

**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**

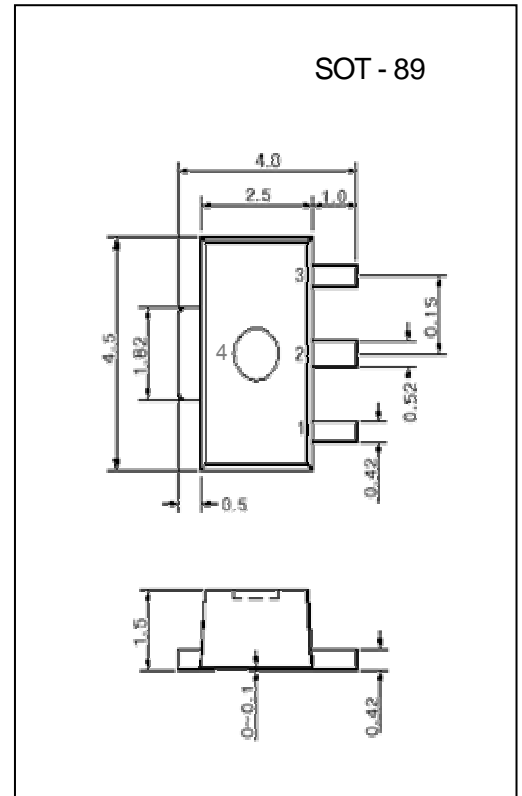
- o 4.8 Volt operation
- o P1dB 28 dBm @f=465MHz
- o Power gain 10 dB @f=465MHz

**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 <sub>CB0</sub>	Collector-Base Voltage	Open Emitter	20	V
V <sub>CEO</sub>	Collector-Emitter Voltage	Open Base	8	V
V <sub>EB0</sub>	Emitter-Base Voltage	Open Collector	4	V
I <sub>c</sub>	Collector Current (DC)		350	mA
P <sub>T</sub>	Total Power Dissipation	T <sub>s</sub> = 60 ; note 1	1	W
T <sub>STG</sub>	Storage Temperature		-65 ~ 150	
T <sub>J</sub>	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
Rth j-s	thermal resistance from junction to soldering point	$P_T=1W$ ; $T_s=60$ ;note1	55	K/W

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

## QUICK REFERENCE DATA

RF performance at  $T_s \leq 60$  in common emitter test circuit (see Fig 8.)

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

DC CHARACTERISTICS

Tj=25 unless otherwise specified

SYMBOL	PARAMETER	CONDITION	MIN.	MAX.	UNIT
BV <sub>CBO</sub>	collector-base breakdown voltage	open emitter	20		V
BV <sub>CEO</sub>	collector-emitter breakdown voltage	open base	8		V
BV <sub>EBO</sub>	emitter-base breakdown voltage	open collector	3		V
I <sub>s</sub>	Collector leakage current		0.1		mA
h <sub>FE</sub>	DC current gain		60		
C <sub>c</sub>	Collector capacitance			4.5	pF

