The RF Line

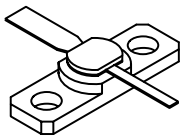
Microwave Linear Power Transistor

. . . designed primarily for wideband, large–signal output and driver amplifier stages in the 1.0 to 3.0 GHz frequency range.

- Designed for Class A or AB, Common–Emitter Linear Power Amplifiers
- Specified 20 Volt, 3.0 GHz Characteristics:
  Output Power — 0.8 Watts
  Power Gain — 7.5 to 8.5 dB, Min
- Gold Metallization for Improved Reliability
- Diffused Ballast Resistors

MRW53601

7.5 – 8.5 dB
1.0 – 3.0 GHz
0.8 WATT
MICROWAVE LINEAR
POWER TRANSISTOR



CASE 328A–03, STYLE 1
(GP–13)

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	22	Vdc
Collector–Base Voltage	V_{CES}	50	Vdc
Emitter–Base Voltage	V_{EBO}	3.5	Vdc
Operating Junction Temperature	T_J	200	°C
Storage Temperature Range	T_{stg}	–65 to +200	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, RF, Junction to Case	$R_{\theta JC}$	31	°C/W
Thermal Resistance, DC, Junction to Case	$R_{\theta JC}$	35	°C/W

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage (I_C = 10 mA, I_B = 0)	$V_{(BR)CEO}$	22	—	—	Vdc
Collector–Emitter Breakdown Voltage (I_C = 10 mA, V_{BE} = 0)	$V_{(BR)CES}$	50	—	—	Vdc
Collector–Base Breakdown Voltage (I_C = 1.0 mA, I_E = 0)	$V_{(BR)CBO}$	45	—	—	Vdc
Emitter–Base Breakdown Voltage (I_E = 0.25 mA, I_C = 0)	$V_{(BR)EBO}$	3.5	—	—	Vdc
Collector Cutoff Current (V_{CB} = 28 V, I_E = 0)	I_{CBO}	—	—	0.25	mAdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 100 mA, V_{CE} = 5.0 V)	h_{FE}	20	—	120	—
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 28 V, I_E = 0, f = 1.0 MHz)	C_{ob}	—	—	3.5	pF

(continued)

ELECTRICAL CHARACTERISTICS — continued

Characteristic	Symbol	Min	Typ	Max	Unit
FUNCTIONAL TESTS					
Common–Emitter Amplifier Power Gain (V_{CE} = 20 V, P_{out} = 0.8 W, f = 2.0 GHz)	G_{PE}	8.5	—	—	dB
Load Mismatch (V_{CE} = 20 V, I_E = 120 mA, P_{out} = 0.8 W, f = 2.0 GHz, Load VSWR = ∞:1, All Phase Angles)	ψ	No Degradation in Output Power			
Cutoff Frequency (V_{CE} = 20 V, I_E = 120 mA)	f_τ	—	3.0	—	GHz
Gain Linearity (V_{CE} = 20 V, I_E = 120 mA, f = 2.0 GHz, P_{o1} = 0.8 W, P_{o2} = 0.8 mW)	L_G	— —	— —	–0.2 +1.0	dB
Intermodulation Distortion, 3rd Order (V_{CE} = 20 V, I_E = 120 mA, P_o (PEP) = 0.8 W, Tones at 2.0 GHz and 3.005 GHz)	IMD	—	–30	—	dB

