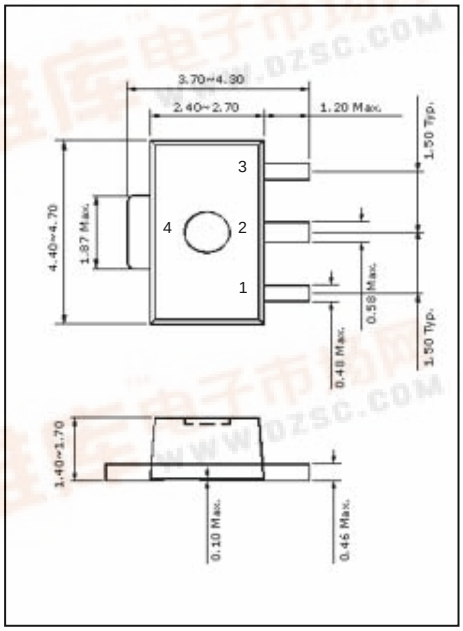
AUK Semiconductor

THN5702F

SiGe NPN Transistor

SOT-89 Unit in mm



☐ *Applications*

- VHF and UHF wide band amplifier

☐ *Features*

- Medium power(800mW, 1W) application
- Power gain

G_P = 14 dB at V_{CE} = 3.6 V, f = 460 MHz, P_{IN} = 0 dBm

G_P = 15 dB at V_{CE} = 4.5 V, f = 460 MHz, P_{IN} = 0 dBm

G_P = 15 dB at V_{CE} = 6.0 V, f = 460 MHz, P_{IN} = 0 dBm

G_P = 16 dB at V_{CE} = 3.0 V, f = 434 MHz, P_{IN} = 0 dBm

- Output power

P_{OUT} = 29 dBm at V_{CE} = 3.6 V, I_{CQ} = 30 mA, f = 460 MHz

P_{OUT} = 30 dBm at V_{CE} = 4.5 V, I_{CQ} = 50 mA, f = 460 MHz

P_{OUT} = 31 dBm at V_{CE} = 6.0 V, I_{CQ} = 30 mA, f = 460 MHz

P_{OUT} = 25 dBm at V_{CE} = 3.0 V, I_{CQ} = 50 mA, f = 434 MHz

Pin Configuration

1. Base
2. Emitter
3. Collector
4. Emitter

☐ *Absolute Maximum Ratings* (T_A = 25 ℃)

Parameter	Symbol	Ratings	Unit
Collector to Base Breakdown Voltage	BV_{CBO}	15	V
Collector to Emitter Breakdown Voltage	BV_{CEO}	10	V
Emitter to Base Breakdown Voltage	BV_{EBO}	1.5	V
Collector Current	I_C	800	mA
Total Power Dissipation	P_{tot}	1.5	W
Junction Temperature	T_j	150	℃
Storage Temperature	T_{stg}	-65 ~ 150	℃

□ *Thermal Characteristics*

Symbol	Parameter	Value	Unit
$R_{th\ j\text{-}a}$	Thermal Resistance from Junction to Ambient	80	K/W

□ *Electrical Characteristics* (T_A = 25 ℃)

