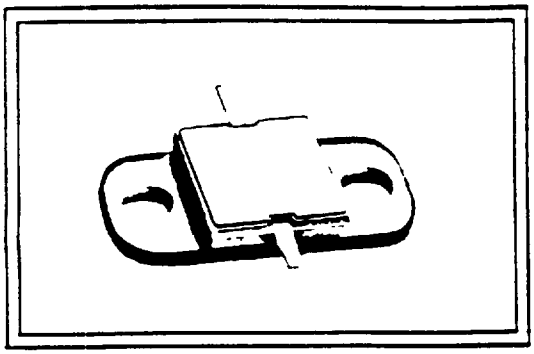
MICROWAVE POWER TRANSISTOR
PH1214-60

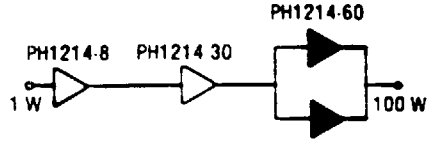
M/A-COM PHI, INC.

e PH1214-60 is an internally matched high power transistor designed for long pulse or CW applications from 1200 to 1400 MHz. Internal matching both at the input and the output increase device impedances and facilitate broadband operation. This bipolar device features multicell chip design for high gain and low thermal resistance. All gold metallization and the fully hermetic metal/ceramic package insure long term reliability.



- PULSE OR CW L-BAND APPLICATIONS
- 1200-1400 MHz, OVER 60W OUTPUT
- INTERNALLY MATCHED FOR BROADBAND OPERATION
- GOLD METALLIZATION, EMITTER BALLASTED
- HERMETIC METAL/CERAMIC PACKAGE
- COMMON BASE CONFIGURATION
- HIGHER GAIN THAN COMPETITIVE DEVICES
- LOW THERMAL RESISTANCE

SUGGESTED LINE-UP



1200-1400 MHz, 1 ms, 10%
28 V SUPPLY

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Value	Units
Collector — Base Voltage	V_{CBO}	58	V_{DC}
Emitter — Base Voltage	V_{EBO}	3.5	V_{DC}
RF Input Power (Peak)	P_{IN}	20	W
Collector Current (Peak)	I_C	7	A
CW Device Dissipation at 25°C Case Temperature	P_D	100	W
CW Device Dissipation Derating Above 25°C	P_D/T_C	0.5	W/°C
Operating Temperature Range	T_{OPER}	−55 to +125	°C
Storage Temperature Range	T_{STG}	−65 to +150	°C

ELECTRICAL CHARACTERISTICS AT 25°C

Parameter	Symbol	Min.	Max.	Units	Test Conditions
Emitter — Base Breakdown Voltage	BV_{EBO}	3.5	—	V_{DC}	$I_E = 10$ mA, $I_C = 0$
Collector — Base Breakdown Voltage	BV_{CBO}	58	—	V_{DC}	$I_C = 50$ mA, $I_E = 0$
Collector Cutoff Current	I_{CES}	—	6	mA	$V_{CE} = 28V$, $V_{BE} = 0$
DC Current Gain	HFE	20	100	—	$I_C = 500$ mA, $V_{CE} = 5V$
Output Capacitance[1]	C_{OB}	—	50	pF	$V_{CB} = 28V$, f = 1 MHz
Thermal Resistance	$\theta_{J/C}$	—	0.8	°C/W	$P_O = 60W$, f = 1200-1400 MHz, PW = 1 ms, DF = 10%, $V_{CC} = 28V$
Output Power	P_{OUT}	60	—	W	$P_{IN} = 12W$, f = 1200-1400 MHz, PW = 1 ms, DF = 10%, $V_{CC} = 28V$
Power Gain	G_P	7.0	—	dB	$P_O = 60W$, f = 1200-1400 MHz, PW = 1 ms, DF = 10%, $V_{CC} = 28V$
Collector Efficiency	ηC	50	—	%	$P_O = 60W$, f = 1200-1400 MHz, PW = 1 ms, DF = 10%, $V_{CC} = 28V$
Return Loss in Broadband Fixture	RL	10	—	dB	$P_O = 60W$, f = 1200-1400 MHz, PW = 1 ms, DF = 10%, $V_{CC} = 28V$
Load Mismatch	↓	3.1	—	—	60W equivalent drive, all phase angles, f = 1200-1400 MHz, PW = 1 ms, DF = 10%, $V_{CC} = 28V$

NOTE 1: For reference only. This transistor has internal collector matching and therefore C_{OB} cannot be measured.

