DATA SHEET

BF545A; BF545B; BF545C
N-channel silicon junction field-effect transistors

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

1996 Jul 29

Philips Semiconductors

PHILIPS

N-channel silicon junction field-effect transistors

BF545A; BF545B; BF545C

FEATURES

- Low leakage level (typ. 500 fA)
- High gain
- Low cut-off voltage (max. 2.2 V for BF545A).

APPLICATIONS

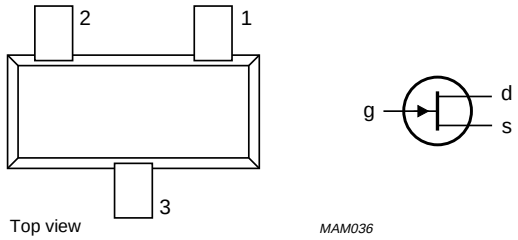
- Impedance converters in e.g. electret microphones and infra-red detectors
- VHF amplifiers in oscillators and mixers.

DESCRIPTION

N-channel symmetrical silicon junction field-effect transistors in a SOT23 package.

PINNING - SOT23

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



Marking codes:
BF545A: M65.
BF545B: M66.
BF545C: M67.

Fig.1 Simplified outline and symbol.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DS}	drain-source voltage		–	±30	V
V_{GSoff}	gate-source cut-off voltage	I_D = 1 μA; V_{DS} = 15 V	–0.4	–7.8	V
I_{DSS}	drain current	V_{GS} = 0; V_{DS} = 15 V			
	BF545A		2	6.5	mA
	BF545B		6	15	mA
	BF545C		12	25	mA
P_{tot}	total power dissipation	up to T_{amb} = 25 °C	–	250	mW
$\lvert y_{fs} \rvert$	forward transfer admittance	V_{GS} = 0; V_{DS} = 15 V	3	6.5	mS

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_{GSO}	gate-source voltage	open drain	–	–30	V
V_{GDO}	gate-drain voltage (DC)	open source	–	–30	V
I_G	forward gate current (DC)		–	10	mA
P_{tot}	total power dissipation	up to T_{amb} = 25 °C; note 1	–	250	mW
T_{stg}	storage temperature		–65	150	°C
T_j	operating junction temperature		–	150	°C

Note

1. Device mounted on an FR4 printed-circuit board, maximum lead length 4 mm; mounting pad for the drain lead 10 mm^2.

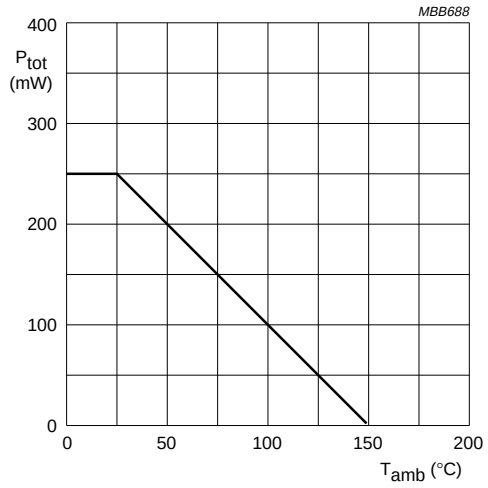


Fig.2 Power derating curve.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient; note 1	500	K/W

