NEC

CLASS C, 940 MHz, 7 VOLT POWER TRANSISTOR

NE090101-07
NEM090301-07
NEM090701-07

FEATURES

- HIGH POWER AND GAIN
- LOW COST
- WIDE BANDWIDTH
- SMALL PACKAGE
- GOLD METALLIZATION
- RUGGED VSWR: ∞

DESCRIPTION

The NE0900-07 and NEM0900-07 series of NPN silicon epitaxial UHF power transistors are designed specifically for hand-held radio applications with a supply voltage of 7.2 V. The series is available in a chip carrier package offering power levels of 1, 3 and 7 watts in the 800 to 900 MHz band. The input matching network is incorporated for the NEM0900-07 series to simplify circuit designs. The series features high gain, power, efficiency, and resistance to burn-out resulting from load mismatch.

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ELECTRICAL CHARACTERISTICS (T_A = 25°C)

PART NUMBER EIAJ[1] REGISTERED NUMBER PACKAGE OUTLINE			NE090101-07 2SC3814 01			NEM090301-07 2SC3815 01			NEM090701-07 2SC3816 01		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
P_{OUT}	Output Power at V_{CC} = 7.2 V, f = 940 MHz, P_{IN} = 0.1 W P_{IN} = 0.7 W P_{IN} = 2.3 W	 W W W	0.8	1		2.5	3.2		5	6.3	
η_C	Collector Efficiency at V_{CC} = 7.2 V, f = 940 MHz, P_{IN} = 0.1 W P_{IN} = 0.7 W P_{IN} = 2.3 W		50	55		55	65		55	65	
I_{CBO}	Collector Cutoff Current at V_{CB} = 15 V, I_E = 0	mA			0.1			0.25			0.5
I_{EBO}	Emitter Cutoff Current at V_{EB} = 1.5 V, I_C = 0	mA			0.1			0.25			0.5
h_{FE}	DC Forward Current Gain at V_{CE} = 7V, I_C = 0.1 A (pulsed) I_C = 0.2 A (pulsed) I_C = 0.4 A (pulsed)		20	60	200	20	60	200	20	100	200
C_{OB}	Output Capacitance[2] at V_{CB} = 10 V, I_E = 0 , f = 1 MHz	pF			5			20			40

Notes:
1. Electronic Industrial Association of Japan.
2. The emitter terminal should be connected to the guard terminal at the three-terminal capacitance bridge.

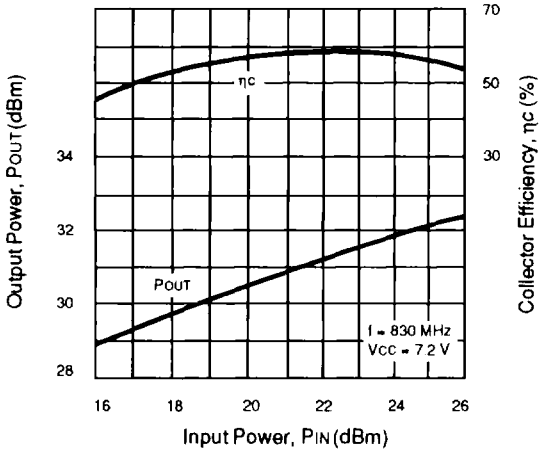
ABSOLUTE MAXIMUM RATINGS[1] (T_A = 25°C)

PART NUMBER PACKAGE OUTLINE			NE090101-07 01	NEM090301-07 01	NEM090701-07 01
SYMBOLS	PARAMETERS	UNITS	RATINGS	RATINGS	RATINGS
V_{CBO}	Collector to Base Voltage	V	20	20	20
V_{CEO}	Collector to Emitter Voltage	V	12	12	12
V_{EBO}	Emitter to Base Voltage	V	2	2	2
I_C	Collector Current	A	0.5	1.5	3.0
$R_{TH(J-C)}$	Thermal Resistance (Junction-to-Case)	°C/W	21	10	5
P_T	Total Power Dissipation (T_C = 25°C)	W	8.3	17.5	35
T_J	Junction Temperature	°C	200	200	200
T_{STG}	Storage Temperature	°C	-65 to +150	-65 to +150	-65 to +150