URE 1. Typical Narrowband Output Power and Collector Efficiency vs. Frequency

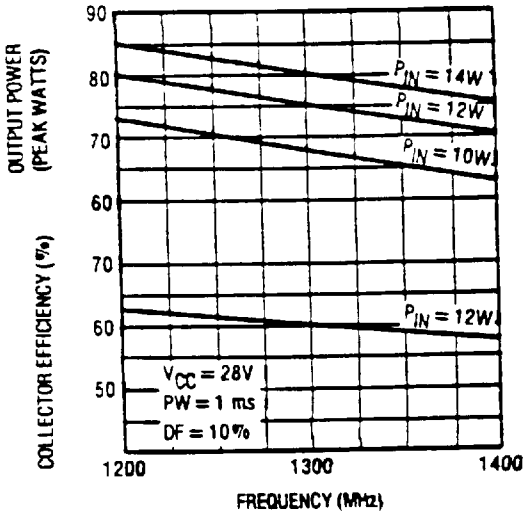
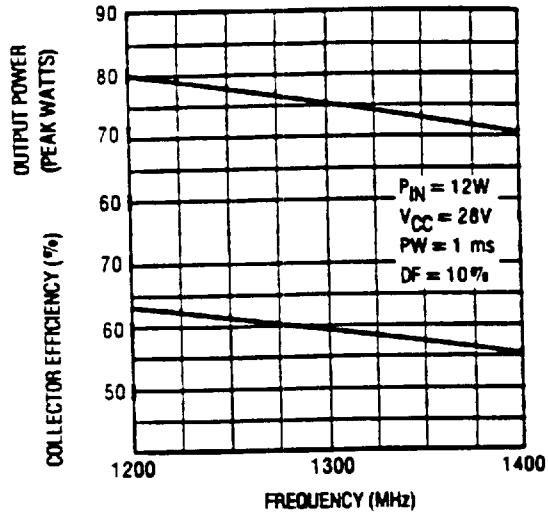


