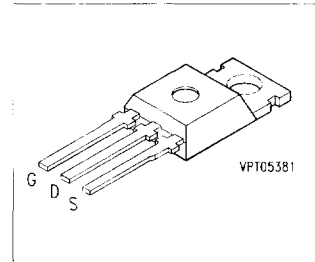


SIPMOS® Power Transistors

- N channel
- Enhancement mode
- Avalanche-rated

BUZ 61 BUZ 61 A



Type	V_{DS}	I_D	$R_{DS(on)}$	Package ¹⁾	Ordering Code
BUZ 61	400 V	12.5 A	0.4 Ω	TO-220 AB	C67078-S1341-A2
BUZ 61 A	400 V	11 A	0.5 Ω	TO-220 AB	C67078-S1341-A3

Maximum Ratings

Parameter	Symbol	BUZ		Unit
		61	61 A	
Continuous drain current, $T_C = 27^\circ\text{C}$	I_D	12.5	11	A
Pulsed drain current, $T_C = 25^\circ\text{C}$	$I_{D\text{puls}}$	50	44	
Avalanche current, limited by $T_{j\text{max}}$	I_{AR}	12.5		
Avalanche energy, periodic limited by $T_{j\text{(max)}}$	E_{AR}	13		mJ
Avalanche energy, single pulse $I_D = 12.5\text{ A}, V_{DD} = 50\text{ V}, R_{GS} = 25\ \Omega$ $L = 6.38\text{ mH}, T_j = 25^\circ\text{C}$	E_{AS}	570		
Gate-source voltage	V_{GS}	± 20		V
Power dissipation, $T_C = 25^\circ\text{C}$	P_{tot}	150		W
Operating and storage temperature range	T_j, T_{slg}	- 55 ... + 150		$^\circ\text{C}$
Thermal resistance, chip-case	$R_{th,ic}$	≤ 0.83		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 $T_j = 25\text{ °C}$, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

Static characteristics

Drain-source breakdown voltage $V_{GS} = 0\text{ V}, I_D = 0.25\text{ mA}$	$V_{(BR)DSS}$	400	–	–	V
Gate threshold voltage $V_{GS} = V_{DS}, I_D = 1\text{ mA}$	$V_{GS(th)}$	2.1	3.0	4.0	
Zero gate voltage drain current $V_{DS} = 400\text{ V}, V_{GS} = 0\text{ V}$ $T_j = 25\text{ °C}$ $T_j = 125\text{ °C}$	I_{DSS}	–	0.1 10	1.0 100	μA
Gate-source leakage current $V_{GS} = 20\text{ V}, V_{DS} = 0\text{ V}$	I_{GSS}	–	10	100	nA
Drain-source on-resistance $V_{GS} = 10\text{ V}, I_D = 8\text{ A}$	$R_{DS(on)}$		0.35 0.4	0.4 0.5	Ω
					BUZ 61 BUZ 61 A

Dynamic characteristics

Forward transconductance $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$ $I_D = 8.0\text{ A}$	g_{fs}	5.0	11.5	–	S
Input capacitance $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	C_{iss}	–	1500	2250	pF
Output capacitance $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	C_{oss}	–	210	315	
Reverse transfer capacitance $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	C_{rss}	–	75	110	
Turn-on time t_{on} , ($t_{on} = t_{d(on)} + t_r$) $V_{DD} = 30\text{ V}, V_{GS} = 10\text{ V}, I_D = 3.0\text{ A}, R_{GS} = 50\text{ }\Omega$	$t_{d(on)}$	–	20	30	ns
	t_r	–	65	100	
Turn-off time t_{off} , ($t_{off} = t_{d(off)} + t_f$) $V_{DD} = 30\text{ V}, V_{GS} = 10\text{ V}, I_D = 3.0\text{ A}, R_{GS} = 50\text{ }\Omega$	$t_{d(off)}$	–	260	340	
	t_f	–	75	100	

