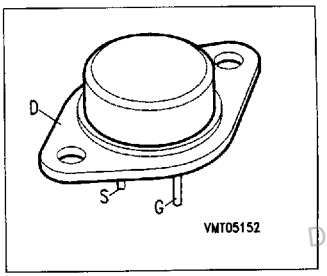
SIEMENS

SIPMOS® Power Transistor

BUZ 15

- N channel
- Enhancement mode
- Avalanche-rated



Type	V_{DS}	I_D	$R_{DS\,(on)}$	Package [1]	Ordering Code
BUZ 15	50 V	45 A	0.03 Ω	TO-204 AE	C67078-S1001-A2

Maximum Ratings

Parameter	Symbol	Values	Unit
Continuous drain current, T_C = 28 °C	I_D	45	A
Pulsed drain current, T_C = 25°C	$I_{D\,puls}$	180	
Avalanche current, limited by $T_{j\,max}$	I_{AR}	45	
Avalanche energy, periodic limited by $T_{j\,(max)}$	E_{AR}	2.5	mJ
Avalanche energy, single pulse I_D = 42 A, V_{DD} = 25 V, R_{GS} = 25 Ω L = 20.2 µH, T_j = 25 °C	E_{AS}	41	
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	$V_{(BR)\ DSS}$	50	–	–	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} = 50 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 = 29 A	$R_{DS\ (on)}$	–	0.025	0.030	Ω
Dynamic characteristics					
Forward transconductance $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$, I_D = 29 A	g_{fs}	7.0	22.0	–	S
Input capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{iss}	–	1800	2400	pF
Output capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{oss}	–	800	1200	
Reverse transfer capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{rss}	–	280	450	
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	$t_{d\ (on)}$	–	35	50	ns
	t_r	–	85	130	
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	$t_{d\ (off)}$	–	220	280	
	t_f	–	140	180	

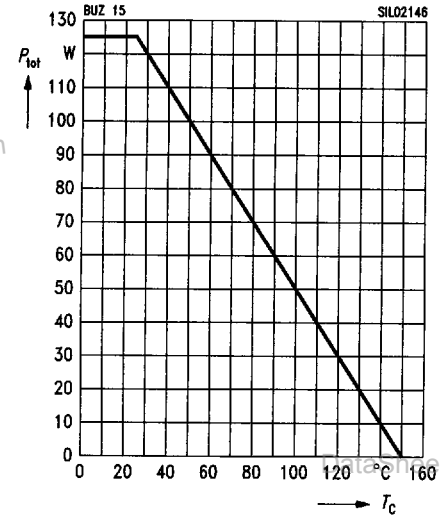
Electrical Characteristics (cont'd)
at T_j = 25 °C, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Reverse diode					
Continuous reverse drain current T_C = 25 °C	I_S	–	–	45	A
Pulsed reverse drain current T_C = 25 °C	I_{SM}	–	–	180	
Diode forward on-voltage I_S = 90 A, V_{GS} = 0 V	V_{SD}	–	1.8	2.2	V
Reverse recovery time V_R = 30 V, $I_F = I_S$, di_F/dt = 100 A/µs	t_{rr}	–	80	–	ns
Reverse recovery charge V_R = 30 V, $I_F = I_S$, di_F/dt = 100 A/µs	Q_{rr}	–	0.14	–	µC

