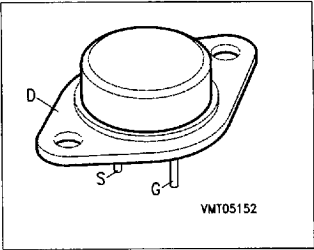


SIPMOS® Power Transistors

- N channel
- Enhancement mode

BUZ 45
BUZ 45 A, BUZ 45 B



Type	V_{DS}	I_D	T_C	$R_{DS(on)}$	Package ¹⁾	Ordering Code
BUZ 45	500 V	9.6 A	25 °C	0.6 Ω	TO-204 AA	C67078-A1008-A8
BUZ 45 A	500 V	8.3 A	25 °C	0.8 Ω	TO-204 AA	C67078-A1008-A9
BUZ 45 B	500 V	10.0 A	40 °C	0.5 Ω	TO-204 AA	C67078-A1008-A10

Maximum Ratings

Parameter	Symbol	BUZ			Unit
		45	45 A	45 B	
Continuous drain current	I_D	9.6	8.3	10	A
Pulsed drain current, $T_C = 25\text{ °C}$	$I_{D\text{ puls}}$	38	33	40	
Drain-source voltage	V_{DS}	500			V
Drain-gate voltage, $R_{GS} = 20\text{ k}\Omega$	V_{DGR}	500			
Gate-source voltage	V_{GS}	± 20			
Power dissipation, $T_C = 25\text{ °C}$	P_{tot}	125			W
Operating and storage temperature range	T_J, T_{stg}	- 55 ... + 150			°C
Thermal resistance, chip-case	$R_{th\text{ JC}}$	≤ 1.0			K/W
DIN humidity category, DIN 40 040		C			—
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 $V_{GS} = 0\text{ V}$, $I_D = 0.25\text{ mA}$	$V_{(BR)DSS}$	500	—	—	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 $V_{DS} = 500\text{ V}$, $V_{GS} = 0\text{ V}$ $T_j = 25\text{ }^{\circ}\text{C}$ $T_j = 125\text{ }^{\circ}\text{C}$	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 $V_{GS} = 10\text{ V}$, $I_D = 5\text{ A}$	$R_{DS(on)}$	— — —	0.55 0.7 0.49	0.6 0.8 0.5	Ω
					BUZ 45 BUZ 45 A BUZ 45 B

Dynamic characteristics

Forward transconductance $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$, $I_D = 5\text{ A}$	g_{fs}	2.7	5.0	—	S
Input capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$	C_{iss}	—	3800	4900	pF
Output capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$	C_{oss}	—	250	400	
Reverse transfer capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$	C_{rss}	—	100	170	
Turn-on time t_{on} , ($t_{on} = t_{d(on)} + t_r$) $V_{DD} = 30\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 2.8\text{ A}$, $R_{GS} = 50\text{ }\Omega$	$t_{d(on)}$	—	50	75	ns
	t_r	—	80	120	
Turn-off time t_{off} , ($t_{off} = t_{d(off)} + t_f$) $V_{DD} = 30\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 2.8\text{ A}$, $R_{GS} = 50\text{ }\Omega$	$t_{d(off)}$	—	330	430	
	t_f	—	110	140	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

