

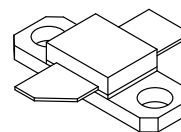
## The RF Line

# NPN Silicon

## RF Power Transistor

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

- Specified 28 Volt, 1.6 GHz Class-C Characteristics
  - Output Power = 30 Watts
  - Minimum Gain = 7.5 dB, @ 30 Watts
  - Minimum Efficiency = 40% @ 30 Watts
- Characterized with Series Equivalent Large-Signal Parameters from 1500 MHz to 1700 MHz
- Silicon Nitride Passivated
- Gold Metallized, Emitter Ballasted for Long Life and Resistance to Metal Migration
- Circuit board photomaster available upon request by contacting RF Tactical Marketing in Phoenix, AZ.

**MRF16030****30 WATTS, 1.6 GHz  
RF POWER TRANSISTOR  
NPN SILICON****CASE 395C-01, STYLE 2****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	$I_C$	4.0	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	103 0.58	Watts $^\circ\text{C/W}$
Storage Temperature Range	$T_{stg}$	-65 to +150	$^\circ\text{C}$

**THERMAL CHARACTERISTICS**

Thermal Resistance — Junction to Case (1) (2)	$R_{\theta JC}$	1.7	$^\circ\text{C/W}$
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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.



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

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

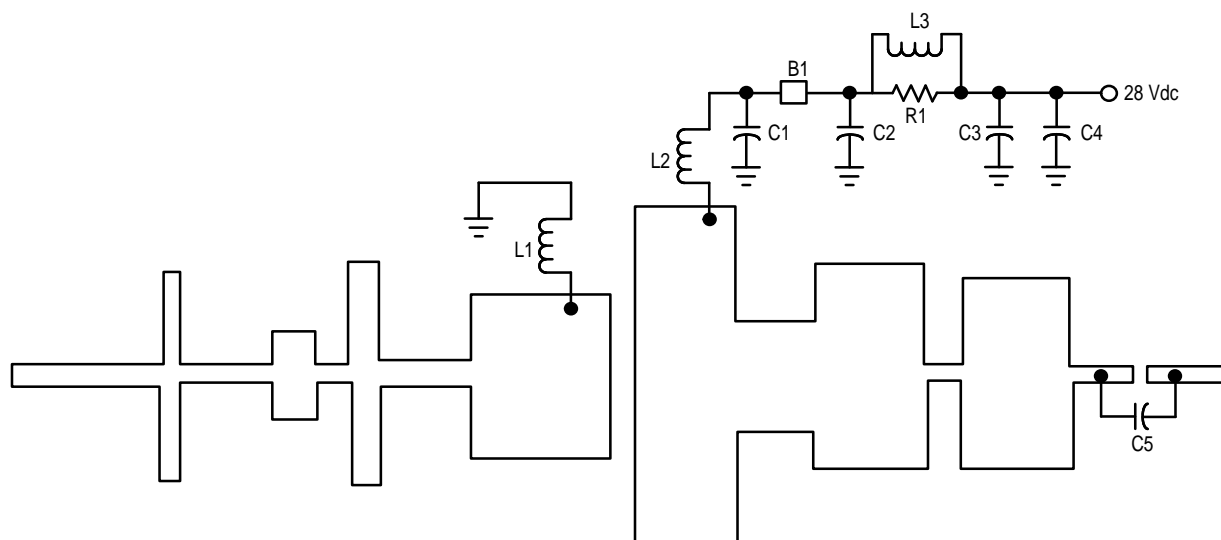
Collector–Emitter Breakdown Voltage ( $I_C = 100\text{ mAdc}$ , $V_{BE} = 0$ )	$V_{(BR)CES}$	55	—	—	Vdc
Collector–Base Breakdown Voltage ( $I_C = 100\text{ mAdc}$ , $I_E = 0$ )	$V_{(BR)CBO}$	55	—	—	Vdc
Emitter–Base Breakdown Voltage ( $I_E = 10\text{ mAdc}$ , $I_C = 0$ )	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current ( $V_{CE} = 28\text{ Vdc}$ , $V_{BE} = 0$ )	$I_{CES}$	—	—	10	mAdc

**ON CHARACTERISTICS**

DC Current Gain ( $I_{CE} = 1.0\text{ Adc}$ , $V_{CE} = 5.0\text{ Vdc}$ )	$h_{FE}$	20	35	80	—
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**FUNCTIONAL TESTS**

