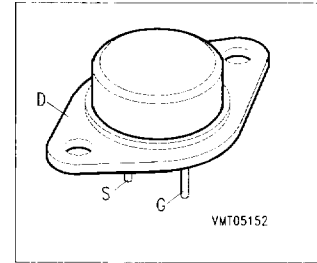


SIPMOS® Power Transistors

- N channel
- Enhancement mode
- FREDFET

BUZ 210
BUZ 211



Type	V_{DS}	I_D	$R_{DS(on)}$	Package ¹⁾	Ordering Code
BUZ 210	500 V	10.5 A	0.6 Ω	TO-204 AA	C67078-A1102-A2
BUZ 211	500 V	9.0 A	0.8 Ω	TO-204 AA	C67078-A1100-A2

Maximum Ratings

Parameter	Symbol	BUZ		Unit
		210	211	
Continuous drain current, $T_C = 25\text{ }^\circ\text{C}$	I_D	10.5	9.0	A
Pulsed drain current, $T_C = 25\text{ }^\circ\text{C}$	$I_{D\text{ puls}}$	42	36	
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, $T_C = 25\text{ }^\circ\text{C}$	P_{tot}	125		W
Operating and storage temperature range	T_j, T_{stg}	- 55 ... + 150		$^\circ\text{C}$
Thermal resistance, chip-case	R_{thJC}	≤ 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 $T_j = 25\text{ °C}$, 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 $V_{DS} = 500\text{ V}$, $V_{GS} = 0\text{ V}$ $T_j = 25\text{ °C}$ $T_j = 125\text{ °C}$	I_{DSS}	–	20	250	μA
		–	100	1000	
Gate-source leakage current $V_{GS} = 20\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}	–	10	100	nA
Drain-source on-resistance $V_{GS} = 10\text{ V}$, $I_D = 6.5\text{ A}$	$R_{DS(on)}$	–	0.55	0.6	Ω
		–	0.7	0.8	
					BUZ 210
					BUZ 211

Dynamic characteristics

Forward transconductance $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$, $I_D = 6.5\text{ A}$	g_{fs}	2.7	5.3	–	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	

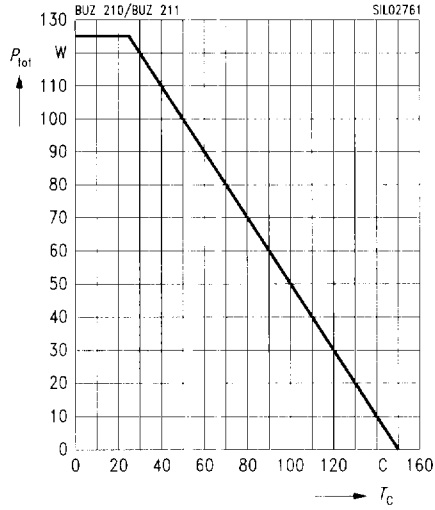
Electrical Characteristics (cont'd)
at $T_j = 25\text{ }^\circ\text{C}$, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Reverse diode					
Continuous reverse drain current $T_C = 25\text{ }^\circ\text{C}$	I_S	-	-	10.5	A
BUZ 210					
BUZ 211	-	-	9.0		
Pulsed reverse drain current $T_C = 25\text{ }^\circ\text{C}$	I_{SM}	-	-	42	
BUZ 210					
BUZ 211	-	-	36		
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}	-	180	250	ns
Reverse recovery charge $V_R = 100\text{ V}$, $I_F = I_S$, $di_F/dt = 100\text{ A}/\mu\text{s}$	Q_{rr}	-	0.65	1.2	μC

