

# DATA SHEET

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

Product specification  
Supersedes data of April 1995  
File under Discrete Semiconductors, SC07

1996 Jul 30

# 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

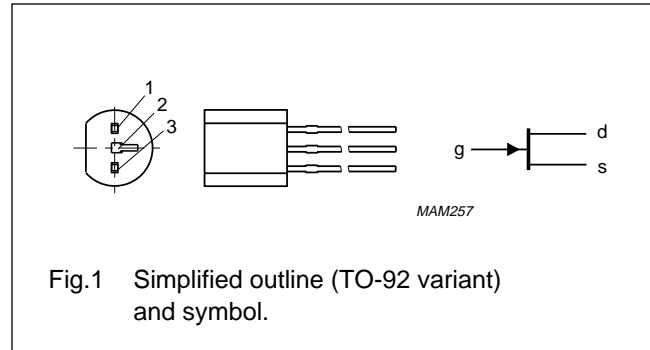
General purpose N-channel symmetrical junction field-effect transistors in a plastic TO-92 variant package.

### 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



## QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{DS}$	drain-source voltage		–	–	$\pm 30$	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	$V_{DS} = 15 \text{ V}; V_{GS} = 0$				
	BF245A		2	–	6.5	mA
	BF245B		6	–	15	mA
	BF245C		12	–	25	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 $T_{amb} = 75\text{ °C}$ ;	–	300	mW
		up to $T_{amb} = 90\text{ °C}$ ; note 1	–	300	mW
$T_{stg}$	storage temperature		–65	+150	°C
$T_j$	operating junction temperature		–	150	°C

**Note**

- Device mounted on a printed-circuit board, minimum lead length 3 mm, mounting pad for drain lead minimum 10 mm × 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**

$T_j = 25\text{ °C}$ ; 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
		$V_{GS} = -20\text{ V}$ ; $V_{DS} = 0$ ; $T_j = 125\text{ °C}$	–	–0.5	$\mu\text{A}$

**Note**

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

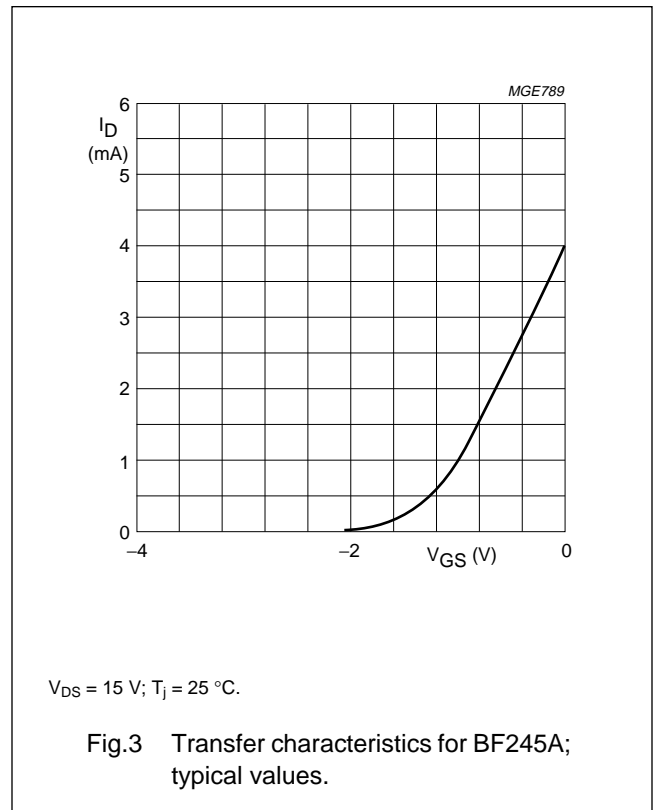
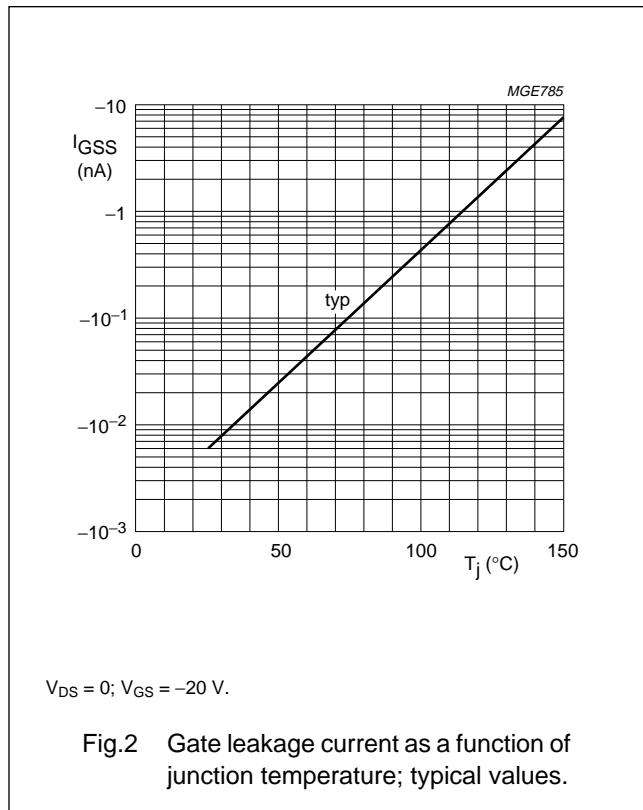
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**DYNAMIC CHARACTERISTICS**