Note

1. Device mounted on an FR4 printed-circuit board, maximum lead length 4 mm; mounting pad for the drain lead 10 mm^2.

STATIC CHARACTERISTICS

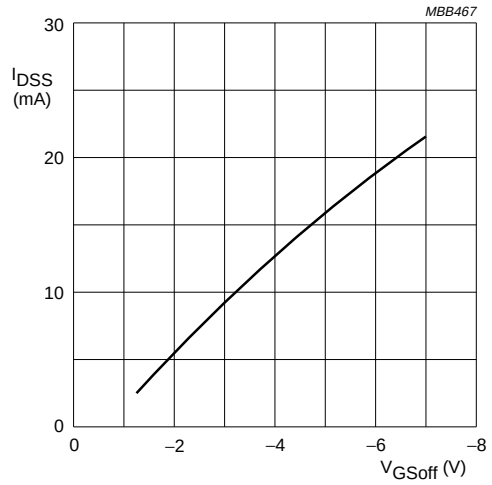
T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)GSS}$	gate-source breakdown voltage	I_G = –1 μA; V_{DS} = 0	–30	–	–	V
V_{GSoff}	gate-source cut-off voltage	I_D = 200 μA; V_{DS} = 15 V				
	BF545A		–0.4	–	–2.2	V
	BF545B		–1.6	–	–3.8	V
	BF545C		–3.2	–	–7.8	V
		I_D = 1 μA; V_{DS} = 15 V	–0.4	–	–7.5	V
I_{DSS}	drain current	V_{GS} = 0; V_{DS} = 15 V				
	BF545A		2	–	6.5	mA
	BF545B		6	–	15	mA
	BF545C		12	–	25	mA
I_{GSS}	gate leakage current	V_{GS} = –20 V; V_{DS} = 0	–	–0.5	–1000	pA
		V_{GS} = –20 V; V_{DS} = 0; T_j = 125 °C	–	–	–100	nA
$\lvert y_{fs} \rvert$	forward transfer admittance	V_{GS} = 0; V_{DS} = 15 V	3	–	6.5	mS
$\lvert y_{os} \rvert$	common source output admittance	V_{GS} = 0; V_{DS} = 15 V	–	40	–	μS

DYNAMIC CHARACTERISTICS

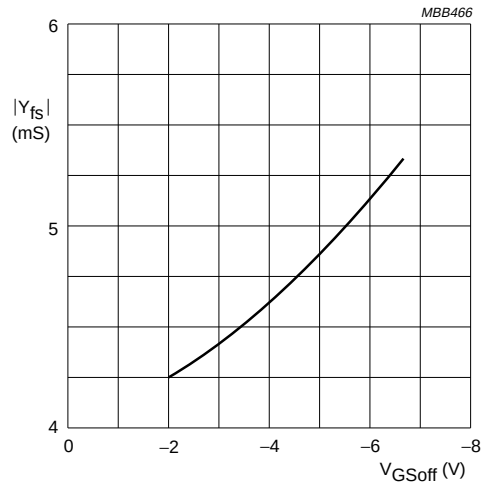
T_{amb} = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	TYP.	UNIT
C_{is}	input capacitance	V_{DS} = 15 V; V_{GS} = –10 V; f = 1 MHz	1.7	pF
		V_{DS} = 15 V; V_{GS} = 0; f = 1 MHz	3	pF
C_{rs}	reverse transfer capacitance	V_{DS} = 15 V; V_{GS} = –10 V; f = 1 MHz	0.8	pF
		V_{DS} = 15 V; V_{GS} = 0; f = 1 MHz	0.9	pF
g_{is}	common source input conductance	V_{DS} = 10 V; I_D = 1 mA; f = 100 MHz	15	µS
		V_{DS} = 10 V; I_D = 1 mA; f = 450 MHz	300	µS
g_{fs}	common source transfer conductance	V_{DS} = 10 V; I_D = 1 mA; f = 100 MHz	2	mS
		V_{DS} = 10 V; I_D = 1 mA; f = 450 MHz	1.8	mS
g_{rs}	common source reverse conductance	V_{DS} = 10 V; I_D = 1 mA; f = 100 MHz	–6	µS
		V_{DS} = 10 V; I_D = 1 mA; f = 450 MHz	–40	µS
g_{os}	common source output conductance	V_{DS} = 10 V; I_D = 1 mA; f = 100 MHz	30	µS
		V_{DS} = 10 V; I_D = 1 mA; f = 450 MHz	60	µS



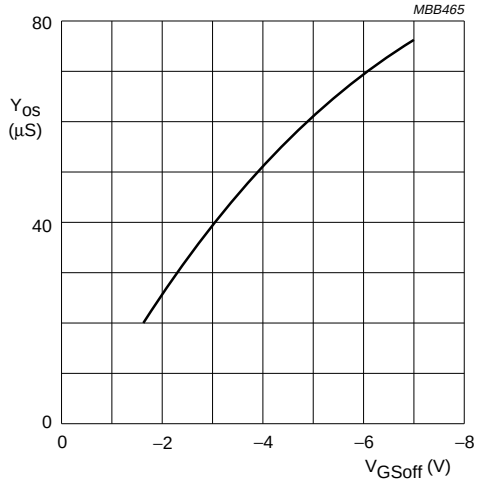
V_{DS} = 15 V; T_j = 25 °C.

Fig.3 Drain current as a function of gate-source cut-off voltage; typical values.



