The RF Line

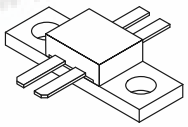
UHF Linear Power Transistor

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

TPV695A

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



**CASE 395B–01, STYLE 1
BMA2**

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°C Derate above 25°C	P_D	50 0.4	Watts W/°C
Operating Junction Temperature	T_J	200	°C
Storage Temperature Range	T_{stg}	–50 to +200	°C
Operating Case Temperature Range	T_C	–15 to +70	°C

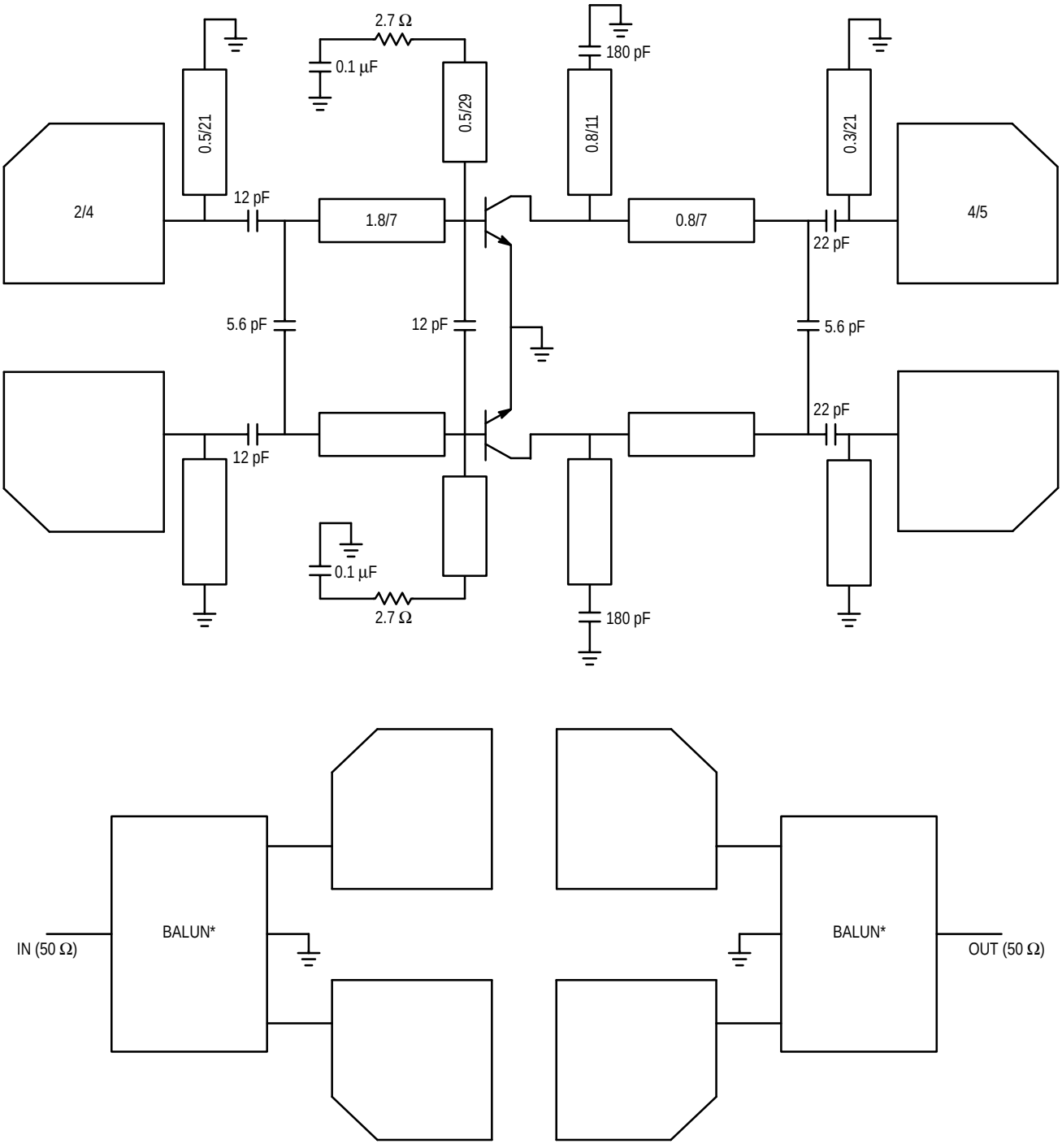
THERMAL CHARACTERISTICS

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

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
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	—
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 28 V, I_E = 0, f = 1.0 MHz)	C_{ob}	—	18	20	pF
FUNCTIONAL TESTS					
Common–Emitter Amplifier Power Gain (V_{CE} = 25 V, P_{out} = 14 W, f = 860 MHz, I_C = 2.0 x 900 mA)	G_{PE}	10	—	—	dB
Overdrive (no degradation) (f = 470 MHz, V_{CE} = 25 V, I_C = 2.0 x 900 mA)	$P_{in_{over}}$	12.5	—	—	W
