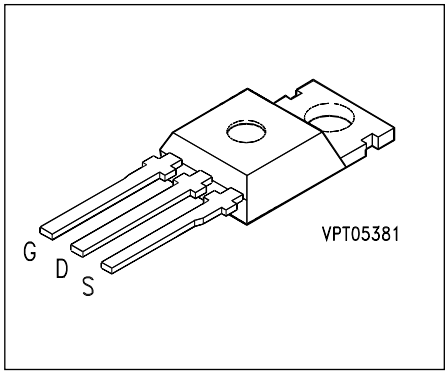
SIEMENS

SIPMOS® Power Transistors

BUZ 92
BUZ 93

- N channel
- Enhancement mode
- Avalanche-rated



Type	V_{DS}	I_D	$R_{DS\ (on)}$	Package [1]	Ordering Code
BUZ 92	600 V	3.3 A	3.0 Ω	TO-220 AB	C67078-S1343-A2
BUZ 93	600 V	3.6 A	2.5 Ω	TO-220 AB	C67078-S1346-A2

Maximum Ratings

Parameter	Symbol	BUZ		Unit
		92	93	
Continuous drain current, T_C = 25 ˚C	I_D	**3.3**	**3.6**	A
Pulsed drain current, T_C = 25 ˚C	$I_{D\ puls}$	**13**	**14.5**	
Avalanche current, limited by $T_{j\ max}$	I_{AR}	**3.3**		
Avalanche energy, periodic limited by $T_{j\ (max)}$	E_{AR}	**6**		mJ
Avalanche energy, single pulse I_D = 3.3 A, V_{DD} = 50 V, R_{GS} = 25 Ω L = 37 mH, T_j = 25 ˚C	E_{AS}	**220**		
Gate-source voltage	V_{GS}	± **20**		V
Power dissipation, T_C = 25 ˚C	P_{tot}	**80**		W
Operating and storage temperature range	T_j , T_{stg}	**– 55 ... + 150**		˚C

Thermal resistance, chip-case	$R_{th\ JC}$	≤ **1.56**	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	nA
Drain-source on-resistance V_{GS} = 10 V, I_D = 2.0 A BUZ 92 BUZ 93	$R_{DS\ (on)}$	 – –	 2.6 2.0	 3.0 2.5	Ω
Dynamic characteristics					
Forward transconductance V_{DS} ≥ 2 x I_D x $R_{DS(on)max}$, I_D = 2.0 A	g_{fs}	2.1	3.0	–	S
Input capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{iss}	–	600	900	pF
Output capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{oss}	–	65	100	
Reverse transfer capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{rss}	–	25	40	
Turn-on time t_{on} , (t_{on} = $t_{d\ (on)}$ + t_r) V_{DD} = 30 V, V_{GS} = 10 V, I_D = 2.3 A, R_{GS} = 50 Ω	$t_{d\ (on)}$	–	10	15	ns
	t_r	–	50	70	
Turn-off time t_{off} , (t_{off} = $t_{d\ (off)}$ + t_f) V_{DD} = 30 V, V_{GS} = 10 V, I_D = 2.3 A, R_{GS} = 50 Ω	$t_{d\ (off)}$	–	70	95	
	t_f	–	40	55	

