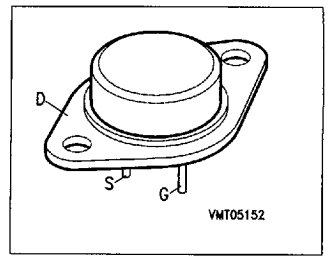
SIEMENS

SIPMOS® Power Transistors

BUZ 16
BUZ 16 S2

- N channel
- Enhancement mode
- Avalanche-rated



Type	V_{DS}	I_D	$R_{DS\,(on)}$	Package [1]	Ordering Code
BUZ 16	50 V	48 A	0.018 Ω	TO-204 AE	C67078-S1020-A2
BUZ 16 S2	60 V	48 A	0.018 Ω	TO-204 AE	C67078-S1020-A3

Maximum Ratings

Parameter	Symbol	Values	Unit
Continuous drain current , T_C = 79 °C	I_D	**48**	A
Pulsed drain current, T_C = 25°C	$I_{D\,puls}$	**192**	
Avalanche current, limited by $T_{j\,max}$	I_{AR}	**48**	
Avalanche energy, periodic limited by $T_{j\,(max)}$	E_{AR}	**4.5**	mJ
Avalanche energy, single pulse V_{DD} = 25 V, R_{GS} = 25 Ω, T_j = 25 °C I_D = 48 A, L = 31.3 µH	E_{AS}	**72**	
Gate-source voltage	V_{GS}	**± 20**	V
Power dissipation, T_C = 25 °C	P_{tot}	**125**	W
Operating and storage temperature range	T_j , T_{stg}	**– 55 ... + 150**	°C

Thermal resistance, chip-case	$R_{th\,JC}$	**≤ 1.0**	K/W
DIN humidity category, DIN 40 040	–	**C**	–
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 BUZ 16 BUZ 16 S2	$V_{(BR)\,DSS}$	 50 60	 – –	 – –	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_{GS} = 0 V, V_{DS} = 50 V BUZ 16 V_{GS} = 0 V, V_{DS} = 60 V BUZ 16 S2 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 = 40 A	$R_{DS\,(on)}$	–	0.012	0.018	Ω
Dynamic characteristics					
Forward transconductance $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$ I_D = 40 A	g_{fs}	30	40	–	S
Input capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{iss}	–	2900	4300	pF
Output capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{oss}	–	1400	2100	
Reverse transfer capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{rss}	–	500	750	
Turn-on time t_{on} , (t_{on} = $t_{d\,(on)}$ + t_r) V_{DD} = 30 V, V_{GS} = 10 V, I_D = 3 A, R_{GS} = 50 Ω	$t_{d\,(on)}$ t_r	– –	55 140	80 210	ns
Turn-off time t_{off} , (t_{off} = $t_{d\,(off)}$ + t_f) V_{DD} = 30 V, V_{GS} = 10 V, I_D = 3 A, R_{GS} = 50 Ω	$t_{d\,(off)}$ t_f	– –	420 250	560 330	

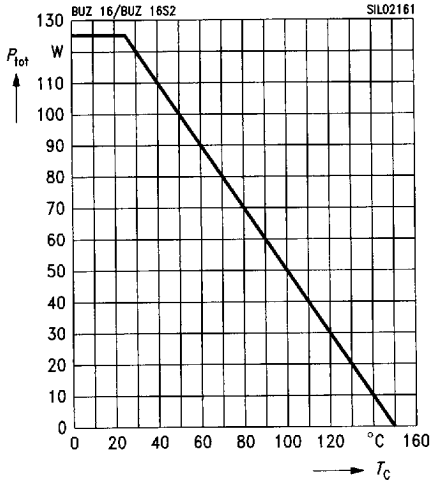
Electrical Characteristics (cont'd)
at T_j = 25 °C, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Reverse diode					
Continuous reverse drain current T_C = 25 °C	I_S	–	–	48	A
Pulsed reverse drain current T_C = 25 °C	I_{SM}	–	–	192	
Diode forward on-voltage I_S = 96 A, V_{GS} = 0 V	V_{SD}	–	1.6	2.0	V
Reverse recovery time V_R = 30 V, $I_F = I_S$, di_F/dt = 100 A/µs	t_{rr}	–	100	–	ns
Reverse recovery charge V_R = 30 V, $I_F = I_S$, di_F/dt = 100 A/µs	Q_{rr}	–	0.3	–	µC