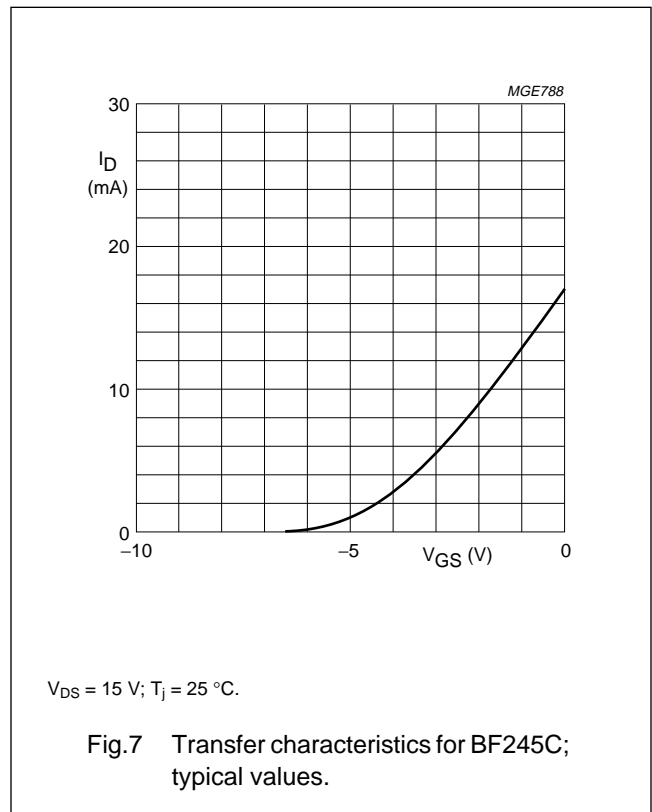
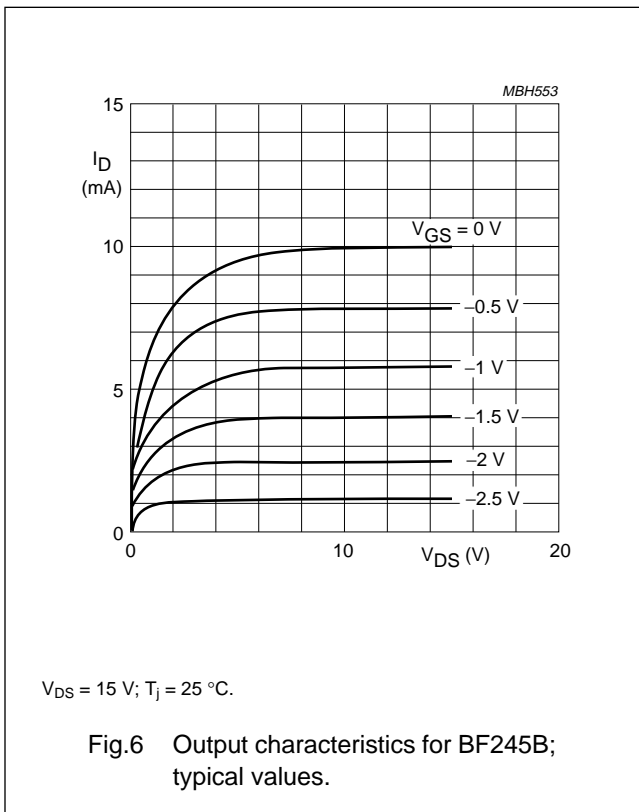
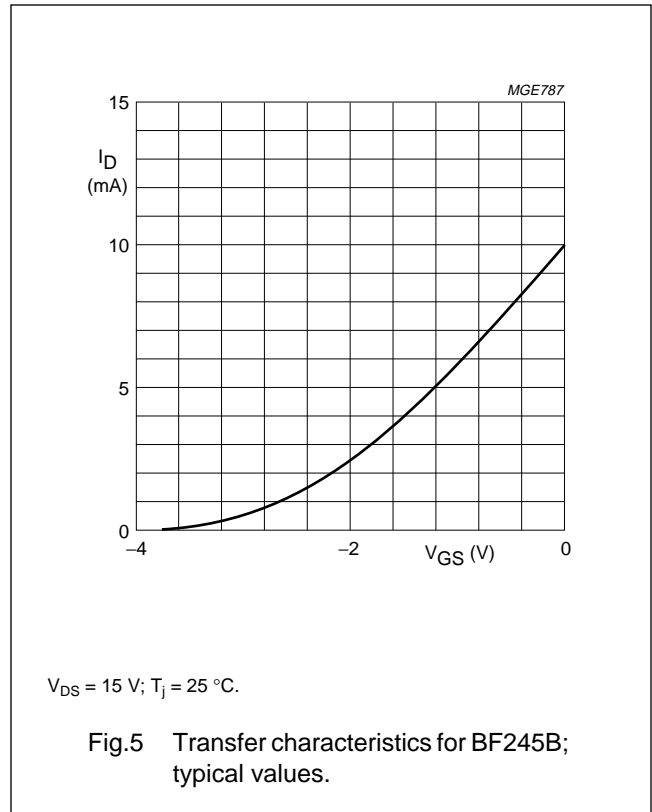
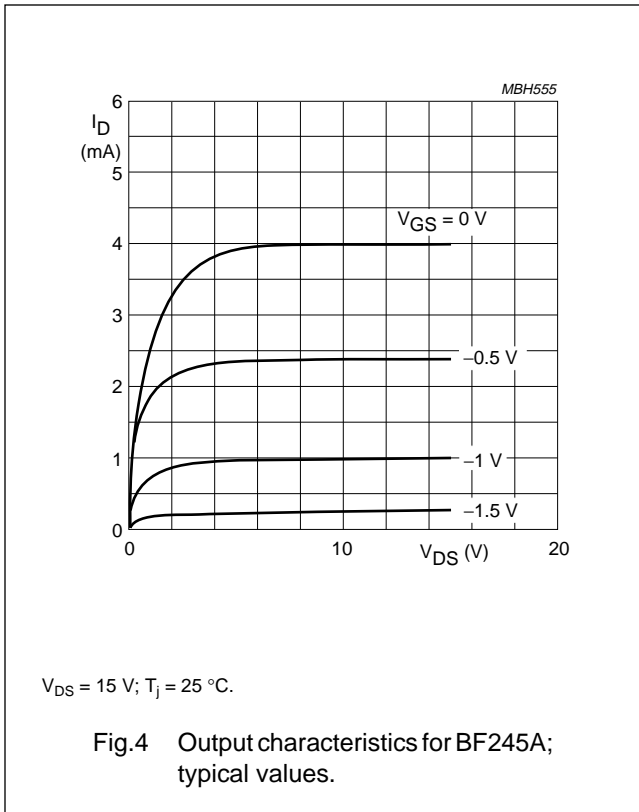
Common source;  $T_{amb} = 25\text{ }^{\circ}\text{C}$ ; unless otherwise specified.

