

NPN SiGe RF TRANSISTOR

The DRF1402F is a low cost, NPN medium power SiGe HBT(Hetero-Junction Bipolar Transistor) encapsulated in a plastic SOT-89 SMD package.

The DRF1402F can be used as a driver device or an output device, depending on the specific application

FEATURES

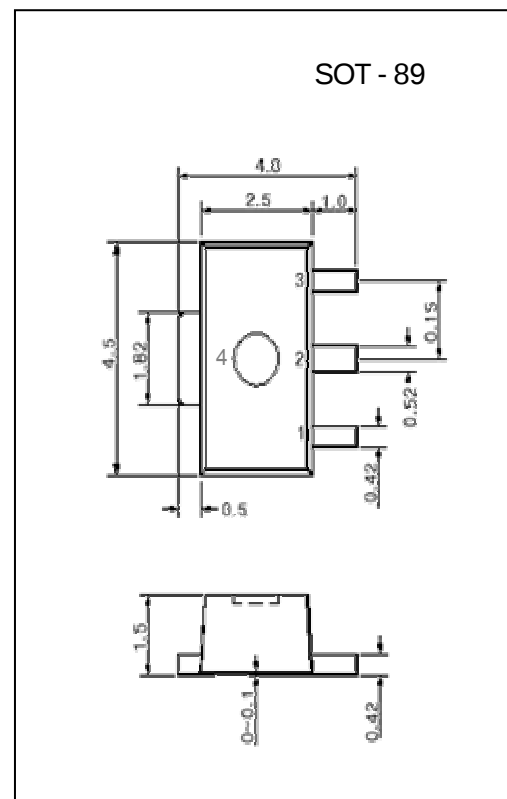
- o 4.8 Volt operation
- o P1dB 28 dBm @f=465MHz
- o Power gain 10 dB @f=465MHz

APPLICATIONS

- o Hand-held radio equipment in common emitter class-AB operation in 450 MHz communication band.

MAXIMUM RATINGS

SYMBOL	PARAMETER	CONDITION	VALUE	Unit
V _{CBO}	Collector-Base Voltage	Open Emitter	20	V
V _{CEO}	Collector-Emitter Voltage	Open Base	8	V
V _{EB0}	Emitter-Base Voltage	Open Collector	4	V
I _c	Collector Current (DC)		350	mA
P _T	Total Power Dissipation	T _s = 60 ; note 1	1	W
T _{STG}	Storage Temperature		-65 ~ 150	
T _J	Operating Junction Temperature		150	



PIN CONFIGURATION

PIN NO	SYMBOL	DESCRIPTION
1	B	base
2	C	collector
3	E	emitter
4	C	collector

□ THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITION	VALUE	Unit
R _{th j-s}	thermal resistance from junction to soldering point	P _T =1W; T _s =60 °C; note1	55	K/W

* Note 1. T_s is temperature at the soldering point of the collector pin.

□ QUICK REFERENCE DATA

RF performance at T_s ≤ 60 °C in common emitter test circuit (see Fig 8.)

Mode of Operation	f [MHz]	V _{CE} [V]	P _L [mW]	G _P [dB]	η _c [%]
CW, class-AB	465	4.8	630	≥ 10	≥ 60

□ DC CHARACTERISTICS

T_j=25 unless otherwise specified

SYMBOL	PARAMETER	CONDITION	MIN.	MAX.	UNIT
BV _{CBO}	collector-base breakdown voltage	open emitter	20		V
BV _{CEO}	collector-emitter breakdown voltage	open base	8		V
BV _{EBO}	emitter-base breakdown voltage	open collector	3		V
I _s	Collector leakage current		0.1		mA
h _{FE}	DC current gain		60		
C _c	Collector capacitance			4.5	pF

