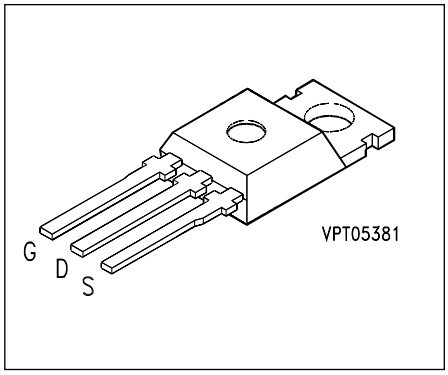
SIEMENS

SIPMOS® Power Transistors

BUZ 90
BUZ 90 A

- N channel
- Enhancement mode
- Avalanche-rated



Type	V_{DS}	I_D	T_C	$R_{DS\ (on)}$	Package [1]	Ordering Code
BUZ 90	600 V	4.5 A	28 ˚C	1.6 Ω	TO-220 AB	C67078-S1321-A2
BUZ 90 A	600 V	4.0 A	30 ˚C	2.0 Ω	TO-220 AB	C67078-S1321-A3

Maximum Ratings

Parameter	Symbol	BUZ		Unit
		90	90 A	
Continuous drain current	I_D	**4.5**	**4.0**	A
Pulsed drain current, T_C = 25 ˚C	$I_{D\ puls}$	**18**	**16**	
Avalanche current, limited by $T_{j\ max}$	I_{AR}	**4.5**		
Avalanche energy, periodic limited by $T_{j\ (max)}$	E_{AR}	**8.0**		mJ
Avalanche energy, single pulse I_D = 4.5 A, V_{DD} = 50 V, R_{GS} = 25 Ω L = 29 mH, T_j = 25 ˚C	E_{AS}	**320**		
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	$V_{(BR)\ DSS}$	600	–	–	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} = 600 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	µA
Drain-source on-resistance V_{GS} = 10 V, I_D = 2.8 A BUZ 90 BUZ 90 A	$R_{DS\ (on)}$	 – –	 1.5 1.7	 1.6 2.0	Ω
Dynamic characteristics					
Forward transconductance V_{DS} ≥ 2 x I_D x $R_{DS(on)max}$, I_D = 2.8 A	g_{fs}	2.5	3.8	–	S
Input capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{iss}	–	780	1050	pF
Output capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{oss}	–	110	170	
Reverse transfer capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{rss}	–	40	70	
Turn-on time t_{on} , (t_{on} = $t_{d\ (on)}$ + t_r) V_{DD} = 30 V, V_{GS} = 10 V,I_D = 2.6 A, R_{GS} = 50 Ω	$t_{d\ (on)}$	–	20	30	ns
	t_r	–	50	75	
Turn-off time t_{off} , (t_{off} = $t_{d\ (off)}$ + t_f) V_{DD} = 30 V, V_{GS} = 10 V, I_D = 2.6 A, R_{GS} = 50 Ω	$t_{d\ (off)}$	–	120	150	
	t_f	–	70	90	