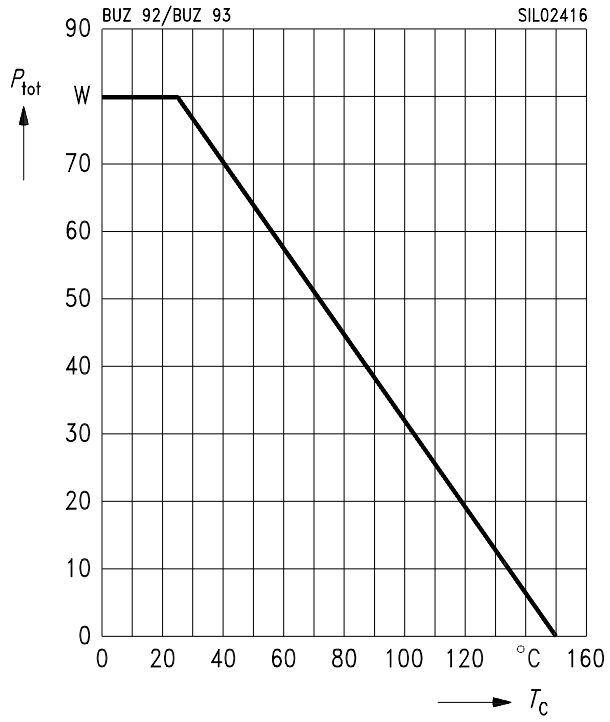
Electrical Characteristics (cont'd)
at T_j = 25 ˚C, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Reverse diode					
Continuous reverse drain current T_C = 25 ˚C BUZ 92 BUZ 93	I_S	 – –	 – –	 3.3 3.6	A
Pulsed reverse drain current T_C = 25 ˚C BUZ 92 BUZ 93	I_{SM}	 – –	 – –	 13 14.5	
Diode forward on-voltage I_S = 6.6 A, V_{GS} = 0 V	V_{SD}	–	1.0	1.4	V
Reverse recovery time V_R = 100 V, $I_F = I_S$, di_F / dt = 100 A/µs	t_{rr}	–	300	–	ns
Reverse recovery charge V_R = 100 V, $I_F = I_S$, di_F / dt = 100 A/µs	Q_{rr}	–	2.5	–	µC

