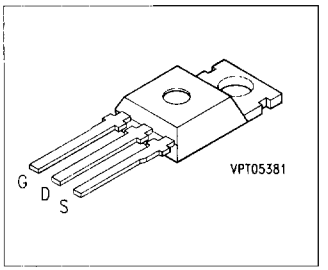
SIEMENS

SIPMOS® Power Transistors

BUZ 10
BUZ 10 S2

- N channel
- Enhancement mode
- Avalanche-rated



Type	V_{DS}	I_D	$R_{DS\,(on)}$	Package [1]	Ordering Code
BUZ 10	50 V	23 A	0.07 Ω	TO-220 AB	C67078-S1300-A2
BUZ 10 S2	60 V	23 A	0.07 Ω	TO-220 AB	C67078-S1300-A7

Maximum Ratings

Parameter	Symbol	Values	Unit
Continuous drain current, T_C = 26 °C	I_D	**23**	A
Pulsed drain current, T_C = 25 °C	$I_{D\,puls}$	**92**	
Avalanche current, limited by $T_{j\,max}$	I_{AR}	**23**	
Avalanche energy, periodic limited by $T_{j\,(max)}$	E_{AR}	**1.3**	mJ
Avalanche energy, single pulse V_{DD} = 25 V, R_{GS} = 25 Ω, T_j = 25 °C I_D = 23 A, L = 15.1 µH	E_{AS}	**8.0**	
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_{GS} = 0 V, I_D = 0.25 mA BUZ 10 BUZ 10 S2	$V_{(BR)\,DSS}$	 50 60	 – –	 – –	V
Gate threshold voltage V_{GS} = V_{DS}, I_D = 1mA	$V_{GS\,(th)}$	2.1	3.0	4.0	V
Zero gate voltage drain current V_{DS} = 50 V, V_{GS} = 0 V V_{DS} = 60 V T_j = 25 °C T_j = 125 °C	I_{DSS}	 – –	 0.1 10	 1.0 100	µA
Gate-source leakage current V_{GS} = 20 V, V_{DS} = 0 V	I_{GSS}	–	10	100	nA
Drain-source on-resistance V_{GS} = 10 V, I_D = 14 A	$R_{DS\,(on)}$	–	0.05	0.07	Ω

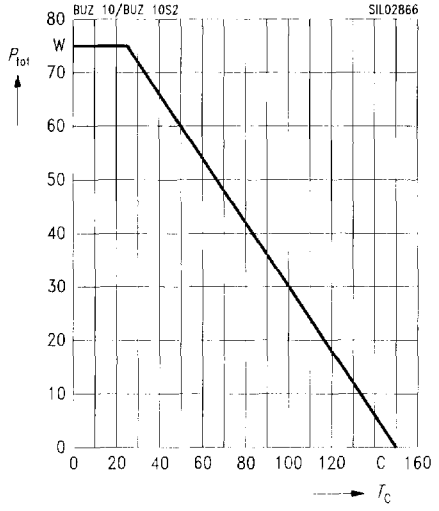
Electrical Characteristics (cont'd)
at T_j = 25 °C, unless otherwise specified.

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 = 14 A	g_{fs}	7	13	–	S
Input capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{iss}	–	650	820	pF
Output capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{oss}	–	300	450	pF
Reverse transfer capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{rss}	–	110	170	pF
Turn-on time t_{on}, ($t_{on} = t_{d(on)} + t_r$) V_{DD} = 30 V, V_{GS} = 10 V, R_{GS} = 50 Ω I_D = 3 A	$t_{d(on)}$	–	20	35	ns
	t_r	–	40	65	ns
Turn-off time t_{off}, ($t_{off} = t_{d(off)} + t_f$) V_{DD} = 30 V, V_{GS} = 10 V, R_{GS} = 50 Ω I_D = 3 A	$t_{d(off)}$	–	80	110	ns
	t_f	–	60	75	ns
Reverse diode					
Continuous reverse drain current	I_S	–	–	23	A
Pulsed reverse drain current	I_{SM}	–	–	92	A
Diode forward on-voltage I_S = 46 A, V_{GS} = 0 V	V_{SD}	–	1.5	1.9	V
Reverse recovery time V_R = 30 V, $I_F = I_S$, di_F / dt = 100 A/µs	t_{rr}	–	60	–	ns
Reverse recovery time 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

