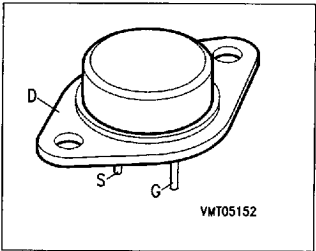


SIPMOS® Power Transistor

BUZ 94

- N channel
- Enhancement mode



Type	V_{DS}	I_D	$R_{DS(on)}$	Package ¹⁾	Ordering Code
BUZ 94	600 V	7.8 A	0.9 Ω	TO-204 AA	C67078-A1019-A2

Maximum Ratings

Parameter	Symbol	Values	Unit
Continuous drain current, $T_C = 27\text{ }^{\circ}\text{C}$	I_D	7.8	A
Pulsed drain current, $T_C = 25\text{ }^{\circ}\text{C}$	$I_{D\text{ puls}}$	31	
Drain-source voltage	V_{DS}	600	V
Drain-gate voltage, $R_{GS} = 20\text{ k}\Omega$	V_{DGR}	600	
Gate-source voltage	V_{GS}	± 20	
Power dissipation, $T_C = 25\text{ }^{\circ}\text{C}$	P_{tot}	125	W
Operating and storage temperature range	T_J, T_{stg}	- 55 ... + 150	$^{\circ}\text{C}$
Thermal resistance, chip-case	$R_{th\text{ JC}}$	≤ 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 $T_j = 25\text{ }^{\circ}\text{C}$, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

Static characteristics

Drain-source breakdown voltage $V_{GS} = 0\text{ V}$, $I_D = 0.25\text{ mA}$	$V_{(BR)\text{ DSS}}$	600	–	–	V
Gate threshold voltage $V_{GS} = V_{DS}$, $I_D = 1\text{ mA}$	$V_{GS(th)}$	2.1	3.0	4.9	
Zero gate voltage drain current $V_{DS} = 600\text{ V}$, $V_{GS} = 0\text{ V}$ $T_j = 25\text{ }^{\circ}\text{C}$ $T_j = 125\text{ }^{\circ}\text{C}$	I_{DSS}	– –	20 100	250 1000	μA
Gate-source leakage current $V_{GS} = 20\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}	–	10	100	nA
Drain-source on-resistance $V_{GS} = 10\text{ V}$, $I_D = 5.0\text{ A}$	$R_{DS(on)}$	–	0.8	0.9	Ω

Dynamic characteristics

Forward transconductance $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$, $I_D = 5.0\text{ A}$	g_{fs}	2.7	5.0	–	S
Input capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$	C_{iss}	–	3.8	4.9	pF
Output capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$	C_{oss}	–	250	400	
Reverse transfer capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$	C_{rss}	–	100	170	
Turn-on time t_{on} , ($t_{on} = t_{d(on)} + t_r$) $V_{DD} = 30\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 2.8\text{ A}$, $R_{GS} = 50\text{ }\Omega$	$t_{d(on)}$	–	50	75	ns
	t_r	–	80	120	
Turn-off time t_{off} , ($t_{off} = t_{d(off)} + t_f$) $V_{DD} = 30\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 2.8\text{ A}$, $R_{GS} = 50\text{ }\Omega$	$t_{d(off)}$	–	330	430	
	t_f	–	110	140	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

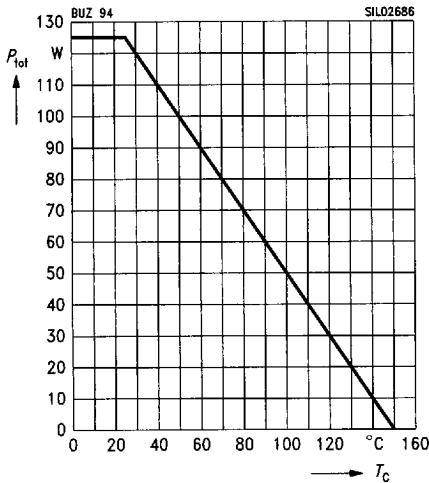
Reverse diode

Continuous reverse drain current $T_C = 25\text{ }^{\circ}\text{C}$	I_S	—	—	7.5	A
Pulsed reverse drain current $T_C = 25\text{ }^{\circ}\text{C}$	I_{SM}	—	—	30	
Diode forward on-voltage $I_S = 15\text{ A}$, $V_{GS} = 0\text{ V}$	V_{SD}	—	1.3	1.7	V
Reverse recovery time $V_R = 100\text{ V}$, $I_F = I_S$, $di_F / dt = 100\text{ A}/\mu\text{s}$	t_{rr}	—	1.2	—	μs
Reverse recovery charge $V_R = 100\text{ V}$, $I_F = I_S$, $di_F / dt = 100\text{ A}/\mu\text{s}$	Q_{rr}	—	12	—	μC