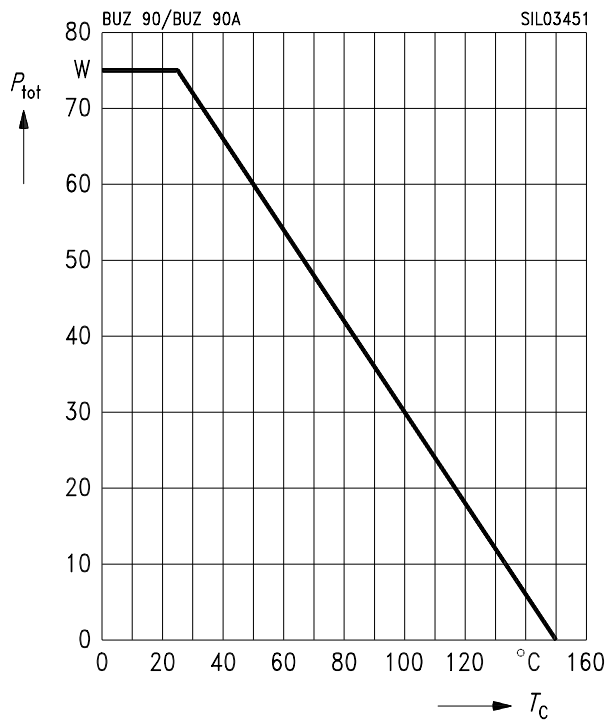
Electrical Characteristics (cont'd)
at T_j = 25 ˚C, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Reverse diode					
Continuous reverse drain current T_C = 25 ˚C BUZ 90 BUZ 90 A	I_S	 – –	 – –	 4.5 4.0	A
Pulsed reverse drain current T_C = 25 ˚C BUZ 90 BUZ 90 A	I_{SM}	 – –	 – –	 18 16	
Diode forward on-voltage I_S = 8.0 A, V_{GS} = 0 V	V_{SD}	–	1.1	1.2	V
Reverse recovery time V_R = 100 V, $I_F = I_S$, di_F / dt = 100 A/µs	t_{rr}	–	350	–	ns
Reverse recovery charge V_R = 100 V, $I_F = I_S$, di_F / dt = 100 A/µs	Q_{rr}	–	3.0	–	µC

