

The RF Line NPN Silicon High-Frequency Transistor

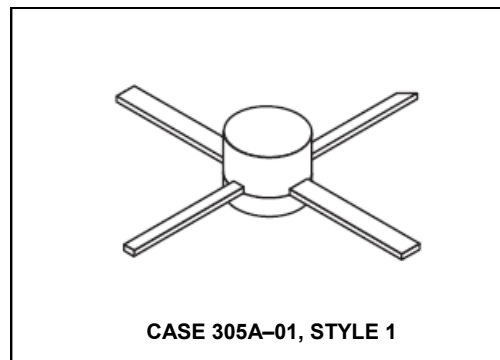
1.0W, 400MHz, 28V

Rev. V1

Designed for wideband amplifier, driver or oscillator applications in military, mobile, and aircraft radio.

- Specified 28 V, 400 MHz characteristics —
Output power = 1.0 W
Power gain = 15 dB min.
Efficiency = 45% typ.
- Emitter ballast and low current density for improved MTBF
- Common emitter for improved stability

Product Image



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	30	Vdc
Collector–Base Voltage	V_{CBO}	40	Vdc
Emitter–Base Voltage	V_{EBO}	3.0	Vdc
Collector Current — Continuous	I_C	150	mAdc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	6.1 35	Watts mW/ $^\circ\text{C}$
Storage Temperature Range	T_{stg}	–65 to +150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	28.5	$^\circ\text{C/W}$

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

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

OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ($I_C = 10$ mAdc, $I_B = 0$)	$V_{(BR)CEO}$	30	—	—	Vdc
Collector–Emitter Breakdown Voltage ($I_C = 5.0$ mAdc, $V_{BE} = 0$)	$V_{(BR)CES}$	35	—	—	Vdc
Collector–Base Breakdown Voltage ($I_C = 0.1$ mAdc, $I_E = 0$)	$V_{(BR)CBO}$	35	—	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = 1.0$ mAdc, $I_C = 0$)	$V_{(BR)EBO}$	3.0	—	—	Vdc
Collector Cutoff Current ($V_{CE} = 20$ Vdc, $I_B = 0$)	I_{CEO}	—	—	1.0	mAdc

(continued)

The RF Line NPN Silicon High-Frequency Transistor
1.0W, 400MHz, 28V

Rev. V1

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

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

ON CHARACTERISTICS

DC Current Gain ($I_C = 100\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$)	h_{FE}	20	60	150	—
--	----------	----	----	-----	---

DYNAMIC CHARACTERISTICS

Current–Gain — Bandwidth Product ($I_C = 100\text{ mAdc}$, $V_{CE} = 20\text{ Vdc}$, $f = 200\text{ MHz}$)	f_T	—	2.5	—	GHz
Output Capacitance ($V_{CB} = 28\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	C_{ob}	—	3.5	5.0	pF

FUNCTIONAL TESTS

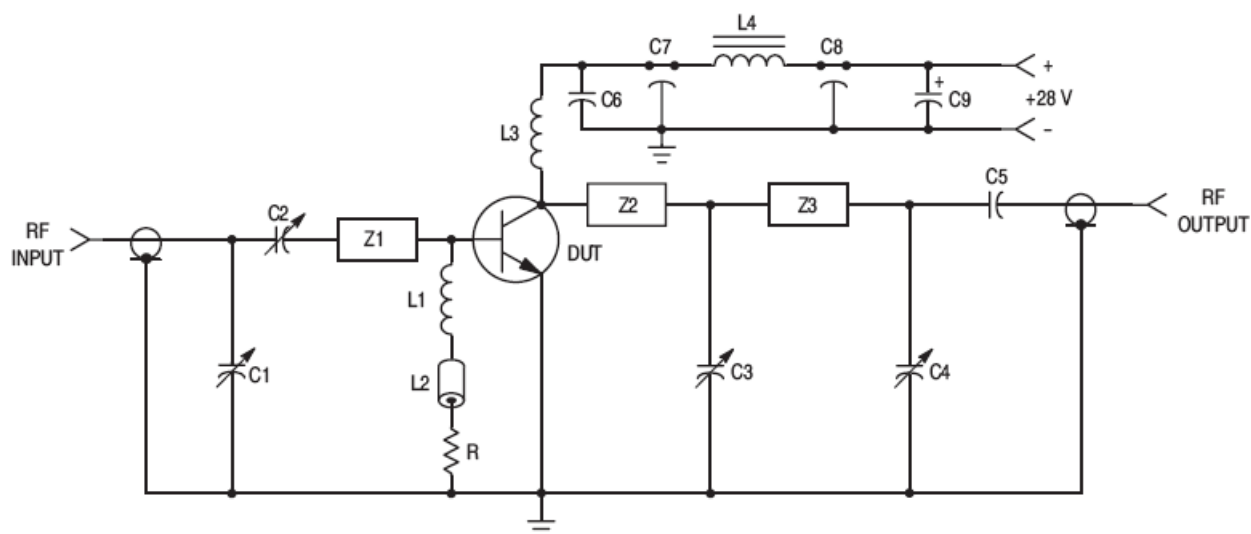
Common–Emitter Amplifier Power Gain (1) ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 1.0\text{ W}$, $f = 400\text{ MHz}$)	G_{pe}	15	16	—	dB
Collector Efficiency ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 1.0\text{ W}$, $f = 400\text{ MHz}$)	η	—	45	—	%
Series Equivalent Input Impedance ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 1.0\text{ W}$, $f = 400\text{ MHz}$)	Z_{in}	—	$6.4 - j4.8$	—	Ohms
Series Equivalent Output Impedance ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 1.0\text{ W}$, $f = 400\text{ MHz}$)	Z_{out}	—	$75 - j45$	—	Ohms

