

### RF Power Transistor



Island Labs

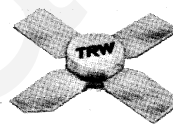
The TP 1045 is designed for 12.5 V VHF and UHF amplifiers.

Its high gain at reduced voltage and stripline package make it suitable for use in pocketphone applications.

The power output is useable to the top of its ratings and it is able to withstand an infinite VSWR at all phase angles at rated output power.

## 2 W - 470 MHz

## 12.5 V

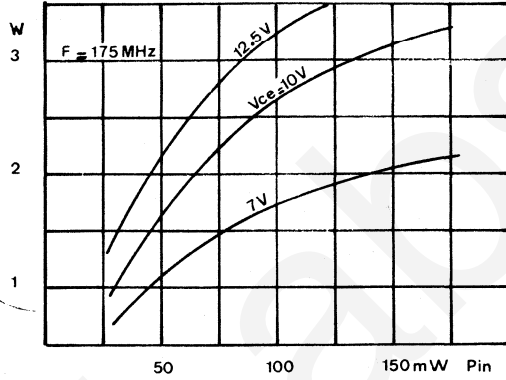
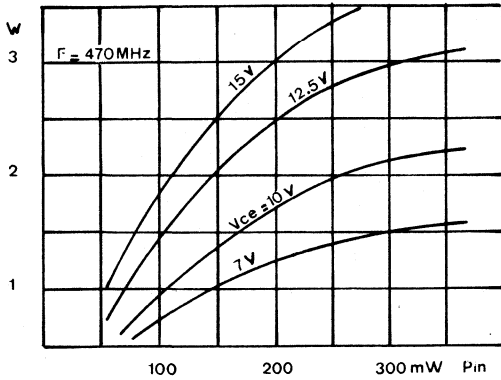


280 SOE STUDLESS

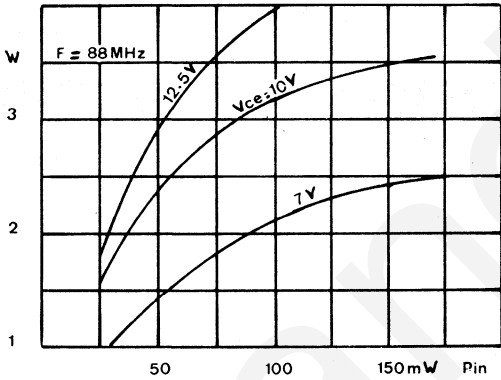
#### Electrical Characteristics (T<sub>case</sub> = 25 °C)

	SYMBOL	CHARACTERISTICS	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
DC Test	BV <sub>EBO</sub>	Emitter - Base Breakdown Voltage	I <sub>E</sub> = 1 mA I <sub>C</sub> = 0	4			V
	BV <sub>CEO</sub>	Collector - Emitter Breakdown Voltage	I <sub>C</sub> = 25 mA I <sub>B</sub> = 0	16			V
	BV <sub>CBO</sub>	Collector - Base Breakdown Voltage	I <sub>C</sub> = 5 mA I <sub>E</sub> = 0	36			V
	I <sub>CBO</sub>	Collector Cutoff Current	V <sub>CB</sub> = 15 V I <sub>E</sub> = 0			1	mA
	H <sub>FE</sub>	D.C Current Gain	V <sub>CE</sub> = 5 V I <sub>C</sub> = 100 mA	20			—
RF Test	P <sub>GAIN</sub>	Power Gain	V <sub>CE</sub> = 12.5 V F = 470 MHz P <sub>in</sub> = 0.2 W V <sub>CE</sub> = 9.5 V F = 175 MHz P <sub>in</sub> = 0.1 W V <sub>CE</sub> = 9.5 V F = 88 MHz P <sub>in</sub> = 0.1 W	2 1.5 1.5	2.2 2.9		W
	η	Efficiency	V <sub>CE</sub> = 12.5 V F = 470 MHz P <sub>out</sub> = 2 W	60			%
	Load VSWR	Mismatch Tolerance	All Phases Angles V <sub>CE</sub> = 12.5 V F = 470 MHz P <sub>out</sub> = 2 W		∞ : 1		
	Z <sub>in</sub>	Common Emitter Amplifier Input Impedance	V <sub>CE</sub> = 12.5 V F = 470 MHz P <sub>in</sub> = 0.2 W		1.96 + j 2.44		Ω
	Z <sub>Load</sub>	Common Emitter Amplifier Load Impedance	V <sub>CE</sub> = 12.5 V F = 470 MHz P <sub>out</sub> = 2 W		15.2 + j 18.2		Ω
	C <sub>OB</sub>	Collector - Base Capacitance	V <sub>CB</sub> = 15 V F = 1 MHz		5	8	pF
	Operating	I <sub>C</sub>	Continuous Collector Current				0.75
θ <sub>j-c</sub>		Thermal Resistance	T <sub>C</sub> = 25 °C			12	°C/W
T <sub>STG</sub>		Storage Temperature and Junction Temperature		- 65°		200°	°C
P <sub>D</sub>		Power Dissipation	T <sub>C</sub> = 25 °C			14.5	W

