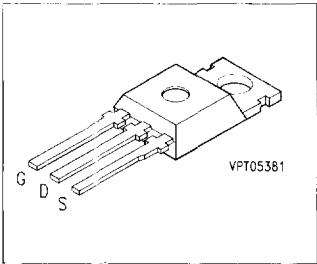


SIPMOS® Power Transistor

BUZ 70

- N channel
- Enhancement mode
- Avalanche-rated



Type	$V_{DS}$	$I_D$	$R_{DS(on)}$	Package <sup>1)</sup>	Ordering Code
BUZ 70	60 V	12 A	0.15 $\Omega$	TO-220 AB	C67078-S1334-A2

Maximum Ratings

Parameter	Symbol	Values	Unit
Continuous drain current, $T_C = 33\text{ }^{\circ}\text{C}$	$I_D$	12	A
Pulsed drain current, $T_C = 25\text{ }^{\circ}\text{C}$	$I_{D\text{ puls}}$	48	
Avalanche current, limited by $T_{j\text{ max}}$	$I_{AR}$	12	
Avalanche energy, periodic limited by $T_{j\text{ (max)}}$	$E_{AR}$	1	mJ
Avalanche energy, single pulse $I_D = 12\text{ A}$ , $V_{DD} = 30\text{ V}$ , $R_{GS} = 25\text{ }\Omega$ $L = 48.6\text{ }\mu\text{H}$ , $T_j = 25\text{ }^{\circ}\text{C}$	$E_{AS}$	6	
Gate-source voltage	$V_{GS}$	$\pm 20$	V
Power dissipation, $T_C = 25\text{ }^{\circ}\text{C}$	$P_{tol}$	40	W
Operating and storage temperature range	$T_j, T_{stg}$	$-55 \dots +150$	$^{\circ}\text{C}$
Thermal resistance, chip-case	$R_{th\text{ JC}}$	$\leq 3.1$	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  $T_j = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

Static characteristics

Drain-source breakdown voltage $V_{GS} = 0\text{ V}$ , $I_D = 0.25\text{ mA}$	$V_{(BR)\text{ DSS}}$	60	—	—	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 $V_{DS} = 60\text{ V}$ , $V_{GS} = 0\text{ V}$ $T_j = 25\text{ }^{\circ}\text{C}$ $T_j = 125\text{ }^{\circ}\text{C}$	$I_{DSS}$	— —	0.1 10	1.0 100	$\mu\text{A}$
Gate-source leakage current $V_{GS} = 20\text{ V}$ , $V_{DS} = 0\text{ V}$	$I_{GSS}$	—	10	100	nA
Drain-source on-resistance $V_{GS} = 10\text{ V}$ , $I_D = 7.5\text{ A}$	$R_{DS(on)}$	—	0.12	0.15	$\Omega$

Dynamic characteristics

Forward transconductance $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$ , $I_D = 7.5\text{ A}$	$g_{fs}$	2.0	5.7	—	S
Input capacitance $V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$	$C_{iss}$	—	360	480	pF
Output capacitance $V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$	$C_{oss}$	—	160	250	
Reverse transfer capacitance $V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$	$C_{rss}$	—	50	90	
Turn-on time $t_{on}$ , ( $t_{on} = t_{d(on)} + t_r$ ) $V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 3\text{ A}$ , $R_{GS} = 50\text{ }\Omega$	$t_{d(on)}$	—	15	25	ns
	$t_r$	—	30	45	
Turn-off time $t_{off}$ , ( $t_{off} = t_{d(off)} + t_f$ ) $V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 3\text{ A}$ , $R_{GS} = 50\text{ }\Omega$	$t_{d(off)}$	—	40	55	
	$t_f$	—	55	75	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

