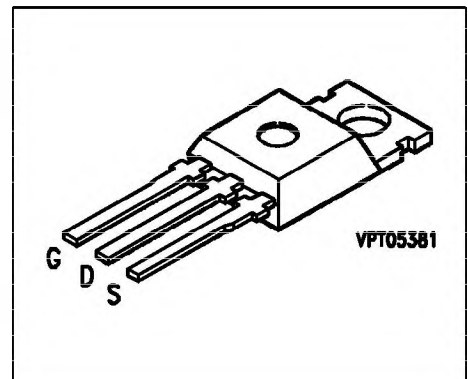


Preliminary

- N channel
- Enhancement mode
- Avalanche-rated
- dv/dt rated
- Low on-resistance
- 175 °C operating temperature



Type	V_{DS}	I_D	$R_{DS(on)}$	Package	Ordering Code
BUZ 101	50 V	29 A	0.06 Ω	TO-220 AB	C67078-S1350-A2

Maximum Ratings

Parameter	Symbol	Value	Unit
Continuous drain current, $T_C = 31\text{ °C}$	I_D	29	A
Pulsed drain current, $T_C = 25\text{ °C}$	$I_{D\text{ puls}}$	116	A
Avalanche current, limited by $T_{j\text{max}}$	I_{AR}	29	A
Avalanche energy, single pulse, $I_D = 29\text{ A}$, $V_{DD} = 25\text{ V}$, $R_{GS} = 25\text{ }\Omega$, $L = 83\text{ }\mu\text{H}$, $T_j = 25\text{ °C}$	E_{AS}	70	mJ
Gate-source voltage	V_{GS}	± 20	V
Power dissipation, $T_C = 25\text{ °C}$	P_{tot}	100	W
Operating temperature range	T_j	- 55 ... + 175	°C
Storage temperature range	T_{stg}	- 55 ... + 175	°C
Thermal resistance chip - case	$R_{\text{th JC}}$	≤ 1.5	K/W
Thermal resistance chip - air	$R_{\text{th JA}}$	≤ 75	K/W
DIN humidity category, DIN 40 040		E	
IEC climatic category, DIN IEC 68-1		55 / 175 / 56	

Electrical Characteristicsat $T_j = 25\text{ °C}$, unless otherwise specified.

Parameter	Symbol	Value			Unit
		min.	typ.	max.	

Static Characteristics

Drain-source breakdown voltage $V_{GS} = 0\text{ V}$, $I_D = 0.25\text{ mA}$, $T_j = -40\text{ °C}$	$V_{(BR)DSS}$	50	–	–	V
Gate threshold voltage $V_{GS} = V_{DS}$, $I_D = 1\text{ mA}$	$V_{GS(th)}$	2.1	3.0	4.0	V
Zero gate voltage drain current $V_{DS} = 50\text{ V}$, $V_{GS} = 0\text{ V}$, $T_j = -40\text{ °C}$	I_{DSS}	–	1	100	nA
Zero gate voltage drain current $V_{DS} = 50\text{ V}$, $V_{GS} = 0\text{ V}$, $T_j = 25\text{ °C}$	I_{DSS}	–	0.1	1.0	μA
Zero gate voltage drain current $V_{DS} = 50\text{ V}$, $V_{GS} = 0\text{ V}$, $T_j = 150\text{ °C}$	I_{DSS}	–	10	100	μA
Gate-source leakage current $V_{GS} = 20\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}	–	10	100	nA
Drain-source on-resistance $V_{GS} = 10\text{ V}$, $I_D = 21\text{ A}$	$R_{DS(on)}$	–	0.036	0.06	Ω

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

Parameter	Symbol	Value			Unit
		min.	typ.	max.	

