

The RF Line UHF Linear Power Transistor

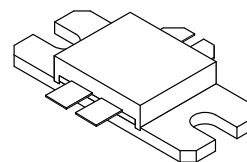
... designed for output stages in Band IV & V TV transmitter amplifiers. Internal matching of both input and output along with use of a push-pull package configuration aids broadband amplifier designs.

Gold metallized dice with diffused emitter ballast resistors enhances reliability, ruggedness and linearity.

- Band IV & V (470–860 MHz)
- 25 W — P_{ref} @ –45 dB IMD
- 25 V — V_{CC}
- Push-Pull Package
- Gold Metallization for Reliability

TPV7025

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



**CASE 398-03, STYLE 1
(BMA-4)**

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	28	Vdc
Collector–Base Voltage	V_{CBO}	45	Vdc
Emitter–Base Voltage	V_{EBO}	4.0	Vdc
Operating Junction Temperature	T_J	200	°C
Storage Temperature Range	T_{stg}	–50 to +200	°C
Operating Case Temperature	T_C	70	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case ($T_C = 70^\circ\text{C}$)	$R_{\theta JC}$	1.5	°C/W

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS (1)

Collector–Emitter Breakdown Voltage ($I_C = 120\text{ mA}$, $I_B = 0$)	$V_{(BR)CEO}$	28	—	—	Vdc
Collector–Base Breakdown Voltage ($I_C = 20\text{ mA}$, $I_E = 0$)	$V_{(BR)CBO}$	45	—	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = 6.0\text{ mA}$, $I_C = 0$)	$V_{(BR)EBO}$	4.0	—	—	Vdc

ON CHARACTERISTICS (1)

DC Current Gain ($I_C = 1.0\text{ A}$, $V_{CE} = 20\text{ V}$)	h_{FE}	10	—	60	—
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DYNAMIC CHARACTERISTICS (1)

Output Capacitance ($V_{CB} = 28\text{ V}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	C_{ob}	64	—	80	pF
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NOTE:

1. Each transistor chip measured separately.

(continued)

ELECTRICAL CHARACTERISTICS — continued

Characteristic	Symbol	Min	Typ	Max	Unit
FUNCTIONAL TESTS (2)					
Common-Emitter Amplifier Power Gain ($V_{CE} = 25\text{ V}$, $P_{out} = 25\text{ W}$, $f = 860\text{ MHz}$, $I_{CQ} = 3.2\text{ A}$)	G_{PE}	9.0	—	10.5	dB
Load Mismatch ($V_{CE} = 25\text{ V}$, $P_{out} = 24\text{ W}$, $f = 860\text{ MHz}$, Load VSWR = $\infty:1$, All Phase Angles)	ψ	No Degradation in Output Power			
Overdrive ($f = 470\text{ MHz}$, 2 tones, $V_{CE} = 25\text{ V}$, $I_C = 3.2\text{ A}$) (No Degradation)	P_{inover}	24	—	—	W
Intermodulation Distortion, 3 Tone ($f = 860\text{ MHz}$, $V_{CE} = 25\text{ V}$, $I_E = 3.2\text{ A}$, $P_{ref} = 25\text{ W}$, Vision Carrier = -8.0 dB , Sound Carrier = -7.0 dB , Sideband Signal = -16 dB , Specification TV05001)	IMD_1	—	—	-45	dB
Cross Modulation Distortion ($P_{ref} = 25\text{ W}$, $f = 860\text{ MHz}$, $\Delta\%$ Sound = (-7.0 dB) , Vision 0 – Peak)	X_{MOD}	—	—	20	%

NOTE:

- Both transistor chips operating in push-pull amplifier.