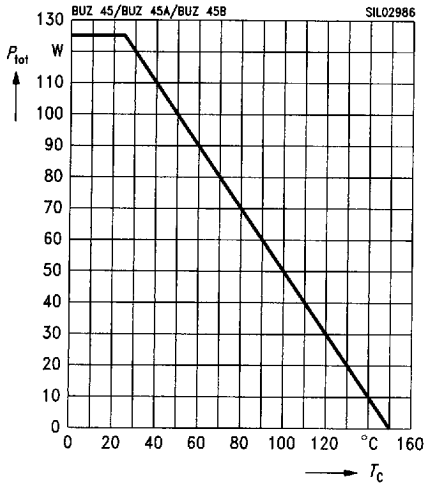
Reverse diode

Continuous reverse drain current $T_C = 25\text{ }^{\circ}\text{C}$	BUZ 45 BUZ 45 A BUZ 45 B	I_S	— — —	— — —	9.6 8.3 10	A
Pulsed reverse drain current $T_C = 25\text{ }^{\circ}\text{C}$	BUZ 45 BUZ 45 A BUZ 45 B	I_{SM}	— — —	— — —	38 33 40	A
Diode forward on-voltage $I_S = 21\text{ A}$, $V_{GS} = 0\text{ V}$		V_{SD}	—	1.3	1.7	V
Reverse recovery time $V_R = 100\text{ V}$, $I_F = I_S$, $di_F / dt = 100\text{ A}/\mu\text{s}$		t_{rr}	—	1.2	—	μs
Reverse recovery charge $V_R = 100\text{ V}$, $I_F = I_S$, $di_F / dt = 100\text{ A}/\mu\text{s}$		Q_{rr}	—	12	—	μC