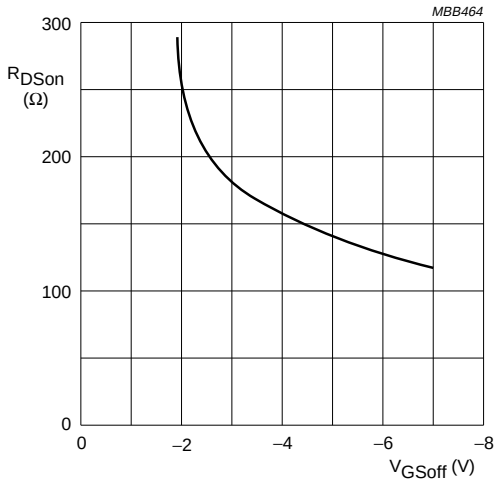
V_{DS} = 15 V; V_{GS} = 0; T_j = 25 °C.

Fig.4 Forward transfer admittance as a function of gate-source cut-off voltage; typical values.



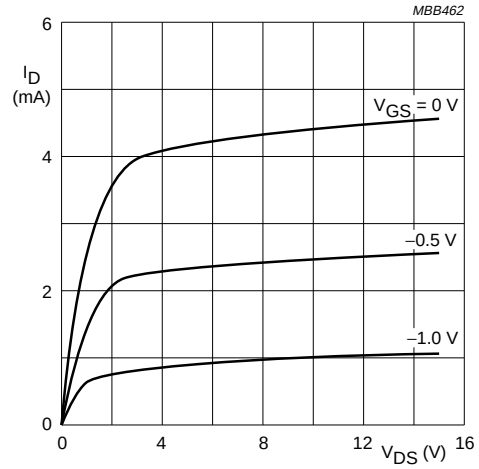
V_{DS} = 15 V; V_{GS} = 0; T_j = 25 °C.

Fig.5 Common-source output admittance as a function of gate-source cut-off voltage; typical values.



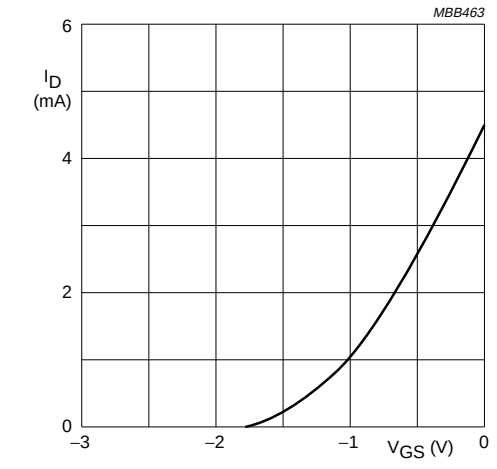
V_{DS} = 100 mV; V_{GS} = 0; T_j = 25 °C.

Fig.6 Drain-source on-resistance as a function of gate-source cut-off voltage; typical values.



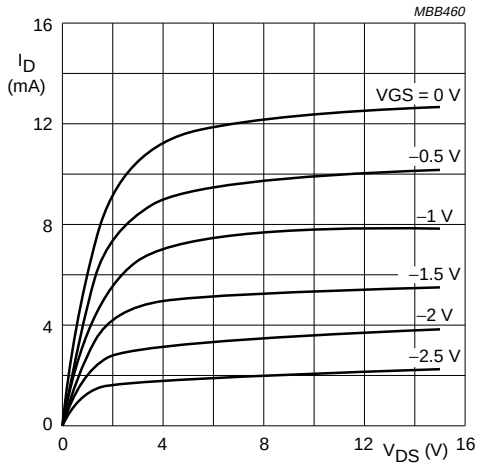
T_j = 25 °C.

Fig.7 Typical output characteristics; BF545A.



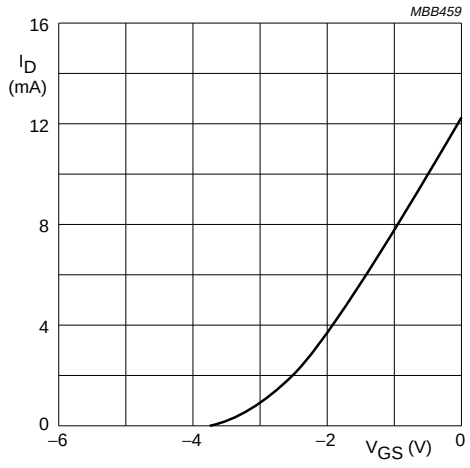
V_{DS} = 15 V; T_j = 25 °C.

Fig.8 Typical input characteristics; BF545A.



