

NEC[®]**CLASS C, 860 MHz,
12 VOLT POWER TRANSISTOR****NE0800-12
SERIES**

T-33-11

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 AND APPLICATIONS

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, rugged 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 SiO₂ under bonding pads to reduce parasitic capacitance and silicon nitride passivation (Si₃N₄). These unique systems provide levels of reliability and orders of magnitude greater than conventional systems, even at rated values.

The NE0800 series is a standard grade D device manufactured and screened to levels unique to standard parts. The series offers the engineer the very best in performance, ruggedness and reliability.

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_{EB0}	Emitter to Base Voltage	V	3
I_C	Collector Current NE080190,91 NE080490,91 NE081090,91	A	0.5
		A	1.5
		A	3
		A	3
$R\theta_{JC}$	Thermal Resistance (Junction-to-Case) NE080190,91 NE080490,91 NE081090,91	$^\circ\text{C/W}$	21
		$^\circ\text{C/W}$	10
		$^\circ\text{C/W}$	5
		$^\circ\text{C/W}$	5
P_T	Total Power Dissipation ($T_C = 25^\circ\text{C}$) NE080190,91 NE080490,91 NE081090,91	W	8.3
		W	17.5
		W	35
		W	35
T_J	Junction Temperature	$^\circ\text{C}$	200
T_{STG}	Storage Temperature	$^\circ\text{C}$	-65 to +150

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

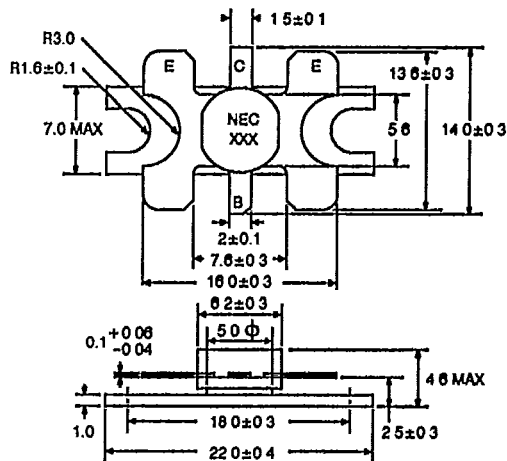
PART NUMBER EIAJ ¹ REGISTERED NUMBER PACKAGE OUTLINE			NE080190,91 2SC2558K,M 90,91			NE080490,91 2SC2559K,M 90,91			NE081090,91 2SC2850K,M 90,91		
SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
P_{OUT}	Output Power at $V_{CC} = 13.5\text{ V}$, $f = 860\text{ MHz}$ $P_{IN} = 20\text{ dBm}$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

Notes:

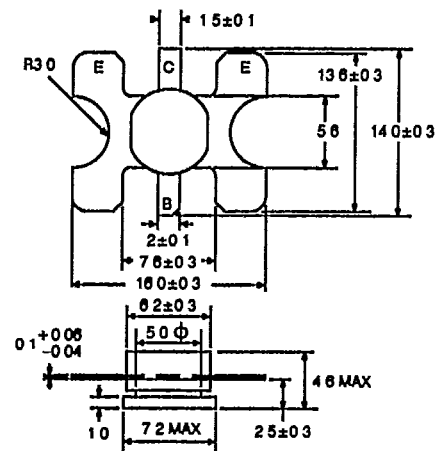
- Electronic Industrial Association of Japan.
- Emitter and Flange are gounded.

OUTLINE DIMENSIONS (Units in mm)