FIGURE 2. Typical Broadband Output Power and Collector Efficiency vs. Frequency



IGURE 3. Typical Narrowband Output Power vs. Input Power

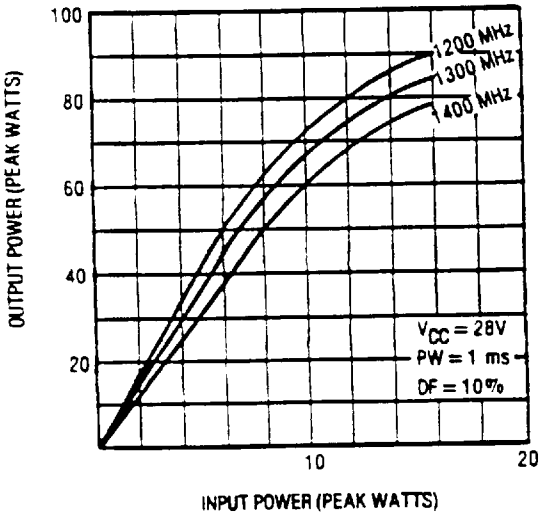


FIGURE 4. Typical Narrowband Output Power vs. Supply Voltage

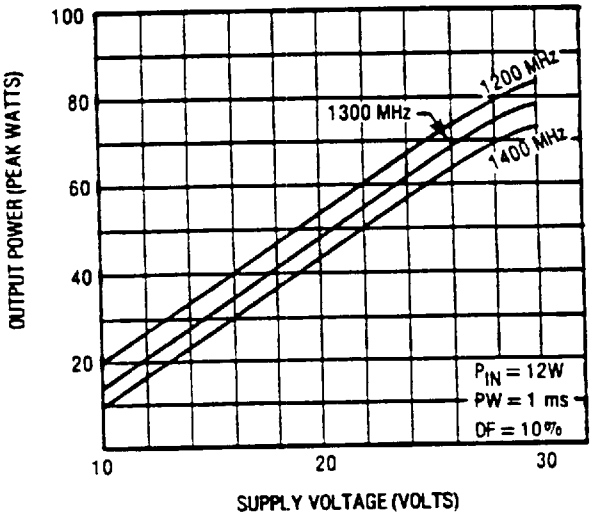