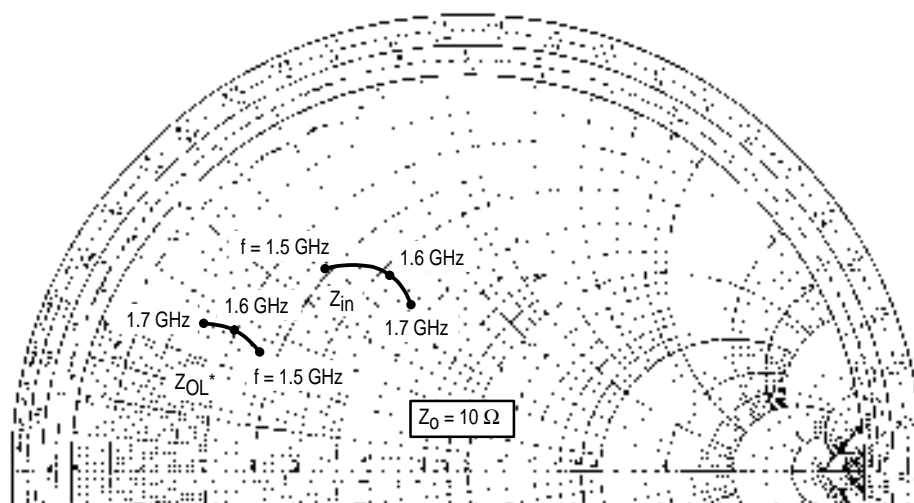
Collector–Base Amplifier Power Gain ( $V_{CC} = 28\text{ Vdc}$ , $P_{out} = 30\text{ Watts}$ , $f = 1600/1640\text{ MHz}$ )	$G_{pe}$	7.5	7.7	—	dB
Collector Efficiency ( $V_{CC} = 28\text{ Vdc}$ , $P_{out} = 30\text{ Watts}$ , $f = 1600/1640\text{ MHz}$ )	$\eta$	40	45	—	%
Input Return Loss ( $V_{CC} = 28\text{ Vdc}$ , $P_{out} = 30\text{ Watts}$ , $f = 1600/1640\text{ MHz}$ )	$I_{RL}$	8.0	—	—	dB
Output Mismatch Stress $V_{CC} = 28\text{ Vdc}$ , $P_{out} = 30\text{ Watts}$ , $f = 1600\text{ MHz}$ , Load $V_{SWR} = 3:1$ , All phase angles at frequency of test	$\Psi$	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 $\mu$ F, 50 V, Electrolytic
C1, C5	100 pF, B Case, ATC Chip Cap	L1, L2	3 Turns, #18, 0.133" ID, 0.15" Long
C2	0.1 $\mu$ F, Dipped Mica Cap	L3	9 Turns, #24 Enamel
C3	0.1 $\mu$ F, Chip Cap	R1	82 $\Omega$ , 1.0 W, Carbon

**Figure 1. MRF16030 Test Fixture Schematic**



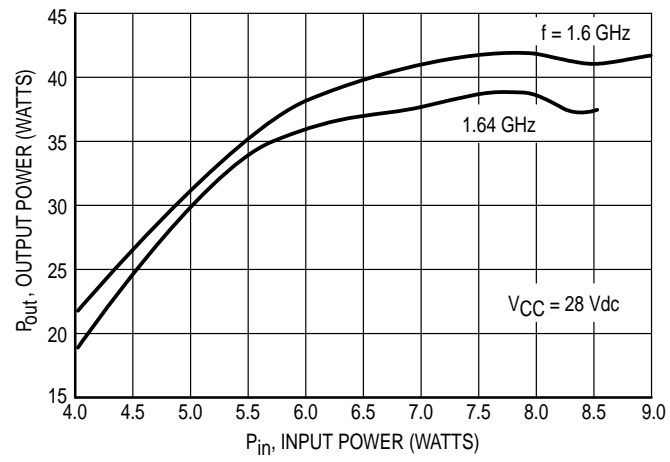
$V_{CC} = 28$  Vdc,  $P_{out} = 30$  W

f MHz	$Z_{in}$ Ohms	$Z_{OL}^*$ Ohms
1500	$3.05 + j 4.88$	$2.66 + j 2.53$
1600	$4.32 + j 6.00$	$1.79 + j 2.80$
1700	$5.62 + j 5.79$	$1.51 + j 2.64$

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

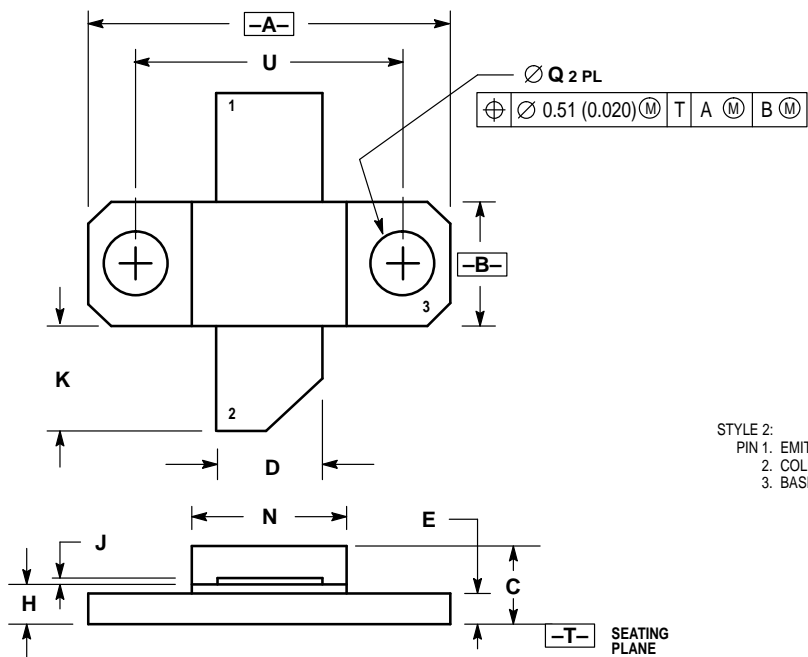
NOTE: Input and output impedance values given are measured from gate to gate and drain to drain respectively.

**Figure 2. Series Equivalent Input/Output Impedance**



**Figure 3. Output Power versus Input Power**

PACKAGE DIMENSIONS




- NOTES:
- 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  - 2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.739	0.750	18.77	19.05
B	0.240	0.260	6.10	6.60
C	0.165	0.198	4.19	5.03
D	0.215	0.225	5.46	5.72
E	0.055	0.070	1.40	1.78
H	0.079	0.091	2.01	2.31
J	0.004	0.006	0.10	0.15
K	0.210	0.240	5.33	6.10
N	0.315	0.330	8.00	8.38
Q	0.125	0.135	3.18	3.42
U	0.560 BSC		14.23 BSC	

STYLE 2:  
PIN 1. EMITTER  
2. COLLECTOR  
3. BASE

CASE 395C-01  
ISSUE A

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**MRF16030/D**

