

CLASS A, 1.3 GHz, 12 VOLT POWER TRANSISTOR

NEL130681-12
NEL132081-12

FEATURES

- **HIGH LINEAR POWER AND GAIN:**
NEL1306: $P_{1dB} = 38 \text{ dBm}$, $G_{1dB} = 7.5 \text{ dB TYP}$
NEL1320: $P_{1dB} = 43 \text{ dBm}$, $G_{1dB} = 6 \text{ dB TYP}$
- **Pt-Si/Ti/Pt/Au METALLIZATION SYSTEM**
- **EMITTER BALLASTING**
- **SILICON NITRIDE PASSIVATION**
- **13.5 V OPERATION**

DESCRIPTION

NEC's NEL1300 series of NPN epitaxial microwave power transistor is designed specifically for large volume mobile and base station applications in the 1300 MHz band. The series is available in a low cost metal-ceramic stripline package offering power levels of 6 watts and 20 watts. The series is designed for linear amplifier applications and is compatible with single sideband and other popular modulation modes.

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

PART NUMBER EIAJ ¹ REGISTERED NUMBER PACKAGE OUTLINE			NEL130681-12 2SC3541 81			NEL132081-12 2SC3542 81		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX
P_{OUT}	Output Power at $V_{CC} = 13.5 \text{ V}$, $f = 1.3 \text{ GHz}$, $P_{IN} = 30 \text{ dBm}$, $I_C = 30 \text{ mA}$ $P_{IN} = 36 \text{ dBm}$, $I_C = 150 \text{ mA}$	dBm dBm	36.5	37.5		41	42	
η_C	Collector Efficiency at $V_{CC} = 13.5 \text{ V}$, $f = 1.3 \text{ GHz}$, $P_{IN} = 30 \text{ dBm}$, $I_C = 30 \text{ mA}$ $P_{IN} = 36 \text{ dBm}$, $I_C = 150 \text{ mA}$	% %	45	55		50	60	
P_{1dB}	Output Power at 1dB Compression Point at $V_{CE} = 13.5 \text{ V}$, $f = 1.3 \text{ GHz}$	dBm		38			43	
G_{1dB}	Gain at 1dB Compression Point at $V_{CE} = 13.5 \text{ V}$, $f = 1.3 \text{ GHz}$	dB		7.5			6	
BV_{CBO}	Collector to Base Breakdown Voltage at $I_E = 0$ $I_C = 1 \text{ mA}$ $I_C = 2 \text{ mA}$	V V	35			35		
BV_{CEO}	Collector to Emitter Breakdown Voltage at $I_B = 0$ $I_C = 10 \text{ mA}$ $I_C = 20 \text{ mA}$	V V	18			18		
BV_{EBO}	Emitter to Base Breakdown Voltage at $I_C = 0$ $I_E = 1 \text{ mA}$ $I_E = 2 \text{ mA}$	V V	3			3		
I_{CBO}	Collector Cutoff Current at $V_{CB} = 20 \text{ V}$, $I_E = 0$	mA			0.15			0.5
I_{EBO}	Emitter Cutoff Current at $V_{EB} = 2 \text{ V}$, $I_C = 0$	mA			0.15			0.5
h_{FE}	DC Forward Current Gain at $V_{CE} = 10 \text{ V}$ (pulsed) $I_C = 0.3 \text{ A}$ $I_C = 0.5 \text{ A}$		20	60	200	20	60	200
C_{OB}	Output Capacitance ² at $V_{CB} = 10 \text{ V}$, $I_E = 0$, $f = 1 \text{ MHz}$	pF		15	20		50	60
P_T	Total Power Dissipation ($T_C = 25^\circ\text{C}$)	W		19.5			50	

Note:

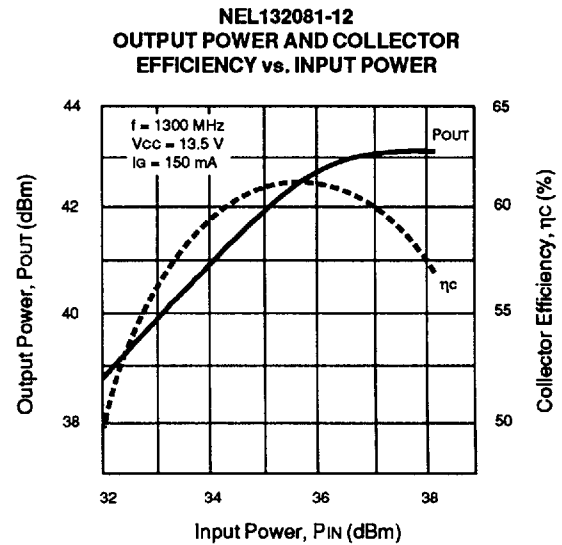
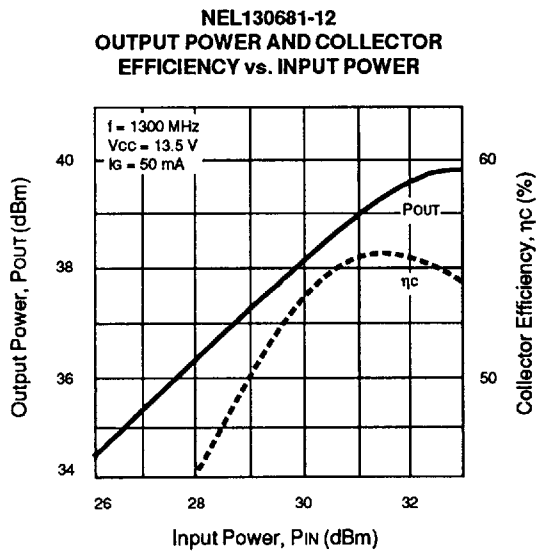
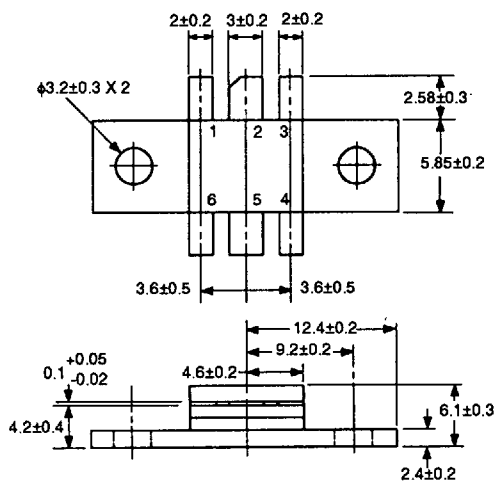
1. Electronic Industrial Association of Japan.
2. Emitter and flange are grounded.