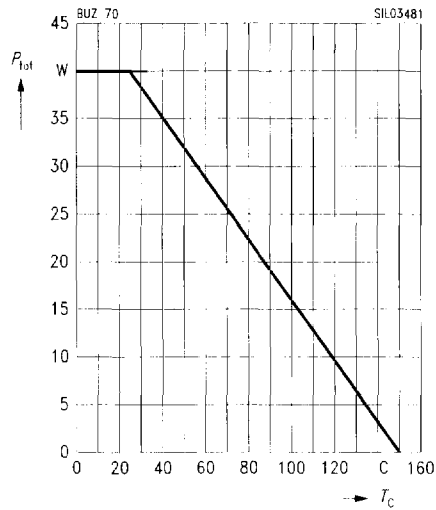
Reverse diode

Continuous reverse drain current $T_C = 25\text{ }^{\circ}\text{C}$	$I_S$	—	—	12	A
Pulsed reverse drain current $T_C = 25\text{ }^{\circ}\text{C}$	$I_{SM}$	—	—	48	
Diode forward on-voltage $I_S = 25\text{ A}$ , $V_{GS} = 0\text{ V}$	$V_{SD}$	—	1.5	1.8	V
Reverse recovery time $V_R = 30\text{ V}$ , $I_F = I_S$ , $di_F / dt = 100\text{ A}/\mu\text{s}$	$t_r$	—	60	—	ns
Reverse recovery charge $V_R = 30\text{ V}$ , $I_F = I_S$ , $di_F / dt = 100\text{ A}/\mu\text{s}$	$Q_{rr}$	—	0.10	—	$\mu\text{C}$

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

**Total power dissipation**

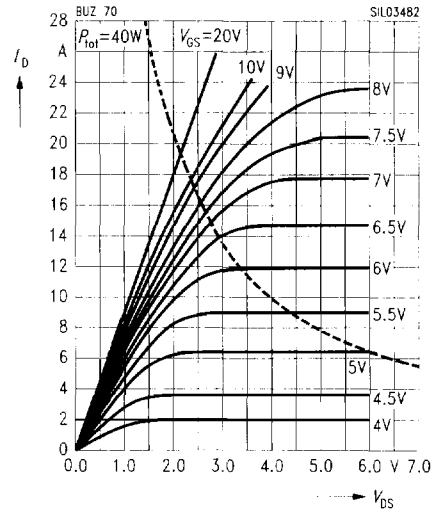
$$P_{\text{tot}} = f(T_C)$$



**Typ. output characteristics**

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

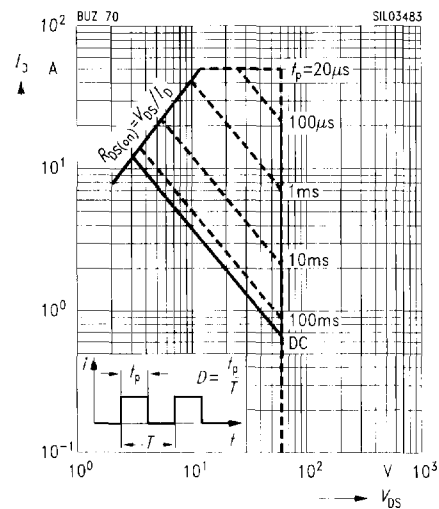
parameter:  $t_p = 80\ \mu\text{s}$



**Safe operating area**

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

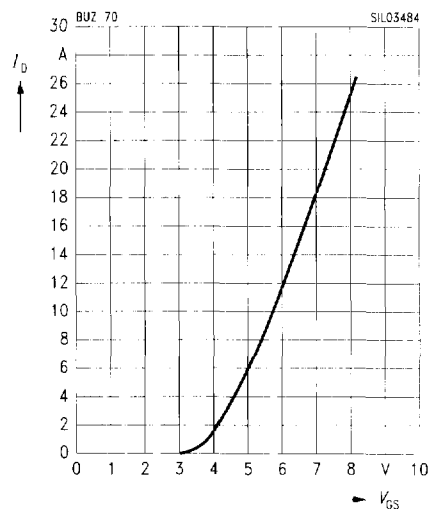
parameter:  $D = 0.01$ ,  $T_C = 25^\circ\text{C}$



