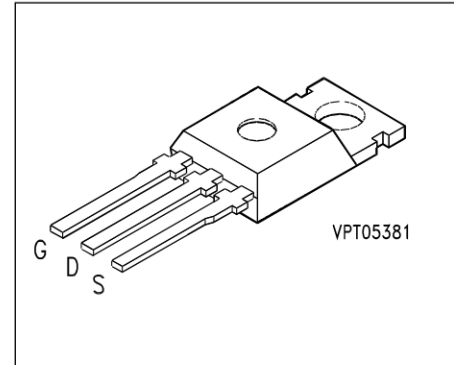


## SIPMOS® Power Transistor

**BUZ 171**

- P channel
- Enhancement mode
- Avalanche rated



Type	$V_{DS}$	$I_D$	$R_{DS(on)}$	Package <sup>1)</sup>	Ordering Code
<b>BUZ 171</b>	- 50 V	- 8.0 A	0.3 $\Omega$	TO-220 AB	C67078-S1450-A2

### Maximum Ratings

Parameter	Symbol	Values	Unit
Continuous drain current, $T_C = 30\text{ °C}$	$I_D$	- 8.0	A
Pulsed drain current, $T_C = 25\text{ °C}$	$I_{D\text{ puls}}$	- 32	
Avalanche energy, single pulse $I_D = - 8.0\text{ A}$ , $V_{DD} = - 25\text{ V}$ , $R_{GS} = 25\text{ }\Omega$ $L = 1.88\text{ mH}$ , $T_j = 25\text{ °C}$	$E_{AS}$	120	mJ
Gate-source voltage	$V_{GS}$	$\pm 20$	V
Power dissipation, $T_C = 25\text{ °C}$	$P_{tot}$	40	W
Operating and storage temperature range	$T_j, T_{stg}$	- 55 ... + 150	$^{\circ}\text{C}$

Thermal resistance, chip-case	$R_{thJC}$	$\leq 3.1$	K/W
DIN humidity category, DIN 40 040		<b>E</b>	-
IEC climatic category, DIN IEC 68-1		<b>55/150/56</b>	

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	$\mu\text{A}$
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	$\Omega$

### 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	

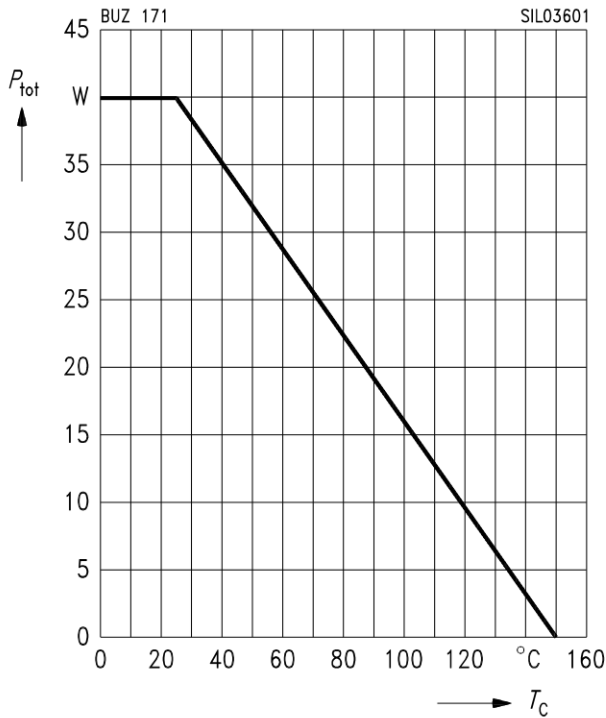
**Electrical Characteristics** (cont'd)at  $T_j = 25\text{ °C}$ , unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Reverse diode</b>					
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	–	$\mu\text{C}$

