N-CHANNEL SILICON FIELD-EFFECT TRANSISTORS

General purpose symmetrical N-channel planar epitaxial junction field-effect transistors in a plastic TO-92 variant; intended for applications in l.f. and d.c. amplifiers, and in h.f. amplifiers.

QUICK REFERENCE DATA

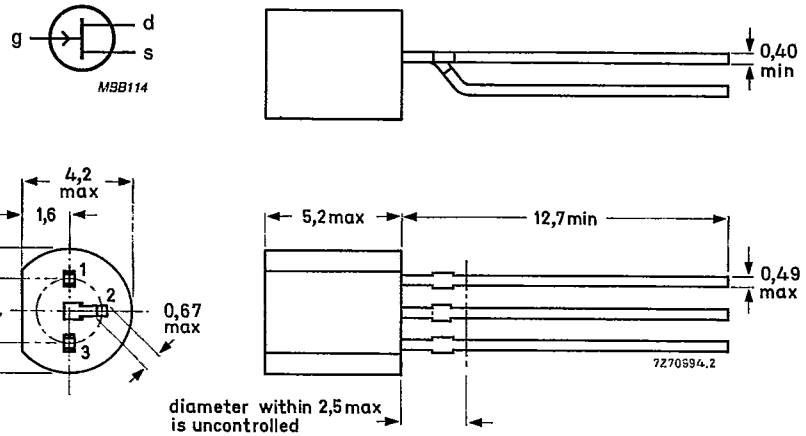
Drain-source voltage	$\pm V_{DS}$			max. 30		V
Gate-source voltage (open drain)	$-V_{GSO}$			max. 30		V
Total power dissipation up to T_{amb} = 75 °C	P_{tot}			max. 300		mW
		BF245A/0	A	B	C	
Drain current						
V_{DS} = 15 V; V_{GS} = 0	I_{DSS}	> 0,5	2,0	6	12	mA
		< 2,1	6,5	15	25	mA
Gate-source cut-off voltage						
I_D = 10 nA; V_{DS} = 15 V	$-V_{(P)GS}$			0,25 to 8,0		V
Feedback capacitance at f = 1 MHz						
V_{DS} = 20 V; $-V_{GS}$ = 1 V; T_{amb} = 25 °C	C_{rs}			typ. 1,1		pF
Transfer admittance (common source)						
V_{DS} = 15 V; V_{GS} = 0; f = 1 kHz; T_{amb} = 25 °C	$\|y_{fs}\|$			3,0 to 6,5		mS

MECHANICAL DATA

Dimensions in mm

Fig. 1 TO-92 variant.

Pinning:
1 = drain
2 = source
3 = gate



Note: Drain and source are interchangeable

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Drain-source voltage	$\pm V_{DS}$	max.	30	V
Drain-gate voltage (open source)	V_{DGO}	max.	30	V
Gate-source voltage (open drain)	$-V_{GSO}$	max.	30	V
Drain current	I_D	max.	25	mA
Gate current	I_G	max.	10	mA
Power dissipation				
up to T_{amb} = 75 °C	P_{tot}	max.	300	mW
up to T_{amb} = 90 °C	P_{tot}	max.	300	mW 1)
Storage temperature	T_{stg}	−65 to +	150	°C
Junction temperature	T_j	max.	150	°C

THERMAL RESISTANCE

From junction to ambient in free air	$R_{th\ j\text{-}a}$	=	250	K/W
From junction to ambient	$R_{th\ j\text{-}a}$	=	200	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

		BF245A	B	C	
Gate cut-off current					
$-V_{GS}$ = 20 V; V_{DS} = 0	$-I_{GSS}$	< 5	5	5	nA
$-V_{GS}$ = 20 V; V_{DS} = 0; T_j = 125 °C	$-I_{GSS}$	< 0,5	0,5	0,5	μA
Drain current 2)					
V_{DS} = 15 V; V_{GS} = 0	I_{DSS} 3)	> 2	6,0	12	mA
		< 6,5	15,0	25	mA
Gate-source breakdown voltage					
$-I_G$ = 1 μA; V_{DS} = 0	$-V_{(BR)GSS}$	> 30	30	30	V
Gate-source voltage					
I_D = 200 μA; V_{DS} = 15 V	$-V_{GS}$ 3)	> 0,4	1,6	3,2	V
		< 2,2	3,8	7,5	V

1) Transistor mounted on printed-circuit board, maximum lead length 3 mm, mounting pad for drain lead minimum 10 mm x 10 mm.