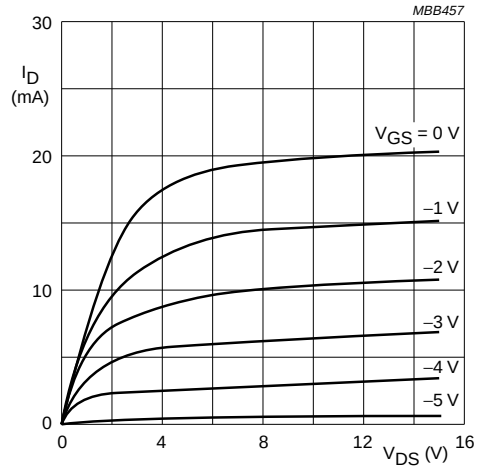
T_j = 25 °C.

Fig.9 Typical output characteristics; BF545B.



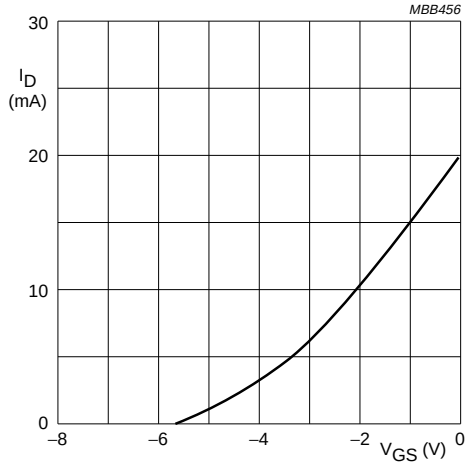
V_{DS} = 15 V; T_j = 25 °C.

Fig.10 Typical input characteristics; BF545B.



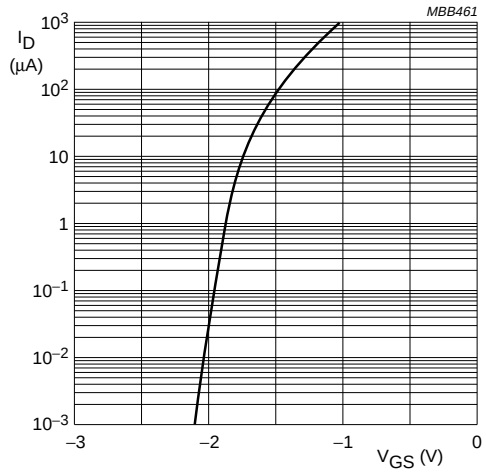
T_j = 25 °C.

Fig.11 Typical output characteristics; BF545C.



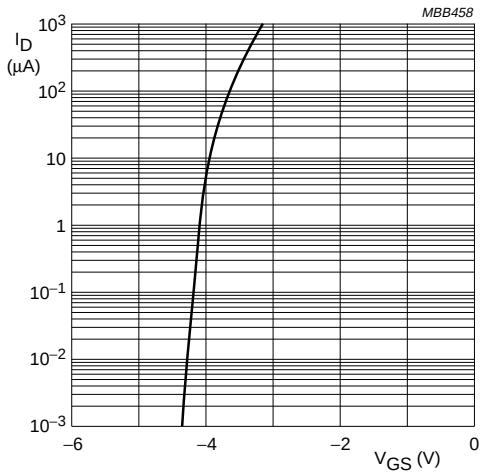
V_{DS} = 15 V; T_j = 25 °C.

Fig.12 Typical input characteristics; BF545C.



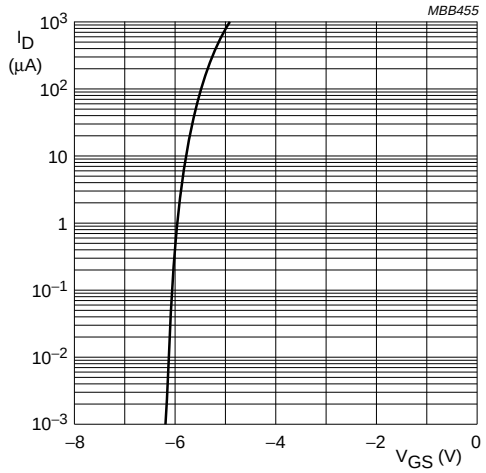
V_{DS} = 15 V; T_j = 25 °C.

Fig.13 Drain current as a function of gate-source voltage; typical values for BF545A.



