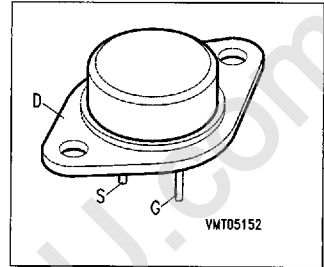


## SIPMOS® Power Transistors

- N channel
- Enhancement mode
- FREDFET

**BUZ 210**  
**BUZ 211**



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

### Maximum Ratings

Parameter	Symbol	BUZ		Unit
		210	211	
Continuous drain current, $T_C = 25\text{ }^\circ\text{C}$	$I_D$	<b>10.5</b>	<b>9.0</b>	A
Pulsed drain current, $T_C = 25\text{ }^\circ\text{C}$	$I_{D\text{ puls}}$	<b>42</b>	<b>36</b>	
Drain-source voltage	$V_{DS}$	<b>500</b>		V
Drain-gate voltage, $R_{GS} = 20\text{ k}\Omega$	$V_{DGR}$	<b>500</b>		
Gate-source voltage	$V_{GS}$	$\pm 20$		
Power dissipation, $T_C = 25\text{ }^\circ\text{C}$	$P_{tot}$	<b>125</b>		W
Operating and storage temperature range	$T_j, T_{stg}$	<b>- 55 ... + 150</b>		$^\circ\text{C}$
Thermal resistance, chip-case	$R_{th\text{ JC}}$	<b>&lt; 1.0</b>		K/W
DIN humidity category, DIN 40 040		<b>C</b>		-
IEC climatic category, DIN IEC 68-1		<b>55/150/56</b>		

1) See chapter Package Outlines.

### Electrical Characteristics

at  $T_j = 25\text{ }^\circ\text{C}$ , 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	$\mu\text{A}$
Gate-source leakage current $V_{GS} = 20\text{ V}$ , $V_{DS} = 0\text{ V}$	$I_{GSS}$	–	10	100	nA
Drain-source on-resistance $V_{GS} = 10\text{ V}$ , $I_D = 6.5\text{ A}$	$R_{DS(on)}$	– –	0.55 0.7	0.6 0.8	$\Omega$
					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	

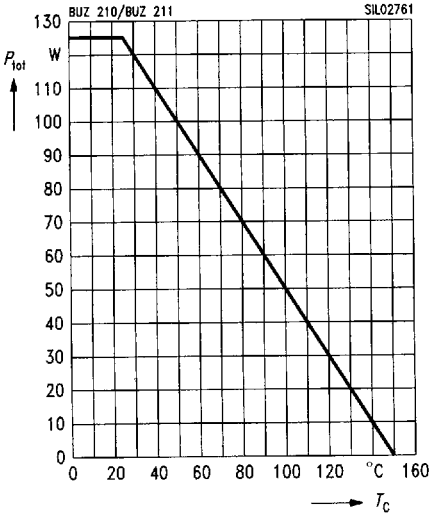
**Electrical Characteristics** (cont'd)  
at  $T_j = 25\text{ }^\circ\text{C}$ , unless otherwise specified.

