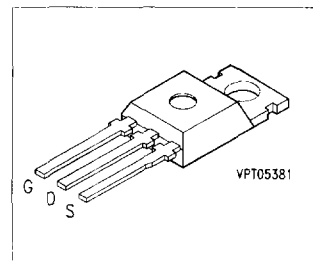


SIPMOS® Power Transistors

- N channel
- Enhancement mode

BUZ 50 A BUZ 50 B, BUZ 50 C



Type	V_{DS}	I_D	$R_{DS(on)}$	Package ¹⁾	Ordering Code
BUZ 50 A	1000 V	2.5 A	5.0 Ω	TO-220 AB	C67078-A1307-A3
BUZ 50 B	1000 V	2.0 A	8.0 Ω	TO-220 AB	C67078-A1307-A4
BUZ 50 C	1000 V	2.3 A	6.0 Ω	TO-220 AB	C67078-A1307-A5

Maximum Ratings

Parameter	Symbol	BUZ			Unit
		50 A	50 B	50 C	
Continuous drain current $T_C = 25\text{ }^\circ\text{C}$	I_D	2.5	2.0	2.3	A
Pulsed drain current, $T_C = 25\text{ }^\circ\text{C}$	$I_{D\text{ puls}}$	10.0	8.0	9.0	
Drain-source voltage	V_{DS}	1000			V
Drain-gate voltage, $R_{GS} = 20\text{ k}\Omega$	V_{DGR}	1000			
Gate-source voltage	V_{GS}	± 20			
Power dissipation, $T_C = 25\text{ }^\circ\text{C}$	P_{tot}	75			W
Operating and storage temperature range	T_j, T_{stg}	- 55 ... + 150			$^\circ\text{C}$
Thermal resistance, chip-case	$R_{th\text{ JC}}$	≤ 1.67			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 $V_{GS} = 0\text{ V}$, $I_D = 0.25\text{ mA}$	$V_{(BR)DSS}$	1000	–	–	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 $V_{DS} = 1000\text{ V}$, $V_{GS} = 0\text{ V}$ $T_j = 25\text{ °C}$ $T_j = 125\text{ °C}$	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 $V_{GS} = 10\text{ V}$, $I_D = 1.5\text{ A}$ BUZ 50 A $I_D = 1.5\text{ A}$ BUZ 50 B $I_D = 1.5\text{ A}$ BUZ 50 C	$R_{DS(on)}$	–	4.5 6.5 5.0	5.0 8.0 6.0	Ω

Dynamic characteristics

Forward transconductance $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$, $I_D = 1.5\text{ A}$	g_{fs}	0.7	1.5	–	S
Input capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$	C_{iss}	–	1600	2100	pF
Output capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$	C_{oss}	–	70	120	
Reverse transfer capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$	C_{rss}	–	30	55	
Turn-on time t_{on} . ($t_{on} = t_{d(on)} + t_r$) $V_{DD} = 30\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 2\text{ A}$, $R_{GS} = 50\text{ }\Omega$	$t_{d(on)}$	–	30	45	ns
	t_r	–	40	60	
Turn-off time t_{off} . ($t_{off} = t_{d(off)} + t_f$) $V_{DD} = 30\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 2\text{ A}$, $R_{GS} = 50\text{ }\Omega$	$t_{d(off)}$	–	110	140	
	t_f	–	60	80	

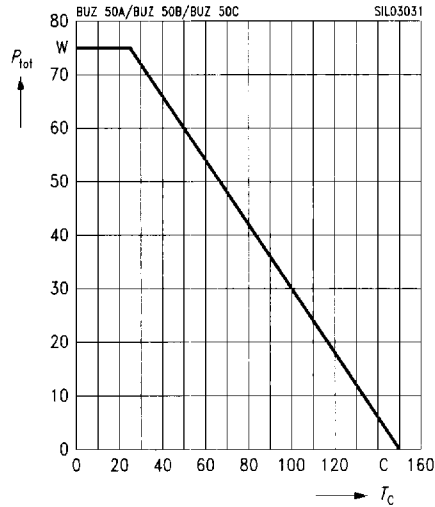
Electrical Characteristics (cont'd)
at $T_j = 25\text{ }^\circ\text{C}$, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Reverse diode					
Continuous reverse drain current $T_C = 25\text{ }^\circ\text{C}$	I_S				A
BUZ 50 A		–	–	2.5	
BUZ 50 B		–	–	2.0	
BUZ 50 C	–	–	2.3		
Pulsed reverse drain current $T_C = 25\text{ }^\circ\text{C}$	I_{SM}				A
BUZ 50 A		–	–	10.0	
BUZ 50 B		–	–	8.0	
BUZ 50 C	–	–	9.0		
Diode forward on-voltage $I_S = 6\text{ A}$, $V_{GS} = 0\text{ V}$	V_{SD}	–	1.05	1.3	V
Reverse recovery time $V_R = 100\text{ V}$, $I_F = I_S$, $di_F/dt = 100\text{ A}/\mu\text{s}$	t_{rr}	–	2.0	–	ns
Reverse recovery charge $V_R = 100\text{ V}$, $I_F = I_S$, $di_F/dt = 100\text{ A}/\mu\text{s}$	Q_{rr}	–	15	–	μC