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

Total power dissipation

$P_{tot} = f(T_C)$

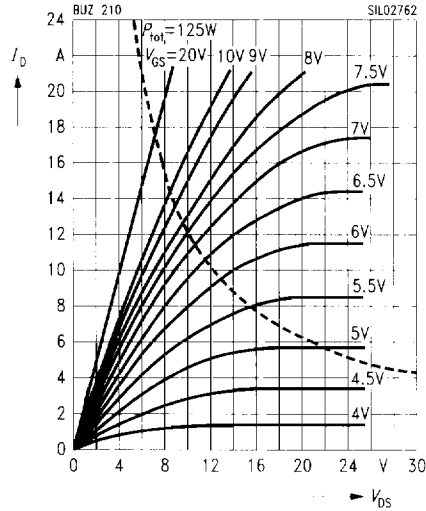


Typ. output characteristics

$I_D = f(V_{DS})$

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

BUZ 210

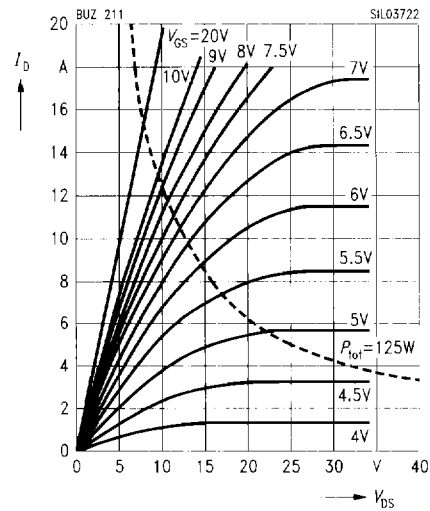


Typ. output characteristics

$I_D = f(V_{DS})$

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

BUZ 211

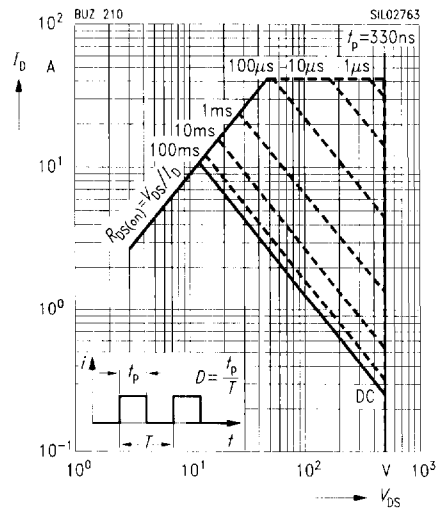


Safe operating area

$I_D = f(V_{DS})$

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

BUZ 210

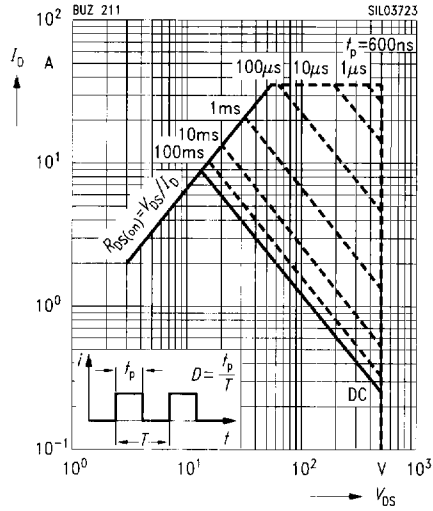


Safe operating area

$I_D = f(V_{DS})$

BUZ 211

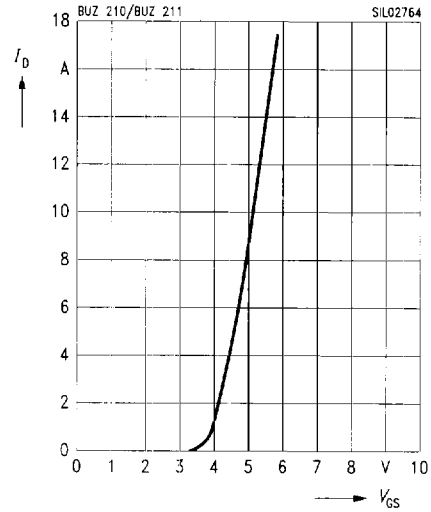
parameter: $D = 0.01$, $T_C = 25^\circ\text{C}$



Typ. transfer characteristics

$I_D = f(V_{GS})$

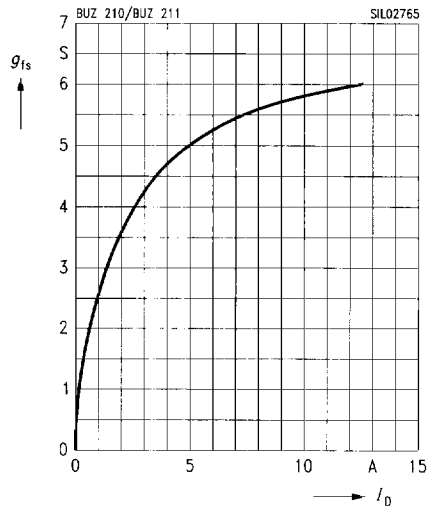
parameter: $t_p = 80 \mu\text{s}$, $V_{DS} = 25 \text{ V}$



