

N-channel silicon field-effect transistors BF245A; BF245B; BF245C

FEATURES

- Interchangeability of drain and source connections
- Frequencies up to 700 MHz.

APPLICATIONS

- LF, HF and DC amplifiers.

DESCRIPTION

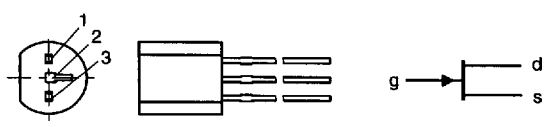
General purpose N-channel symmetrical junction field-effect transistors in a plastic TO-92 variant package.

CAUTION

The device is supplied in an antistatic package. The gate-source input must be protected against static discharge during transport or handling.

PINNING

PIN	SYMBOL	DESCRIPTION
1	d	drain
2	s	source
3	g	gate



MAM257

Fig.1 Simplified outline (TO-92 variant) and symbol.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{DS}	drain-source voltage		–	–	± 30	V
V_{GSoff}	gate-source cut-off voltage	$I_D = 10\text{ nA}; V_{DS} = 15\text{ V}$	–0.25	–	–8	V
V_{GSO}	gate-source voltage	open drain	–	–	–30	V
I_{DSS}	drain current BF245A BF245B BF245C	$V_{DS} = 15\text{ V}; V_{GS} = 0$	2 6 12	– – –	6.5 15 25	mA mA mA
P_{tot}	total power dissipation	$T_{amb} = 75\text{ }^{\circ}\text{C}$	–	–	300	mW
$ y_{fs} $	forward transfer admittance	$V_{DS} = 15\text{ V}; V_{GS} = 0;$ $f = 1\text{ kHz}; T_{amb} = 25\text{ }^{\circ}\text{C}$	3	–	6.5	mS
C_{rs}	reverse transfer capacitance	$V_{DS} = 20\text{ V}; V_{GS} = -1\text{ V};$ $f = 1\text{ MHz}; T_{amb} = 25\text{ }^{\circ}\text{C}$	–	1.1	–	pF

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LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DS}	drain-source voltage		–	± 30	V
V_{GDO}	gate-drain voltage	open source	–	–30	V
V_{GSO}	gate-source voltage	open drain	–	–30	V
I_D	drain current		–	25	mA
I_G	gate current		–	10	mA
P_{tot}	total power dissipation	up to $T_{amb} = 75\text{ }^{\circ}\text{C}$;	–	300	mW
		up to $T_{amb} = 90\text{ }^{\circ}\text{C}$; note 1	–	300	mW
T_{stg}	storage temperature		–65	+150	$^{\circ}\text{C}$
T_j	operating junction temperature		–	150	$^{\circ}\text{C}$

Note

1. Device mounted on a printed-circuit board, minimum lead length 3 mm, mounting pad for drain lead minimum 10 mm $\times$ 10 mm.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient	in free air	250	K/W
	thermal resistance from junction to ambient		200	K/W

STATIC CHARACTERISTICS

$T_j = 25\text{ }^{\circ}\text{C}$; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{(BR)GSS}$	gate-source breakdown voltage	$I_G = -1\text{ }\mu\text{A}$; $V_{DS} = 0$	–30	–	V
V_{GSoff}	gate-source cut-off voltage	$I_D = 10\text{ nA}$; $V_{DS} = 15\text{ V}$	–0.25	–8.0	V
V_{GS}	gate-source voltage	$I_D = 200\text{ }\mu\text{A}$; $V_{DS} = 15\text{ V}$			
	BF245A		–0.4	–2.2	V
	BF245B		–1.6	–3.8	V
	BF245C		–3.2	–7.5	V
I_{DSS}	drain current	$V_{DS} = 15\text{ V}$; $V_{GS} = 0$; note 1			
	BF245A		2	6.5	mA
	BF245B		6	15	mA
	BF245C		12	25	mA
I_{GSS}	gate cut-off current	$V_{GS} = -20\text{ V}$; $V_{DS} = 0$	–	–5	nA
		$V_{GS} = -20\text{ V}$; $V_{DS} = 0$; $T_j = 125\text{ }^{\circ}\text{C}$	–	–0.5	μA