2) Measured under pulse conditions: t_p = 300 μs; $\delta \leqslant 0{,}02$.

3) BF245A/0: I_{DSS} = 0,5 to 2,1 mA; $-V_{GS}$ = 0,2 to 1,0 V
BF245A/1: I_{DSS} = 1,9 to 3,0 mA; $-V_{GS}$ = 0,4 to 1,0 V
BF245A/2: I_{DSS} = 3,0 to 4,5 mA; $-V_{GS}$ = 0,7 to 1,4 V
BF245A/3: I_{DSS} = 4,5 to 6,5 mA; $-V_{GS}$ = 1,1 to 2,2 V.

Gate-source cut-off voltage				
I_D = 10 nA; V_{DS} = 15 V		$-V_{(P)GS}$	0,25 to 8,0	V
y-parameters at T_{amb} = 25 °C (common source)				
V_{DS} = 15 V; V_{GS} = 0				
f = 1 kHz	Transfer admittance	$\|y_{fs}\|$	3,0 to 6,5	mS
	Output admittance	$\|y_{os}\|$	typ. 25	μS
f = 200 MHz	Input conductance	g_{is}	typ. 250	μS
	Reverse transfer admittance	$\|y_{rs}\|$	typ. 1,4	mS
	Transfer admittance	$\|y_{fs}\|$	typ. 6	mS
	Output conductance	g_{os}	typ. 40	μS
V_{DS} = 20 V; $-V_{GS}$ = 1 V				
f = 1 MHz	Input capacitance	C_{is}	typ. 4,0	pF
	Feedback capacitance	C_{rs}	typ. 1,1	pF
	Output capacitance	C_{os}	typ. 1,6	pF
Cut-off frequency *				
V_{DS} = 15 V; V_{GS} = 0		f_{gfs}	typ. 700	MHz
Noise figure at f = 100 MHz; R_G = 1 kΩ (common source)				
V_{DS} = 15 V; V_{GS} = 0; T_{amb} = 25 °C input tuned to minimum noise		F	typ. 1,5	dB

* The frequency at which g_{fs} is 0,7 of its value at 1 kHz.