Dynamic Characteristics

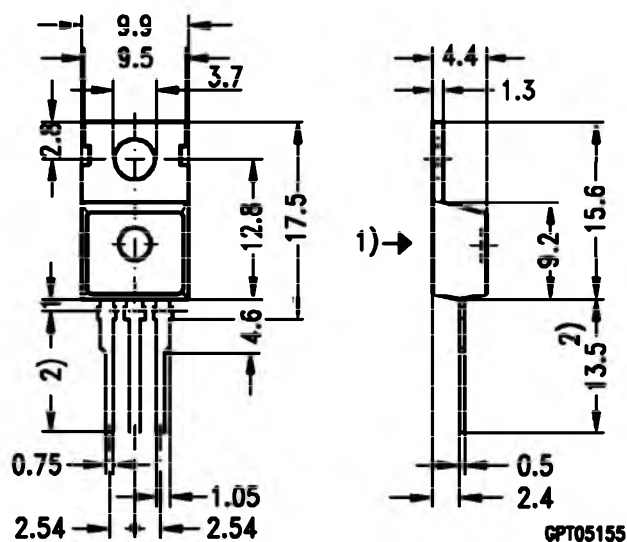
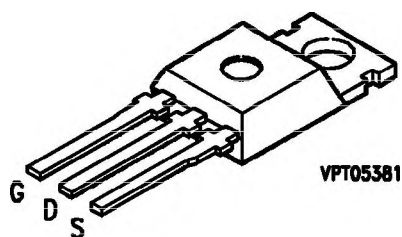
Forward transconductance $V_{DS} \geq 2 \times I_D \times R_{DS(on)\text{ max}}, I_D = 21\text{ A}$	g_{fs}	7	13.5	–	S
Input capacitance $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	C_{iss}	–	680	900	pF
Output capacitance $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	C_{oss}	–	240	360	pF
Reverse transfer capacitance $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	C_{rss}	–	90	135	pF
Turn-on delay time $V_{DD} = 30\text{ V}, V_{GS} = 10\text{ V}, I_D = 3\text{ A}, R_{GS} = 50\text{ }\Omega$	$t_{d(on)}$	–	15	23	ns
Rise time $V_{DD} = 30\text{ V}, V_{GS} = 10\text{ V}, I_D = 3\text{ A}, R_{GS} = 50\text{ }\Omega$	t_r	–	55	85	ns
Turn-off delay time $V_{DD} = 30\text{ V}, V_{GS} = 10\text{ V}, I_D = 3\text{ A}, R_{GS} = 50\text{ }\Omega$	$t_{d(off)}$	–	100	135	ns
Fall time $V_{DD} = 30\text{ V}, V_{GS} = 10\text{ V}, I_D = 3\text{ A}, R_{GS} = 50\text{ }\Omega$	t_f	–	70	95	ns

Reverse Diode

Continuous reverse drain current	I_S	–	–	29	A
Pulsed reverse drain current	I_{SM}	–	–	116	A
Reverse diode forward on-voltage $V_{GS} = 0\text{ V}, I_F = 58\text{ A}$	V_{SD}	–	1.2	2.0	V
Reverse recovery time $V_R = 30\text{ V}, I_F = I_S, di_F / dt = 100\text{ A}/\mu\text{s}$	t_{rr}	–	60	–	ns
Reverse recovery charge $V_R = 30\text{ V}, I_F = I_S, di_F / dt = 100\text{ A}/\mu\text{s}$	Q_{rr}	–	0.12	–	μC

Package Outline

TO-220 AB



- 1) punch direction, burr max. 0.04
- 2) dip tinning
- 3) max. 14.5 by dip tinning press burr max. 0.05

Weight approx. 2.0 g

Dimensions in mm

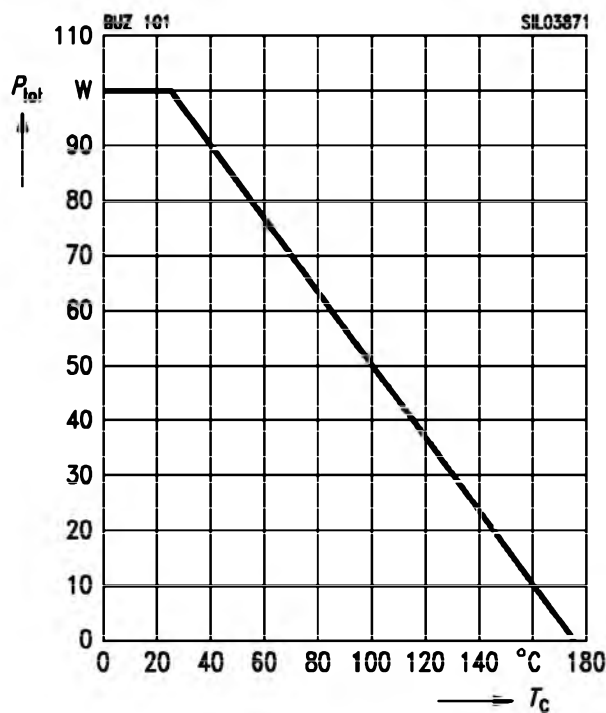
Sorts of Packing

Package outlines for tubes, trays etc. are contained in our Data Book "Package Information".

