NEC

CLASS C, 860 MHz, 12 VOLT POWER TRANSISTOR

NE0800-12 SERIES

FEATURES

- **LOW OPERATING VOLTAGE** (V_{CC} = 13.5 V)
- **TITANIUM-PLATINUM-GOLD METALLIZATION FOR HIGH RELIABILITY**
- **SUPERIOR RF PERFORMANCE**
- **HIGH GAIN**
- **RUGGED VSWR ∞:** 1 at V_{CC} = 16 V
- **FOR 800 MHz BAND MOBILE RADIO APPLICATIONS**
- **LOW COST PACKAGES**
- **HIGH POWER**

DESCRIPTION

NEC's NE0800 series of NPN epitaxial UHF power transistors is designed for large volume mobile radio applications in the 800 MHz band. The series is available in two low cost packages. High gain, power and efficiency, combined with low cost packages, make the NE0800 series an ideal choice for large volume applications in the 800 MHz mobile radio band.

The series solves the metal migration problem by using NEC's famous Pt-si/Ti/Pt/Au system rather than conventional aluminum or tungsten-gold metallization. NEC's proprietary fabrication technique employed in the series features ion-implantation base regions, arsenic doped polysilicon emitter structure, porous SiO_2 under bonding pads to reduce parasitic capacitance and silicon nitride passivation (Si_3N_4).

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

PART NUMBER EIAJ[1] REGISTERED NUMBER PACKAGE OUTLINE			NE080190,91 2SC2558K,M 90,91			NE080490,91 2SC2559K,M 90,91			NE081090,91 2SC2850K,M 90,91		
SYMBOLS	**PARAMETERS AND CONDITIONS**	**UNITS**	**MIN**	**TYP**	**MAX**	**MIN**	**TYP**	**MAX**	**MIN**	**TYP**	**MAX**
P_{OUT}	Output Power at V_{CC} = 13.5 V, f = 860 MHz P_{IN} = 20 dBm P_{IN} = 29.5 dBm P_{IN} = 36 dBm	dBm dBm dBm	30	32.5		36	37.8		39.5	40.2	
η_C	Collector Efficiency at V_{CC} = 13.5, f = 860 MHz P_{IN} = 20 dBm P_{IN} = 29.5 dBm P_{IN} = 36 dBm	% % %	50	55		55	60		65	75	
VSWR	Voltage Standing Wave Ratio at V_{CC} = 13.5 V, f = 860 MHz P_{OUT} = 32 dBm P_{OUT} = 37.5 dBm P_{OUT} = 41 dBm		∞:1			∞:1			∞:1		
BV_{CBO}	Collector to Base Breakdown Voltage at I_E = 0 I_C = 100 µA I_C = 1 mA I_C = 2 mA	V V V	35			35			35		
BV_{CEO}	Collector to Emitter Breakdown Voltage at I_B = 0 I_C = 1 mA I_C = 10 mA I_C = 20 mA	V V V	18			18			18		
BV_{EBO}	Emitter to Base Breakdown Voltage at IC = 0 I_E = 100 µA I_E = 1 mA I_E = 2 mA	V V V	3			3			3		
I_{CBO}	Collector Cutoff Current at V_{CB} = 20 V, I_E = 0	mA			0.1			0.2			0.4
I_{EBO}	Emitter Cutoff Current at V_{EB} = 2 V, I_C = 0	mA			0.1			0.2			0.4
h_{FE}	DC Forward Current Gain at V_{CE} = 10 V, I_C = 100 mA (pulsed) I_C = 300 mA (pulsed) I_C = 500 mA (pulsed)		20	60	200	20	60	200	20	60	200
C_{OB}	Output Capacitance at V_{CB} = 10 V, I_E = 0, f = 1 MHz[2]	pF		2.3	3.5		7	10		14	20

