

The RF Line

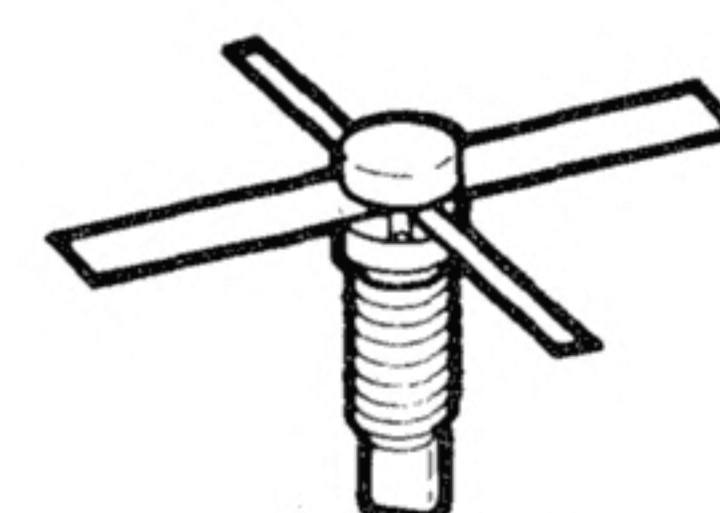
UHF Linear Power Transistor

... designed for pre-driver and driver stages in band IV and V TV transposers and transmitter amplifiers. The TPV590 uses gold metallized die with diffused emitter ballast resistors to enhance reliability, ruggedness and linearity.

- Band IV and V (470–860 MHz)
- 0.25 W — P_{ref} @ –58 dB IMD
- 28 V — V_{CC}
- High Gain — 14 dB Min, Class A @ $f = 860$ MHz
- Gold Metallization for Reliability

TPV590

28 V — 470–860 MHz
UHF LINEAR
POWER TRANSISTOR



.200 SOE
CASE 305B-01, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	24	Vdc
Collector-Base Voltage	V_{CBO}	45	Vdc
Emitter-Base Voltage	V_{EBO}	3.5	Vdc
Collector Current — Continuous	I_C	0.4	Adc
Operating Junction Temperature	T_J	200	°C
Storage Temperature Range	T_{stg}	–65 to +200	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case ($T_C = 70^\circ\text{C}$)	$R_{\theta JC}$	30	°C/W

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ($I_C = 10$ mA, $I_B = 0$)	$V_{(BR)CEO}$	24	—	—	Vdc
Collector-Base Breakdown Voltage ($I_C = 1$ mA, $I_E = 0$)	$V_{(BR)CBO}$	45	—	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = 0.25$ mA, $I_C = 0$)	$V_{(BR)EBO}$	3.5	—	—	Vdc
Collector-Emitter Breakdown Voltage ($I_C = 10$ mA, $R_{BE} = 10 \Omega$)	$V_{(BR)CER}$	50	—	—	Vdc
Collector Cutoff Current ($V_{CB} = 28$ V, $I_E = 0$)	I_{CBO}	—	—	0.25	mAdc

ON CHARACTERISTICS

DC Current Gain ($I_C = 100$ mA, $V_{CE} = 5$ V)	h_{FE}	20	—	120	—
---	----------	----	---	-----	---

DYNAMIC CHARACTERISTICS

Output Capacitance ($V_{CB} = 20$ V, $I_E = 0$, $f = 1$ MHz)	C_{ob}	—	—	3	pF
--	----------	---	---	---	----

(continued)

ELECTRICAL CHARACTERISTICS — continued

Characteristic	Symbol	Min	Typ	Max	Unit
FUNCTIONAL TESTS					
Common-Emitter Amplifier Power Gain ($V_{CE} = 20\text{ V}$, $P_{out} = 0.25\text{ W}$, $f = 860\text{ MHz}$, $I_E = 75\text{ mA}$)	G_{PE}	14	14.5	—	dB
Load Mismatch ($V_{CC} = 20\text{ V}$, $P_{out} = 0.25\text{ W}$, $I_E = 75\text{ mA}$, $f = 860\text{ MHz}$, Load VSWR = $\infty:1$, All Phase Angles)	ψ	No Degradation in Output Power			
Intermodulation Distortion, 3 Tone ($f = 860\text{ MHz}$, $V_{CE} = 20\text{ V}$, $I_E = 75\text{ mA}$, $P_{ref} = 0.25\text{ W}$, Vision Carrier = -8 dB ref. , Sound Carrier = -7 dB ref. , Sideband Signal = -16 dB ref. , Specification TV05001)	IMD ₁	—	-60	-58	dB
Cutoff Frequency ($V_{CE} = 20\text{ V}$, $I_E = 75\text{ mA}$)	f_T	3	—	—	GHz