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

Total power dissipation

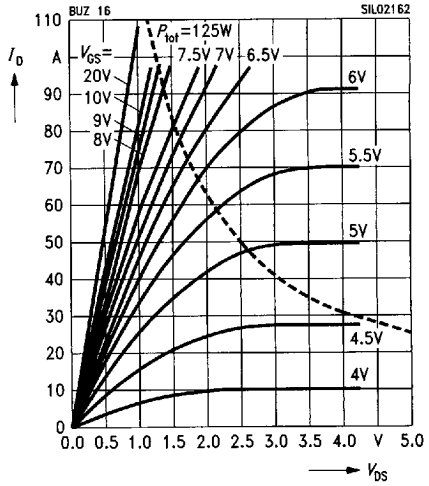
$P_{tot} = f(T_C)$



Typ. output characteristics

$I_D = f(V_{DS})$ **BUZ 16**

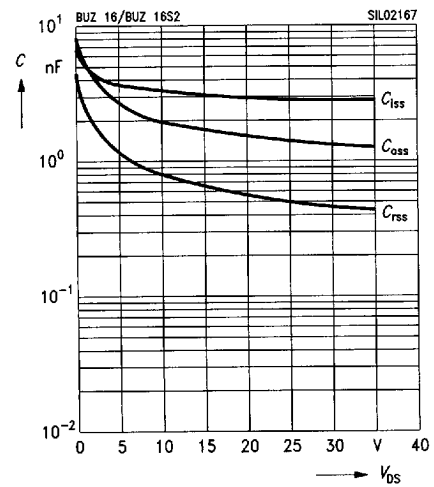
parameter: $t_p = 80$ µs



Typ. output characteristics

$I_D = f(V_{DS})$ **BUZ 16 S2**

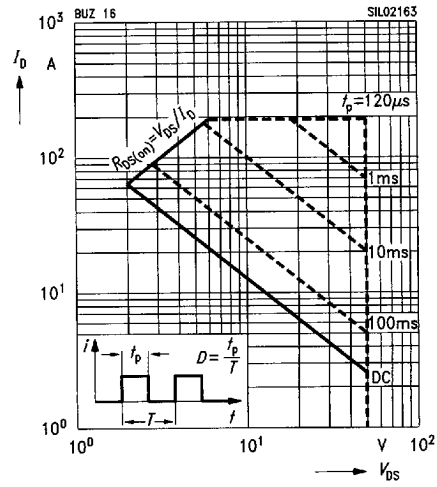
parameter: $t_p = 80$ µs



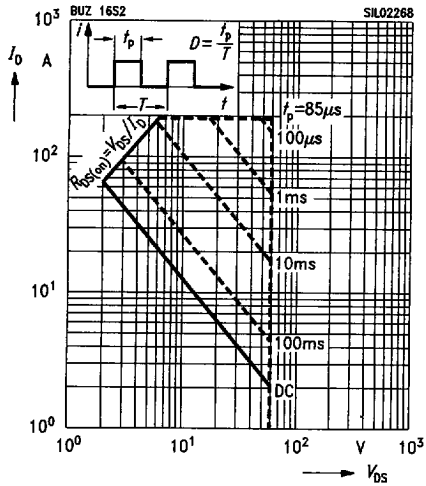
Safe operating area

$I_D = f(V_{DS})$ **BUZ 16**

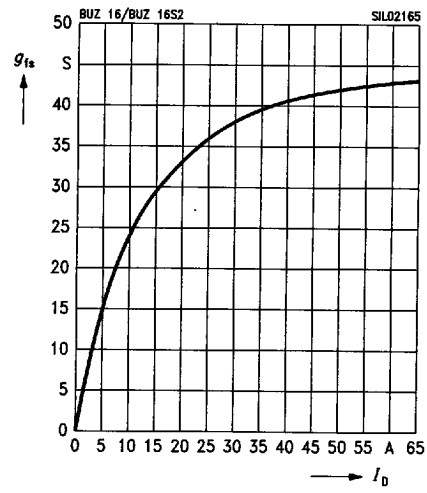
parameter: $D = 0.01$, $T_C = 25$ °C



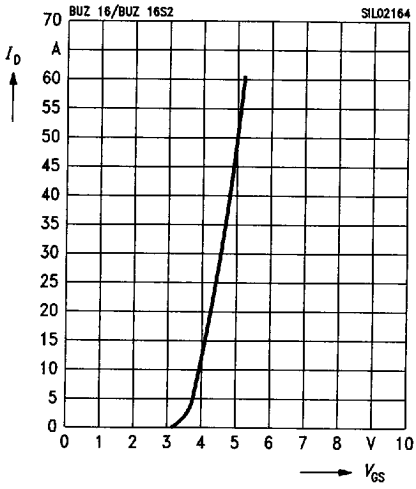