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

Total power dissipation

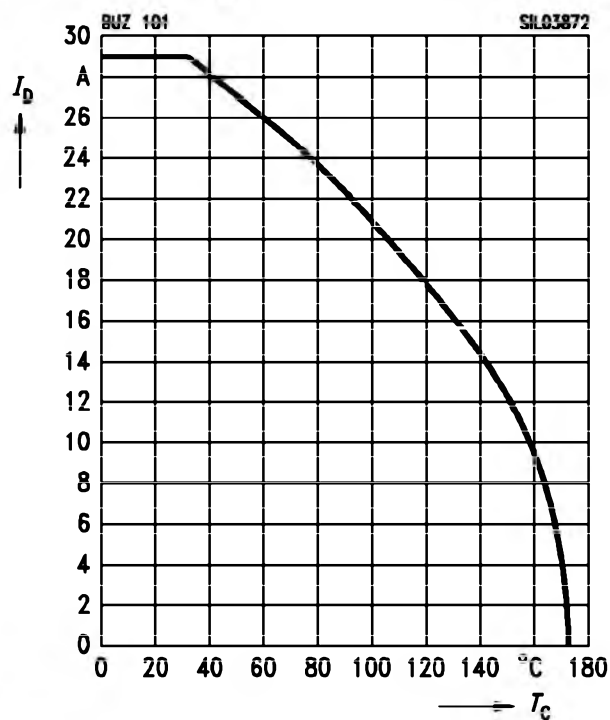
$$P_{\text{tot}} = f(T_C)$$



Drain current

$$I_D = f(T_C)$$

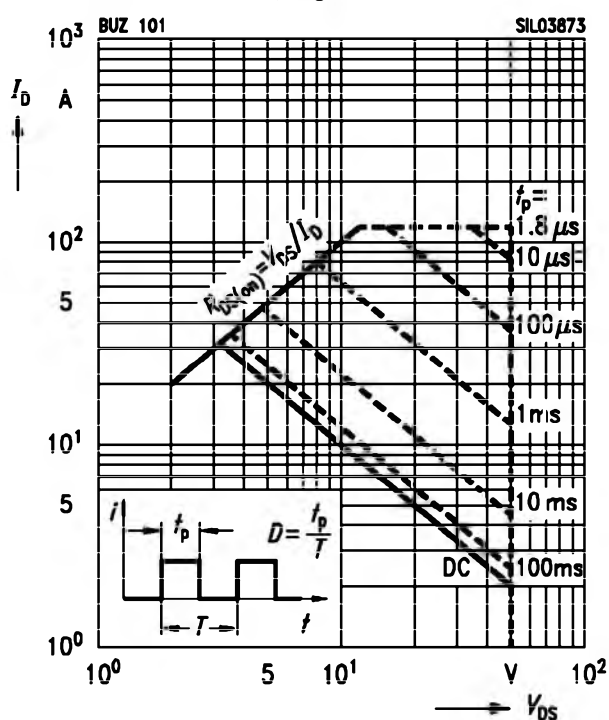
parameter: $V_{GS} \geq 10\text{ V}$



Safe operating area

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

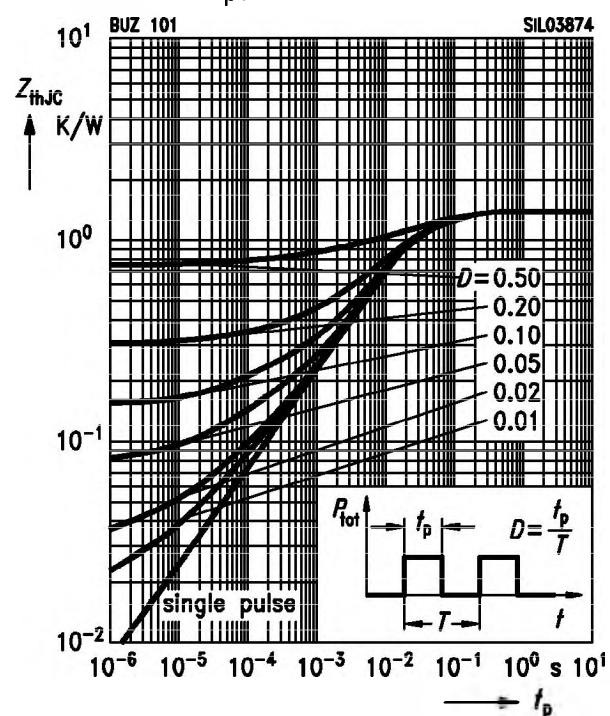
parameter: $D = 0.01$, $T_C = 25\text{ }^{\circ}\text{C}$



