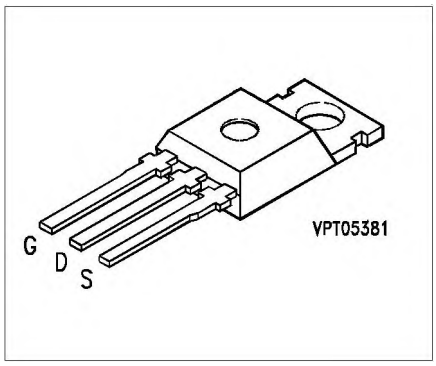
SIEMENS

SIPMOS® Power Transistor — BUZ 22

- N channel
- Enhancement mode
- Avalanche-rated



Type	V_{DS}	I_D	$R_{DS\ (on)}$	Package [1]	Ordering Code
BUZ 22	100 V	34 A	0.055 Ω	TO-220 AB	C67078-S1333-A2

Maximum Ratings

Parameter	Symbol	Values	Unit
Continuous drain current, T_C = 27 °C	I_D	**34**	A
Pulsed drain current, T_C = 25 °C	$I_{D\ puls}$	**136**	
Avalanche current, limited by $T_{j\ max}$	I_{AR}	**34**	
Avalanche energy, periodic limited by $T_{j\ (max)}$	E_{AR}	**15**	mJ
Avalanche energy, single pulse I_D = 34 A, V_{DD} = 25 V, R_{GS} = 25 Ω L = 285.5 µH, T_j = 25 °C	E_{AS}	**220**	
Gate-source voltage	V_{GS}	± **20**	V
Power dissipation, T_C = 25 °C	P_{tot}	**125**	W
Operating and storage temperature range	T_j , T_{stg}	**– 55 ... + 150**	°C

Thermal resistance, chip-case	$R_{th\ JC}$	≤ **1.0**	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	$V_{(BR)\ DSS}$	100	–	–	V
Gate threshold voltage V_{GS} = V_{DS}, I_D = 1 mA	$V_{GS\ (th)}$	2.1	3.0	4.0	
Zero gate voltage drain current V_{DS} = 100 V, V_{GS} = 0 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 = 22 A	$R_{DS\ (on)}$	–	0.05	0.055	Ω
Dynamic characteristics					
Forward transconductance $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$, I_D = 22 A	g_{fs}	10	17.5	–	S
Input capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{iss}	–	1400	1850	pF
Output capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{oss}	–	450	700	
Reverse transfer capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{rss}	–	230	370	
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	$t_{d\ (on)}$	–	20	30	ns
	t_r	–	80	120	
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	$t_{d\ (off)}$	–	230	300	
	t_f	–	120	160	

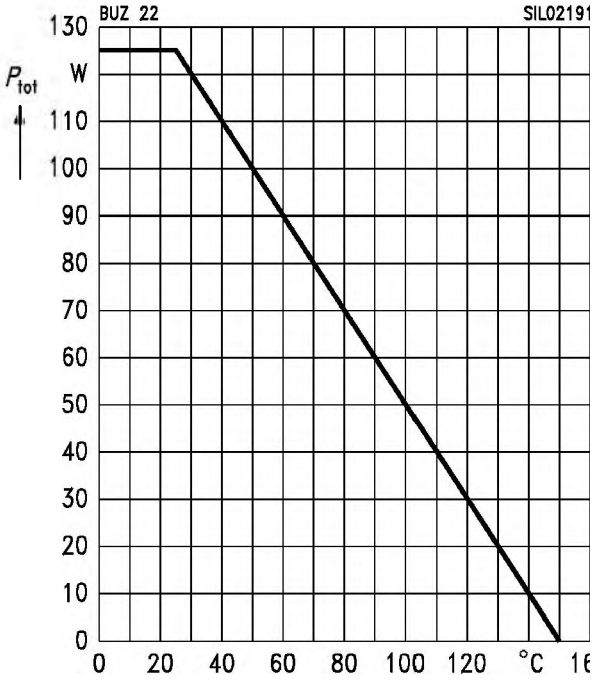
Electrical Characteristics (cont'd)
at T_j = 25 °C, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Reverse diode					
Continuous reverse drain current T_C = 25 °C	I_S	–	–	34	A
Pulsed reverse drain current T_C = 25 °C	I_{SM}	–	–	136	
Diode forward on-voltage I_S = 68 A, V_{GS} = 0 V	V_{SD}	–	1.4	1.8	V
Reverse recovery time V_R = 30 V, $I_F = I_S$, di_F / dt = 100 A/µs	t_{rr}	–	130	–	ns
Reverse recovery charge V_R = 30 V, $I_F = I_S$, di_F / dt = 100 A/µs	Q_{rr}	–	0.7	–	µC