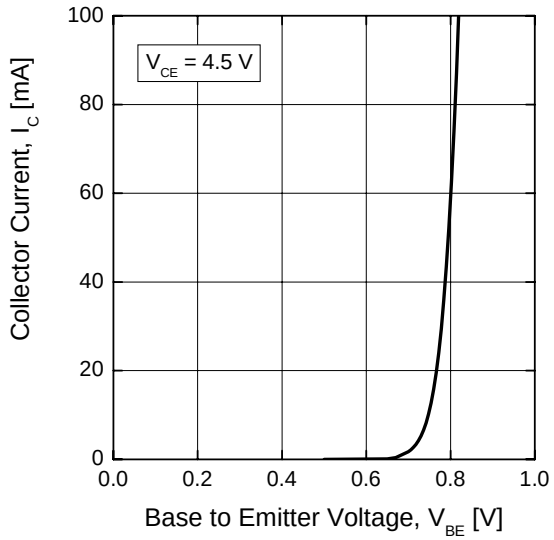
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Collector Cut-off Current	I_{CBO}	V_{CB} = 13 V, I_E = 0 mA	-	-	2.5	㎂
	I_{CEO}	V_{CE} = 7 V, I_B = 0 mA	-	-	1.5	㎂
Emitter Cut-off Current	I_{EBO}	V_{EB} = 1.0 V, I_C = 0 mA	-	-	1.5	㎂
DC Current Gain	h_{FE}	V_{CE} = 4.5 V, I_C = 150 mA	40		300	
Power Gain	G_P	V_{CE} = 3.6 V, I_C = 30 mA(RF off), f = 460 MHz, P_{IN}=0dBm	12	14	-	dB
		V_{CE} = 4.5 V, I_C = 50 mA(RF off), f = 460 MHz, P_{IN}=0dBm	13	15	-	dB
		V_{CE} = 6.0 V, I_C = 30 mA(RF off), f = 460 MHz, P_{IN}=0dBm	13	15	-	dB
		V_{CE} = 3.0 V, I_C = 50 mA(RF off), f = 434 MHz, P_{IN}=0dBm	14	16	-	dB
Output Power	P_{OUT}	V_{CE} = 3.6 V, I_C = 30 mA(RF off), f = 460 MHz, P_{IN}=15dBm	27	29	-	dBm
		V_{CE} = 4.5 V, I_C = 50 mA(RF off), f = 460 MHz, P_{IN}=15dBm	28	30	-	dBm
		V_{CE} = 6.0 V, I_C = 30 mA(RF off), f = 460 MHz, P_{IN}=15dBm	29	31	-	dBm
		V_{CE} = 3.0 V, I_C = 50 mA(RF off), f = 434 MHz, P_{IN}=10dBm	23	25	-	dBm
Reverse Transfer Capacitance	C_{re}	V_{CB} = 4.5 V, I_E = 0 mA, f = 1 MHz	-	6.5	8.0	pF

□ *h_{FE} Classification*

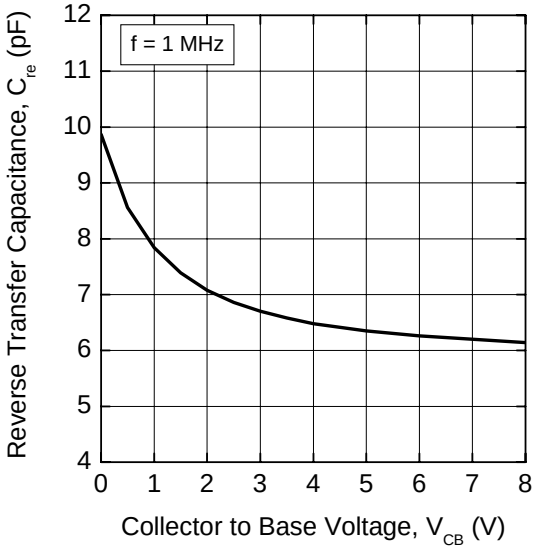
Marking	PC1	PC2
h_{FE} Value	40 - 200	170 - 300

□ *Typical Characteristics (T_A = 25 ℃, unless otherwise specified)*

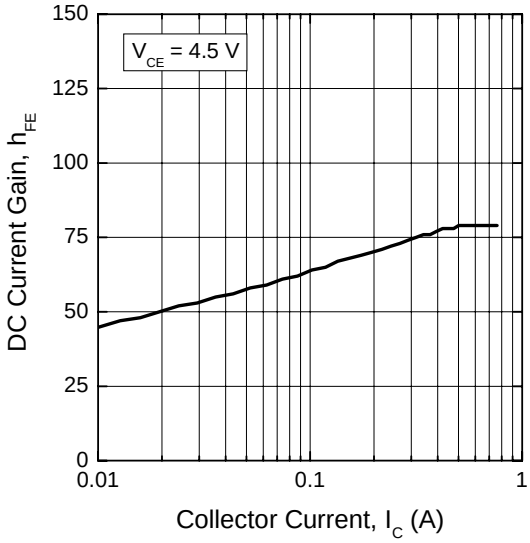
Collector Current vs. Base to Emitter Voltage