NOTE:

1. Class C

The RF Line NPN Silicon High-Frequency Transistor 1.0W, 400MHz, 28V

Rev. V1



C1, C2, C4 — 1.0–20 pF JOHANSON 9063
C3 — 1.0–10 pF JOHANSON
C5 — 150 pF Chip
C6 — 0.1 μ F
C7, C8 — 680 pF Feedthru
C9 — 1.0 μ F TANTALUM

L1, L3 — 5 Turns, AWG #20, 1/4" I.D.
L2 — Ferrite Bead, FERROXCUBE
No. 56–590–65/4B
L4 — FERROXCUBE VK200–20/4B
Input/Output Connectors — Type N
Board — Glass Teflon, $\epsilon = 2.56$, $t = 0.062$ "

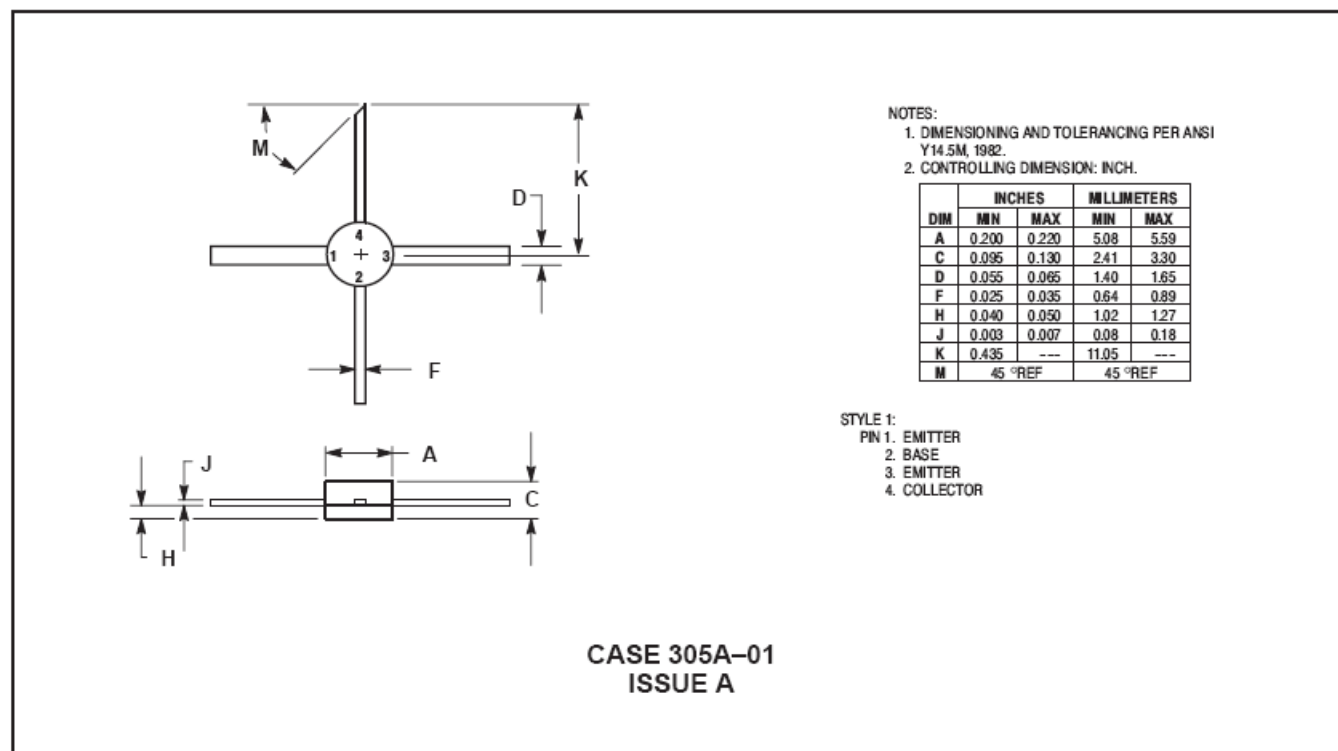
R — 4.7 Ohms, 1/4 W
Z1 — 2.0" x 0.1" MICROSTRIP LINE
Z2, Z3 — 2.6" x 0.1" MICROSTRIP LINE

Figure 1. 400 MHz Power Gain Test Circuit

The RF Line NPN Silicon High-Frequency Transistor 1.0W, 400MHz, 28V

Rev. V1

PACKAGE DIMENSIONS



The RF Line NPN Silicon High-Frequency Transistor 1.0W, 400MHz, 28V

Rev. V1

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.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[MACOM:](#)

[MRF313](#)