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

Total power dissipation

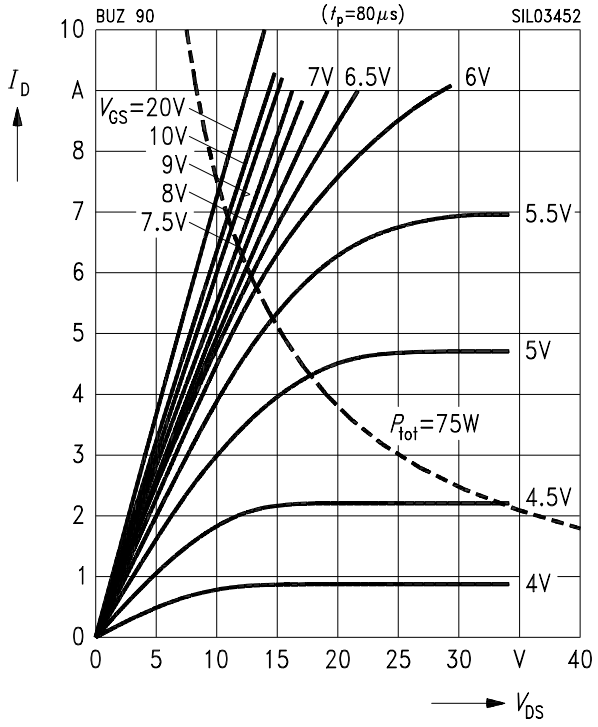
$P_{tot} = f(T_C)$



Typ. output characteristics

$I_D = f(V_{DS})$ **BUZ 90**

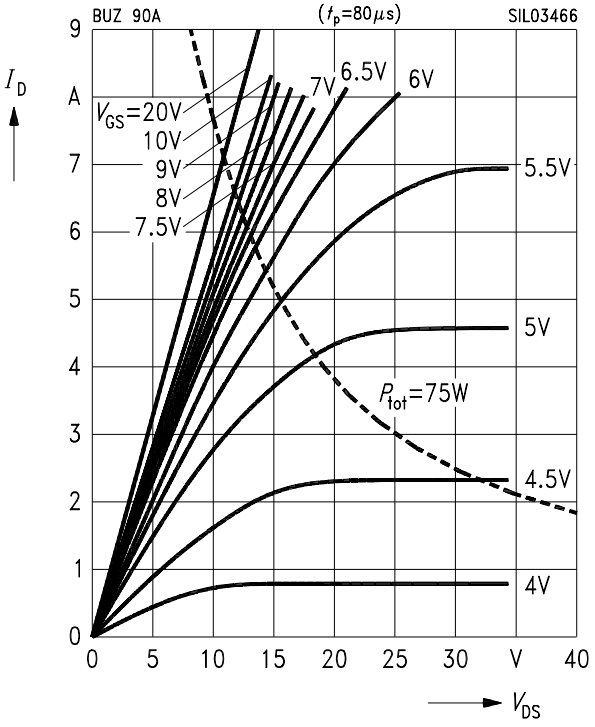
parameter: t_p = 80 µs



Typ. output characteristics

$I_D = f(V_{DS})$ **BUZ 90 A**

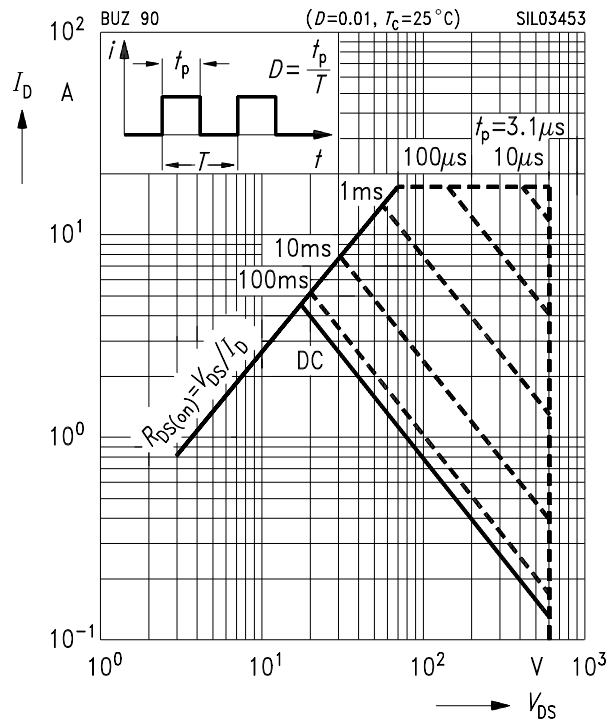
parameter: t_p = 80 µs



Safe operating area

$I_D = f(V_{DS})$ **BUZ 90**

