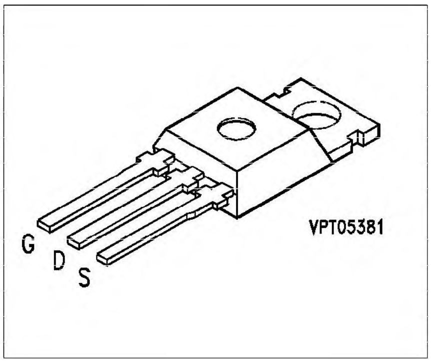
SIPMOS® Power Transistor

BUZ 20

- N channel
- Enhancement mode
- Avalanche-rated



Type	V_{DS}	I_D	$R_{DS(on)}$	Package [1]	Ordering Code
BUZ 20	100 V	13.5 A	0.2 Ω	TO-220 AB	C67078-S1302-A2

Maximum Ratings

Parameter	Symbol	Values	Unit
Continuous drain current, T_C = 28 °C	I_D	**13.5**	A
Pulsed drain current, T_C = 25 °C	$I_{D\,puls}$	**54**	
Avalanche current, limited by $T_{j\,max}$	I_{AR}	**13.5**	
Avalanche energy, periodic limited by $T_{j\,(max)}$	E_{AR}	**7.9**	mJ
Avalanche energy, single pulse I_D = 13.5 A, V_{DD} = 25 V, R_{GS} = 25 Ω L = 486 µH, T_j = 25 °C	E_{AS}	**59**	
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

Parameter	Symbol	Values	Unit
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	$V_{(BR)\,DSS}$	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 = 8.5 A	$R_{DS\,(on)}$	–	0.125	0.2	Ω
Dynamic characteristics					
Forward transconductance $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$, I_D = 8.5 A	g_{fs}	3.0	4.7	–	S
Input capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{iss}	–	400	530	pF
Output capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{oss}	–	120	180	
Reverse transfer capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{rss}	–	70	105	
Turn-on time t_{on}, ($t_{on} = t_{d\,(on)} + t_r$) V_{DD} = 30 V, V_{GS} = 10 V, I_D = 3.0 A, R_{GS} = 50 Ω	$t_{d\,(on)}$	–	10	15	ns
	t_r	–	45	70	
Turn-off time t_{off} , ($t_{off} = t_{d\,(off)} + t_f$) V_{DD} = 30 V, V_{GS} = 10 V, I_D = 3.0 A, R_{GS} = 50 Ω	$t_{d\,(off)}$	–	55	75	
	t_f	–	40	55	

Electrical Characteristics (cont'd)

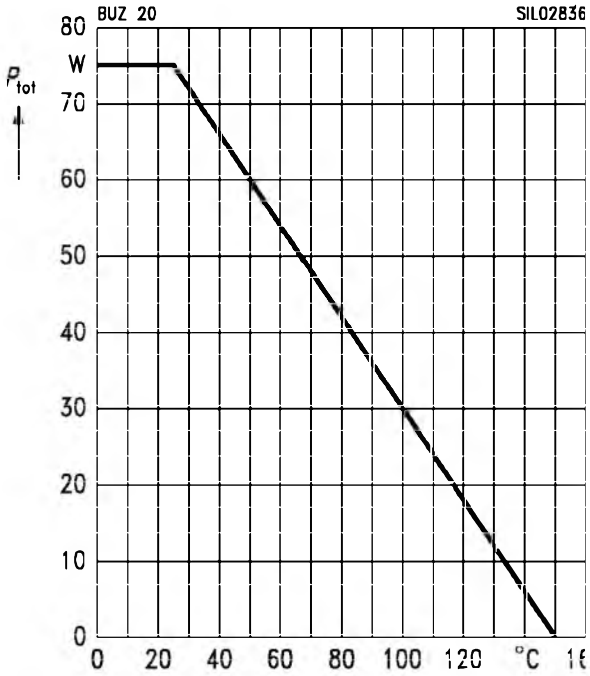
at T_j = 25 °C, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Reverse diode					
Continuous reverse drain current T_C= 25 °C	I_S	–	–	13.5	A
Pulsed reverse drain current T_C = 25 °C	I_{SM}	–	–	54	
Diode forward on-voltage I_S = 27 A, V_{GS} = 0 V	V_{SD}	–	1.4	1.6	V
Reverse recovery time V_R = 30 V, I_F = I_S , di_F / dt = 100 A/µs	t_{rr}	–	170	–	ns
Reverse recovery charge V_R = 30 V, I_F = I_S , di_F / dt = 100 A/µs	Q_{rr}	–	0.30	–	µC

