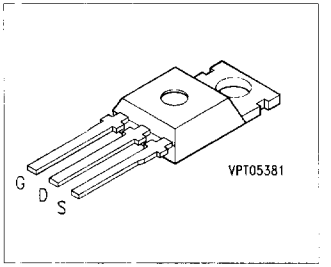
SIEMENS

SIPMOS® Power Transistors

BUZ 11
BUZ 11 A, BUZ 11 S2

- N channel
- Enhancement mode
- Avalanche-rated



Type	V_{DS}	I_D	T_C	$R_{DS\,(on)}$	Package [1]	Ordering Code
BUZ 11	50 V	30 A	29 °C	0.040 Ω	TO-220 AB	C67078-S1301-A2
BUZ 11 A	50 V	26 A	25 °C	0.055 Ω	TO-220 AB	C67078-S1301-A3
BUZ 11 S2	60 V	30 A	29 °C	0.040 Ω	TO-220 AB	C67078-S1301-A5

Maximum Ratings

Parameter	Symbol	BUZ			Unit
		11	11 A	11 S2	
Continuous drain current	I_D	**30**	**26**	**30**	A
Pulsed drain current, T_C = 25 °C	$I_{D\,puls}$	**120**	**104**	**120**	
Avalanche current, limited by $T_{j\,max}$	I_{AR}	**30**			
Avalanche energy, periodic limited by $T_{j\,(max)}$	E_{AR}	**1.9**			mJ
Avalanche energy, single pulse V_{DD} = 25 V, R_{GS} = 25 Ω, T_j = 25 °C I_D = 30 A, L = 15.6 µH	E_{AS}	**14**			
Gate-source voltage	V_{GS}	**± 20**			V
Power dissipation, T_C = 25 °C	P_{tot}	**75**			W
Operating and storage temperature range	T_j , T_{stg}	**– 55 ... + 150**			°C

Thermal resistance, chip-case	$R_{th\,JC}$	**≤ 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 °C, unless otherwise specified.

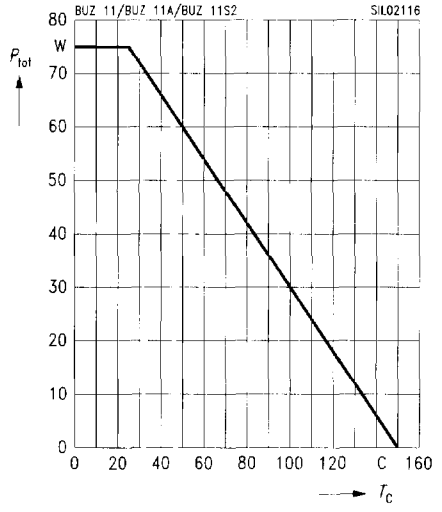
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static characteristics					
Drain-source breakdown voltage	$V_{(BR)\,DSS}$				V
V_{GS} = 0 V, I_D = 0.25 mA BUZ 11 / 11 A		50	–	–	
BUZ 11 S2		60	–	–	
Gate threshold voltage	$V_{GS\,(th)}$	2.1	3.0	4.0	V
V_{GS} = V_{DS} , I_D = 0.25 mA					
Zero gate voltage drain current	I_{DSS}				µA
V_{GS} = 0 V V_{DS} = 50 V BUZ 11 / 11 A					
V_{DS} = 60 V BUZ 11 S2					
T_j = 25 °C		–	0.1	0.1	
T_j = 125 °C		–	10	100	
Gate-source leakage current	I_{GSS}	–	10	100	nA
V_{GS} = 20 V, V_{DS} = 0 V					
Drain-source on-resistance	$R_{DS\,(on)}$				Ω
V_{GS} = 10 V, I_D = 19 A BUZ 11 / 11 S2		–	0.03	0.04	
BUZ 11 A		–	0.04	0.055	

Electrical Characteristics (cont'd)
at T_j = 25 °C, unless otherwise specified.