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

Total power dissipation

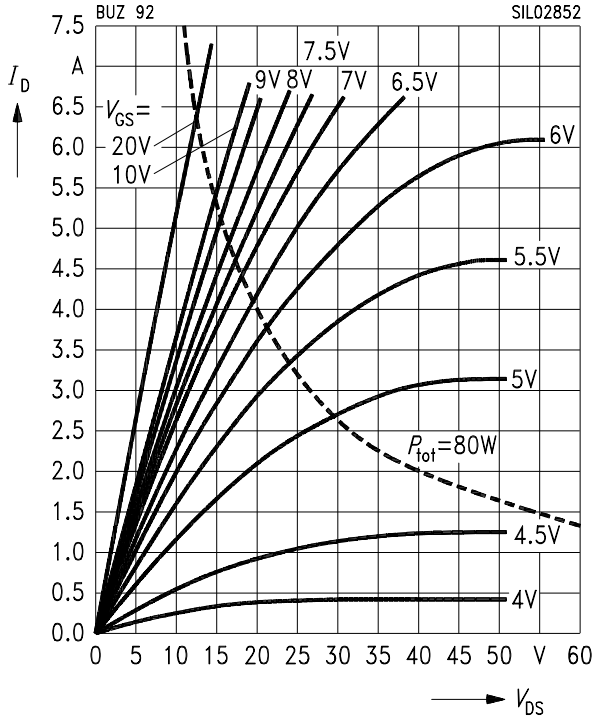
$P_{tot} = f(T_C)$



Typ. output characteristics

$I_D = f(V_{DS})$ **BUZ 92**

parameter: t_p = 80 µs



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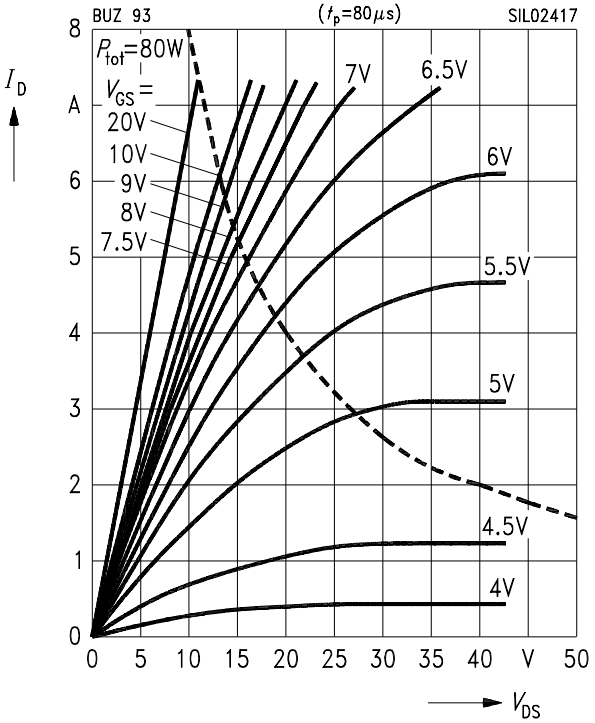
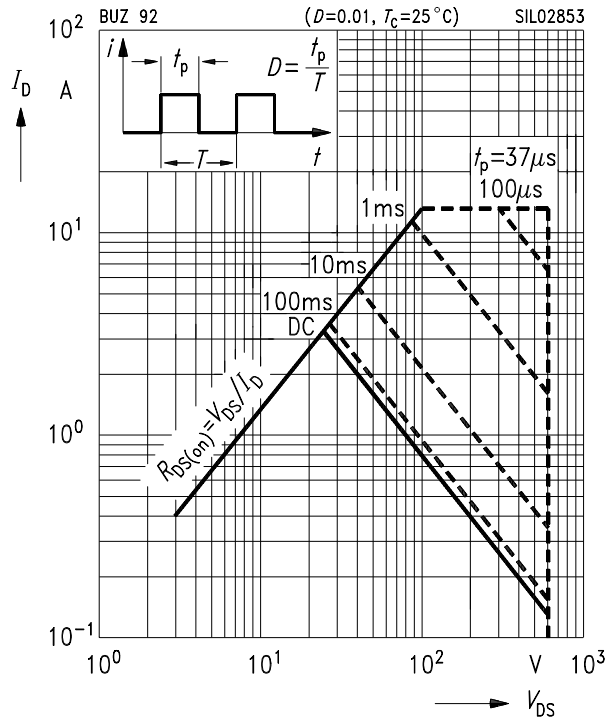


Safe operating area

$I_D = f(V_{DS})$ **BUZ 92**

parameter: D = 0.01, T_C = 25 °C



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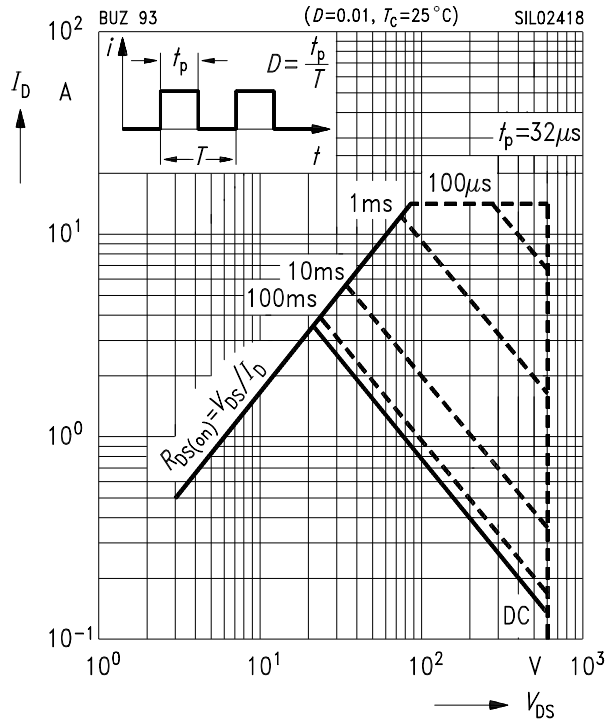
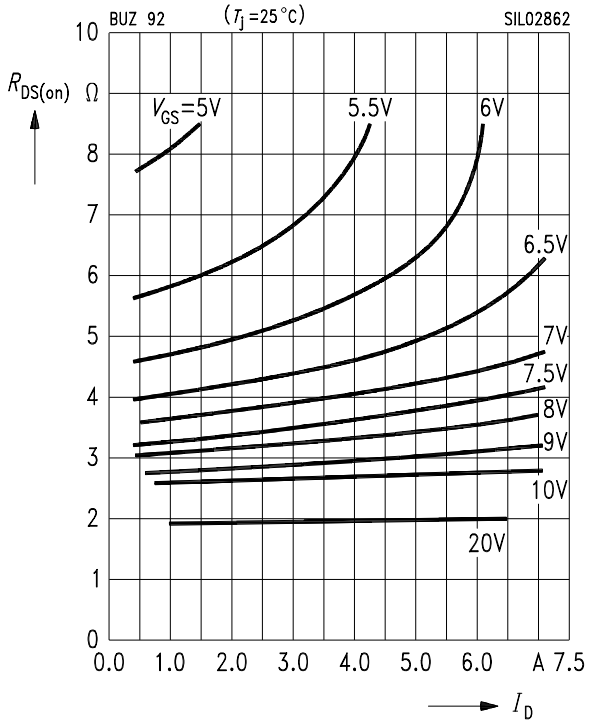