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

Total power dissipation

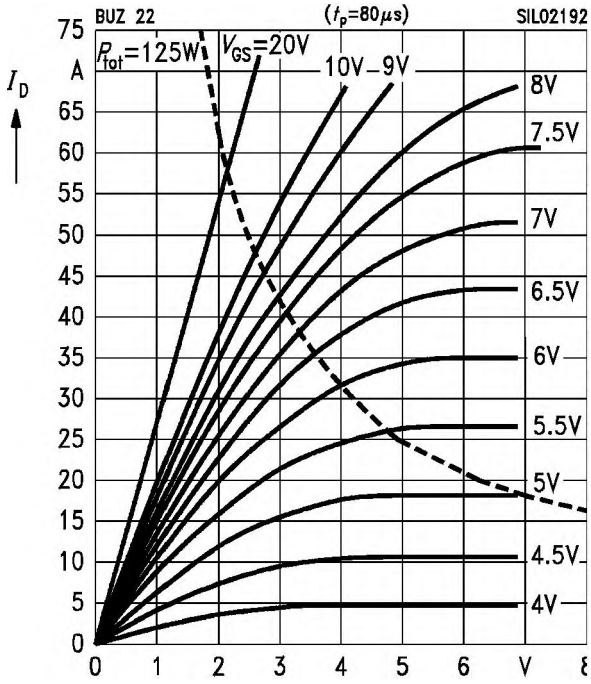
$P_{tot} = f(T_C)$



Typ. output characteristics

$I_D = f(V_{DS})$

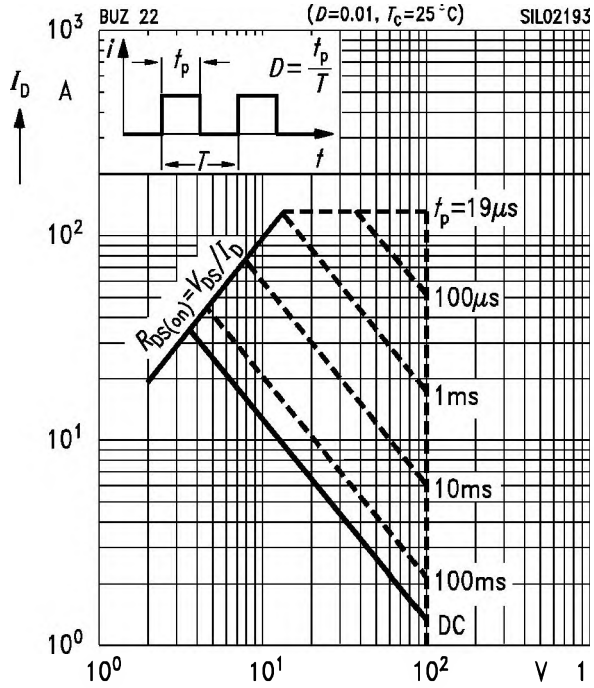
parameter: t_p = 80 µs



Safe operating area

$I_D = f(V_{DS})$

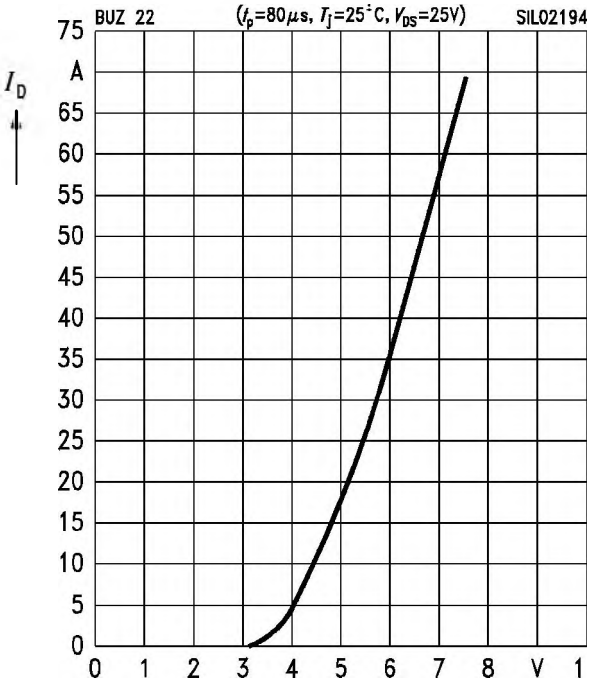