Typ. forward transconductance

$g_{fs} = f(I_D)$

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

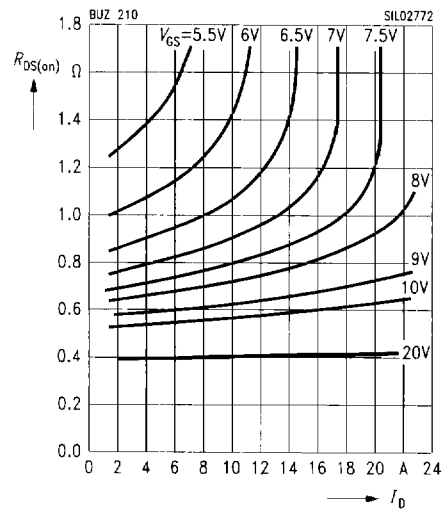


Typ. drain-source on-resistance

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

BUZ 210

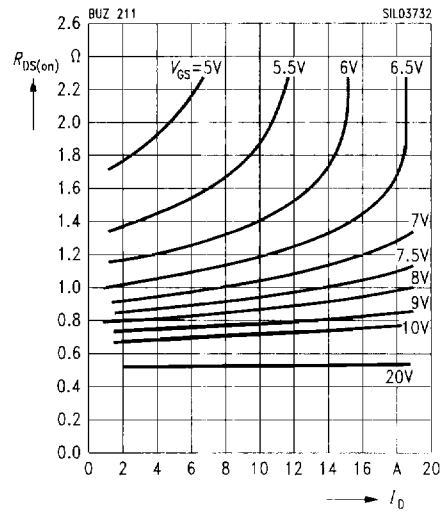
parameter: V_{GS}



Typ. drain-source on-resistance

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

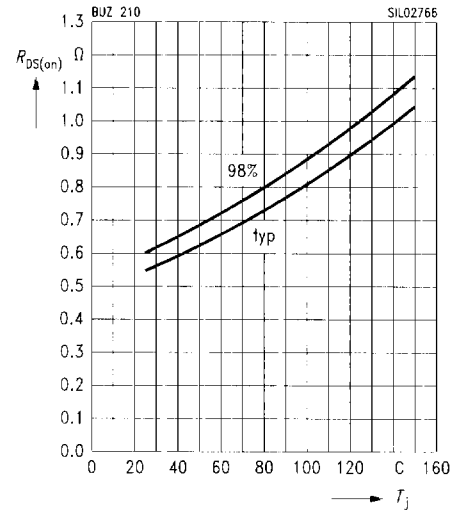
BUZ 211



Drain-source on-resistance

$R_{DS(on)} = f(T_j)$
parameter: $I_D = 6.5$ A, $V_{GS} = 10$ V, (spread)