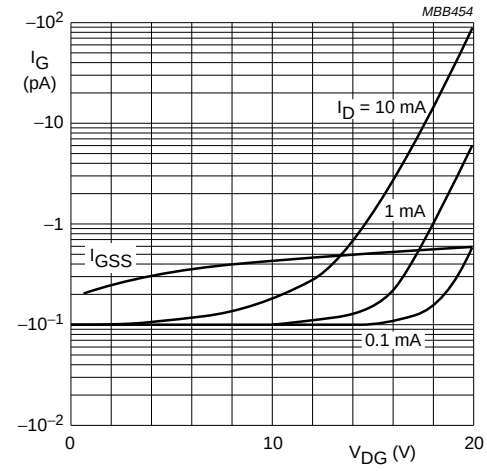
V_{DS} = 15 V; T_j = 25 °C.

Fig.14 Drain current as a function of gate-source voltage; typical values for BF545B.



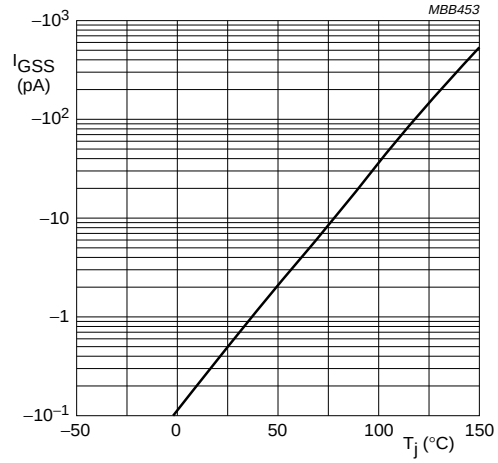
V_{DS} = 15 V; T_j = 25 °C.

Fig.15 Drain current as a function of gate-source voltage; typical values for BF545C.



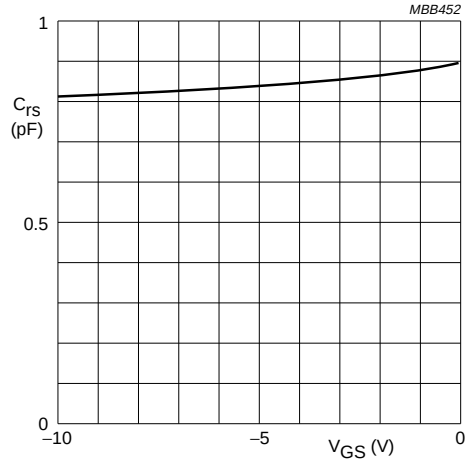
I_D = 10 mA only for BF545B and BF545C; T_j = 25 °C.

Fig.16 Gate current as a function of drain-gate voltage; typical values.



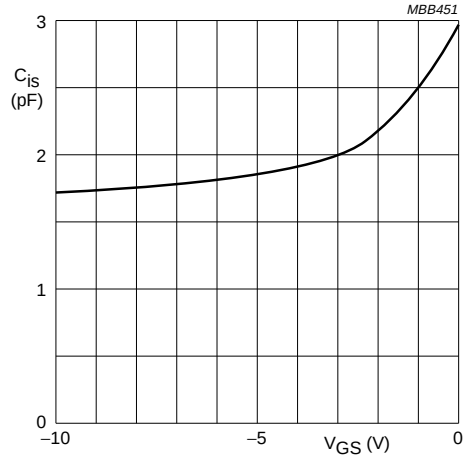
V_{DS} = 0; V_{GS} = −20 V.

Fig.17 Gate current as a function of junction temperature; typical values.



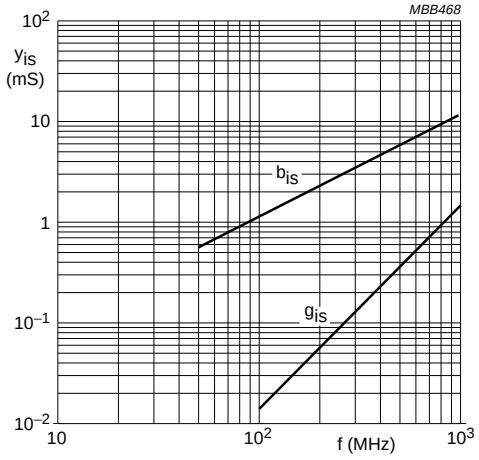
V_{DS} = 15 V; T_j = 25 °C.

Fig.18 Reverse transfer capacitance as a function of gate-source voltage; typical values.