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

**Total power dissipation**

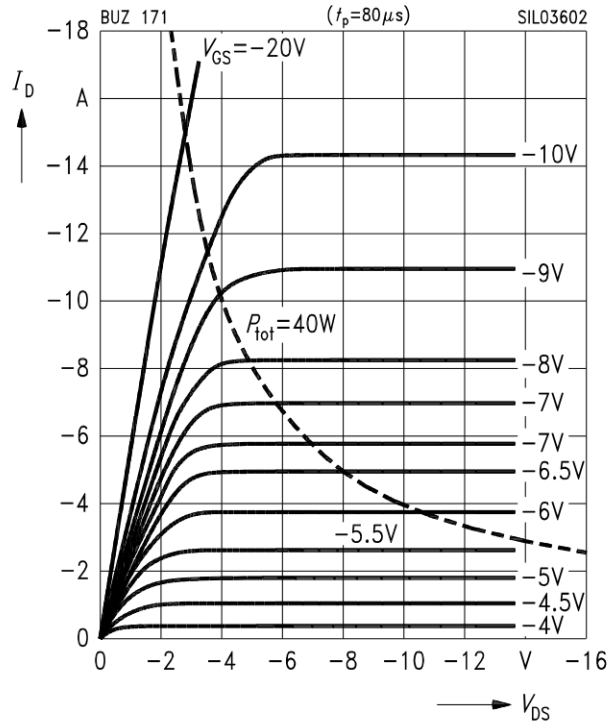
$P_{\text{tot}} = f(T_C)$



**Typ. output characteristics**

$I_D = f(V_{DS})$

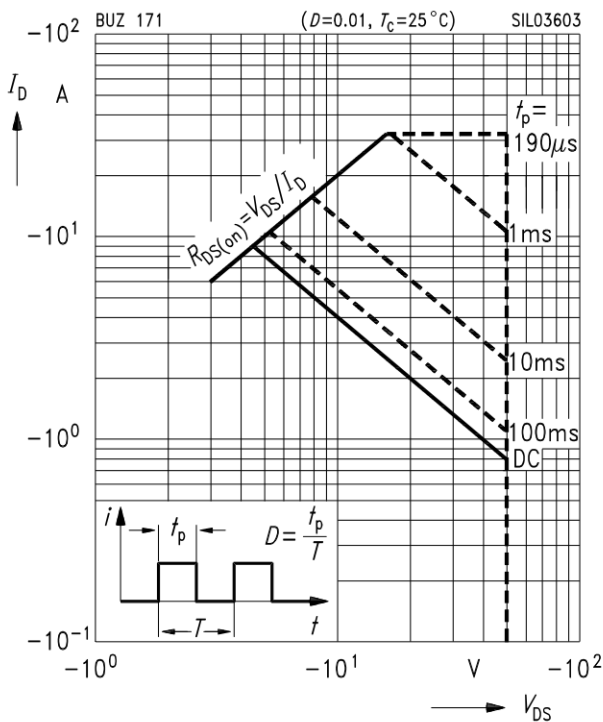
parameter:  $t_p = 80 \mu\text{s}$



**Safe operating area**

$I_D = f(V_{DS})$

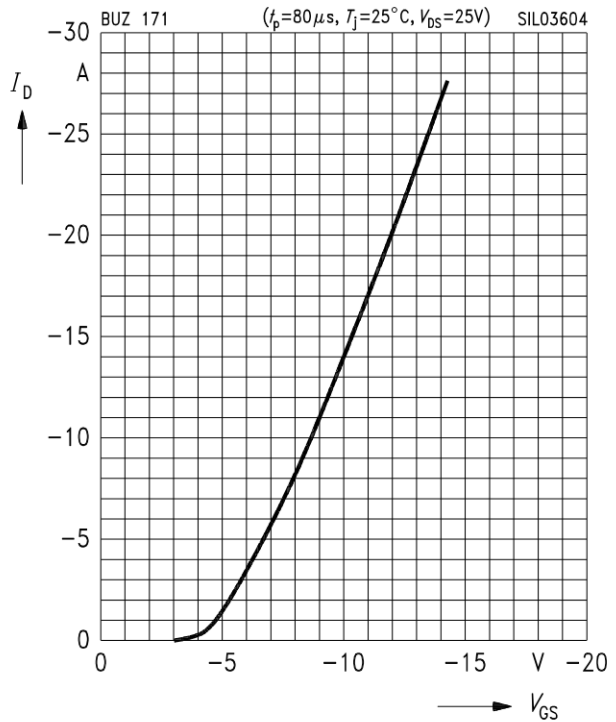
parameter:  $D = 0.01$ ,  $T_C = 25^\circ\text{C}$