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

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

### Total power dissipation

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

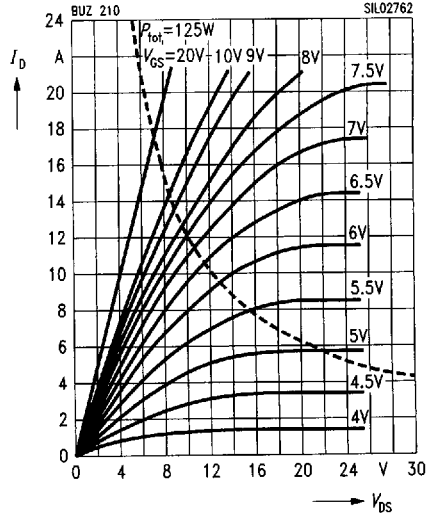


### Typ. output characteristics

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

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

BUZ 210

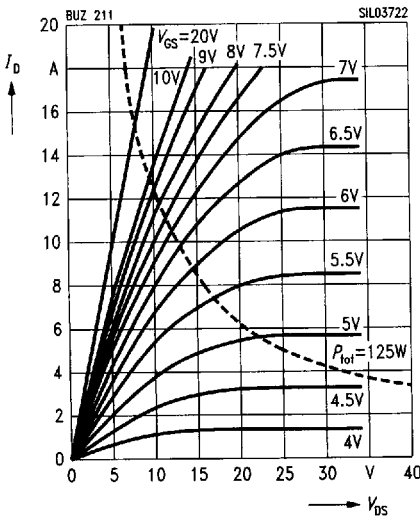


### Typ. output characteristics

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

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

BUZ 211

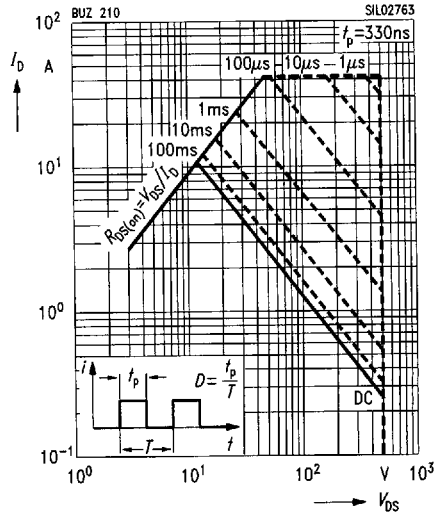


### Safe operating area

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

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

BUZ 210

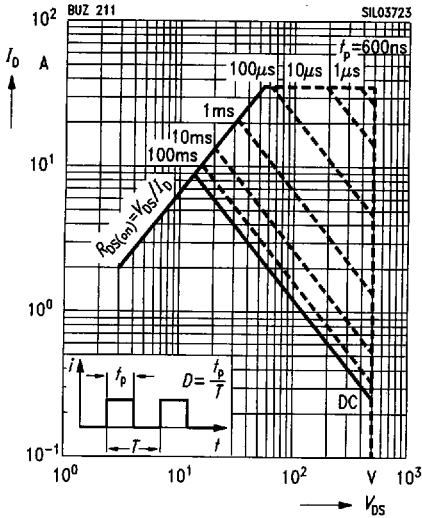


**Safe operating area**

$I_D = f(V_{DS})$

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

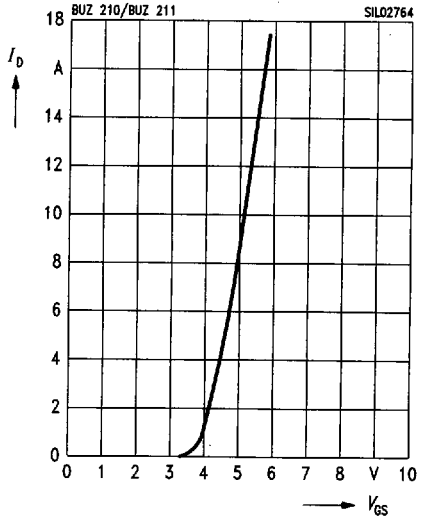
**BUZ 211**



**Typ. transfer characteristics**

$I_D = f(V_{GS})$

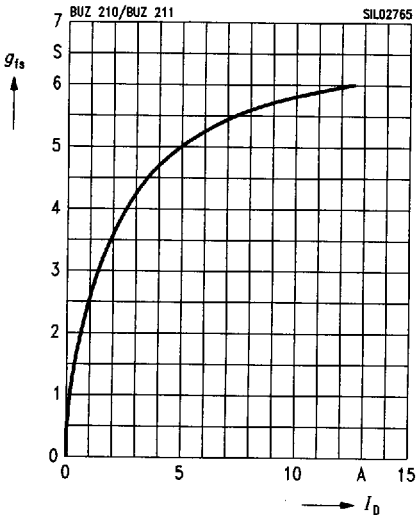
parameter:  $t_p = 80 \mu s, V_{DS} = 25 V$



