

The RF Line UHF Linear Power Transistor

... designed for very high output 1.5 V MATV amplifiers up to 860 MHz and 500 mW Band V TV transposer stages. Gold metallization and diffused emitter ballast resistors are used to enhanced reliability, ruggedness and linearity.

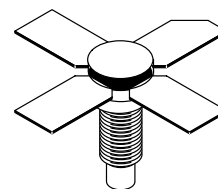
- Band IV and V (470–860 MHz)
- 0.5 W — P_{ref} @ –58 dB IMD
- High Gain — 12 dB Typ, Class A, $f = 860$ MHz
- Gold Metallization for Reliability

TPV596A

0.5 W, 470–860 MHz
UHF LINEAR
POWER TRANSISTOR

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	0.7	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	8.75 0.05	Watts W/ $^\circ\text{C}$
Operating Junction Temperature	T_J	200	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	–65 to +200	$^\circ\text{C}$



CASE 244–04, STYLE 1
(.280 SOE)

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case ($T_C = 70^\circ\text{C}$)	$R_{\theta JC}$	20	$^\circ\text{C/W}$

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ($I_C = 20$ mA, $I_B = 0$)	$V_{(BR)CEO}$	24	—	—	Vdc
Collector–Base Breakdown Voltage ($I_C = 1.0$ mA, $I_E = 0$)	$V_{(BR)CBO}$	45	—	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = 4.0$ mA, $I_C = 0$)	$V_{(BR)EBO}$	3.5	—	—	Vdc
Emitter–Base Leakage Current ($V_{EB} = 2.0$ V)	I_{EBO}	—	—	0.25	mA
Collector Cutoff Current ($V_{CB} = 28$ V, $I_E = 0$)	I_{CBO}	—	—	1.0	mAdc
Collector–Emitter Breakdown Voltage ($I_C = 20$ mA, $R_{BE} = 10$ Ω)	$V_{(BR)CER}$	50	—	—	Vdc

ON CHARACTERISTICS

DC Current Gain ($I_C = 100$ mA, $V_{CE} = 5.0$ V)	h_{FE}	15	—	120	—
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DYNAMIC CHARACTERISTICS

Output Capacitance ($V_{CB} = 28$ V, $I_E = 0$, $f = 1.0$ MHz)	C_{ob}	—	—	5.0	pF
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(continued)

ELECTRICAL CHARACTERISTICS — continued

Characteristic	Symbol	Min	Typ	Max	Unit
FUNCTIONAL TESTS					
Common-Emitter Amplifier Power Gain ($V_{CE} = 20\text{ V}$, $P_{out} = 0.5\text{ W}$, $f = 860\text{ MHz}$, $I_E = 0.22\text{ A}$)	G_{PE}	11.5	12	—	dB
Load Mismatch ($V_{CE} = 20\text{ V}$, $P_{out} = 1.0\text{ W}$, $I_E = 0.22\text{ A}$, $f = 860\text{ MHz}$, Load VSWR = $\infty:1$, All Phase Angles)	ψ	No Degradation in Output Power			
Intermodulation Distortion, 3 Tone ($f = 860\text{ MHz}$, $V_{CE} = 20\text{ V}$, $I_E = 0.22\text{ A}$, $P_{ref} = 1.0\text{ W}$, Vision Carrier = -8.0 dB , Sound Carrier = -7.0 dB , Sideband Signal = -16 dB , Specification TV05001)	IMD_1	—	—	-50	dB
Intermodulation Distortion (IDEM) ($f = 860\text{ MHz}$, $V_{CE} = 20\text{ V}$, $I_E = 0.22\text{ A}$, $P_{ref} = 0.5\text{ W}$, Vision Carrier = -8.0 dB , Sound Carrier = -10 dB , Sideband Signal = -16 dB)	IMD_2	—	-60	-58	dB

