

## The RF Line UHF Linear Power Transistor

Designed for driver and output stages in band IV and V TV transposers and transmitter amplifiers. The TPV695A uses gold metallized die with diffused emitter ballast resistors to enhance reliability, ruggedness and linearity.

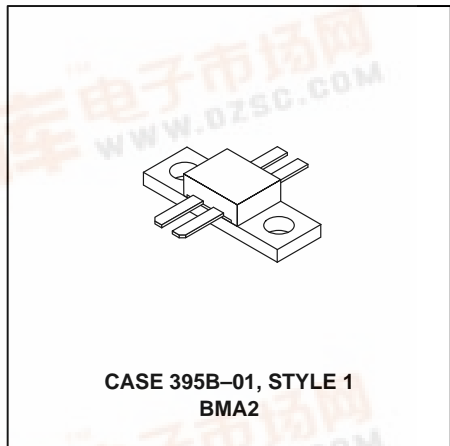
- Band IV and V (470–860 MHz)
- 14 W —  $P_{ref}$  @ -47 dB IMD
- 25 V —  $V_{CC}$
- High Gain — 10 dB Min, Class A,  $f = 860$  MHz
- Gold Metallization for Reliability
- Push-Pull Package



**14 W, 470–860 MHz  
 UHF LINEAR  
 POWER TRANSISTOR**

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	28	Vdc
Collector-Base Voltage	$V_{CES}$	50	Vdc
Emitter-Base Voltage	$V_{EBO}$	4.0	Vdc
Collector Current — Continuous	$I_C$	5.0	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	50 0.4	Watts W/ $^\circ\text{C}$
Operating Junction Temperature	$T_J$	200	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-50 to +200	$^\circ\text{C}$
Operating Case Temperature Range	$T_C$	-15 to +70	$^\circ\text{C}$



### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.5	$^\circ\text{C}/\text{W}$

### ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ( $I_C = 20$ mA, $I_B = 0$ )	$V_{(BR)CEO}$	28	—	—	Vdc
Collector-Emitter Breakdown Voltage ( $I_C = 20$ mA, $V_{BE} = 0$ )	$V_{(BR)CES}$	50	—	—	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 5.0$ mA, $I_C = 0$ )	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current ( $V_{CB} = 19$ V, $I_E = 0$ )	$I_{CBO}$	—	—	15	mAdc

### ON CHARACTERISTICS

DC Current Gain ( $I_C = 1.0$ A, $V_{CE} = 10$ V)	$h_{FE}$	20	—	80	—
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### DYNAMIC CHARACTERISTICS

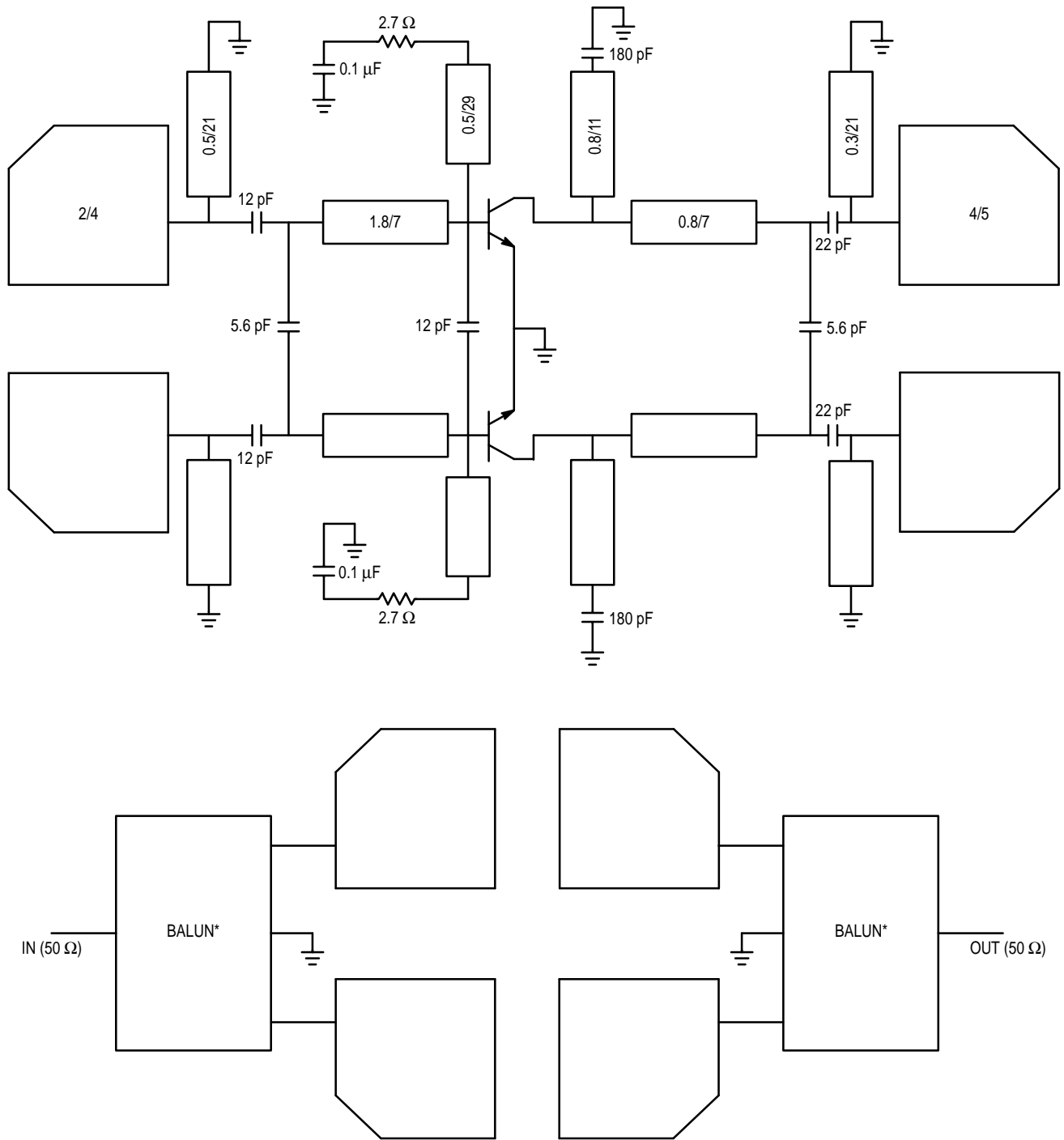
Output Capacitance ( $V_{CB} = 28$ V, $I_E = 0$ , $f = 1.0$ MHz)	$C_{ob}$	—	18	20	pF
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### FUNCTIONAL TESTS