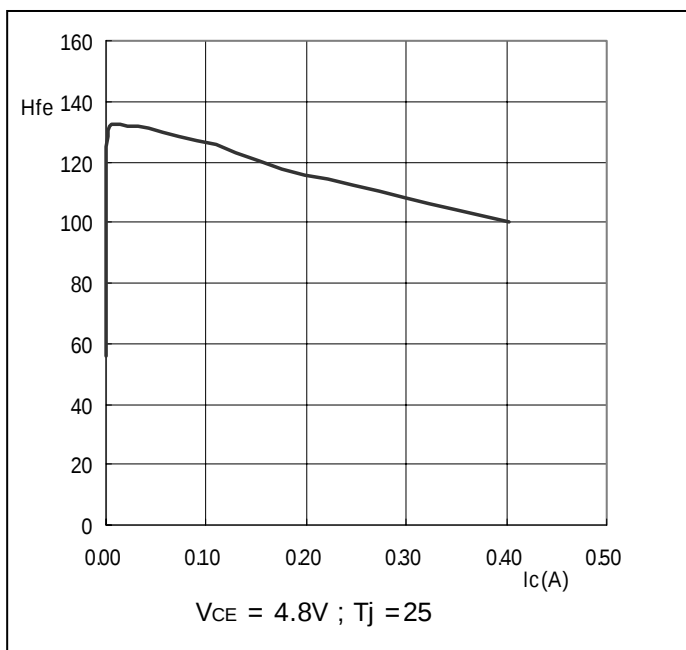


Fig 1. DC Current gain v.s Collector current

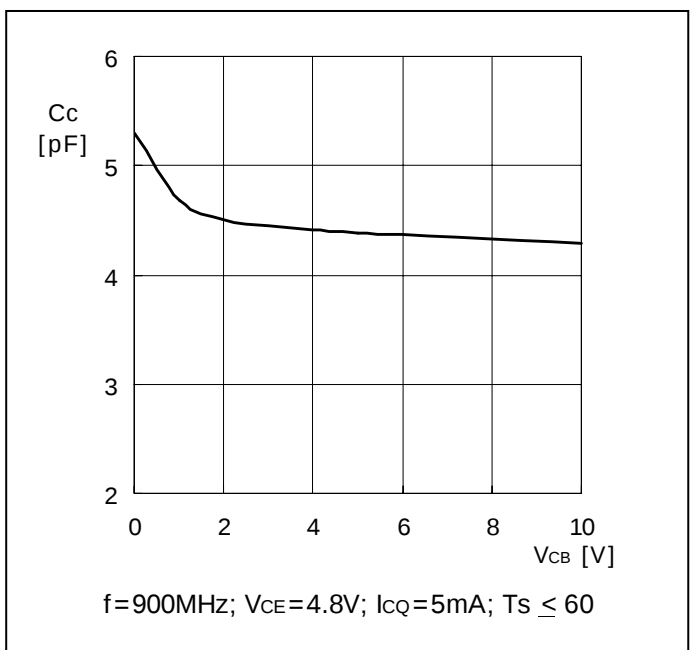


Fig 2. Collector-base capacitance v.s Collector-base voltage(DC)

□ APPLICATION INFORMATION

RF performance at $T_s \leq 60$ in common emitter configuration.

Mode of Operation	f [MHz]	V_{CE} [V]	P_L [mW]	G_P [dB]	η_c [%]
CW, class-AB	465	4.8	630	≥ 10	≥ 60

DRF1402F Source/Load Impedance as a frequency

DRF1402F Transister Impedance

$V_{CE} = 4.8V$, $I_{CQ} = 5mA$, $P_{out} = 28dBm$

Freq.	Z_S [Ω]		Z_L [Ω]	
[MHz]	R_S	X_S	R_L	X_L
440	17.34	6.91	22.21	-0.59
450	17.21	7.89	19.31	2.58
460	17.12	8.90	17.20	7.07
470	17.09	9.95	15.66	19.00