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	–	$\mu\text{S}$
$g_{os}$	output conductance	$V_{DS} = 15\text{ V}; V_{GS} = 0; f = 200\text{ MHz}$	–	40	–	$\mu\text{S}$
$ 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	–	$\mu\text{S}$
$f_{gfs}$	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



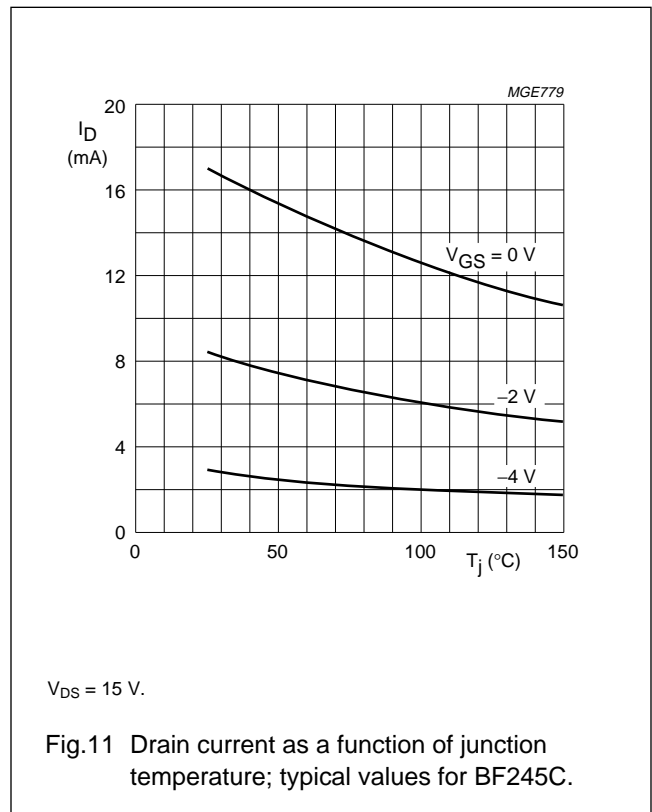
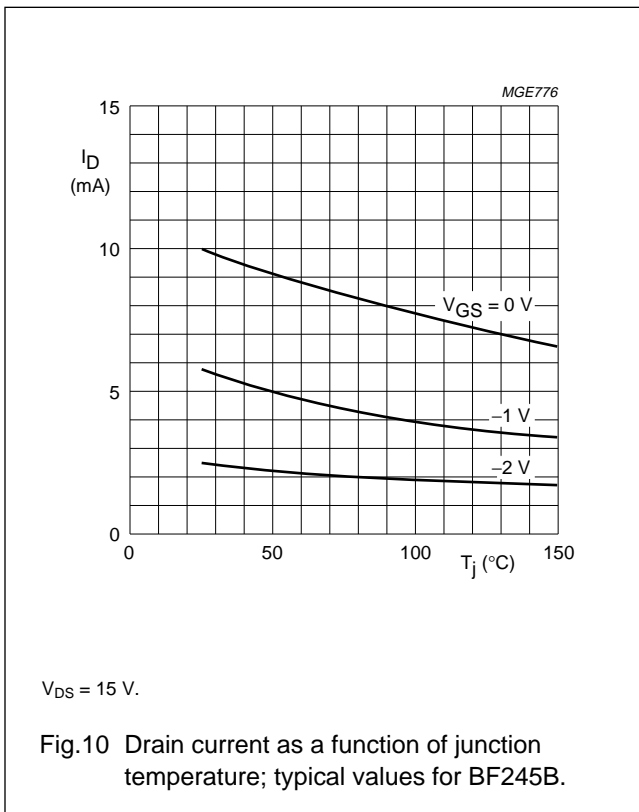
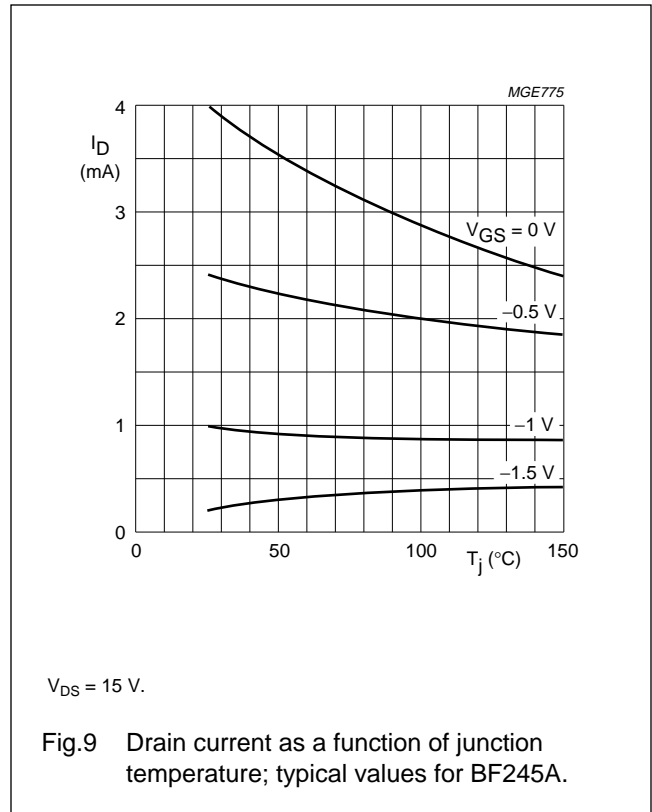
