

DATA SHEET

BF410A to D N-channel silicon field-effect transistors

Product specification
File under Discrete Semiconductors, SC07

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N-channel silicon field-effect transistors

BF410A to D

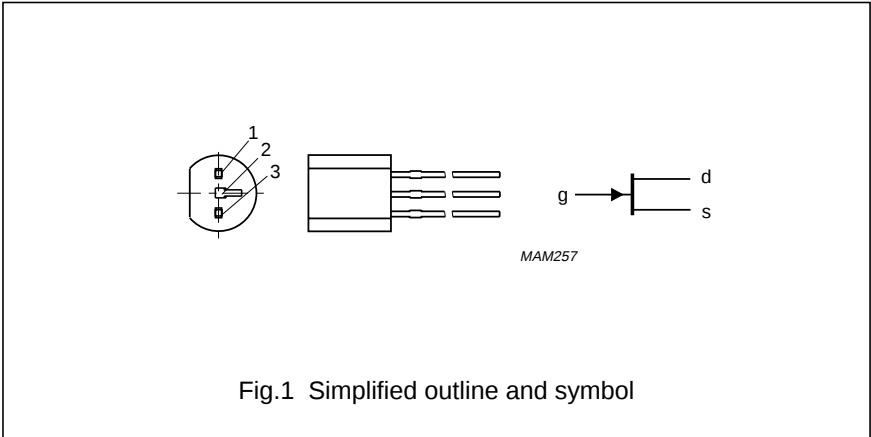
DESCRIPTION

Asymmetrical N-channel planar epitaxial junction field-effect transistors in a plastic TO-92 variant; intended for applications up to the VHF range.

These FETs can be supplied in four I_{DSS} groups. Special features are the low feedback capacitance and the low noise figure. Thanks to these special features the BF410 is very suitable for applications such as the RF stages in FM portables (type A), car radios (type B) and mains radios (type C) or the mixer stage (type D).

PINNING - TO-92 VARIANT

- 1 = drain
- 2 = source
- 3 = gate



QUICK REFERENCE DATA

Drain-source voltage	V_{DS}	max.	20	V		
Drain current (DC or average)	I_D	max.	30	mA		
Total power dissipation up to $T_{amb} = 75\text{ }^{\circ}\text{C}$	P_{tot}	max.	300	mW		
			BF410A	B	C	D
Drain current $V_{DS} = 10\text{ V}; V_{GS} = 0$	I_{DSS}	min.	0.7	2.5	6	10 mA
		max.	3.0	7.0	12	18 mA
Transfer admittance $V_{DS} = 10\text{ V}; V_{GS} = 0; f = 1\text{ kHz}$	$ y_{fs} $	min.	2.5	4	6	7 mS
Feedback capacitance $V_{DS} = 10\text{ V}; V_{GS} = 0$	C_{rs}	typ.	0.5	0.5	—	— pF
$V_{DS} = 10\text{ V}; I_D = 5\text{ mA}$	C_{rs}	typ.	—	—	0.5	0.5 pF
Noise figure at optimum source admittance $G_S = 1\text{ mS}; -B_S = 3\text{ mS}; f = 100\text{ MHz}$						
$V_{DS} = 10\text{ V}; V_{GS} = 0$	F	typ.	1.5	1.5	—	— dB
$V_{DS} = 10\text{ V}; I_D = 5\text{ mA}$	F	typ.	—	—	1.5	1.5 dB

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RATINGS

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

Drain-source voltage	V_{DS}	max.	20	V
Drain-gate voltage (open source)	V_{DGO}	max.	20	V
Drain current (DC or average)	I_D	max.	30	mA
Gate current	$\pm I_G$	max.	10	mA
Total power dissipation up to $T_{amb} = 75\text{ }^{\circ}\text{C}$	P_{tot}	max.	300	mW
Storage temperature range	T_{stg}		-65 to +150 $^{\circ}\text{C}$	
Junction temperature	T_j	max.	150	$^{\circ}\text{C}$

