

DATA SHEET

BF689K

NPN 2 GHz wideband transistor

Product specification
File under Discrete Semiconductors, SC14

September 1995

NPN 2 GHz wideband transistor

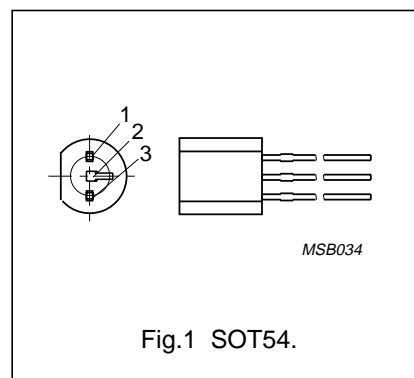
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DESCRIPTION

NPN transistor in a plastic SOT54 (TO-92 variant) envelope. It is intended for application as an amplifier or oscillator in the VHF and UHF range.

PINNING

PIN	DESCRIPTION
Code: F689	
1	emitter
2	base
3	collector



QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	–	–	25	V
V_{CEO}	collector-emitter voltage	open base	–	–	15	V
I_C	DC collector current		–	–	25	mA
P_{tot}	total power dissipation	up to $T_{amb} = 60\text{ °C}$	–	–	360	mW
h_{FE}	DC current gain	$I_C = 2\text{ mA}; V_{CE} = 5\text{ V}; T_j = 25\text{ °C}$	20	–	–	
		$I_C = 20\text{ mA}; V_{CE} = 5\text{ V}; T_j = 25\text{ °C}$	35	–	–	
f_T	transition frequency	$I_C = 15\text{ mA}; V_{CE} = 5\text{ V}; f = 500\text{ MHz}$	–	1.8	–	GHz

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	–	25	V
V_{CEO}	collector-emitter voltage	open base	–	15	V
V_{CER}	collector-emitter voltage	$R_{BE} \leq 50\ \Omega$	–	25	V
V_{EBO}	emitter-base voltage	open collector	–	3.5	V
I_C	DC collector current		–	25	mA
I_{CM}	peak collector current	$t_p < 1\ \mu\text{s}$	–	50	mA
P_{tot}	total power dissipation	up to $T_{amb} = 60\text{ °C}$	–	360	mW
T_{stg}	storage temperature		–55	150	°C
T_j	junction temperature		–	150	°C

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THERMAL RESISTANCE

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

CHARACTERISTICS

 $T_j = 25\text{ °C}$ unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector cut-off current	$I_E = 0; V_{CB} = 15\text{ V}$	–	–	50	nA
I_{EBO}	emitter cut-off current	$I_C = 0; V_{EB} = 2\text{ V}$	–	–	1	μA
$V_{CE\ sat}$	collector-emitter saturation voltage	$I_C = 25\text{ mA}; I_B = 1.25\text{ mA}$	–	–	1.0	V
$V_{BE\ sat}$	base-emitter saturation voltage	$I_C = 25\text{ mA}; I_B = 1.25\text{ mA}$	–	–	1.0	V
h_{FE}	DC current gain	$I_C = 2\text{ mA}; V_{CE} = 5\text{ V}$	20	–	–	
		$I_C = 20\text{ mA}; V_{CE} = 5\text{ V}$	35	–	–	
f_T	transition frequency	$I_C = 15\text{ mA}; V_{CE} = 5\text{ V}; f = 500\text{ MHz}$	–	1.8	–	GHz
C_{re}	feedback capacitance	$I_C = 2\text{ mA}; V_{CE} = 5\text{ V}; f = 1\text{ MHz}; T_{amb} = 25\text{ °C}$	–	1.1	–	pF
G_p	power gain	$I_C = 2\text{ mA}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}; T_{amb} = 25\text{ °C}; Z_S = 60\ \Omega; R_L = 2\text{ k}\Omega$	–	16	–	dB
		$I_C = 2\text{ mA}; V_{CE} = 5\text{ V}; f = 200\text{ MHz}; T_{amb} = 25\text{ °C}; Z_S = 60\ \Omega; R_L = 920\ \Omega$	–	16	–	dB
F	noise figure	$I_C = 2\text{ mA}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}; T_{amb} = 25\text{ °C}; Z_S = 60\ \Omega$	–	4	–	dB
		$I_C = 2\text{ mA}; V_{CE} = 5\text{ V}; f = 200\text{ MHz}; T_{amb} = 25\text{ °C}; Z_S = 60\ \Omega$	–	3	–	dB