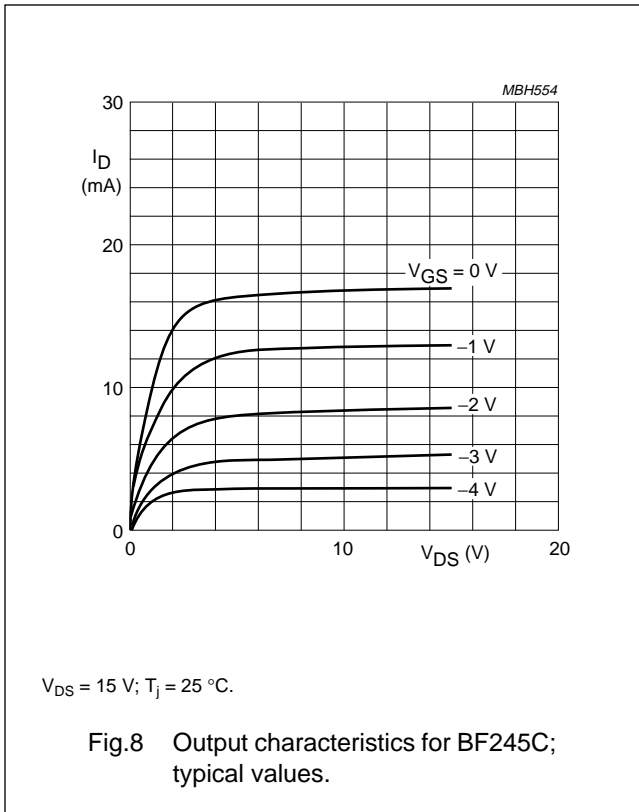
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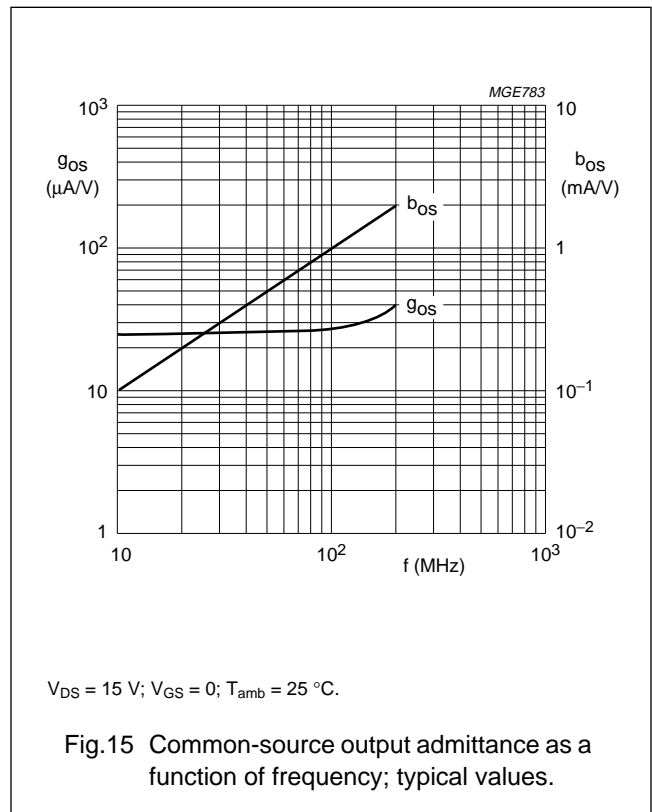
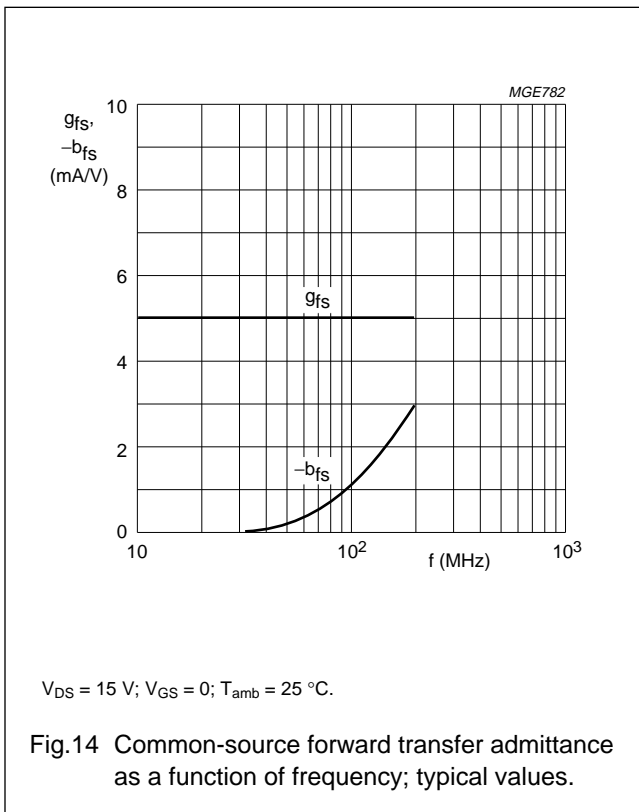
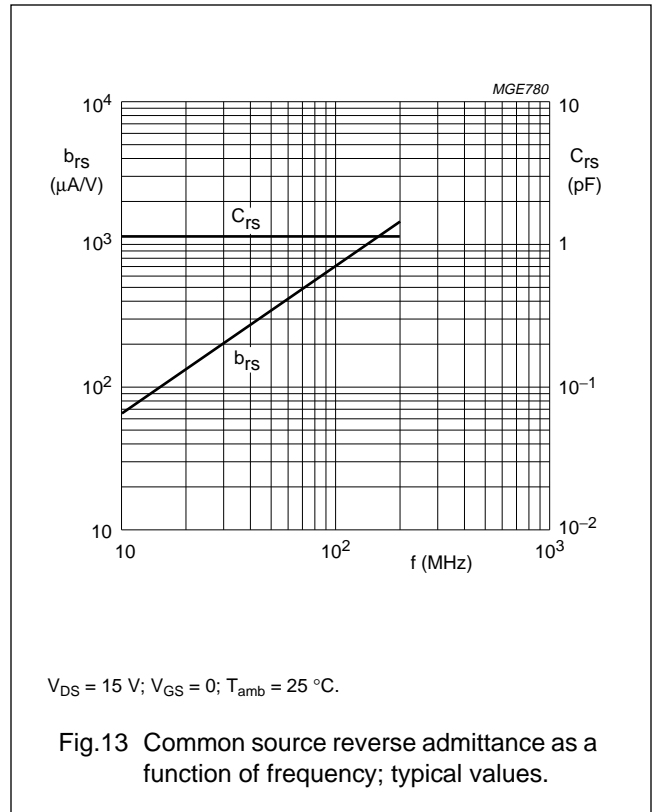