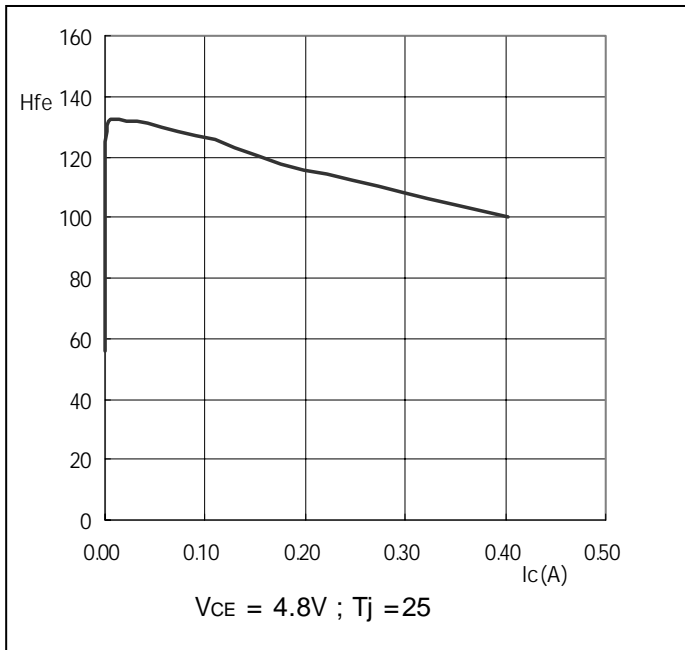


Fig 1. DC Current gain v.s Collector current

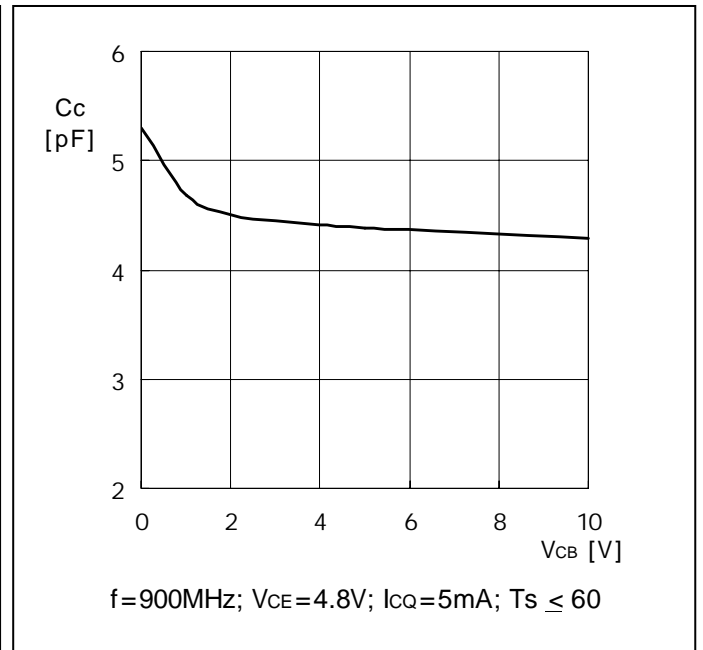


Fig 2. Collector-base capacitance v.s Collector-base voltage(DC)

APPLICATION INFORMATION

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

Mode of Operation	f [MHz]	V <sub>CE</sub> [V]	P <sub>L</sub> [mW]	G <sub>P</sub> [dB]	c [%]
CW, class-AB	465	4.8	630	10	60

DRF1402F Source/Load Impedance as a frequency

DRF1402F Transister Impedance

V<sub>CE</sub> = 4.8V, I<sub>CQ</sub> = 5mA, P<sub>out</sub> = 28dBm

Freq. [MHz]	Z <sub>S</sub> [Ω]		Z <sub>L</sub> [Ω]	
	R <sub>s</sub>	X <sub>s</sub>	R <sub>L</sub>	X <sub>L</sub>
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

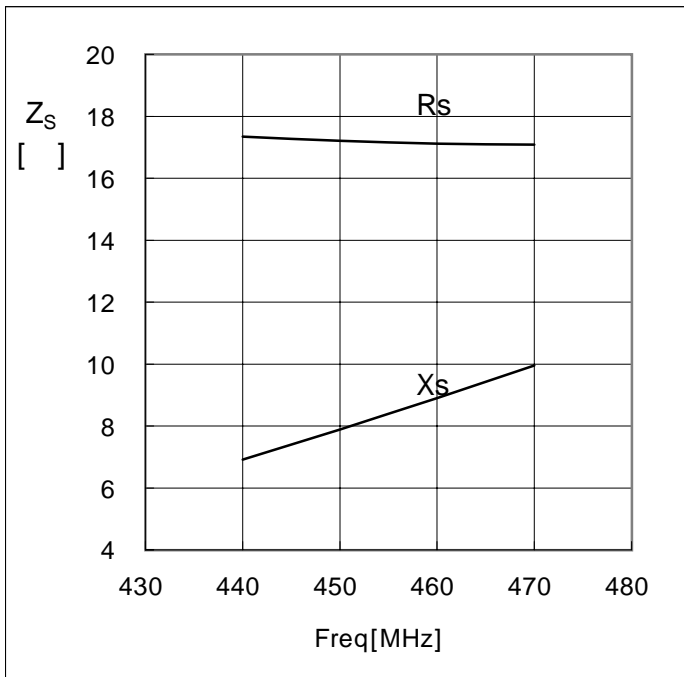
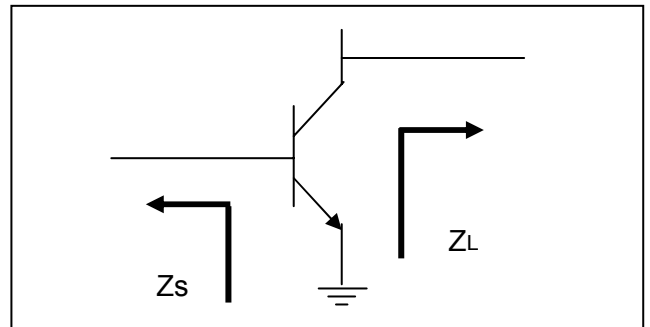


Fig 5. Source Impedance (series components) as a freq, typical values.