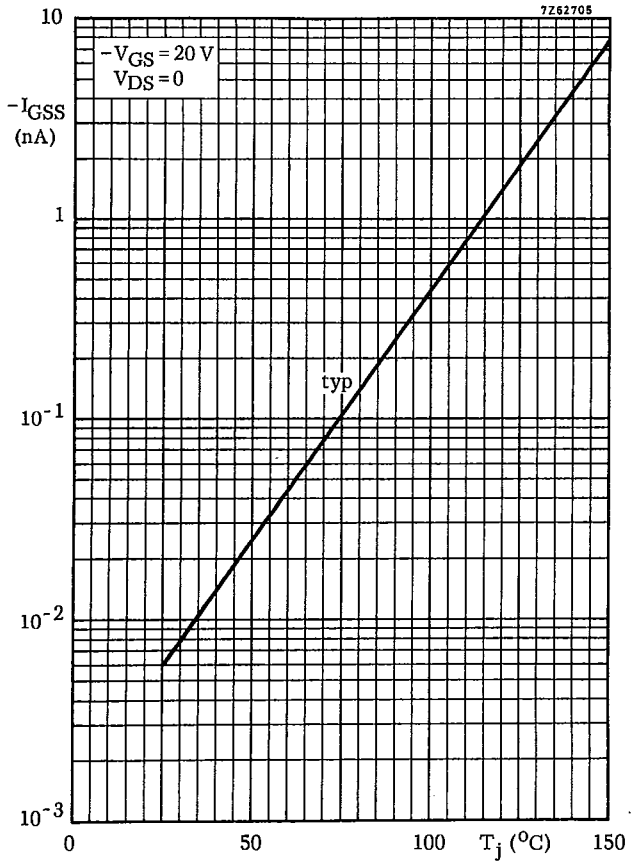

7Z62705
10
$-V_{GS} = 20\ V$
$V_{DS} = 0$
$-I_{GSS}$ (nA)
1
typ
10^{-1}
10^{-2}
10^{-3}
0
50
100
T_j (°C)
150

Fig. 2

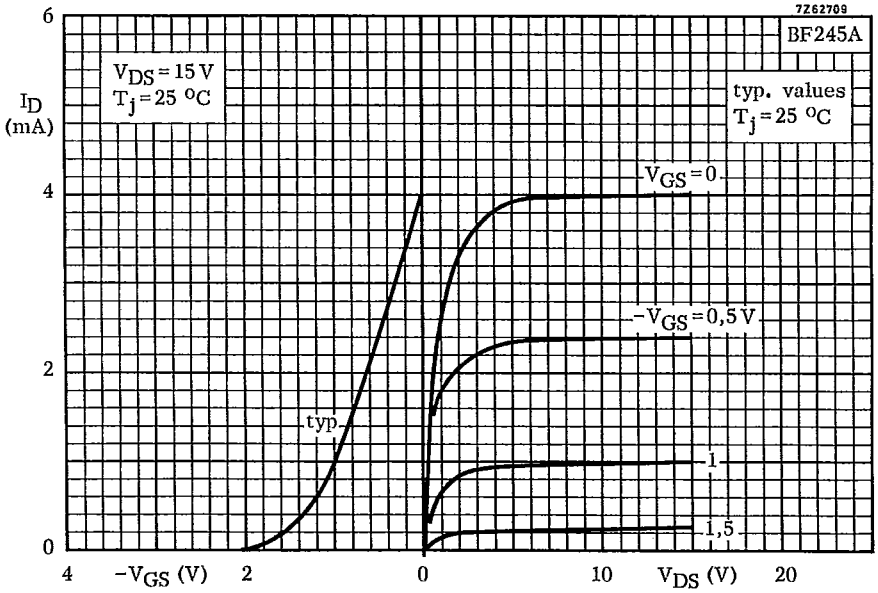

7Z62709
BF245A
V_{DS} = 15 V
T_j = 25 °C
typ. values
T_j = 25 °C
I_D (mA)
V_{GS} = 0
$-V_{GS}$ = 0,5 V
typ.
1
1,5
6
4
2
0
4
$-V_{GS}$ (V)
2
0
10
V_{DS} (V)
20

Fig. 3

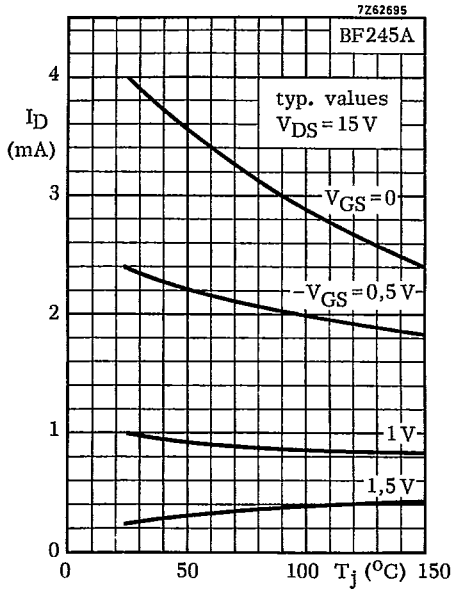

7Z62695
BF245A
typ. values
V_{DS} = 15 V
I_D (mA)
V_{GS} = 0
$-V_{GS}$ = 0,5 V
1 V
1,5 V
4
3
2
1
0
0
50
100
T_j (°C)
150