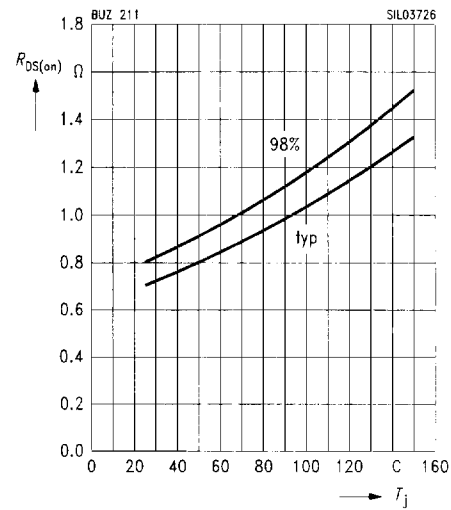
BUZ 210



Drain-source on-resistance

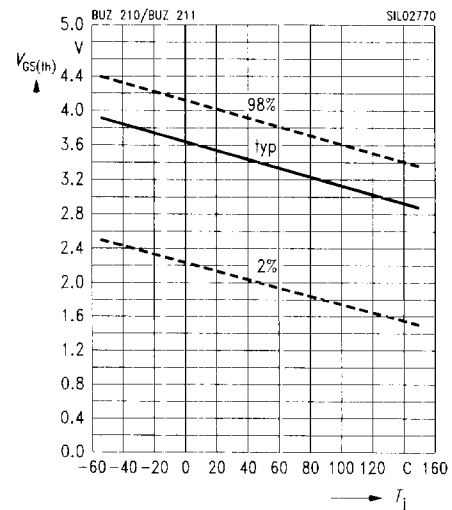
$R_{DS(on)} = f(T_j)$
parameter: $I_D = 6.5$ A, $V_{GS} = 10$ V, (spread)

BUZ 211



Gate threshold voltage

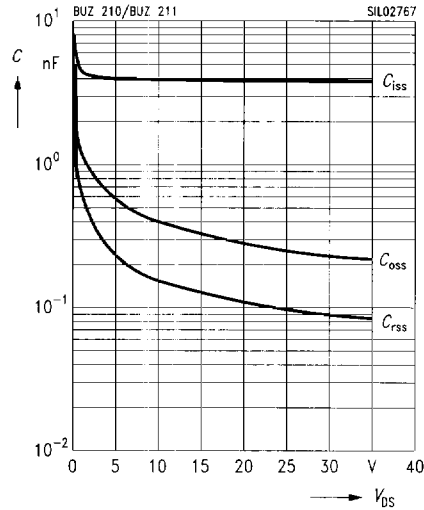
$V_{GS(th)} = f(T_j)$
parameter: $V_{GS} = V_{DS}$, $I_D = 1$ mA



Typ. capacitances

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

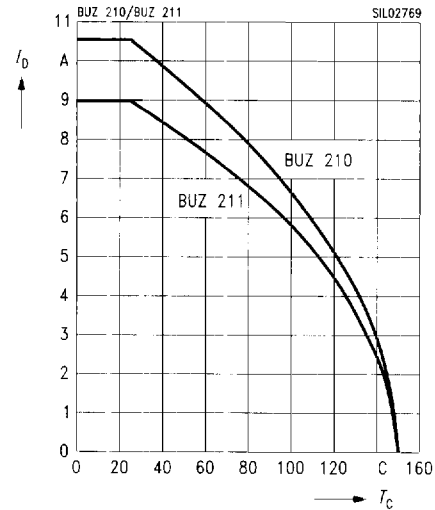
parameter: $V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$



Drain current

$$I_D = f(T_C)$$

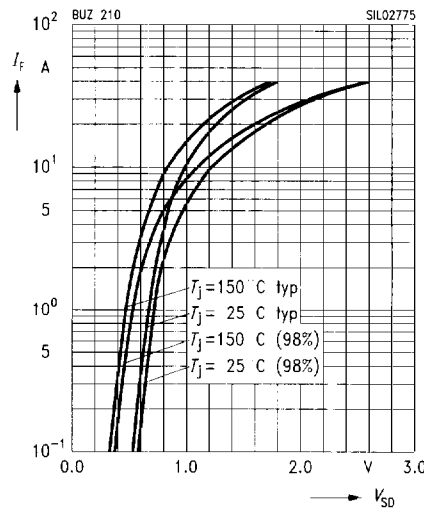
parameter: $V_{GS} \geq 10 \text{ V}$



Forward characteristics of reverse diode

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

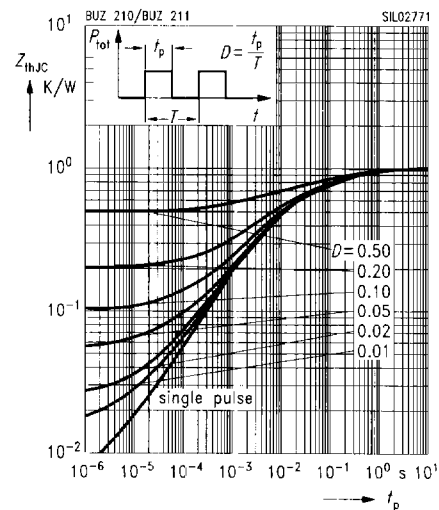
parameter: $t_p = 80 \mu\text{s}, T_j$



Transient thermal impedance

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

parameter: $D = t_p / T$



Typ. gate charge

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

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