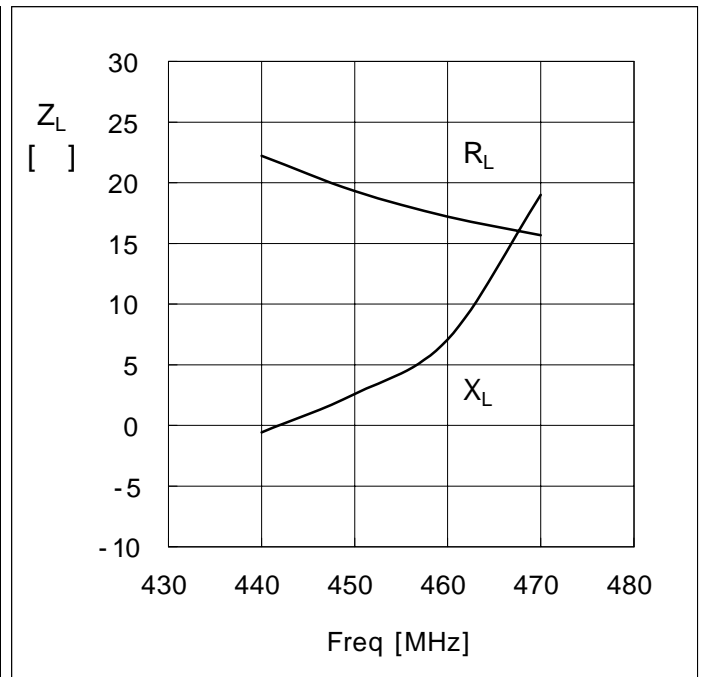


Fig 6. Load Impedance (series components) as a freq, typical values.

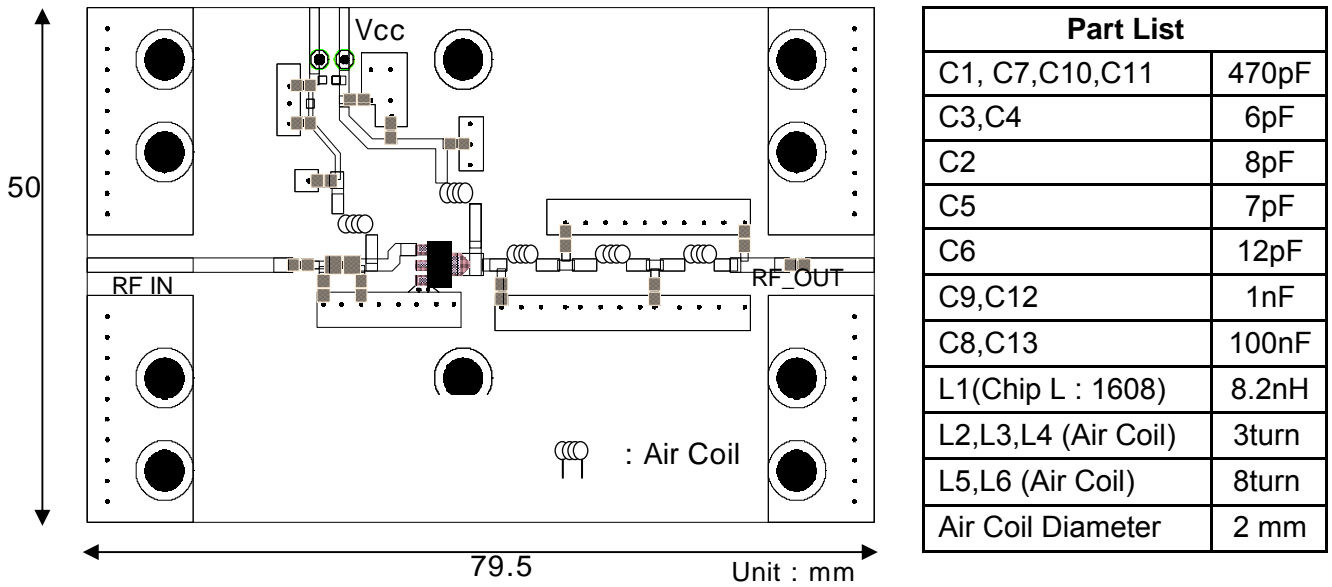


Fig 7. DRF1402F Test Circuit Board Layout @ f = 465MHz

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.