Transient thermal impedance

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

parameter: $D = t_p / T$

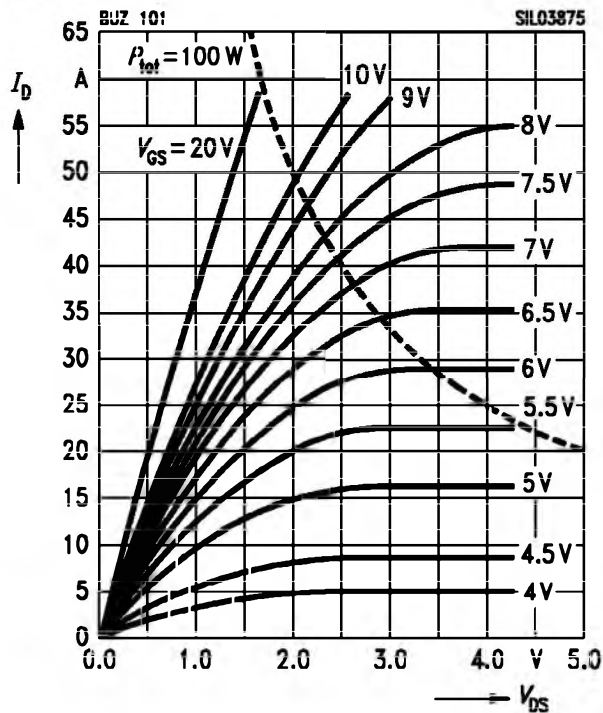


Characteristics at $T_j = 25\text{ }^{\circ}\text{C}$, unless otherwise specified.

Typ. output characteristics

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

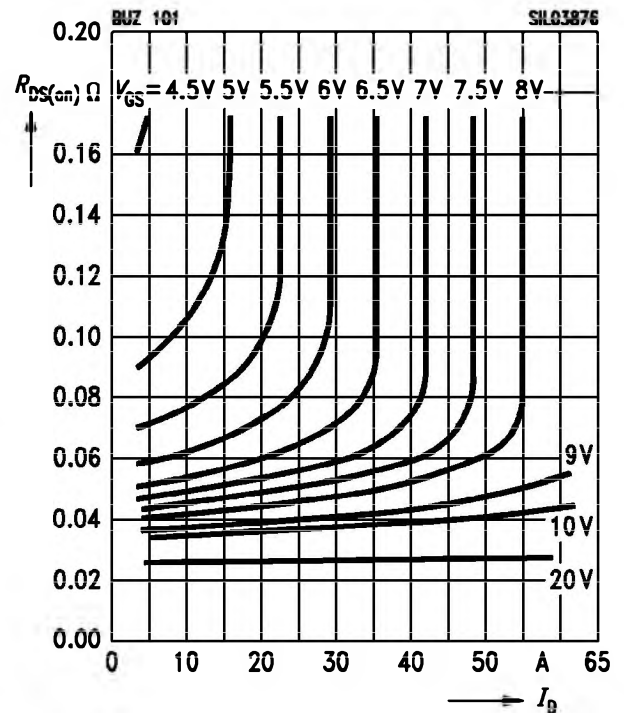
parameter: $t_p = 80\text{ }\mu\text{s}$