parameter: D = 0.01, T_C = 25 °C



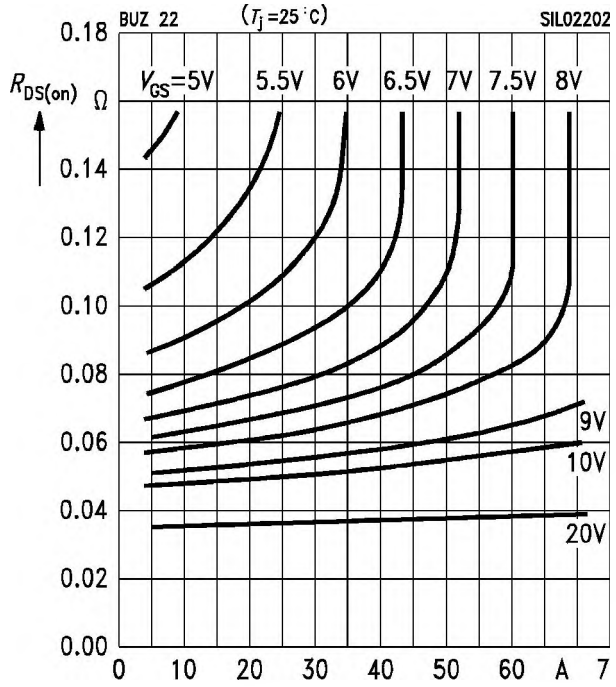
Typ. transfer characteristics

$I_D = f(V_{GS})$

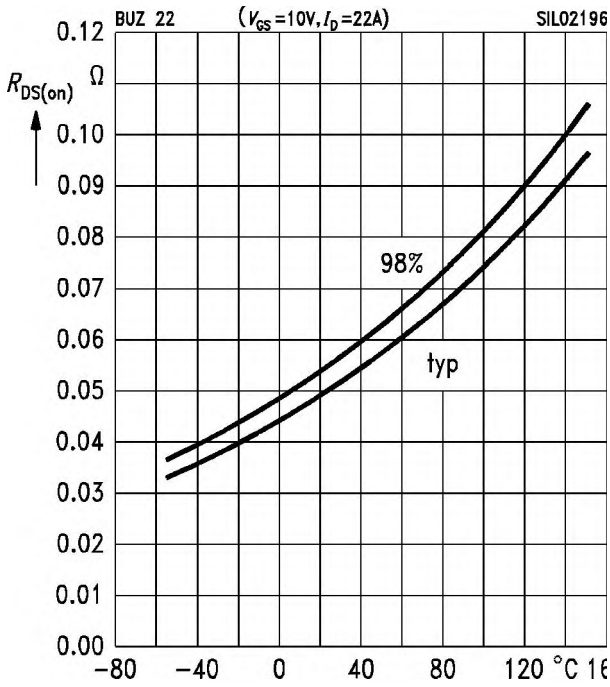
parameter: t_p = 80 µs, V_{DS} = 25 V



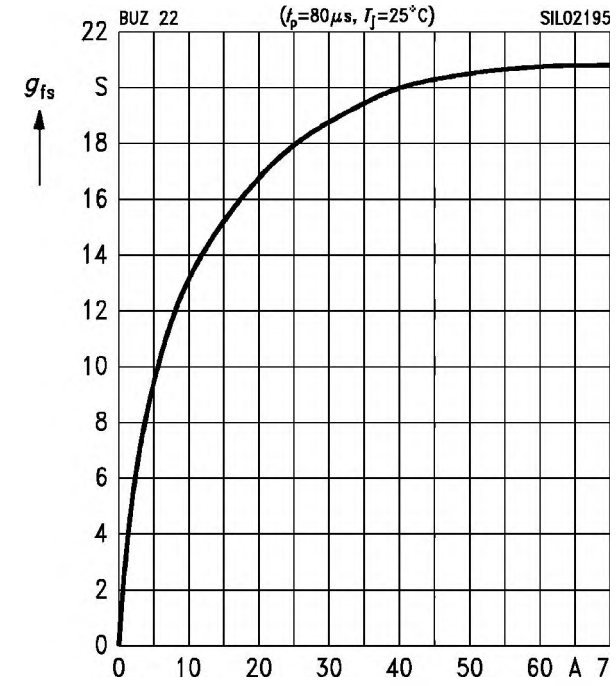
Typ. drain-source on-resistance
$R_{DS\,(on)} = f(I_D)$
parameter: V_{GS}