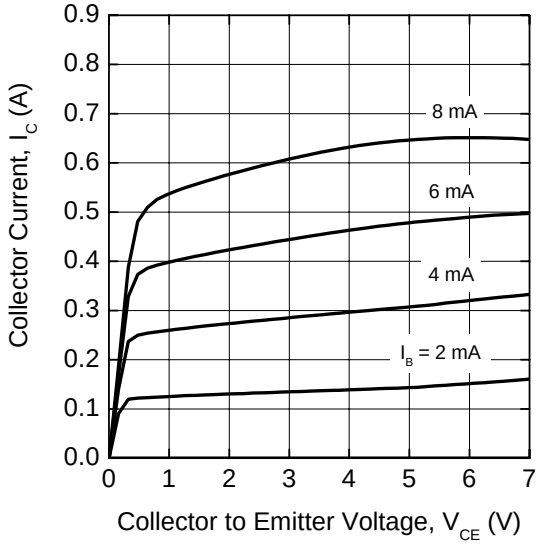
Reverse Transfer Capacitance vs. Collector to Base Voltage



DC Current Gain vs. Collector Current



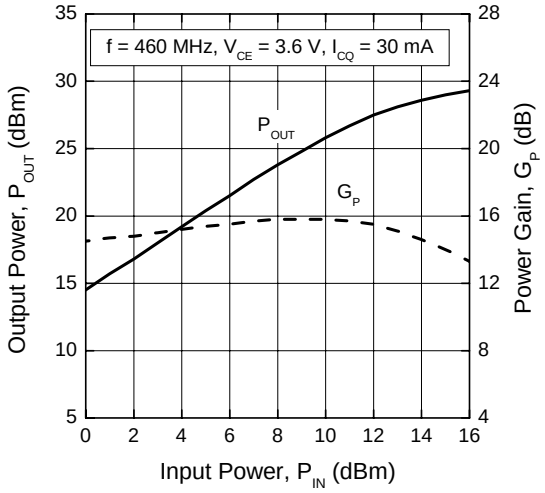
Collector Current vs. Collector to Emitter Voltage



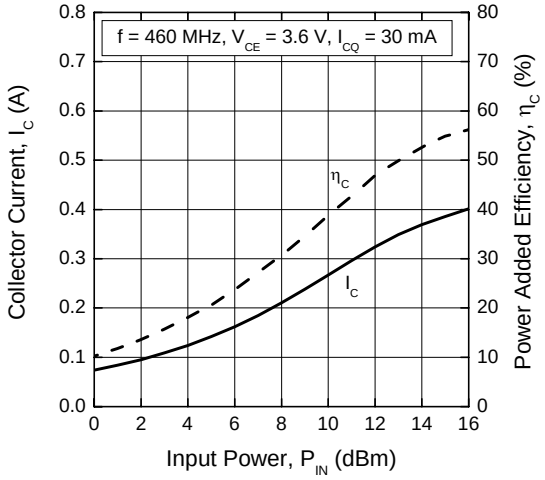
☐ *Application Information (at f = 460 MHz)*

Operation Mode	f (MHz)	V_{CE} (V)	P_{OUT} (dBm)	G_P (dB)	η_C (%)
CW, class-AB	460	3.6	29.0	14.0	54.9

Output Power or Power Gain vs. Input Power

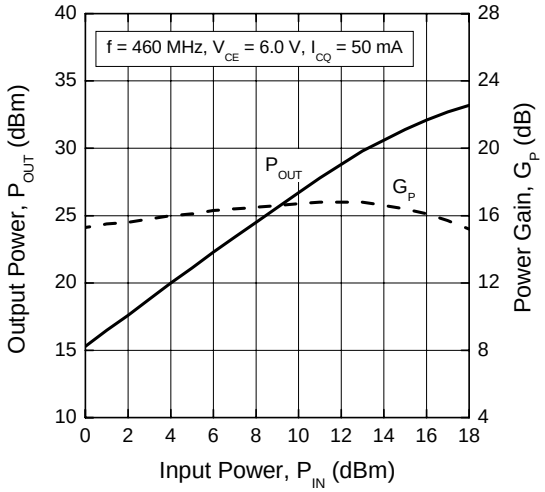


Collector Current or Power Added Efficiency vs. Input Power

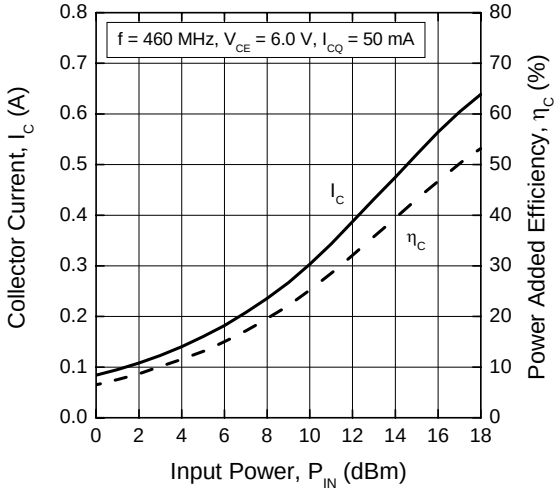


Operation Mode	f (MHz)	V_{CE} (V)	P_{OUT} (dBm)	G_P (dB)	η_C (%)
CW, class-AB	460	6.0	31.4	16.4	43.2