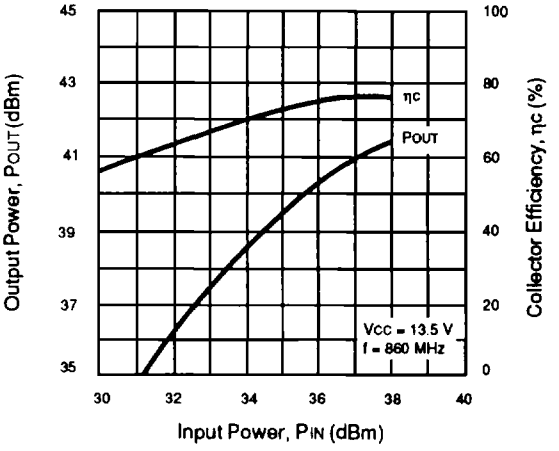
Notes:
1. Electronic Industrial Association of Japan.
2. Emitter and flange are grounded.

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

SYMBOLS	PARAMETERS	UNITS	RATINGS
V_{CBO}	Collector to Base Voltage	V	35
V_{CEO}	Collector to Emitter Voltage	V	18
V_{EBO}	Emitter to Base Voltage	V	3
I_C	Collector Current		
	NE080190,91	A	0.5
	NE080490,91	A	1.5
	NE081090,91	A	3
$R_{TH(J-C)}$	Thermal Resistance (Junction to Case)		
	NE080190,91	°C/W	21
	NE080490,91	°C/W	10
	NE081090,91	°C/W	5
P_T	Total Power Dissipation (T_C = 25°C)		
	NE080190,91	W	8.3
	NE080490,91	W	17.5
	NE081090,91	W	35
T_J	Junction Temperature	°C	200
T_{STG}	Storage Temperature	°C	-65 to +150

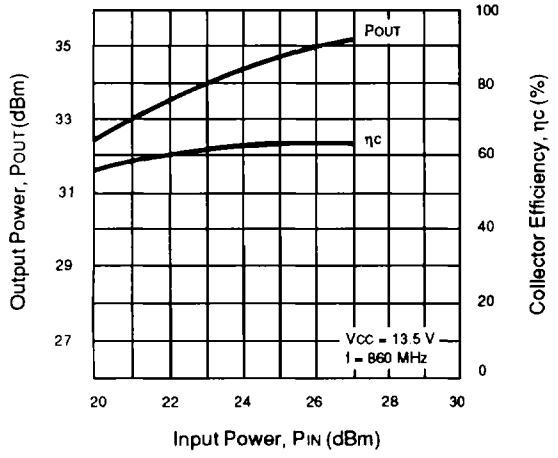
Notes:
1. Operation in excess of any one of these parameters may result in permanent damage.

NE081090(91)
OUTPUT POWER AND COLLECTOR EFFICIENCY vs. INPUT POWER

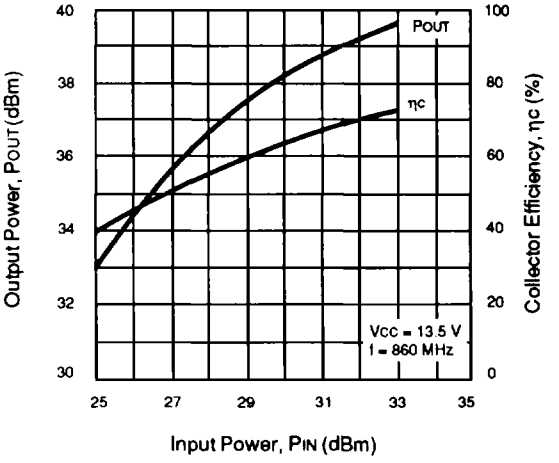


TYPICAL PERFORMANCE CURVES (T_A = 25°C)