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

Total power dissipation

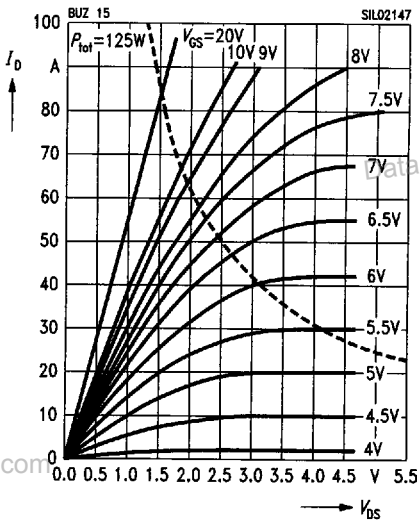
$P_{tot} = f(T_C)$



Typ. output characteristics

$I_D = f(V_{DS})$

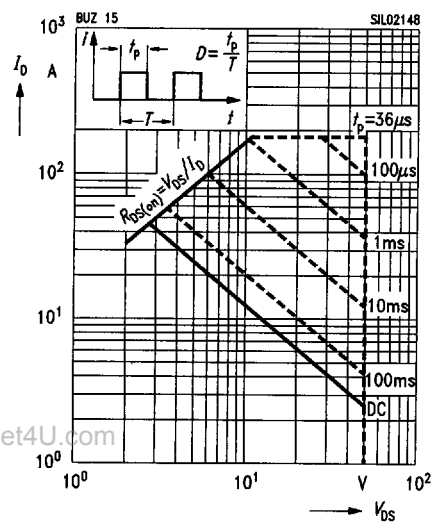
parameter: $t_p = 80$ µs



Safe operating area

$I_D = f(V_{DS})$

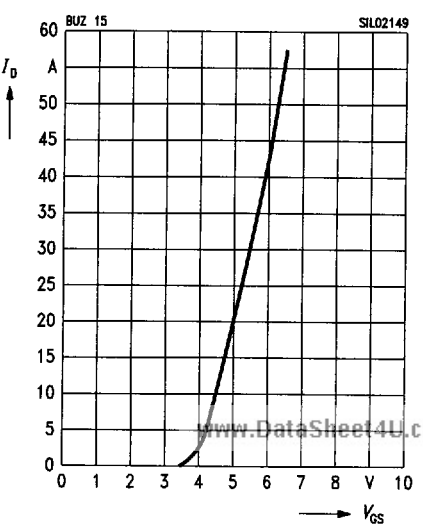
parameter: $D = 0.01$, $T_C = 25$ °C



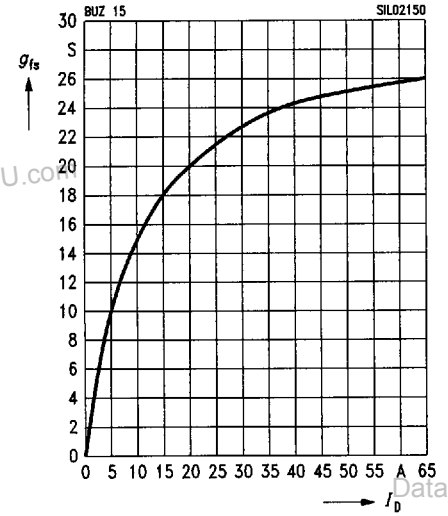
Typ. transfer characteristics

$I_D = f(V_{GS})$

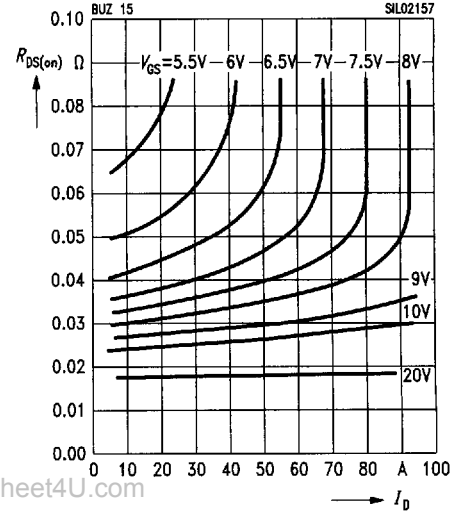
parameter: $t_p = 80$ µs, $V_{DS} = 25$ V



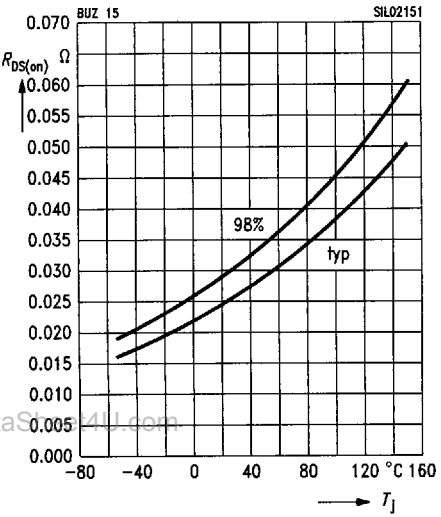
Typ. forward transconductance
$g_{fs} = f(I_D)$
parameter: t_p = 80 µs