Output Power or Power Gain vs. Input Power



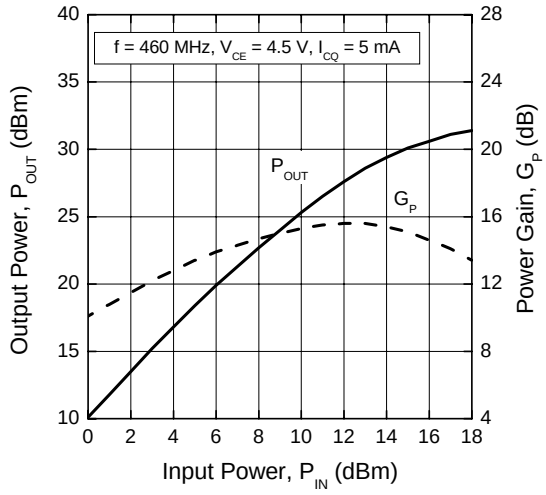
Collector Current or Power Added Efficiency vs. Input Power



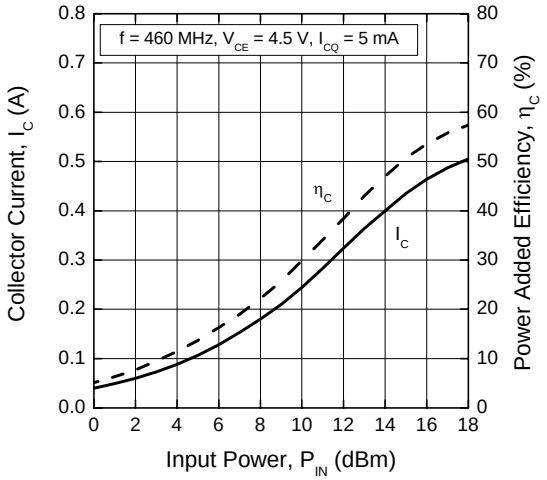
☐ *Application Information (at f = 460 MHz)*

Operation Mode	f (MHz)	V_{CE} (V)	P_{OUT} (dBm)	G_P (dB)	η_C (%)
CW, class-AB	460	4.5	30.0	15.0	50.8

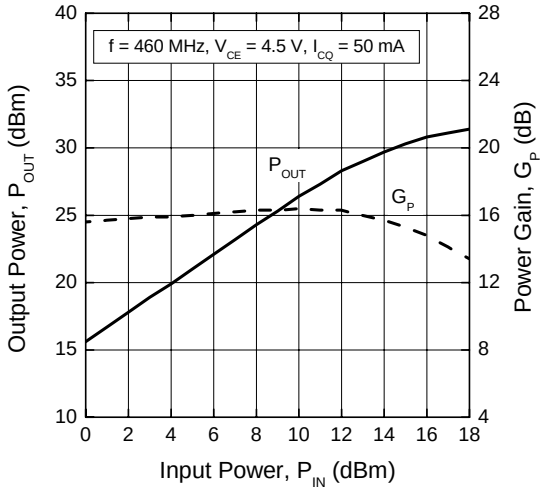
Output Power or Power Gain vs. Input Power



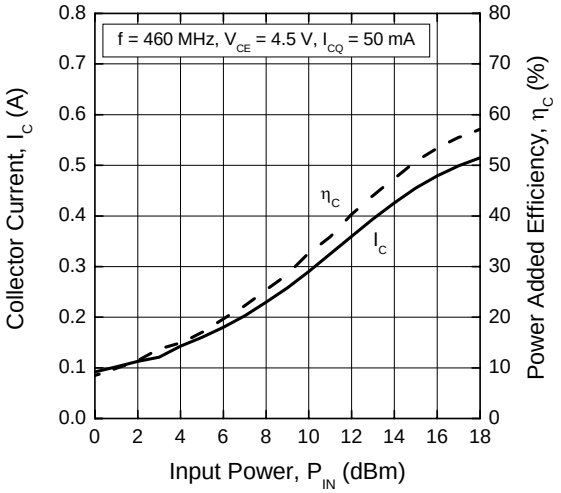
Collector Current or Power Added Efficiency vs. Input Power