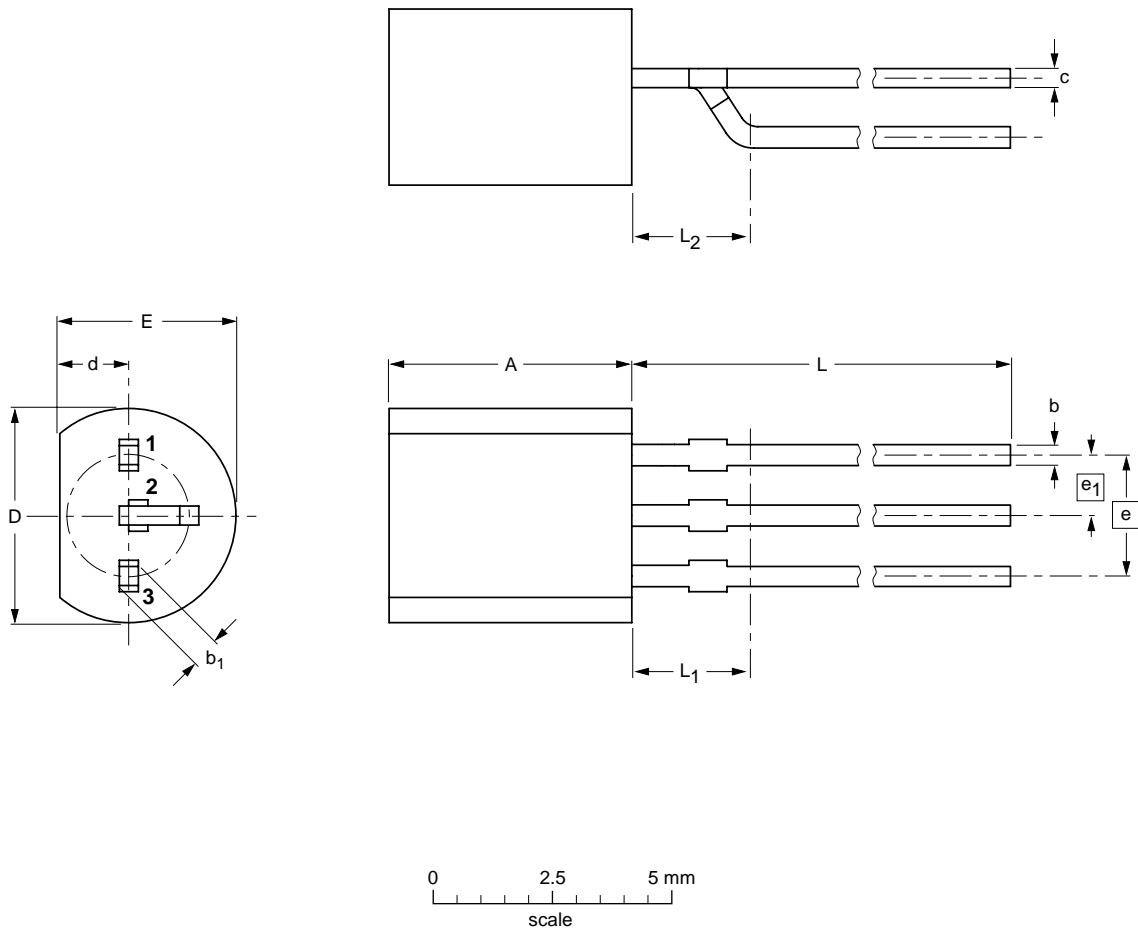
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PACKAGE OUTLINE

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.
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

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.