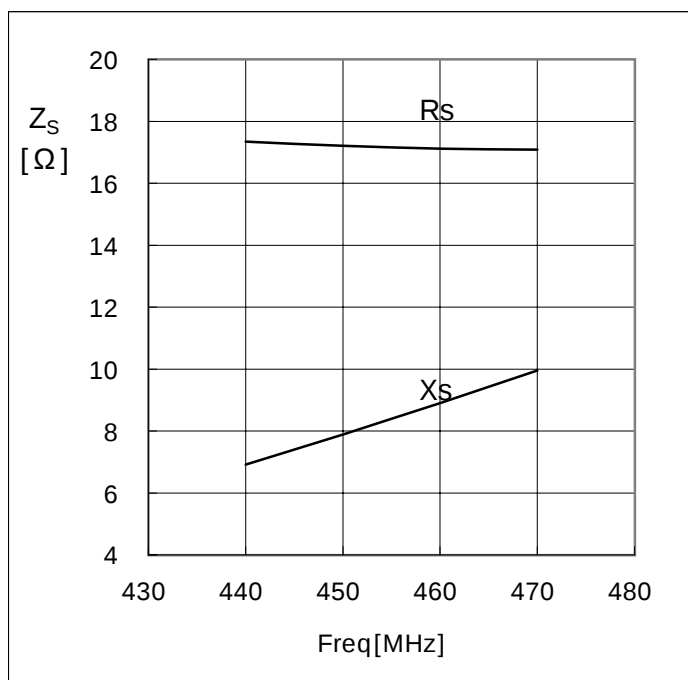
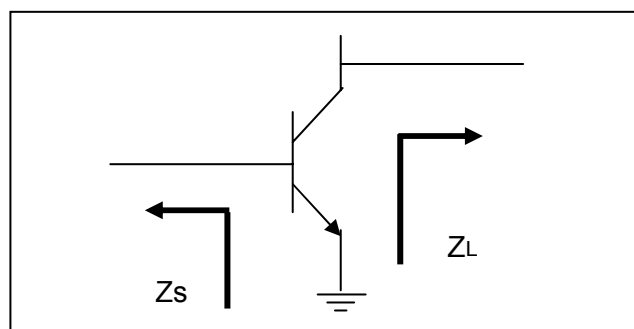


Fig 5. Source Impedance (series components) as a freq, typical values.

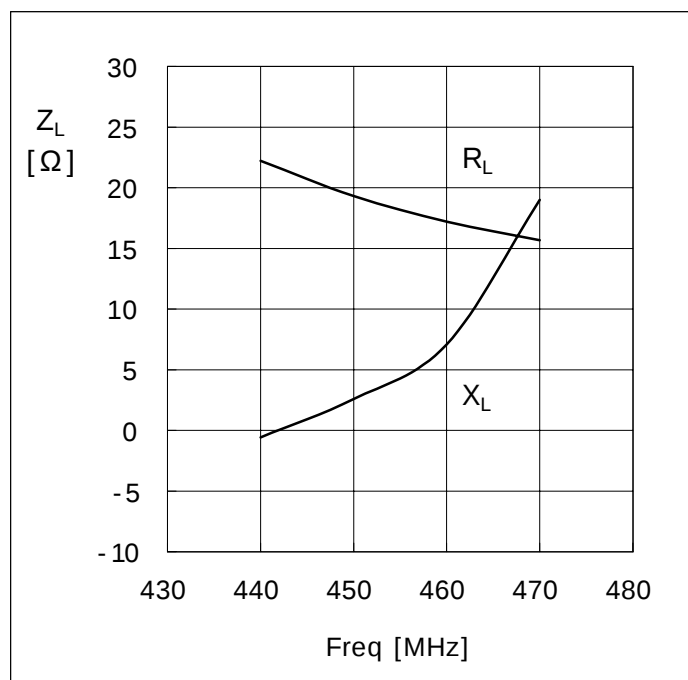


Fig 6. Load Impedance (series components) as a freq, typical values.