Typ. drain-source on-resistance

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

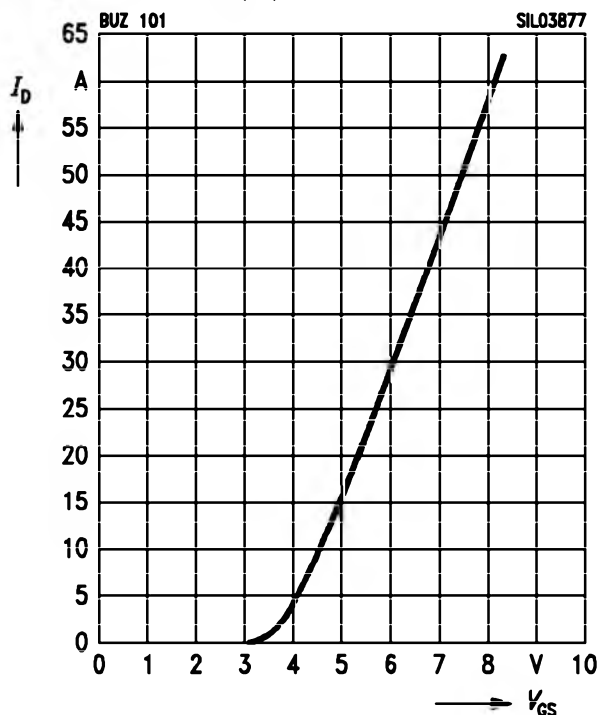
parameter: V_{GS}



Typ. transfer characteristics $I_D = f(V_{GS})$

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

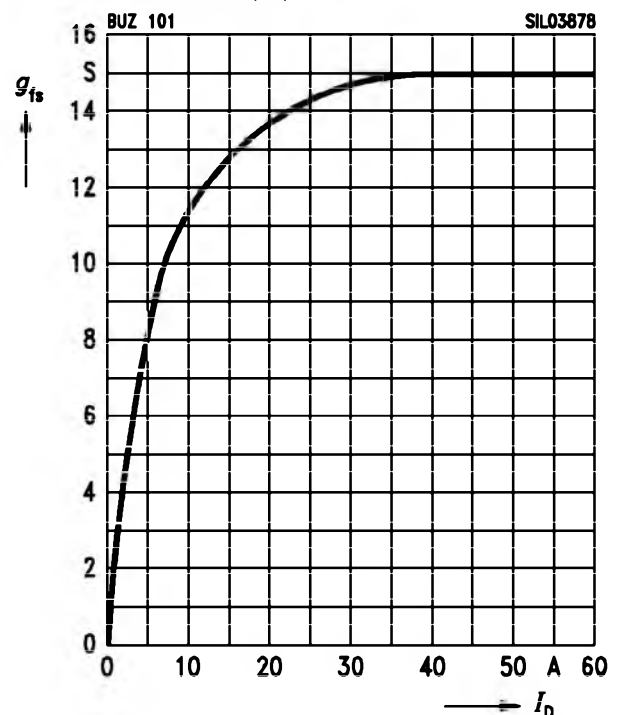
$$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$$



Typ. forward transconductance $g_{fs} = f(I_D)$

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

$$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$$

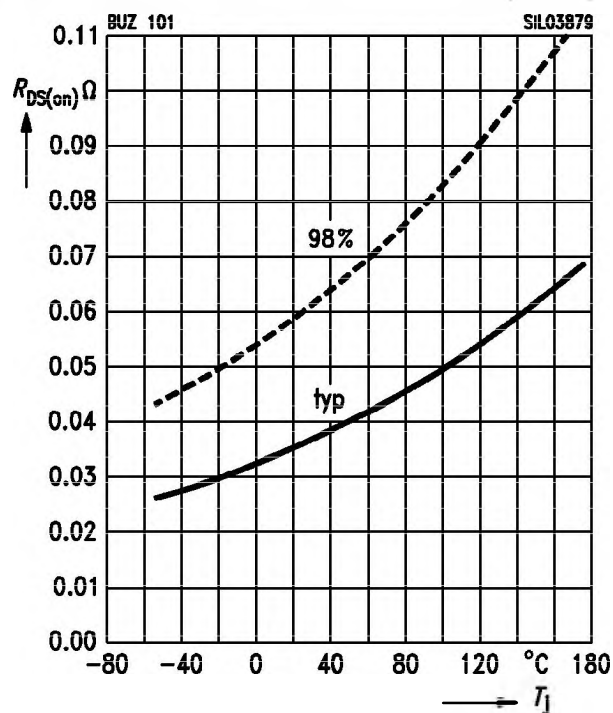


Characteristics at $T_j = 25\text{ }^{\circ}\text{C}$, unless otherwise specified.