Note

1. Measured under pulse conditions: $t_p = 300\text{ }\mu\text{s}$; $\delta \leq 0.02$.

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DYNAMIC CHARACTERISTICS

Common source; $T_{amb} = 25\text{ }^{\circ}\text{C}$; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
C_{is}	input capacitance	$V_{DS} = 20\text{ V}$; $V_{GS} = -1\text{ V}$; $f = 1\text{ MHz}$	—	4	—	pF
C_{rs}	reverse transfer capacitance	$V_{DS} = 20\text{ V}$; $V_{GS} = -1\text{ V}$; $f = 1\text{ MHz}$	—	1.1	—	pF
C_{os}	output capacitance	$V_{DS} = 20\text{ V}$; $V_{GS} = -1\text{ V}$; $f = 1\text{ MHz}$	—	1.6	—	pF
g_{is}	input conductance	$V_{DS} = 15\text{ V}$; $V_{GS} = 0$; $f = 200\text{ MHz}$	—	250	—	μS
g_{os}	output conductance	$V_{DS} = 15\text{ V}$; $V_{GS} = 0$; $f = 200\text{ MHz}$	—	40	—	μS
$ y_{fs} $	forward transfer admittance	$V_{DS} = 15\text{ V}$; $V_{GS} = 0$; $f = 1\text{ kHz}$	3	—	6.5	mS
		$V_{DS} = 15\text{ V}$; $V_{GS} = 0$; $f = 200\text{ MHz}$	—	6	—	mS
$ y_{rs} $	reverse transfer admittance	$V_{DS} = 15\text{ V}$; $V_{GS} = 0$; $f = 200\text{ MHz}$	—	1.4	—	mS
$ y_{os} $	output admittance	$V_{DS} = 15\text{ V}$; $V_{GS} = 0$; $f = 1\text{ kHz}$	—	25	—	μS
f_{gfs}	cut-off frequency	$V_{DS} = 15\text{ V}$; $V_{GS} = 0$; $g_{fs} = 0.7$ of its value at 1 kHz	—	700	—	MHz
F	noise figure	$V_{DS} = 15\text{ V}$; $V_{GS} = 0$; $f = 100\text{ MHz}$; $R_G = 1\text{ k}\Omega$ (common source); input tuned to minimum noise	—	1.5	—	dB

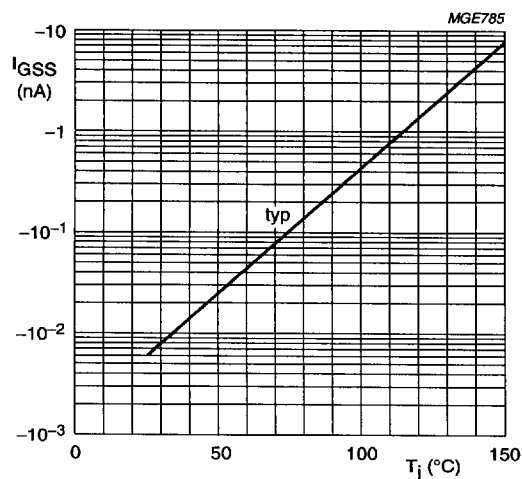
 $V_{DS} = 0$; $V_{GS} = -20\text{ V}$.

Fig.2 Gate leakage current as a function of junction temperature; typical values.