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

Total power dissipation

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

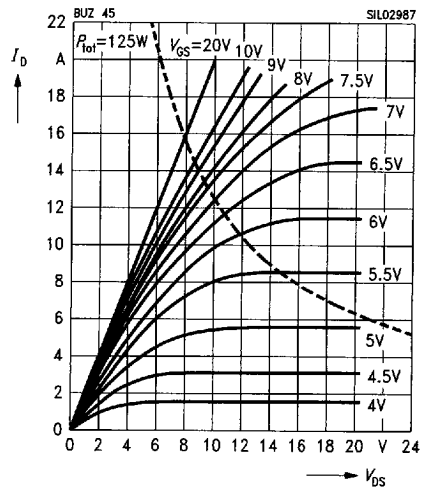


Typ. output characteristics

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

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

BUZ 45

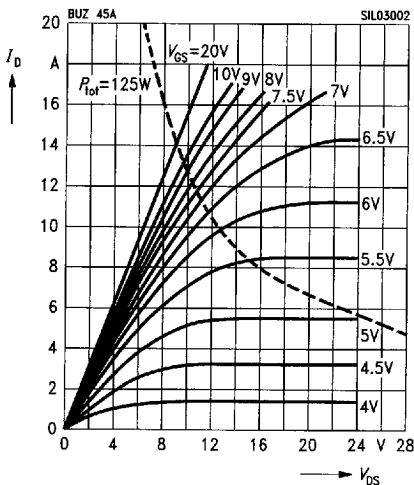


Typ. output characteristics

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

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

BUZ 45 A

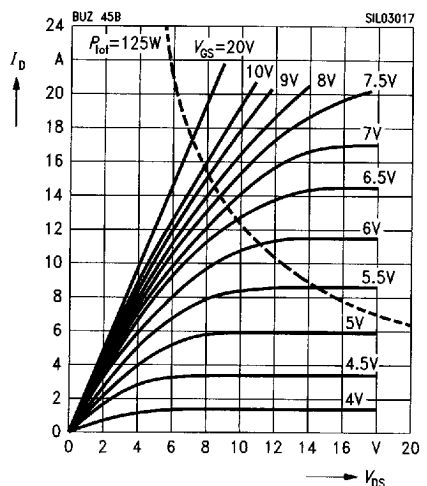


Typ. output characteristics

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

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

BUZ 45 B

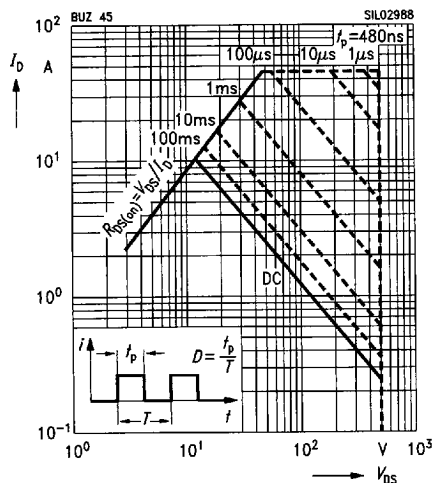


Safe operating area

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

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

BUZ 45

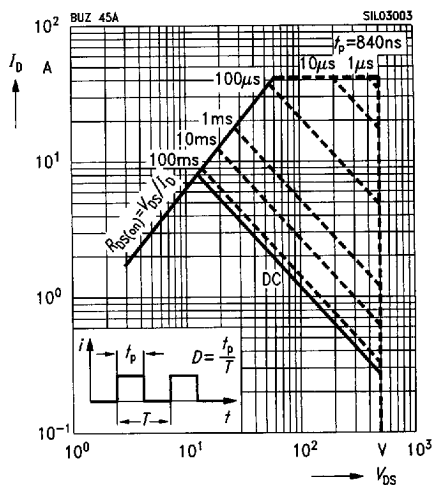


Safe operating area

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

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

BUZ 45 A

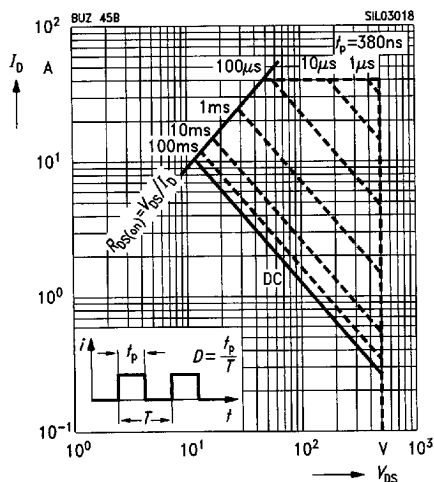


Safe operating area

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

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

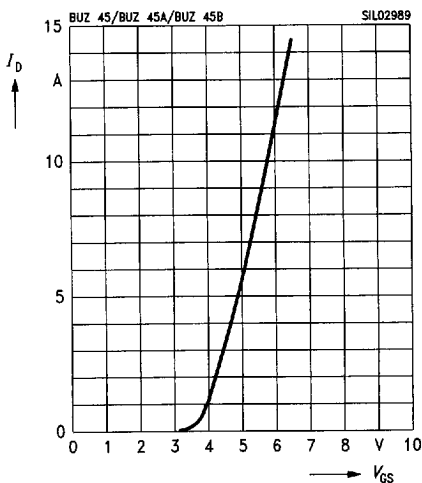
BUZ 45 B



Typ. transfer characteristics

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

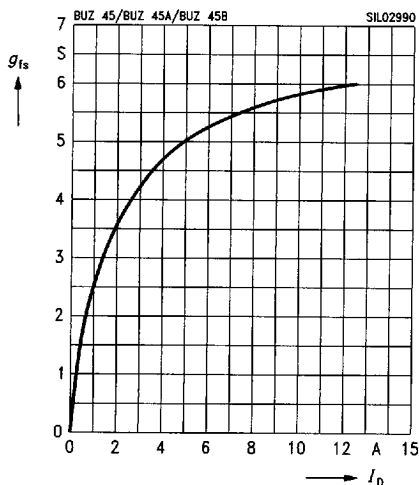
parameter: $t_p = 80\mu\text{s}$, $V_{DS} = 25\text{V}$