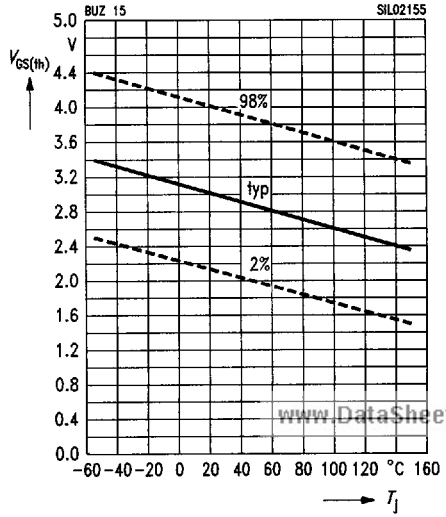
Typ. drain-source on-resistance
$R_{DS\,(on)} = f(I_D)$
parameter: V_{GS}



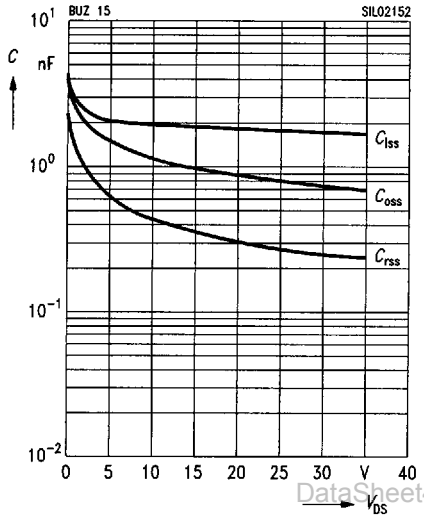
Drain-source on-resistance
$R_{DS\,(on)} = f(T_j)$
parameter: I_D = 29 A, V_{GS} = 10 V, (spread)



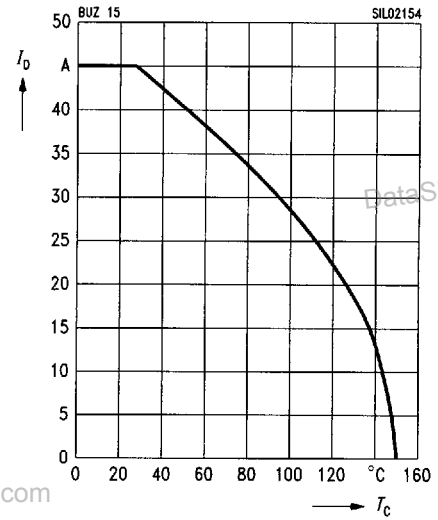
Gate threshold voltage
$V_{GS\,(th)} = f(T_j)$
parameter: V_{GS} = V_{DS} , I_D = 1 mA, (spread)



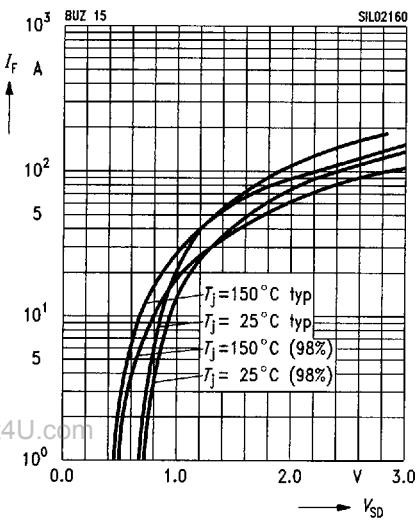
Typ. capacitances
$C = f(V_{DS})$
parameter: V_{GS} = 0 V, f = 1 MHz



