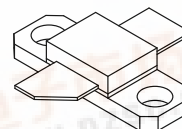


The RF Line
NPN Silicon
RF Power Transistor

MRF16030

30 WATTS, 1.6 GHz
RF POWER TRANSISTOR
NPN SILICON



CASE 395C-01, STYLE 2

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.

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°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	$^\circ\text{C/W}$
---	-----------------	-----	--------------------

(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
----------------	--------	-----	-----	-----	------

OFF CHARACTERISTICS

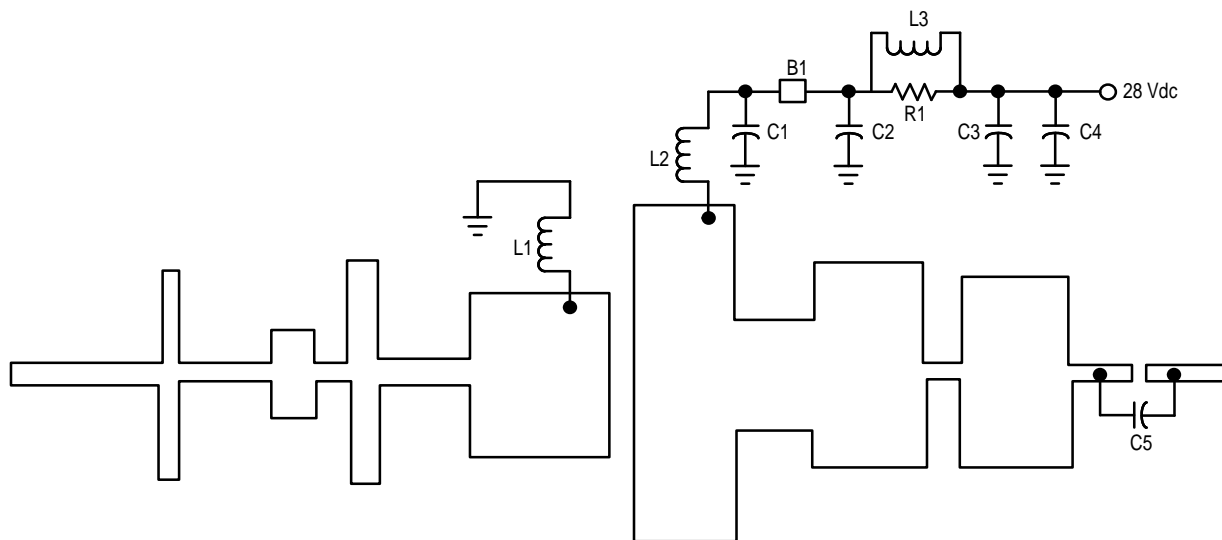
Collector–Emitter Breakdown Voltage ($I_C = 100\text{ mAdc}$, $V_{BE} = 0$)	$V_{(BR)CES}$	55	—	—	Vdc
Collector–Base Breakdown Voltage ($I_C = 100\text{ mAdc}$, $I_E = 0$)	$V_{(BR)CBO}$	55	—	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = 10\text{ mAdc}$, $I_C = 0$)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff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

FUNCTIONAL TESTS

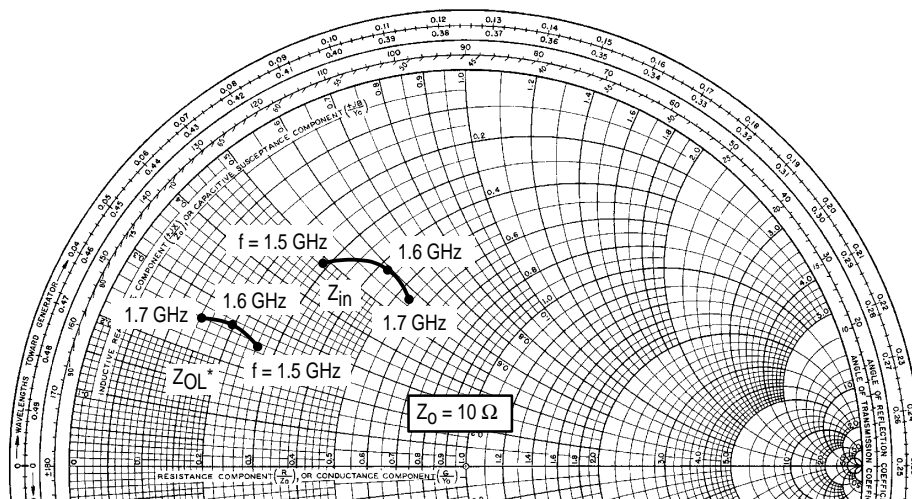
Collector–Base Amplifier Power Gain ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 30\text{ Watts}$, $f = 1600/1640\text{ MHz}$)	G_{pe}	7.5	7.7	—	dB
Collector Efficiency ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 30\text{ Watts}$, $f = 1600/1640\text{ MHz}$)	η	40	45	—	%
Input Return Loss ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 30\text{ Watts}$, $f = 1600/1640\text{ MHz}$)	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	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 |
| 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 |