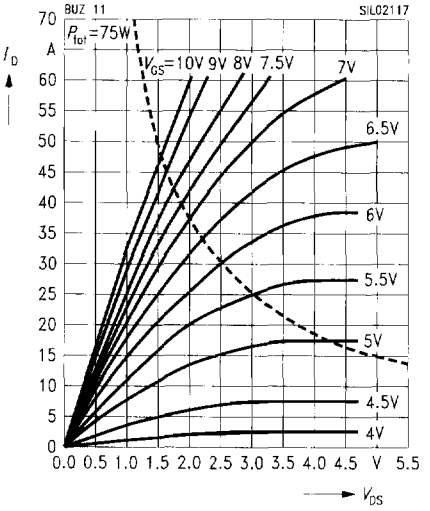
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic characteristics					
Forward transconductance $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$ I_D = 19 A	g_{fs}	10	17	–	A
Input capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{iss}	–	1000	1350	pF
Output capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{oss}	–	450	680	pF
Reverse transfer capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{rss}	–	165	250	pF
Turn-on time t_{on} , ($t_{on} = t_{d\,(on)} + t_r$) V_{DD} = 30 V, V_{GS} = 10 V, I_D = 3 A, R_{GS} = 50 Ω	$t_{d\,(on)}$ t_r	 –	15 55	25 85	ns
Turn-off time t_{off} , ($t_{off} = t_{d\,(off)} + t_f$) V_{DD} = 30 V, V_{GS} = 10 V, I_D = 3 A, R_{GS} = 50 Ω	$t_{d\,(off)}$ t_f	– –	120 80	160 110	ns
Reverse diode					
Continuous reverse drain current T_C = 25 °C BUZ 11 / 11 S2 BUZ 11 A	I_S	 – –	 – –	 30 26	A
Pulsed reverse drain current T_C = 25 °C BUZ 11 / 11 S2 BUZ 11 A	I_{SM}	 – –	 – –	 120 104	A
Diode forward on-voltage V_{GS} = 0 V I_S = 60 A	V_{SD}	–	1.6	1.8	V
Reverse recovery time V_R = 30 V, $I_F = I_S$, di_F / dt = 100 A/µs	t_{rr}	–	80	–	ns
Reverse recovery charge V_R = 30 V, $I_F = I_S$, di_F / dt = 100 A/µs	Q_{rr}	–	0.1	–	µC

Characteristics at T_j = 25 °C, unless otherwise specified.

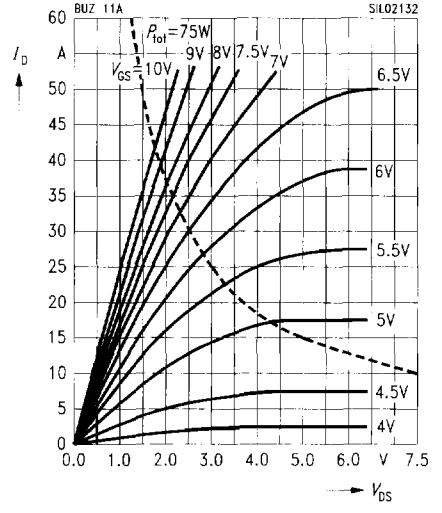
Total power dissipation
$P_{tot} = f(T_C)$



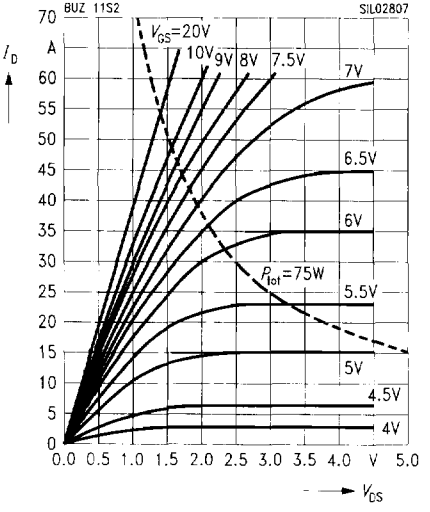
Typ. output characteristics
$I_D = f(V_{DS})$ **BUZ 11**
parameter: t_p = 80 µs



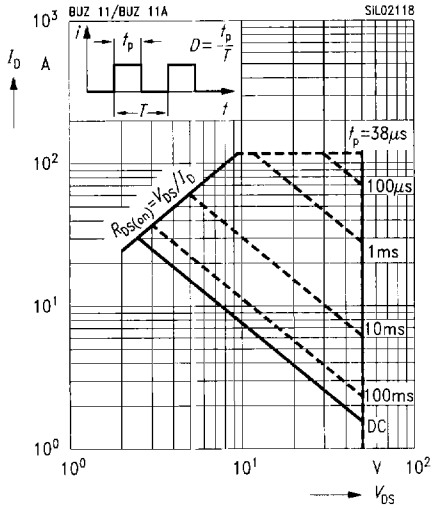
Typ. output characteristics
$I_D = f(V_{DS})$ **BUZ 11A**
parameter: t_p = 80 µs



