

**NEC**<sup>®</sup>**CLASS C, 800-960 MHz,  
12 VOLT POWER TRANSISTOR**T-33-15  
**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:**  $\infty$  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 AND APPLICATIONS**

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.

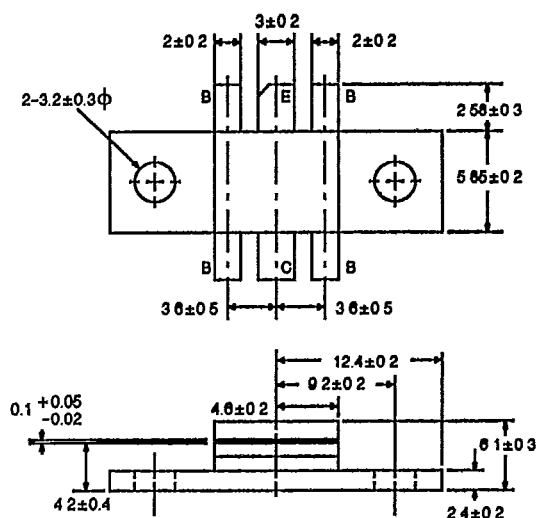
**PERFORMANCE SPECIFICATIONS** ( $T_A = 25^\circ\text{C}$ )

| PART NUMBER<br>EIAJ* REGISTERED NUMBER<br>PACKAGE OUTLINE |                                                                                                                                                                                      |                  | NEM080481E-12<br>81E |     |          | NEM081081E-12<br>81E |      |          | NEM082081B-12<br>2SC3282A<br>81B |     |          | NEM084081B-12<br>2SC3283A<br>81B |     |          |
|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------------|-----|----------|----------------------|------|----------|----------------------------------|-----|----------|----------------------------------|-----|----------|
| SYMBOLS                                                   | PARAMETERS                                                                                                                                                                           | UNITS            | MIN                  | TYP | MAX      | MIN                  | TYP  | MAX      | MIN                              | TYP | MAX      | MIN                              | TYP | MAX      |
| $P_{OUT}$                                                 | Output Power<br>at $V_{cc} = 13.5$ V<br>$f = 950$ MHz, $P_{IN} = 1.5$ W<br>$f = 950$ MHz, $P_{IN} = 3.5$ W<br>$f = 860$ MHz, $P_{IN} = 4$ W<br>$f = 860$ MHz, $P_{IN} = 8$ W         | W<br>W<br>W<br>W | 4                    | 6   |          | 10                   | 12.5 |          | 18                               | 22  |          | 30                               | 37  |          |
| $\eta_c$                                                  | Collector Efficiency<br>at $V_{cc} = 13.5$ V<br>$f = 950$ MHz, $P_{IN} = 1.5$ W<br>$f = 950$ MHz, $P_{IN} = 3.5$ W<br>$f = 860$ MHz, $P_{IN} = 4$ W<br>$f = 860$ MHz, $P_{IN} = 8$ W | %<br>%<br>%<br>% | 55                   | 60  |          | 55                   | 65   |          | 50                               | 58  |          | 50                               | 55  |          |
| VSWR                                                      | Voltage Standing Wave Ratio<br>at $V_{cc} = 13.5$ V<br>$P_{OUT} = 4$ W<br>$P_{OUT} = 10$ W<br>$P_{OUT} = 20$ W<br>$P_{OUT} = 40$ W                                                   |                  |                      |     | $\infty$ |                      |      | $\infty$ |                                  |     | $\infty$ |                                  |     | $\infty$ |
| $I_{CBO}$                                                 | Collector Cutoff Current<br>at $V_{CB} = 20$ V, $I_E = 0$                                                                                                                            | mA               |                      | 0.2 |          |                      | 0.3  |          |                                  |     | 2        |                                  |     | 4        |
| $I_{EBO}$                                                 | Emitter Cutoff Current<br>at $V_{EB} = 20$ V, $I_E = 0$                                                                                                                              | mA               |                      | 0.2 |          |                      | 0.3  |          |                                  |     | 2        |                                  |     | 4        |
| $h_{FE}$                                                  | DC Forward Current Gain<br>at $V_{cc} = 10$ V<br>$I_C = 0.3$ A (pulsed)<br>$I_C = 0.5$ A (pulsed)<br>$I_C = 1$ A (pulsed)<br>$I_C = 2$ A (pulsed)                                    |                  | 20                   | 60  | 200      | 20                   | 60   | 200      | 20                               | 50  | 200      | 20                               | 50  | 200      |
| $C_{OB}$                                                  | Output Capacitance<br>at $V_{CB} = 10$ V, $I_E = 0$<br>$f = 1$ MHz                                                                                                                   | pF               |                      | 7   | 10       |                      | 15   | 19.5     |                                  | 2.5 | 35       |                                  | 50  | 70       |