Output Power or Power Gain vs. Input Power



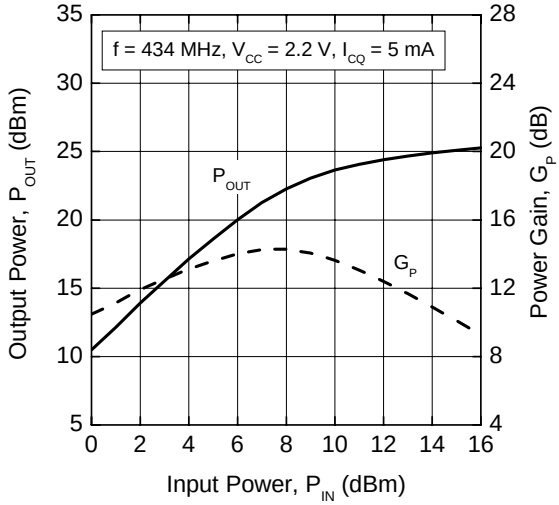
Collector Current or Power Added Efficiency vs. Input Power



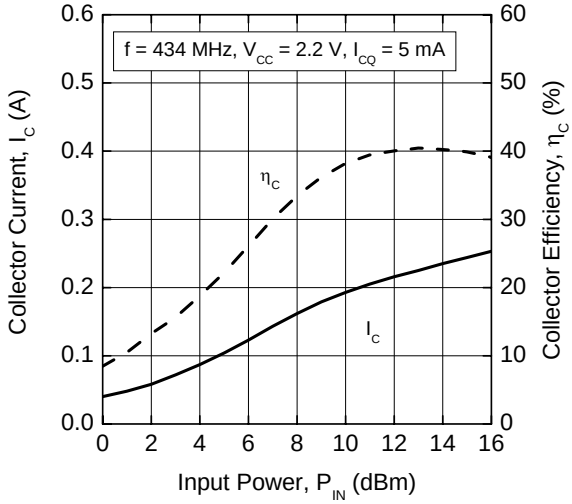
☐ *Application Information (f = 434 MHz)*

Operation Mode	f (MHz)	V_{CE} (V)	P_{OUT} (dBm)	G_P (dB)	η_C (%)
CW, class-AB	434	2.2	24	14	38

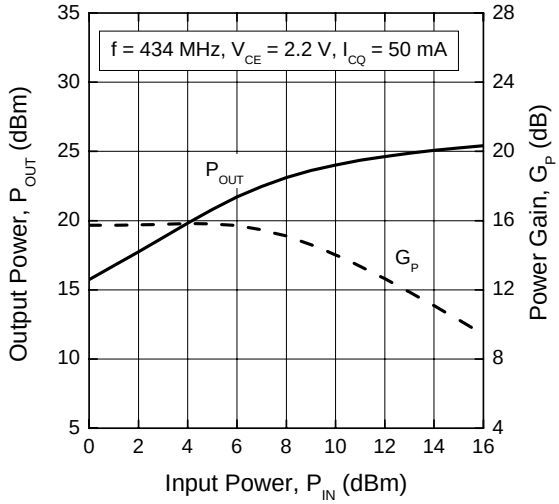
Output Power or Power Gain vs. Input Power



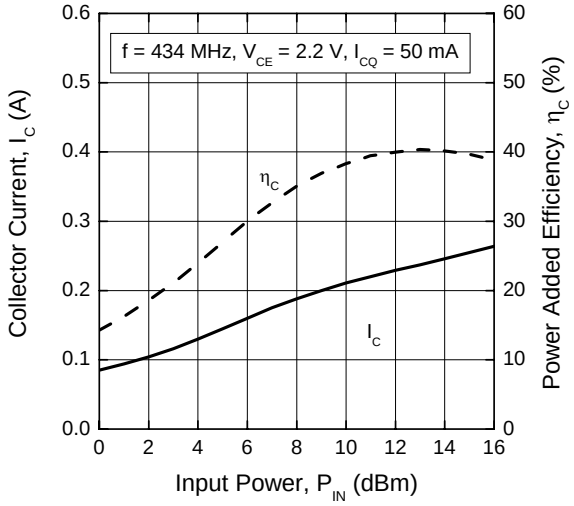
Collector Current or Power Added Efficiency vs. Input Power