Safe operating area
$I_D = f(V_{DS})$ **BUZ 16 S2**
parameter: $D = 0.01$, $T_C = 25$ °C



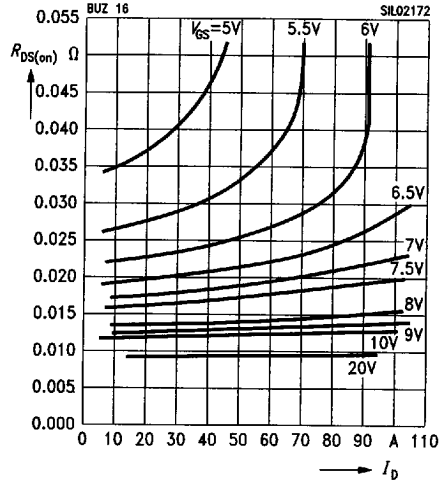
Typ. forward transconductance
$g_{fs} = f(I_D)$
parameter: $t_p = 80$ µs



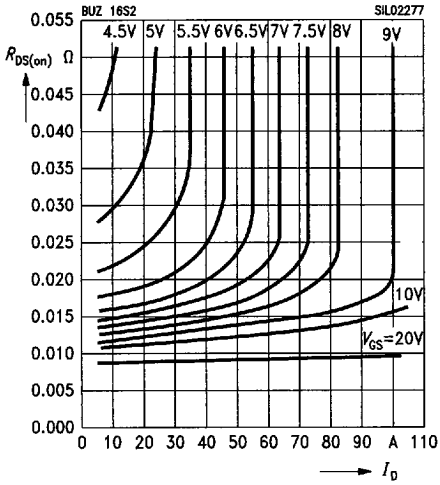
Typ. transfer characteristics
$I_D = f(V_{GS})$
parameter: $t_p = 80$ µs, $V_{DS} = 25$ V



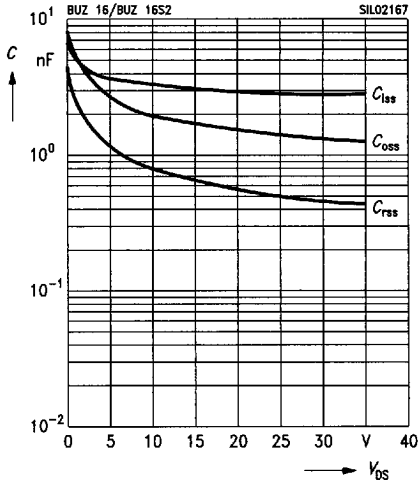
Typ. drain-source on-resistance
$R_{DS\,(on)} = f(I_D)$ **BUZ 16**
parameter: V_{GS}



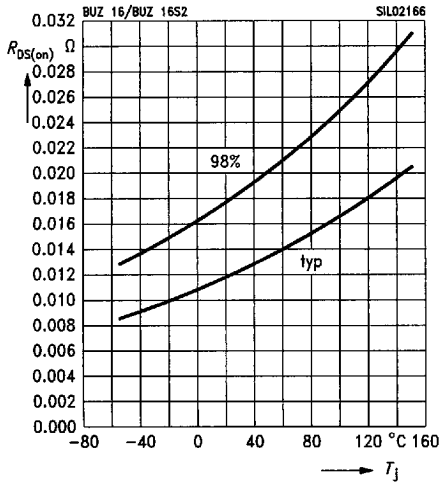
Typ. drain-source on-resistance
$R_{DS\,(on)} = f(I_D)$ **BUZ 16 S2**
parameter: V_{GS}



