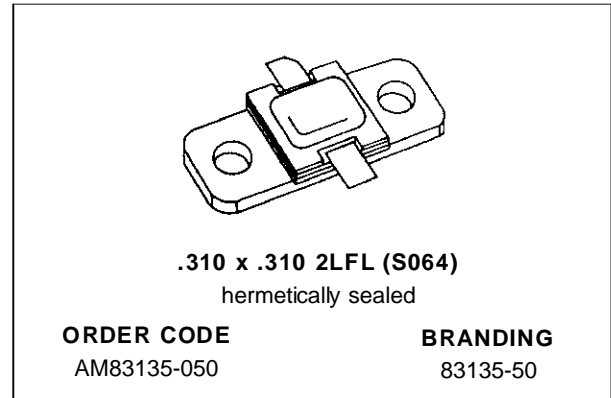


## RF & MICROWAVE TRANSISTORS S-BAND RADAR APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- RUGGEDIZED VSWR 3:1 @ 1dB OVERDRIVE
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- P<sub>OUT</sub> = 50 W MIN. WITH 5.2 dB GAIN

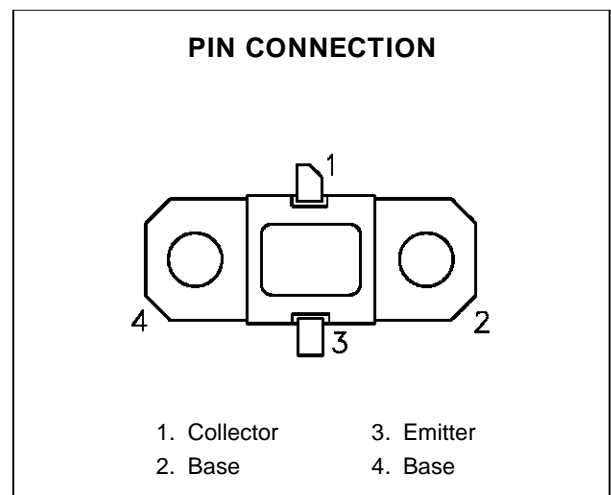


### DESCRIPTION

The AM83135-050 device is a high power silicon bipolar NPN transistor specifically designed for S-Band radar pulsed output and driver applications.

This device is characterized at 10 μsec pulsewidth and 10% duty cycle, but is capable of operation over a range of pulse widths, duty cycles and temperatures and can withstand a 3:1 output VSWR with a +1 dB input overdrive. Low RF thermal resistance, refractory/gold metallization, and computerized automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM83135-050 is supplied in the IMPAC™ Hermetic Metal/Ceramic package with internal Input/Output impedance matching circuitry, and is intended for military and other high reliability applications.



### ABSOLUTE MAXIMUM RATINGS (T<sub>case</sub> = 25°C)

Symbol	Parameter	Value	Unit
P <sub>DISS</sub>	Power Dissipation* (T <sub>C</sub> ≤ 125°C)	312	W
I <sub>C</sub>	Device Current*	8.0	A
V <sub>CC</sub>	Collector-Supply Voltage*	48	V
T <sub>J</sub>	Junction Temperature (Pulsed RF Operation)	250	°C
T <sub>STG</sub>	Storage Temperature	- 65 to +200	°C

### THERMAL DATA

R <sub>TH(j-c)</sub>	Junction-Case Thermal Resistance*	0.40	°C/W
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\*Applies only to rated RF amplifier operation

ELECTRICAL SPECIFICATIONS ( $T_{\text{case}} = 25^{\circ}\text{C}$ )

## STATIC

Symbol	Test Conditions			Value			Unit
				Min.	Typ.	Max.	
$BV_{\text{CBO}}$	$I_{\text{C}} = 25\text{mA}$	$I_{\text{E}} = 0\text{mA}$		55	—	—	V
$BV_{\text{EBO}}$	$I_{\text{E}} = 5\text{mA}$	$I_{\text{C}} = 0\text{mA}$		3.5	—	—	V
$BV_{\text{CER}}$	$I_{\text{C}} = 25\text{mA}$	$R_{\text{BE}} = 10\text{W}$		55	—	—	V
$I_{\text{CES}}$	$V_{\text{BE}} = 0\text{V}$	$V_{\text{CE}} = 42\text{V}$		—	—	20	mA
$h_{\text{FE}}$	$V_{\text{CE}} = 5\text{V}$	$I_{\text{C}} = 3\text{A}$		30	—	300	—

