MRF525

CASE 79-03, STYLE 5
TO-39 (TO-205AD)

HIGH FREQUENCY TRANSISTOR

NPN SILICON

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage R_{BE} = 330 Ω	V_{CER}	25	Vdc
Collector-Base Voltage	V_{CBO}	35	Vdc
Emitter-Base Voltage	V_{EBO}	3.5	Vdc
Collector Current — Continuous	I_C	150	mAdc
Total Device Dissipation @ T_A = 50°C Derate above 50°C	P_D	2.5 0.017	Watts W/°C
Junction Temperature	T_J	+175	°C
Storage Temperature	T_{stg}	−65 to +200	°C

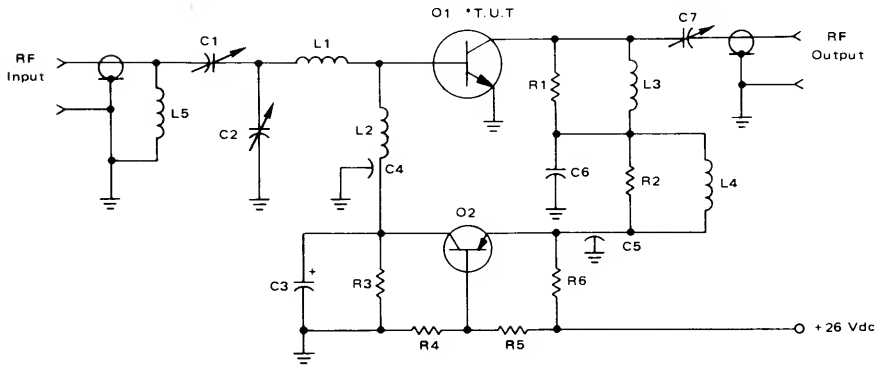
THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	60	°C/W

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 5.0 mAdc, I_B = 0)	$V_{(BR)CEO}$	20	—	—	Vdc
Collector-Emitter Breakdown Voltage (I_C = 5.0 mAdc, R_{BE} = 330 Ohms)	$V_{(BR)CER}$	25	—	—	Vdc
Collector-Base Breakdown Voltage (I_C = 0.1 mA, I_E = 0)	$V_{(BR)CBO}$	35	—	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 0.1 mA, I_C = 0)	$V_{(BR)EBO}$	3.5	—	—	Vdc
Collector Cutoff Current (V_{CE} = 15 Vdc, I_B = 0)	I_{CEO}	—	—	100	μA
ON CHARACTERISTICS					
DC Current Gain (I_C = 80 mAdc, V_{CE} = 10 Vdc)	h_{FE}	60	—	175	—
SMALL SIGNAL CHARACTERISTICS					
Current-Gain — Bandwidth Product (I_C = 50 mAdc, V_{CE} = 20 Vdc, f = 200 MHz)	f_T	2.2	2.5	—	GHz
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 1.0 MHz)	C_{obo}	—	3.0	4.0	pF
FUNCTIONAL TEST (FIGURE 1)					
Common-Emitter Amplifier Power Gain (V_{CC} = 26 Vdc, P_{in} = 0 dBm, f = 400 MHz)	G_{PE}	13	14	—	dB
Broadband Noise Figure (V_{CE} = 26 Vdc, f = 400 MHz)	NF	—	—	4.0	dB

FIGURE 1 – 225 to 400 MHz BROADBAND TEST CIRCUIT SCHEMATIC



C1, C2 – 2.5-11 pF Erie Ceramic Variable
C3 – 47 μF 6.0 Volt Electrolytic
C4, C5 – 1000 pF Feedthru
C6 – 470 pF Ceramic Chip
C7 – 5.5-18 pF Erie Ceramic Variable

R1 – 150 Ω 1/8 Watt Carbon
R2 – 100 Ω 1/8 Watt Carbon
R3, R4 – 10 kΩ 1/8 Watt Carbon
R5 – 3.3 kΩ 1/8 Watt Carbon
R6 – 120 Ω 1/2 Watt Carbon

L1 – 1 Turn #24, 0.125 mil ID
L2, L4 – 0.47 μH Molded Choke
L3 – 2 Turns #24, 0.125 mil ID
L5 – 4 Turns #24, 0.125 mil ID

Q2 – 2N2907A

*Transistor Under Test
I_E = 47 mAdc (Nominal)