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

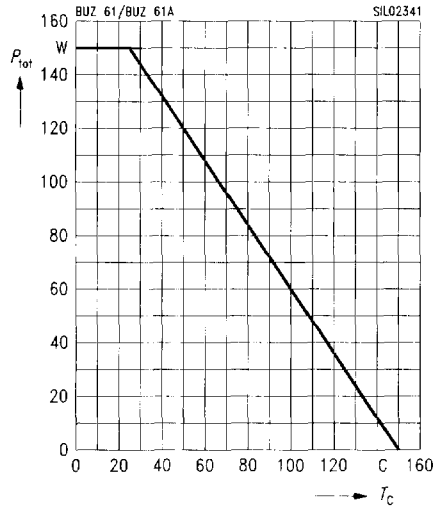
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Reverse diode					
Continuous reverse drain current $T_C = 25\text{ }^\circ\text{C}$	I_S				A
BUZ 61		–	–	12.5	
BUZ 61 A		–	–	11.0	
Pulsed reverse drain current $T_C = 25\text{ }^\circ\text{C}$	I_{SM}				
BUZ 61		–	–	50	
BUZ 61 A		–	–	44	
Diode forward on-voltage $I_S = 25\text{ A}$, $V_{GS} = 0\text{ V}$	V_{SD}	–	1.1	1.4	V
Reverse recovery time $V_R = 100\text{ V}$, $I_F = I_S$, $di_F / dt = 100\text{ A}/\mu\text{s}$	t_{rr}	–	280	–	ns
Reverse recovery charge $V_R = 100\text{ V}$, $I_F = I_S$, $di_F / dt = 100\text{ A}/\mu\text{s}$	Q_{rr}	–	3	–	μC



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

Total power dissipation

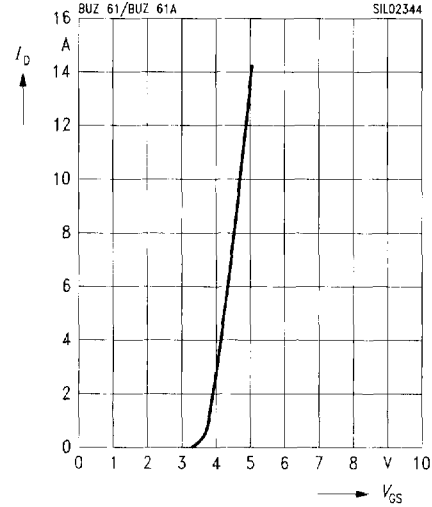
$$P_{\text{tot}} = f(T_C)$$



Typ. transfer characteristics

$$I_D = f(V_{\text{GS}})$$

parameter: $t_p = 80\text{ }\mu\text{s}$, $V_{\text{DS}} = 25\text{ V}$

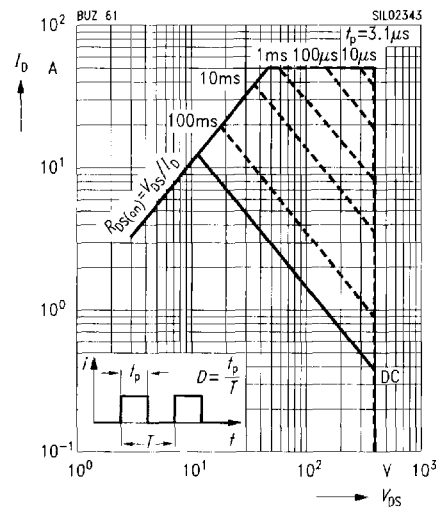


Safe operating area

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

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

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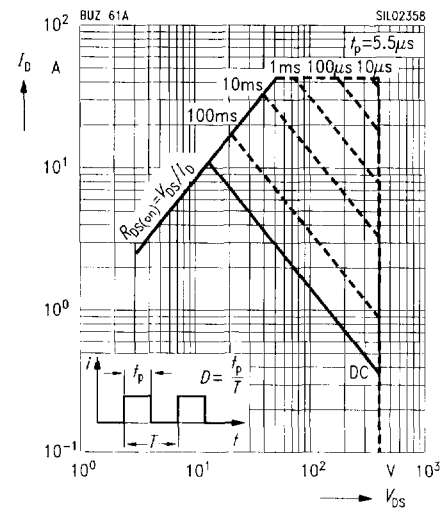


