

## Microwave Power Silicon Bipolar Transistor 5.0 W, 960–1215 MHz, 28V

Rev. V1

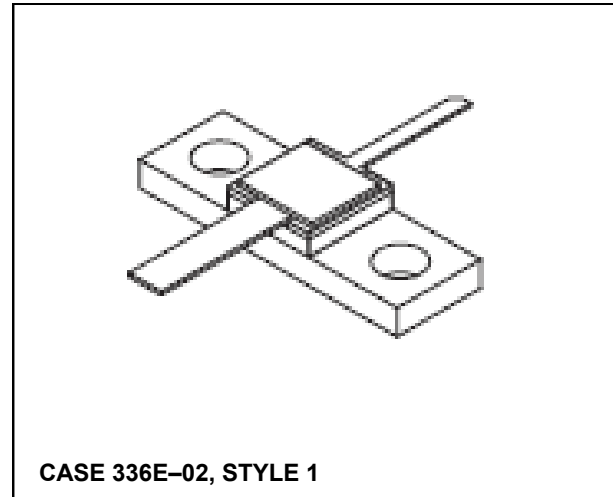
### Features

- Guaranteed performance @1.215GHz, 28Vdc
- Output power: 5.0W CW
- Minimum gain = 8.5dB, 10.3dB (Typ.)
- RF performance curves for 28 Vdc and 36 Vdc operation
- 100% tested for load mismatch at all phase angles with 10:1 VSWR
- Hermetically sealed industry standard package
- Silicon nitride passivated
- Gold metallized, emitter ballasted for long life and resistance to metal migration
- Internal input matching for broadband operation

### Description and Applications

Designed for CW and long-pulsed common base amplifier applications, such as JTIDS and Mode S, in the 0.96 to 1.215 GHz frequency range with high overall duty cycles.

### Product Image



### Maximum Ratings

	Symbol	Value	
Collector–Emitter Voltage	$V_{CES}$	55	Vdc
Collector–Base Voltage	$V_{CBO}$	55	Vdc
Emitter–Base Voltage	$V_{EBO}$	3.5	Vdc
Collector Current — Continuous (1)	$I_C$	1.25	mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ (1) Derate above $25^\circ\text{C}$	$P_D$	25 143	Watt mW/ $^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	–65 to +200	$^\circ\text{C}$
Junction Temperature	$T_J$	200	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case (2)	$R_{\theta JC}$	7.0	$^\circ\text{C/W}$

#### NOTES:

1. These devices are designed for RF operation. The total device dissipation rating applies only when the devices are operated as RF amplifiers.
2. Thermal Resistance is determined under specified RF operating conditions by infrared measurement techniques.

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### ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
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#### OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage (I <sub>C</sub> = 25 mA <sub>dc</sub> , V <sub>BE</sub> = 0)	V <sub>(BR)CES</sub>	55	—	—	V <sub>dc</sub>
Collector–Base Breakdown Voltage (I <sub>C</sub> = 25 mA <sub>dc</sub> , I <sub>E</sub> = 0)	V <sub>(BR)CBO</sub>	55	—	—	V <sub>dc</sub>
Emitter–Base Breakdown Voltage (I <sub>E</sub> = 0.5 mA <sub>dc</sub> , I <sub>C</sub> = 0)	V <sub>(BR)EBO</sub>	3.5	—	—	V <sub>dc</sub>
Collector Cutoff Current (V <sub>CB</sub> = 28 V <sub>dc</sub> , I <sub>E</sub> = 0)	I <sub>CBO</sub>	—	—	1.0	mA <sub>dc</sub>