Typ. drain-source on-resistance
$R_{DS\,(on)} = f(I_D)$ **BUZ 92**
parameter: V_{GS}



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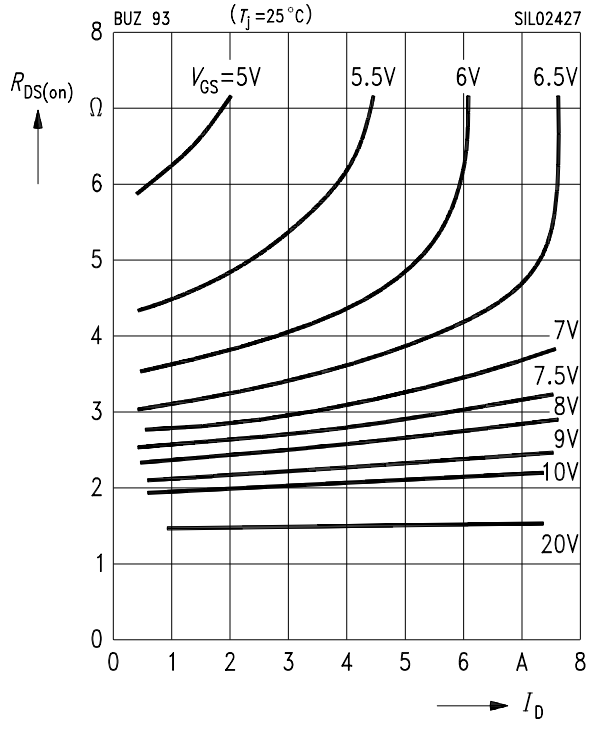
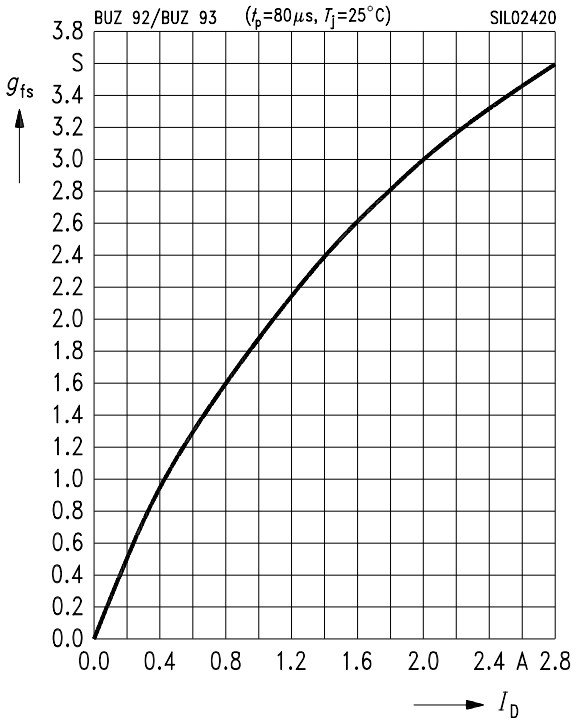


