

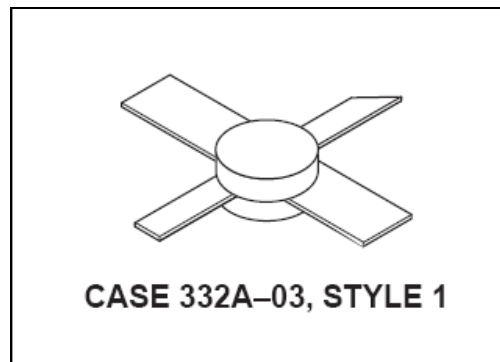
## Microwave Pulse Power Silicon NPN Transistor 150W (peak), 960–1215MHz

Rev. V1

Designed for Class B and C common base amplifier applications in short pulse TACAN, IFF, and DME transmitters.

- Guaranteed performance @ 1090 MHz, 50 Vdc  
Output power = 150 W peak  
Minimum gain = 7.8 dB
- 100% tested for load mismatch at all phase angles with 10:1 VSWR
- Industry standard package
- Nitride passivated
- Gold metallized, emitter ballasted for long life and resistance to metal migration
- Internal input matching for broadband operation

### Product Image



### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Base Voltage	$V_{CBO}$	70	Vdc
Emitter–Base Voltage	$V_{EBO}$	4.0	Vdc
Collector Current — Peak (1)	$I_C$	12	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ (1) (2) Derate above $25^\circ\text{C}$	$P_D$	583 3.33	Watts $\text{W}/^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-65 to +150	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case (3)	$R_{\theta JC}$	0.3	$^\circ\text{C}/\text{W}$

### ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

### OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ( $I_C = 50 \text{ mAdc}$ , $V_{BE} = 0$ )	$V_{(BR)CES}$	70	—	—	Vdc
Collector–Base Breakdown Voltage ( $I_C = 50 \text{ mAdc}$ , $I_E = 0$ )	$V_{(BR)CBO}$	70	—	—	Vdc
Emitter–Base Breakdown Voltage ( $I_E = 5.0 \text{ mAdc}$ , $I_C = 0$ )	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current ( $V_{CB} = 50 \text{ Vdc}$ , $I_E = 0$ )	$I_{CBO}$	—	—	10	mAdc

### ON CHARACTERISTICS

DC Current Gain (4) ( $I_C = 5.0 \text{ Adc}$ , $V_{CE} = 5.0 \text{ Vdc}$ )	$h_{FE}$	10	30	—	—
---	----------	----	----	---	---

### NOTES:

1. Pulse Width = 10  $\mu\text{s}$ , Duty Cycle = 1%.
2. This device is designed for RF operation. The total device dissipation rating applies only when the device is operated as an RF amplifier.
3. Thermal Resistance is determined under specified RF operating conditions by infrared measurement techniques.
4. 80  $\mu\text{s}$  Pulse on Tektronix 576 or equivalent.

(continued)

## Microwave Pulse Power Silicon NPN Transistor 150W (peak), 960–1215MHz

Rev. V1

### ELECTRICAL CHARACTERISTICS — continued ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

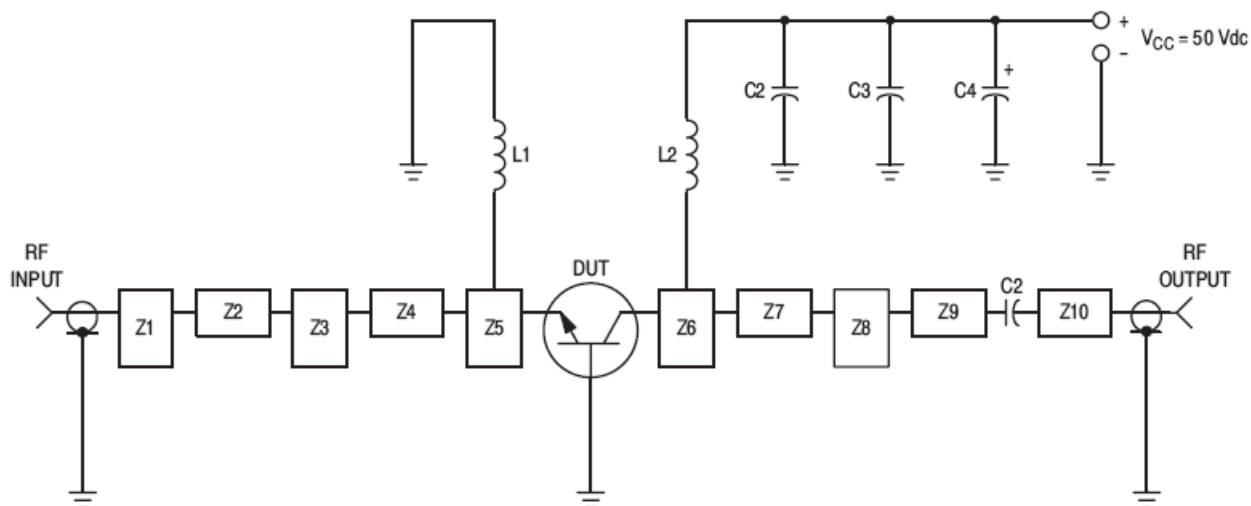
Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