Fig. 4

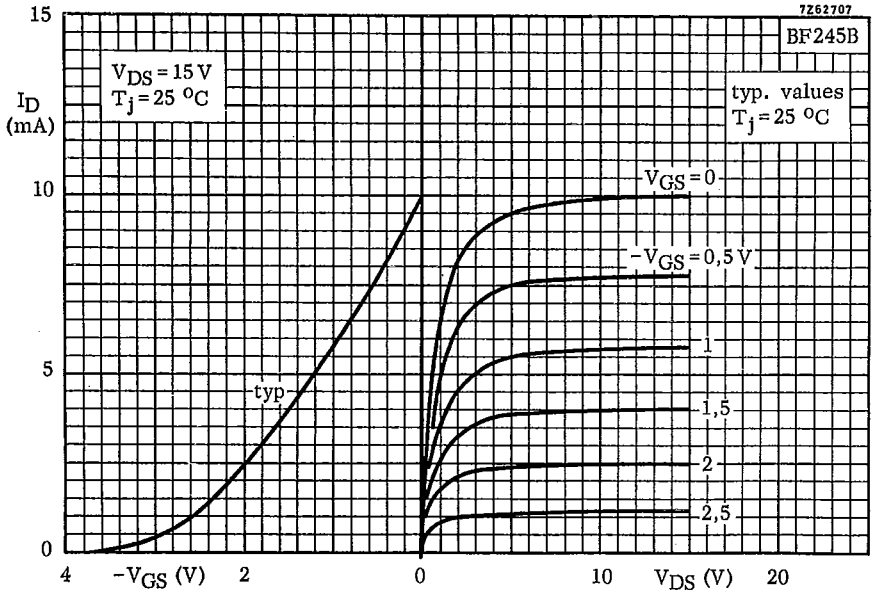

7Z62707
BF245B
V_{DS} = 15 V
T_j = 25 °C
typ. values
T_j = 25 °C
I_D (mA)
15
10
5
0
V_{GS} = 0
$-V_{GS}$ = 0,5 V
1
1,5
2
2,5
typ
4
$-V_{GS}$ (V)
2
0
10
V_{DS} (V)
20

Fig. 5

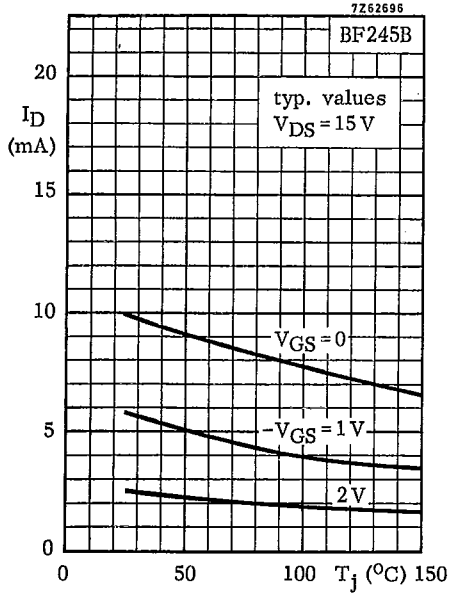

7Z62696
BF245B
typ. values
V_{DS} = 15 V
I_D (mA)
20
15
10
5
0
V_{GS} = 0
$-V_{GS}$ = 1 V
2 V
0
50
100
T_j (°C)
150