FIGURE 5. Typical Narrowband Power Gain vs. Frequency

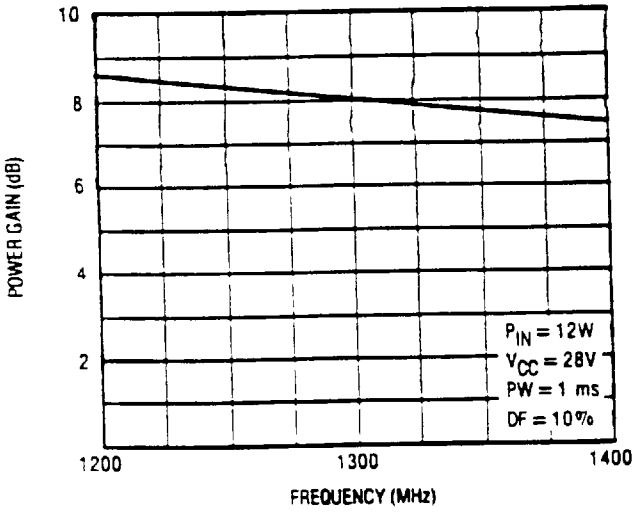


FIGURE 6. Typical Narrowband Saturated Output Power vs. Frequency

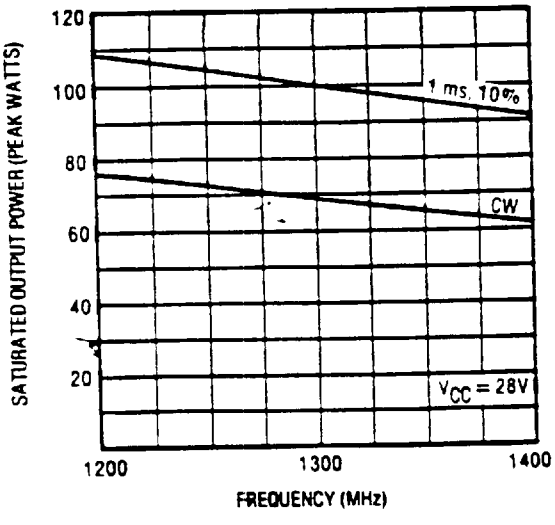
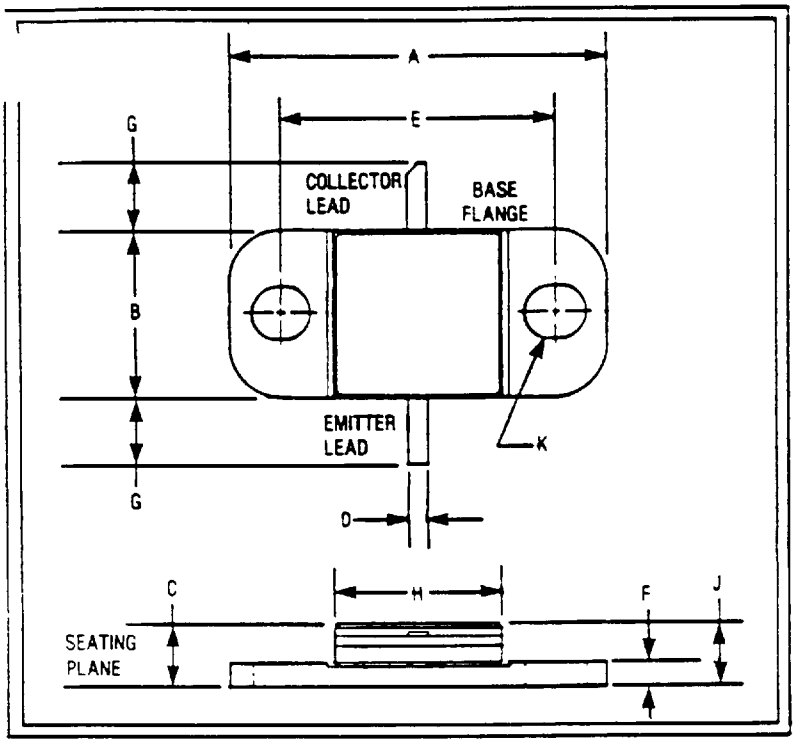
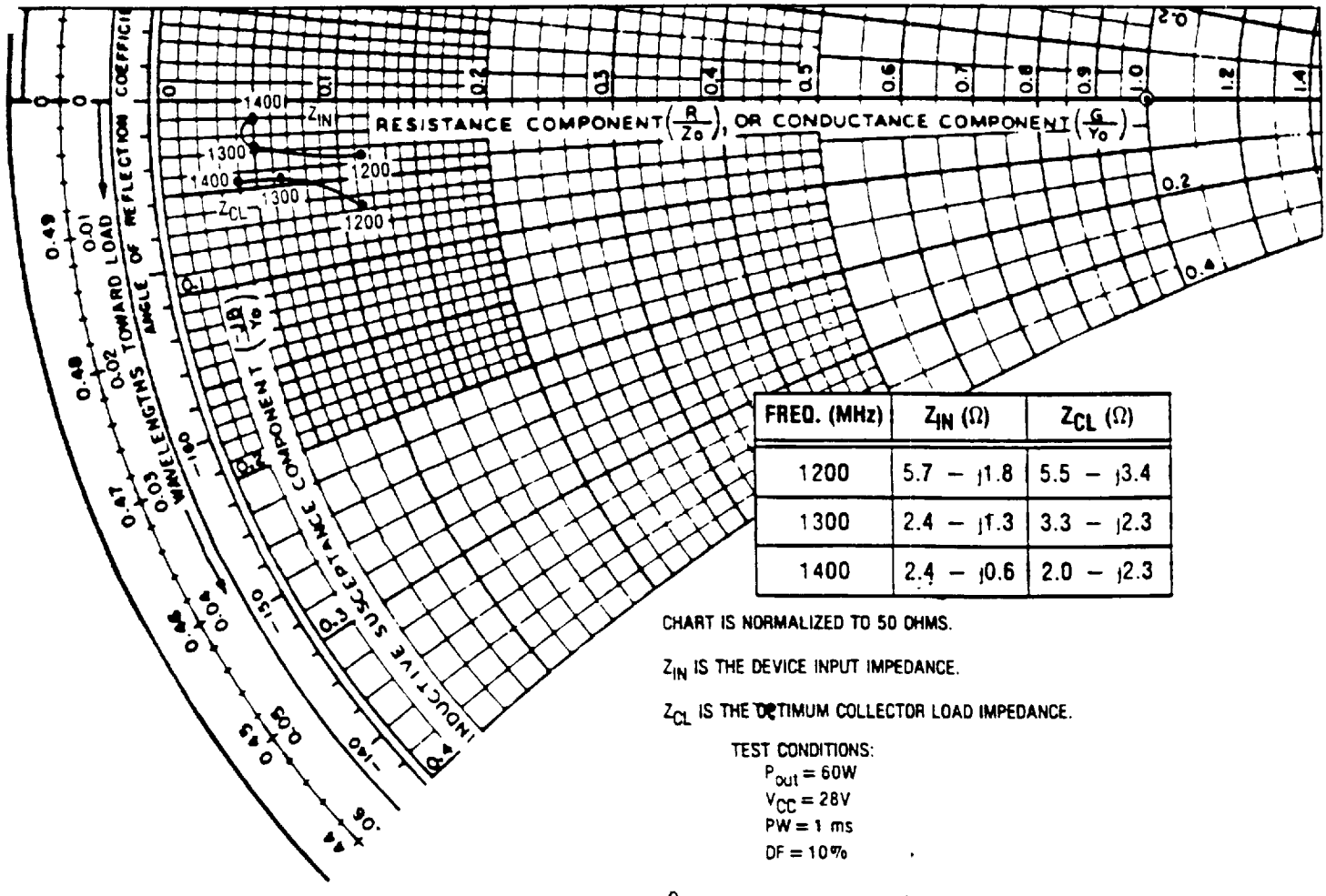