TYPICAL CHARACTERISTICS

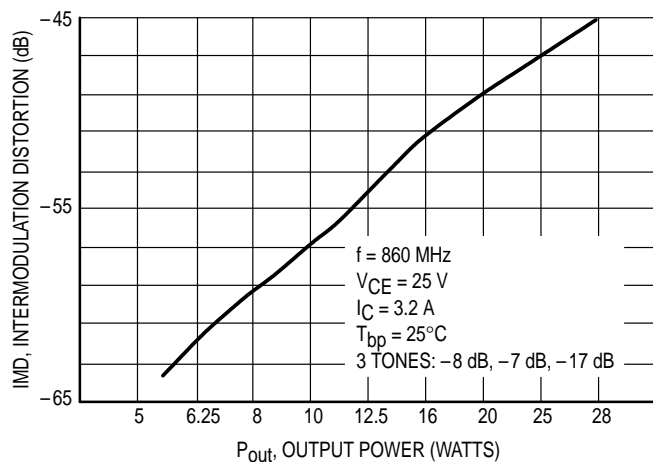


Figure 1. IMD versus Output Power

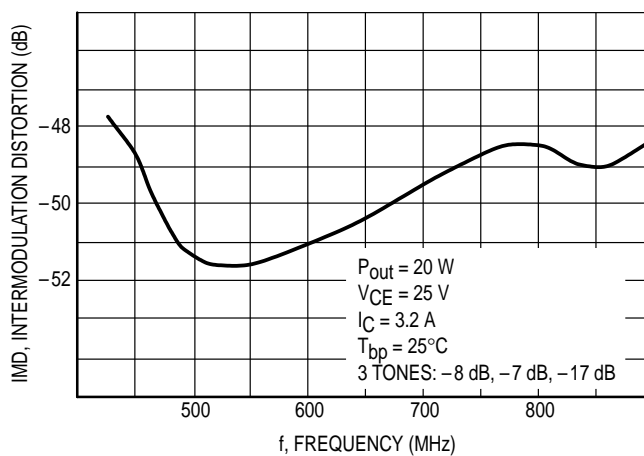


Figure 2. IMD versus Frequency

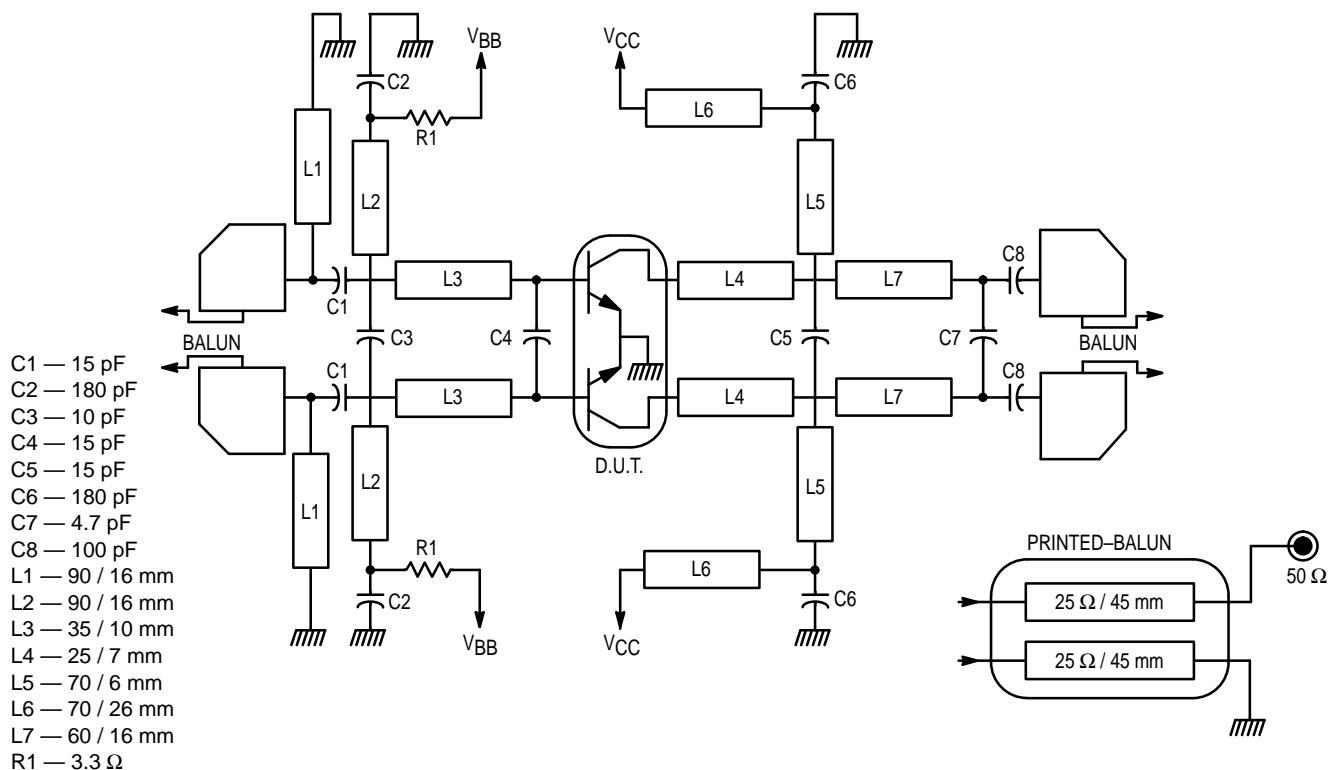
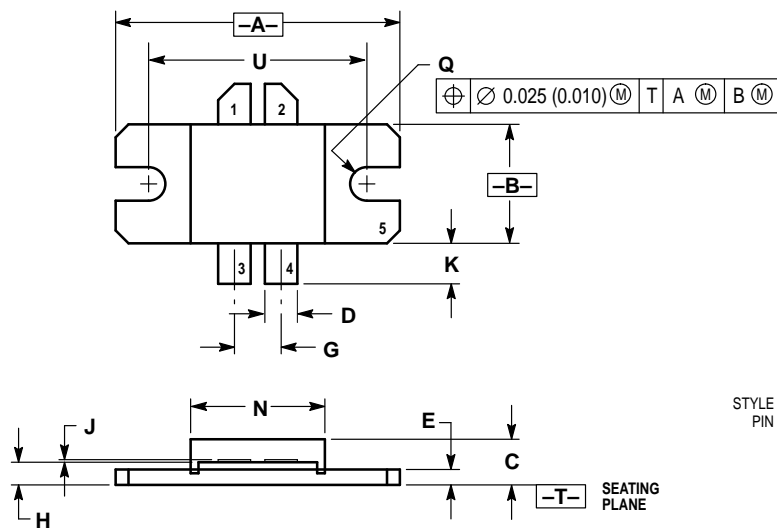