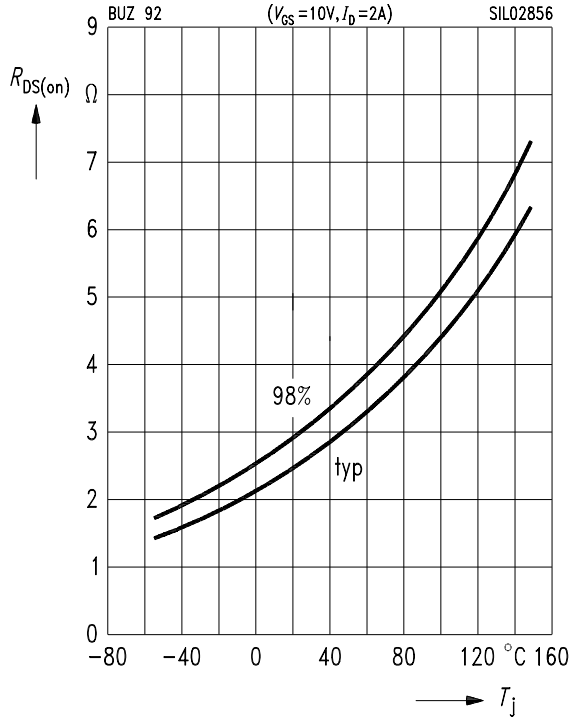
Typ. forward transconductance
$g_{fs} = f(I_D)$
parameter: t_p = 80 µs



Drain-source on-resistance

$R_{DS\,(on)} = f\,(T_j)$ **BUZ 92**

parameter: I_D = 2 A, V_{GS} = 10 V, (spread)



Drain-source on-resistance

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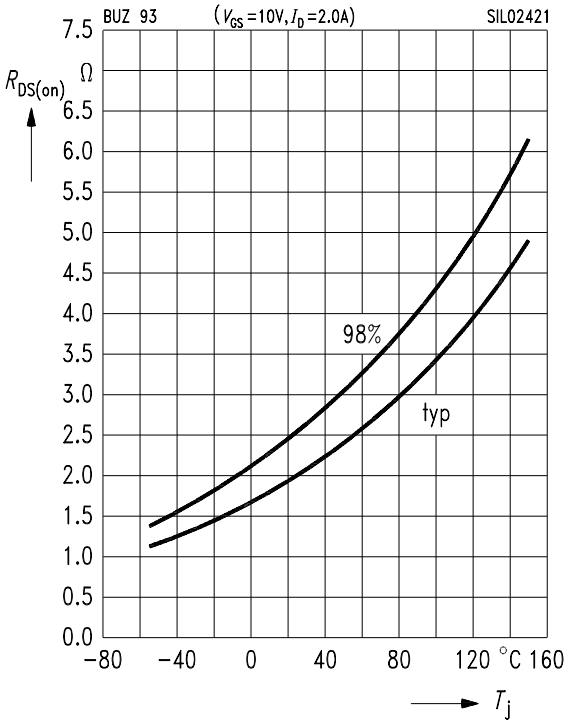
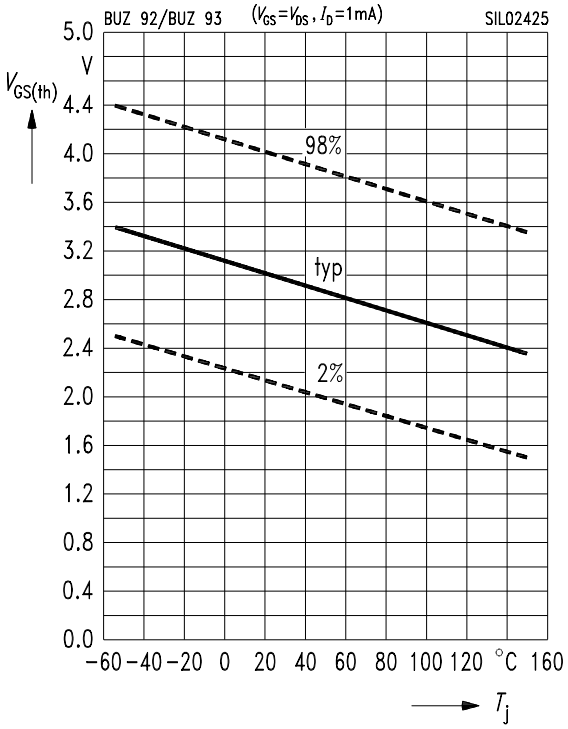