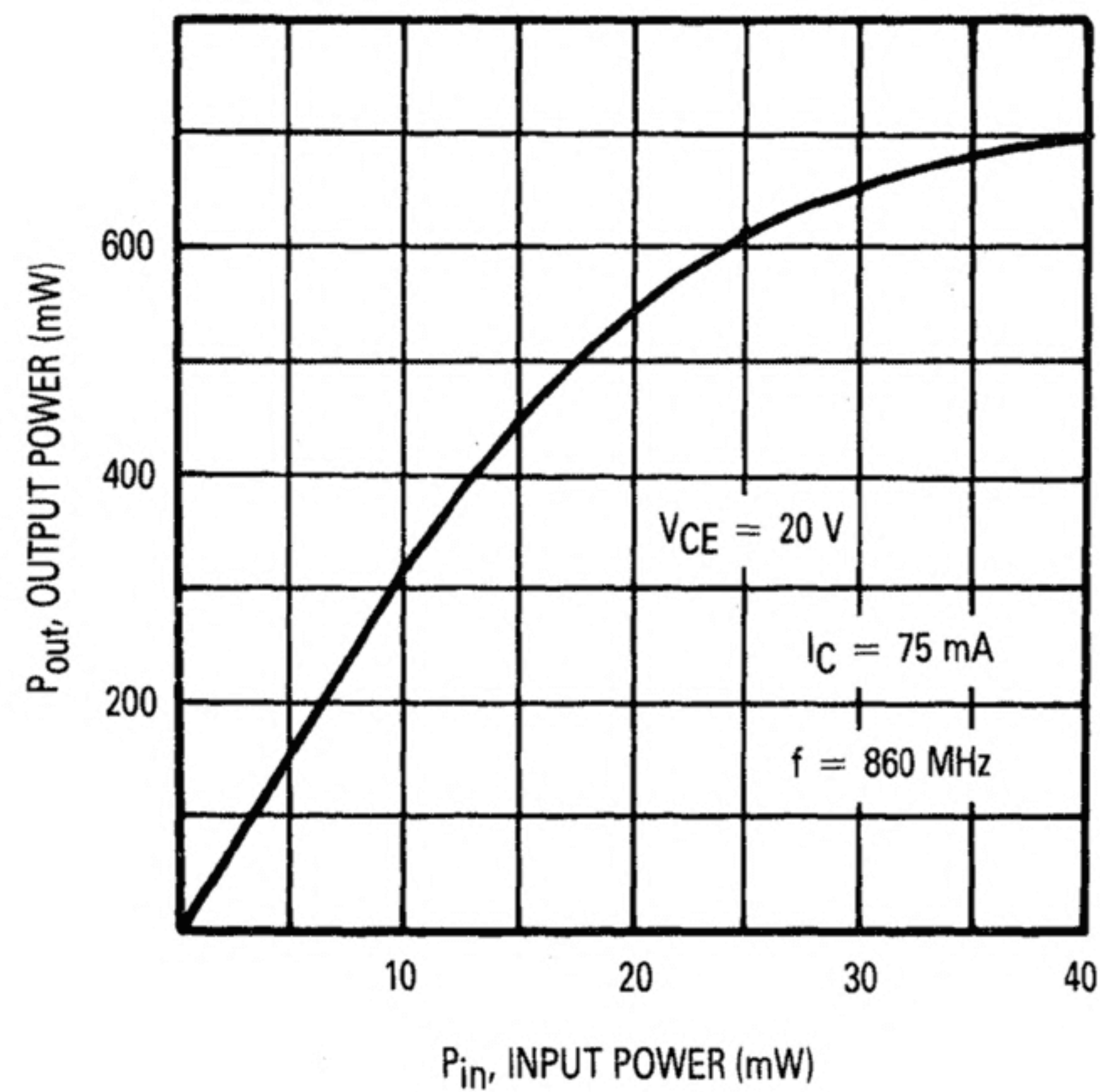


Figure 1. Output Power versus Input Power

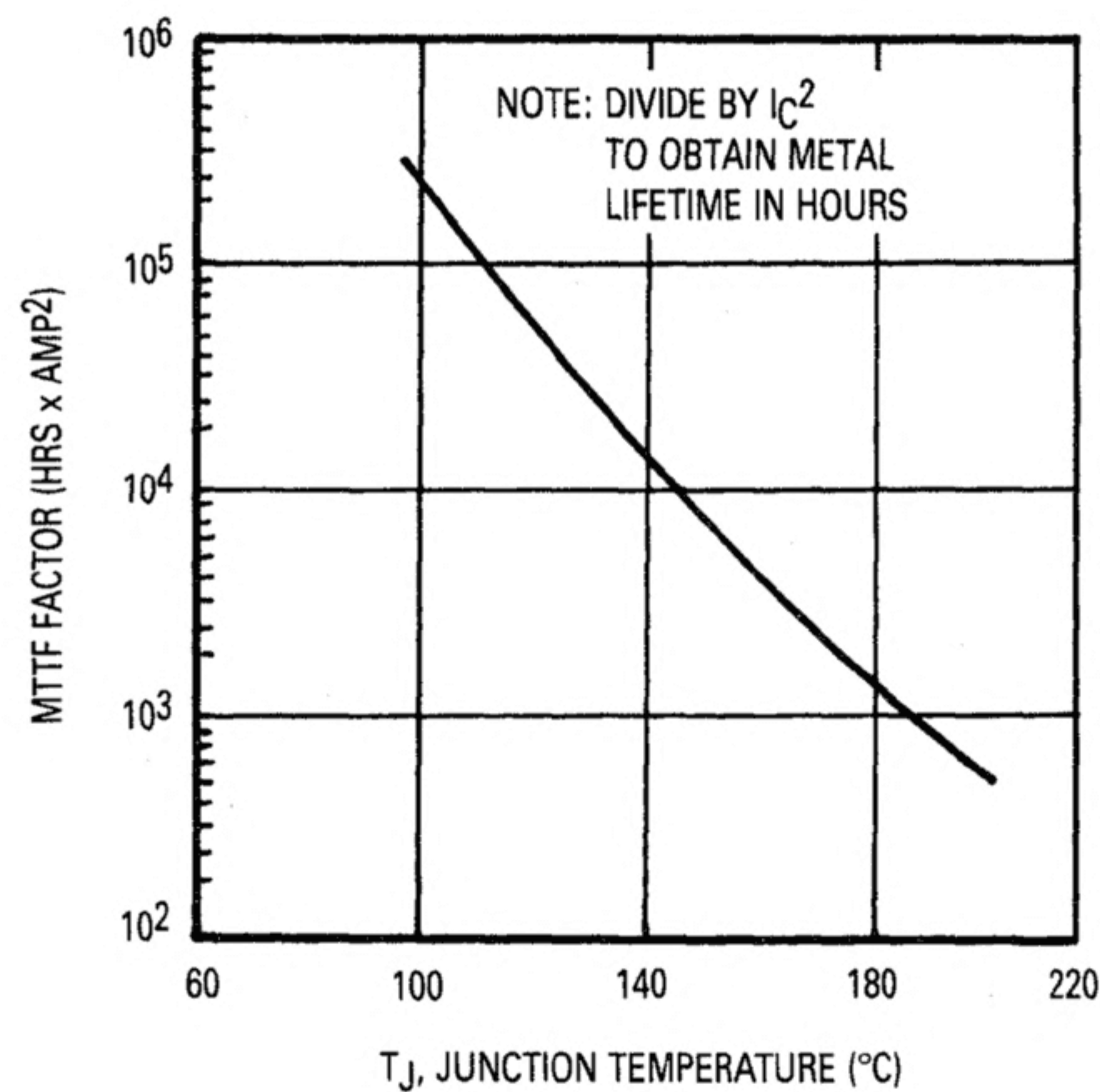


Figure 2. MTTF Factor versus Junction Temperature

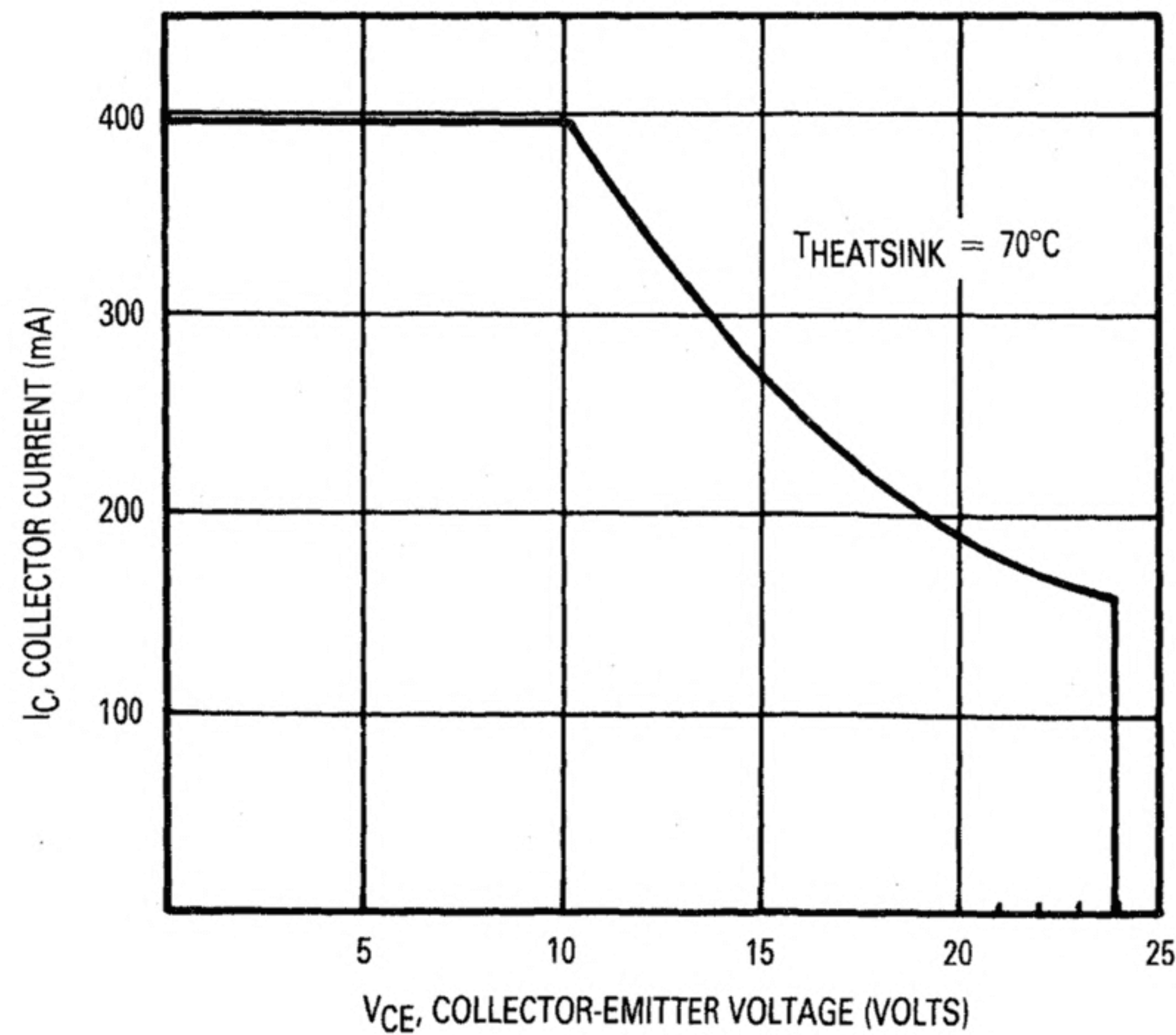


Figure 3. DC Safe Operating Area