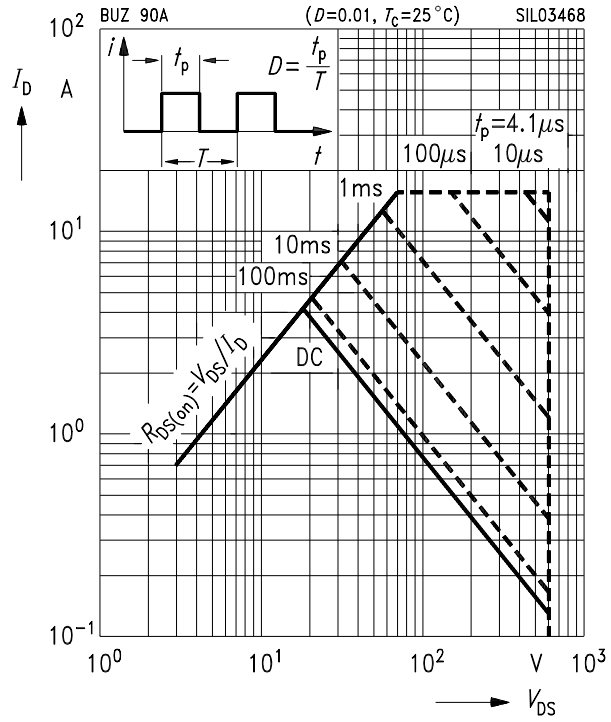
parameter: D = 0.01, T_C = 25 ˚C



Safe operating area

$I_D = f(V_{DS})$ **BUZ 90 A**

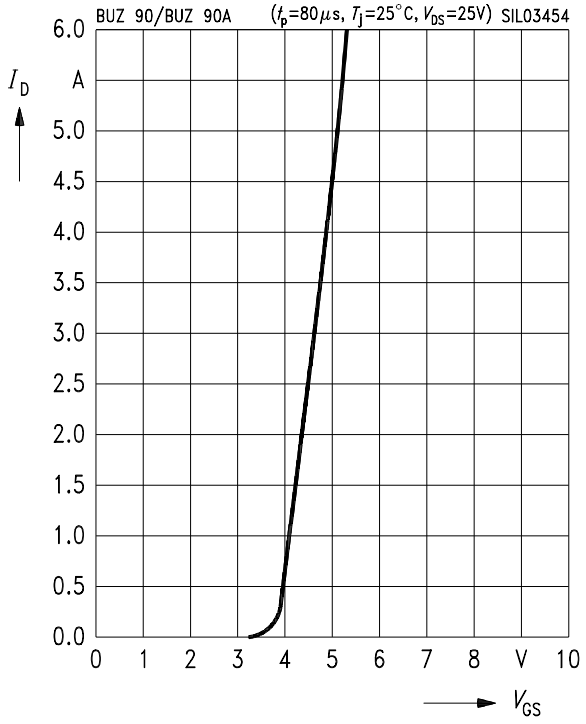
parameter: D = 0.01, T_C = 25 °C



Typ. transfer characteristics

$I_D = f(V_{GS})$

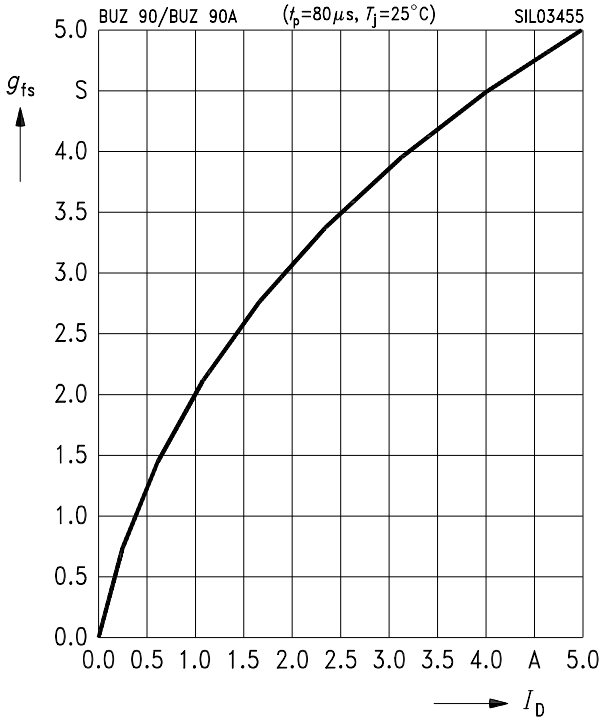
parameter: t_p = 80 µs, V_{DS} = 25 V



Typ. forward transconductance

$g_{fs} = f(I_D)$

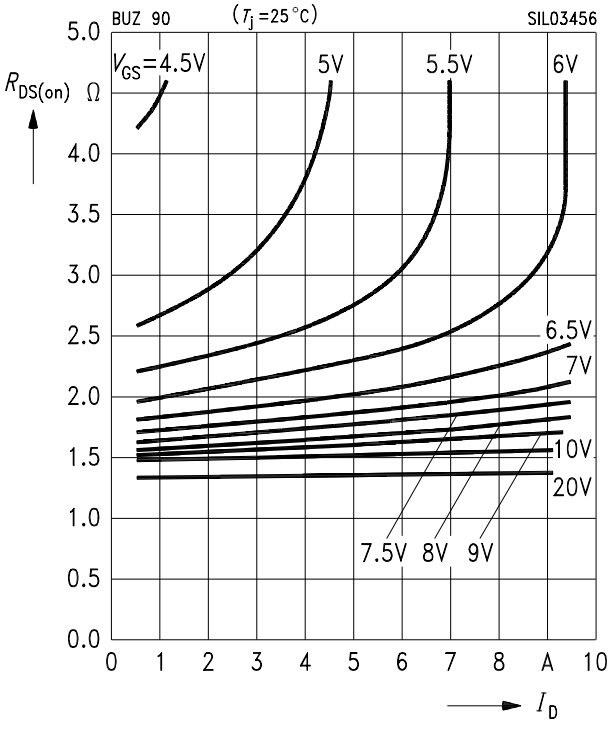