#### ON CHARACTERISTICS

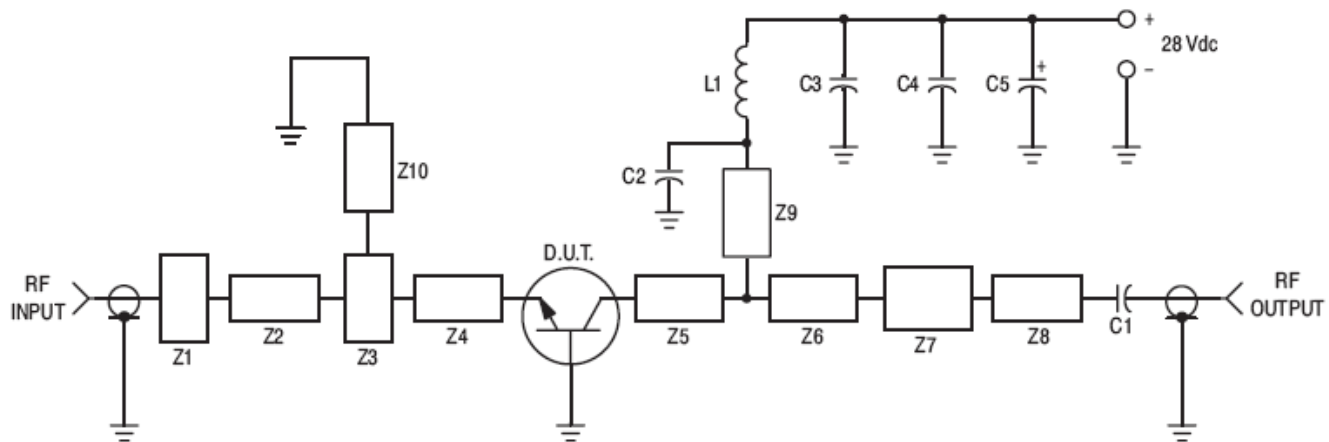
DC Current Gain (I <sub>C</sub> = 500 mA <sub>dc</sub> , V <sub>CE</sub> = 5.0 V <sub>dc</sub> )	h <sub>FE</sub>	20	—	100	—
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#### DYNAMIC CHARACTERISTICS

Output Capacitance (V <sub>CB</sub> = 28 V <sub>dc</sub> , I <sub>E</sub> = 0, f = 1.0 MHz)	C <sub>ob</sub>	—	7.0	10	pF
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#### FUNCTIONAL TESTS

Common–Base Amplifier Power Gain (V <sub>CC</sub> = 28 V <sub>dc</sub> , P <sub>out</sub> = 5.0 W, f = 1215 MHz)	G <sub>PB</sub>	8.5	10.3	—	dB
Collector Efficiency (V <sub>CC</sub> = 28 V <sub>dc</sub> , P <sub>out</sub> = 5.0 W, f = 1215 MHz)	η	45	55	—	%
Load Mismatch (V <sub>CC</sub> = 28 V <sub>dc</sub> , P <sub>out</sub> = 5.0 W, f = 1215 MHz, VSWR = 10:1 All Phase Angles)	ψ	No Degradation in Output Power			



C1, C2, C3 — 220 pF 100 mil Chip Capacitor  
 C4 — 0.1 μF  
 C5 — 47 μF/50 V Electrolytic  
 L1 — 3 turn #18 AWG, 1/8" ID, 0.18" Long

Z1–Z10 — Microstrip, see details below  
 Board Material — 0.030" Glass Teflon,  
 2.0 oz. Copper, ε<sub>r</sub> = 2.55