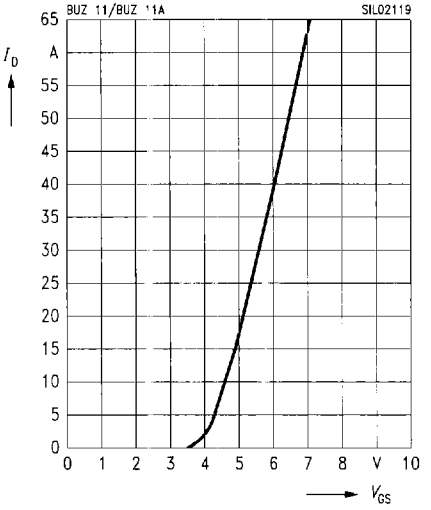
Typ. output characteristics
$I_D = f(V_{DS})$ **BUZ 11 S2**
parameter: t_p = 80 µs



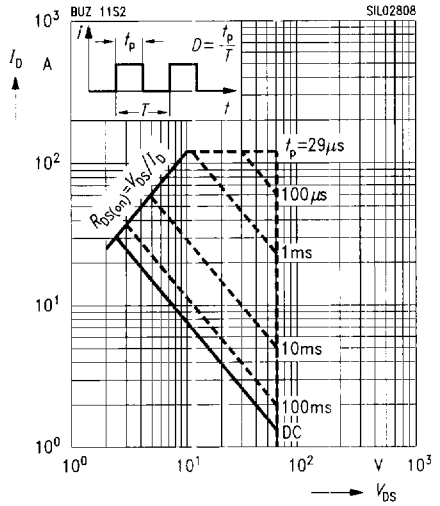
Safe operating area
$I_D = f(V_{DS})$ **BUZ 11 / BUZ 11 A**
parameter: $D = 0.01$, $T_C = 25$ °C



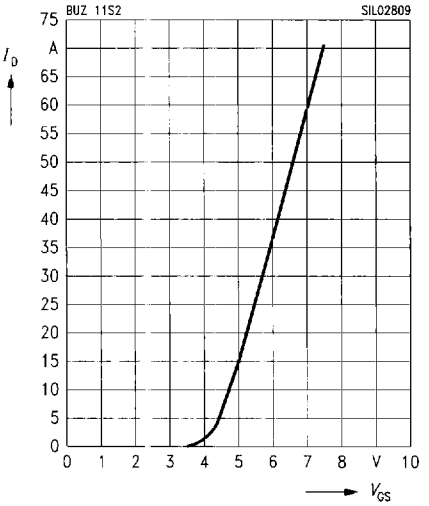
Typ. transfer characteristics
$I_D = f(V_{GS})$ **BUZ 11 / BUZ 11 A**
parameter: t_p = 80 µs, V_{DS} = 25 V



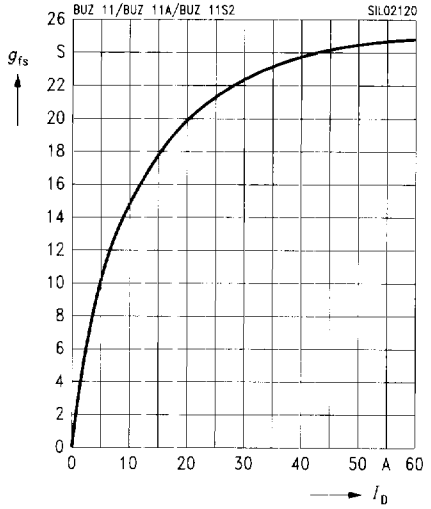
Safe operating area
$I_D = f(V_{DS})$ **BUZ 11 S2**
parameter: $D = 0.01$, $T_C = 25$ °C



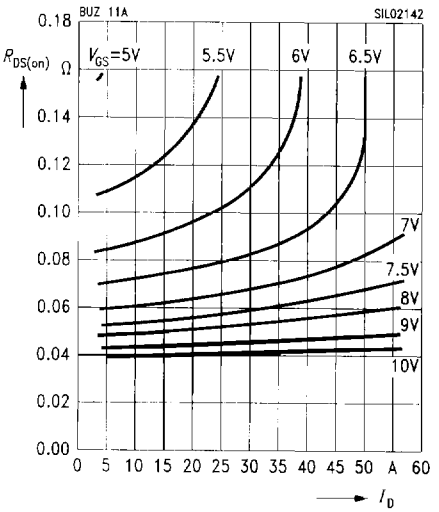
Typ. transfer characteristics
$I_D = f(V_{GS})$ **BUZ 11 S2**
parameter: t_p = 80 µs, V_{DS} = 25 V