Fig. 6

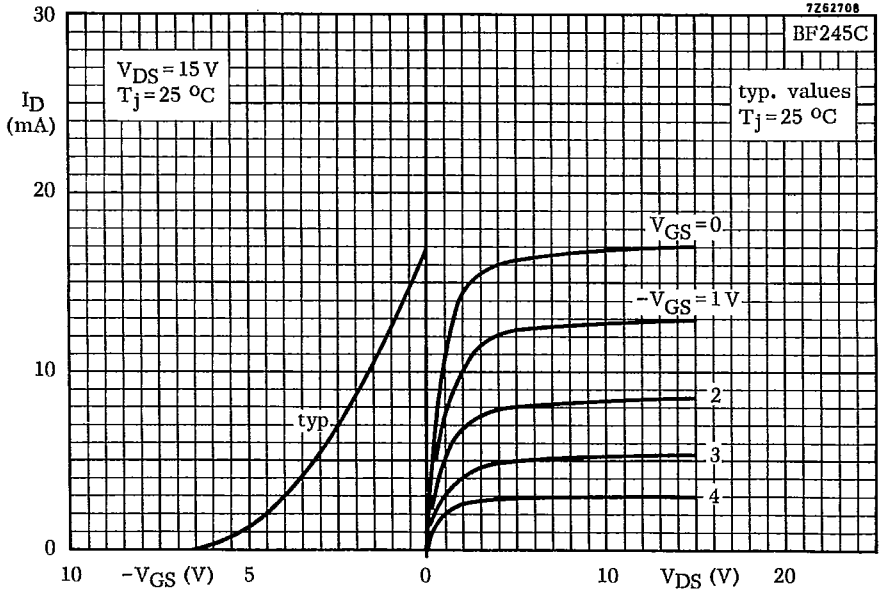

7Z62708
BF245C
V_{DS} = 15 V
T_j = 25 °C
typ. values
T_j = 25 °C
I_D (mA)
30
20
10
0
V_{GS} = 0
$-V_{GS}$ = 1 V
2
3
4
typ.
10
$-V_{GS}$ (V)
5
0
10
V_{DS} (V)
20

Fig. 7

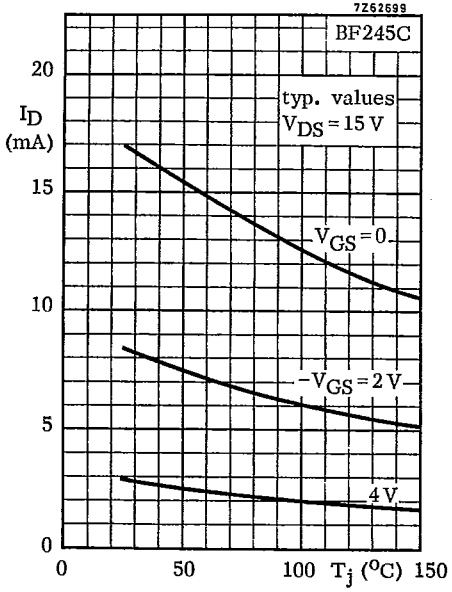

7Z62699
BF245C
typ. values
V_{DS} = 15 V
I_D (mA)
20
15
10
5
0
V_{GS} = 0
$-V_{GS}$ = 2 V
4 V
0
50
100
T_j (°C)
150

Fig. 8

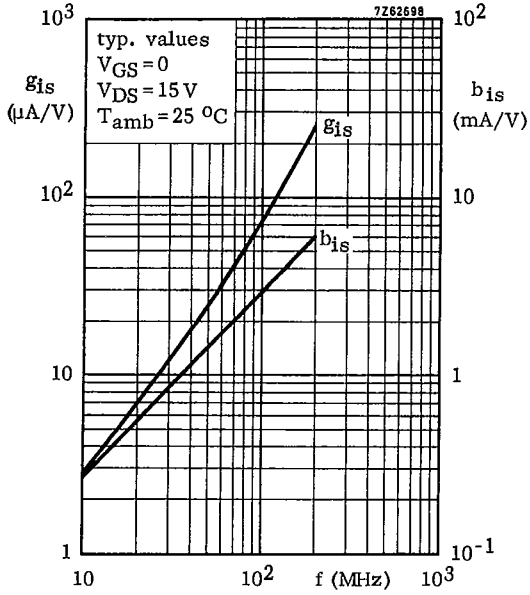

7Z62698
typ. values
$V_{GS} = 0$
$V_{DS} = 15\ V$
$T_{amb} = 25\ ^{o}C$
g_{is} (μA/V)
b_{is} (mA/V)
g_{is}
b_{is}
10^3
10^2
10
1
10^2
10
1
10^{-1}
10
10^2
f (MHz)
10^3