parameter: t_p = 80 µs



Typ. drain-source on-resistance

$R_{DS\,(on)} = f(I_D)$ **BUZ 90**

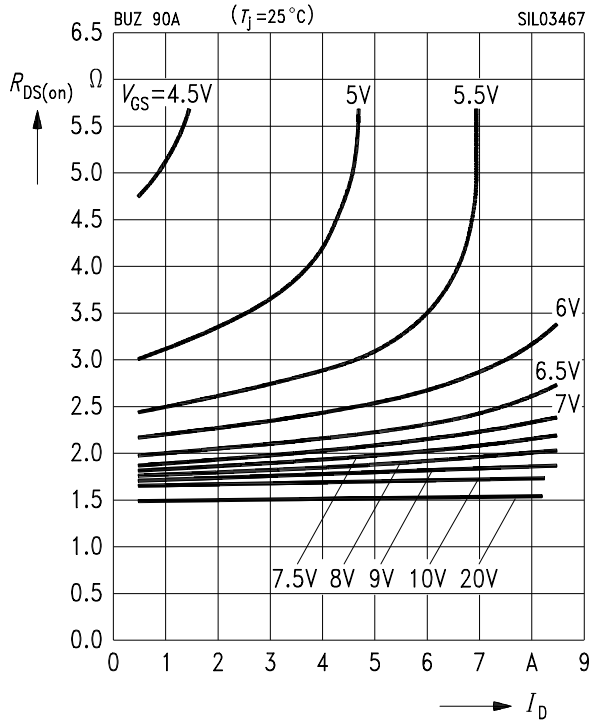
parameter: V_{GS}



Typ. drain-source on-resistance

$R_{DS\,(on)} = f\,(I_D)$ **BUZ 90 A**

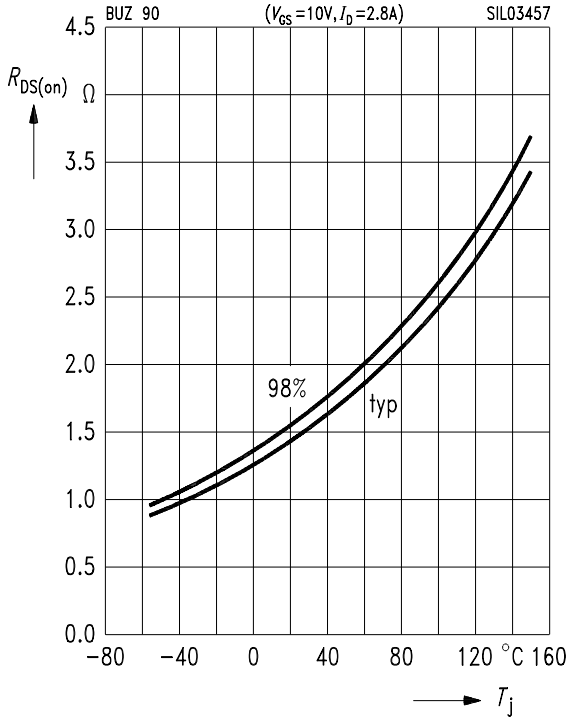
parameter: V_{GS}



Drain-source on-resistance

$R_{DS\,(on)} = f\,(T_j)$ **BUZ 90**

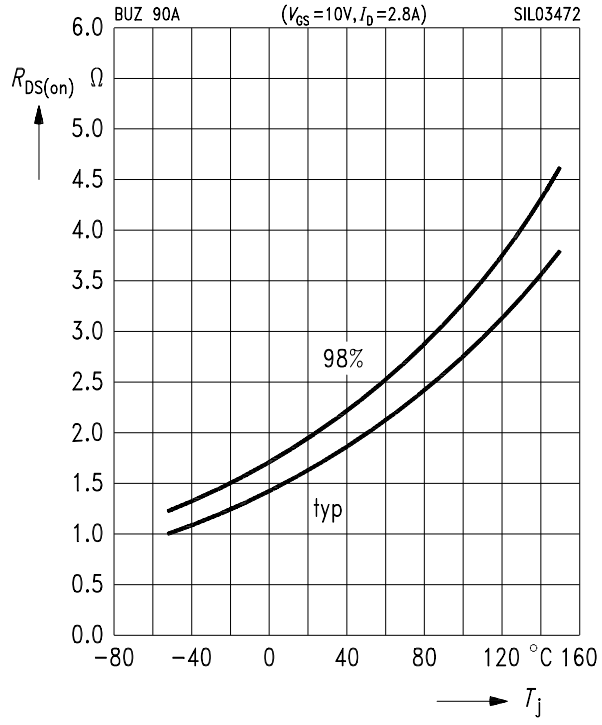
parameter: I_D = 2.8 A, V_{GS} = 10 V, (spread)