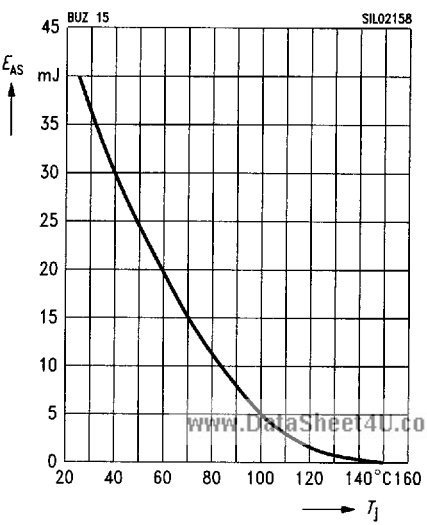
Drain current
$I_D = f(T_C)$
parameter: $V_{GS} \geq 10$ V



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

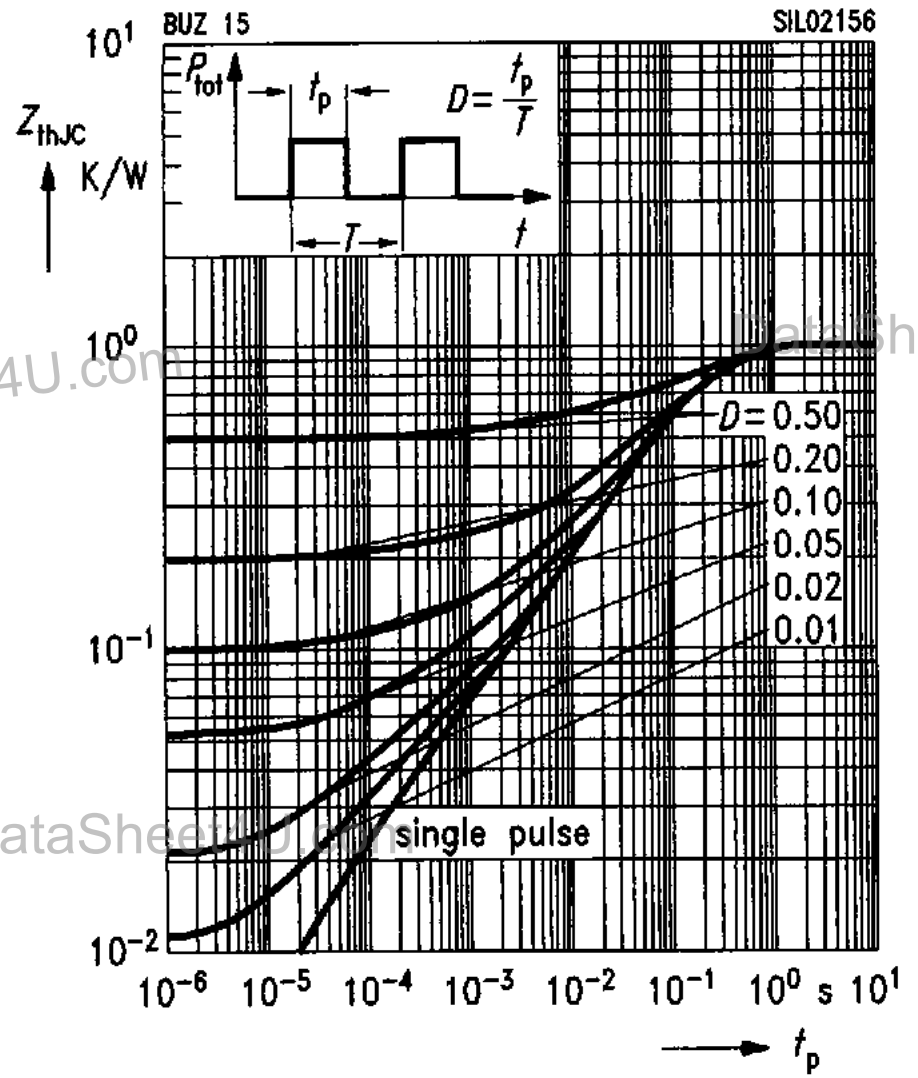


Avalanche energy $E_{AS} = f(T_j)$
parameter: I_D = 45 A, V_{DD} = 25 V
R_{GS} = 25 Ω, L = 20.2 µH



Transient thermal impedance

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



Typ. gate charge

$V_{GS} = f(Q_{Gate})$
parameter: $I_{D\,puls}$ = 63.0 A