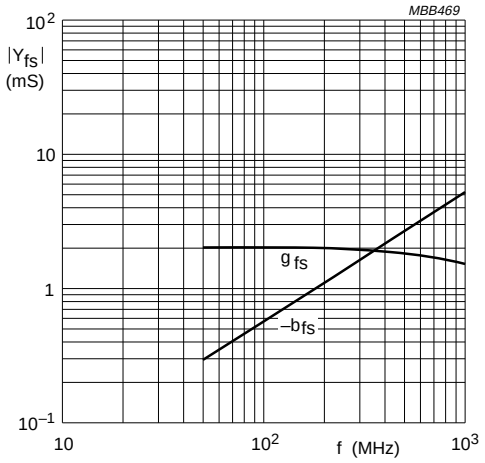
V_{DS} = 15 V; T_j = 25 °C.

Fig.19 Typical input capacitance.



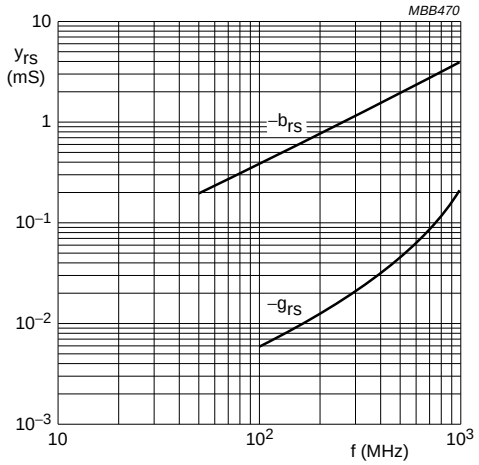
V_{DS} = 10 V; I_D = 1 mA; T_{amb} = 25 °C.

Fig.20 Common-source input admittance; typical values.



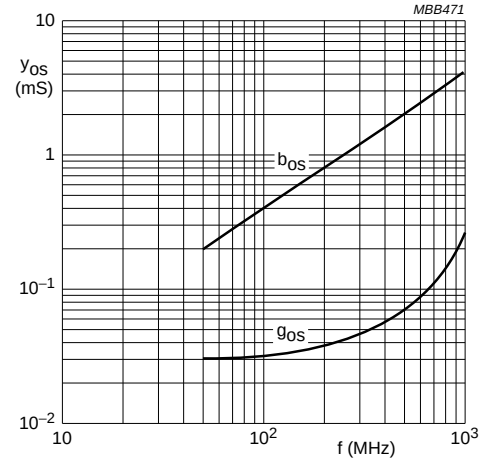
V_{DS} = 10 V; I_D = 1 mA; T_{amb} = 25 °C.

Fig.21 Common-source forward transfer admittance; typical values.



V_{DS} = 10 V; I_D = 1 mA; T_{amb} = 25 °C.

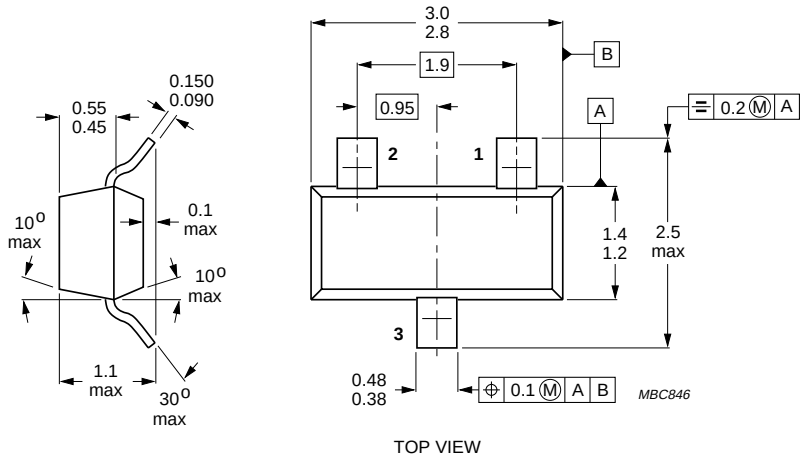
Fig.22 Common-source reverse transfer admittance; typical values.



V_{DS} = 10 V; I_D = 1 mA; T_{amb} = 25 °C.

Fig.23 Common-source output admittance; typical values.

PACKAGE OUTLINE



Dimensions in mm.

Fig.24 SOT23.

DEFINITIONS

Data Sheet Status	
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.
Limiting values	
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.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

LIFE SUPPORT APPLICATIONS

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