**Typ. transfer characteristics**

$I_D = f(V_{GS})$

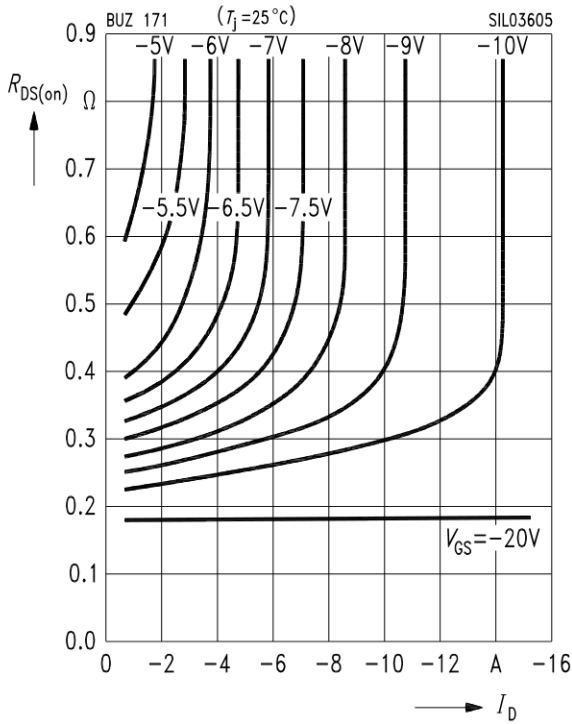
parameter:  $t_p = 80 \mu\text{s}$ ,  $V_{DS} = 25 \text{ V}$