Common-Emitter Amplifier Power Gain ( $V_{CE} = 25$ V, $P_{out} = 14$ W, $f = 860$ MHz, $I_C = 2.0 \times 900$ mA)	$G_{PE}$	10	—	—	dB
Overdrive (no degradation) ( $f = 470$ MHz, $V_{CE} = 25$ V, $I_C = 2.0 \times 900$ mA)	$P_{inover}$	12.5	—	—	W
Intermodulation Distortion, 3 Tone ( $f = 860$ MHz, $V_{CE} = 25$ V, $I_E = 2.0 \times 900$ mA, $P_{ref} = 14$ W, Vision Carrier = -7.0 dB, Sound Carrier = -8.0 dB, Sideband Signal = -16 dB, Specification TV05001)	$IMD_1$	—	-47	-46	dB



Dimension: width/length mm  
 Board Material — 1/50", Teflon Glass,  $\epsilon_r = 2.55$



— Balun is 50 Ω unbalanced to 2 x 25 Ω balanced

**Figure 1. 470–860 MHz Test Circuit**

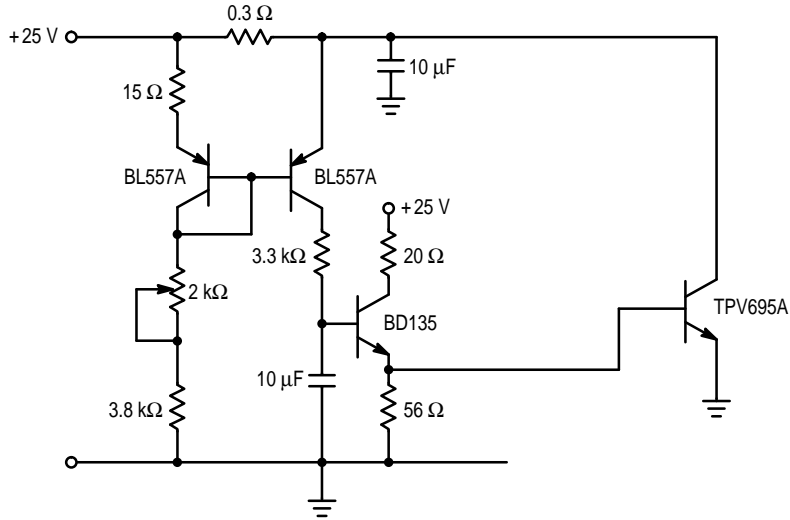


Figure 2. Bias Network

### Intermodulation Distortion, 3 Tone

**Test Conditions:**

@ -8 dB Ref. Vision Carrier, -7 dB Ref. Sound Carrier,

-16 dB Ref. Sideband Signal

$P_{ref} = 14$  Watts

$V_{CB} = 25$  Volts &  $I_{CS} = 2 \times 900$  mA

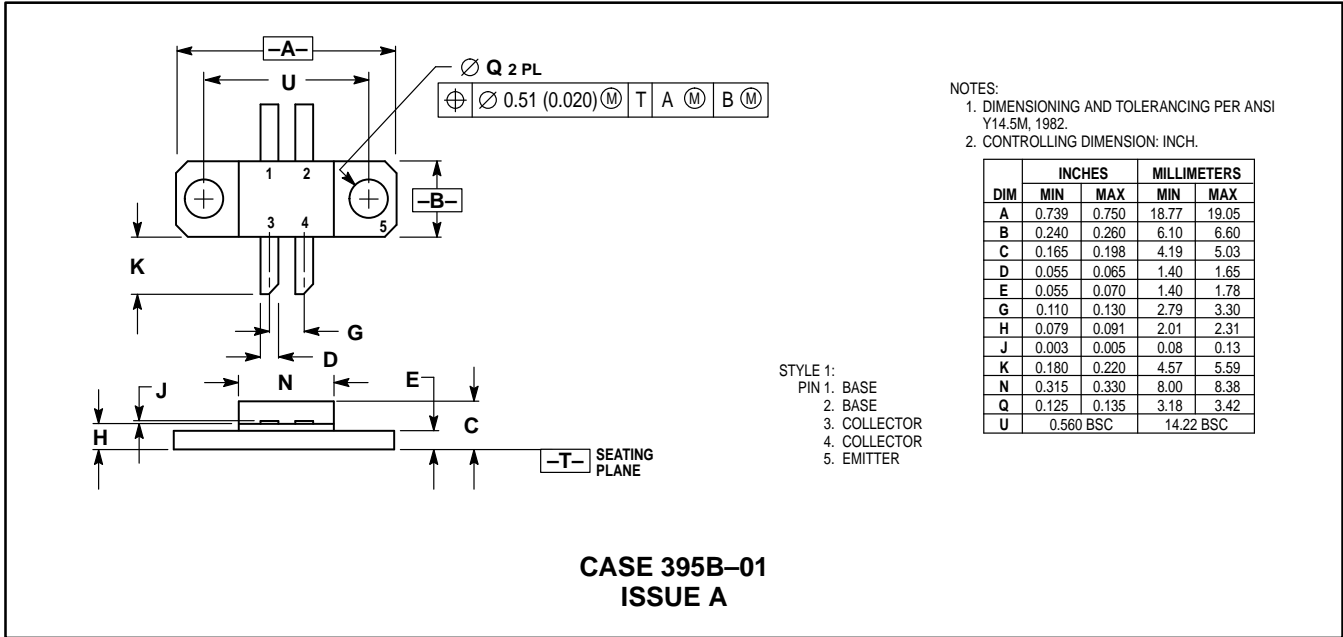
Frequency MHz	IMD dB
860	-47
760	-47
660	-47
560	-47
470	-48

Figure 3. IMD versus Frequency

f (MHz)	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	S <sub>11</sub>	∠φ	S <sub>21</sub>	∠φ	S <sub>12</sub>	∠φ	S <sub>22</sub>	∠φ
400	0.918	176.6	0.605	58.3	2.75·10 <sup>-4</sup>	-8.2	0.449	-173.1