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

TYPICAL PERFORMANCE CURVES (T_A = 25°C)

NE090101-07
OUTPUT POWER AND COLLECTOR EFFICIENCY vs. INPUT POWER



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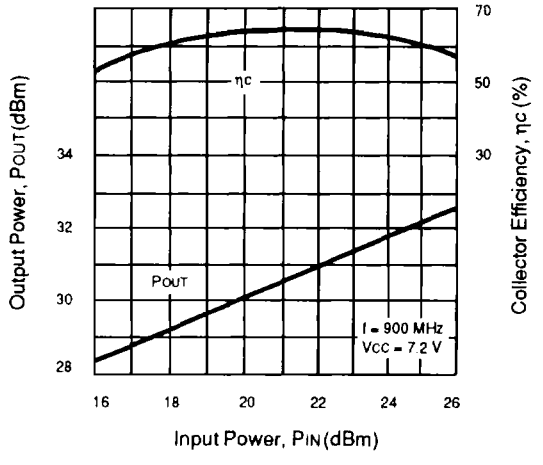

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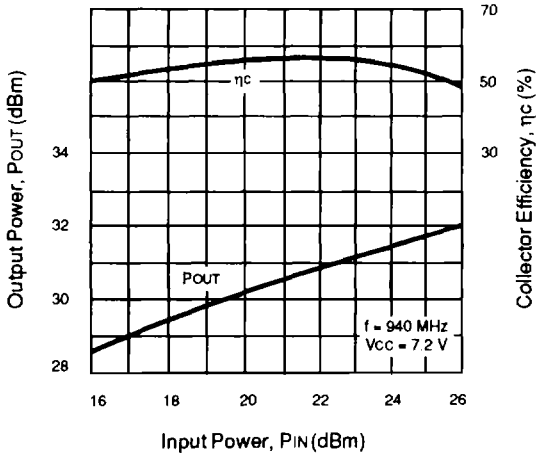
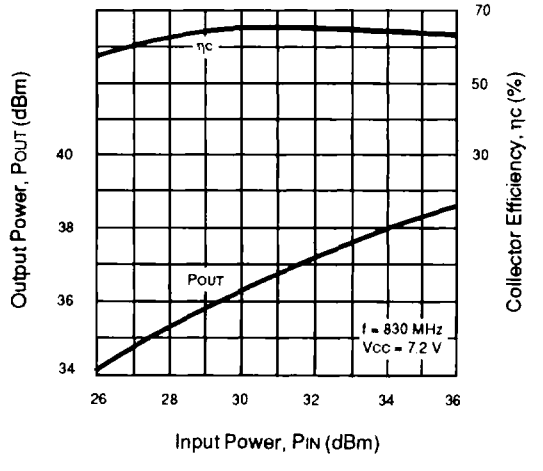


NEM090301-07
OUTPUT POWER AND COLLECTOR EFFICIENCY vs. INPUT POWER



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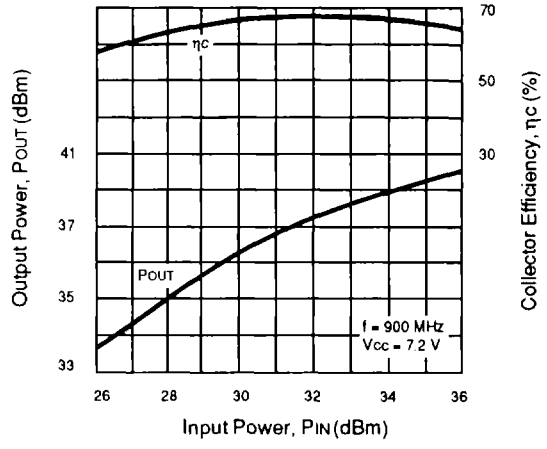

