

The RF Line NPN Silicon Power Transistor 6.0W , 1.6GHz, 28V

Rev. V1

Designed for 28 V microwave large-signal, common base, Class C, CW amplifier applications in the range 1600 – 1640 MHz.

- Specified 28 V, 1.6 GHz Class C characteristics
 - Output power = 6 W
 - Minimum gain = 7.4 dB, @ 6 W
 - Minimum efficiency = 40% @ 6 W
- Characterized with series equivalent large-signal parameters from 1500 MHz to 1700 MHz
- Silicon nitride passivated
- Gold metalized, emitter ballasted for long life and resistance to metal migration

Product Image



MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CES}	60	Vdc
Emitter-Base Voltage	V_{EBO}	4.0	Vdc
Collector-Current	I_C	1.0	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	26 0.15	Watts $\text{W}/^\circ\text{C}$
Storage Temperature Range	T_{stg}	-65 to +150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Thermal Resistance — Junction to Case (1) (2)	$R_{\theta JC}$	6.8	$^\circ\text{C}/\text{W}$
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(1) Thermal measurement performed using CW RF operating condition.

(2) Thermal resistance is determined under specified RF operating conditions by infrared measurement techniques.

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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 ($I_C = 40\text{ mAdc}$, $V_{BE} = 0$)	$V_{(BR)CES}$	55	—	—	Vdc
Collector–Base Breakdown Voltage ($I_C = 40\text{ mAdc}$, $I_E = 0$)	$V_{(BR)CBO}$	55	—	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = 2.5\text{ mAdc}$, $I_C = 0$)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current ($V_{CE} = 28\text{ Vdc}$, $V_{BE} = 0$)	I_{CES}	—	—	2.5	mAdc

ON CHARACTERISTICS

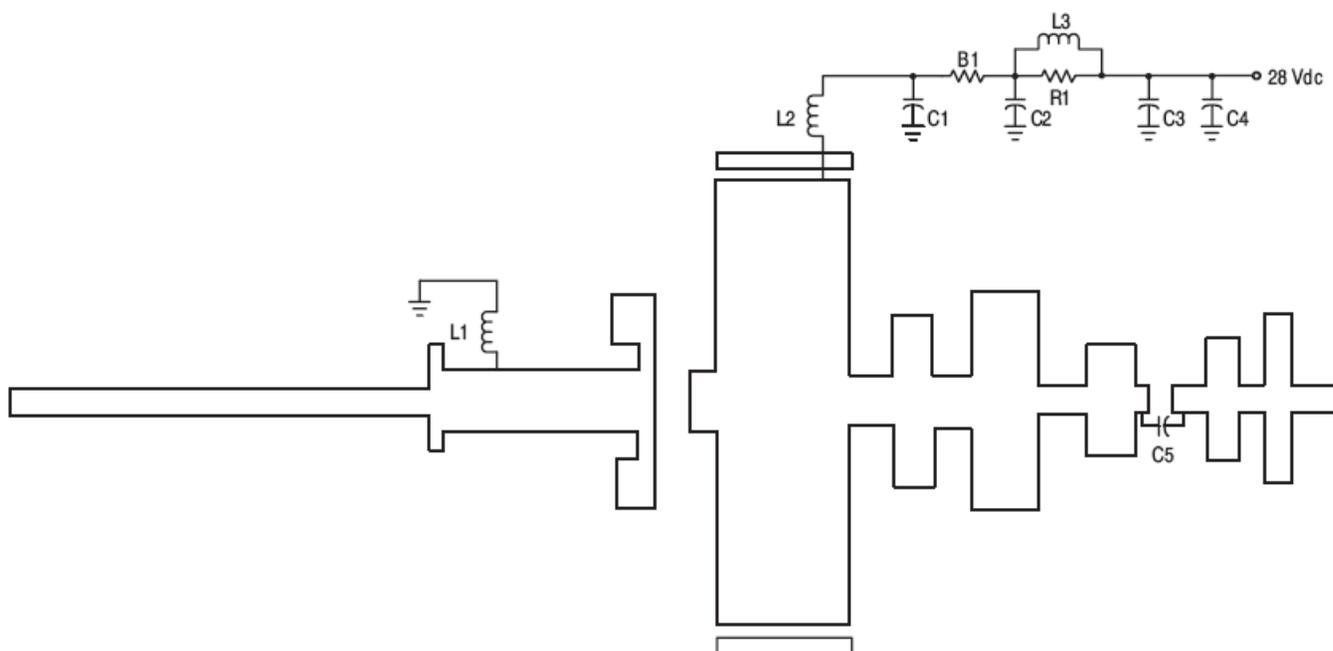
DC Current Gain ($I_{CE} = 0.2\text{ Adc}$, $V_{CE} = 5.0\text{ Vdc}$)	h_{FE}	20	—	80	—
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DYNAMIC CHARACTERISTICS