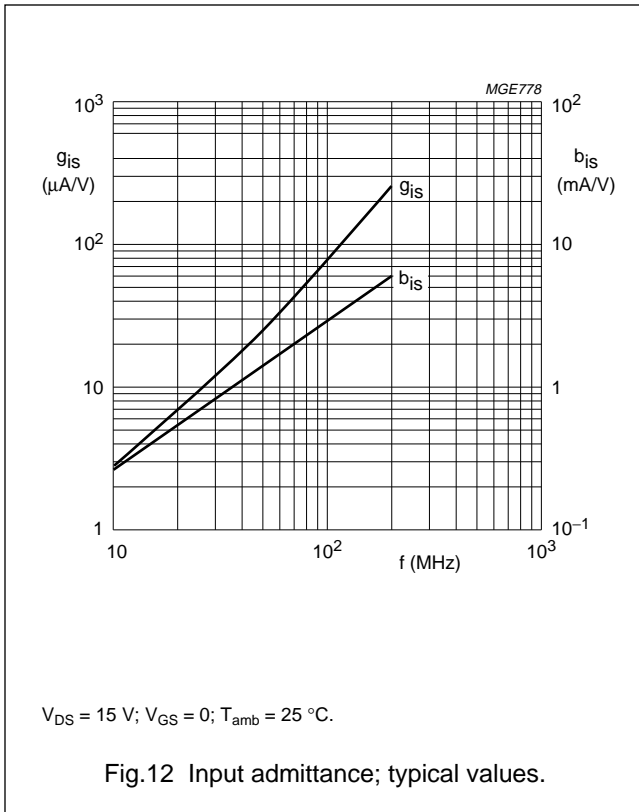
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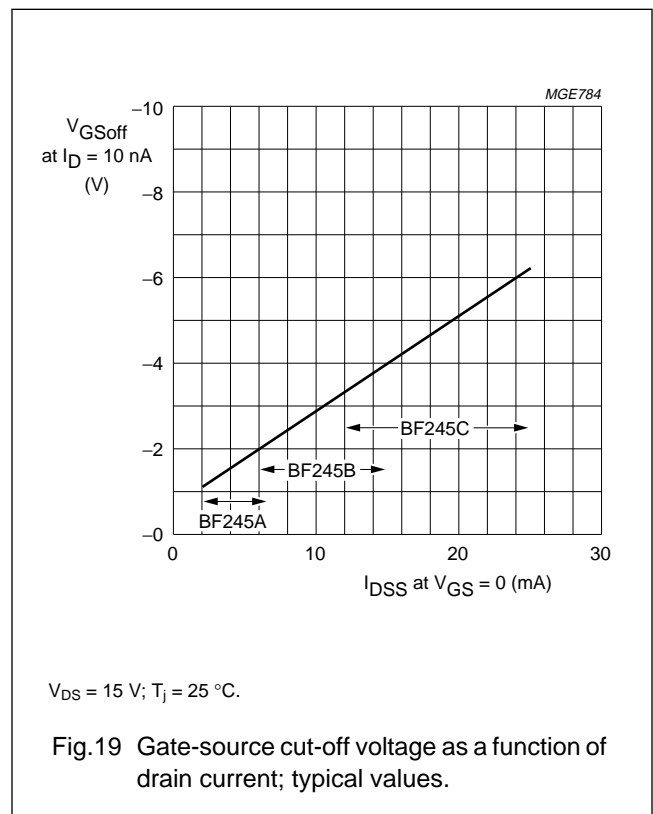
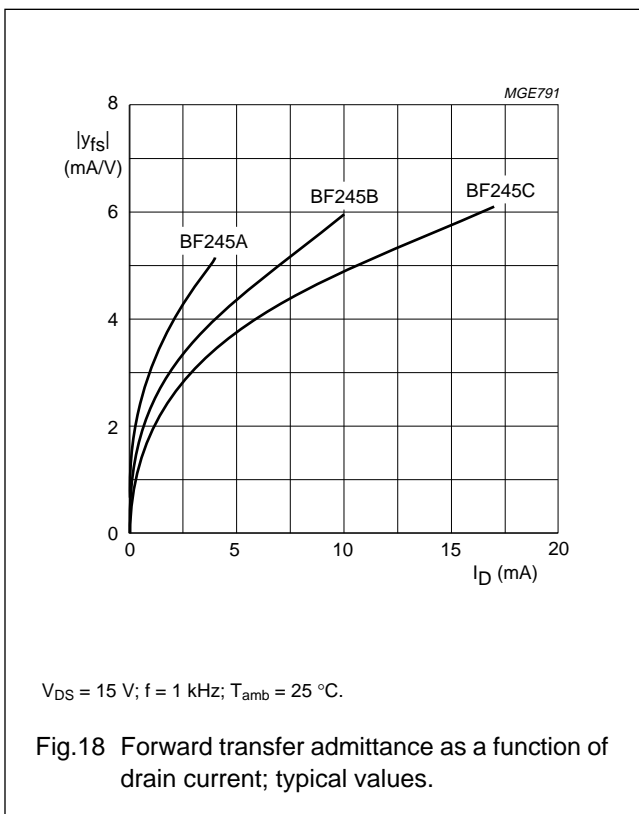
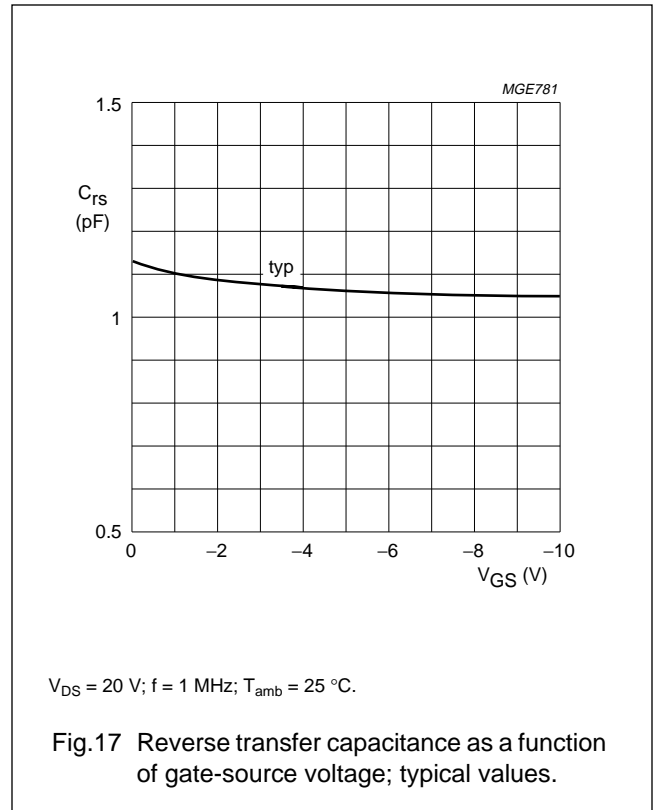
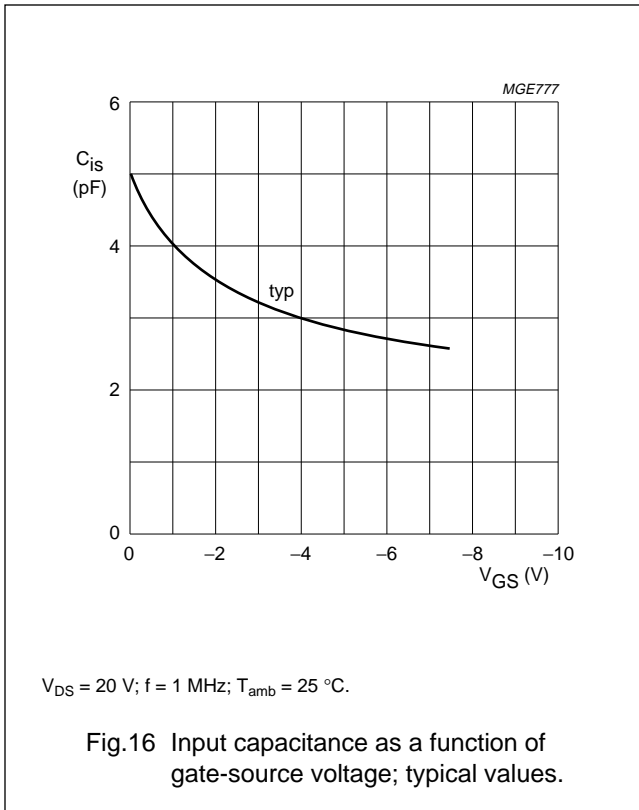