**Typ. forward transconductance**

$g_{fs} = f(I_D)$

parameter:  $t_p = 80 \mu s$

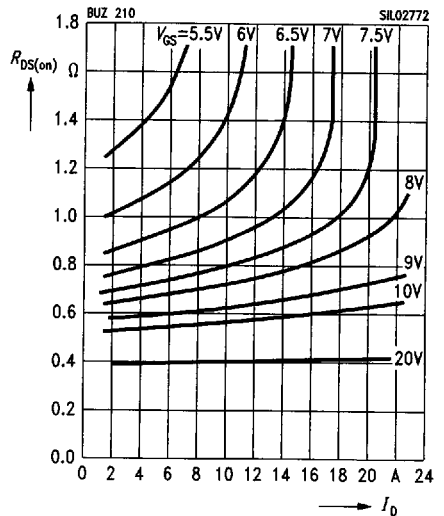


**Typ. drain-source on-resistance**

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

parameter:  $V_{GS}$

**BUZ 210**

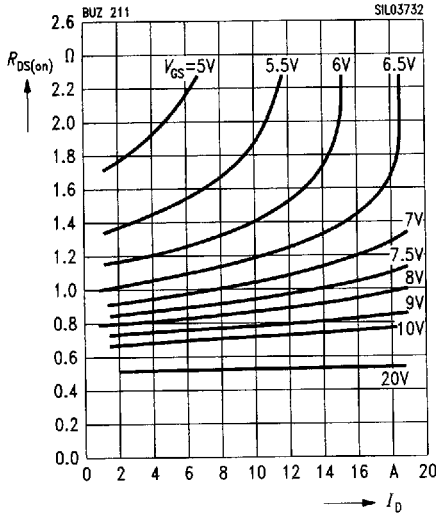


### Typ. drain-source on-resistance

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

parameter:  $V_{GS}$

**BUZ 211**

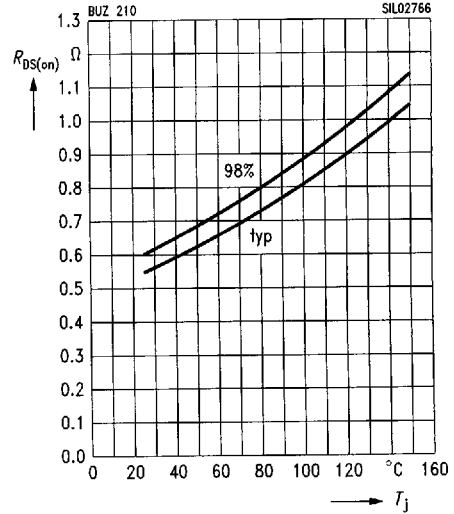


### Drain-source on-resistance

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

parameter:  $I_D = 6.5$  A,  $V_{GS} = 10$  V, (spread)

**BUZ 210**

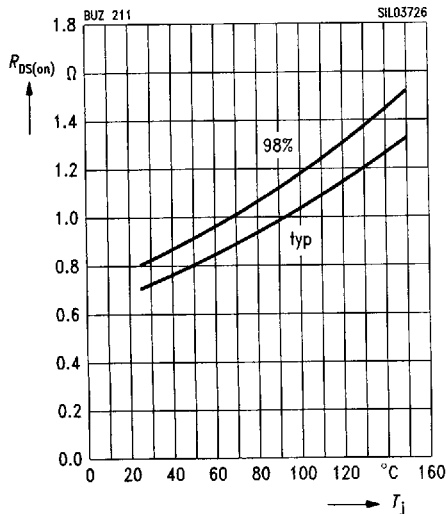


### Drain-source on-resistance

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

parameter:  $I_D = 6.5$  A,  $V_{GS} = 10$  V, (spread)