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

Total power dissipation

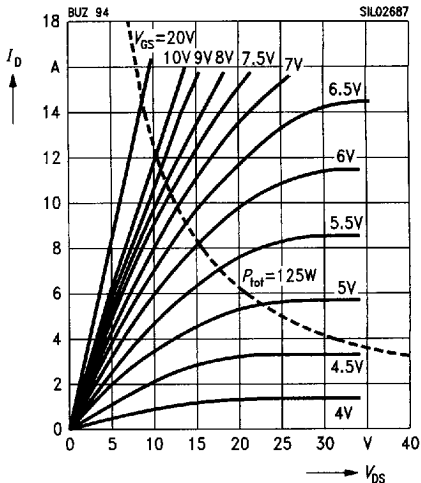
$P_{\text{tot}} = f(T_C)$



Typ. output characteristics

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

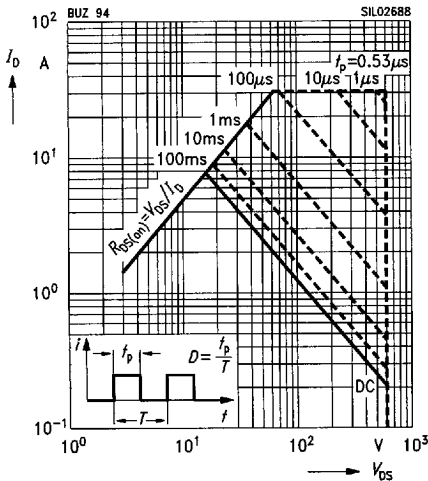
parameter: $D = 0.01$, $T_C = 25\text{ }^{\circ}\text{C}$



Safe operating area

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

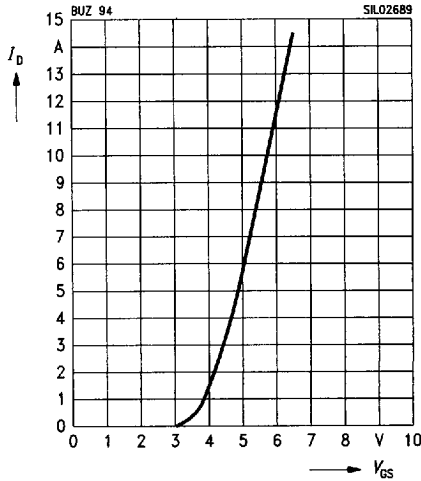
parameter: $D = 0.01$, $T_C = 25\text{ }^{\circ}\text{C}$



Typ. transfer characteristics

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

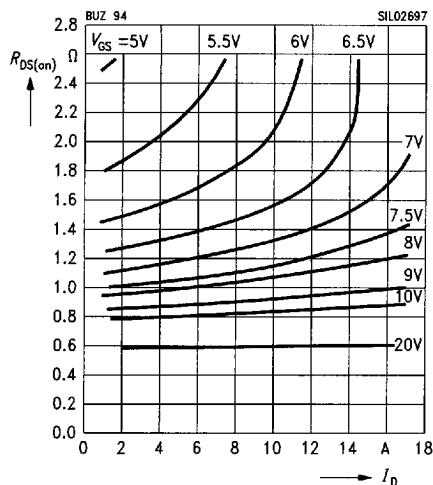
parameter: $t_p = 80\text{ }\mu\text{s}$, $V_{\text{DS}} = 25\text{ V}$



Typ. drain-source on-resistance

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

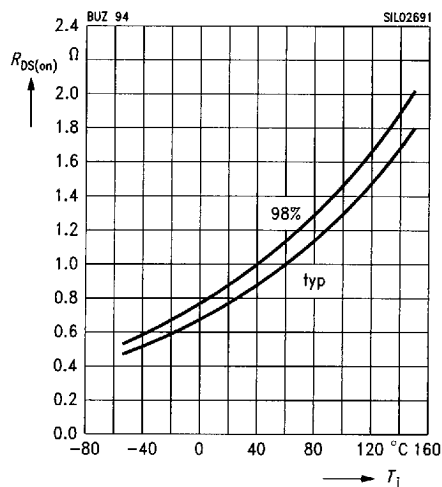
parameter: V_{GS}



Drain-source on-resistance

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

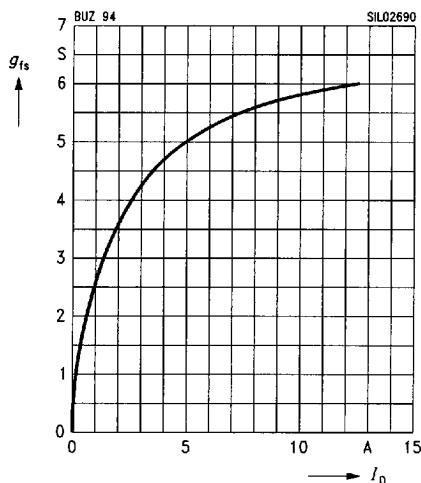
parameter: $I_D = 5.0$ A, $V_{GS} = 10$ V, (spread)