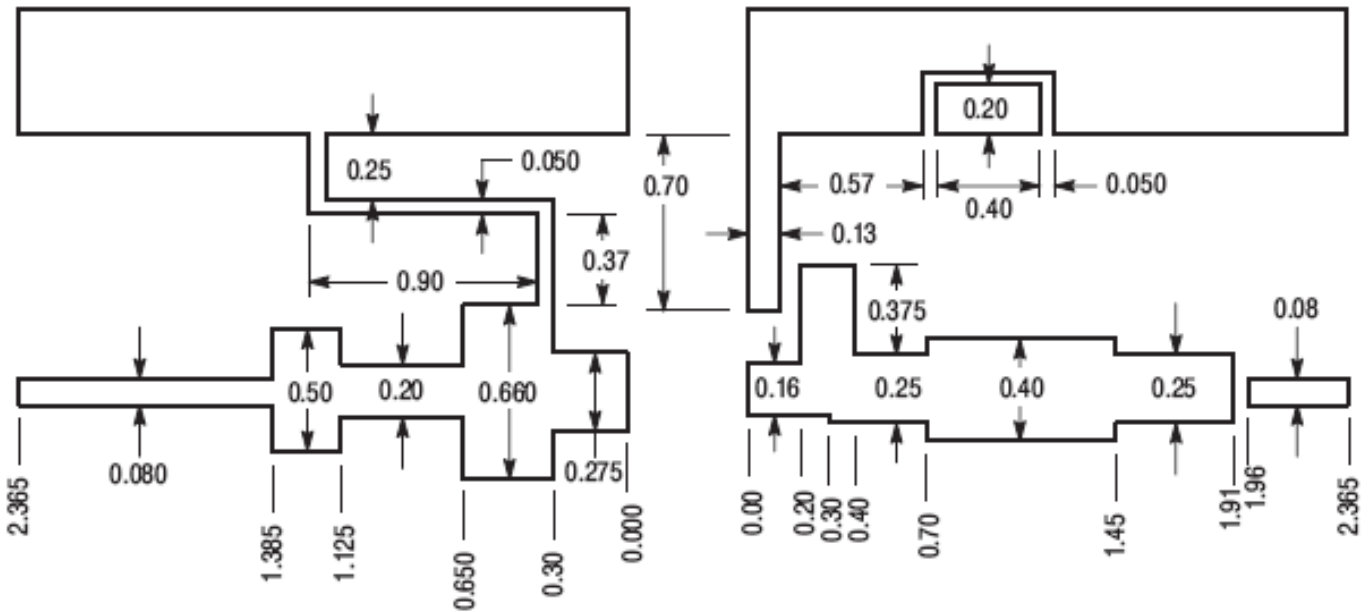


Figure 1. Test Circuit

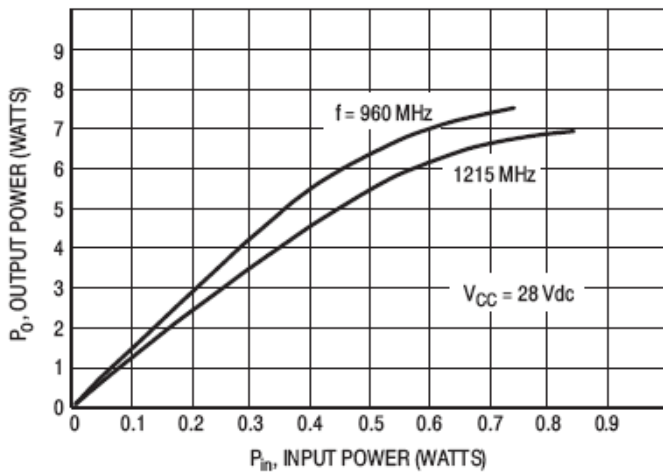