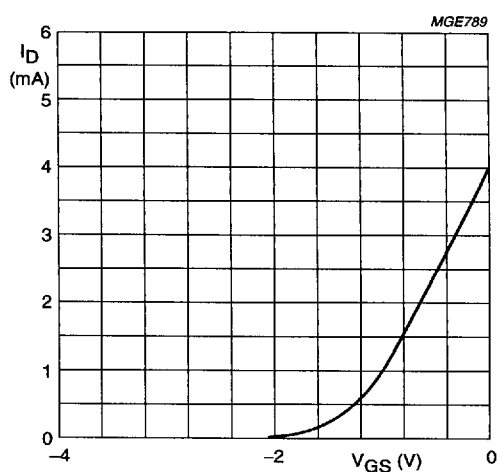
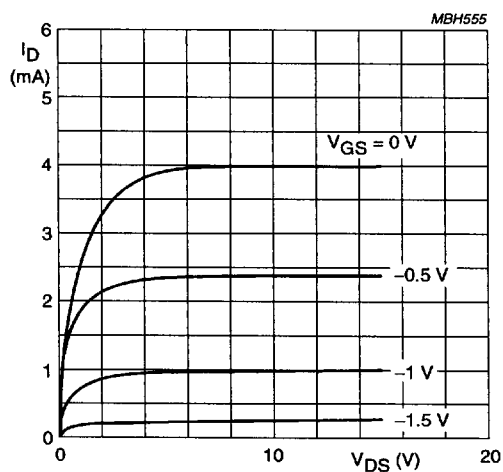
 $V_{DS} = 15\text{ V}$; $T_J = 25\text{ }^{\circ}\text{C}$.

Fig.3 Transfer characteristics for BF245A; typical values.

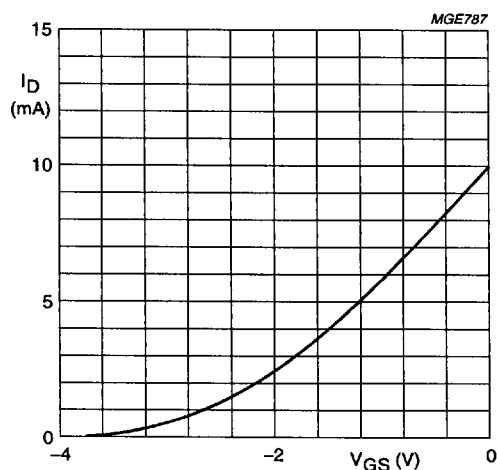
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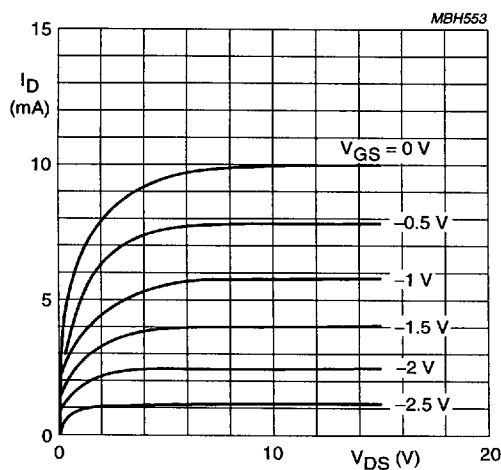
$V_{DS} = 15 \text{ V}$; $T_J = 25^\circ\text{C}$.

Fig. 4 Output characteristics for BF245A; typical values.



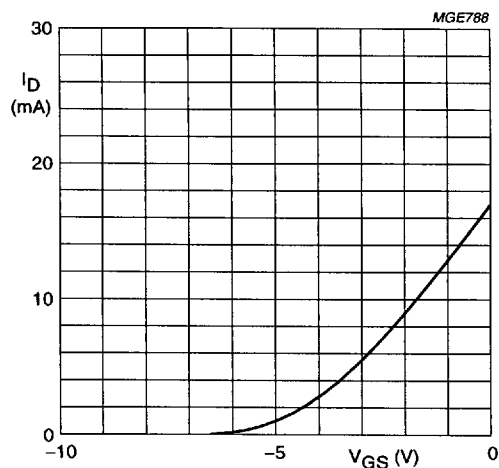
$V_{DS} = 15 \text{ V}$; $T_J = 25^\circ\text{C}$.

Fig. 5 Transfer characteristics for BF245B; typical values.



$V_{DS} = 15 \text{ V}$; $T_J = 25^\circ\text{C}$.

Fig. 6 Output characteristics for BF245B; typical values.