Safe operating area

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

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

BUZ 61 A

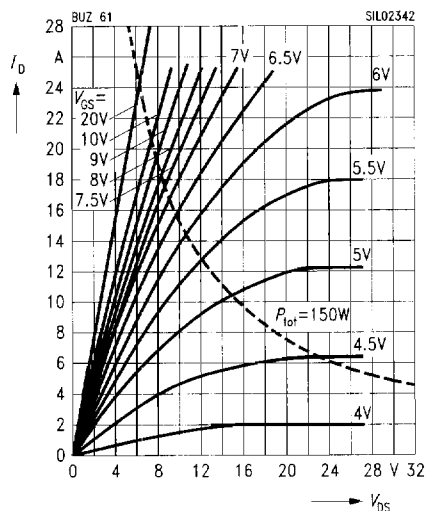


Typ. output characteristics

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

parameter: $t_p = 80 \mu s$

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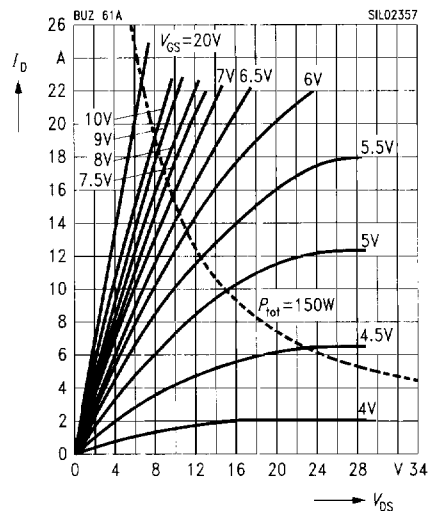


Typ. output characteristics

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

parameter: $t_p = 80 \mu s$

BUZ 61 A

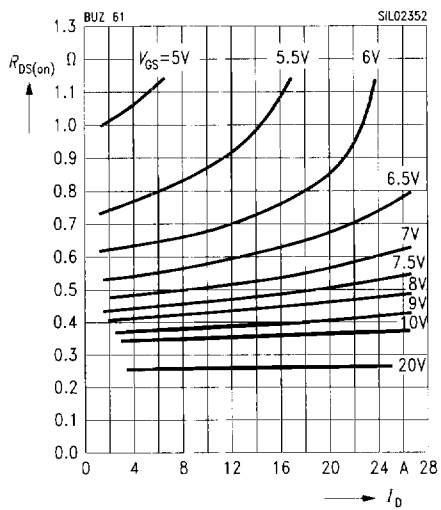


Typ. drain-source on-resistance

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

parameter: V_{GS}

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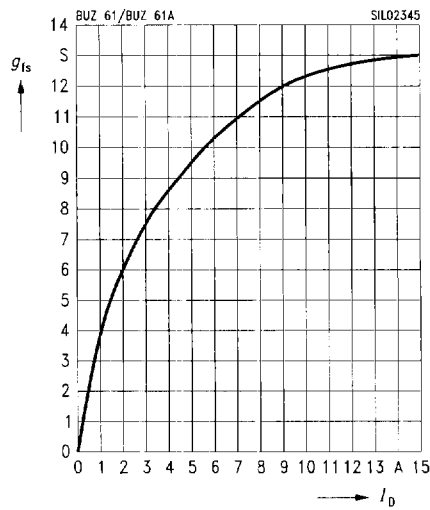


Typ. forward transconductance

$$g_{fs} = f(I_D)$$

parameter: $t_p = 80 \mu s$

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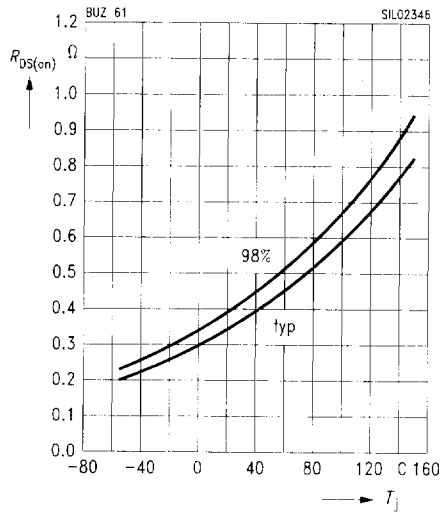