### DYNAMIC CHARACTERISTICS

Output Capacitance ( $V_{CB} = 50\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{ob}$	—	25	32	pF
---	----------	---	----	----	----

### FUNCTIONAL TESTS (Pulse Width = 10 $\mu\text{s}$ , Duty Cycle = 1.0%)

Common-Base Amplifier Power Gain ( $V_{CC} = 50\text{ Vdc}$ , $P_{out} = 150\text{ W pk}$ , $f = 1090\text{ MHz}$ )	$G_{PB}$	7.8	9.8	—	dB
Collector Efficiency ( $V_{CC} = 50\text{ Vdc}$ , $P_{out} = 150\text{ W pk}$ , $f = 1090\text{ MHz}$ )	$\eta$	35	40	—	%
Load Mismatch ( $V_{CC} = 50\text{ Vdc}$ , $P_{out} = 150\text{ W pk}$ , $f = 1090\text{ MHz}$ , $VSWR = 10:1$ All Phase Angles)	$\psi$	No Degradation in Power Output			



C1, C2 — 220 pF Chip Capacitor, 100-mil ATC  
 C3 — 0.1  $\mu\text{F}/100\text{ V}$   
 C4 — 47  $\mu\text{F}/75\text{ V}$  Electrolytic  
 L1, L2 — 3 Turns #18 AWG, 1/8" ID  
 Z1–Z10 — Distributed Microstrip Elements — See Photomaster  
 Board Material — 0.031" Thick Teflon-Fiberglass,  $\epsilon_r = 2.5$