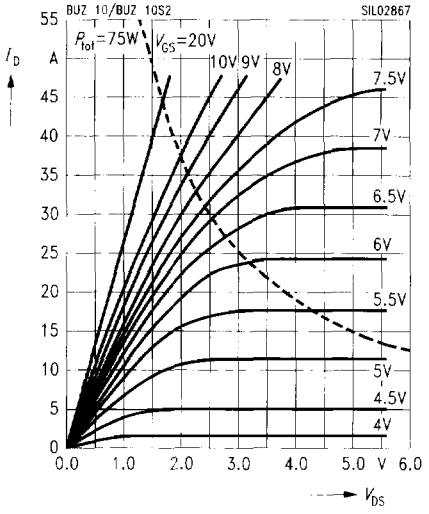
$P_{tot} = f(T_C)$



Typ. output characteristics

$I_D = f(V_{DS})$

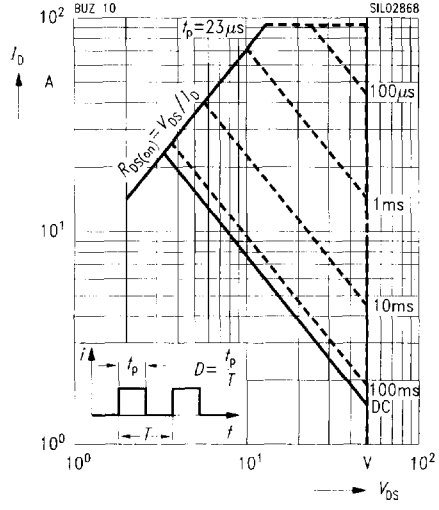
parameter: t_p = 80 µs



Safe operating area

$I_D = f(V_{DS})$ **BUZ 10**

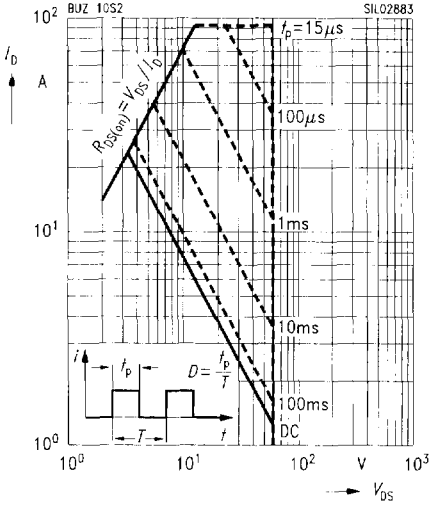
parameter: D = 0.01, T_C = 25 °C



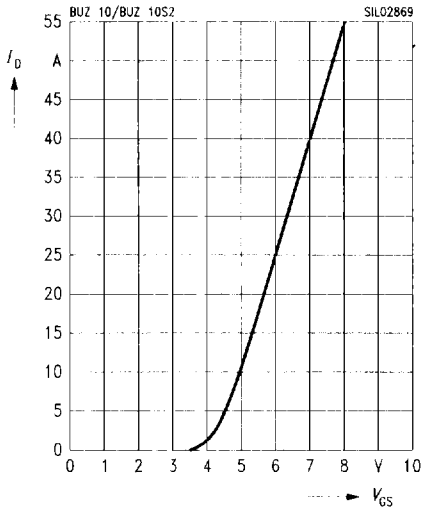
Safe operating area

$I_D = f(V_{DS})$ **BUZ 10 S2**

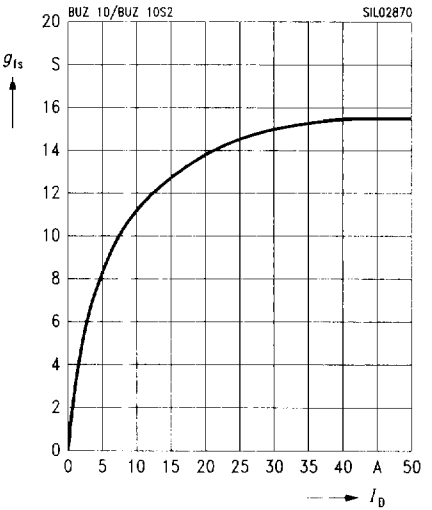
parameter: D = 0.01, T_C = 25 °C



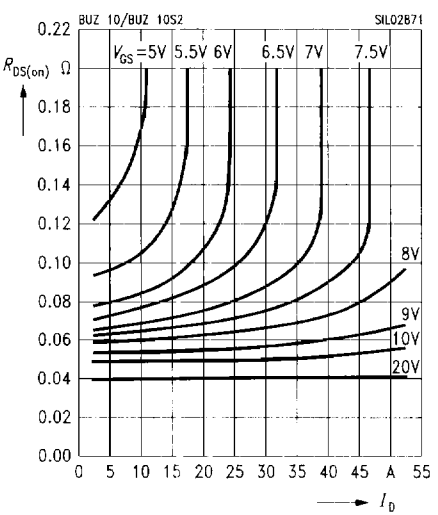
Typ. transfer characteristics