Output Power or Power Gain vs. Input Power



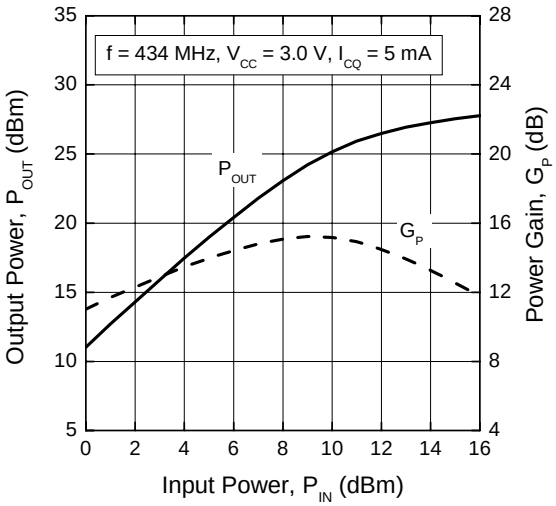
Collector Current or Power Added Efficiency vs. Input Power



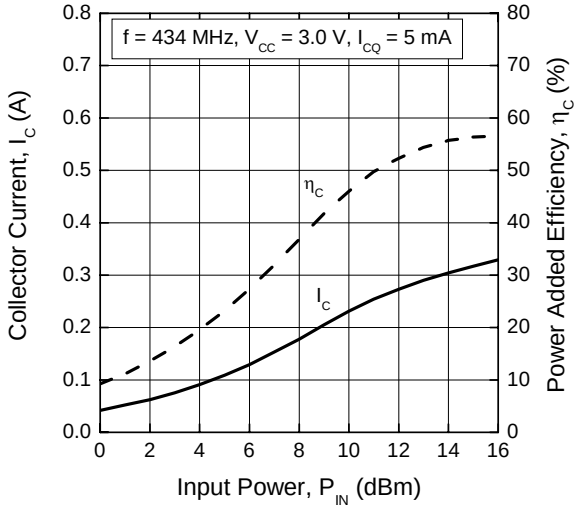
☐ *Application Information (f = 434 MHz)*

Operation Mode	f (MHz)	V_{CE} (V)	P_{OUT} (dBm)	G_P (dB)	η_C (%)
CW, class-AB	434	3.0	25	15	47

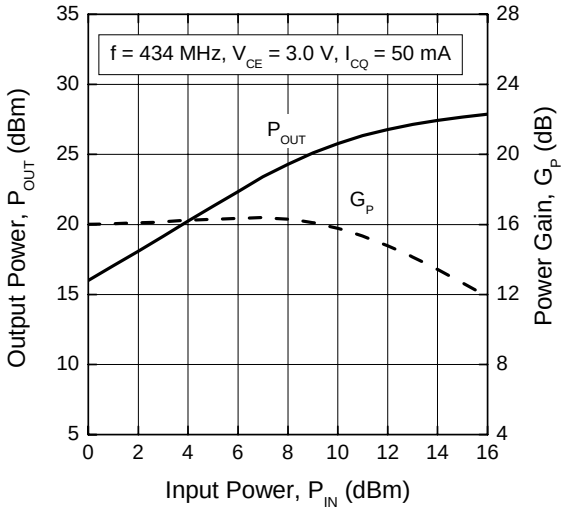
Output Power or Power Gain vs. Input Power



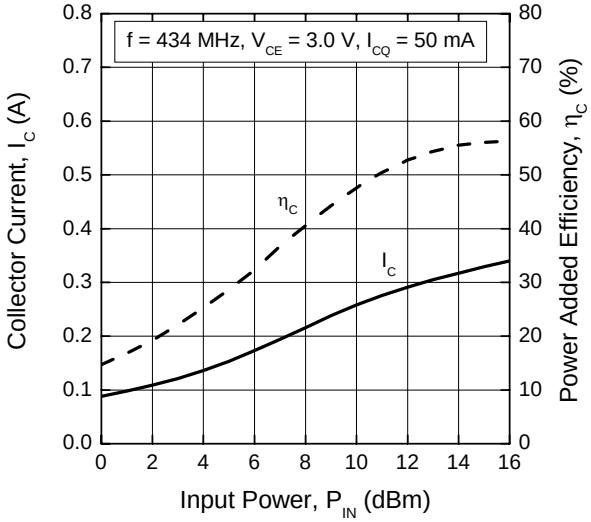
Collector Current or Power Added Efficiency vs. Input Power



