

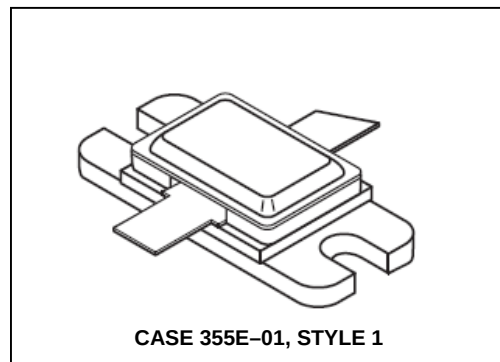
Microwave Pulse Power Silicon NPN Transistor 350W (peak), 1025–1150MHz

M/A-COM Products
Released - Rev. 07.07

Product Image

Designed for 1025–1150 MHz pulse common base amplifier applications such as TCAS, TACAN and Mode–S transmitters.

- Guaranteed performance @ 1090 MHz
Output power = 350 W Peak
Gain = 8.5 dB min, 9.0 dB (typ.)
- 100% tested for load mismatch at all phase angles with 10:1 VSWR
- Hermetically sealed package
- Silicon nitride passivated
- Gold metallized, emitter ballasted for long life and resistance to metal migration
- Internal input and output matching
- Characterized using Mode–S pulse format



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CES}	65	Vdc
Collector–Base Voltage	V_{CBO}	65	Vdc
Emitter–Base Voltage	V_{EBO}	3.5	Vdc
Collector Current — Peak (1)	I_C	31	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ (1), (2) Derate above 25°C	P_D	1590 9.1	Watts $\text{W}/^\circ\text{C}$
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 (3)	$R_{\theta JC}$	0.11	$^\circ\text{C}/\text{W}$

NOTES:

- Under pulse RF operating conditions.
- These devices are designed for RF operation. The total device dissipation rating applies only when the devices are operated as pulsed RF amplifiers.
- Thermal Resistance is determined under specified RF operating conditions by infrared measurement techniques. (Worst Case θ_{JC} measured using Mode–S pulse train, 128 μs burst 0.5 μs on, 0.5 μs off repeating at 6.4 ms interval.)

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

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ($I_C = 60 \text{ mAdc}$, $V_{BE} = 0$)	$V_{(BR)CES}$	65	—	—	Vdc
Collector–Base Breakdown Voltage ($I_C = 60 \text{ mAdc}$, $I_E = 0$)	$V_{(BR)CBO}$	65	—	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = 10 \text{ mAdc}$, $I_C = 0$)	$V_{(BR)EBO}$	3.5	—	—	Vdc
Collector Cutoff Current ($V_{CB} = 36 \text{ Vdc}$, $I_E = 0$)	I_{CBO}	—	—	25	mAdc

ON CHARACTERISTICS

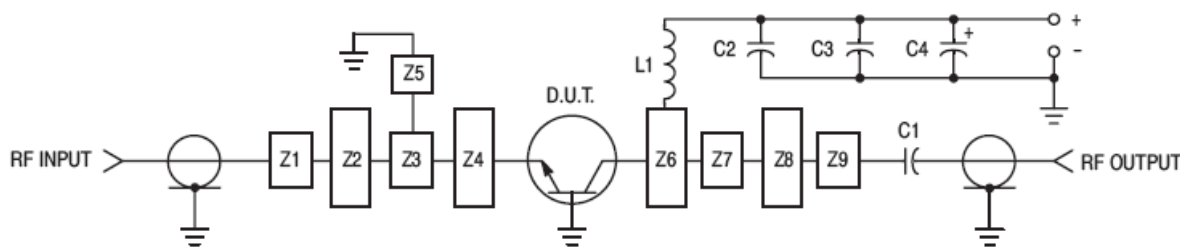
DC Current Gain ($I_C = 5.0 \text{ Adc}$, $V_{CE} = 5.0 \text{ Vdc}$)	h_{FE}	20	—	—	—
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FUNCTIONAL TESTS