Typ. forward transconductance

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

parameter: $t_p = 80 \mu s$

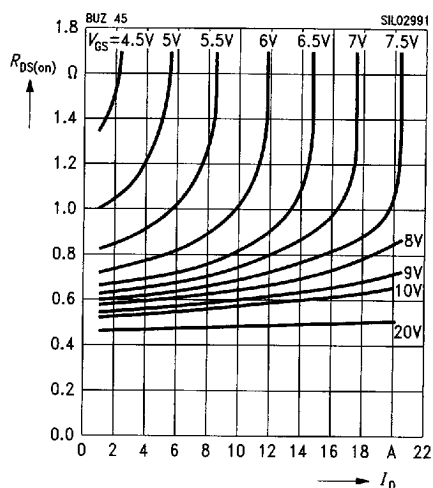


Typ. drain-source on-resistance

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

parameter: V_{GS}

BUZ 45

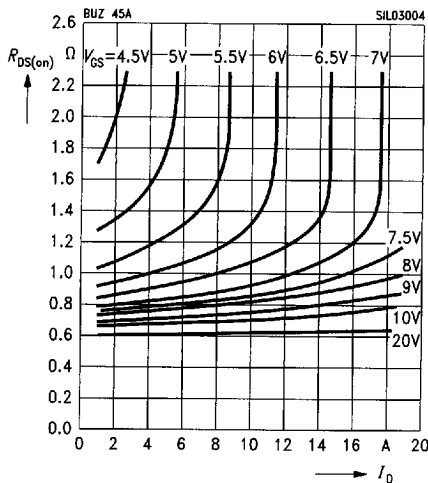


Typ. drain-source on-resistance

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

parameter: V_{GS}

BUZ 45 A

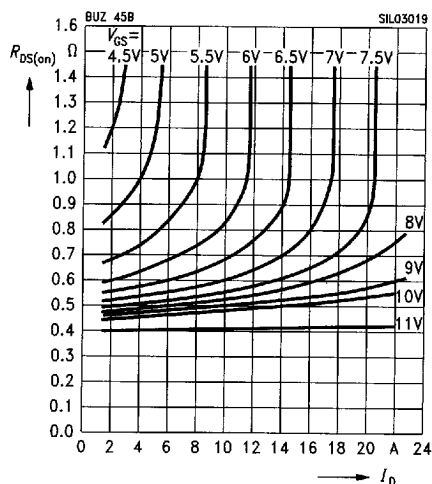


Typ. drain-source on-resistance

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

parameter: V_{GS}

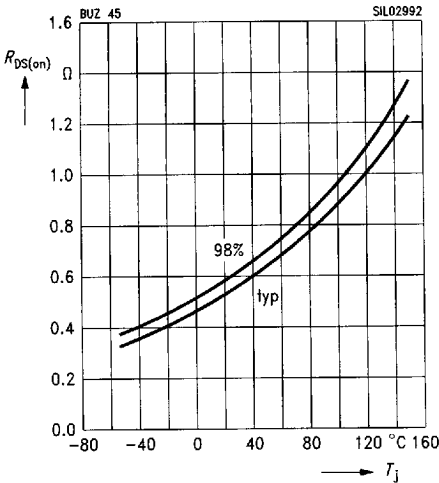
BUZ 45 B



Drain-source on-resistance

$R_{DS(on)} = f(T_j)$
parameter: $I_D = 5\text{ A}$, $V_{GS} = 10\text{ V}$

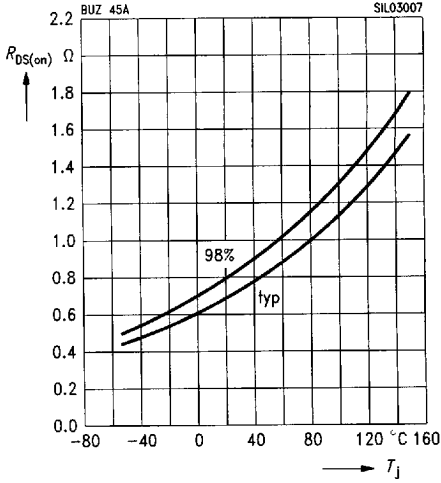
BUZ 45



Drain-source on-resistance

$R_{DS(on)} = f(T_j)$
parameter: $I_D = 5\text{ A}$, $V_{GS} = 10\text{ V}$

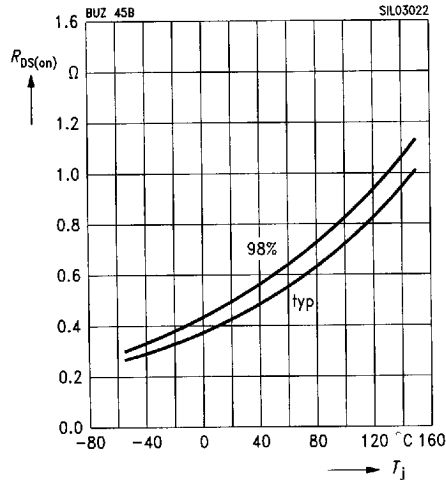
BUZ 45 A



Drain-source on-resistance