Gate threshold voltage

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

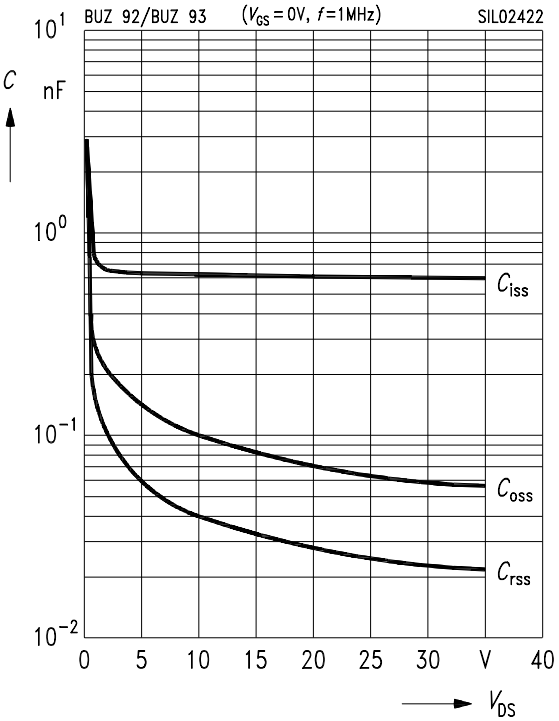
parameter: $V_{GS} = V_{DS}$, I_D = 1 mA, (spread)