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

Total power dissipation

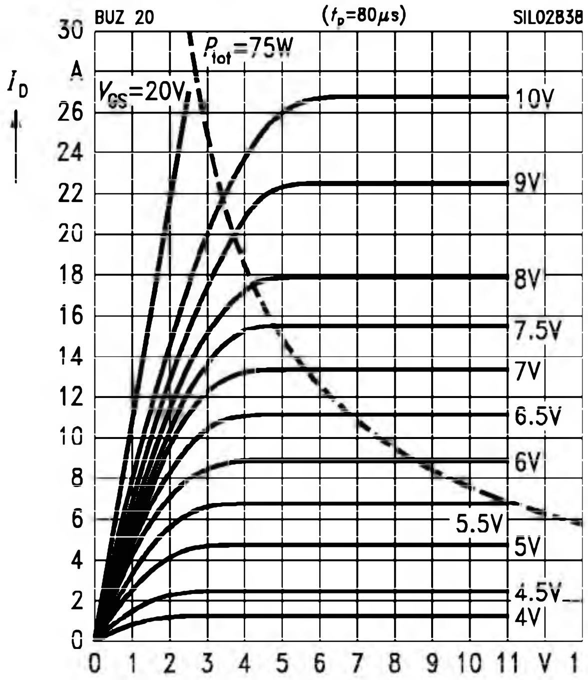
$P_{tot} = f(T_C)$



Typ. output characteristics

$I_D = f(V_{DS})$

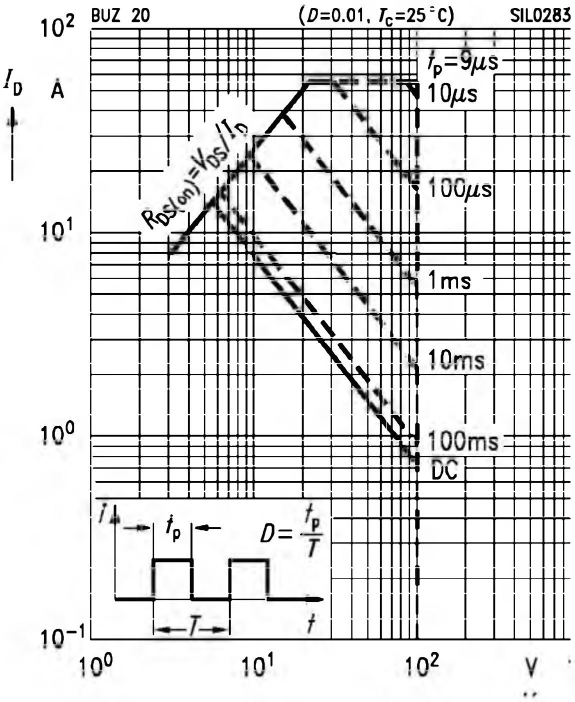
parameter: t_p = 80 µs



Safe operating area

$I_D = f(V_{DS})$

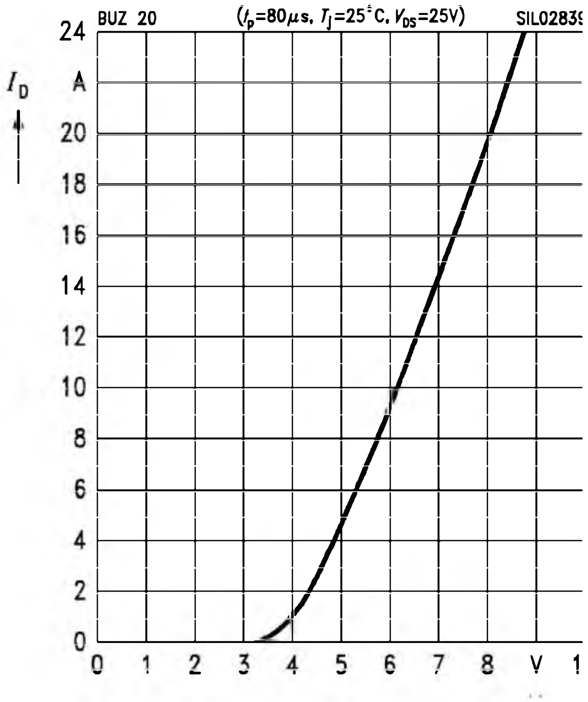