TYPICAL CHARACTERISTICS

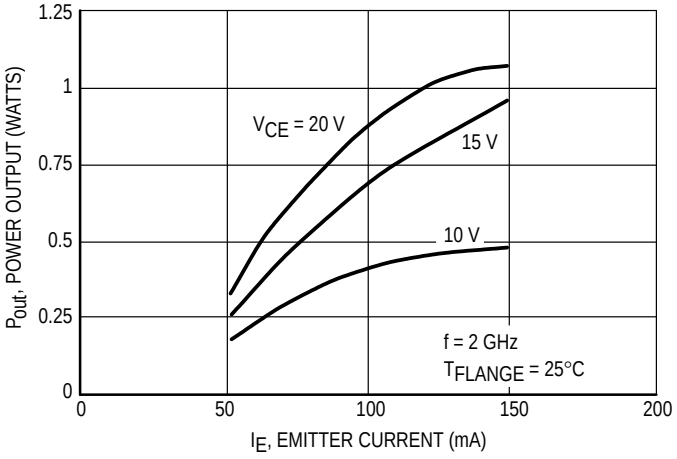


Figure 1. 1.0 dB Compression Point versus Emitter Current

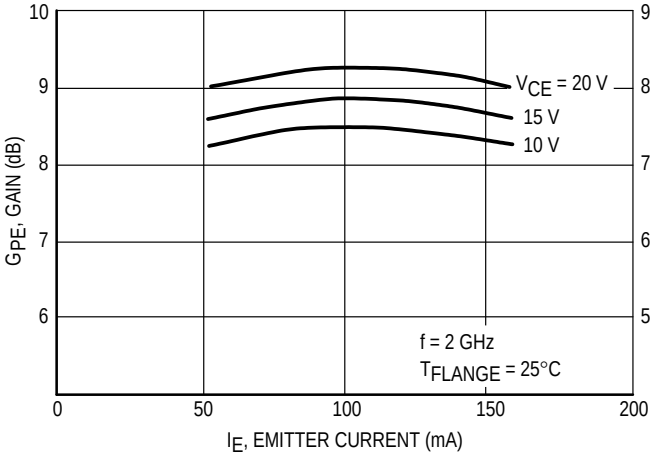


Figure 2. Gain versus Emitter Current

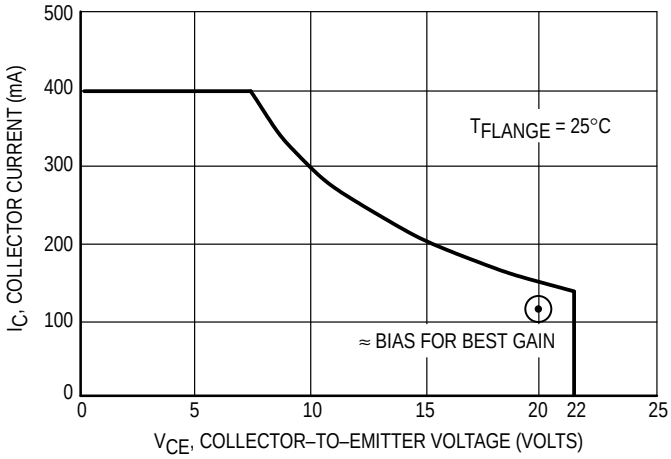


Figure 3. DC Safe Operating Area

V_{CE} (Volts)	I_C (mA)	f (GHz)	S_{11}		S_{21}		S_{12}		S_{22}	
			Mag	ϕ	Mag	ϕ	Mag	ϕ	Mag	ϕ
20	120	0.5	0.83	−177	4.91	71	0.03	22	0.36	−82
		1.0	0.82	170	2.48	42	0.04	25	0.46	−108
		1.3	0.81	162	1.87	28	0.04	26	0.54	−122
		1.6	0.80	155	1.45	11	0.05	23	0.62	−132
		2.0	0.78	141	1.17	−6.0	0.06	20	0.67	−142
		2.3	0.83	132	1.02	−20	0.07	15	0.69	−151
		2.5	0.84	130	0.91	−29	0.07	11	0.72	−158
		2.7	0.79	125	0.85	−35	0.08	10	0.76	−160
		3.0	0.64	110	0.79	−43	0.10	6.0	0.80	−168
		3.3	0.61	82	0.77	−57	0.12	−2.0	0.79	−174