THERMAL RESISTANCE

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

$T_{amb} = 25\text{ }^{\circ}\text{C}$

Gate cut-off current			BF410A	B	C	D	
$-V_{GS} = 0.2\text{ V}; V_{DS} = 0$	$-I_{GSS}$	max.	10	10	10	10	nA
Gate-drain breakdown voltage							
$I_S = 0; -I_D = 10\text{ }\mu\text{A}$	$-V_{(BR)GDO}$	min.	20	20	20	20	V
Drain current							
$V_{DS} = 10\text{ V}; V_{GS} = 0$	I_{DSS}	min.	0.7	2.5	6	10	mA
		max.	3.0	7.0	12	18	mA
Gate-source cut-off voltage							
$I_D = 10\text{ }\mu\text{A}; V_{DS} = 10\text{ V}$	$-V_{(P)GS}$	typ.	0.8	1.5	2.2	3	V

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DYNAMIC CHARACTERISTICS

Measuring conditions (common source): $V_{DS} = 10\text{ V}$; $V_{GS} = 0$; $T_{amb} = 25\text{ }^{\circ}\text{C}$ for BF410A and B
 $V_{DS} = 10\text{ V}$; $I_D = 5\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$ for BF410C and D

y-parameters (common source)

			BF410A	B	C	D
Input capacitance at $f = 1\text{ MHz}$	C_{is}	max.	5	5	5	5 pF
Input conductance at $f = 100\text{ MHz}$	g_{is}	typ.	100	90	60	50 μS
Feedback capacitance at $f = 1\text{ MHz}$	C_{rs}	typ.	0.5	0.5	0.5	0.5 pF
		max.	0.7	0.7	0.7	0.7 pF
Transfer admittance at $f = 1\text{ kHz}$ $V_{GS} = 0$ instead of $I_D = 5\text{ mA}$	$ y_{fs} $	min.	2.5	4.0	4.0	3.5 mS
		min.	—	—	6.0	7.0 mS
Transfer admittance at $f = 100\text{ MHz}$	$ y_{fs} $	typ.	3.5	5.5	5.0	5.0 mS
Output capacitance at $f = 1\text{ MHz}$	C_{os}	max.	3	3	3	3 pF
Output conductance at $f = 1\text{ MHz}$	g_{os}	max.	60	80	100	120 μS
Output conductance at $f = 100\text{ MHz}$	g_{os}	typ.	35	55	70	90 μS

Noise figure at optimum source admittance

$G_S = 1\text{ mS}$; $-B_S = 3\text{ mS}$; $f = 100\text{ MHz}$	F	typ.	1.5	1.5	1.5	1.5 dB
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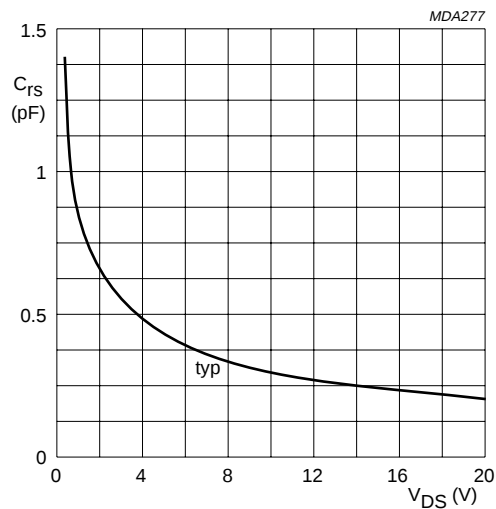


Fig.2 $V_{GS} = 0$ for BF410A and BF410B;
 $I_D = 5\text{ mA}$ for BF410C and BF410D;
 $f = 1\text{ MHz}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$.

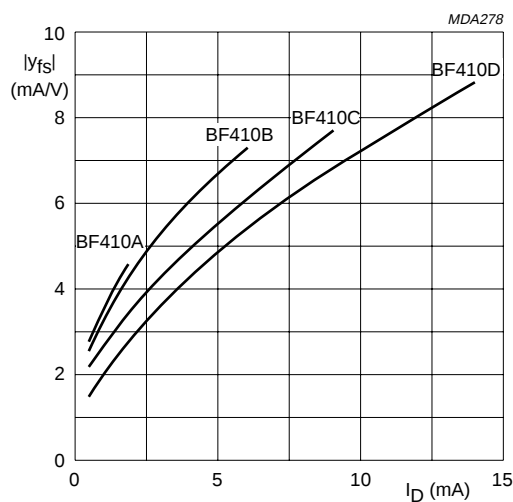


Fig.3 $V_{DS} 10\text{ V}$; $f = 1\text{ kHz}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$; typical values.