parameter: D = 0.01, T_C = 25 °C



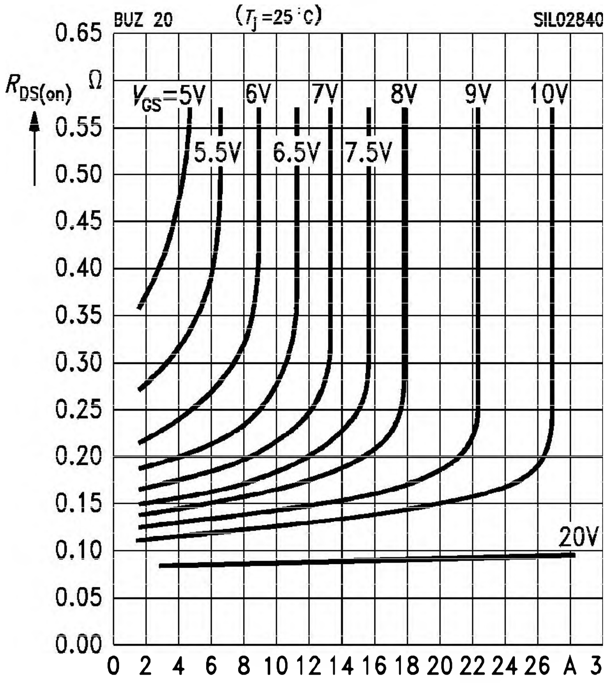
Typ. transfer characteristics

$I_D = f(V_{GS})$

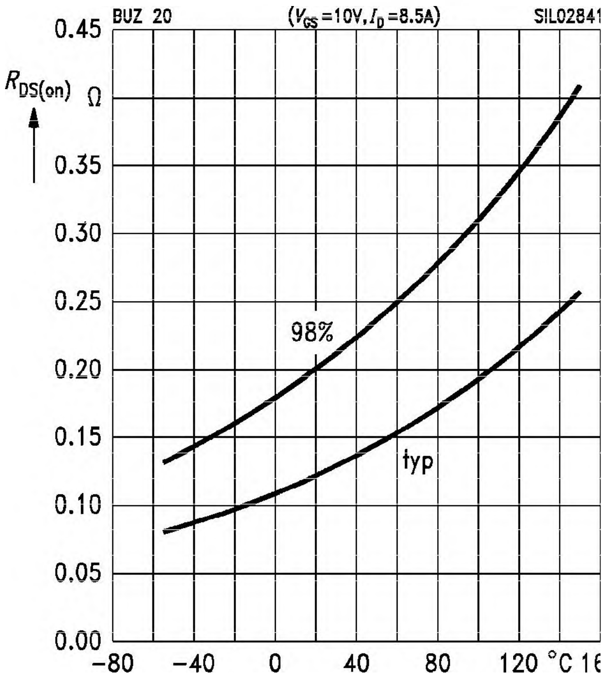
parameter: t_p = 80 µs, V_{DS} = 25 V



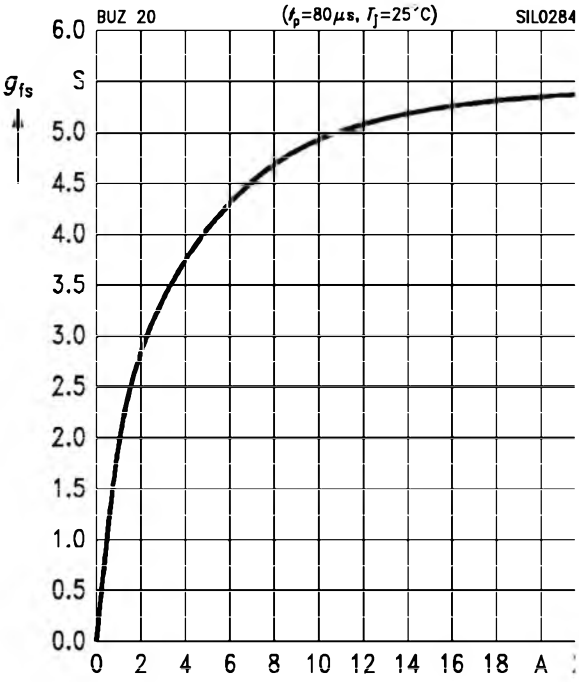
Typ. drain-source on-resistance
$R_{DS\,(on)} = f(I_D)$
parameter: V_{GS}