Common–Base Amplifier Power Gain ($V_{CC} = 50 \text{ Vdc}$, $P_{out} = 350 \text{ W Peak}$, $f = 1090 \text{ MHz}$)	G_{PB}	8.5	9.0	—	dB
Collector Efficiency ($V_{CC} = 50 \text{ Vdc}$, $P_{out} = 350 \text{ W Peak}$, $f = 1090 \text{ MHz}$)	η	40	—	—	%
Load Mismatch ($V_{CC} = 50 \text{ Vdc}$, $P_{out} = 350 \text{ W Peak}$, $f = 1090 \text{ MHz}$, $VSWR = 10:1$ All Phase Angles)	ψ	No Degradation in Output Power			

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C1 — 75 pF 100 Mil Chip Capacitor
C2 — 39 pF 100 Mil Chip Capacitor
C3 — 0.1 μ F
C4 — 100 μ F, 100 Vdc, Electrolytic
L1 — 3 Turns #18 AWG, 1/8" ID, 0.18 Long

Z1–Z9 — Microstrip, See Details
Board Material — Teflon, Glass Laminate
Dielectric Thickness = 0.030"
 $\epsilon_r = 2.55$, 2 Oz. Copper

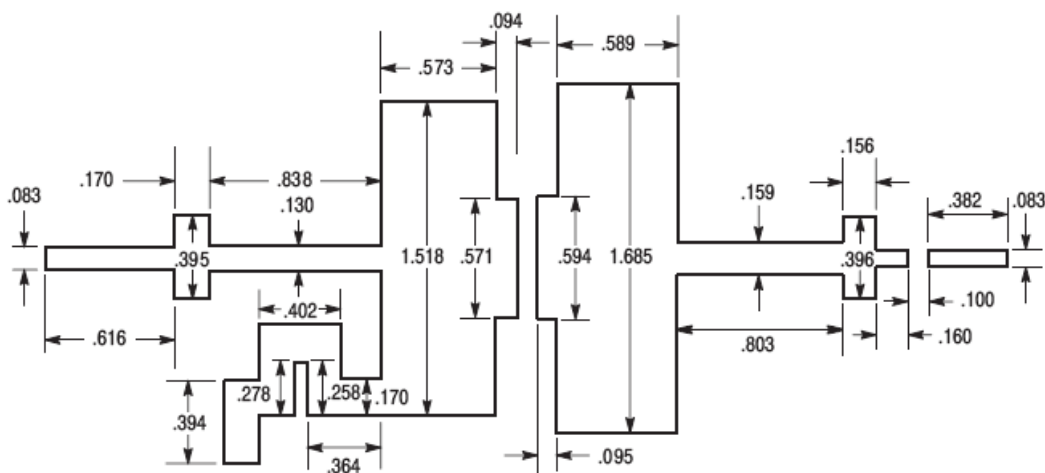


Figure 1. Test Circuit

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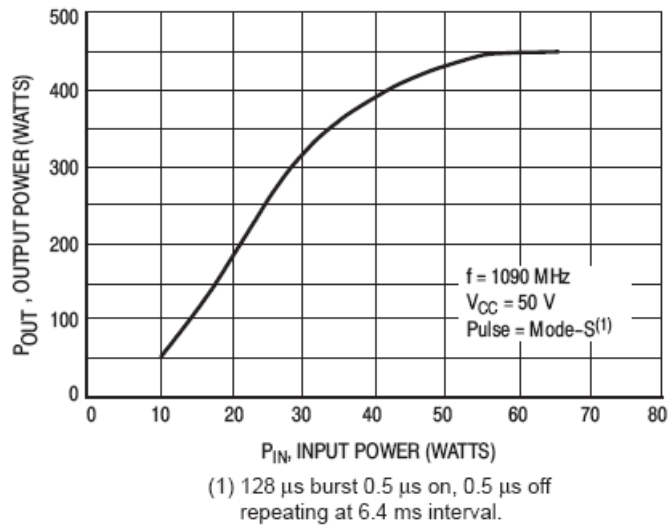
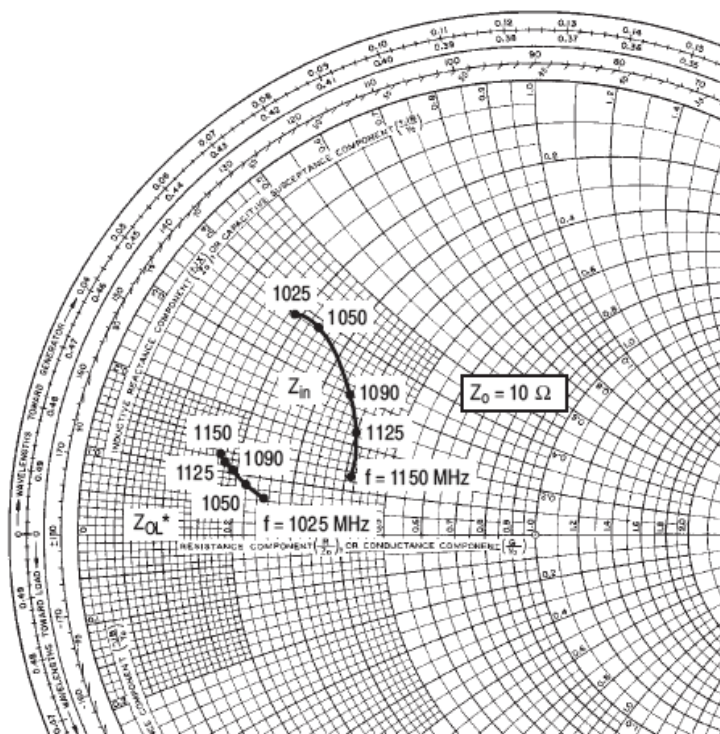


Figure 2. Output Power versus Input Power



$P_{OUT} = 350 \text{ W Pk}$ $V_{CC} = 50 \text{ V}$

f MHz	Z_{in} OHMS	$Z_{OL}^* (1)$ OHMS
1025	$1.92 + j3.80$	$2.52 + j0.70$
1050	$2.44 + j3.92$	$2.18 + j0.85$
1090	$3.55 + j3.02$	$1.94 + j1.13$
1125	$4.11 + j2.27$	$1.80 + j1.22$
1150	$4.13 + j1.35$	$1.71 + j1.31$

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

Figure 3. Series Equivalent Input/Output Impedances

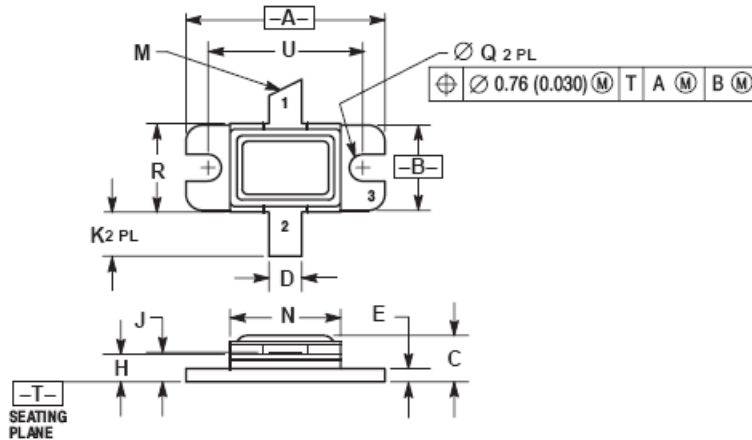
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PACKAGE DIMENSIONS



CASE 355E-01
ISSUE B