FIGURE 7. Package Outline Drawing



DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	22.73	22.99	.895	.905
B	10.03	10.29	.395	.405
C	3.76	4.06	.148	.160
D	1.41	1.38	.045	.055
E	16.38	16.64	.645	.655
F	1.40	1.65	.055	.065
G	3.81	— —	.150	— —
H	10.03	10.29	.395	.405
J	3.05	3.20	.120	.126
K	3.12	3.38	.123	.133

FIGURE 8. Typical Device Impedances



FREQ. (MHz)	Z_{IN} (Ω)	Z_{CL} (Ω)
1200	5.7 − j1.8	5.5 − j3.4
1300	2.4 − j1.3	3.3 − j2.3
1400	2.4 − j0.6	2.0 − j2.3

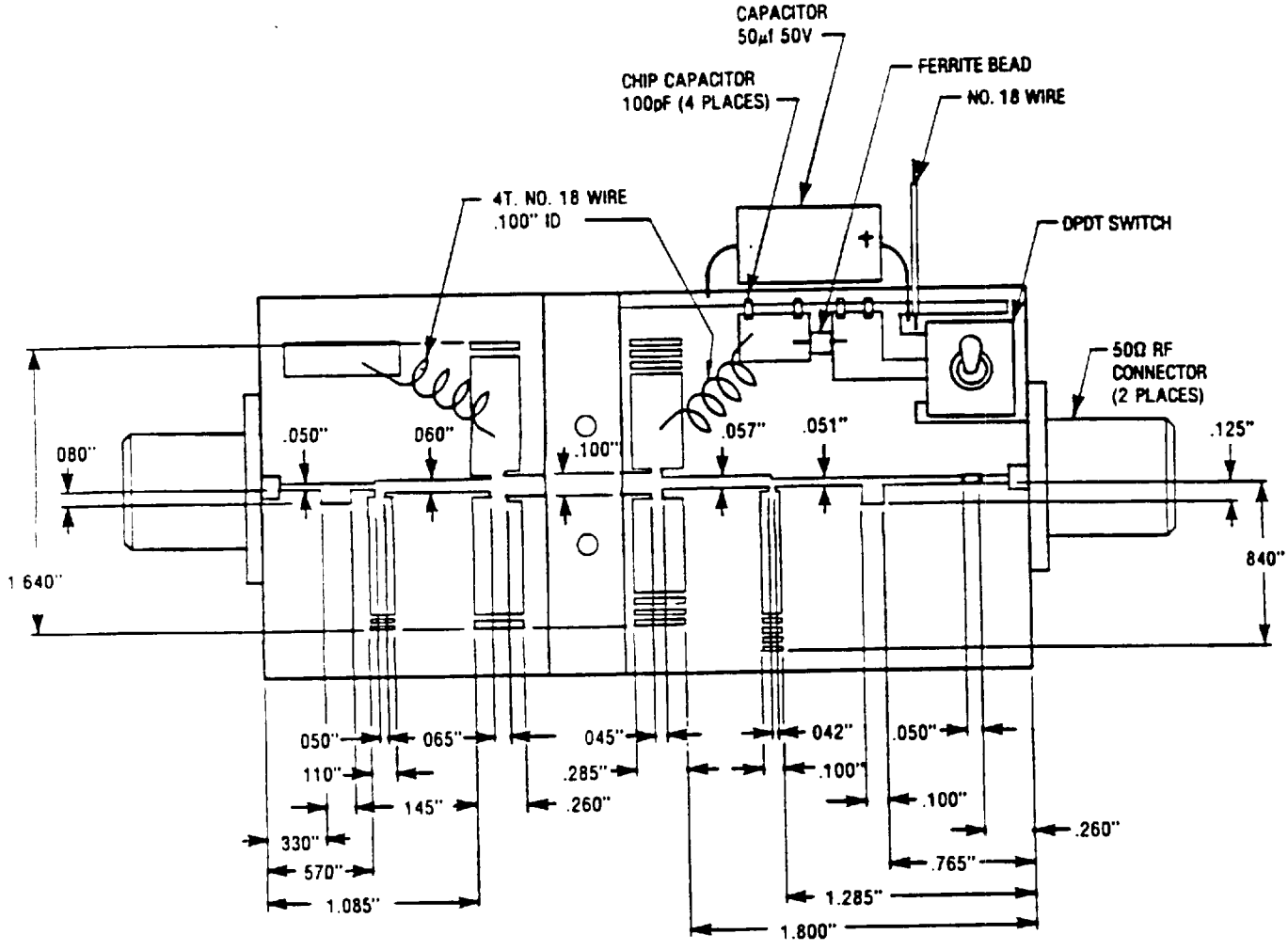
CHART IS NORMALIZED TO 50 OHMS.