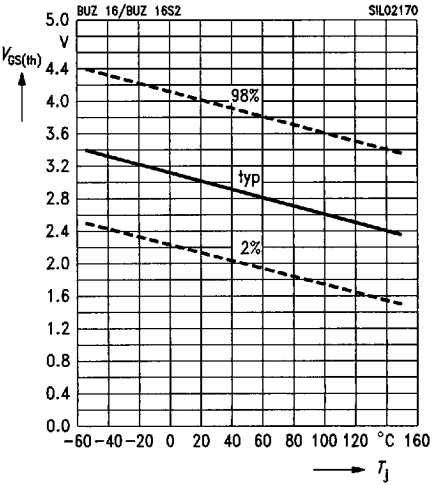
Typ. capacitances
$C = f(V_{DS})$
parameter: V_{GS} = 0 V, f = 1 MHz



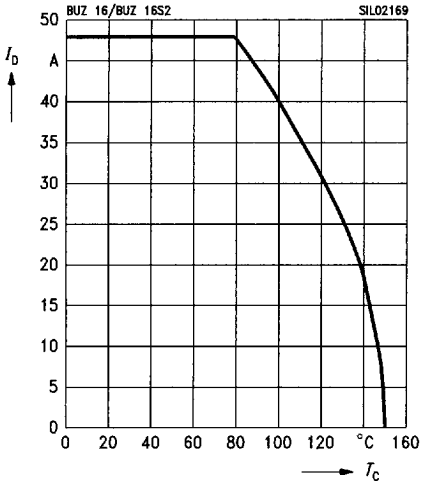
Drain-source on-resistance
$R_{DS\,(on)} = f(T_j)$
parameter: I_D = 40 A, V_{GS} = 10 V, (spread)



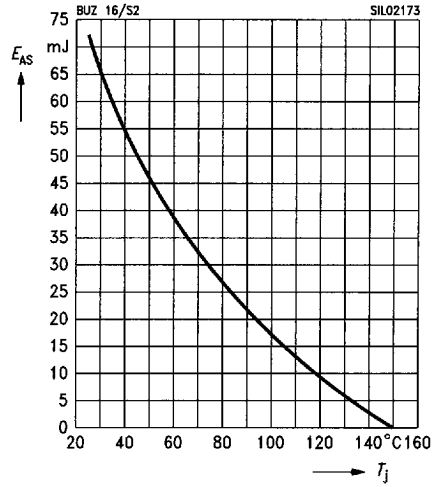
Gate threshold voltage
$V_{GS\,(th)} = f(T_j)$
parameter: $V_{GS} = V_{DS}$, I_D = 1 mA, (spread)



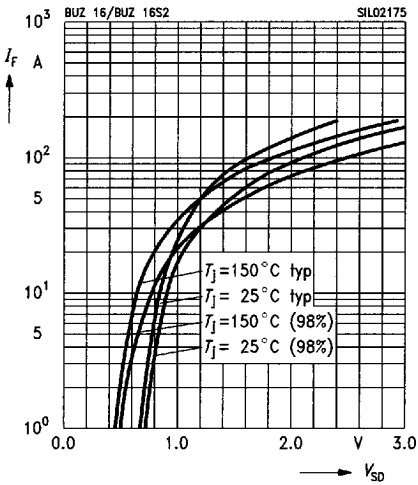
Drain current
$I_D = f(T_C)$
parameter: $V_{GS} \geq 10$ V



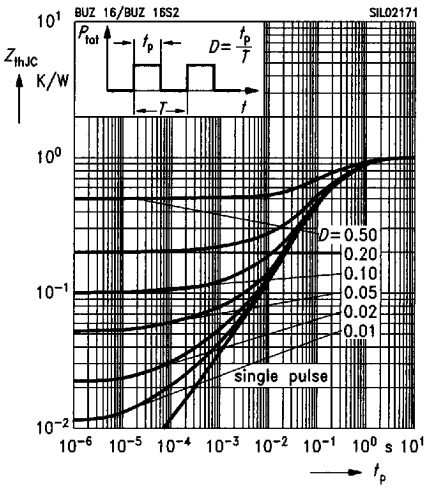
Avalanche energy $E_{AS} = f(T_j)$
parameter: $I_D = 48$ A, $V_{DD} = 25$ V
$R_{GS} = 25\ \Omega$, $L = 31.3\ \mu$H



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



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



Typ. gate charge
$V_{GS} = f(Q_{Gate})$
parameter: $I_{D\,puls}$ = 87.0 A