NEC

CLASS C, 800-960 MHz 12 VOLT POWER TRANSISTOR

NEM080481-12
NEM081081-12
NEM082081B-12
NEM084081B-12

FEATURES

- **LOW OPERATING VOLTAGE:** 13.5 V
- **TITANIUM/PLATINUM/GOLD METALLIZATION FOR HIGH RELIABILITY**
- **GAIN AS HIGH AS 7 dB**
- **RUGGED VSWR:** ∞ at V_{CC} = 13.5 V
- **IDEALLY SUITED FOR 800/960 MHz BAND MOBILE/CELLULAR RADIO APPLICATIONS**
- **LOW COST PACKAGES**
- **HIGH OUTPUT POWER:** 37 WATTS AT 860 MHz
- **COMMON BASE**

DESCRIPTION

NEC's NEM0800 series of NPN epitaxial UHF power transistors are designed specifically for large volume mobile radio applications in the 800 & 960 MHz bands. The series is available in a low cost metal-ceramic stripline package offering power levels of 6, 12, 24 and 40 W. Internal matching is incorporated to simplify circuit design. The series provides high gain, high efficiency and a high resistance to burn-out with load mismatch. The NEM0800 series is complementary to NEC's range of power amplifier modules offering total discrete/modular design flexibility.

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ELECTRICAL CHARACTERISTICS (T_A = 25°C)

PART NUMBER EIAJ[1] REGISTERED NUMBER PACKAGE OUTLINE			NEM080481E-12 81E			NEM081081E-12 81E			NEM082081B -12 2SC3282A 81B			NEM084081B12 2SC3283A 81B		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
P_{OUT}	Output Power at V_{CC} = 13.5 V f = 950 MHz, P_{IN} = 1.5 W f = 950 MHz, P_{IN} = 3.5 W f = 860 MHz, P_{IN} = 4 W f = 860 MHz, P_{IN} = 8 W	 W W W W	4	6		10	12.5		18	22		30	37	
η_C	Collector Efficiency at V_{CC} = 13.5 V f = 950 MHz, P_{IN} = 1.5 W f = 950 MHz, P_{IN} = 3.5 W f = 860 MHz, P_{IN} = 4 W f = 860 MHz, P_{IN} = 8 W	 % % % %	55	60		55	65		50	58		50	55	
VSWR	Voltage Standing Wave Ratio at V_{CC} = 13.5 V P_{OUT} = 4 W P_{OUT} = 10 W P_{OUT} = 20 W P_{OUT} = 40 W				∞			∞			∞			∞
I_{CBO}	Collector Cutoff Current at V_{CB} = 20 V, I_E = 0	mA		0.2			0.3				2			4
I_{EBO}	Emitter Cutoff Current at V_{EB} = 20 V, I_E = 0	mA		0.2			0.3				2			4
h_{FE}	DC Forward Current Gain at V_{CE} = 10 V, I_C = 0.3 A (pulsed) I_C = 0.5 A (pulsed) I_C = 1 A (pulsed) I_C = 2 A (pulsed)		20	60	200	20	60	200	20	50	200	20	50	200
C_{OB}	Output Capacitance at V_{CB} = 10 V, I_E = 0, f = 1 MHz	pF		7	10		15	19.5		2.5	35		50	70

Note:

1. Electronic Industrial Association of Japan.

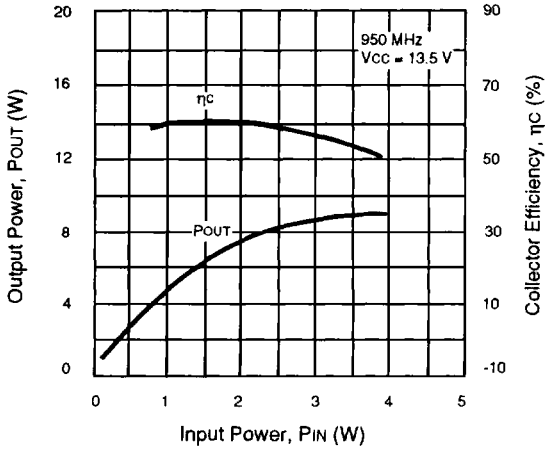
ABSOLUTE MAXIMUM RATINGS[1] (T_A = 25°C)

