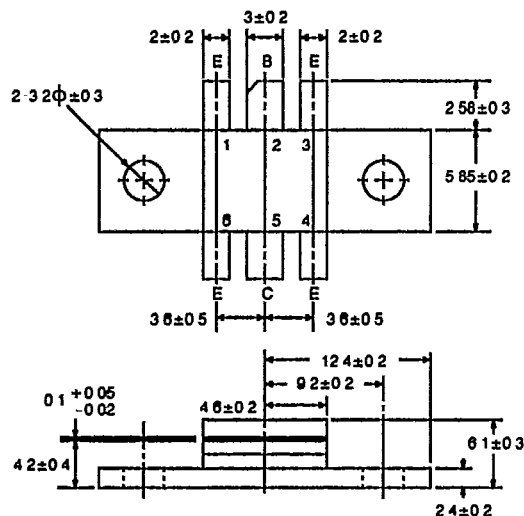


NEC[®]**CLASS A, 1.3 GHz,
12 VOLT POWER TRANSISTOR****NEL130681-12
NEL132081-12**

T-33-11

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**

OUTLINE DIMENSIONS (Units in mm)**OUTLINE 81****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 NEL130681-12 NEL132081-12	A A	2 6
T_J	Junction Temperature	$^\circ\text{C}$	200
T_{STG}	Storage Temperature	$^\circ\text{C}$	-65 to +150

DESCRIPTION AND APPLICATIONS

NEC's NEL1300 series of NPN epitaxial microwave power transistors 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.

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

PART NUMBER EIAJ* 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 $V_{CC} = 13.5 \text{ V}$, $f = 1.3 \text{ GHz}$, $P_{IN} = 30 \text{ dBm}$, $I_Q = 30 \text{ mA}$ $P_{IN} = 36 \text{ dBm}$, $I_Q = 150 \text{ mA}$	dBm dBm	36.5	37.5		41	42	
η_c	Collector Efficiency at $V_{CC} = 13.5 \text{ V}$, $f = 1.3 \text{ GHz}$, $P_{IN} = 30 \text{ dBm}$, $I_Q = 30 \text{ mA}$ $P_{IN} = 36 \text{ dBm}$, $I_Q = 150 \text{ mA}$	% %	45	55		50	60	

*Electronic Industrial Association of Japan.

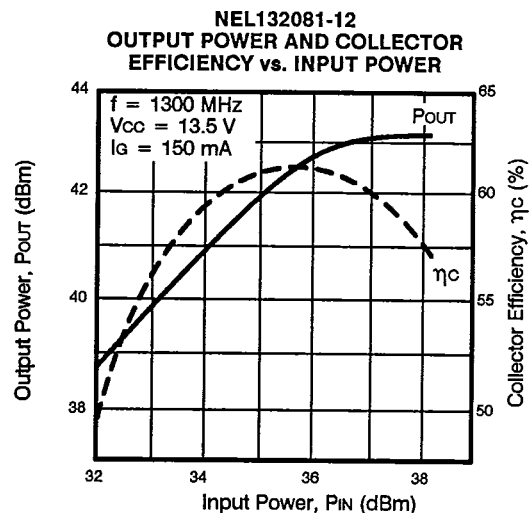
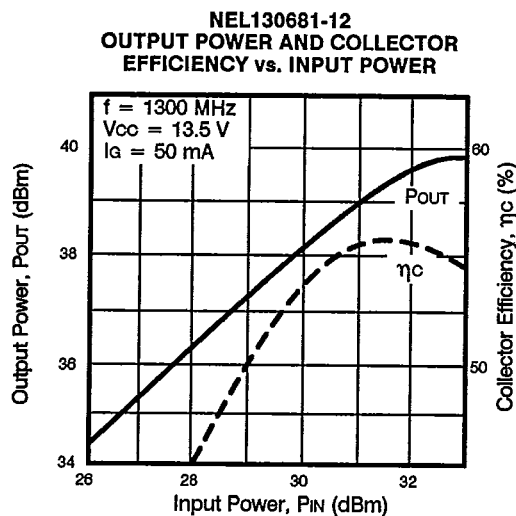
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

PART NUMBER EIAJ* REGISTERED NUMBER PACKAGE OUTLINE			NEL130681-12 2SC3541 81			NEL132081-12 2SC3542 81		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX
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** 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	
R_{TH}	Thermal Resistance (Junction-to-Case)	$^\circ\text{C/W}$		10			4	

*Electronic Industrial Association of Japan.