**Typ. transfer characteristics**

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

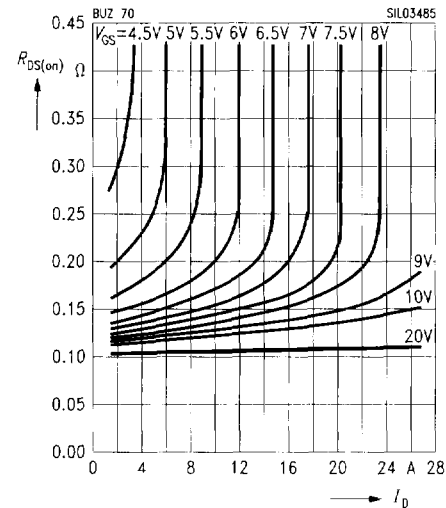
parameter:  $t_p = 80\ \mu\text{s}$ ,  $V_{\text{DS}} = 25\text{ V}$



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

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

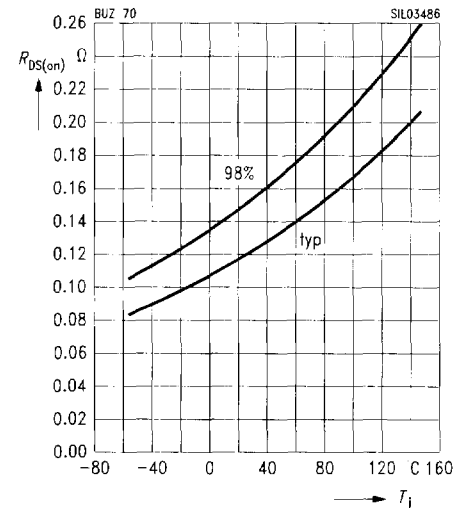
parameter:  $V_{GS}$



**Drain-source on-resistance**

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

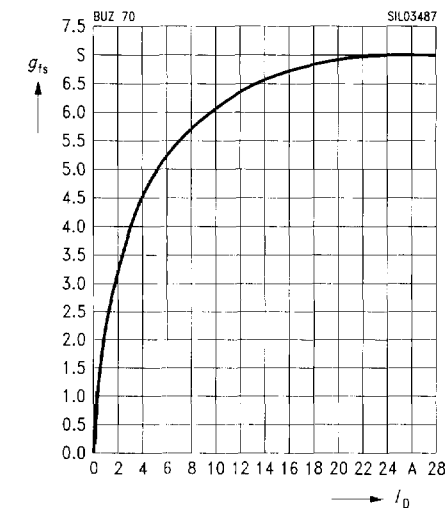
parameter:  $I_D = 7.5 A, V_{GS} = 10 V$ , (spread)



**Typ. forward transconductance**

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

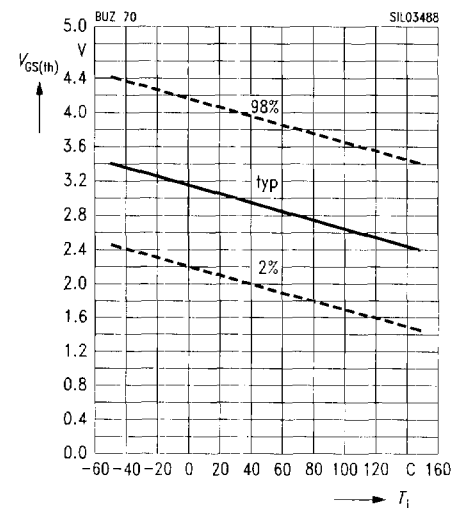
parameter:  $t_p = 80 \mu s$



**Gate threshold voltage**

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

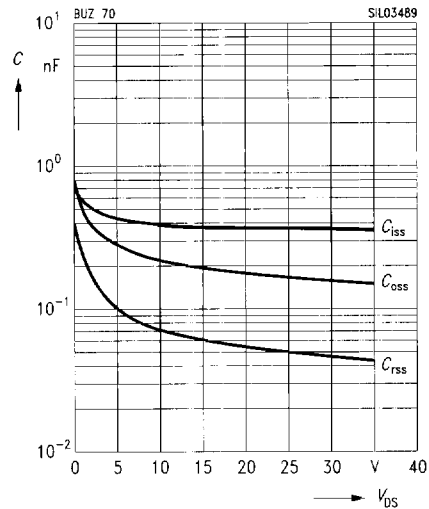
parameter:  $V_{GS} = V_{DS}, I_D = 1 mA$ , (spread)