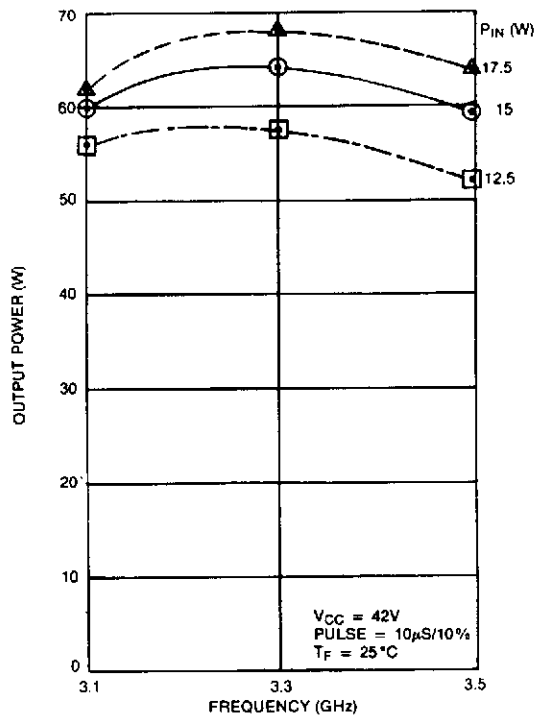
## DYNAMIC

Symbol	Test Conditions			Value			Unit
				Min.	Typ.	Max.	
$P_{\text{OUT}}$	$f = 3.1 - 3.5\text{GHz}$	$P_{\text{IN}} = 15\text{W}$	$V_{\text{CC}} = 42\text{V}$	50	—	—	W
$\eta_{\text{C}}$	$f = 3.1 - 3.5\text{GHz}$	$P_{\text{IN}} = 15\text{W}$	$V_{\text{CC}} = 42\text{V}$	30	—	—	%
$G_{\text{P}}$	$f = 3.1 - 3.5\text{GHz}$	$P_{\text{IN}} = 15\text{W}$	$V_{\text{CC}} = 42\text{V}$	5.2	—	—	dB

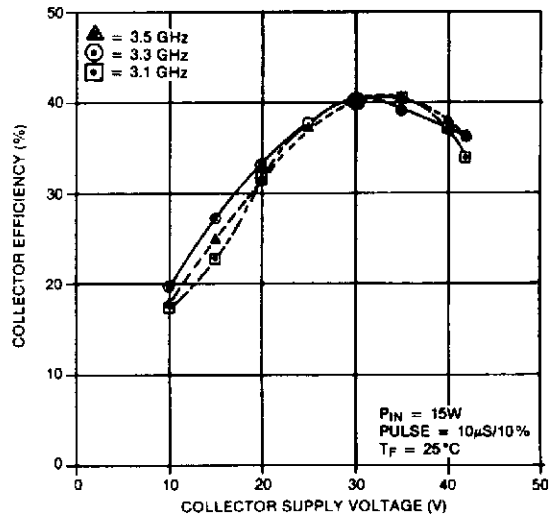
Note: Pulse Width =  $10\mu\text{Sec}$   
Duty Cycle = 10%