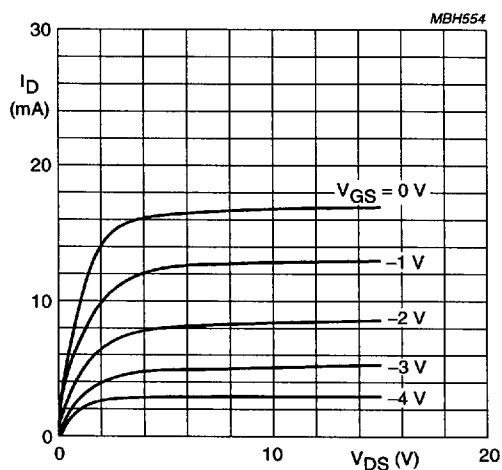


$V_{DS} = 15 \text{ V}$; $T_J = 25^\circ\text{C}$.

Fig. 7 Transfer characteristics for BF245C; typical values.

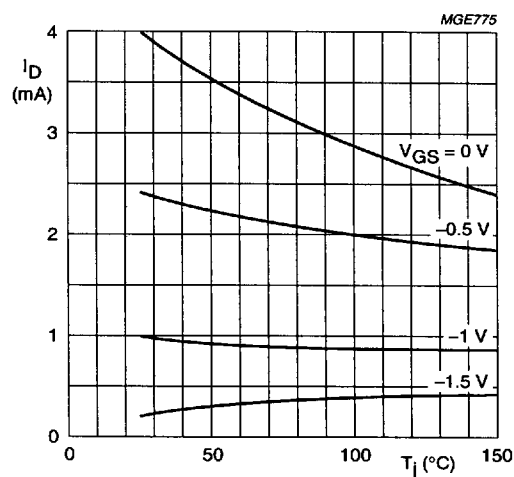
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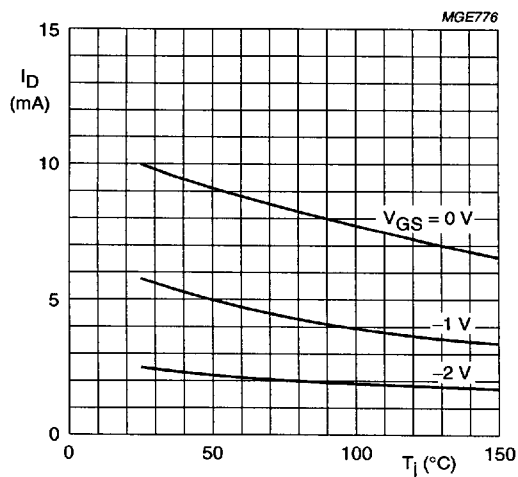
$V_{DS} = 15\text{ V}$; $T_J = 25\text{ }^\circ\text{C}$.

Fig.8 Output characteristics for BF245C; typical values.



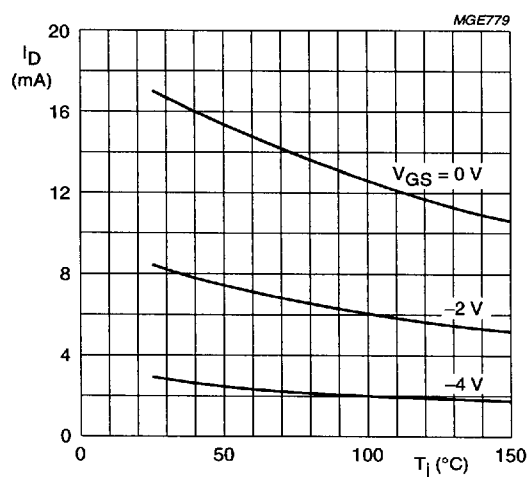
$V_{DS} = 15\text{ V}$.

Fig.9 Drain current as a function of junction temperature; typical values for BF245A.



$V_{DS} = 15\text{ V}$.

Fig.10 Drain current as a function of junction temperature; typical values for BF245B.