Drain-source on-resistance

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

BUZ 61

parameter: $I_D = 8 \text{ A}$, $V_{GS} = 10 \text{ V}$, (spread)

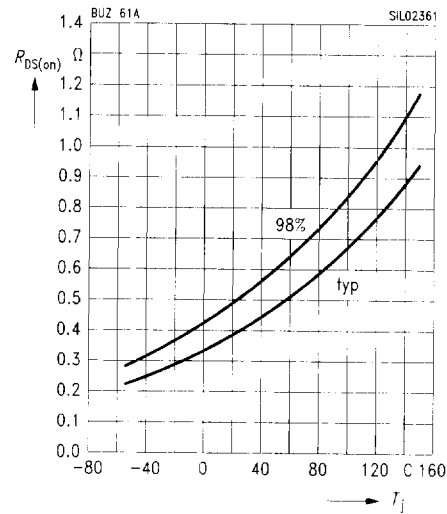


Drain-source on-resistance

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

BUZ 61 A

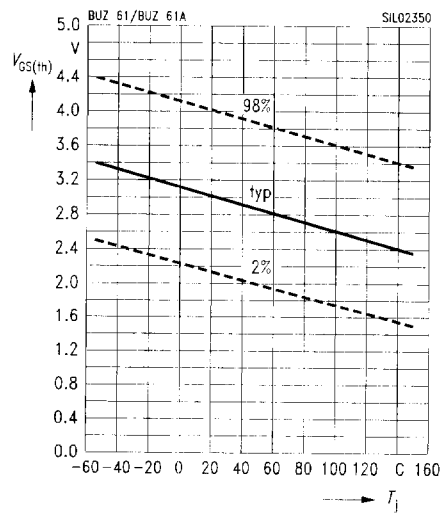
parameter: $I_D = 8 \text{ A}$, $V_{GS} = 10 \text{ V}$, (spread)



Gate threshold voltage

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

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

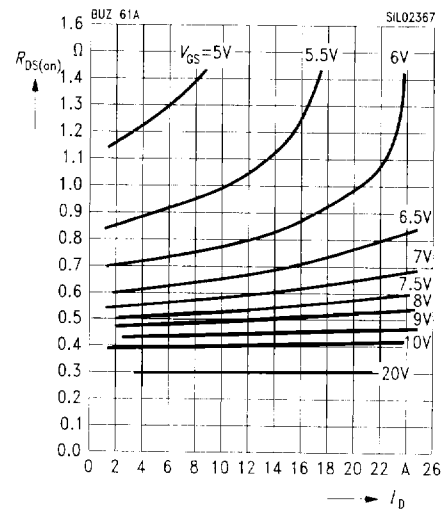


Typ. drain-source on-resistance

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

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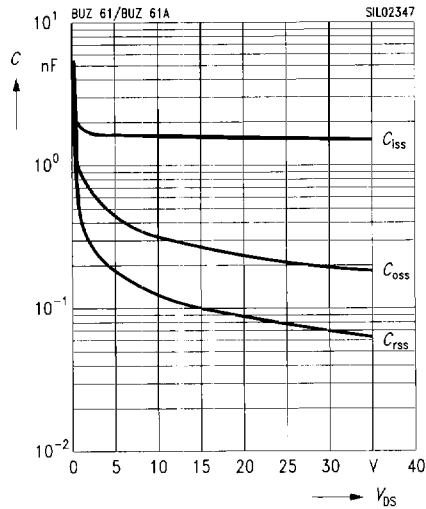
parameter: V_{GS}



Typ. capacitances

$C = f(V_{DS})$

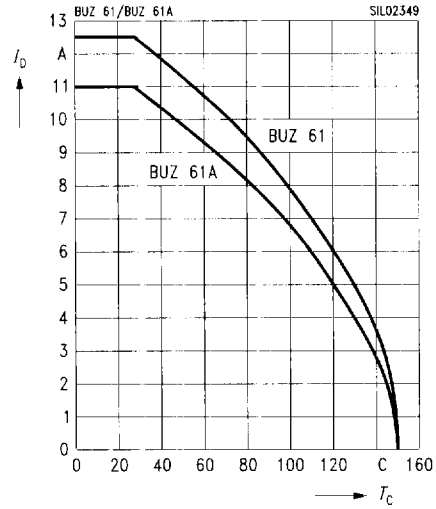
parameter: $V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$



