

**NPN 2 GHz wideband transistor**

**BF689K**

**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
1	emitter
2	base
3	collector

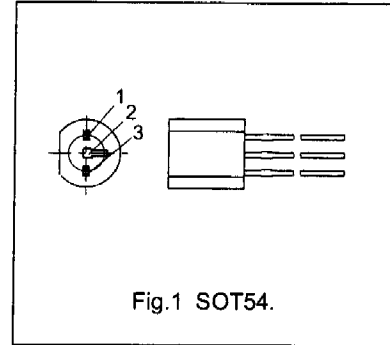


Fig.1 SOT54.

**QUICK REFERENCE DATA**

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V <sub>CB0</sub>	collector-base voltage	open emitter	-	-	25	V
V <sub>CE0</sub>	collector-emitter voltage	open base	-	-	15	V
I <sub>C</sub>	DC collector current		-	-	25	mA
P <sub>tot</sub>	total power dissipation	up to T <sub>amb</sub> = 60 °C	-	-	360	mW
h <sub>FE</sub>	DC current gain	I <sub>C</sub> = 2 mA; V <sub>CE</sub> = 5 V; T <sub>J</sub> = 25 °C	20	-	-	
		I <sub>C</sub> = 20 mA; V <sub>CE</sub> = 5 V; T <sub>J</sub> = 25 °C	35	-	-	
f <sub>T</sub>	transition frequency	I <sub>C</sub> = 15 mA; V <sub>CE</sub> = 5 V; f = 500 MHz	-	1.8	-	GHz

**LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>CB0</sub>	collector-base voltage	open emitter	-	25	V
V <sub>CE0</sub>	collector-emitter voltage	open base	-	15	V
V <sub>CEr</sub>	collector-emitter voltage	R <sub>BE</sub> ≤ 50 Ω	-	25	V
V <sub>EBO</sub>	emitter-base voltage	open collector	-	3.5	V
I <sub>C</sub>	DC collector current		-	25	mA
I <sub>CM</sub>	peak collector current	t <sub>p</sub> < 1 μs	-	50	mA
P <sub>tot</sub>	total power dissipation	up to T <sub>amb</sub> = 60 °C	-	360	mW
T <sub>stg</sub>	storage temperature		-55	150	°C
T <sub>J</sub>	junction temperature		-	150	°C



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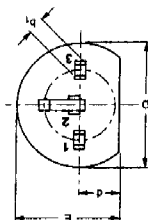
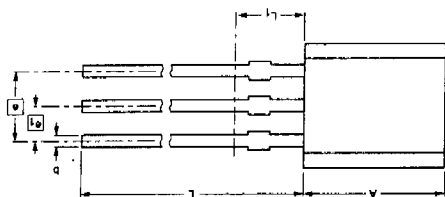
## THERMAL RESISTANCE

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

## CHARACTERISTICS

$T_j = 25\text{ }^\circ\text{C}$  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	$\mu\text{A}$
$V_{CE\ sat}$	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	$I_C = 2\text{ mA}; V_{CE} = 5\text{ V}; f = 1\text{ MHz}; T_{amb} = 25\text{ }^\circ\text{C}$	–	1.1	–	pF
$G_p$	power gain	$I_C = 2\text{ mA}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}; T_{amb} = 25\text{ }^\circ\text{C}; Z_S = 60\ \Omega; R_L = 2\text{ k}\Omega$	–	16	–	dB
		$I_C = 2\text{ mA}; V_{CE} = 5\text{ V}; f = 200\text{ MHz}; T_{amb} = 25\text{ }^\circ\text{C}; Z_S = 60\ \Omega; R_L = 920\ \Omega$	–	16	–	dB
F	noise figure	$I_C = 2\text{ mA}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}; T_{amb} = 25\text{ }^\circ\text{C}; Z_S = 60\ \Omega$	–	4	–	dB
		$I_C = 2\text{ mA}; V_{CE} = 5\text{ V}; f = 200\text{ MHz}; T_{amb} = 25\text{ }^\circ\text{C}; Z_S = 60\ \Omega$	–	3	–	dB



DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b <sub>1</sub>	c	D	d	E	e	e <sub>1</sub>	L	L <sub>1</sub> <sup>(1)</sup> max	L <sub>2</sub> max
mm	5.2 5.0	0.48 0.40	0.68 0.58	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		
	IEC	JEDOC	SIAJ
SOT54 variant		TO-92	SC-43