$I_D = f(V_{GS})$
parameter: t_p = 80 µs, V_{DS} = 25 V



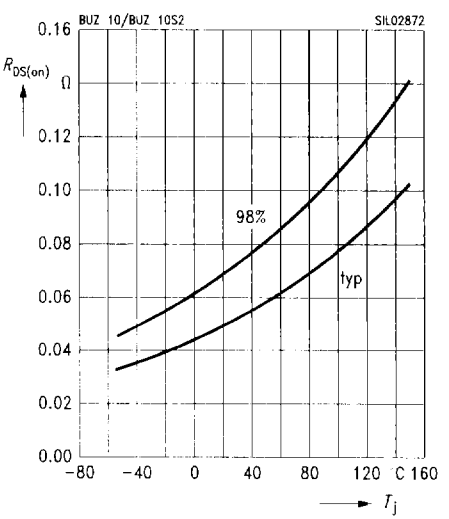
Typ. forward transconductance
$g_{fs} = f(I_D)$
parameter: t_p = 80 µs



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



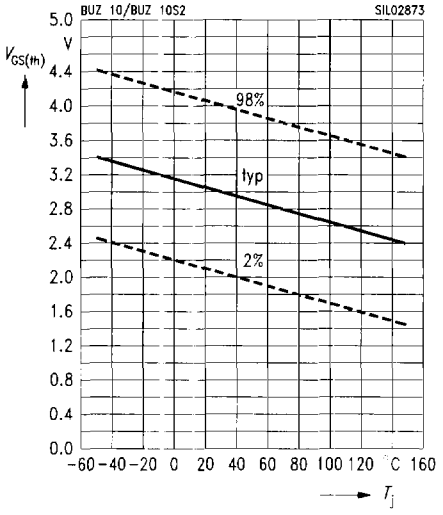
Drain-source on-resistance
$R_{DS\,(on)} = f(T_j)$
parameter: I_D = 14 A, V_{GS} = 10 V, (spread)



Gate threshold voltage

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

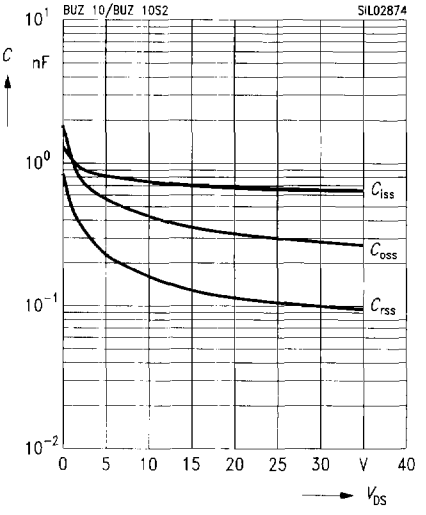
parameter: $V_{GS} = V_{DS}$, I_D = 1 mA, (spread)