## Typ. capacitances

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

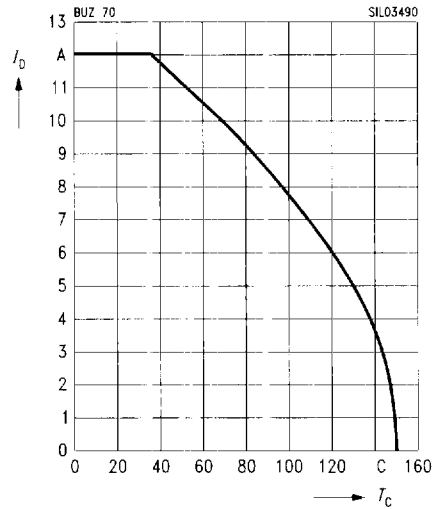
parameter:  $V_{GS} = 0 \text{ V}$ ,  $f = 1 \text{ MHz}$



## Drain current

$$I_D = f(T_c)$$

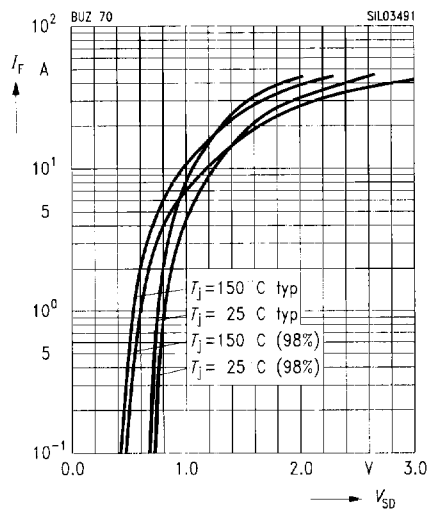
parameter:  $V_{GS} \geq 10 \text{ V}$



## Forward characteristics of reverse diode

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

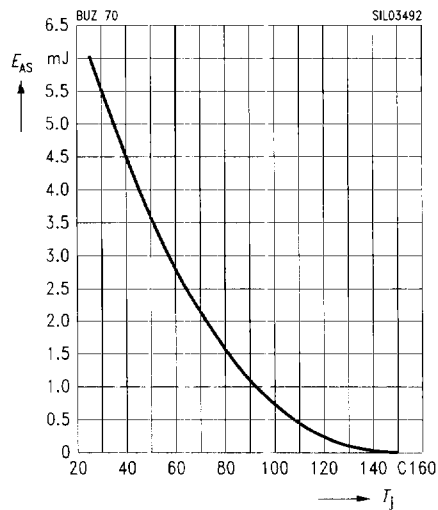
parameter:  $T_j, t_p = 80 \mu\text{s}$ , (spread)



## Avalanche energy $E_{AS} = f(T_j)$

parameter:  $I_D = 12 \text{ A}$ ,  $V_{DD} = 25 \text{ V}$

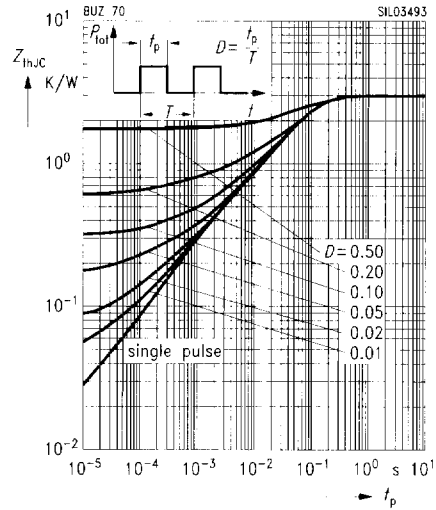
$R_{GS} = 25 \Omega$ ,  $L = 48.6 \mu\text{H}$



## Transient thermal impedance

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

parameter:  $D = t_p / T$



## Typ. gate charge

$$V_{GS} = f(Q_{Gate})$$

parameter:  $I_{D,puls} = 18$  A