Fig. 9

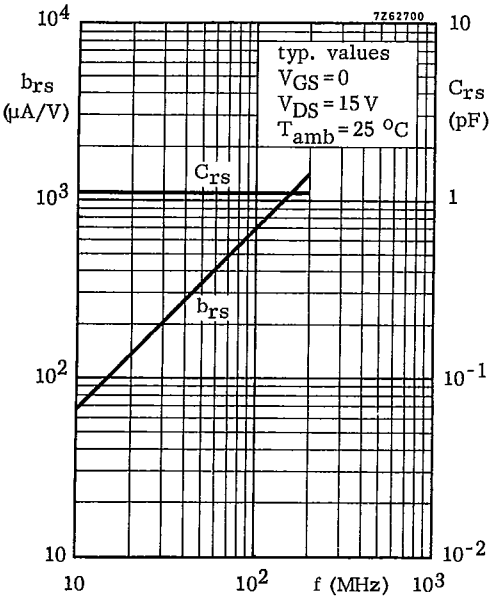

7Z62700
typ. values
$V_{GS} = 0$
$V_{DS} = 15\ V$
$T_{amb} = 25\ ^{o}C$
b_{rs} (μA/V)
C_{rs} (pF)
C_{rs}
b_{rs}
10^4
10^3
10^2
10
10
1
10^{-1}
10^{-2}
10
10^2
f (MHz)
10^3

Fig. 10

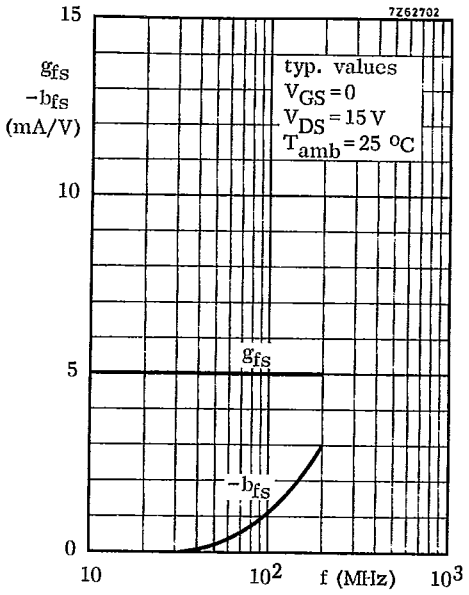

7Z62702
15
g_{fs}
$-b_{fs}$
(mA/V)
10
5
0
typ. values
$V_{GS}=0$
$V_{DS}=15\,V$
$T_{amb}=25\,^{o}C$
g_{fs}
$-b_{fs}$
10
10^2
f (MHz)
10^3

Fig. 11

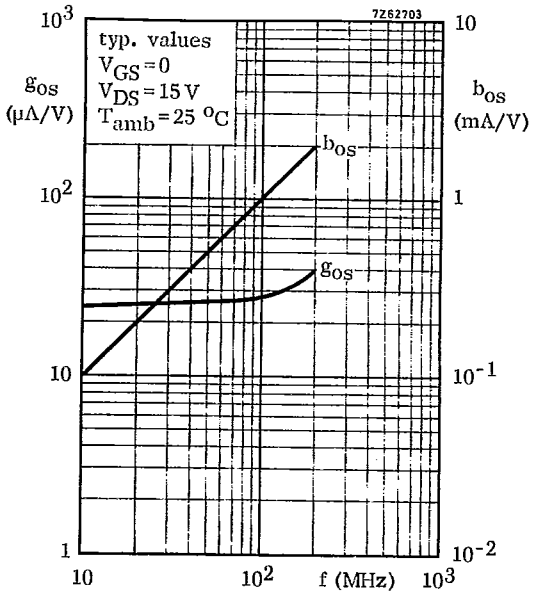

7Z62703
10^3
g_{os}
(μA/V)
10^2
10
1
typ. values
$V_{GS}=0$
$V_{DS}=15\,V$
$T_{amb}=25\,^{o}C$
b_{os}
g_{os}
10
b_{os}
(mA/V)
1
10^{-1}
10^{-2}
10
10^2
f (MHz)
10^3