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

Total power dissipation

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

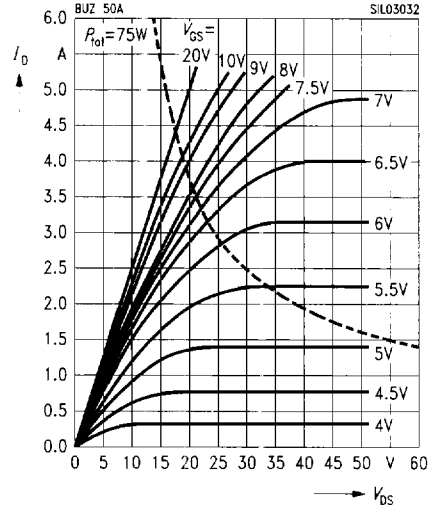


Typ. output characteristics

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

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

BUZ 50 A

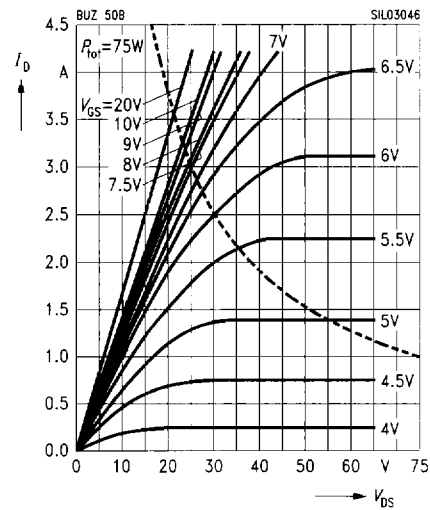


Typ. output characteristics

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

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

BUZ 50 B

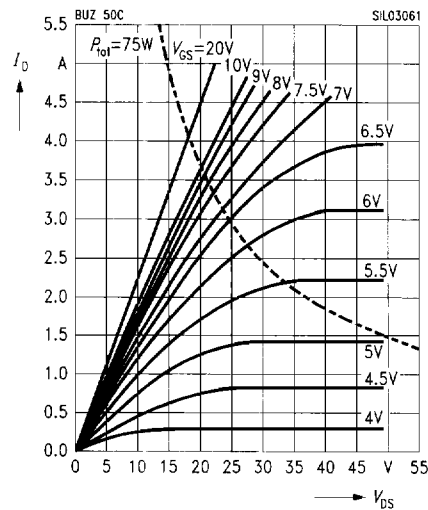


Typ. output characteristics

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