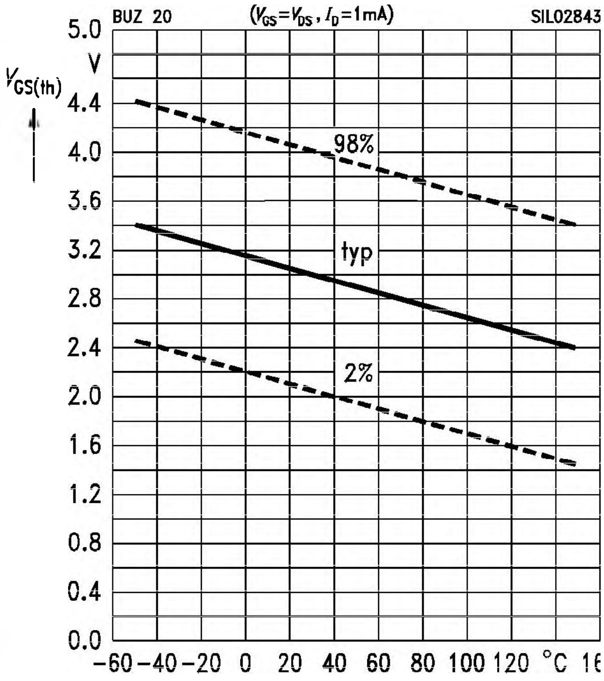
Drain-source on-resistance
$R_{DS\,(on)} = f(T_j)$
parameter: I_D = 8.5 A, V_{GS} = 10 V, (spread)



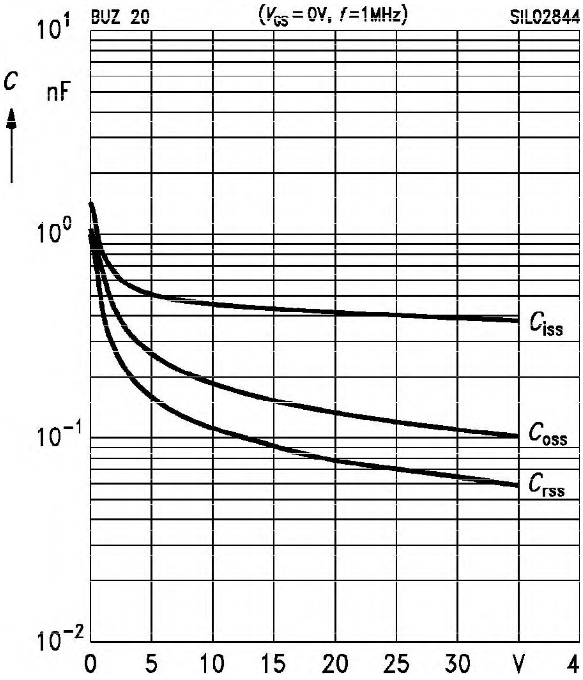
Typ. forward transconductance
$g_{fs} = f(I_D)$
parameter: t_p = 80 µs



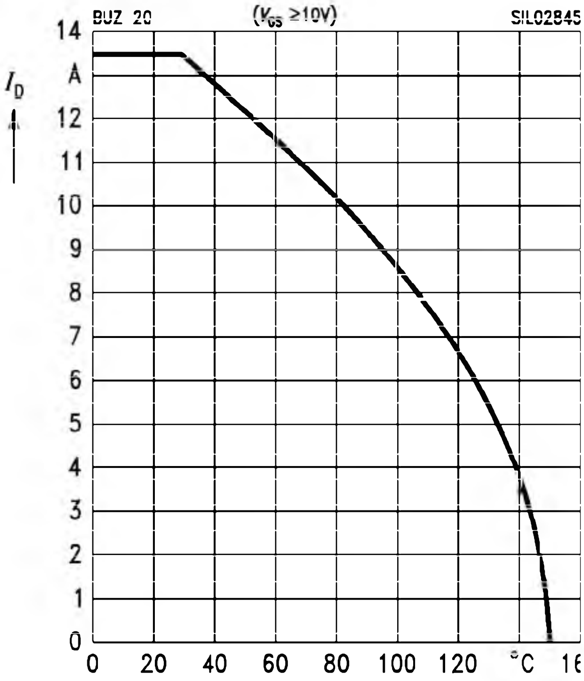
Gate threshold voltage
$V_{GS\,(th)} = f(T_j)$
parameter: $V_{GS} = V_{DS}$, I_D = 1 mA, (spread)