Z_{IN} IS THE DEVICE INPUT IMPEDANCE.

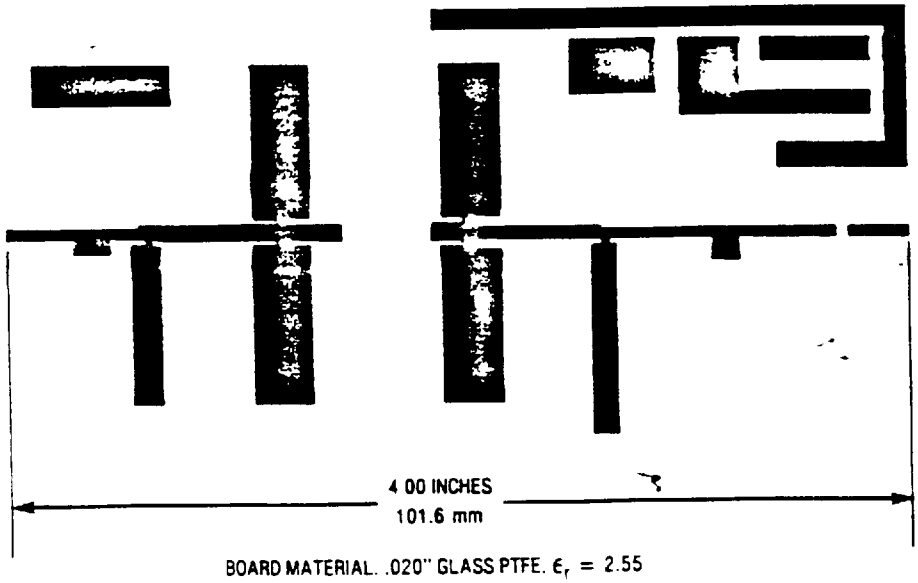
Z_{CL} IS THE OPTIMUM COLLECTOR LOAD IMPEDANCE.

TEST CONDITIONS:
P_{out} = 60W
V_{CC} = 28V
PW = 1 ms
DF = 10%

:URE 9. Broadband Test Fixture (1200-1400 MHz)



iGURE 10. PC Board Layout for Broadband Test Fixture



BOARD MATERIAL. .020" GLASS PTFE. ϵ_r = 2.55

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