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

BUZ 50 C

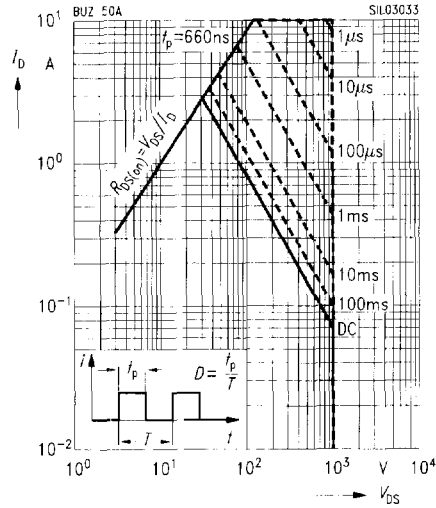


Safe operating area

$I_D = f(V_{DS})$

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

BUZ 50 A

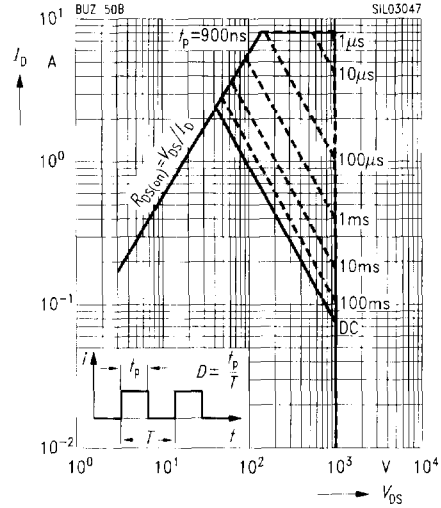


Safe operating area

$I_D = f(V_{DS})$

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

BUZ 50 B

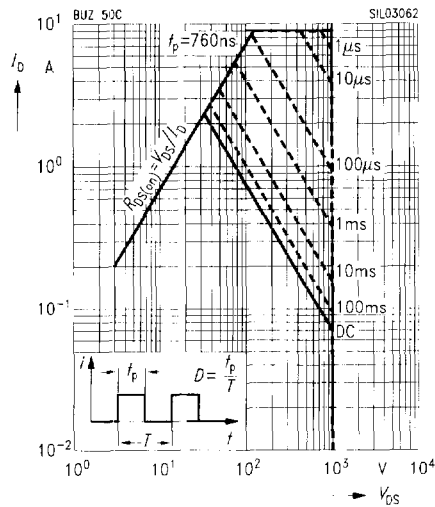


Safe operating area

$I_D = f(V_{DS})$

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

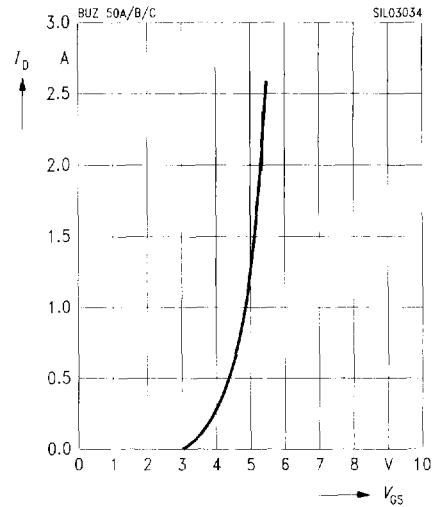
BUZ 50 C



Typ. transfer characteristics

$I_D = f(V_{GS})$

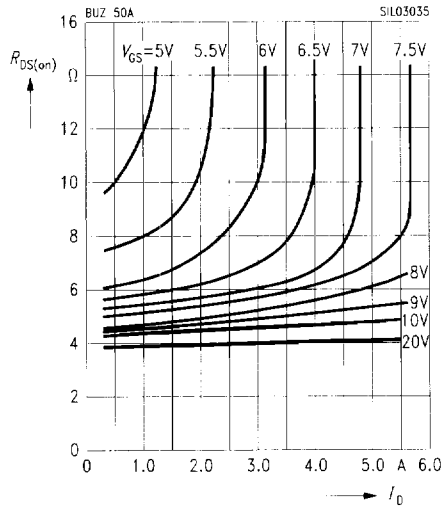
parameter: $t_p = 80 \mu\text{s}, V_{DS} = 25\text{V}$