TYPICAL PERFORMANCE

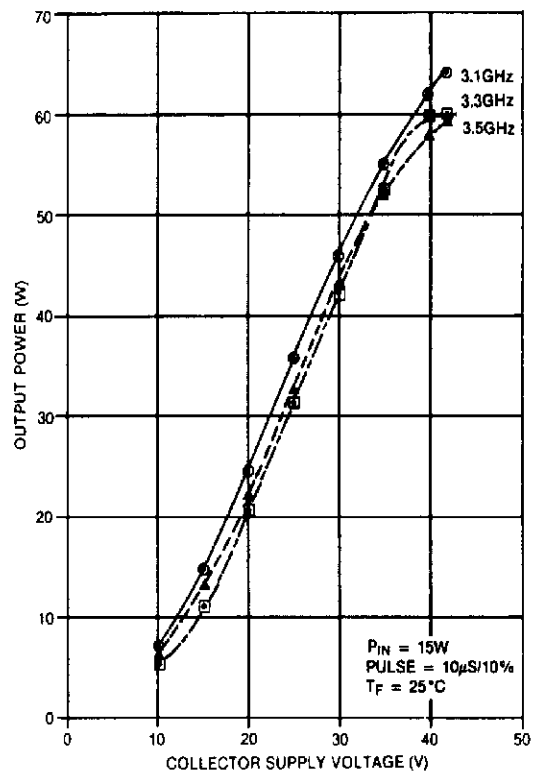
OUTPUT POWER vs FREQUENCY



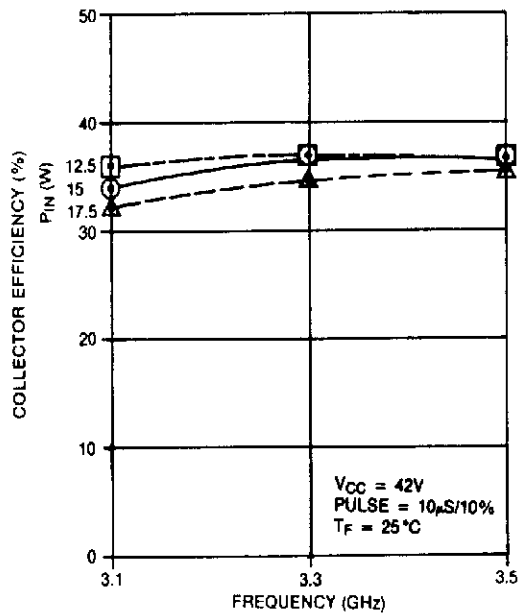
COLLECTOR EFFICIENCY vs COLLECTOR SUPPLY VOLTAGE