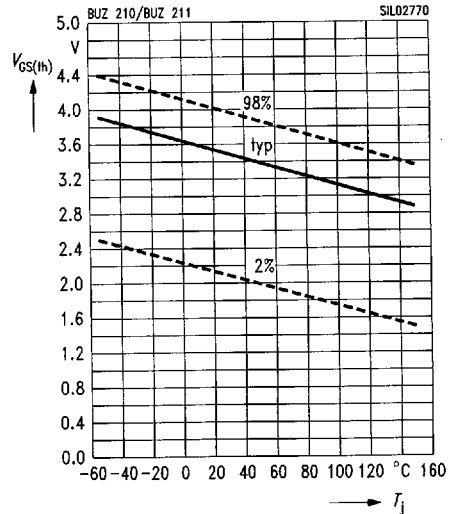
**BUZ 211**



### Gate threshold voltage

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

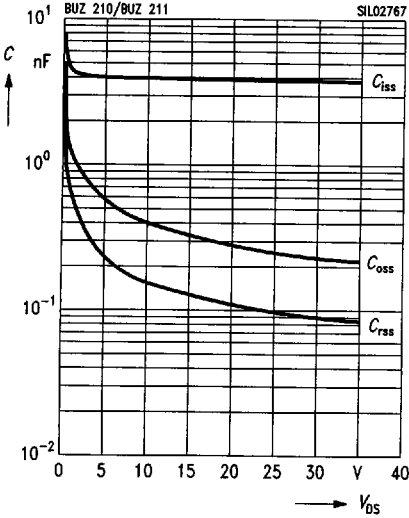
parameter:  $V_{GS} = V_{DS}$ ,  $I_D = 1$  mA



**Typ. capacitances**

$C = f(V_{DS})$

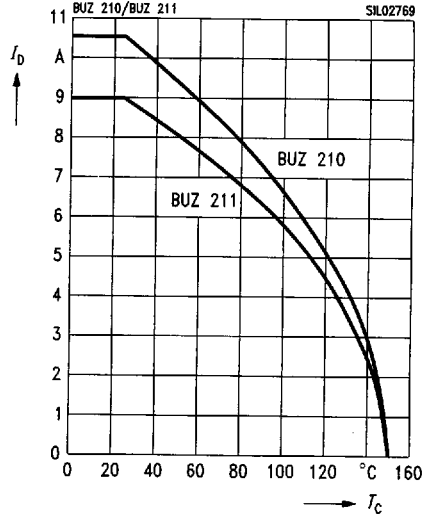
parameter:  $V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$



**Drain current**

$I_D = f(T_C)$

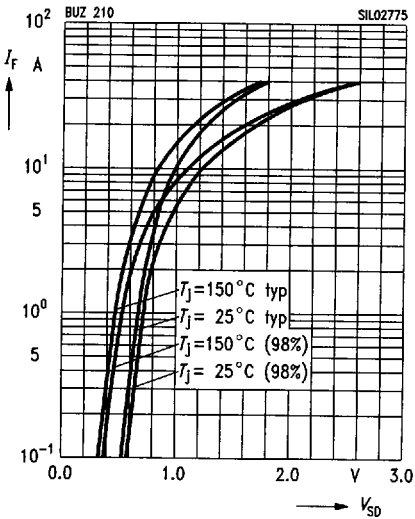
parameter:  $V_{GS} \geq 10 \text{ V}$



**Forward characteristics of reverse diode**

$I_F = f(V_{SD})$

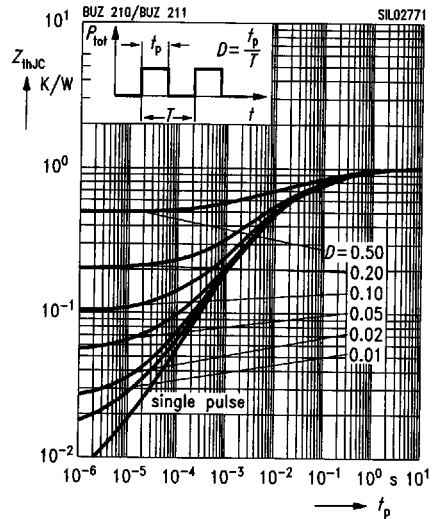
parameter:  $t_p = 80 \mu\text{s}, T_j$



**Transient thermal impedance**

$Z_{thJC} = f(t_p)$

parameter:  $D = t_p / T$



### Typ. gate charge

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

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