FIGURE 2 – COMMON-EMITTER POWER GAIN (G_{max}) versus FREQUENCY

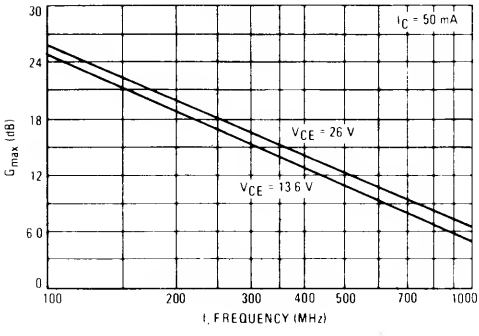


FIGURE 3 – CURRENT GAIN BANDWIDTH PRODUCT versus COLLECTOR CURRENT

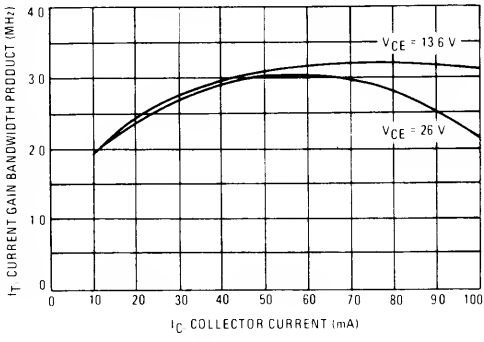


FIGURE 4 – BROADBAND AMPLIFIER RESPONSE

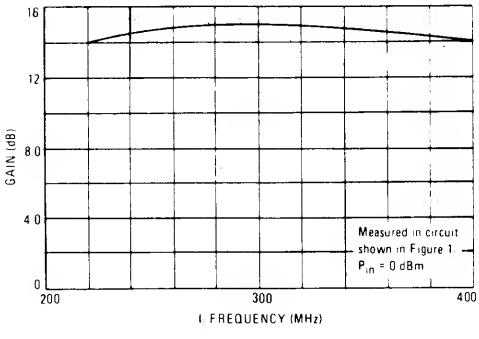


FIGURE 5 – 1.0 dB GAIN COMPRESSION OUTPUT versus FREQUENCY

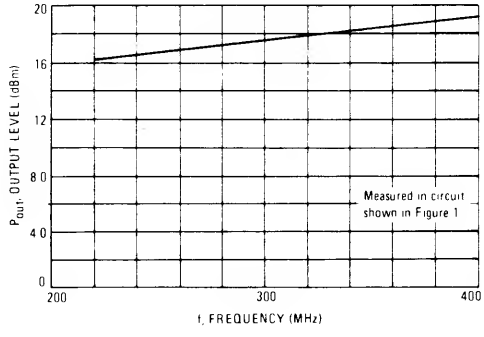
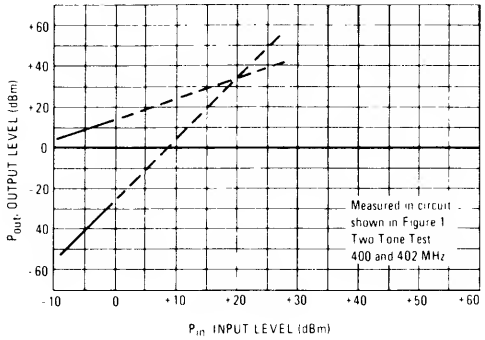


FIGURE 6 – THIRD ORDER INTERCEPT



S–PARAMETERS

V_{CE} (Volts)	I_C (mA)	Frequency (MHz)	S11		S21		S12		S22	
			|S11|	∠φ	|S21|	∠φ	|S12|	∠φ	|S22|	∠φ
13.6	10	100	0.388	-111	12.318	107	0.032	61	0.597	-24
		200	0.331	-151	6.768	88	0.049	68	0.480	-25
		300	0.337	-171	4.650	77	0.072	73	0.443	-31
		400	0.344	176	3.580	68	0.096	78	0.442	-40
		500	0.349	166	2.889	59	0.125	80	0.459	-47
	20	100	0.287	-125	14.160	103	0.030	67	0.516	-24
		200	0.263	-160	7.585	86	0.053	73	0.414	-23
		300	0.275	-177	5.167	76	0.078	76	0.378	-30
		400	0.288	172	3.968	68	0.104	77	0.378	-38
		500	0.293	164	3.214	60	0.135	78	0.396	-45
	50	100	0.206	-140	15.745	99	0.029	74	0.446	-24
		200	0.208	-171	8.299	84	0.056	76	0.358	-21
		300	0.226	176	5.612	75	0.084	76	0.324	-27
		400	0.235	169	4.307	68	0.113	77	0.326	-36
		500	0.243	161	3.488	60	0.114	76	0.345	-42
	100	100	0.179	-151	15.931	98	0.029	77	0.430	-22
		200	0.187	-177	8.293	85	0.058	80	0.358	-19
		300	0.203	171	5.626	77	0.087	80	0.330	-25
		400	0.212	164	4.276	70	0.115	80	0.338	-33
		500	0.213	157	3.456	63	0.147	79	0.364	-39
26	10	100	0.454	-100	13.580	105	0.027	58	0.625	-15
		200	0.313	-138	7.339	88	0.040	67	0.552	-17
		300	0.291	-161	4.989	78	0.060	76	0.532	-23
		400	0.287	-175	3.826	70	0.080	84	0.544	-30
		500	0.287	173	3.096	63	0.106	89	0.570	-36
	20	100	0.313	-105	15.191	102	0.025	62	0.566	-14
		200	0.220	-144	8.086	87	0.044	73	0.509	-15
		300	0.213	-166	5.487	77	0.067	78	0.489	-20
		400	0.215	-178	4.204	71	0.092	83	0.498	-28
		500	0.214	170	3.404	64	0.116	86	0.523	-34
	50	100	0.165	-117	16.375	102	0.026	71	0.529	-14
		200	0.139	-157	8.695	87	0.048	78	0.471	-14
		300	0.151	-176	5.882	78	0.073	80	0.449	-20
		400	0.157	173	4.494	71	0.098	82	0.458	-27
		500	0.158	164	3.659	65	0.124	84	0.485	-32
	100	100	0.215	-147	13.156	103	0.023	72	0.602	-14
		200	0.212	-176	7.220	88	0.044	82	0.536	-17
		300	0.222	171	4.951	79	0.069	84	0.507	-24
		400	0.230	164	3.851	72	0.093	87	0.513	-31
		500	0.233	156	3.123	64	0.123	89	0.534	-36