OUTPUT POWER vs COLLECTOR SUPPLY VOLTAGE

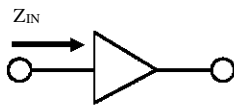


COLLECTOR EFFICIENCY vs FREQUENCY

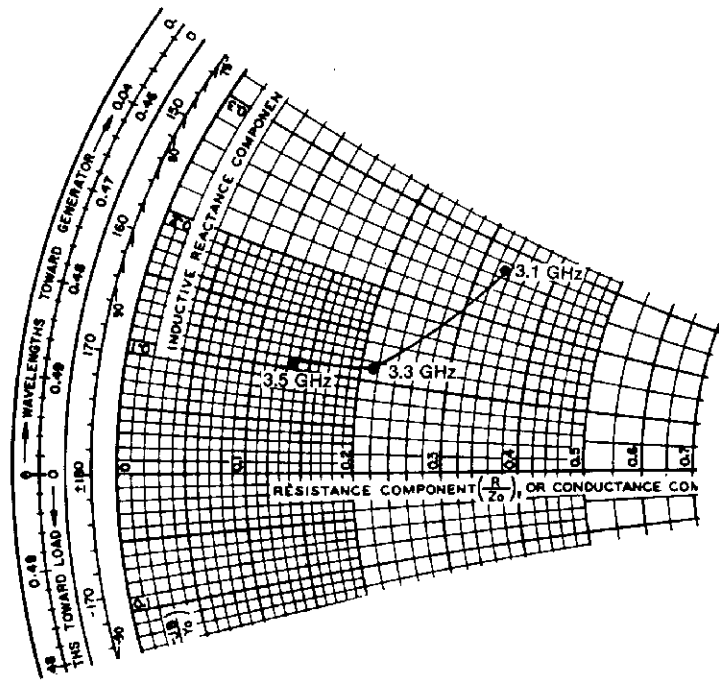


IMPEDANCE DATA

TYPICAL INPUT IMPEDANCE

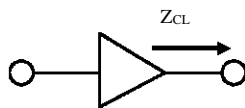


$P_{IN} = 15\text{ W}$   
 $V_{CC} = 42\text{ V}$   
 $Z_{O^*} = 50\text{ ohms}$

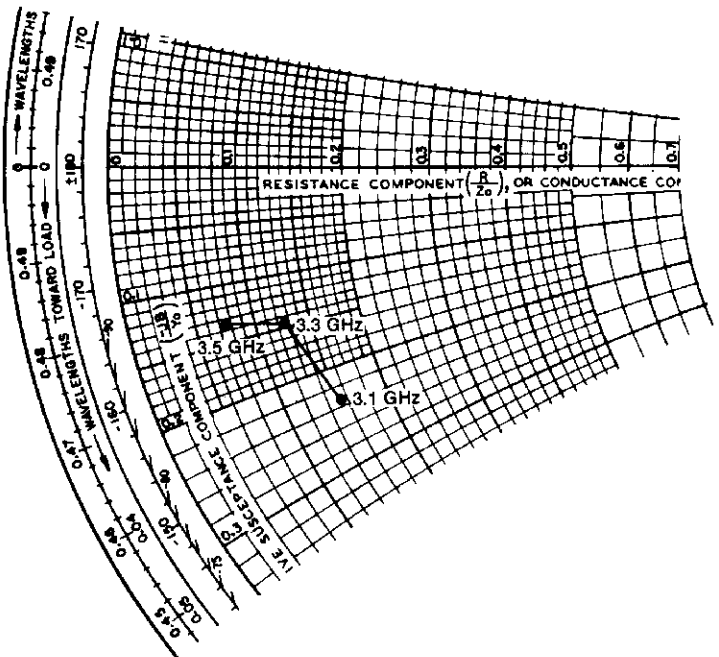


FREQ.	$Z_{IN} (\Omega)$	$Z_{CL} (\Omega)$
L = 3.1 GHz	$16.5 + j 13.5$	$7.7 - j 11.8$
M = 3.3 GHz	$10.8 + j 5.5$	$6.5 - j 7.2$
H = 3.5 GHz	$6.7 + j 5.2$	$3.8 - j 6.7$