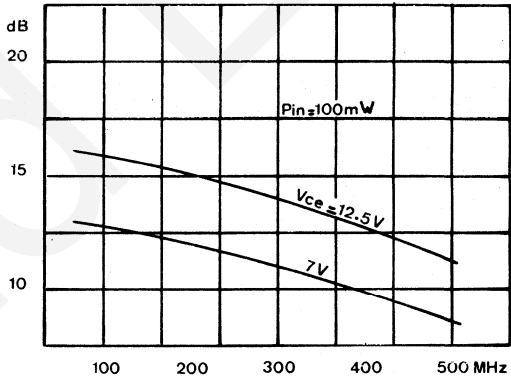
Output Power vs Input Power and Voltage Supply



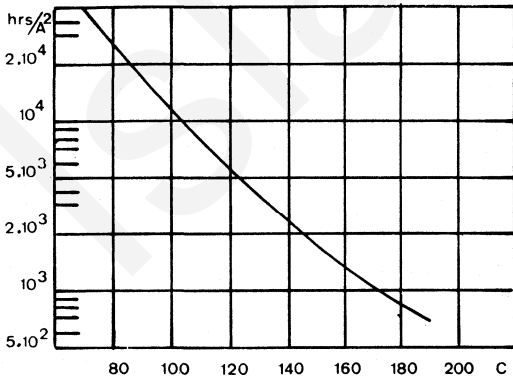
Output Power vs Input Power and Voltage Supply



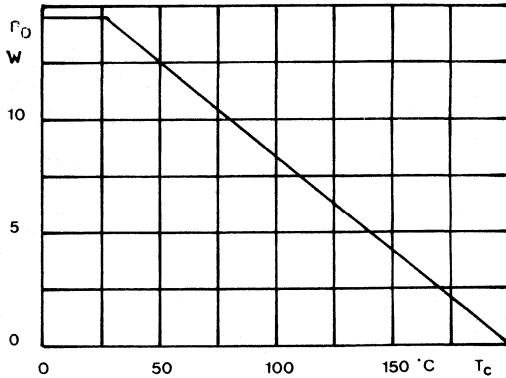
Power Gain vs Frequency and Voltage Supply



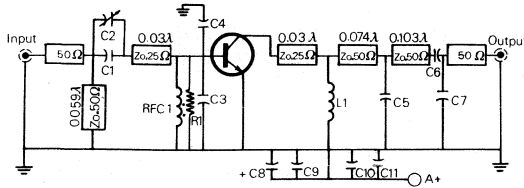
MTTF Factor vs Junction Temperature



Power - Temperature Derating Curve



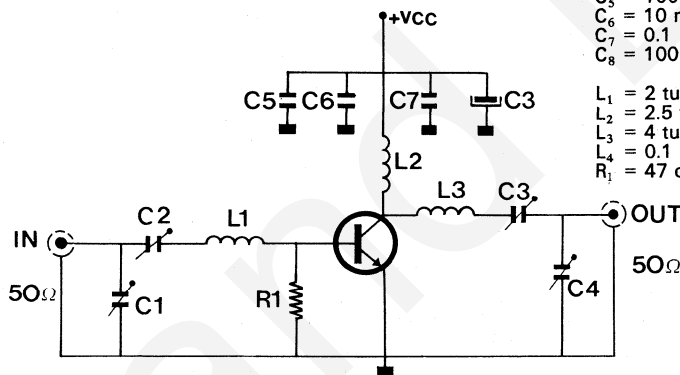
**TEST CIRCUIT  
BROADBAND (450-510 MHz)**