Typ. capacitances

$C = f(V_{DS})$

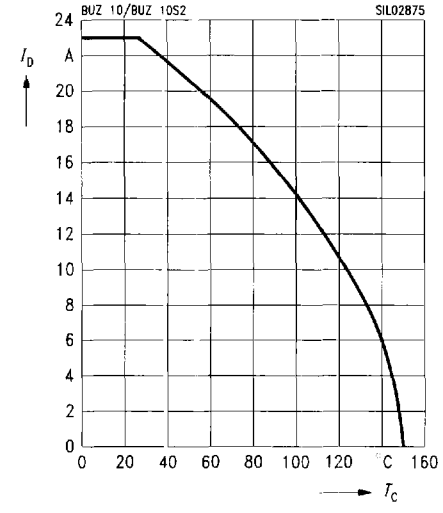
parameter: V_{GS} = 0 V, f = 1 MHz



Drain current

$I_D = f(T_C)$

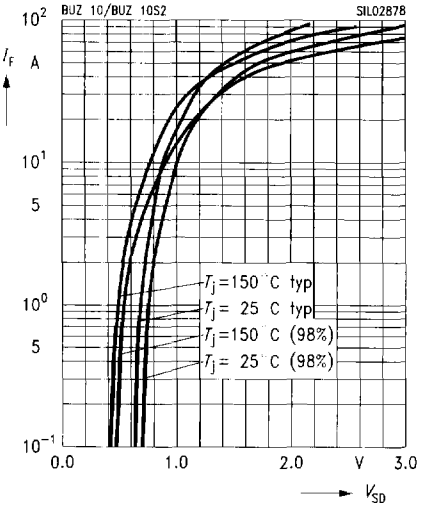
parameter: $V_{GS} \geq 10$ V



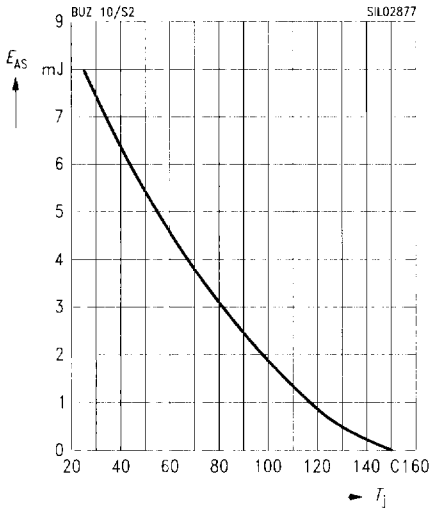
Forward characteristics of reverse diode

$I_F = f(V_{SD})$

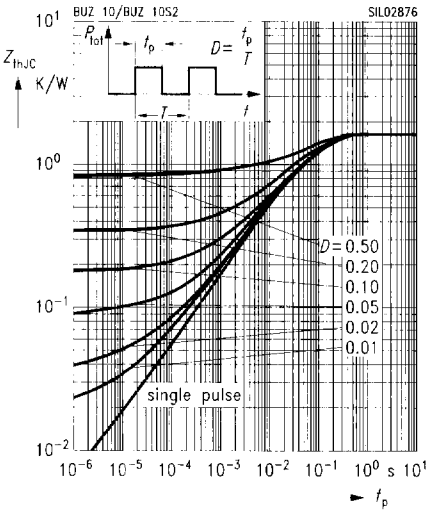
parameter: T_j, t_p = 80 µs, (spread)



Avalanche energy $E_{AS} = f(T_j)$
parameter: I_D = 23 A, V_{DD} = 25 V
R_{GS} = 25 Ω, L = 15.1 µH



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



Typ. gate charge
$V_{GS} = f(Q_{Gate})$
parameter: $I_{D\,puls}$ = 37.5 A