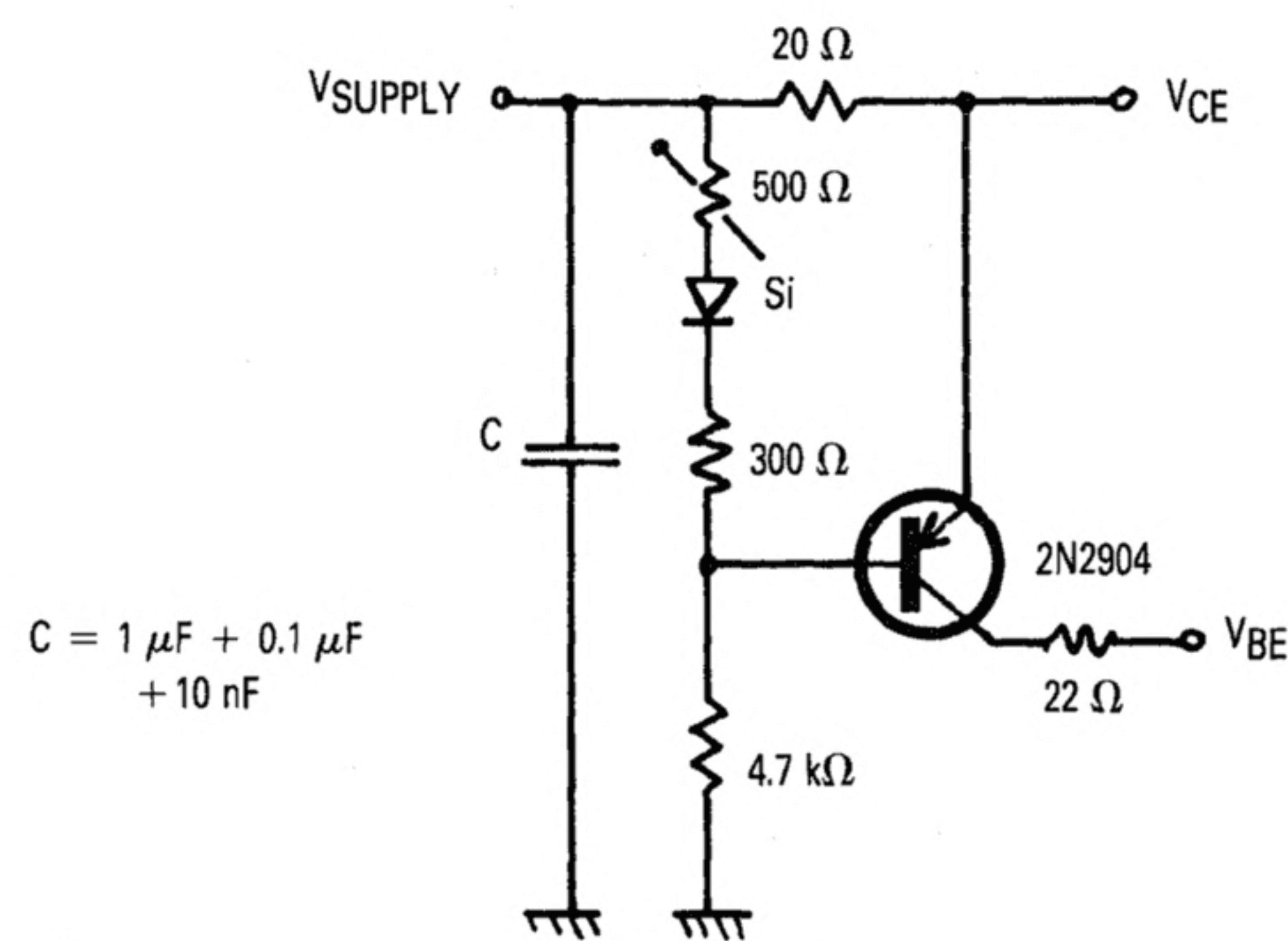


Figure 4. Bias Circuit

TPV590 S-PARAMETERS
V_{CE} = 20 V — I_C = 100 mA

POLAR S-PARAMETERS IN 50 OHM SYSTEM								
F	S 11		S 21		S 12		S 22	
MHz	Magn	Angl°	Magn	Angl°	Magn	Angl°	Magn	Angl°
100 MHz	0.613	226°	17.78	126°	0.0199	35°	0.530	320°
200 MHz	0.732	203°	12.88	103°	0.028	33°	0.316	305°
300 MHz	0.767	192.5°	9.22	93°	0.029	33°	0.266	297°
400 MHz	0.767	185°	6.91	84°	0.033	33°	0.266	295°
500 MHz	0.754	179.5°	5.16	79°	0.033	38°	0.266	300°
600 MHz	0.776	174°	4.67	72°	0.035	42°	0.237	300°
700 MHz	0.776	170°	4.02	66°	0.039	43°	0.237	290°
800 MHz	0.767	167°	3.34	61°	0.044	44°	0.266	285°
900 MHz	0.767	163°	3.16	56°	0.047	44°	0.237	290°
1 GHz	0.776	160°	2.786	52°	0.053	45°	0.266	280°