**Typ. drain-source on-resistance**

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

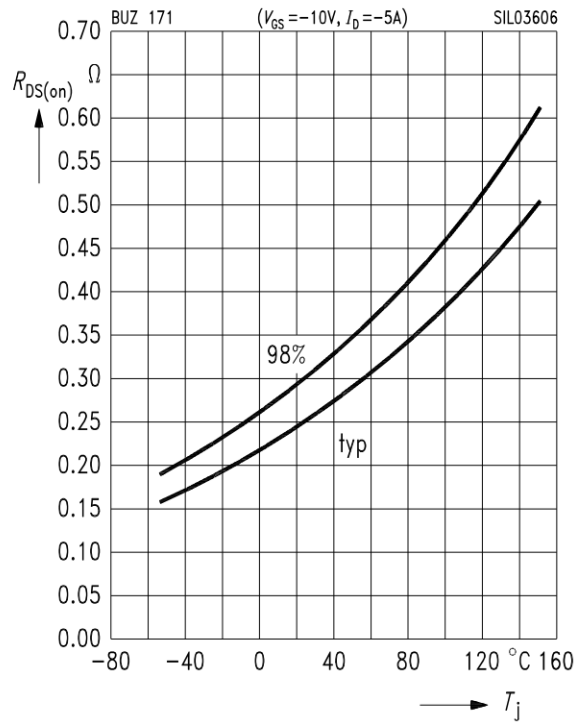
parameter:  $V_{GS}$



**Drain-source on-resistance**

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

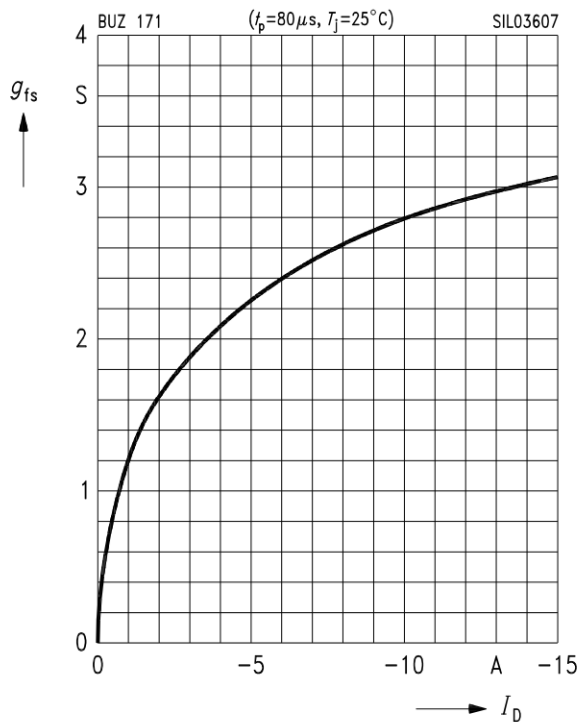
parameter:  $I_D = -5\text{ A}$ ,  $V_{GS} = -10\text{ V}$ , (spread)



**Typ. forward transconductance**

$g_{fs} = f(I_D)$

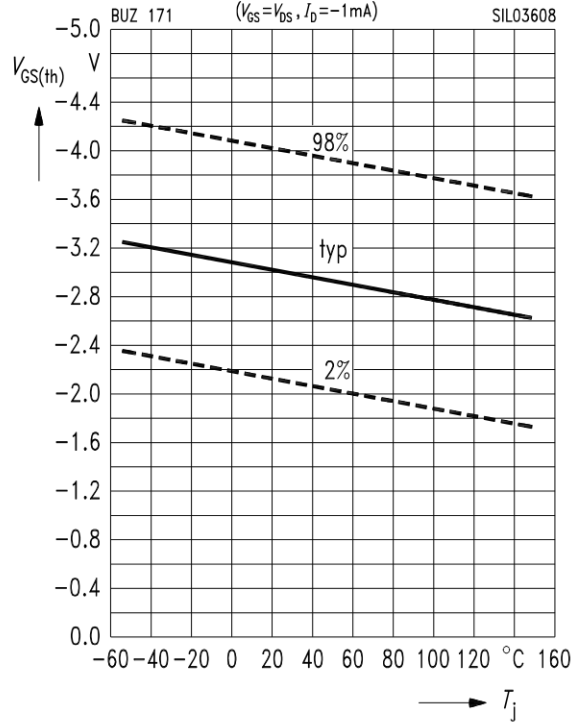
parameter:  $t_p = 80\ \mu\text{s}$



**Gate threshold voltage**

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

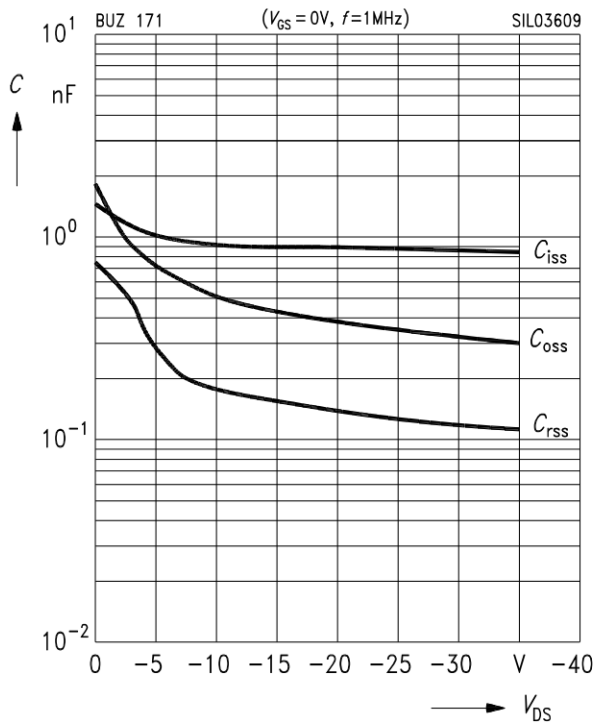
parameter:  $V_{GS} = V_{DS}$ ,  $I_D = -1\text{ mA}$ , (spread)