TYPICAL CHARACTERISTICS

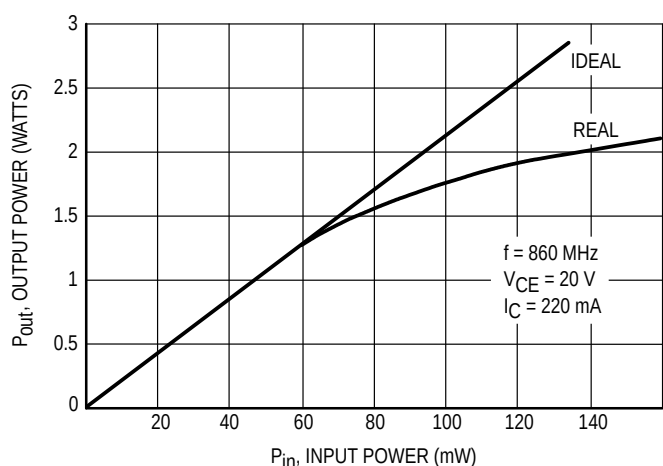


Figure 1. Power Output versus Power Input

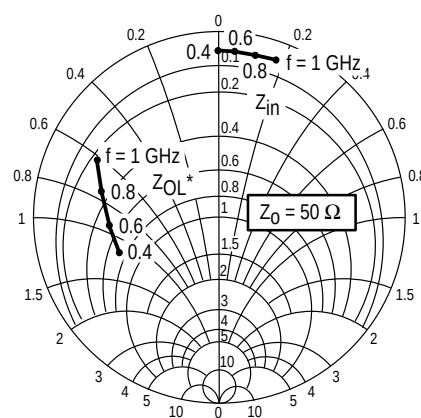


Figure 2. Large Signal Impedances
 $V_{CE} = 20\text{ V}$ — $I_C = 220\text{ mA}$

Z_{OL}^* = Conjugate of the optimum load impedance into which the device output operates at a given output power, voltage and frequency.

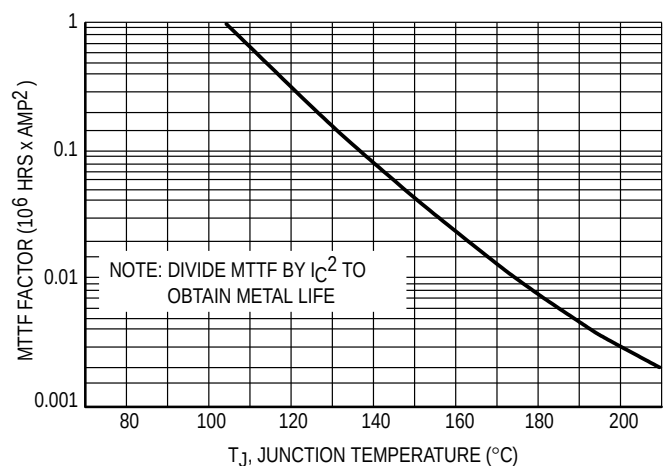


Figure 3. MTTF Factor versus Junction Temperature

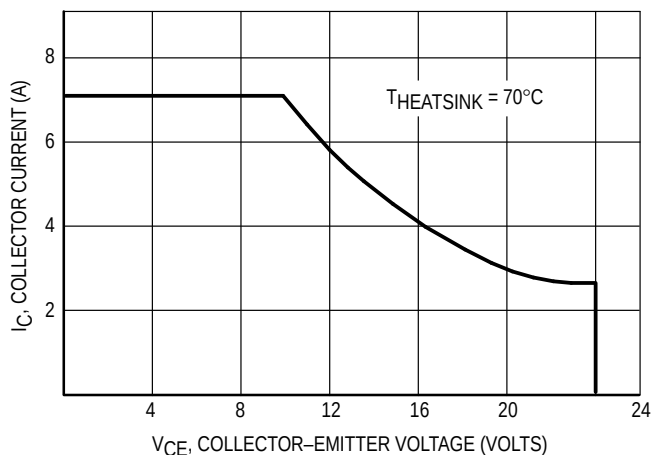
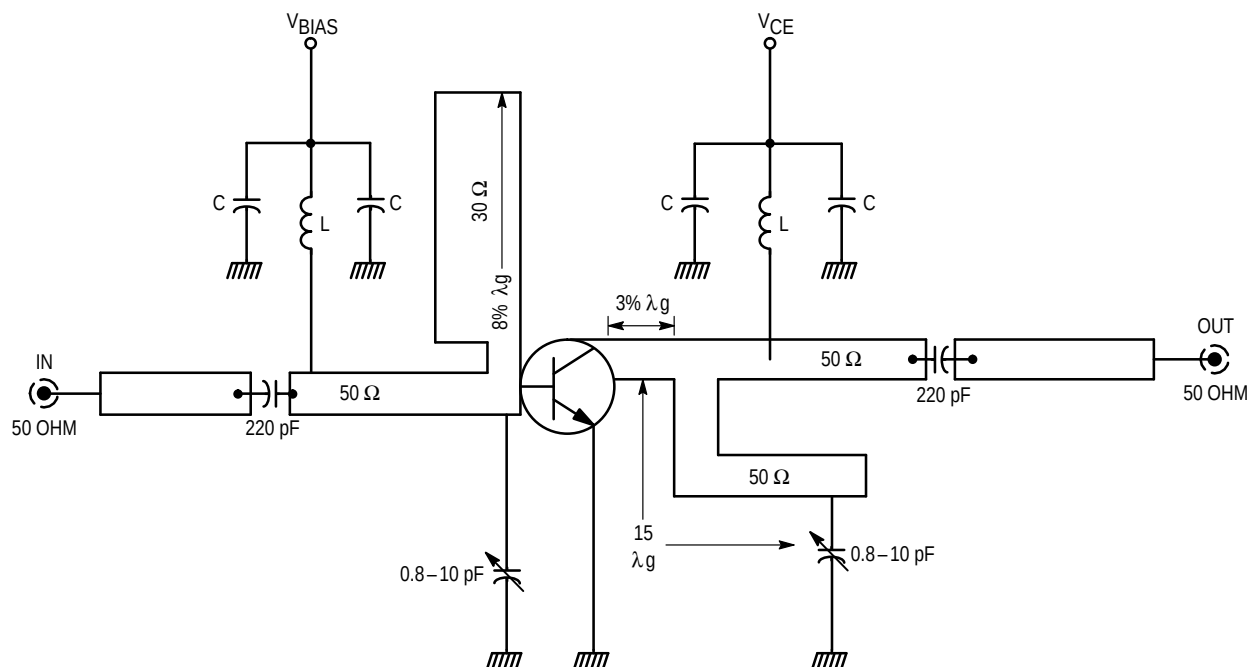