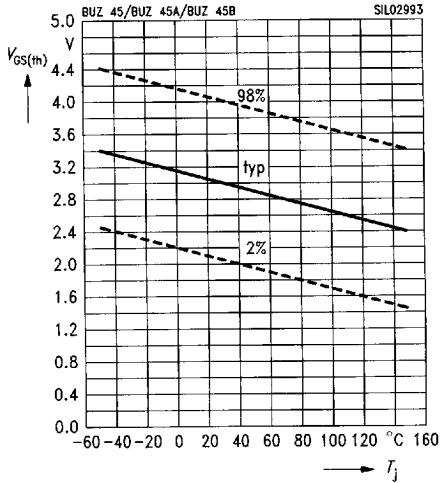
$R_{DS(on)} = f(T_j)$
parameter: $I_D = 5\text{ A}$, $V_{GS} = 10\text{ V}$

BUZ 45 B



Gate threshold voltage

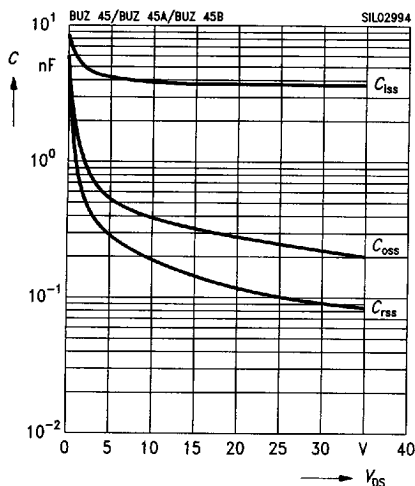
$V_{GS(th)} = f(T_j)$
parameter: $V_{GS} = V_{DS}$, $I_D = 1\text{ mA}$



Typ. capacitances

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

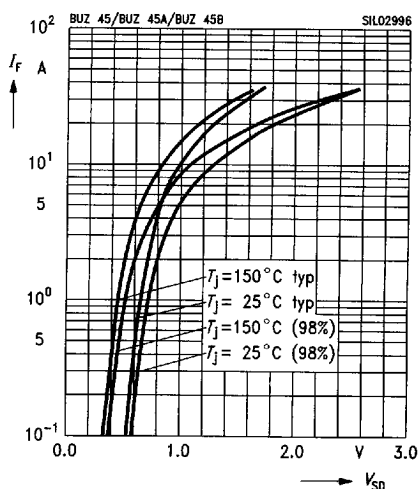
parameter: $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$



Forward characteristics of reverse diode

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

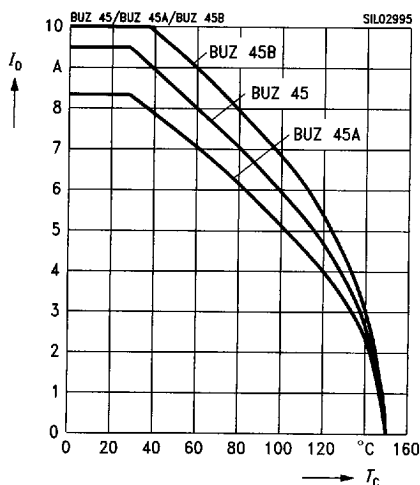
parameter: $T_J, t_p = 80 \mu\text{s}$



Drain current

$$I_D = f(T_C)$$

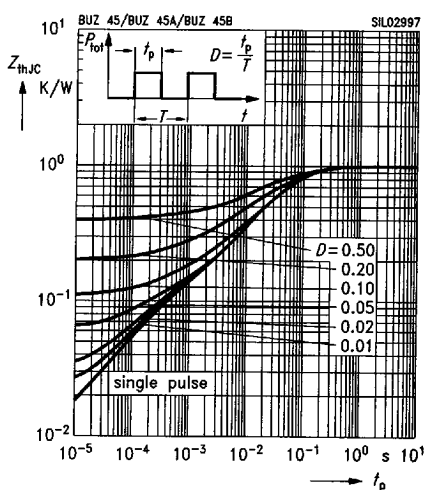
parameter: $V_{GS} \geq 10 \text{ V}$



Transient thermal impedance

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

parameter: $D = t_p / T$



Typ. gate charge

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

parameter: $I_{D\,puls} = 14.4\,A$