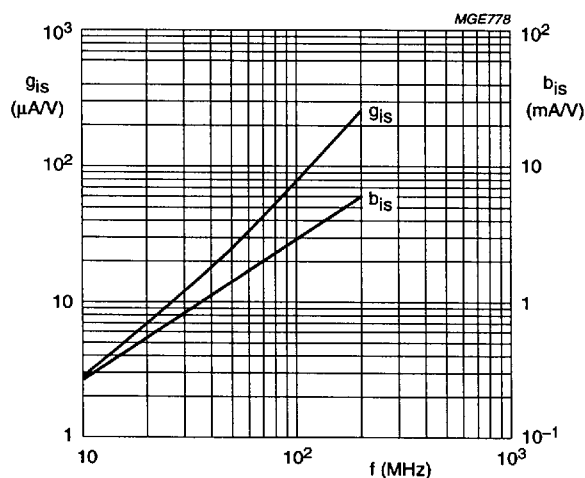


$V_{DS} = 15\text{ V}$.

Fig.11 Drain current as a function of junction temperature; typical values for BF245C.

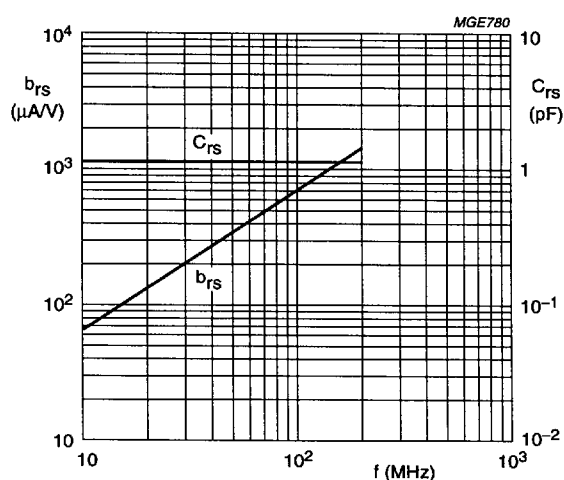
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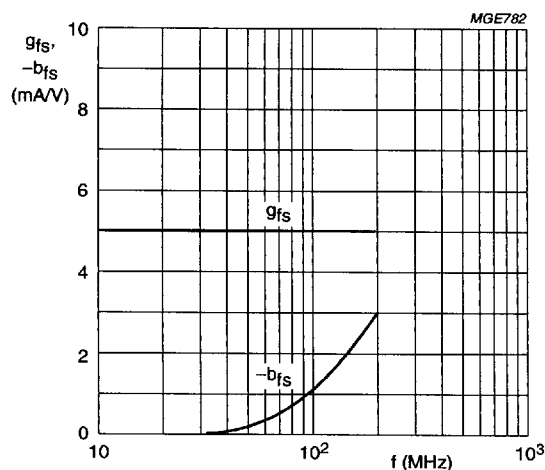
$V_{DS} = 15$ V; $V_{GS} = 0$; $T_{amb} = 25$ °C.

Fig.12 Input admittance; typical values.



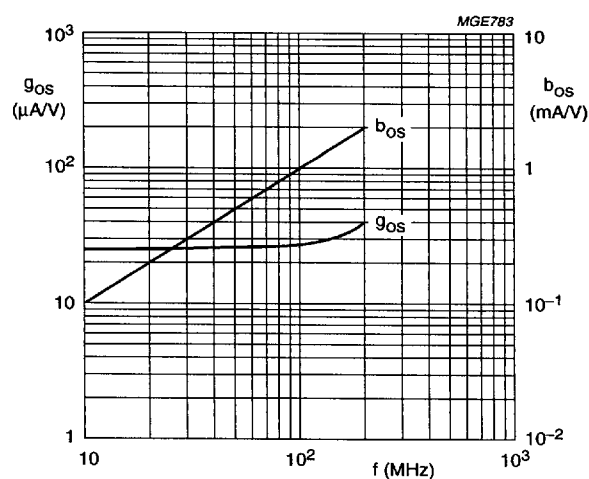
$V_{DS} = 15$ V; $V_{GS} = 0$; $T_{amb} = 25$ °C.

Fig.13 Common source reverse admittance as a function of frequency; typical values.



$V_{DS} = 15$ V; $V_{GS} = 0$; $T_{amb} = 25$ °C.

Fig.14 Common-source forward transfer admittance as a function of frequency; typical values.