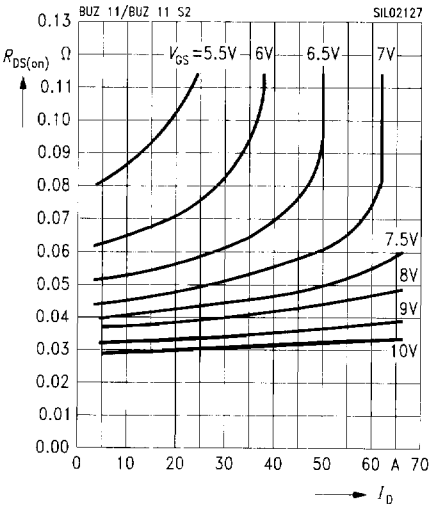
Typ. forward transconductance
$g_{fs} = f(I_D)$
parameter: t_p = 80 µs



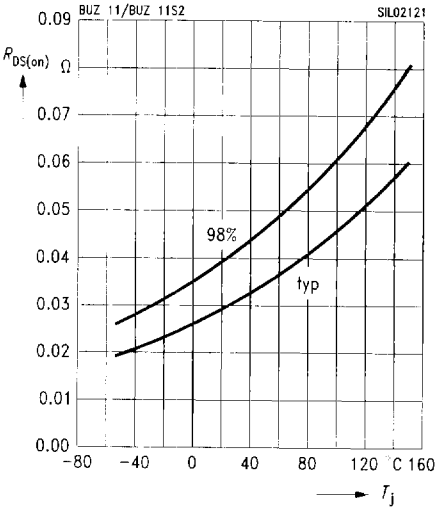
Typ. drain-source on-resistance
$R_{DS\,(on)} = f(I_D)$ **BUZ 11 A**
parameter: V_{GS}



Typ. drain-source on-resistance
$R_{DS\,(on)} = f(I_D)$ **BUZ 11 / BUZ 11 S2**
parameter: V_{GS}



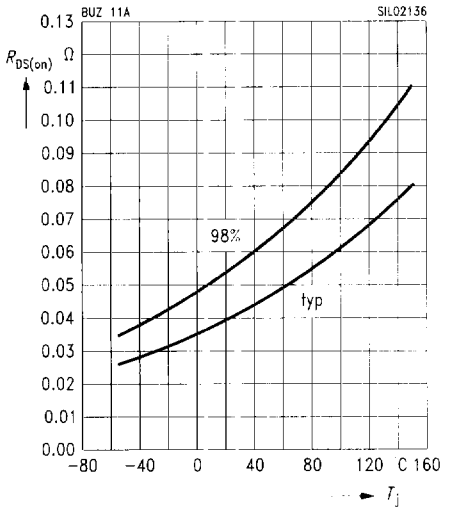
Drain-source on-resistance
$R_{DS\,(on)} = f(T_j)$ **BUZ 11/BUZ 11 S2**
parameter: I_D = 19 A, V_{GS} = 10 V, (spread)



Drain-source on-resistance

$R_{DS\,(on)} = f(T_j)$ **BUZ 11 A**

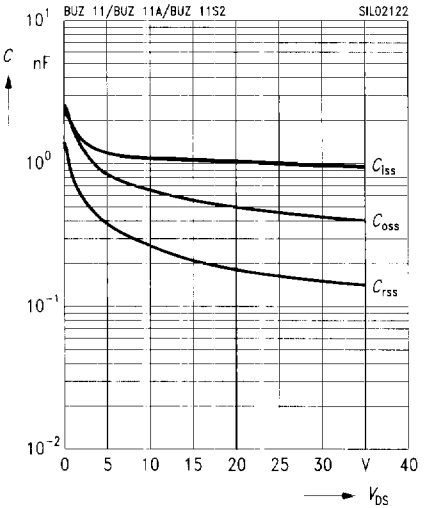
parameter: I_D = 19 A, V_{GS} = 10 V, (spread)