Figure 2. Output Power versus Input Power

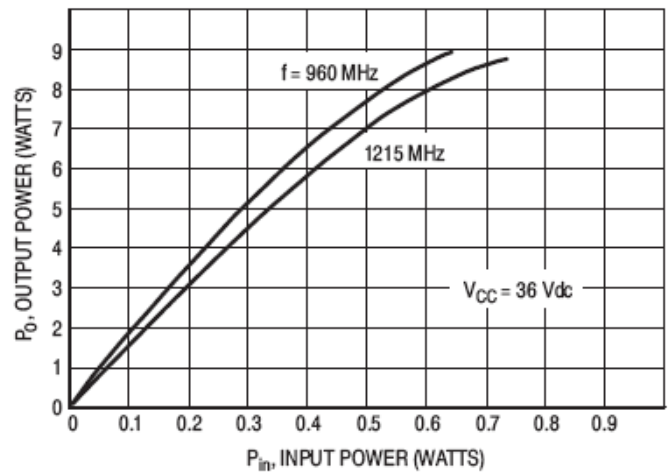
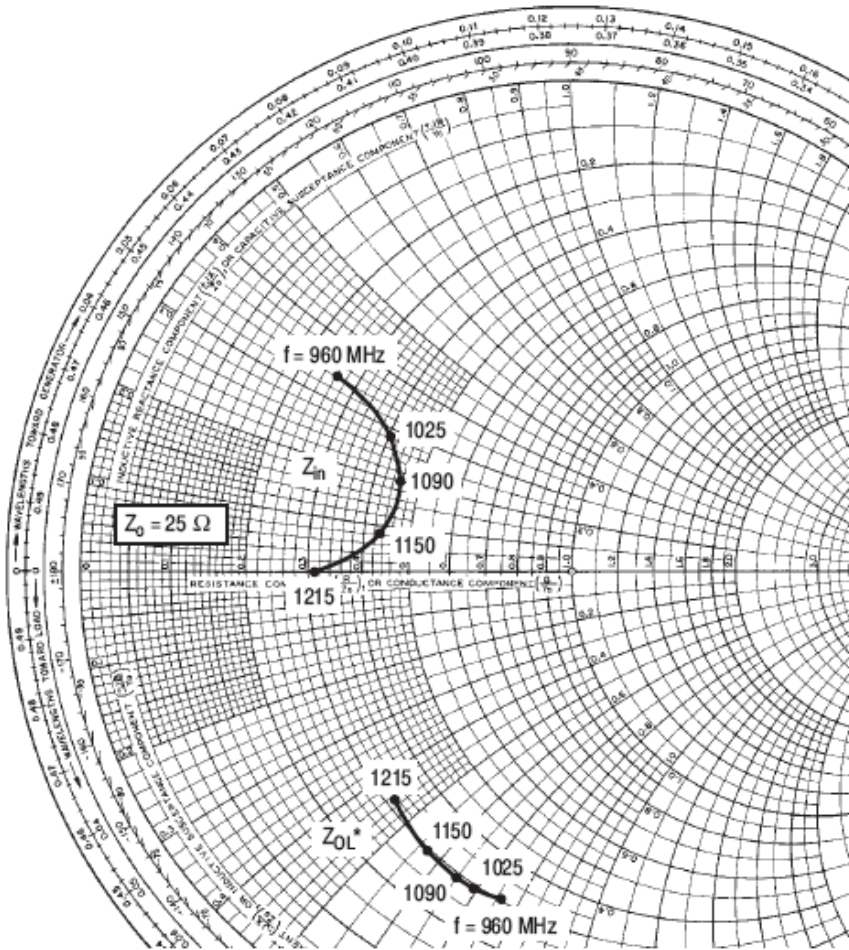