Output Capacitance ($V_{CB} = 28\text{ Vdc}$, $f = 1.0\text{ MHz}$)	C_{ob}	11	—	—	pf
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FUNCTIONAL TESTS

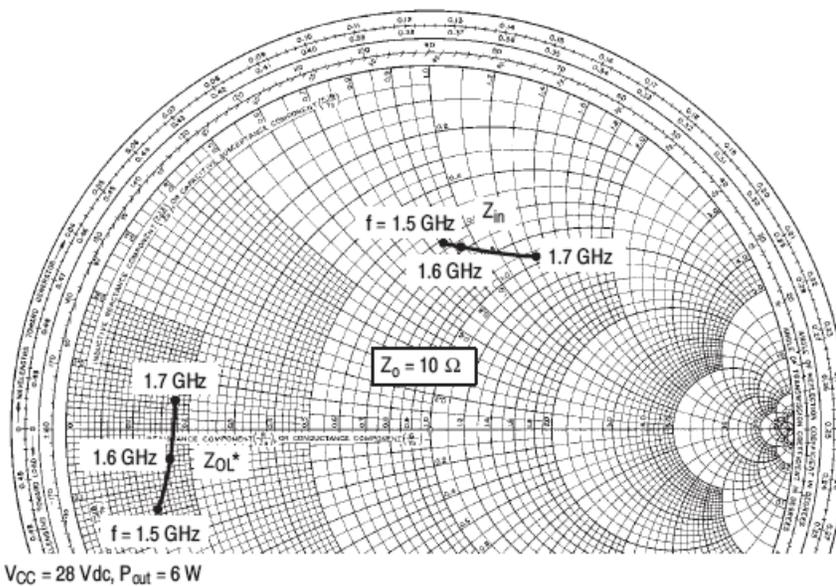
Common–Base Amplifier Power Gain ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 6\text{ Watts}$, $f = 1600/1640\text{ MHz}$)	G_{pe}	7.4	—	—	dB
Collector Efficiency ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 6\text{ Watts}$, $f = 1600/1640\text{ MHz}$)	η	40	45	—	%
Return Loss ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 6\text{ Watts}$, $f = 1600/1640\text{ MHz}$)	I_{RL}	—	8.0	—	dB
Output Mismatch Stress ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 6\text{ Watts}$, $f = 1600\text{ MHz}$, Load VSWR = 3:1 all phase angles at frequency of test)	ψ	No Degradation in Output Power			



Board Material – Teflon[®] Glass Laminate Dielectric
Thickness – 0.30", $\epsilon_r = 2.55$ ", 2.0 oz. Copper

B1	Fair Rite Bead on #24 Wire	C4	47 μ F, 50 V, Electrolytic Cap
C1, C5	100 pF, B Case, ATC Chip Cap	L1, L2	3 Turns, #18, 0.133" ID, 0.15" Long
C2	0.1 μ F, Dipped Mica Cap	L3	9 Turns, #24 Enamel
C3	0.1 μ F, Chip Cap	R1	82 Ω , 1.0 W, Carbon Resistor

Figure 1. MRF16006 Test Fixture Schematic



f MHz	Z_{in} Ohms	Z_{OL}^* Ohms
1500	$6.28 + j 8.53$	$1.22 - j 1.37$
1600	$7.04 + j 9.00$	$1.58 - j 0.53$
1700	$9.55 + j 12.86$	$1.71 + j 0.39$