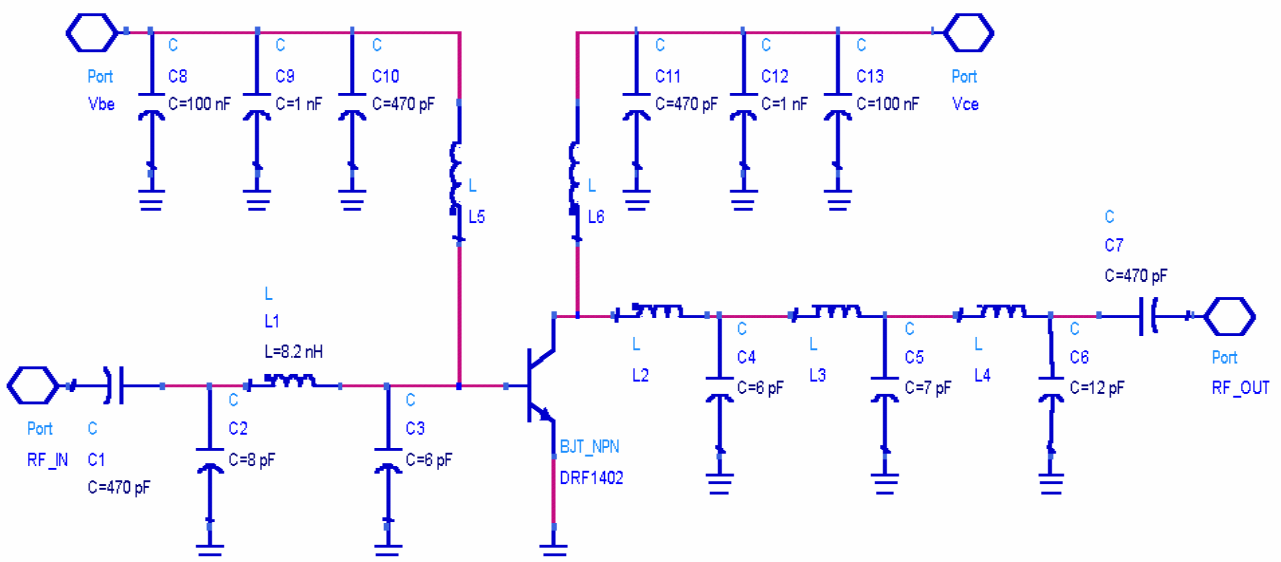
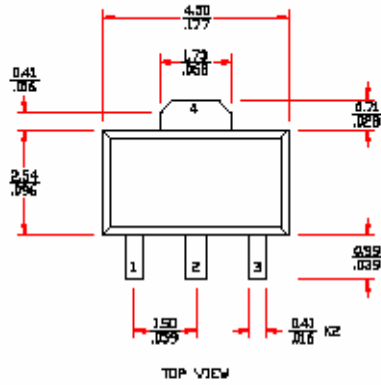


Fig 8. Test Circuit Schematic Diagram @f = 465MHz

PACKAGE DIMENSION  
OUTLINE DRAWING



mm  
inch

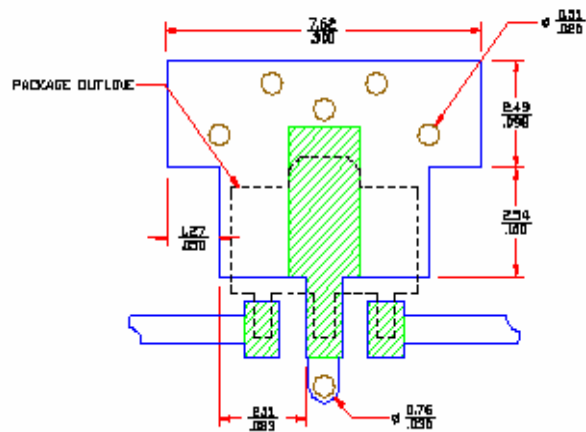
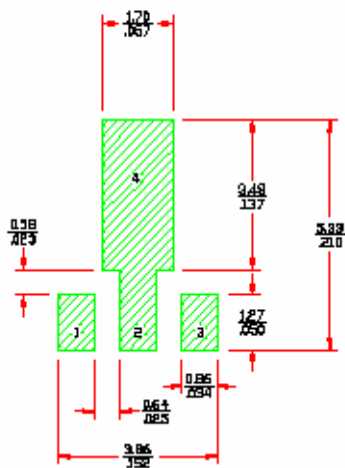
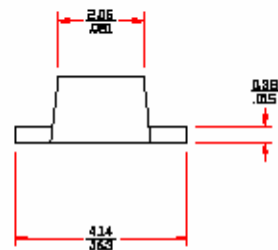
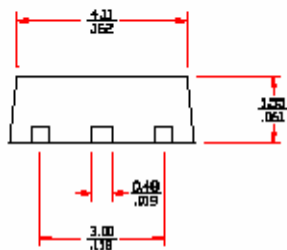


Fig 9. SOT-89 Package dimension