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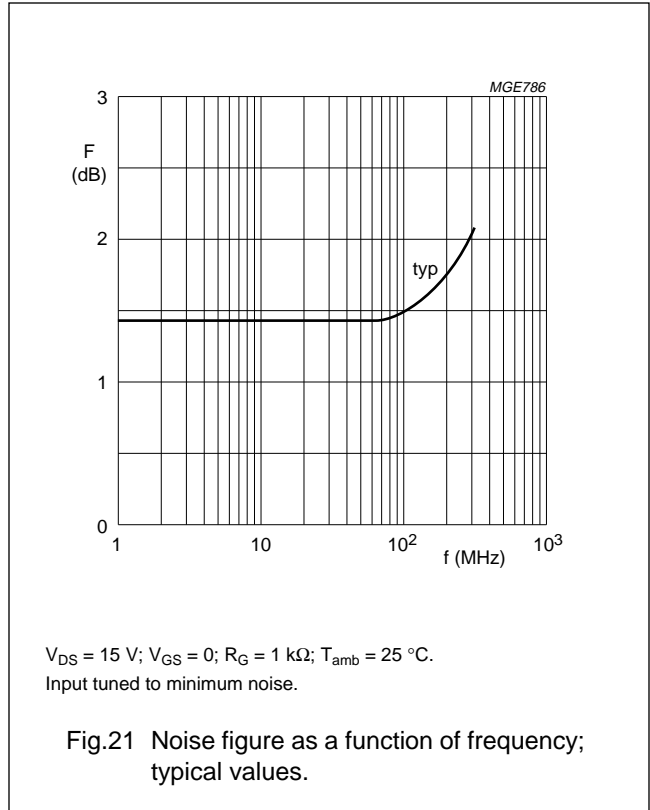
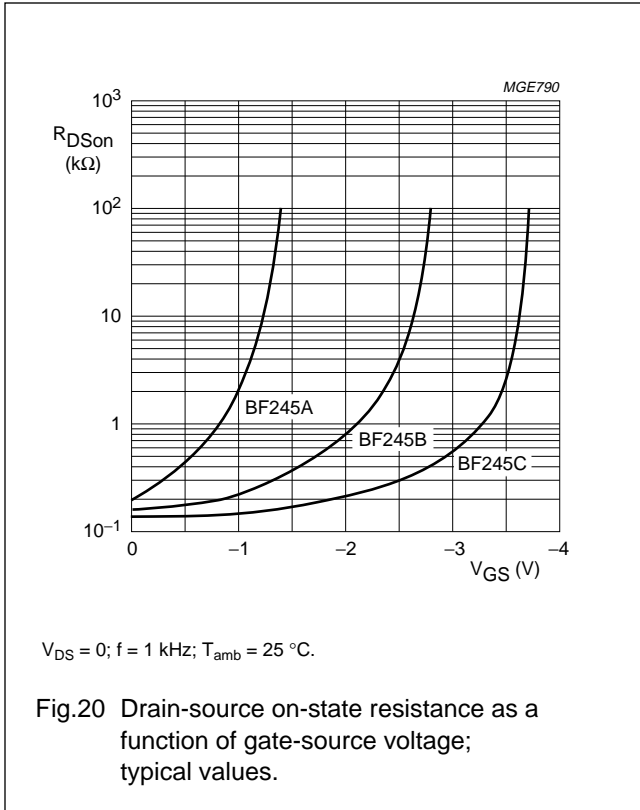
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PACKAGE OUTLINE