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

Figure 2. Series Equivalent Input/Output Impedance

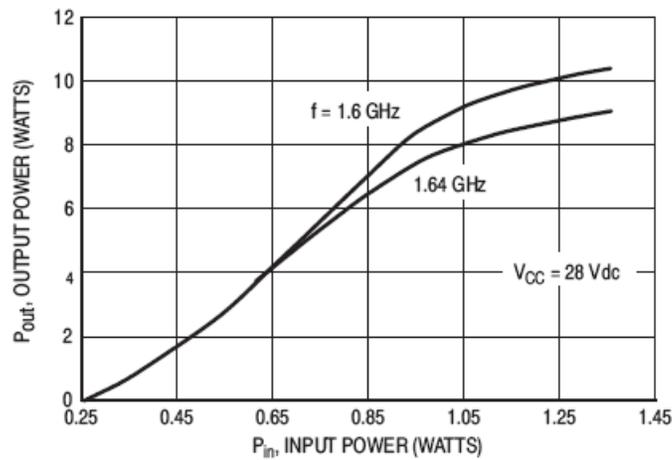
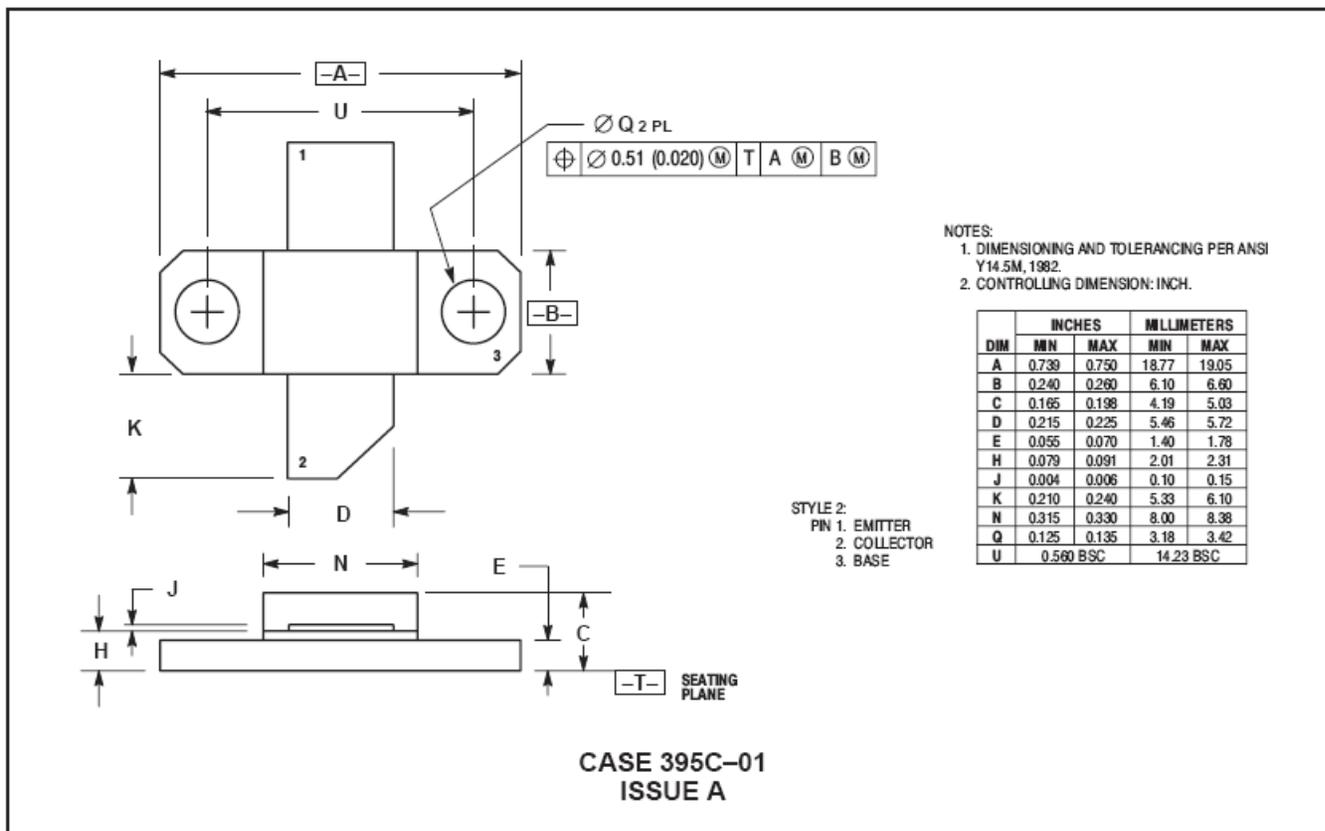


Figure 3. Output Power versus Input Power

PACKAGE DIMENSIONS



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