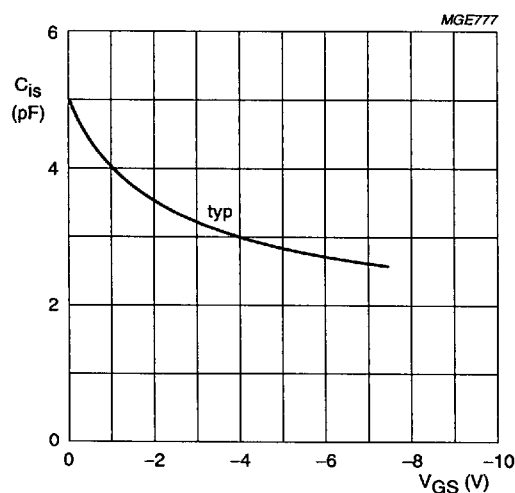


$V_{DS} = 15$ V; $V_{GS} = 0$; $T_{amb} = 25$ °C.

Fig.15 Common-source output admittance as a function of frequency; typical values.

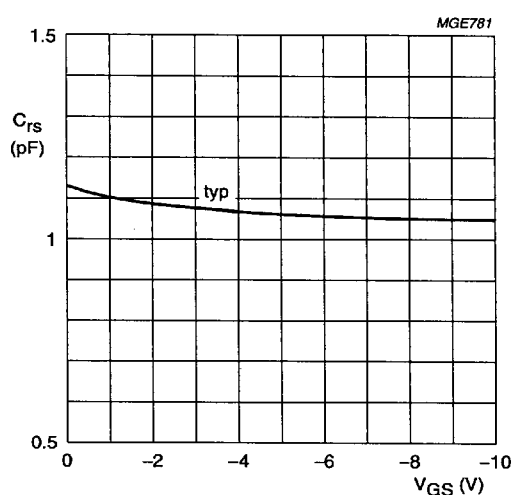
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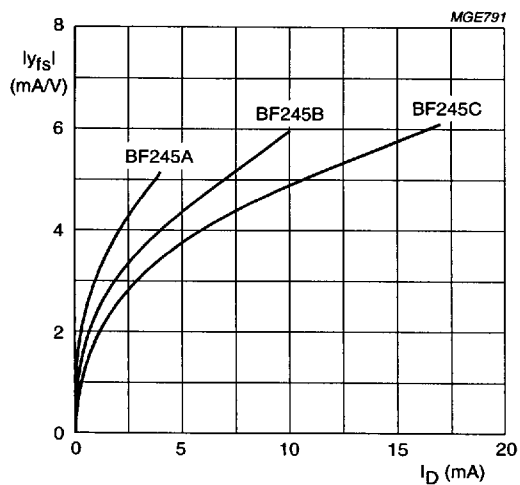
$V_{DS} = 20$ V; $f = 1$ MHz; $T_{amb} = 25$ °C.

Fig.16 Input capacitance as a function of gate-source voltage; typical values.



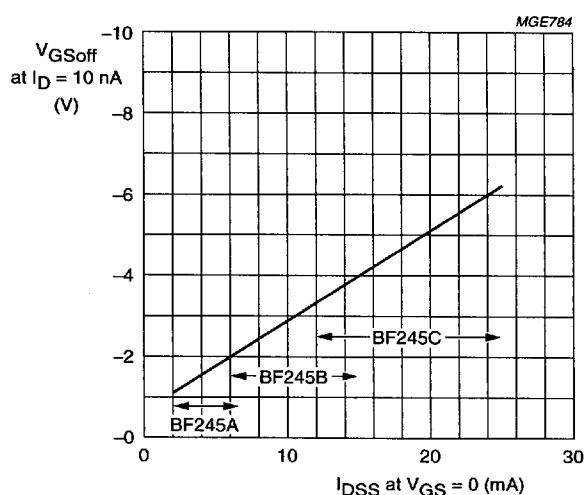
$V_{DS} = 20$ V; $f = 1$ MHz; $T_{amb} = 25$ °C.