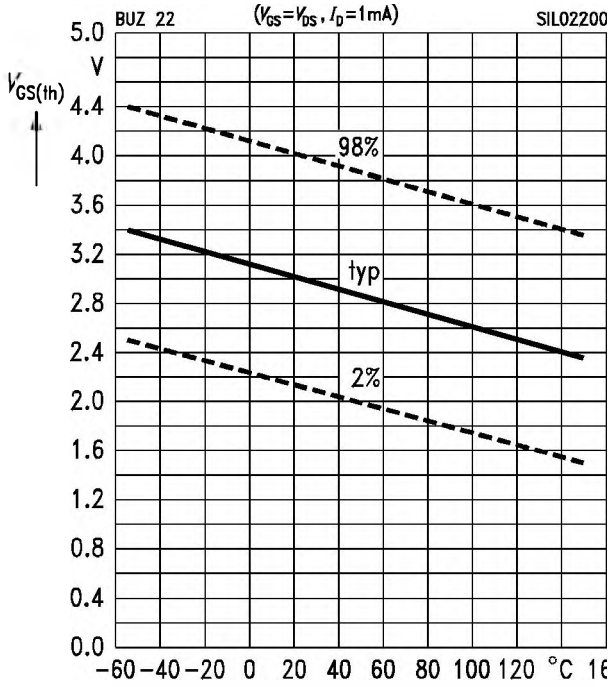
Drain-source on-resistance
$R_{DS\,(on)} = f(T_j)$
parameter: I_D = 22 A, V_{GS} = 10 V, (spread)



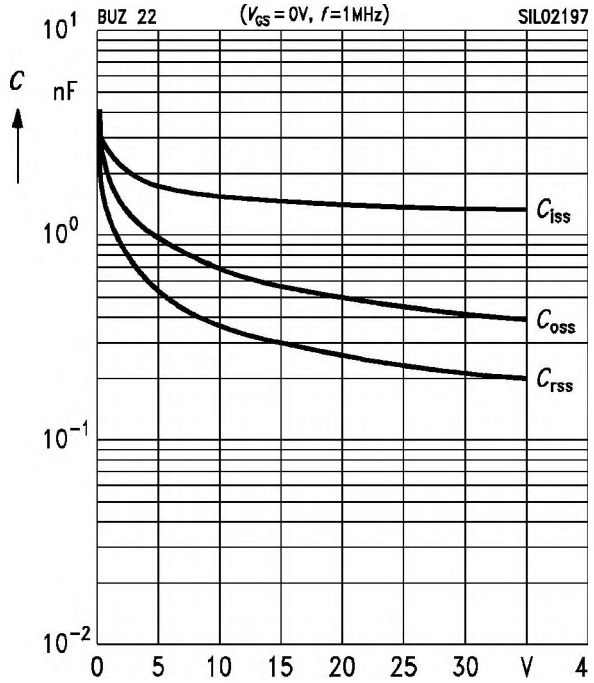
Typ. forward transconductance
$g_{fs} = f(I_D)$
parameter: t_p = 80 µs



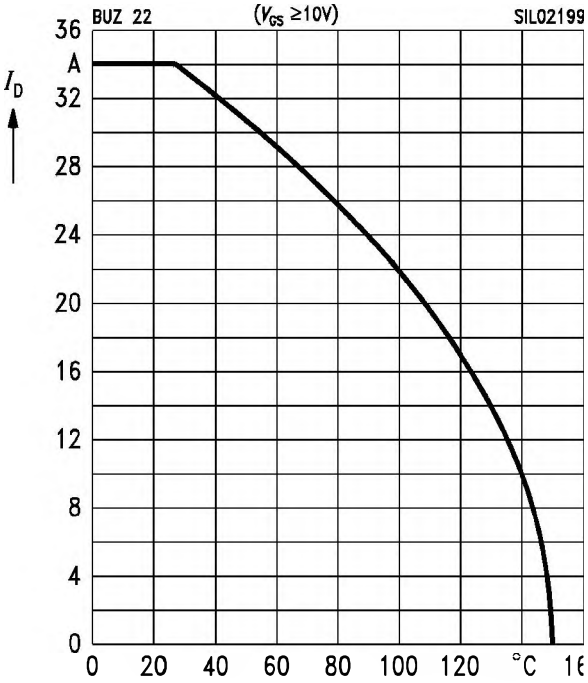
Gate threshold voltage
$V_{GS\,(th)} = f(T_j)$
parameter: $V_{GS} = V_{DS}$, I_D = 1 mA, (spread)