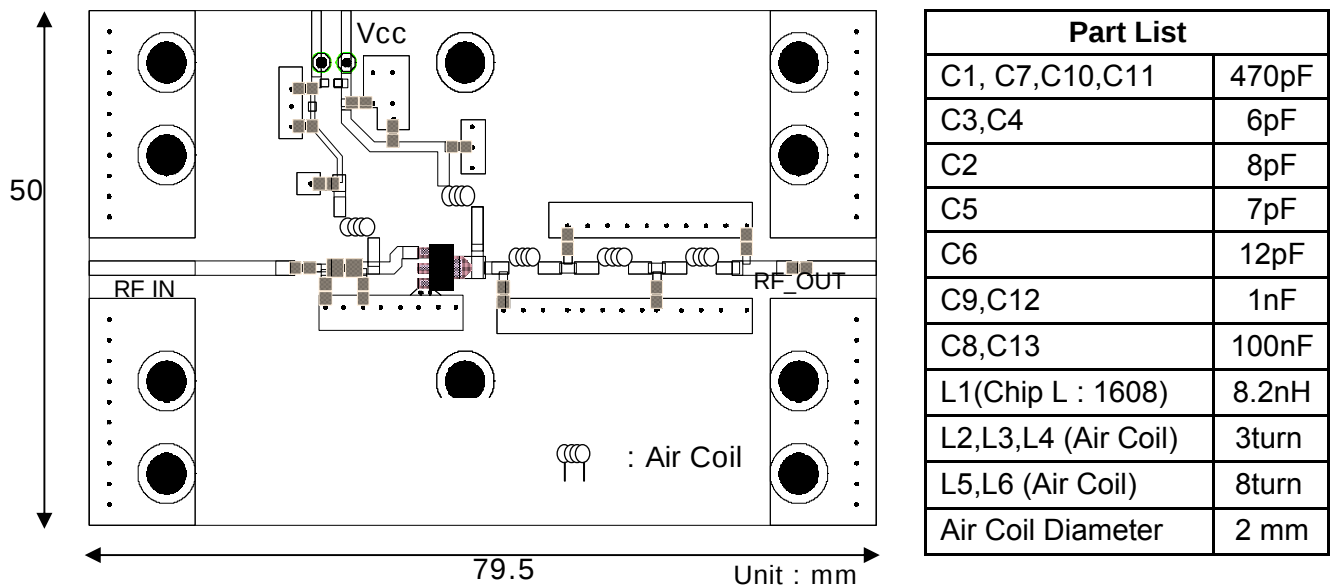


Fig 7. DRF1402F Test Circuit Board Layout @ f = 465MHz

Test board : FR4 glass epoxy board, dielectric constant = 4.5, thickness = 0.8 mm

Test condition : CW test, Vcc = 4.8 V, Icq = 5 mA, frequency = 465 MHz.