Figure 4. DC Safe Operating Area



NOTE: λg is the wave length in the microstrip circuit

Figure 5. 860 MHz Test Circuit

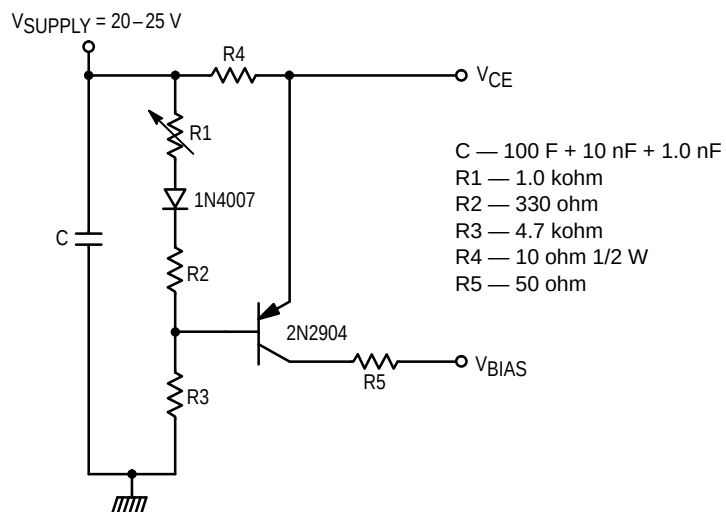
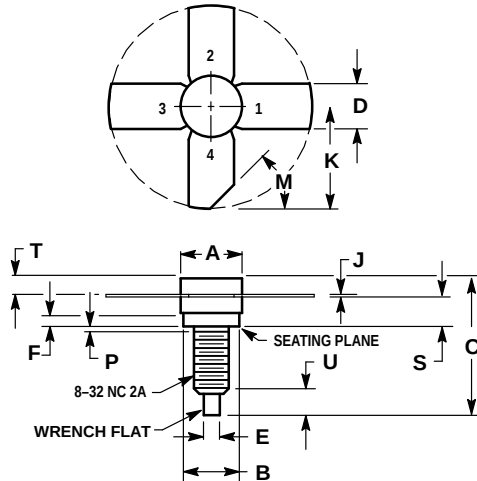


Figure 6. Class A Bias Circuit

PACKAGE DIMENSIONS



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	7.06	7.26	0.278	0.286
B	6.20	6.50	0.244	0.256
C	14.99	16.51	0.590	0.650
D	5.46	5.96	0.215	0.235
E	1.40	1.65	0.055	0.065
G	1.52	—	0.060	—
J	0.08	0.17	0.003	0.007
K	11.05	—	0.435	—
M	45° NOM		45° NOM	
P	—	1.27	—	0.050
S	3.00	3.25	0.118	0.128
T	1.40	1.77	0.055	0.070
U	2.92	3.68	0.115	0.145

STYLE 1:
 PIN 1. EMITTER
 2. BASE
 3. EMITTER
 4. COLLECTOR

CASE 244-04 ISSUE J

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How to reach us:

USA / EUROPE: Motorola Literature Distribution;
 P.O. Box 20912; Phoenix, Arizona 85036. 1-800-441-2447

JAPAN: Nippon Motorola Ltd.; Tatsumi-SPD-JLDC, Toshikatsu Otsuki,
 6F Seibu-Butsuryu-Center, 3-14-2 Tatsumi Koto-Ku, Tokyo 135, Japan. 03-3521-8315

MFAX: RMFAX0@email.sps.mot.com — TOUCHTONE (602) 244-6609
INTERNET: http://Design-NET.com

HONG KONG: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,
 51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298



TPV596A/D