Fig. 12

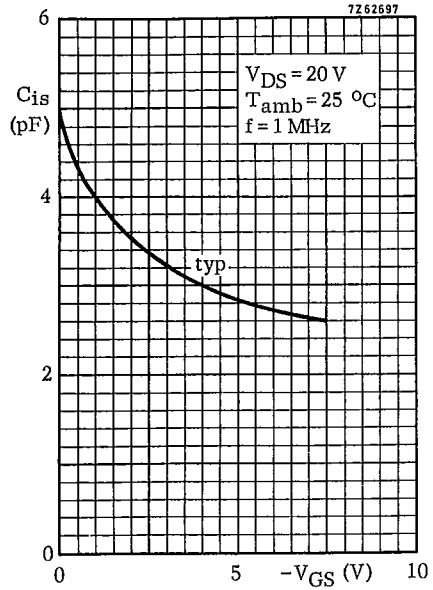


Fig. 13

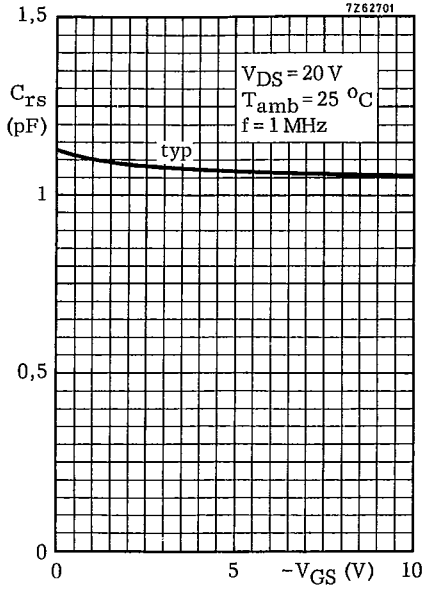


Fig. 14

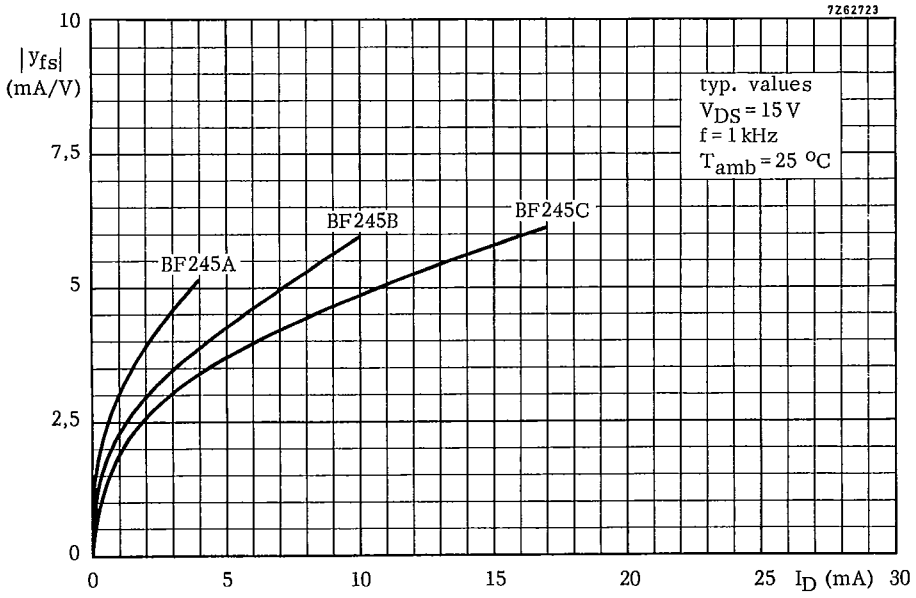