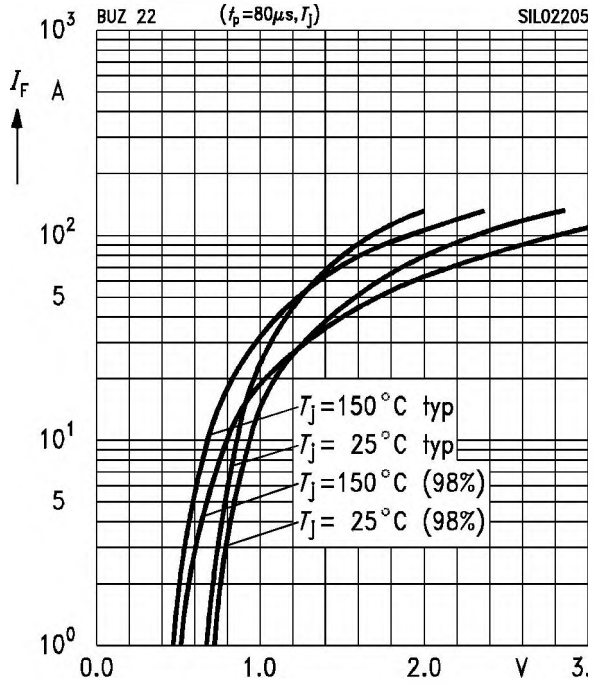
Typ. capacitances
$C = f(V_{DS})$
parameter: V_{GS} = 0 V, f = 1 MHz



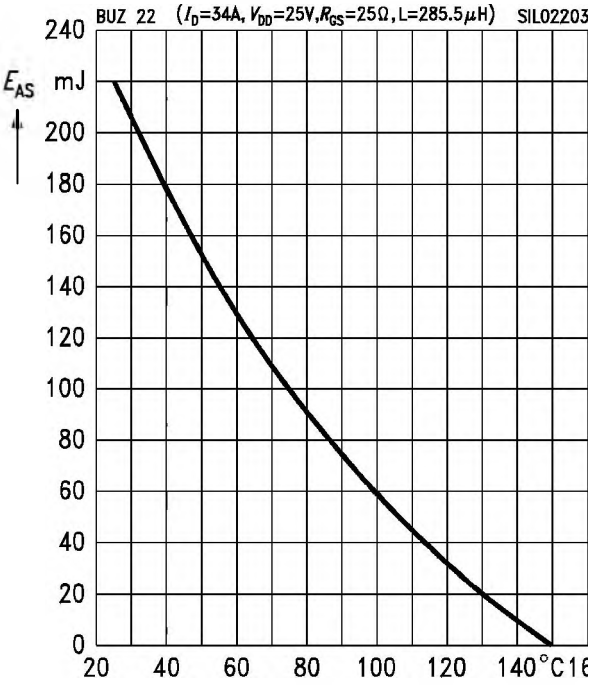
Drain current
$I_D = f(T_C)$
parameter: $V_{GS} \geq 10$ V



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



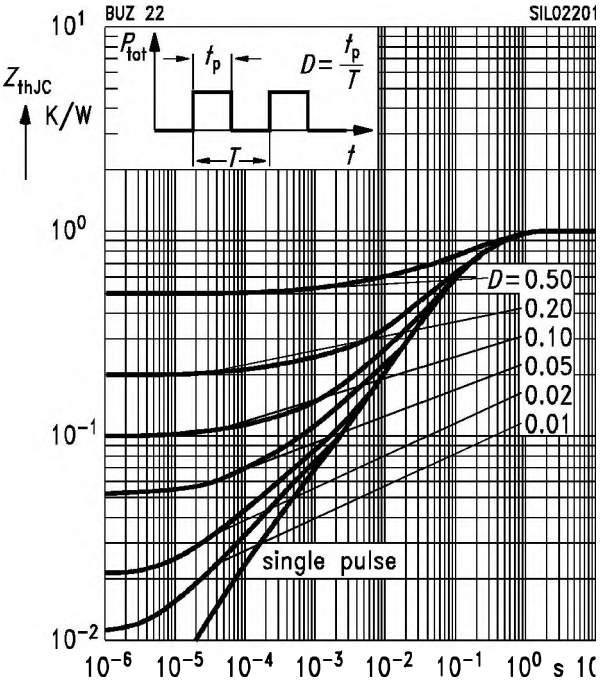
Avalanche energy $E_{AS} = f(T_j)$
parameter: I_D = 34 A, V_{DD} = 25 V
R_{GS} = 25 Ω, L = 285.5 µH



Transient thermal impedance

$Z_{\text{th JC}} = f(t_p)$

parameter: $D = t_p / T$



Typ. gate charge

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

parameter: $I_{\text{D puls}}$ = 51.0 A