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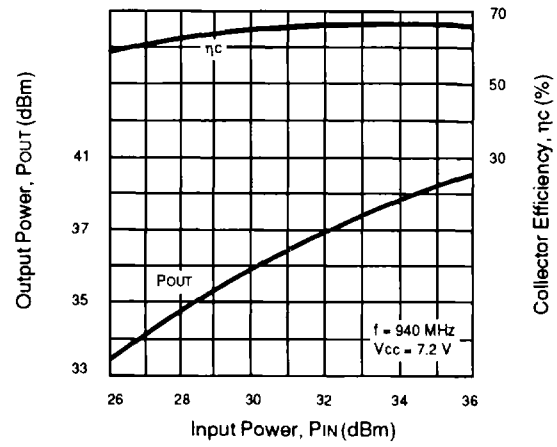
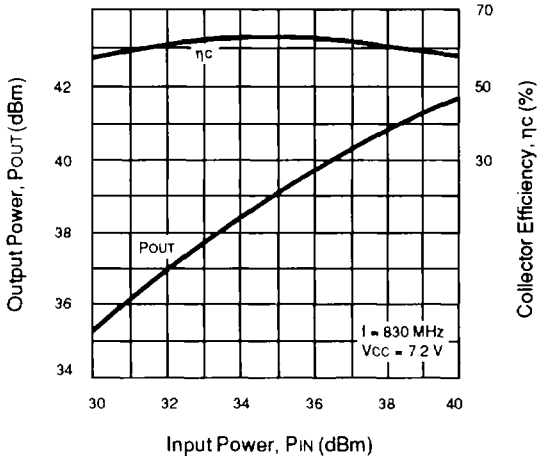


NEM090701-07
OUTPUT POWER AND COLLECTOR EFFICIENCY vs. INPUT POWER



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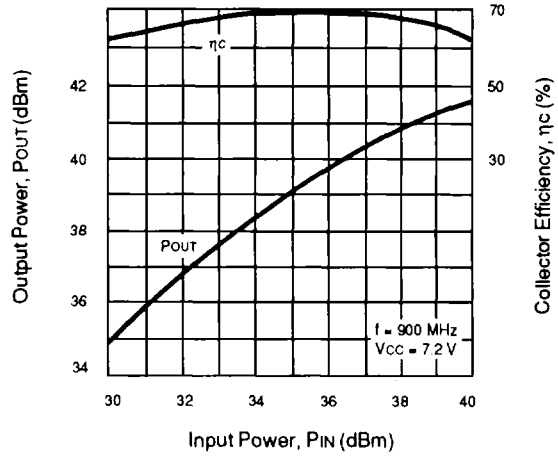
OUTPUT POWER AND COLLECTOR EFFICIENCY vs. INPUT POWER



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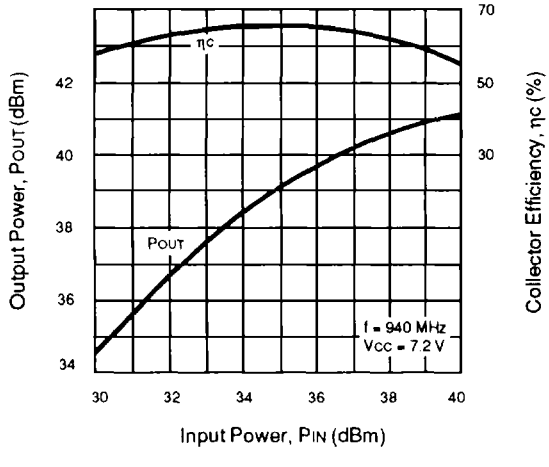