Table 1. Common Emitter S–Parameters

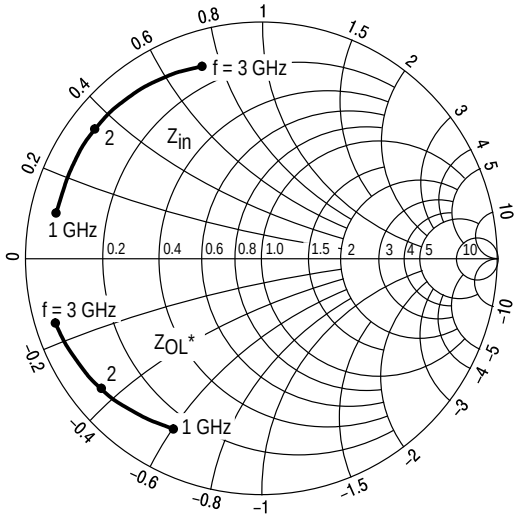


Figure 4. Series Equivalent Input/Output Impedance
Conditions: V_{CE} = 20 V, I_E = 120 mA,
T_{FLANGE} = 25°C

The graph shown below displays MTTF in hours x ampere^2 emitter current for each of the devices. Life tests at elevated temperatures have correlated to better than ±10% to the theoretical prediction for metal failure. Divide MTTF by I_C^2 for MTTF in a particular application.

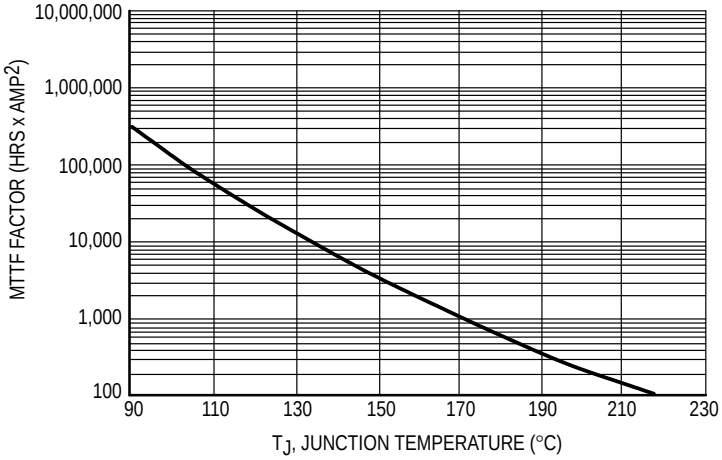
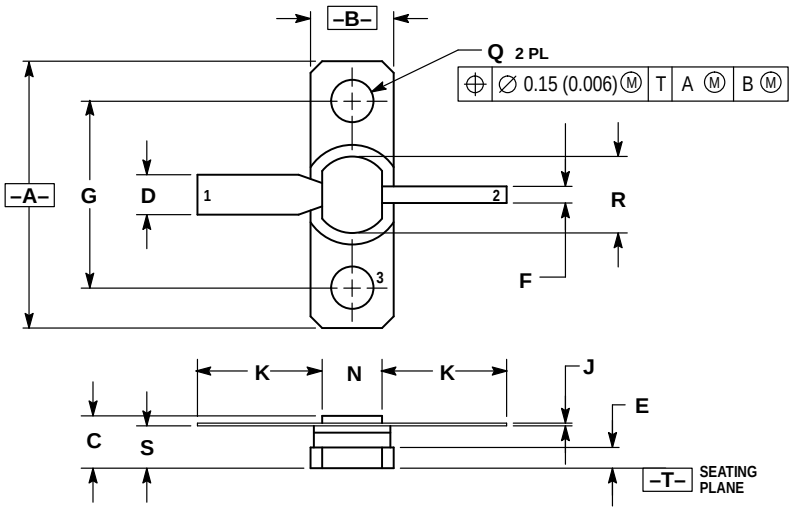


Figure 5. MTTF Factor versus Junction Temperature

PACKAGE DIMENSIONS



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

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.795	0.805	20.20	20.45
B	0.245	0.255	6.23	6.47
C	0.145	0.170	3.69	4.31
D	0.115	0.125	2.93	3.17
E	0.055	0.065	1.40	1.65
F	0.045	0.055	1.15	1.39
G	0.562 BSC		14.27 BSC	
J	0.003	0.006	0.08	0.15
K	0.260	0.375	6.60	9.52
N	0.175	0.185	4.45	4.69
Q	0.120	0.135	3.05	3.42
R	0.225	0.235	5.72	5.97
S	0.120	0.130	3.05	3.30

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

CASE 328A–03
ISSUE D

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