450	0.908	175.6	1.44	53.1	3.01·10 <sup>-4</sup>	-11.8	0.452	-172.4
500	0.877	176.1	1.28	48.3	3.10·10 <sup>-4</sup>	-12.8	0.438	-171.7
550	0.889	174.5	1.21	42.3	3.72·10 <sup>-4</sup>	-16.3	0.452	-170.1
600	0.891	174.0	1.16	36.3	4.31·10 <sup>-4</sup>	-18.5	0.466	-168.9
650	0.863	173.6	1.15	29.9	6.11·10 <sup>-4</sup>	-25	0.469	-167.2
700	0.839	173.1	1.15	21.9	6.03·10 <sup>-4</sup>	-34.3	0.500	-165.5
750	0.805	172.8	1.15	13.8	6.55·10 <sup>-4</sup>	-39.9	0.541	-164.2
800	0.800	172.6	1.15	4.7	7.29·10 <sup>-4</sup>	-46.6	0.583	-163.5
850	0.771	172.3	1.20	-8.2	8.39·10 <sup>-4</sup>	-57.4	0.673	-163.1
900	0.762	172.2	1.11	-21.1	8.55·10 <sup>-4</sup>	-67.6	0.759	-164.3

Table 1. S-Parameters

## PACKAGE DIMENSIONS



NOTES:  
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
 2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.739	0.750	18.77	19.05
B	0.240	0.260	6.10	6.60
C	0.165	0.198	4.19	5.03
D	0.055	0.065	1.40	1.65
E	0.055	0.070	1.40	1.78
G	0.110	0.130	2.79	3.30
H	0.079	0.091	2.01	2.31
J	0.003	0.005	0.08	0.13
K	0.180	0.220	4.57	5.59
N	0.315	0.330	8.00	8.38
Q	0.125	0.135	3.18	3.42
U	0.560 BSC		14.22 BSC	

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

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