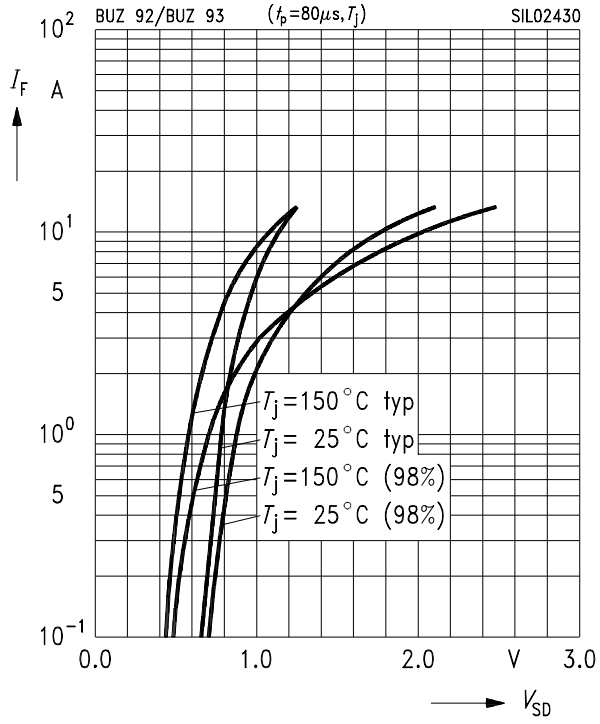
Typ. capacitances

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

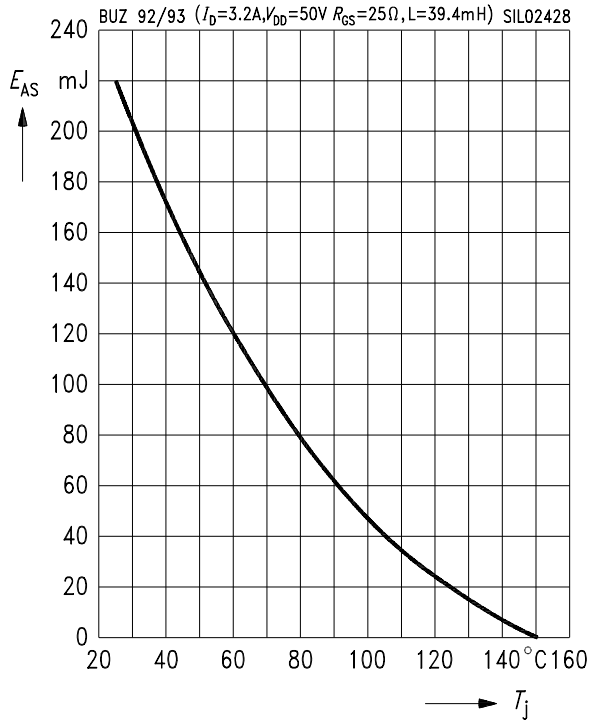
parameter: V_{GS} = 0 V, f = 1 MHz



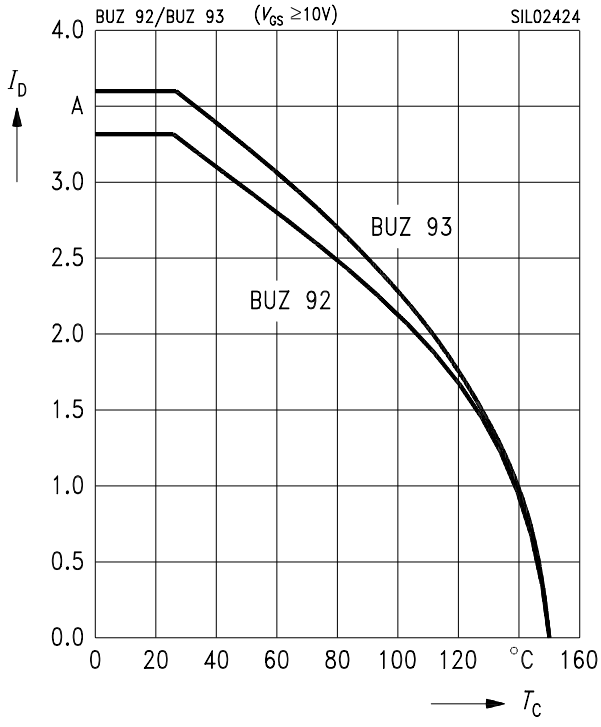
Forward characteristics of reverse diode
$I_F = f(V_{SD})$
parameter: T_j , t_p = 80 µs, (spread)



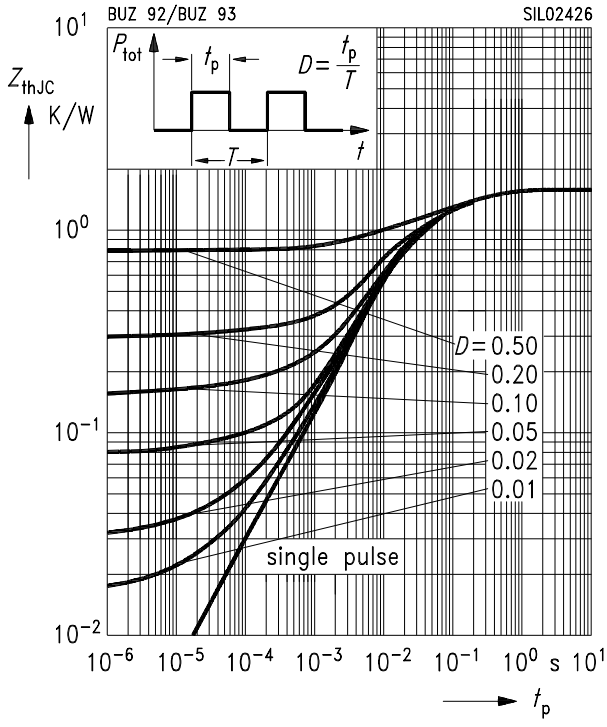
Avalanche energy $E_{AS} = f(T_j)$
parameter: I_D = 3.2 A, V_{DD} = 50 V
R_{GS} = 25 Ω, L = 39.4 mH



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



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



Typ. gate charge

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

parameter: $I_{D\ puls}$ = 4.8 A