Drain-source on-resistance

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

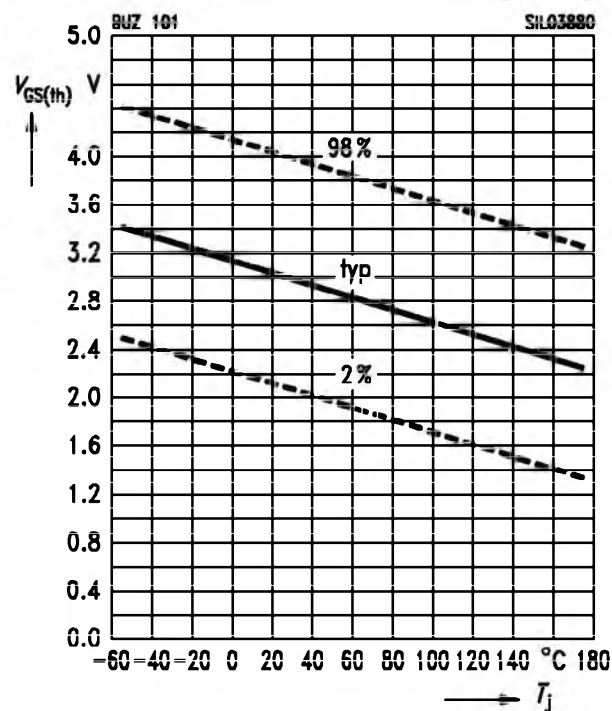
parameter: $I_D = 60\text{ A}$, $V_{GS} = 10\text{ V}$, (spread)



Gate threshold voltage

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

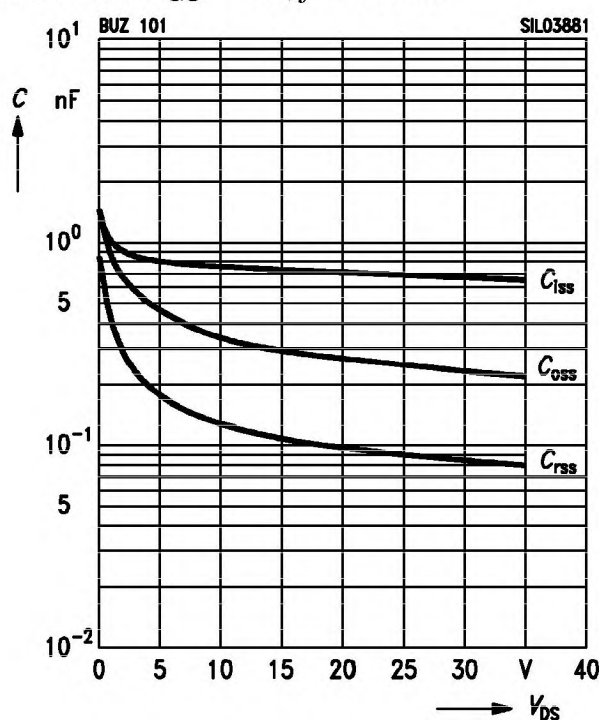
parameter: $V_{GS} = V_{DS}$, $I_D = 1\text{ mA}$, (spread)



Typ. capacitances

$$C = f(V_{DS})$$

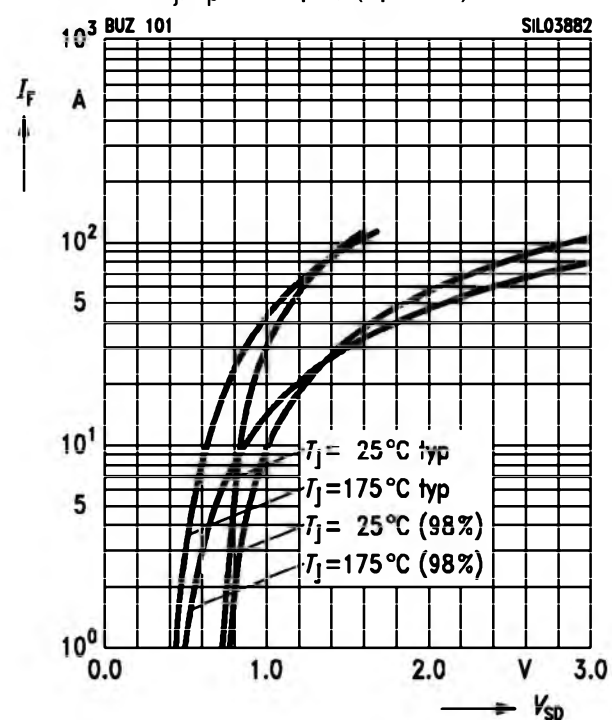
parameter: $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$