Intermodulation Distortion, 3 Tone (f = 860 MHz, V_{CE} = 25 V, I_E = 2.0 x 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, ε_r = 2.55



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

Figure 1. 470 – 860 MHz Test Circuit

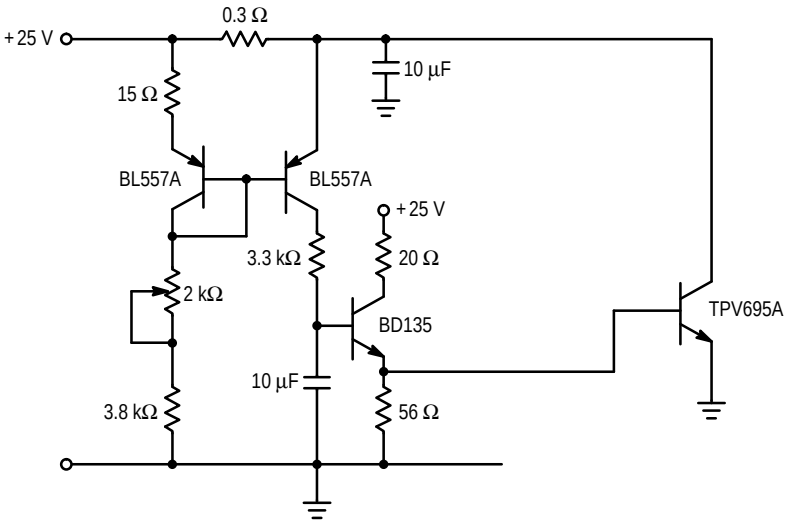


Figure 2. Bias Network

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 x 900 mA

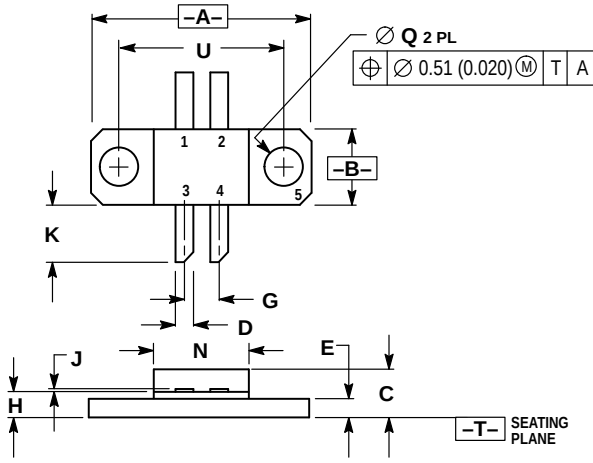
Frequency MHz	IMD dB
860	–47
760	–47
660	–47
560	–47
470	–48

Figure 3. IMD versus Frequency

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

Table 1. S–Parameters

PACKAGE DIMENSIONS



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

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

	INCHES		MILLIMETERS	
DIM	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	

CASE 395B–01
ISSUE A

How to reach us:
USA / EUROPE: Motorola Literature Distribution;
P.O. Box 20912; Phoenix, Arizona 85036. 1–800–441–2447

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

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

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