Figure 3. 470–860 MHz Broadband Test Circuit

V _{CE} (Volts)	I _C (A)	f (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
			Mag	ϕ	Mag	ϕ	Mag	ϕ	Mag	ϕ
25	2 x 1.8	0.44	1.0	178	1.25	80	0.02	29	0.89	156
		0.46	1.0	176	1.25	84	0.02	31	0.78	151
		0.48	1.0	174	1.30	81	0.02	30	0.70	148
		0.50	0.99	173	1.39	75	0.02	29	0.65	145
		0.52	0.98	171	1.42	70	0.03	26	0.59	142
		0.54	0.97	173	1.52	65	0.03	17	0.53	140
		0.56	0.97	171	1.67	67	0.03	12	0.46	139
		0.58	0.94	169	1.77	49	0.03	8.0	0.39	138
		0.60	0.92	164	1.93	40	0.04	0	0.31	142
		0.62	0.89	163	2.05	30	0.04	-9.0	0.23	157
		0.64	0.86	163	2.19	18	0.05	-19	0.21	-173
		0.66	0.82	164	2.29	4.0	0.05	-30	0.30	-150
		0.68	0.79	166	2.29	-11	0.05	-42	0.43	-147
		0.70	0.79	169	2.16	-26	0.05	-55	0.57	-150
		0.72	0.79	171	1.99	-40	0.05	-66	0.68	-155
		0.74	0.82	172	1.80	-52	0.05	-76	0.77	-161
		0.76	0.84	172	1.59	-63	0.04	-87	0.83	-168
		0.78	0.86	172	1.38	-74	0.04	-96	0.86	-173
		0.80	0.88	171	1.23	-82	0.03	-102	0.88	-178
		0.82	0.89	170	1.10	-88	0.03	-106	0.88	178
		0.84	0.90	170	0.99	-94	0.03	-110	0.89	175
		0.86	0.90	169	0.89	-100	0.03	-115	0.88	172
		0.88	0.90	168	0.80	-107	0.03	-119	0.87	170

Table 1. Common Emitter 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	1.094	1.110	27.79	28.19
B	0.457	0.465	11.61	11.81
C	0.165	0.182	4.25	4.62
D	0.121	0.131	3.08	3.32
E	0.055	0.065	1.40	1.65
G	0.177	0.185	4.50	4.69
H	0.081	0.091	2.06	2.31
J	0.002	0.004	0.06	0.10
K	0.142	0.163	3.60	4.14
N	0.510	0.520	12.95	13.21
Q	0.125	0.135	3.18	3.42
U	0.844	BSC	21.44	BSC

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

CASE 398-03
ISSUE C

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