Forward characteristics of reverse diode

$$I_F = f(V_{SD})$$

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

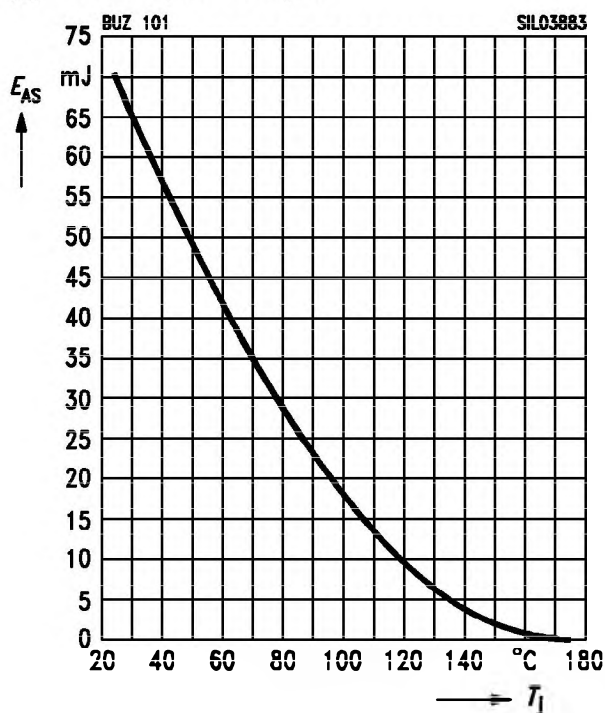


Characteristics at $T_j = 25\text{ °C}$, unless otherwise specified.

Maximum avalanche energy $E_{AS} = f(T_j)$

parameter: $I_D = 29\text{ A}$, $V_{DD} = 25\text{ V}$,

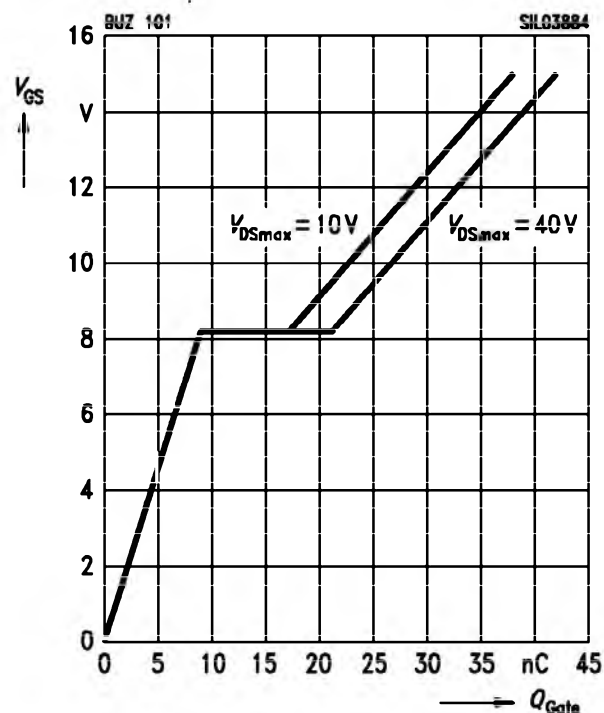
$R_{GS} = 250\text{ }\Omega$, $L = 83\text{ }\mu\text{H}$



Typ. gate charge

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

parameter: $I_{D\text{ puls}} = 44\text{ A}$



Drain-source breakdown voltage

$V_{(BR)DSS}(T_j) = b \times V_{(BR)DSS}(25\text{ °C})$