Typ. drain-source on-resistance

$R_{DS(on)} = f(I_D)$
parameter: V_{GS}

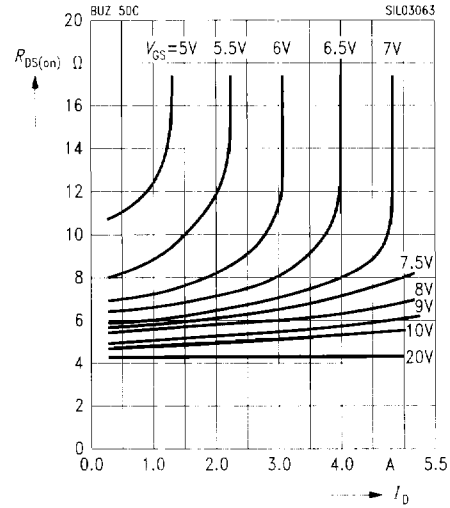
BUZ 50 A



Typ. drain-source on-resistance

$R_{DS(on)} = f(I_D)$
parameter: V_{GS}

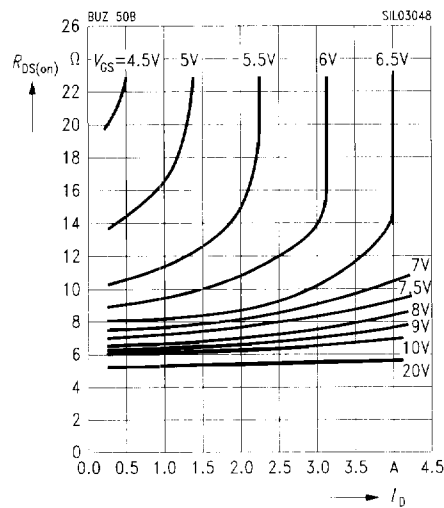
BUZ 50 C



Drain-source on-resistance

$R_{DS(on)} = f(I_D)$
parameter: V_{GS}

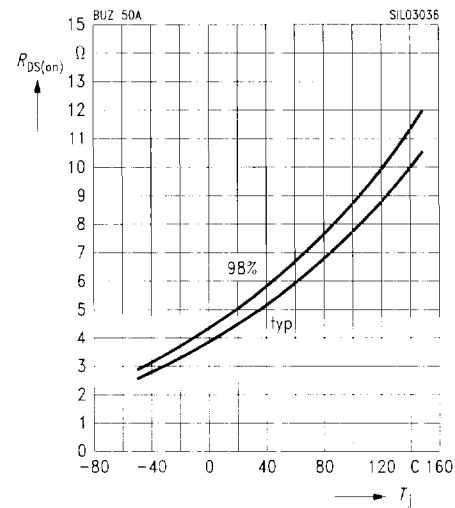
BUZ 50 B



Drain-source on-resistance

$R_{DS(on)} = f(T_j)$
parameter: $V_{GS} = 10V, I_D = 1.5A$

BUZ 50 A

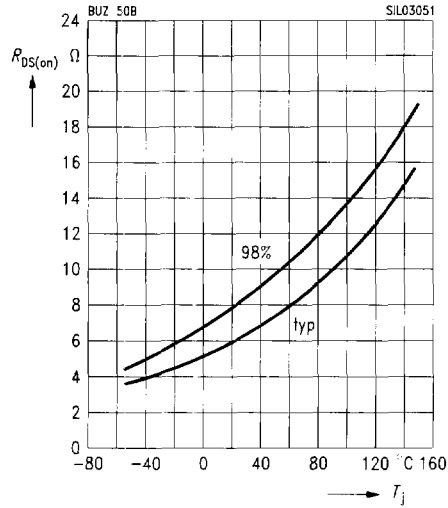


Drain-source on-resistance

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

parameter: $V_{GS} = 10\text{ V}$, $I_D = 1.5\text{ A}$

BUZ 50 B

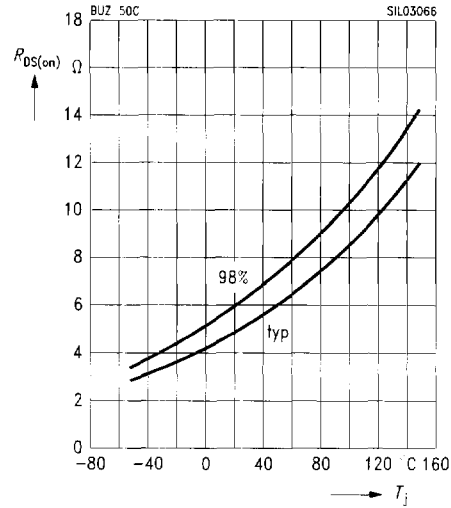


Drain-source on-resistance

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

parameter: $V_{GS} = 10\text{ V}$, $I_D = 1.5\text{ A}$

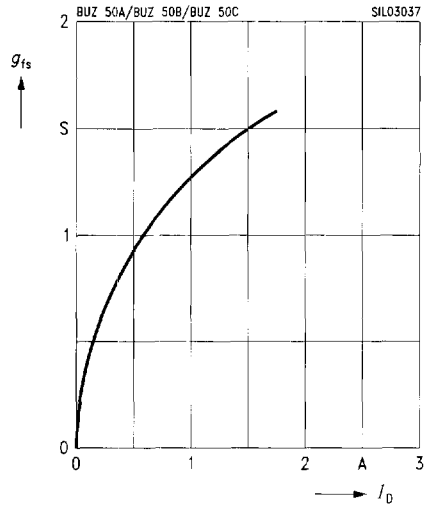
BUZ 50 C



Typ. forward transconductance

$g_{fs} = f(I_D)$