**COMPONENT AND MATERIAL LIST**

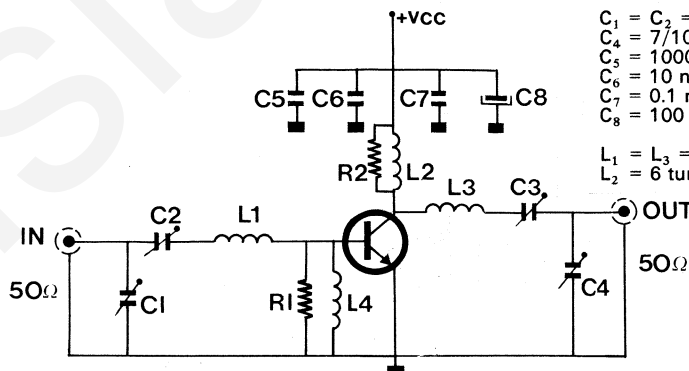
- C<sub>1</sub> 3.9 pF, ceramic chip
  - C<sub>2</sub>, C<sub>7</sub> 0.8-10 pF, Voltronics AP 10, variable
  - C<sub>3</sub>, C<sub>4</sub> 27 pF, ceramic chip
  - C<sub>5</sub> 15 pF, ceramic chip
  - C<sub>6</sub> 470 pF, ceramic chip
  - C<sub>8</sub> 5 μF, electrolytic
  - C<sub>9</sub> 1000 pF, Underwood
  - C<sub>10</sub> 0.1 μF, disc-ceramic
  - C<sub>11</sub> 0.01 μF, disc-ceramic
  - L<sub>1</sub> 2 turns # 22 enameled, 0.1" I.D.
  - R<sub>1</sub> 270 Ω, 1/2 watt, carbon
  - RFC-1 2 1/2 turns # 22 AWG on Ferroxcube VK211/17-4B
- All transmission lines reference at 480 MHz

**175 MHz TEST CIRCUIT**



- C<sub>1</sub> = 2-60 pF ARCO 404
- C<sub>2</sub> = 24-200 pF ARCO 425
- C<sub>3</sub> = 7-100 pF ARCO 425
- C<sub>4</sub> = 4-40 pF ARCO 423
- C<sub>5</sub> = 1000 pF UNELCO
- C<sub>6</sub> = 10 nF ceramic disc
- C<sub>7</sub> = 0.1 μF ceramic disc
- C<sub>8</sub> = 100 μF/35 V electrolytic
- L<sub>1</sub> = 2 turns - 8/10 mm wire - 4 mm I.D.
- L<sub>2</sub> = 2.5 turns - 8/10 mm wire on ferrite core
- L<sub>3</sub> = 4 turns - 8/10 mm wire - 4 mm I.D.
- L<sub>4</sub> = 0.1 μH Molded Coil
- R<sub>1</sub> = 47 ohms - 1/2 W carbon

**88 MHz TEST CIRCUIT**



- C<sub>1</sub> = C<sub>2</sub> = C<sub>3</sub> = 24/200 pF ARCO 425
- C<sub>4</sub> = 7/100 pF ARCO 423
- C<sub>5</sub> = 1000 pF UNELCO
- C<sub>6</sub> = 10 nF ceramic disc
- C<sub>7</sub> = 0.1 nF ceramic disc
- C<sub>8</sub> = 100 μF/35 V electrolytic
- L<sub>1</sub> = L<sub>3</sub> = 4 turns 14 AWG - 1/2" I.D.
- L<sub>2</sub> = 6 turns - 14 AWG - 1/2" I.D. close wound

# PACKAGE OUTLINE

## 280 SOE STUDLESS