Figure 1. 1090 MHz Test Circuit

## Microwave Pulse Power Silicon NPN Transistor 150W (peak), 960–1215MHz

Rev. V1

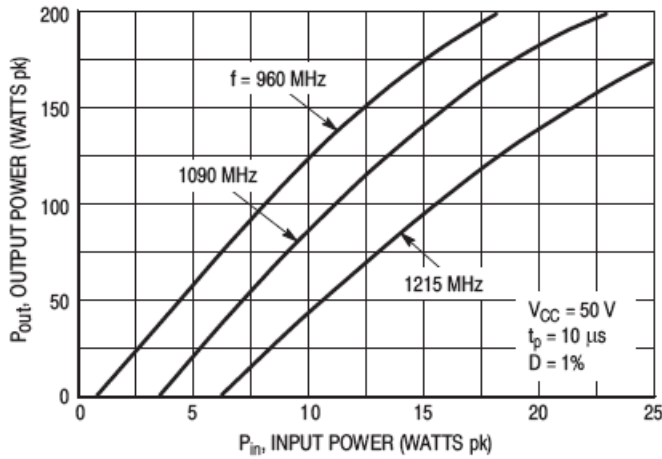


Figure 2. Output Power versus Input Power

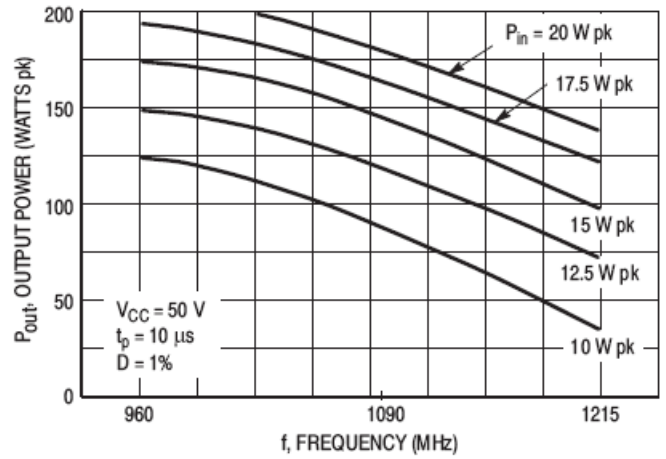


Figure 3. Output Power versus Frequency

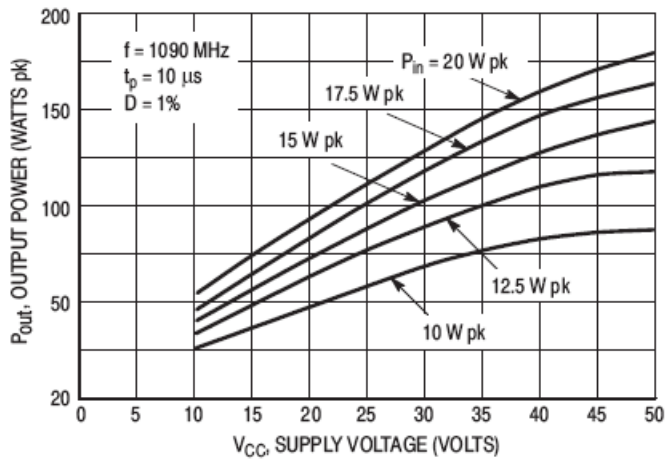


Figure 4. Output Power versus Supply Voltage

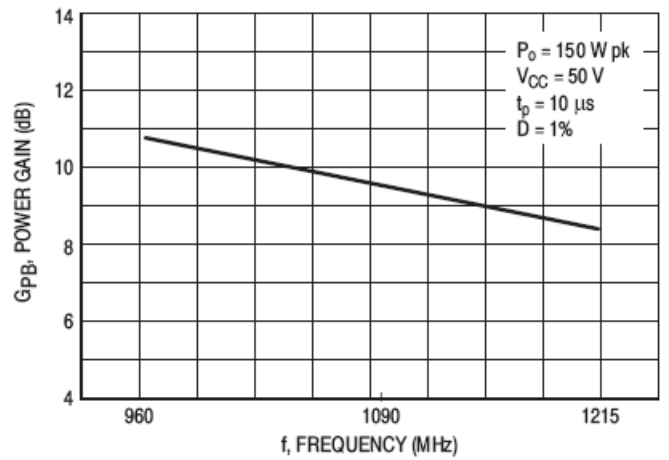


Figure 5. Power Gain versus Frequency

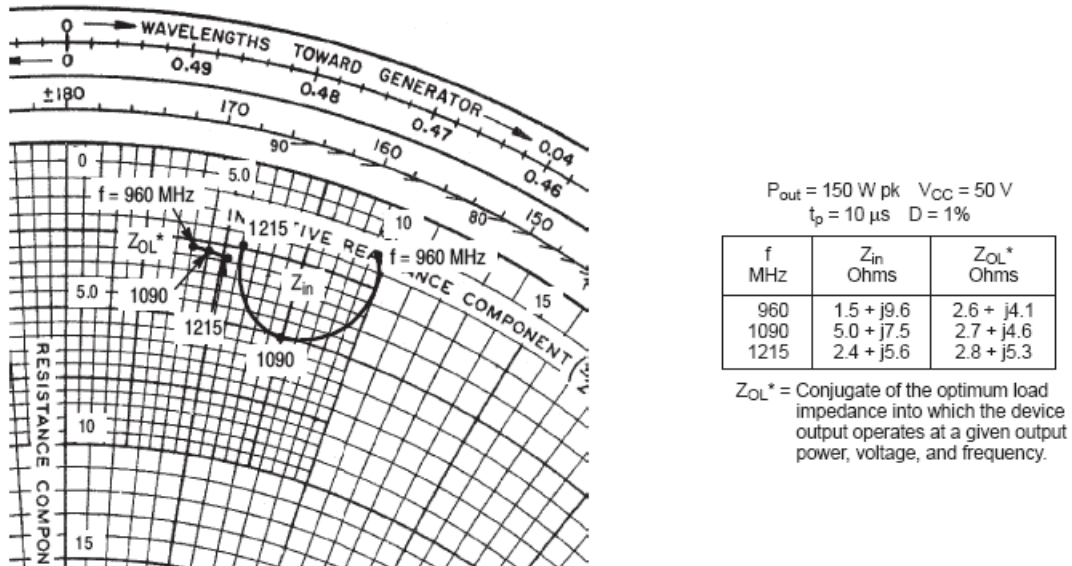


Figure 6. Series Equivalent Input/Output Impedance

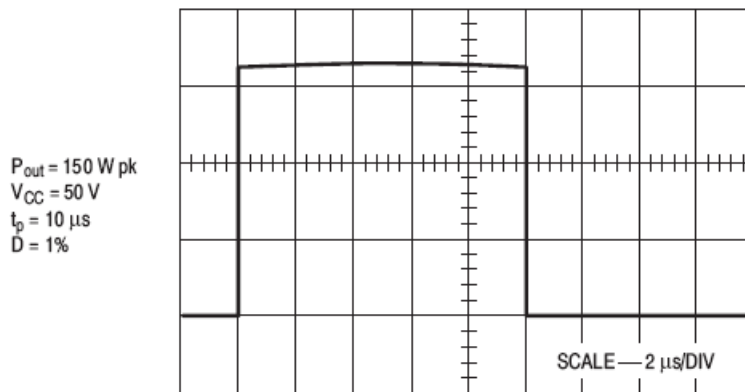
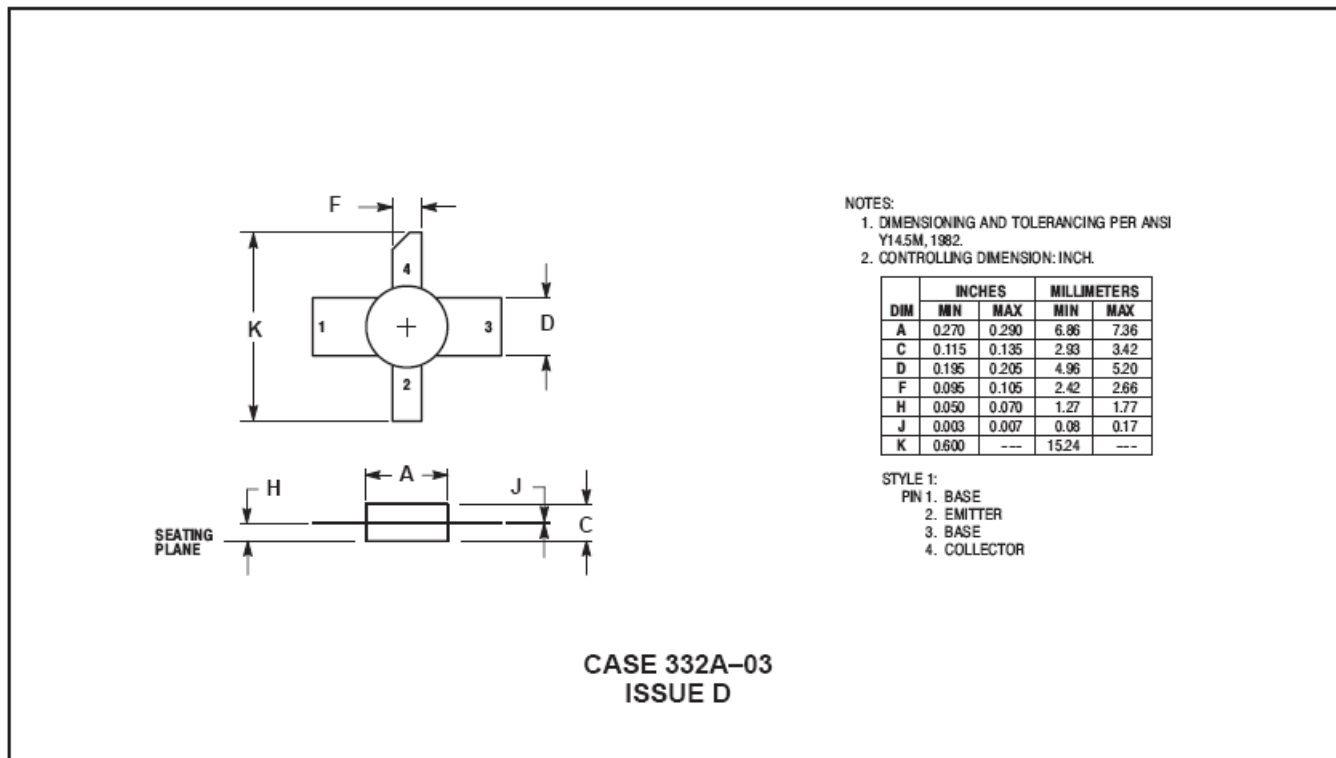


Figure 7. Typical Pulse Performance

## PACKAGE DIMENSIONS



M/A-COM Technology Solutions Inc. All rights reserved.

Information in this document is provided in connection with M/A-COM Technology Solutions Inc ("MACOM") products. These materials are provided by MACOM as a service to its customers and may be used for informational purposes only. Except as provided in MACOM's Terms and Conditions of Sale for such products or in any separate agreement related to this document, MACOM assumes no liability whatsoever. MACOM assumes no responsibility for errors or omissions in these materials. MACOM may make changes to specifications and product descriptions at any time, without notice. MACOM makes no commitment to update the information and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to its specifications and product descriptions. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document.

THESE MATERIALS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, RELATING TO SALE AND/OR USE OF MACOM PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, CONSEQUENTIAL OR INCIDENTAL DAMAGES, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. MACOM FURTHER DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. MACOM SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS, WHICH MAY RESULT FROM THE USE OF THESE MATERIALS.

MACOM products are not intended for use in medical, lifesaving or life sustaining applications. MACOM customers using or selling MACOM products for use in such applications do so at their own risk and agree to fully indemnify MACOM for any damages resulting from such improper use or sale.