PART NUMBER PACKAGE OUTLINE			NEM080481E-12 01	NEM081081E-12 01	NEM082081B-12 01	NEM084081B-1 01
SYMBOLS	PARAMETER	UNITS	RATINGS	RATINGS	RATINGS	RATINGS
V_{CBO}	Collector to Base Voltage	V	35	35	35	35
V_{CEO}	Collector to Emitter Voltage	V	18	18	16	16
V_{EBO}	Emitter to Base Voltage	V	3	3	2.5	2.5
I_C	Collector Current	A	1.5	3	7.5	15
$R_{TH(J-C)}$	Thermal Resistance (Junction to Case)	°C/W	10	5	2.5	1.5
P_T	Total Power Dissipation (T_C = 25°C)	W	17.5	35	70	120
T_J	Junction Temperature	°C	200	200	200	200
T_{STG}	Storage Temperature	°C	-65 to +150	-65 to +150	-65 to +150	-65 to +150

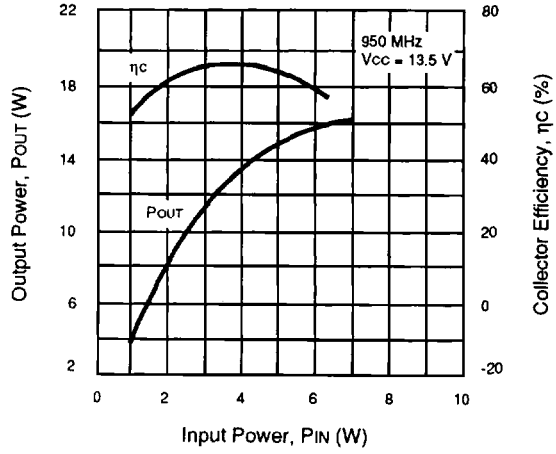
Notes:
1. Operation in excess of any one of these parameters may result in permanent damage.

TYPICAL PERFORMANCE CURVES (T_A = 25°C)