\*Electronic Industrial Association of Japan

## OUTLINE DIMENSIONS (Units in mm)

OUTLINE 81B\*

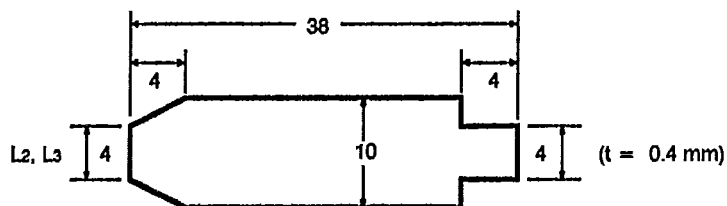
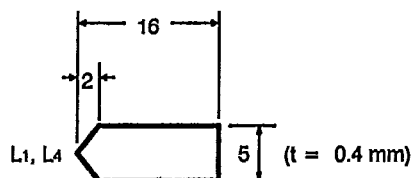
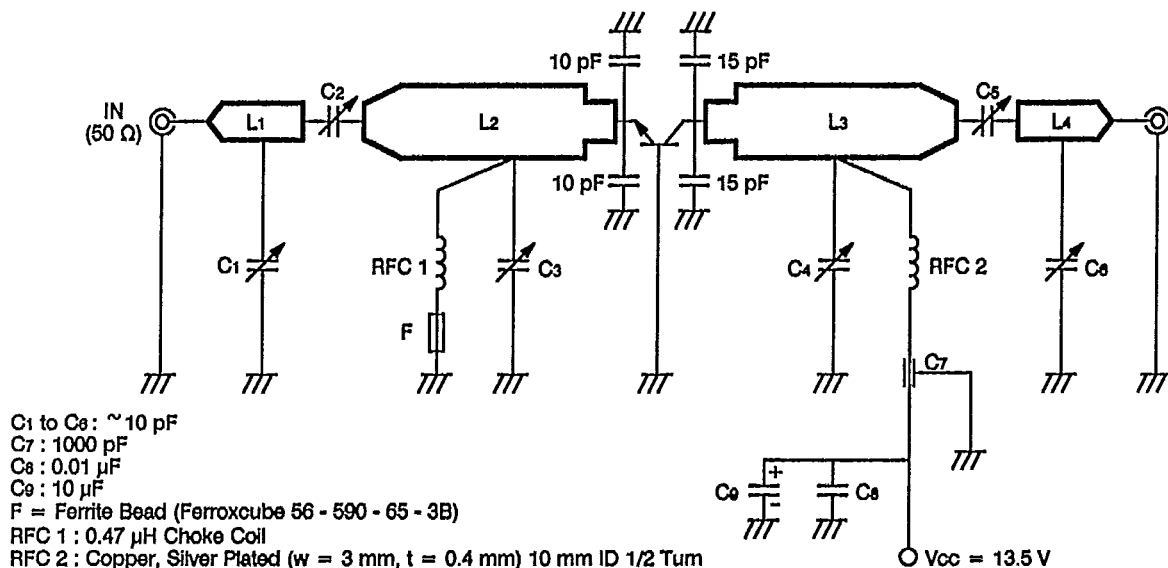