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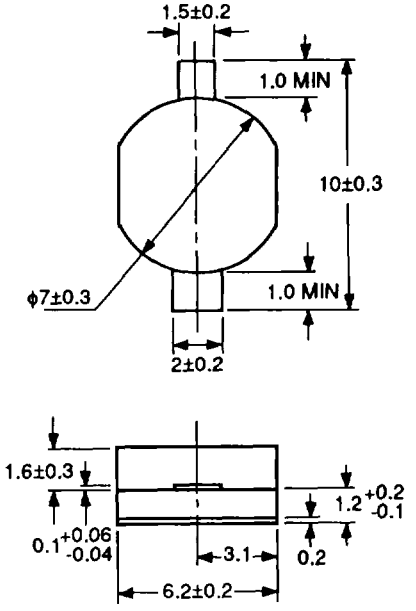
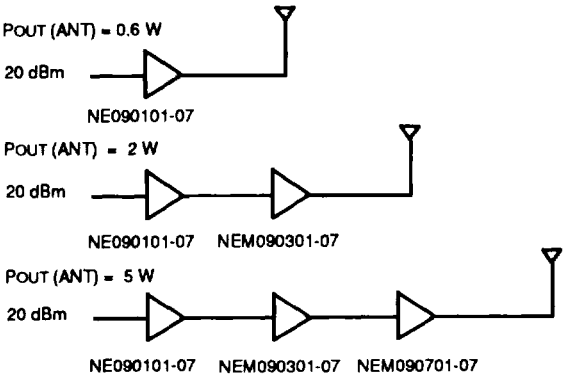
OUTLINE DIMENSIONS (Units in mm)

PACKAGE OUTLINE 01



APPLICATIONS

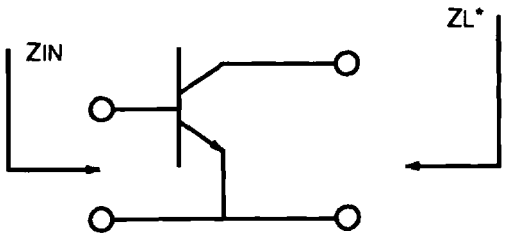
RECOMMENDED LINE UP FOR NE0900-07 AND NEM0900-07 SERIES (V_{CC} = 7.2 V)



TYPICAL INPUT/OUTPUT LOAD IMPEDANCE[1]

PART NUMBER	FREQUENCY (MHz)	Z_{IN} (Ω)	Z_L (Ω)
NE090101-07	830	2.9 +j4.4	11.3 -j2.5
	900	2.6 +j5.7	9.2 -j3.8
	940	2.0 +j5.7	6.9 -j0.9
NEM090301-07	830	3.5 +j6.6	3.5 +j2.6
	900	5.6 +j7.4	2.9 +j3.0
	940	7.3 +j7.3	2.9 +j3.5
NEM090701-07	830	2.3 +j4.8	2.3 +j3.5
	900	2.9 +j5.7	2.9 +j3.9
	940	2.9 +j6.1	2.6 +j4.8

Note:
1. Typical Large Signal Impedances at V_{CC} = 7 V.



*Z_L is optimum load impedance at rated output power.

ASSEMBLY INSTRUCTION AND BeO WARNING

HANDLING PRECAUTIONS

This product contains beryllium oxide (BeO) ceramic. Beryllium oxide powder or vapor is highly toxic and can be fatal. Parts containing beryllia shall not be ground, sandblasted, machined, or have other operations performed on them which will produce beryllia or beryllium dust. Furthermore, beryllium oxide packages shall not be placed in acids that will produce forms containing beryllium. Do not dispose of this product with common household or industrial waste. Disposal of this product may be subject to hazardous waste procedures dictated by your government, state or local laws.

INSTALLATION PROCEDURE

- Solder the emitter surface to the heat sink. Then solder the base and the collector leads to the printed circuit board. A soldering temperature of 260°C or less for 10 seconds or less is recommended.
- To relieve stress, leave a gap between the printed circuit board and the leads to the base and the emitter.
- When soldering the emitter terminal surface to the heat sink, make sure that the solder covers the entire collector terminal surface and that it is securely fixed to the heat sink. Improper soldering will result in increased thermal resistance, etc. The use of a flux, a soldering temperature of 200°C or less, and a reflow within 1 minute are recommended.
- If the base of the emitter lead or the heat sink surface is either soldered at a temperature that is too high or soldered for too long, the connection may peel. Follow the temperature and the time recommendations given above.