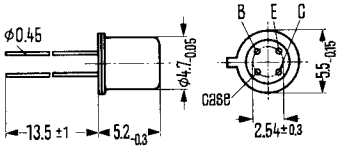
NPN Transistor for RF applications up to the GHz range

BFS 55 is a NPN silicon RF transistor in a case 18 A 4 DIN 41876 (TO-72). The terminals are electrically insulated from the case. The transistor is especially designed for use in RF applications up into the GHz range, e.g., antenna amplifiers and radar IF amplifiers and satellite engineering.

Type	Order number
BFS 55	Q62702-F272



Weight approx. 0.3 g Dimensions in mm

Maximum ratings		BFS 55	
Collector-emitter voltage	V_{CEO}	12	V
Collector-emitter voltage	V_{CER}	20	V
Emitter-base voltage	V_{EBO}	3.5	V
Collector current	I_C	50	mA
Base current	I_B	10	mA
Junction temperature	T_j	175	°C
Storage temperature	T_s	−65 to +175	°C
Total power dissipation (T_{amb} = 45 °C)	P_{tot}	325	mW
Thermal resistance			
Junction to air	R_{thJamb}	≦700	K/W
Junction to case	$R_{thJcase}$	≦400	K/W

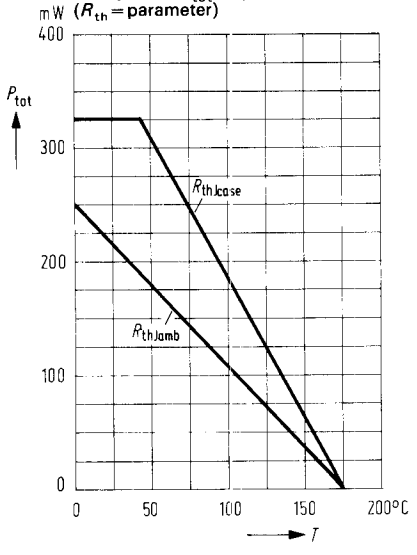
Static characteristics ($T_{amb}=25$ °C)		**BFS 55**	
Collector-emitter breakdown voltage ($I_C=0.5$ mA; $I_B=0$)	$V_{(BR)CEO}$	>12	V
Collector-emitter breakdown voltage ($I_C=10$ mA; $R_{BE}=50\ \Omega$)	$V_{(BR)CER}$	>20	V
Emitter-base breakdown voltage ($I_E=0.1$ mA; $I_C=0$)	$V_{(BR)EBO}$	>3.5	V
Collector-base cutoff current ($V_C=10$ V; $I_E=0$)	I_{CBO}	<50	nA
Forward current transfer ratio			
($I_C=25$ mA; $V_{CE}=8$ V)	h_{FE}	>30	–
($I_C=50$ mA; $V_{CE}=5$ V)	h_{FE}	>30	–

Dynamic characteristics ($T_{amb}=25$ °C)			
Small-signal short-circuit forward current transfer ratio ($I_C=25$ mA; $V_{CE}=8$ V; $f=1$ kHz)	h_{fe}	70	–
Current-gain bandwidth product ($f=500$ MHz; $I_C=25$ mA; $V_{CE}=8$ V)	f_T	3.3	GHz
Feedback capacitance ($f=1$ MHz; $I_C=1$ mA; $V_{CE}=8$ V)	$-C_{12e}$	0.65	pf
Output capacitance ($f=1$ MHz; $V_{CBO}=8$ V)	C_{CBO}	0.85	pf
Noise figure ($I_C=25$ mA; $V_{CE}=8$ V; $f=800$ MHz; $R_g=60\ \Omega$)	NF	5	db
Power gain ($I_C=25$ mA; $V_{CE}=8$ V; $f=800$ MHz; $R_g=R_L=50\ \Omega$)	G_{pe}	10	db
Output voltage ($I_C=25$ mA; $V_{CE}=8$ V; $f=800$ MHz; $R_g=R_L=50\ \Omega$; $d_{IM}=60$ db; $f_1=798$ MHz; $f_2=802$ MHz)	V_O	200	mV

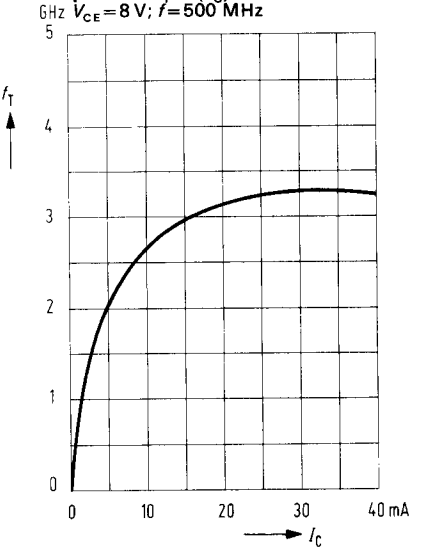
S-parameters at $V_{CE}=8$ V; $I_C=25$ mA; $Z_O=50\ \Omega$

$f=200$ MHz	$f=800$ MHz
$S_{11e}=0.2$; $\varphi_{11e}=+76°$	$S_{11e}=0.05$; $\varphi_{11e}=+170°$
$S_{22e}=0.55$; $\varphi_{22e}=-26°$	$S_{22e}=0.44$; $\varphi_{22e}=-48°$
$S_{12e}=0.04$; $\varphi_{12e}=+70°$	$S_{12e}=0.12$; $\varphi_{12e}=+52°$
$S_{21e}=11.5$; $\varphi_{21e}=+100°$	$S_{21e}=2.9$; $\varphi_{21e}=+60°$

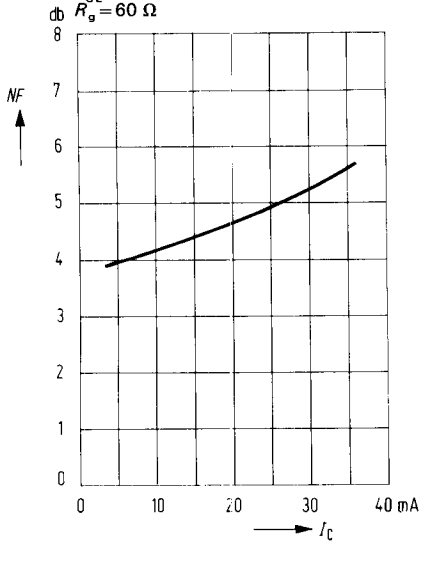
Total permissible power dissipation $P_{tot}=f(T)$
(R_{th} = parameter)



Current gain bandwidth product $f_T=f(I_C)$
$V_{CE}=8$ V; $f=500$ MHz



Noise figure $NF=f(I_C)$
$V_{CE}=8$ V; $f=800$ MHz
$R_g=60\ \Omega$



Intermodulation product distance $d_{IM}=f(I_C)$
$f_1=798$ MHz; $f_2=802$ MHz
$R_g=R_L=50\ \Omega$
$V_{CE}=8$ V; $V_{o1}=V_{o2}=200$ mV