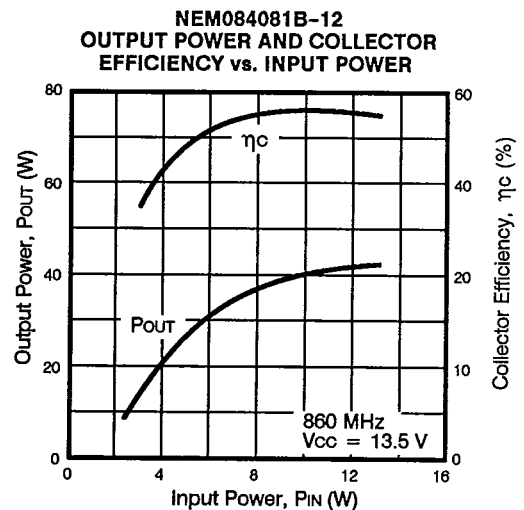
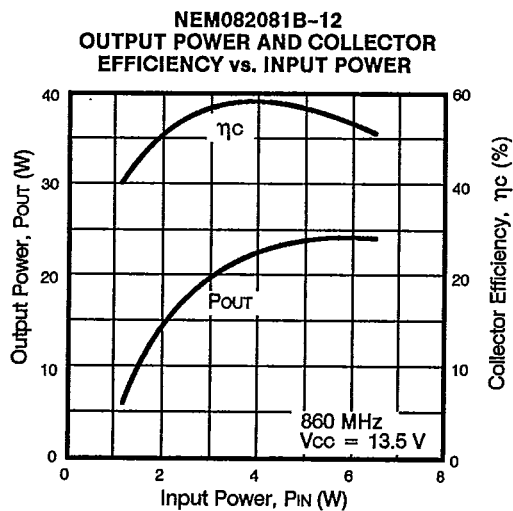
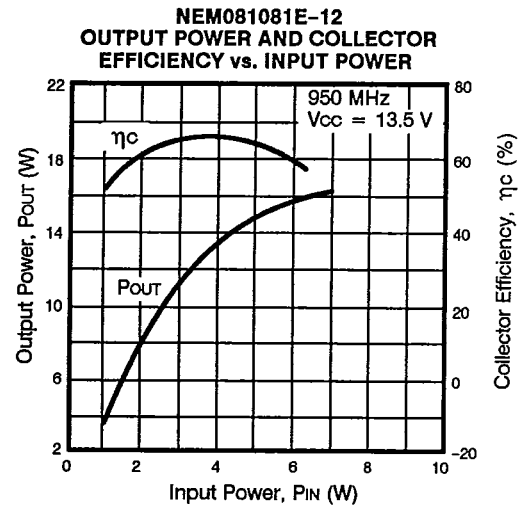
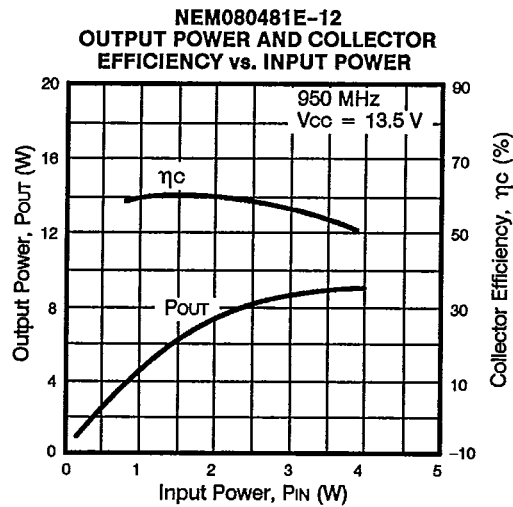
\*81E has emitter and base reversed.

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ )

| SYMBOLS         | PARAMETERS                                           | UNITS              | RATINGS     |
|-----------------|------------------------------------------------------|--------------------|-------------|
| $V_{CB0}$       | Collector to Base Voltage                            | V                  | 35          |
| $V_{CE0}$       | Collector to Emitter Voltage                         | V                  | 18          |
|                 |                                                      | V                  | 18          |
|                 |                                                      | V                  | 16          |
|                 |                                                      | V                  | 16          |
| $V_{EB0}$       | Emitter to Base Voltage                              | V                  | 3           |
|                 |                                                      | V                  | 3           |
|                 |                                                      | V                  | 2.5         |
|                 |                                                      | V                  | 2.5         |
| $I_C$           | Collector Current                                    | A                  | 1.5         |
|                 |                                                      | A                  | 3           |
|                 |                                                      | A                  | 7.5         |
|                 |                                                      | A                  | 15          |
| $R_{\theta JC}$ | Thermal Resistance (Junction-to-Case)                | $^\circ\text{C/W}$ | 10          |
|                 |                                                      | $^\circ\text{C/W}$ | 5           |
|                 |                                                      | $^\circ\text{C/W}$ | 2.5         |
|                 |                                                      | $^\circ\text{C/W}$ | 1.5         |
| $P_D$           | Total Power Dissipation ( $T_c = 25^\circ\text{C}$ ) | W                  | 17.5        |
|                 |                                                      | W                  | 35          |
|                 |                                                      | W                  | 70          |
|                 |                                                      | W                  | 120         |
| $T_J$           | Junction Temperature                                 | $^\circ\text{C}$   | 200         |
| $T_{STG}$       | Storage Temperature                                  | $^\circ\text{C}$   | -65 to +150 |

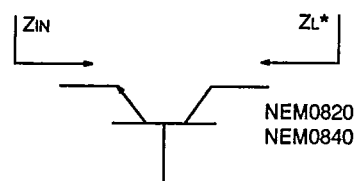
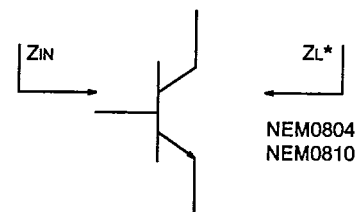
## TEST CIRCUIT DIAGRAM



TYPICAL PERFORMANCE CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )

## TYPICAL IMPEDANCE

| PART NUMBER   | FREQUENCY | $Z_{IN}$ |        | $Z_L^*$ |        |
|---------------|-----------|----------|--------|---------|--------|
| NEM080481E-12 | 950 MHz   | 3.22     | +j6.6  | 6.36    | -j4.7  |
| NEM081081E-12 | 950 MHz   | 2.31     | +j3.49 | 9.8     | -j5.91 |
| NEM082081B-12 | 860 MHz   | 2.5      | +j0.5  | 2.23    | +j0    |
| NEM084081B-12 | 860 MHz   | 1.5      | -j4.75 | 1.75    | -j2.0  |

\*  $Z_L$  is optimum load impedance at rated output power.