OUTLINE 90

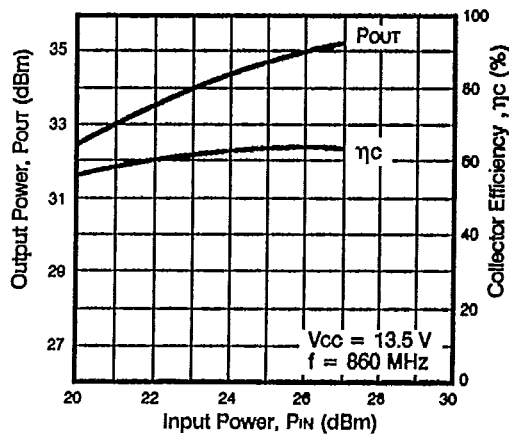


OUTLINE 91

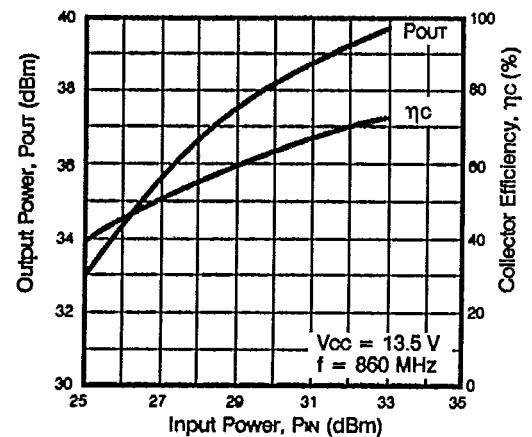


TYPICAL PERFORMANCE CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

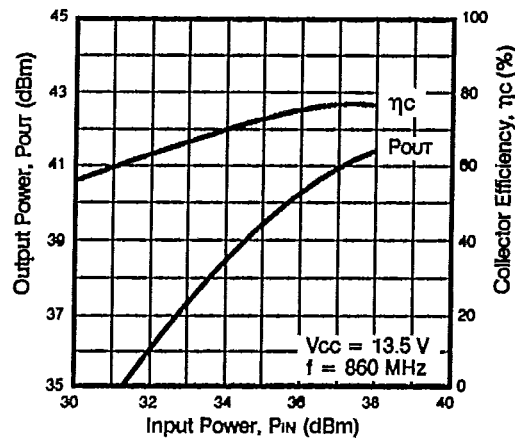
NE080190(91)
OUTPUT POWER AND COLLECTOR
EFFICIENCY vs. INPUT POWER



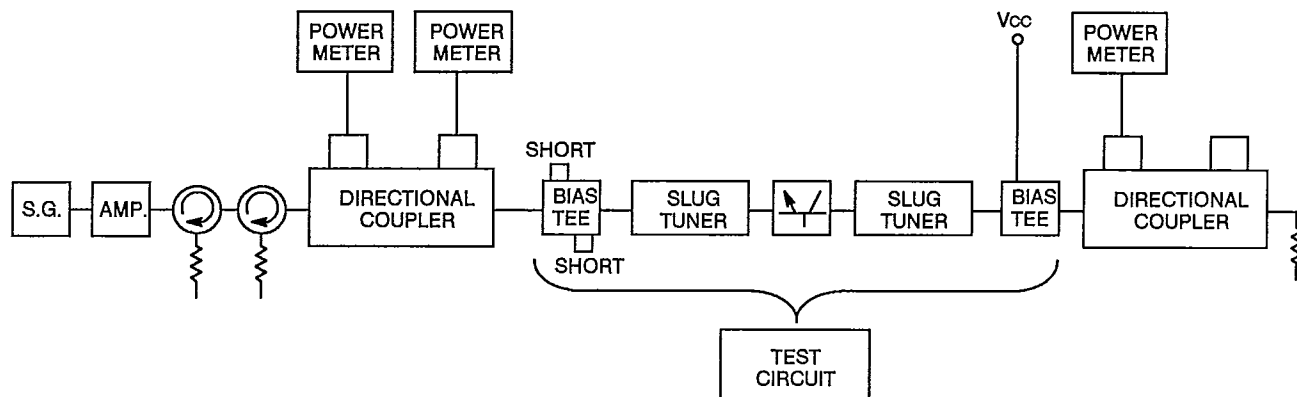
NE080490(91)
OUTPUT POWER AND COLLECTOR
EFFICIENCY vs. INPUT POWER



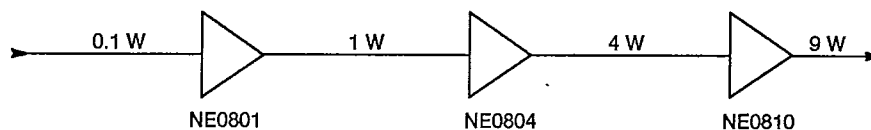
NE081090(91)
OUTPUT POWER AND COLLECTOR
EFFICIENCY vs. INPUT POWER



TEST CIRCUIT

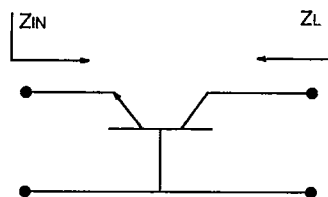


APPLICATIONS

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

TYPICAL INPUT/OUTPUT LOAD IMPEDANCE*

PART NUMBER	P_{IN} (dBm)	$Z_{IN}(\Omega)$	$Z_{OUT}(\Omega)$
NE080190(91)	20	$1.44 + j2.62$	$9.65 - j17.6$
NE080490(91)	29.5	$1.16 + j6.14$	$6.02 - j0.86$
NE081090(91)	36	$2.64 + j7$	$5.16 + j1.3$

* $f = 860 \text{ MHz}$, $V_{CC} = 13.5 \text{ V}$, $Z_o = 50 \Omega$  Z_L is optimum load impedance at rated output power.