**Typ. capacitances**

$C = f(V_{DS})$

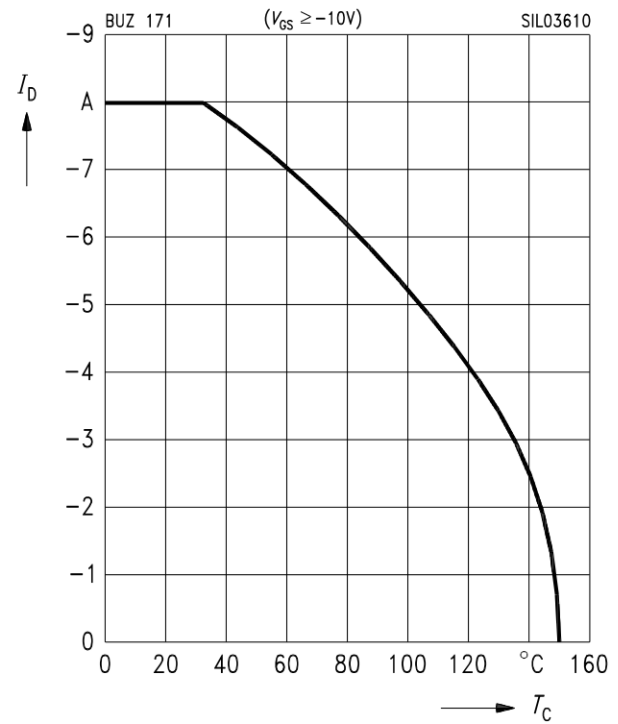
parameter:  $V_{GS} = 0\text{ V}, f = 1\text{ MHz}$



**Drain current**

$I_D = f(T_C)$

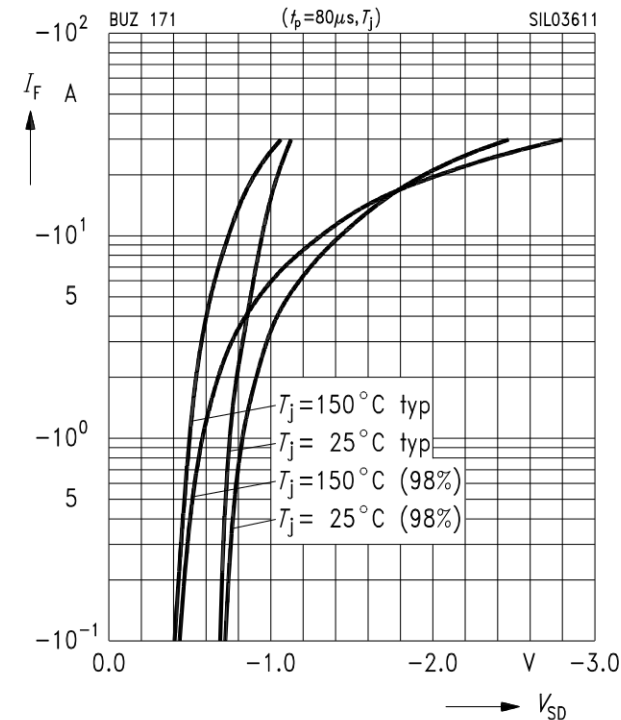
parameter:  $V_{GS} \geq -10\text{ V}$



**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:  $D = t_p / T$