Drain-source on-resistance

$R_{DS\,(on)} = f\,(T_j)$ **BUZ 90 A**

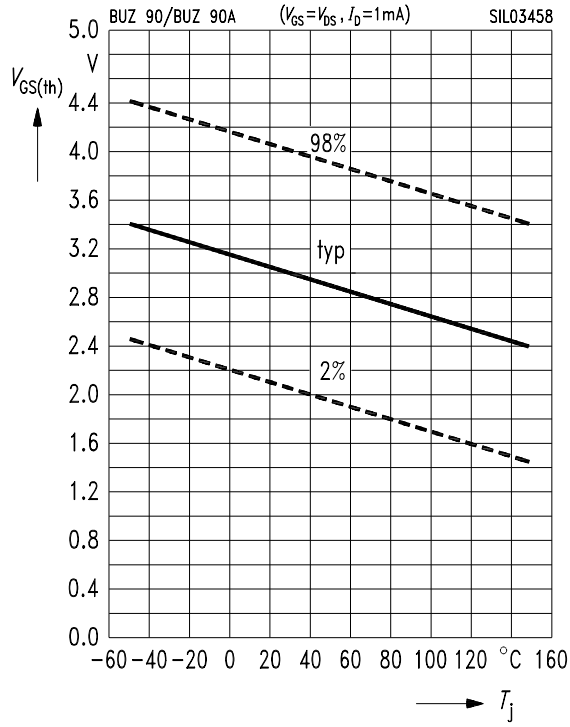
parameter: I_D = 2.8 A, V_{GS} = 10 V, (spread)



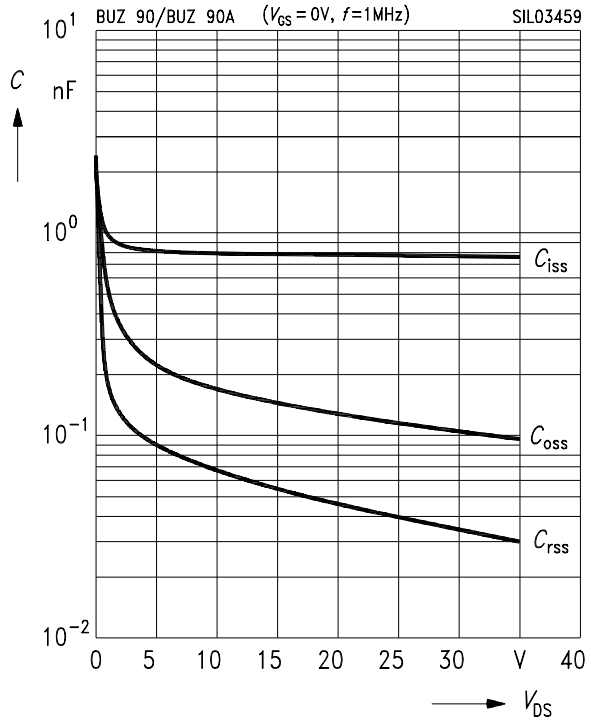
Gate threshold voltage

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

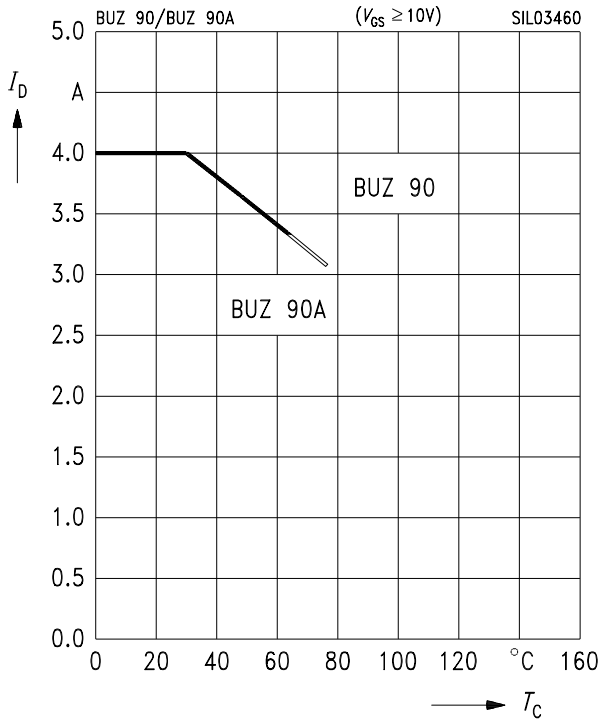
parameter: $V_{GS} = V_{DS}$, I_D = 1 mA, (spread)