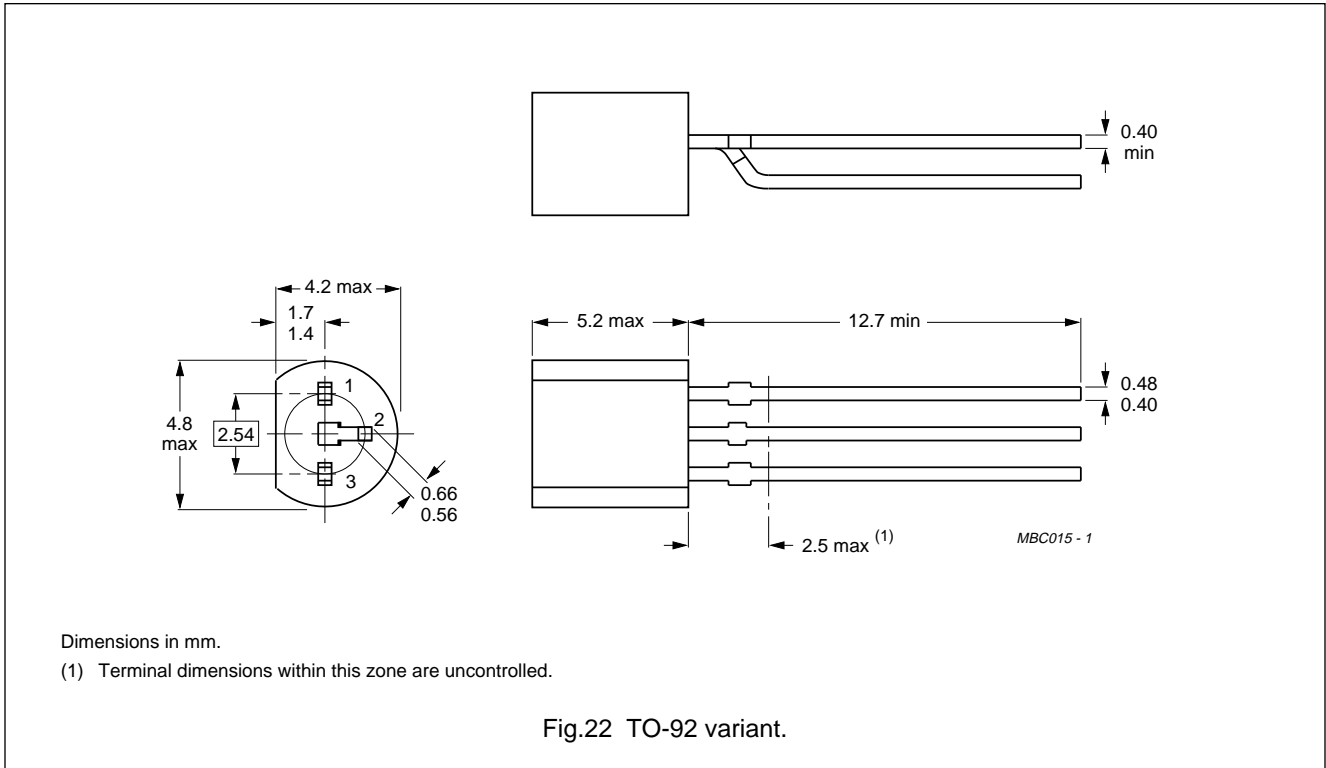


Fig.22 TO-92 variant.

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**DEFINITIONS**

<b>Data Sheet Status</b>	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
<b>Limiting values</b>	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
<b>Application information</b>	
Where application information is given, it is advisory and does not form part of the specification.	

**LIFE SUPPORT APPLICATIONS**

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