Fig. 15

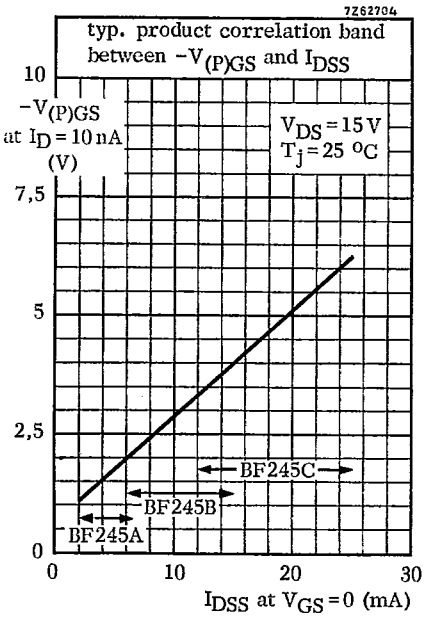


Fig. 16

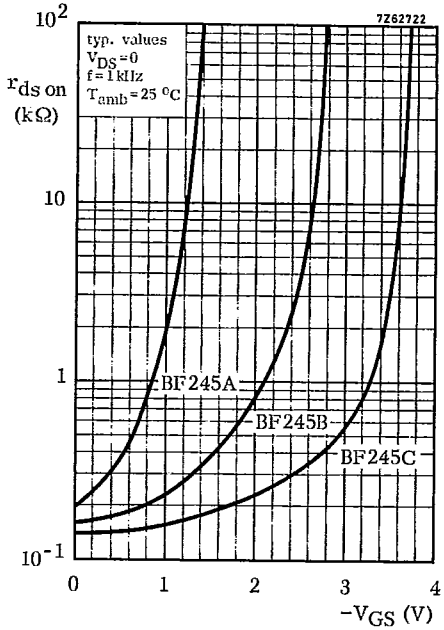


Fig. 17

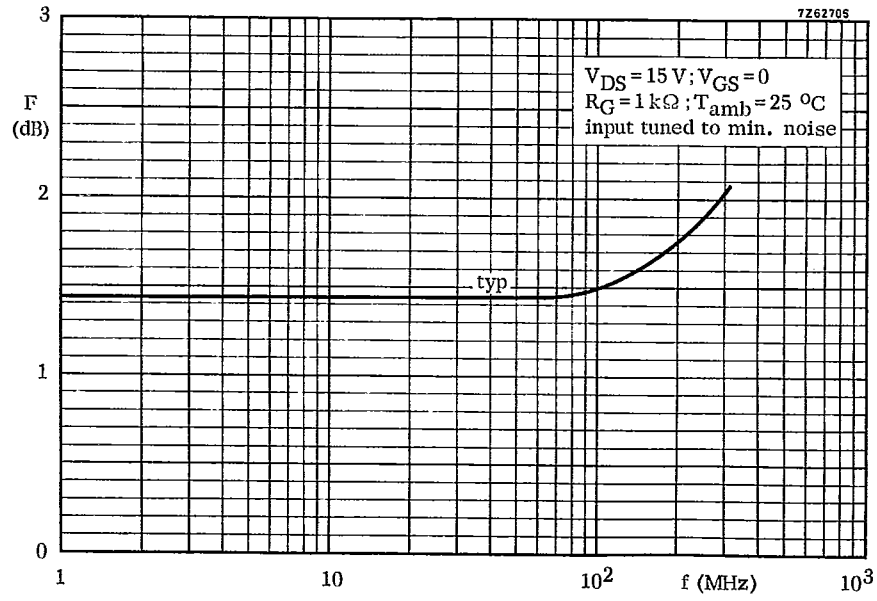


Fig. 18