Drain current

$I_D = f(T_C)$

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

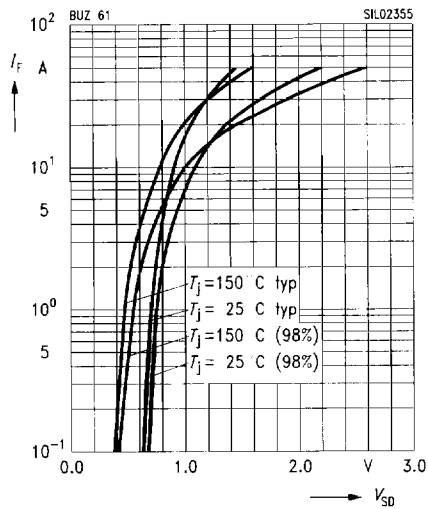


Forward characteristics of reverse diode

$I_F = f(V_{SD})$

BUZ 61

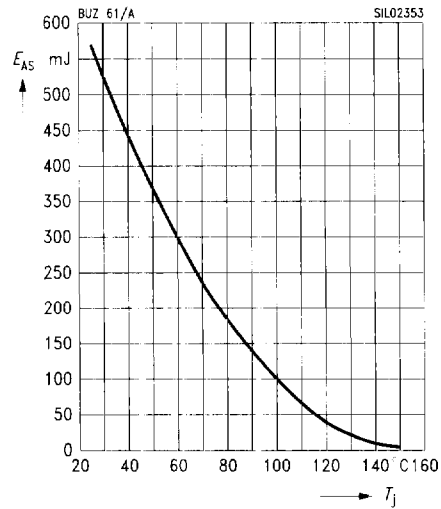
parameter: $T_j, t_p = 80 \mu\text{s}$, (spread)



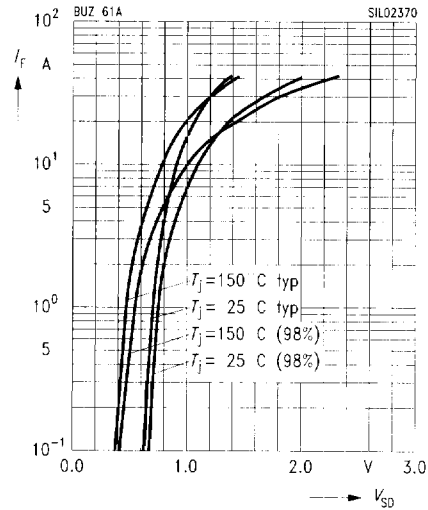
Avalanche energy $E_{AS} = f(T_j)$

parameter: $I_D = 12.5 \text{ A}, V_{DD} = 50 \text{ V}$

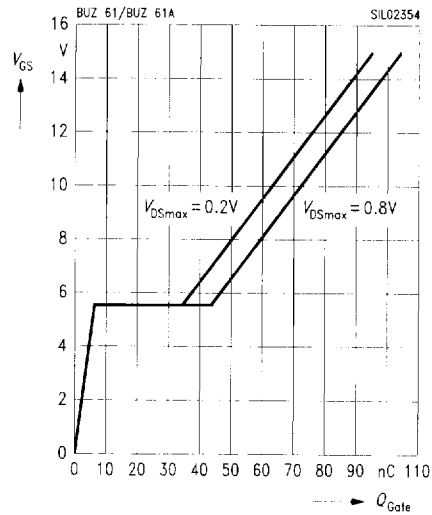
$R_{GS} = 25 \Omega, L = 6.38 \text{ mH}$



Forward characteristics of reverse diode
 $I_F = f(V_{SD})$ **BUZ 61 A**
 parameter: $T_j, t_p = 80 \mu s$, (spread)



Typ. gate charge
 $V_{GS} = f(Q_{Gate})$
 parameter: $I_{D \text{ puls}} = 15.0 \text{ A}$



Transient thermal impedance
 $Z_{thJC} = f(t_p)$
 parameter: $D = t_p / T$