TYPICAL COLLECTOR LOAD IMPEDANCE

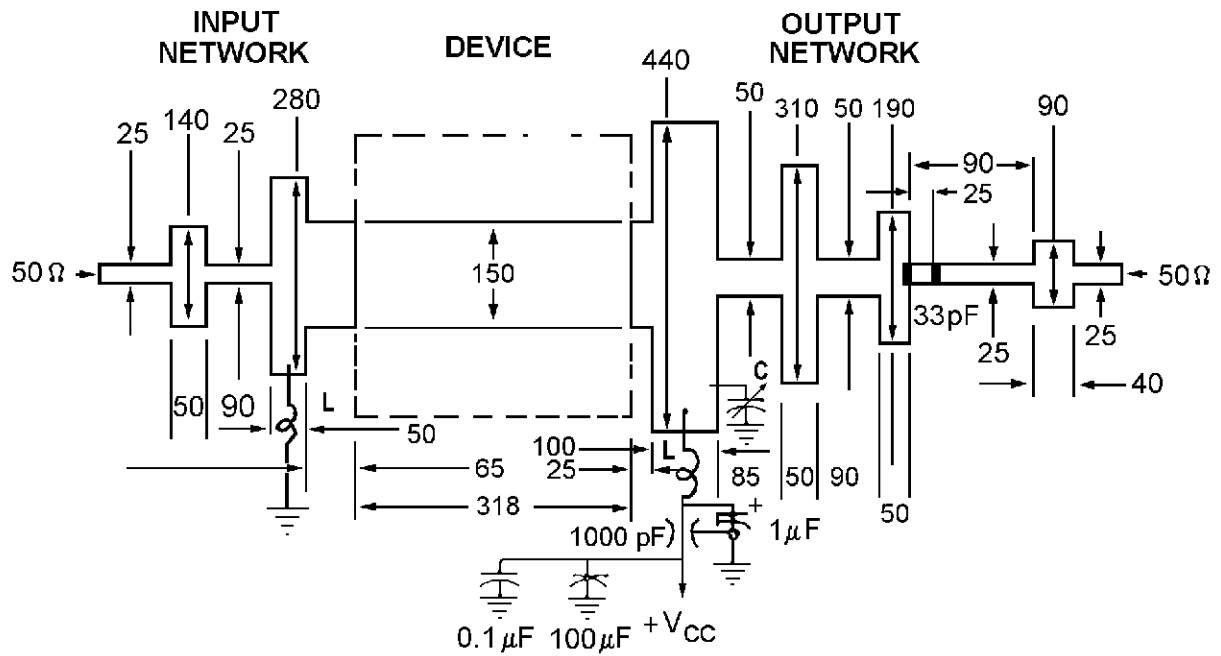


$P_{IN} = 15\text{ W}$   
 $V_{CC} = 42\text{ V}$   
 $Z_{O^*} = 50\text{ ohms}$



\*Normalized

## TEST CIRCUIT



All dimensions are in mils.

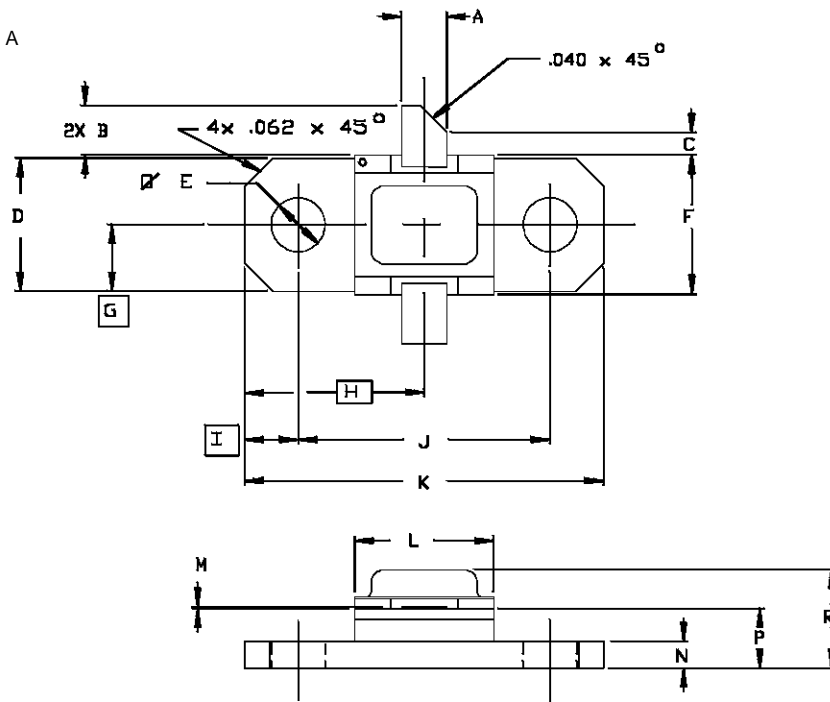
Substrate material: 25 mil thick Al<sub>2</sub>O<sub>3</sub> (E<sub>r</sub> = 9.6)

C - 0.3 to 1.2 pF Johanson Gigatrim

L - 1 Turn #26 wire .80 I.D.

PACKAGE MECHANICAL DATA

Ref.: Dwg. No. 12-0221  
UDCS No. 1011424 rev A



SGS-THOMSON MICROELECTRONICS			CONT'D		
	MINIMUM Inches/mm	MAXIMUM Inches/mm		MINIMUM Inches/mm	MAXIMUM Inches/mm
A	.095/2,41	.105/2,67	K	.790/20,07	.810/20,57
B	.100/2,54	.120/3,05	L	.300/7,62	.320/8,13
C	.050/1,27		M	.003/0,08	.006/0,15
D	.286/7,26	.306/7,77	N	.052/1,32	.072/1,83
E	.110/2,79	.130/3,30	P	.118/3,00	.131/3,33
F	.306/7,77	.318/8,08	R		.230/5,84
G	.148/3,76				
H	.400/10,16				
I	.119/3,02				
J	.552/14,02	.572/14,53			

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