Typ. forward transconductance

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

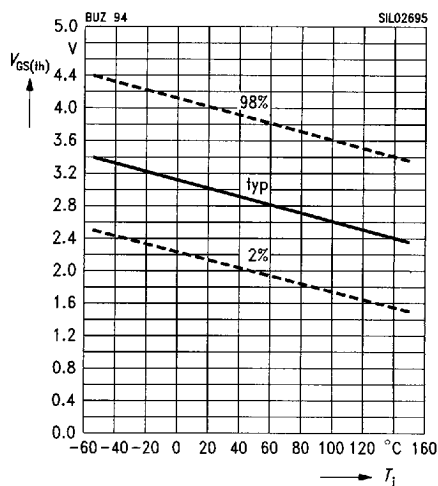
parameter: $t_p = 80$ μs



Gate threshold voltage

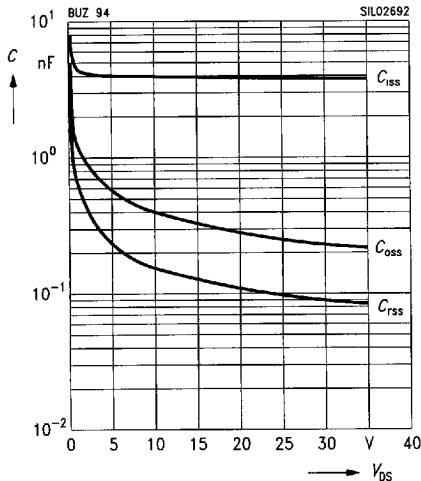
$$V_{GS(th)} = f(T_j)$$

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



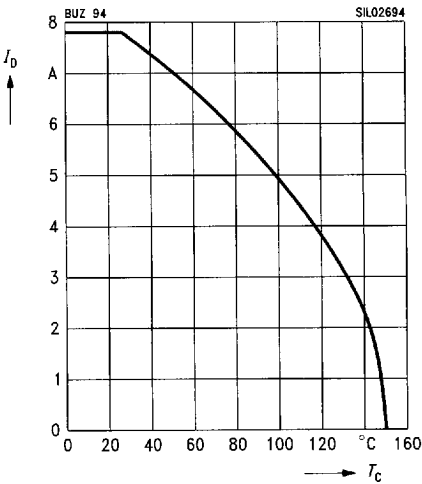
Typ. capacitances

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



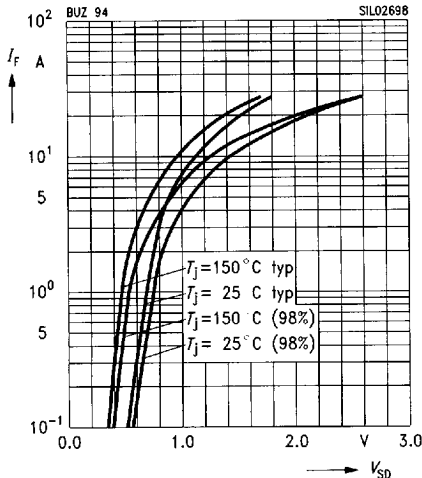
Drain current

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



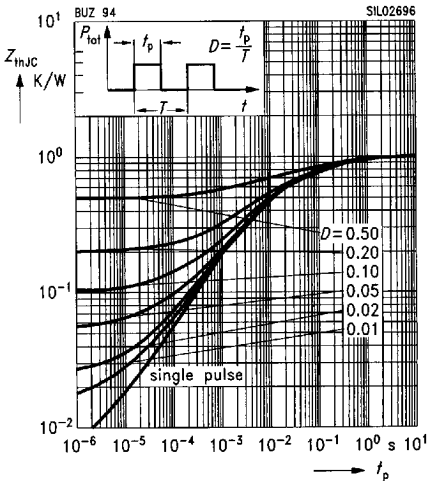
Forward characteristics of reverse diode

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



Transient thermal impedance

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



Typ. gate charge

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

parameter: $I_{D\ puls} = 11.7\ A$