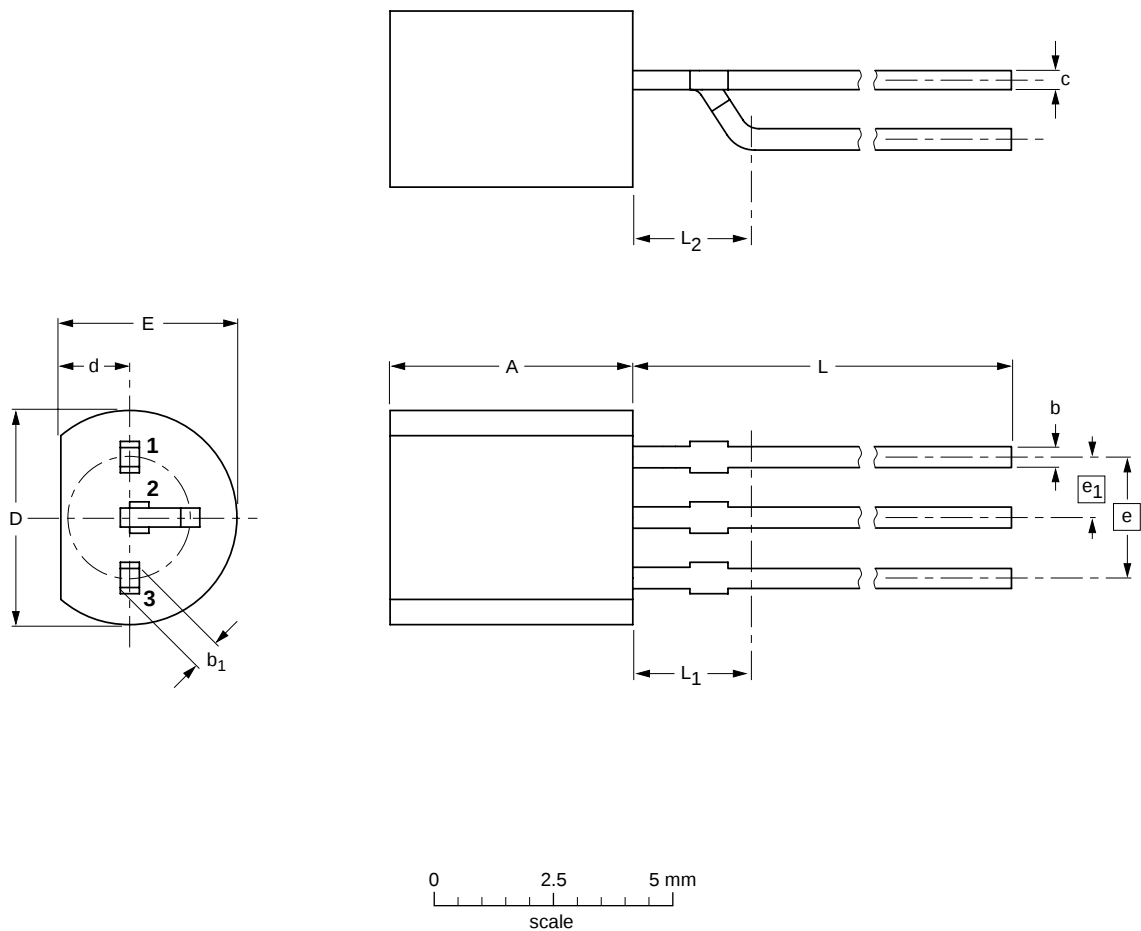
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PACKAGE OUTLINE

Plastic single-ended leaded (through hole) package; 3 leads (on-circle)

SOT54 variant



DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b ₁	c	D	d	E	e	e ₁	L	L ₁ ⁽¹⁾ max	L ₂ max
mm	5.2 5.0	0.48 0.40	0.66 0.56	0.45 0.40	4.8 4.4	1.7 1.4	4.2 3.6	2.54	1.27	14.5 12.7	2.5	2.5

Notes

1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT54 variant		TO-92	SC-43			97-04-14

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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.
Short-form specification	The data in this specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.
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.	

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