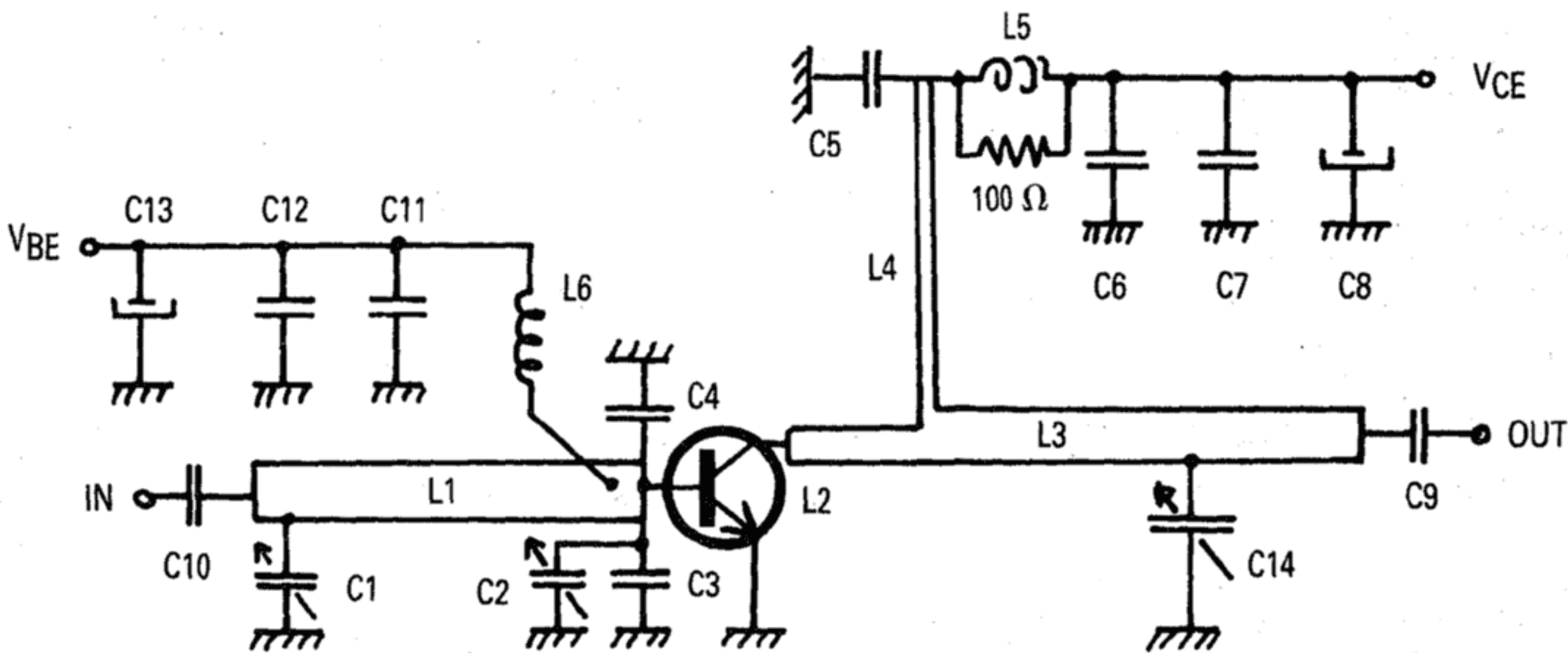


Figure 5. 860 MHz Test Circuit
V_{CE} = 20 V — I_C = 75 mA

- L1 — 50 Ω line l = 10% λ_g at 860 MHz
L2 — 100 Ω line l = 12% λ_g at 860 MHz
L3 — 50 Ω line l = 7% λ_g at 860 MHz
L4 — 120 Ω line l = 10% λ_g at 860 MHz
L5 — 6 turns ID 3 mm wire .5 mm
L6 — 6 turns ID 3 mm wire .5 mm
- C1, C2, C14 — variable AIRTRONIC C max 4.7 pF AT7275
C3, C4 — ATC chip 10 pF
C5 — 680 pF ATC chip
C6, C11 — 1 nF
C7, C12 — 10 nF
C8 — 10 μF 63 V
C13 — 10 μF 25 V
C9, C10 — 1 nF chip