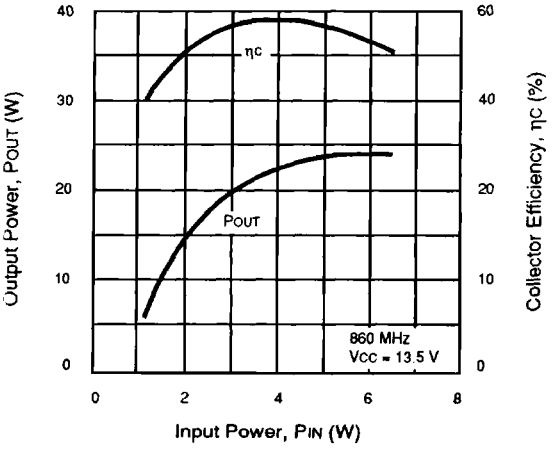
NEM080481E-12
OUTPUT POWER AND COLLECTOR EFFICIENCY vs. INPUT POWER



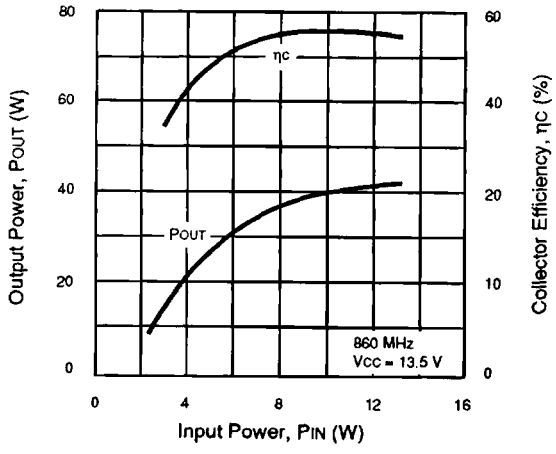
NEM081081E-12
OUTPUT POWER AND COLLECTOR EFFICIENCY vs. INPUT POWER



NEM082081B-12
OUTPUT POWER AND COLLECTOR EFFICIENCY vs. INPUT POWER

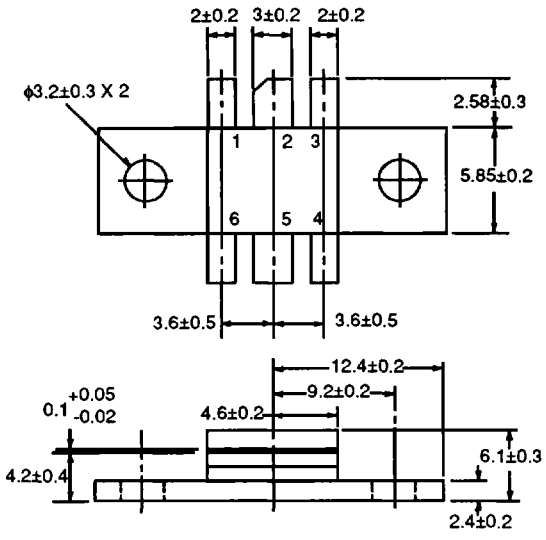


NEM084081B-12
OUTPUT POWER AND COLLECTOR EFFICIENCY vs. INPUT POWER



OUTLINE DIMENSIONS (Units in mm)

PACKAGE OUTLINE 81B*

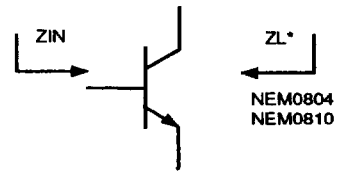


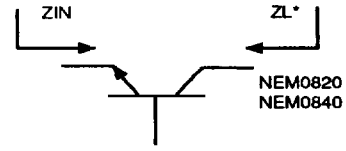
*81E has emitter and base reversed.

TYPICAL INPUT/OUTPUT IMPEDANCE LOAD[1]

PART NUMBER	FREQUENCY (MHz)	ZIN (Ω)		ZL (Ω)	
NEM080481E-12	950	3.22	+j6.6	6.36	-j4.7
NEM081081E-12	950	2.3	+j3.49	9.8	-j5.91
NEM082081B-12	860	2.5	+j0.5	2.23	+j0
NEM084081B-12	860	1.5	+j4.75	1.75	+j2.0

Note:
1. Typical Large Signal Impedances at V_{CC} = 13.5 V, T_A = 25°C.





*ZL is optimum load impedance at rated output power.

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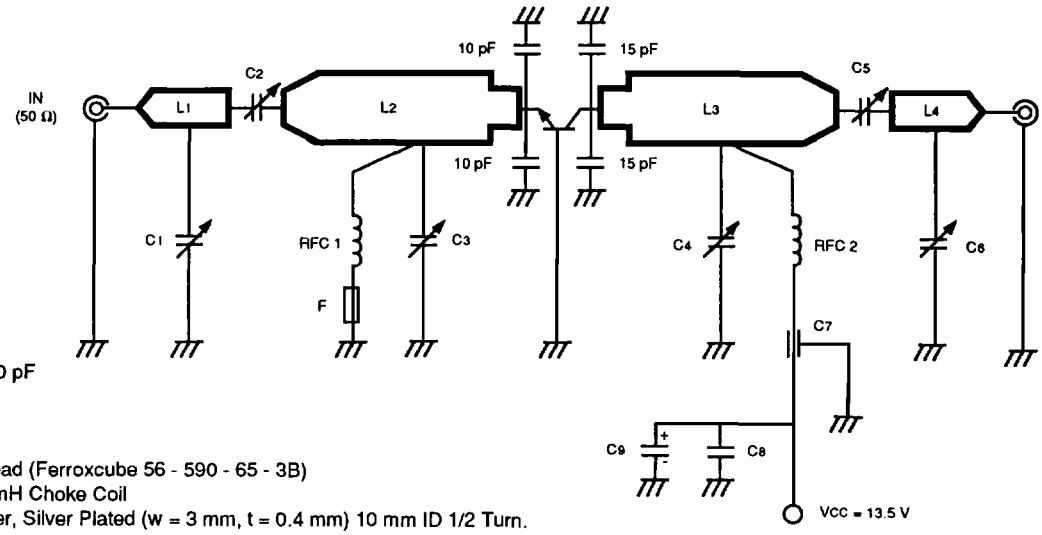
TEST CIRCUIT DIAGRAM



C1 to C8: ~ 10 pF
C7: 1000 pF
C8: 0.01 μF
C9: 10 μF
F = Ferrite Bead (Ferroxcube 56 - 590 - 65 - 3B)
RFC 1: 0.47 mH Choke Coil
RFC 2: Copper, Silver Plated (w = 3 mm, t = 0.4 mm) 10 mm ID 1/2 Turn.