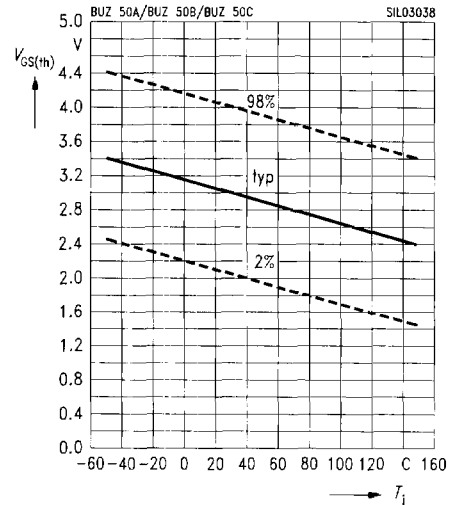
parameter: $t_p = 80\text{ }\mu\text{s}$



Gate threshold voltage

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

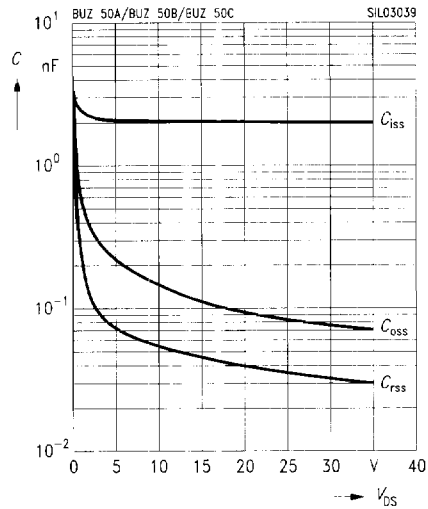
parameter: $V_{GS} = V_{DS}$, $I_D = 1\text{ mA}$, (spread)



Typ. capacitances

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

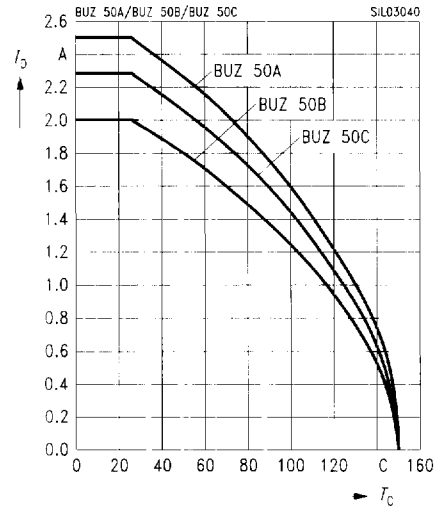
parameter: $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$



Drain current

$$I_D = f(T_C)$$

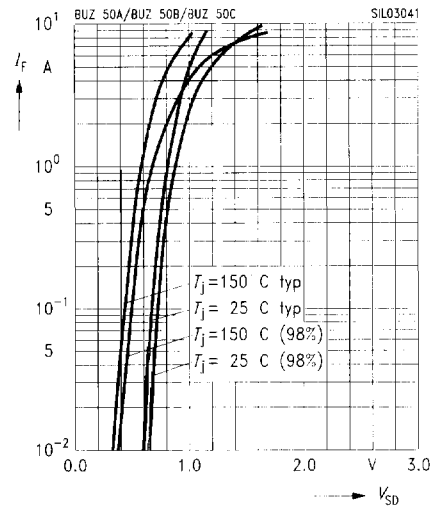
parameter: $V_{GS} \geq 10 \text{ V}$



Forward characteristics of reverse diode

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

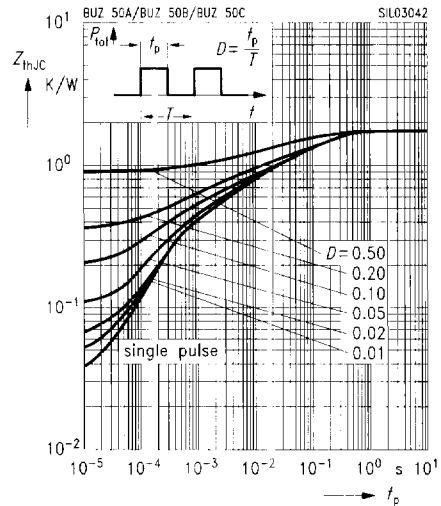
parameter: T_J , $t_p = 80 \mu\text{s}$, (spread)



Transient thermal impedance

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

parameter: $D = t_p / T$



Typ. gate charge

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

parameter: $I_{D,puls} = 3.75\text{ A}$