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.

Figure 2. Series Equivalent Input/Output Impedance

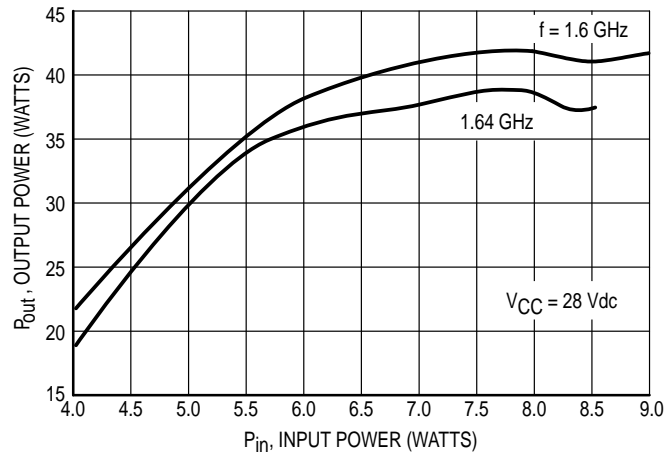
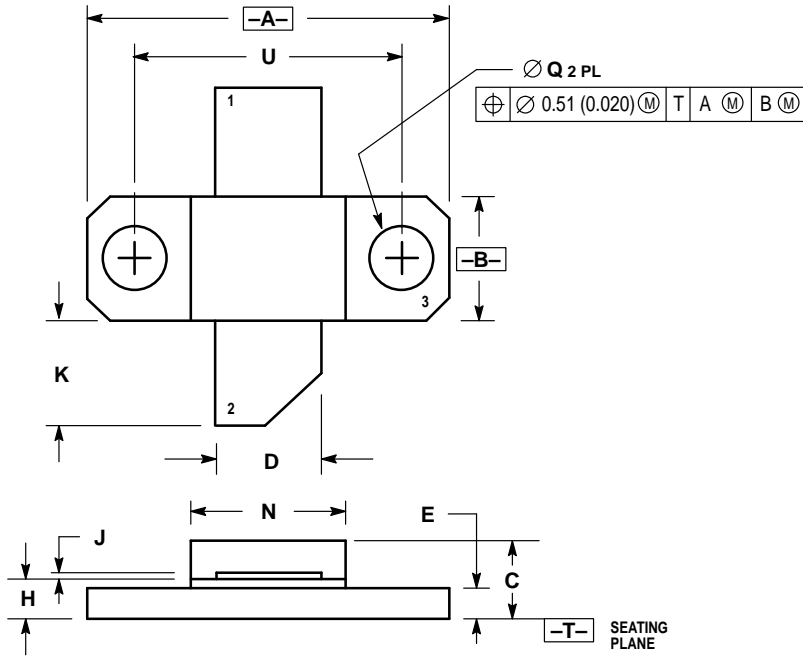


Figure 3. Output Power versus Input Power

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

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters which may be provided in Motorola data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and  are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

Mfax is a trademark of Motorola, Inc.

How to reach us:

USA/EUROPE/Locations Not Listed: Motorola Literature Distribution;
P.O. Box 5405, Denver, Colorado 80217. 303-675-2140 or 1-800-441-2447

JAPAN: Nippon Motorola Ltd.: SPD, Strategic Planning Office, 4-32-1,
Nishi-Gotanda, Shinagawa-ku, Tokyo 141, Japan. 81-3-5487-8488

Mfax™: RMFAX0@email.sps.mot.com – TOUCHTONE 602-244-6609
– US & Canada ONLY 1-800-774-1848

ASIA/PACIFIC: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298

INTERNET: <http://motorola.com/sps>



MOTOROLA