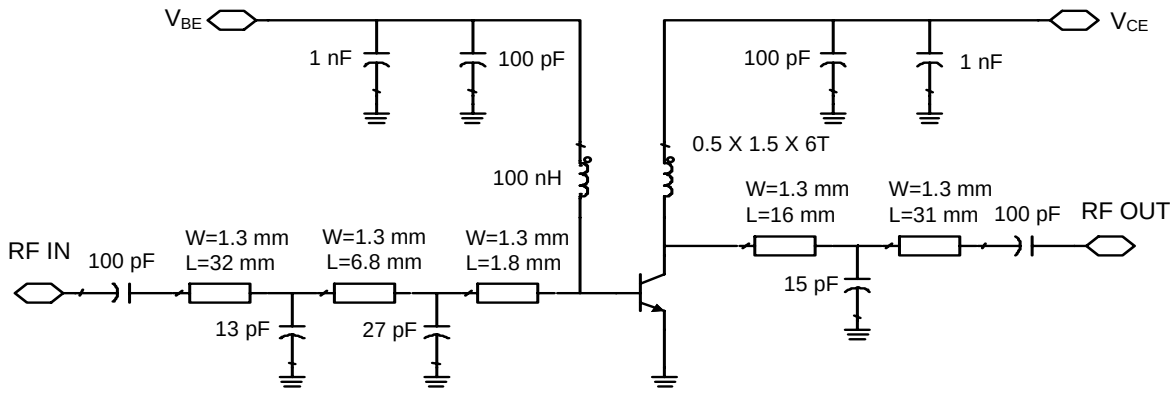
Output Power or Power Gain vs. Input Power



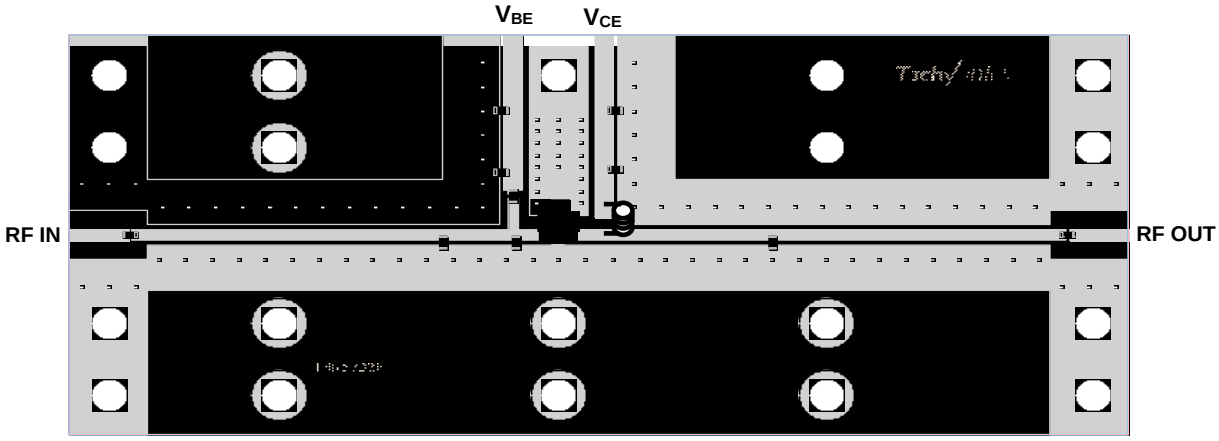
Collector Current or Power Added Efficiency vs. Input Power



☐ *Test Circuit Schematic Diagram (f = 460 MHz, 434MHz)*



☐ *Evaluation Board (f = 460 MHz, 434 MHz)*



Notes

1. FR4 glass epoxy: dielectric constant = 4.5, thickness = 0.8 mm
2. Evaluation board dimension = 119 x 50 mm^2