NE080190(91)
OUTPUT POWER AND COLLECTOR EFFICIENCY vs. INPUT POWER



NE080490(91)
OUTPUT POWER AND COLLECTOR EFFICIENCY vs. INPUT POWER



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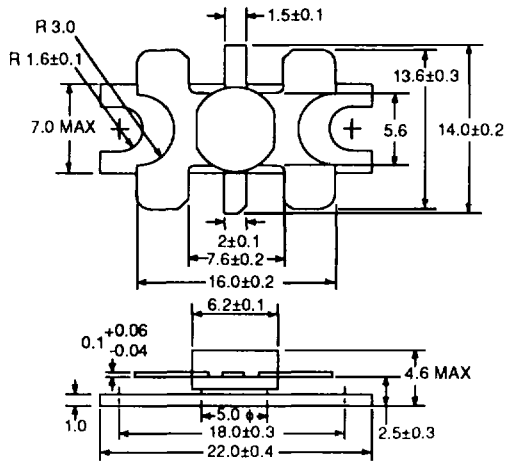
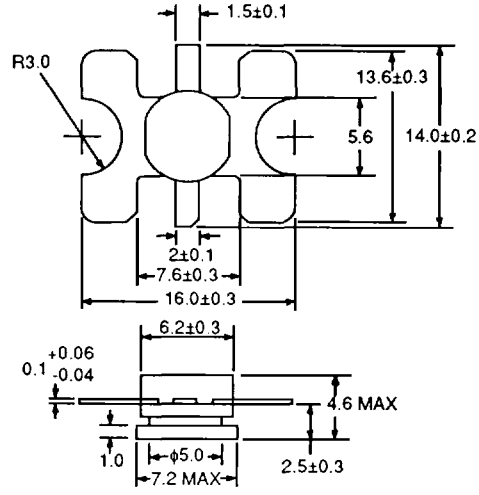
OUTLINE DIMENSIONS (Units in mm)

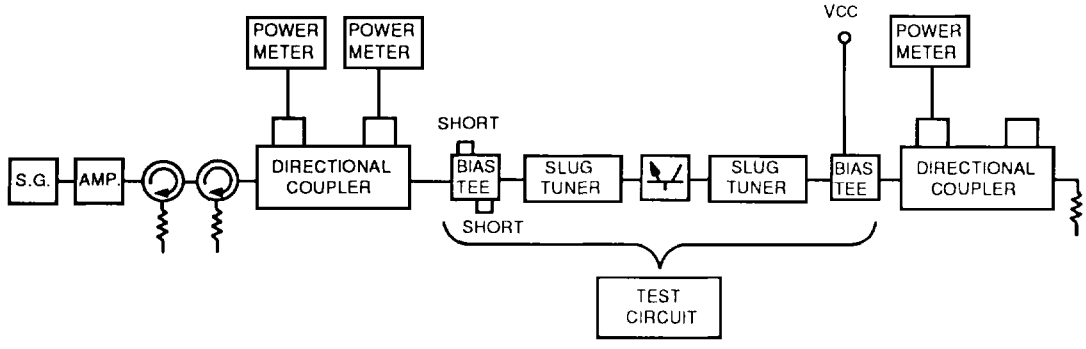
PACKAGE OUTLINE 90



PACKAGE OUTLINE 91

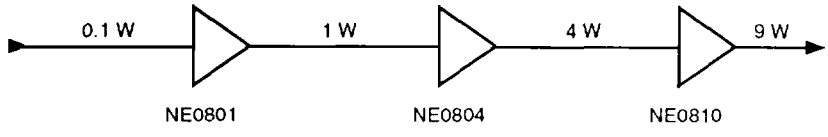


TEST CIRCUIT



APPLICATIONS

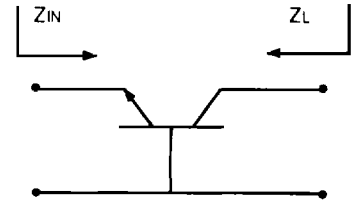
800 MHz MOBILE RADIO BAND (V_{CC} = 13.5V)



TYPICAL INPUT/OUTPUT LOAD IMPEDANCE[1]

PART NUMBER	P_{IN} (dBm)	Z_{IN} (Ω)	Z_{OUT} (Ω)
NE080190(91)	20	144+j2.62	9.65-j17.6
NE080490(91)	29.5	1.16+j6.14	6.02-j0.86
NE081090(91)	36	2.64+j7	5.16+j1.3

Note:
1. Typical large signal impedances at V_{CC} = 13.5, f = 860 MHz, T_A = 25°C.



Z_L is optimum load impedance at rated output power.