ABSOLUTE MAXIMUM RATINGS¹ ($T_A = 25^\circ\text{C}$)

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		
	NEL130681-12	A	2
	NEL132081-12	A	6
$R_{\theta(J-C)}$	Thermal Resistance (Junction to Case)		
	NEL130681-12	$^\circ\text{C/W}$	10
	NEL132081-12	$^\circ\text{C/W}$	4
T_J	Junction Temperature	$^\circ\text{C}$	200
T_{STG}	Storage Temperature	$^\circ\text{C}$	-65 to +150

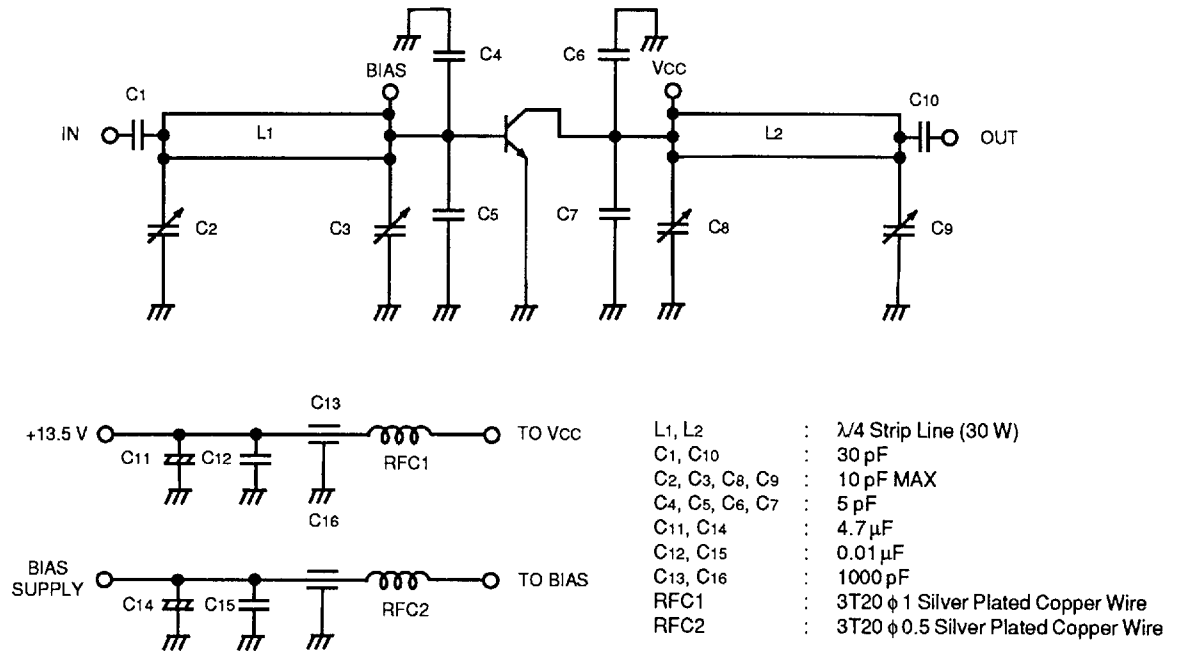
Notes:

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

TYPICAL PERFORMANCE CURVES ($T_A = 25^\circ\text{C}$)**OUTLINE DIMENSIONS** (Units in mm)**PACKAGE OUTLINE 81**

TEST CIRCUIT DIAGRAM (Units in mm)

NEL1306 and NEL1320



TYPICAL INPUT/OUTPUT LOAD IMPEDANCE¹

PART NUMBER	CLASS	INPUT POWER	OUTPUT POWER	$Z_{IN} \Omega$	$Z^*_{OUT} \Omega$	I_a
NEL130681-12	AB	30 dBm	38 dBm	$5.5 + j2.25$	$6.75 + j4.25$	50 mA
NEL132081-12	AB	36 dBm	42 dBm	$3 - j1.25$	$4 + j7.5$	150 mA

Note:

1. Typical Large Signal Impedances at $V_{CC} = 13.5$ V, $f = 1300$ MHz, $T_A = 25^\circ\text{C}$.

* Z_L is optimum load impedance at rated output power.