Typ. capacitances

$C = f(V_{DS})$

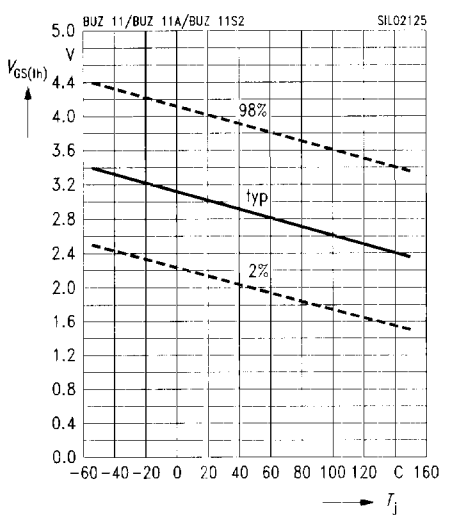
parameter: V_{GS} = 0 V, f = 1 MHz



Gate threshold voltage

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

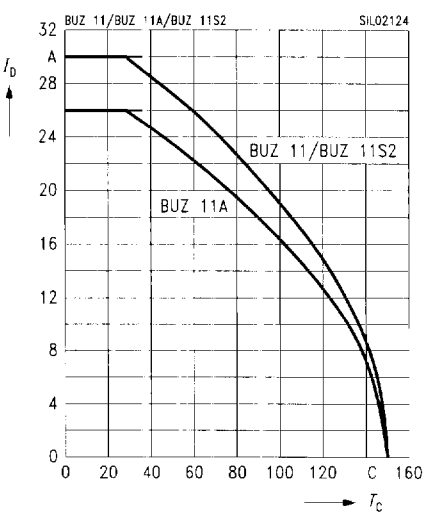
parameter: $V_{GS} = V_{DS}$, I_D = 1 mA, (spread)



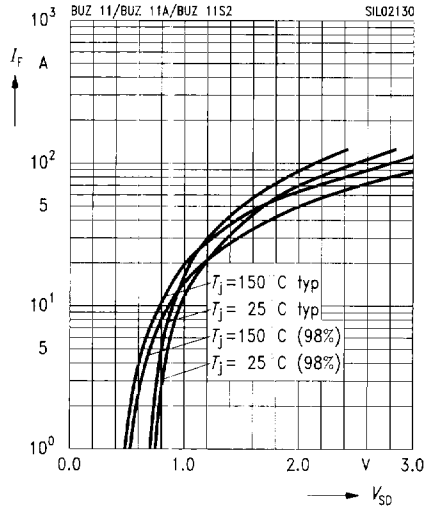
Drain current

$I_D = f(T_C)$

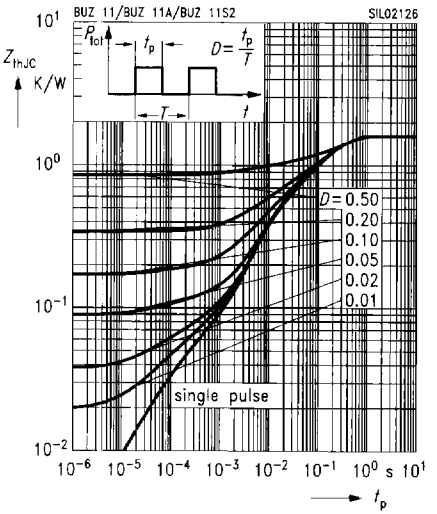
parameter: $V_{GS} \geq 10$ V



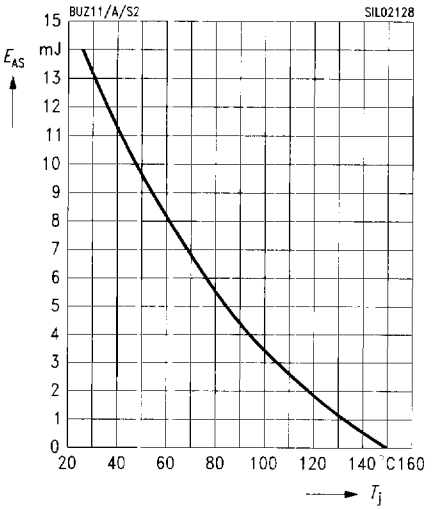
Forward characteristics of reverse diode
$I_F = f(V_{SD})$
parameter: T_j , t_p = 80 µs,(spread)



Transient thermal impedance
$Z_{th\,JC} = f(t_p)$
parameter: $D = t_p / T$



Avalanche energy $E_{AS} = f(T_j)$
parameter: I_D = 30 A, V_{DD} = 25 V
R_{GS} = 25 Ω, L = 15.6 µH



Typ. gate charge
$V_{GS} = f(Q_{Gate})$
parameter: $I_{D\,puls}$ = 55.5 A