Fig.17 Reverse transfer capacitance as a function of gate-source voltage; typical values.



$V_{DS} = 15$ V; $f = 1$ kHz; $T_{amb} = 25$ °C.

Fig.18 Forward transfer admittance as a function of drain current; typical values.

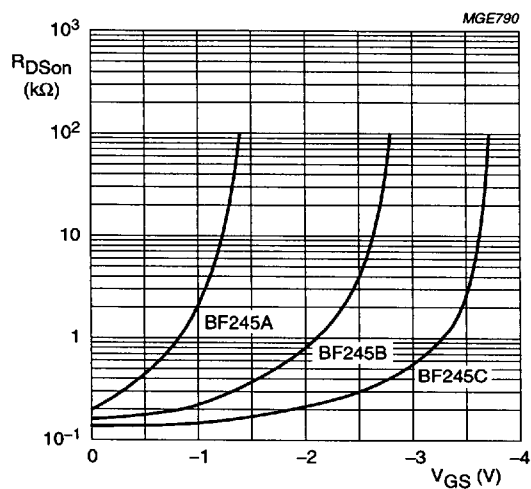


$V_{DS} = 15$ V; $T_J = 25$ °C.

Fig.19 Gate-source cut-off voltage as a function of drain current; typical values.

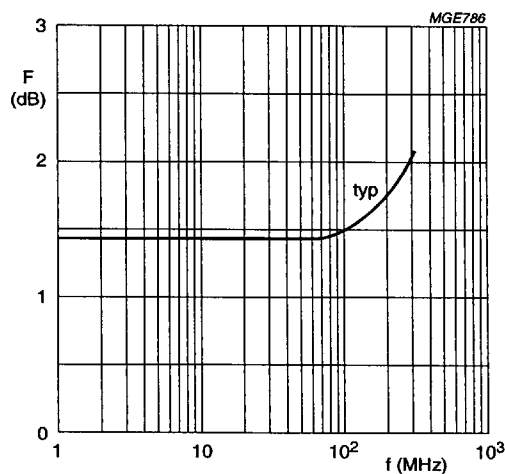
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$V_{DS} = 0$; $f = 1$ kHz; $T_{amb} = 25$ °C.

Fig.20 Drain-source on-state resistance as a function of gate-source voltage; typical values.



$V_{DS} = 15$ V; $V_{GS} = 0$; $R_G = 1$ $k\Omega$; $T_{amb} = 25$ °C.
Input tuned to minimum noise.

Fig.21 Noise figure as a function of frequency; typical values.

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PACKAGE OUTLINE

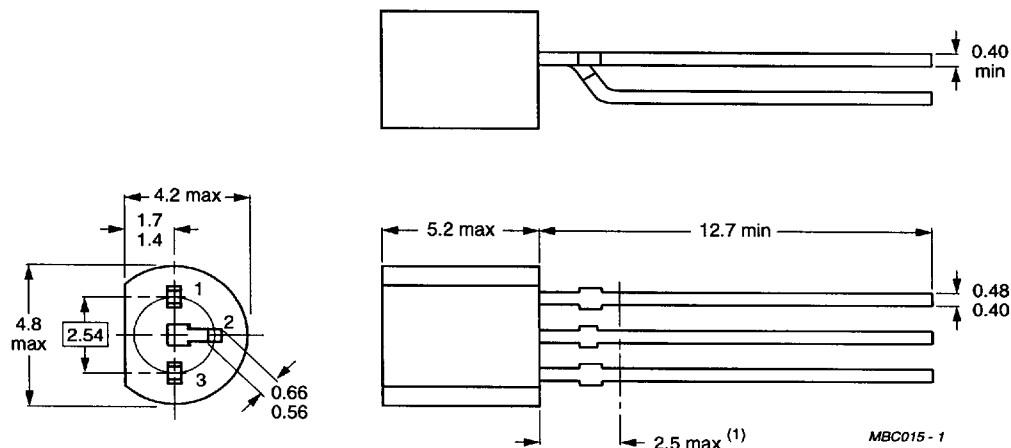


Fig.22 TO-92 variant.