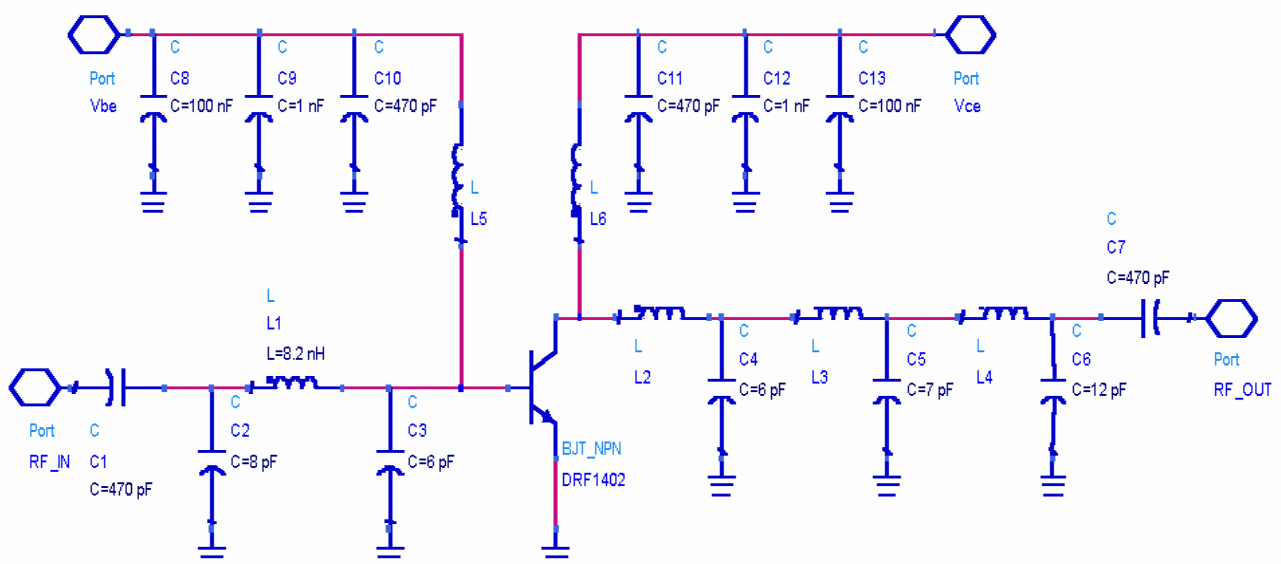
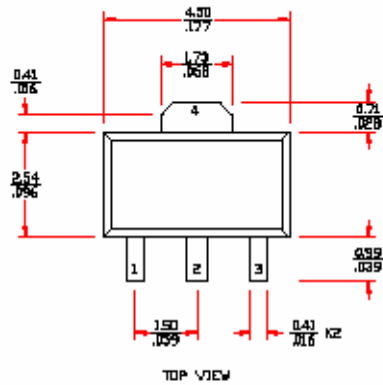
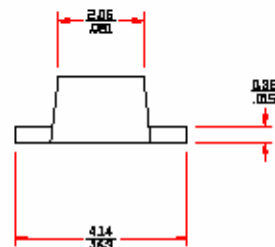
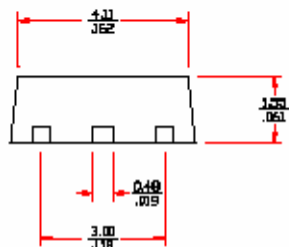


Fig 8. Test Circuit Schematic Diagram @f = 465MHz

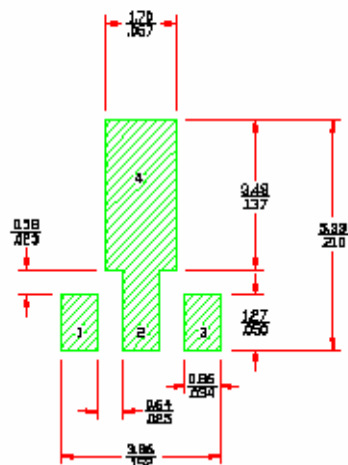
□ PACKAGE DIMENSION OUTLINE DRAWING



mm
inch



LAND PATTERN



MOUNTING CONFIGURATION

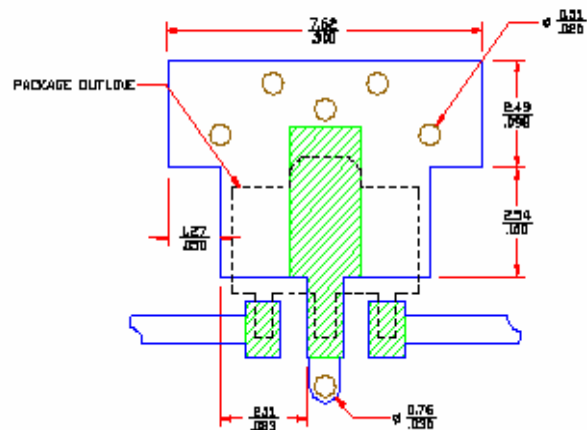


Fig 9. SOT-89 Package dimension