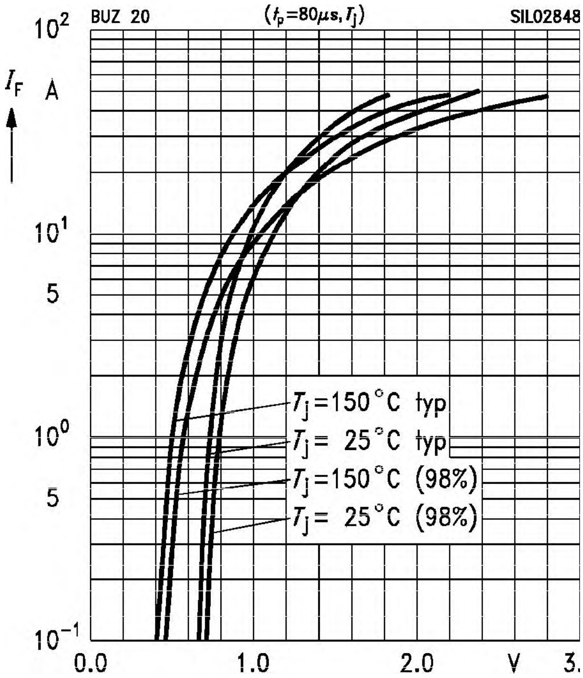
Typ. capacitances
$C = f(V_{DS})$
parameter: V_{GS} = 0 V, f = 1 MHz



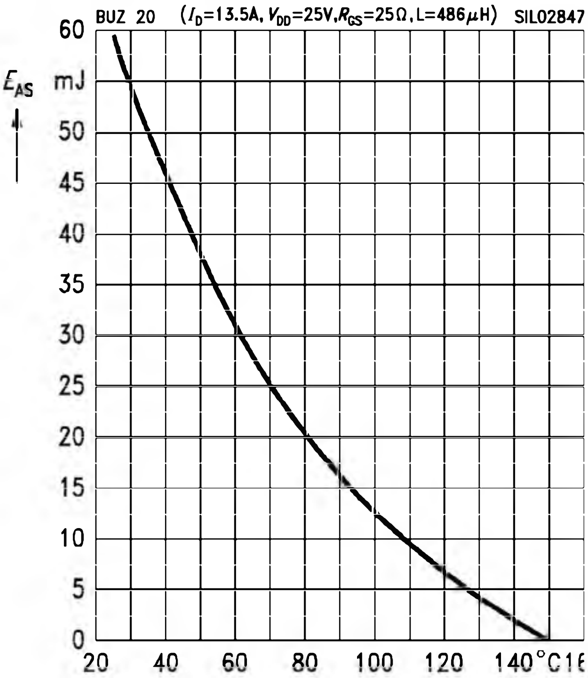
Drain current
$I_D = f(T_C)$
parameter: $V_{GS} \geq 10$ V



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



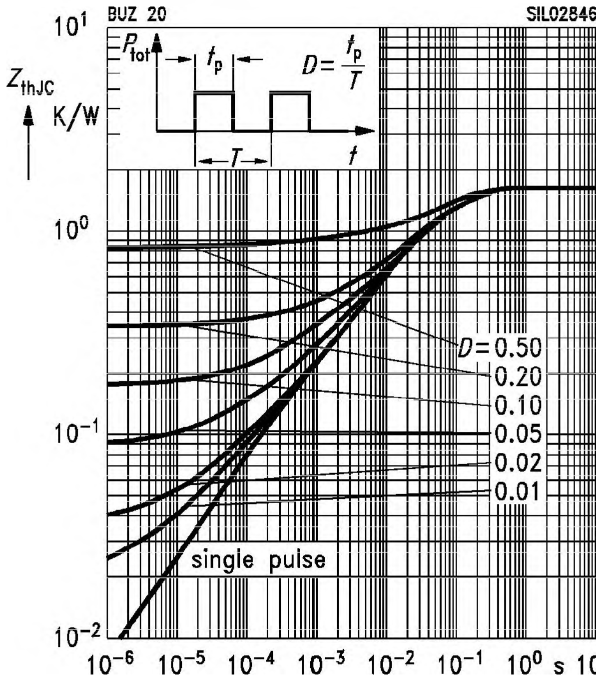
Avalanche energy $E_{AS} = f(T_j)$
parameter: I_D = 13.5 A, V_{DD} = 25 V
R_{GS} = 25 Ω, L = 486 µH



Transient thermal impedance

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

parameter: $D = t_p\,/\,T$



Typ. gate charge

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

parameter: $I_{\mathrm{D\,puis}}$ = 21.0 A