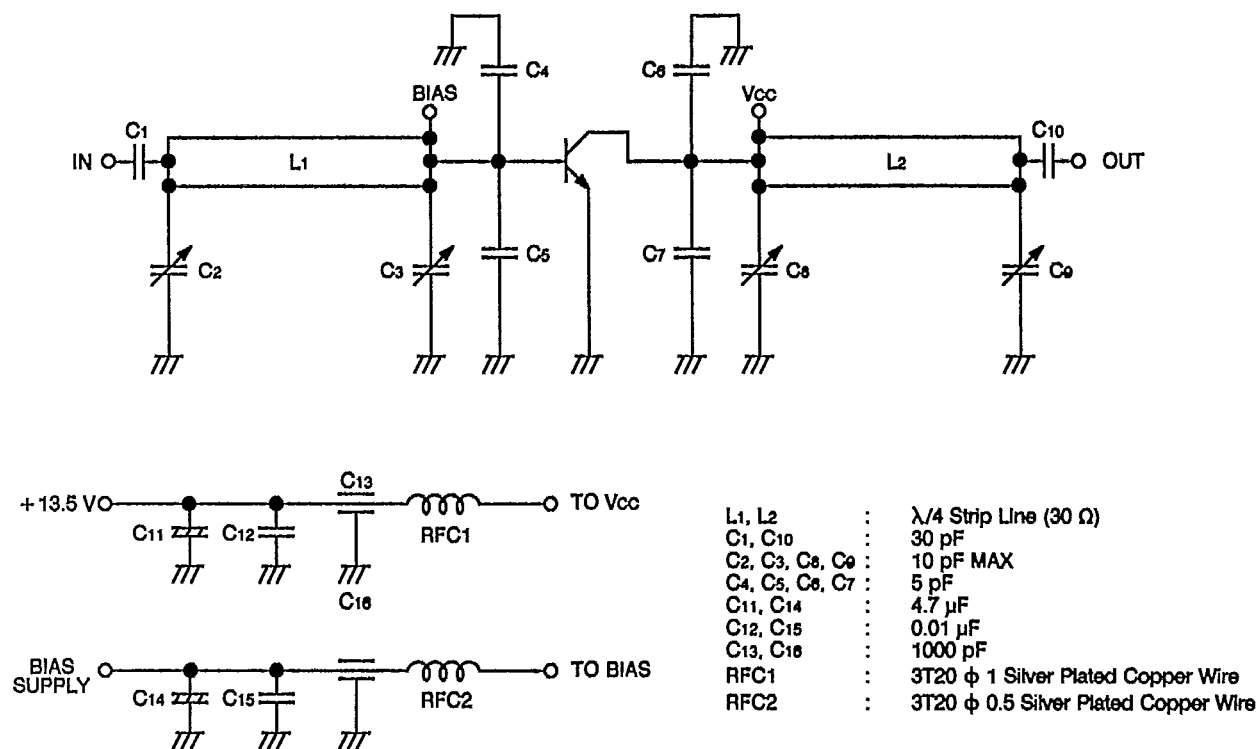
**Emitter and flange are grounded.

4

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

TEST CIRCUIT DIAGRAM (Units in mm)

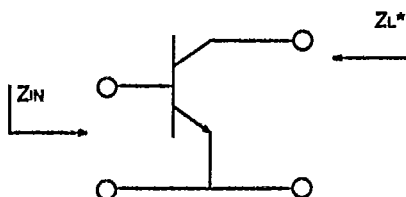
NEL1306 and NEL1320



TYPICAL IMPEDANCE

PART NUMBER	CLASS	INPUT POWER	OUTPUT POWER	$Z_{IN} \Omega$	$Z_{OUT}^* \Omega$	I_a	V_{cc}
NEL130681-12	AB	30 dBm	38 dBm	$5.5 + j2.25$	$6.75 + j4.25$	50 mA	13.5 V
NEL132081-12	AB	36 dBm	42 dBm	$3 - j1.25$	$4 + j7.5$	150 mA	13.5 V

($F_o = 1300 \text{ MHz}$)



* Z_L is optimum load impedance at rated output power.