Figure 3. Output Power versus Input Power



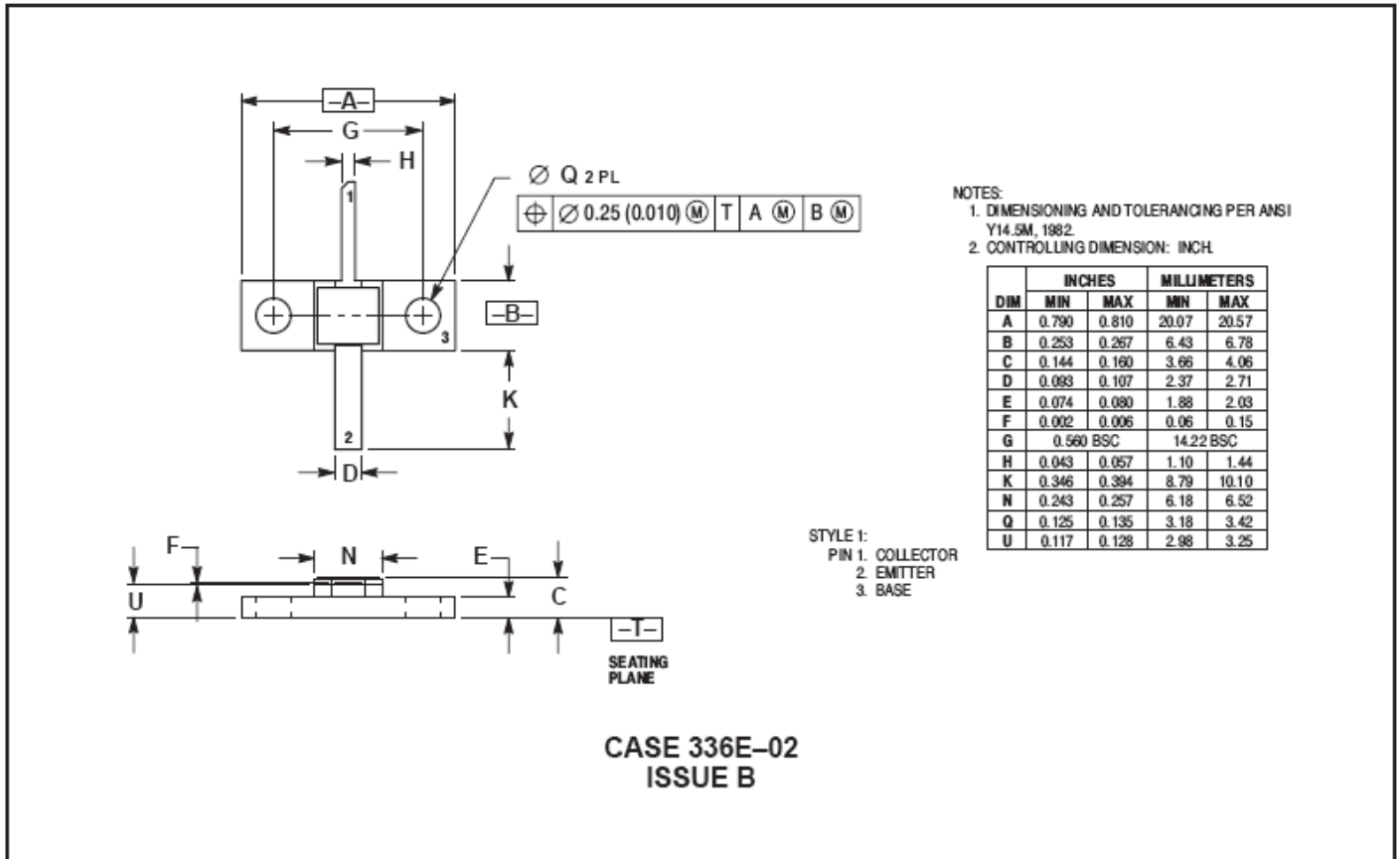
$P_{out} = 5\text{ W}, V_{CC} = 28\text{ V}$

f MHz	$Z_{in}$ OHMS	$Z_{OL}^*$ OHMS
960	6.5 + j8.5	7.4 - j18.9
1025	10.0 + j7.0	7.2 - j17.4
1090	11.2 + j4.9	7.1 - j16.3
1150	10.8 + j2.0	7.15 - j14.3
1215	7.8 + j0.0	7.8 - j11.2

$Z_{OL}^*$  = Conjugate of the optimum load impedance into which the device output operates at a given output power, voltage and frequency.

Figure 4. Series Equivalent Input/Output Impedances

## PACKAGE DIMENSIONS



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