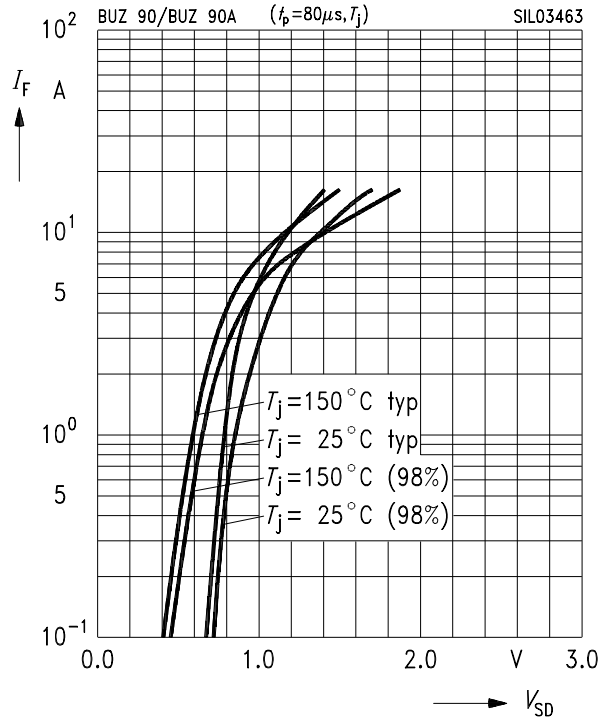
Typ. capacitances
$C = f(V_{DS})$
parameter: V_{GS} = 0 V, f = 1 MHz



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



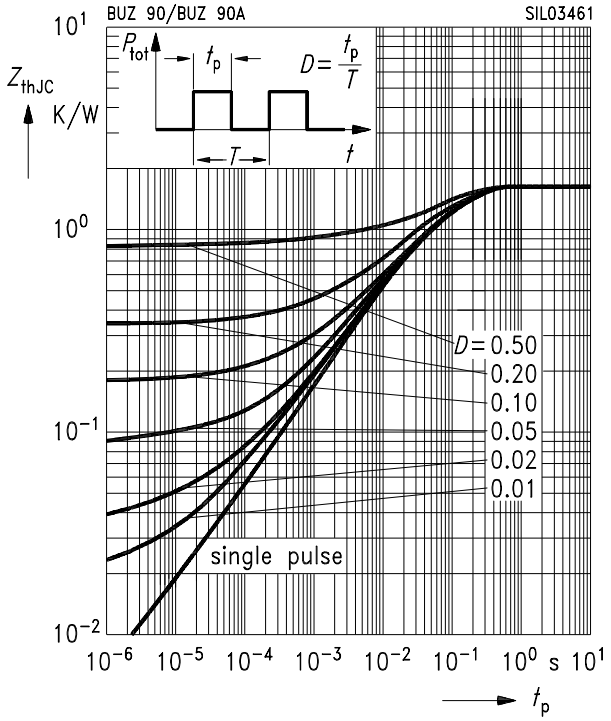
Forward characteristics of reverse diode
$I_F = f(V_{SD})$
parameter: T_j , t_p = 80 µs, (spread)



Avalanche energy $E_{AS} = f(T_j)$
parameter: I_D = 4.5 A, V_{DD} = 50 V
R_{GS} = 25 Ω, L = 29 mH

Transient thermal impedance

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



Typ. gate charge

$V_{GS} = f(Q_{Gate})$
parameter: $I_{D\,puls}$ = 6.75 A