

NPN SILICON BIPOLAR L - BAND POWER TRANSISTOR

NEL2012F03-24

FEATURES

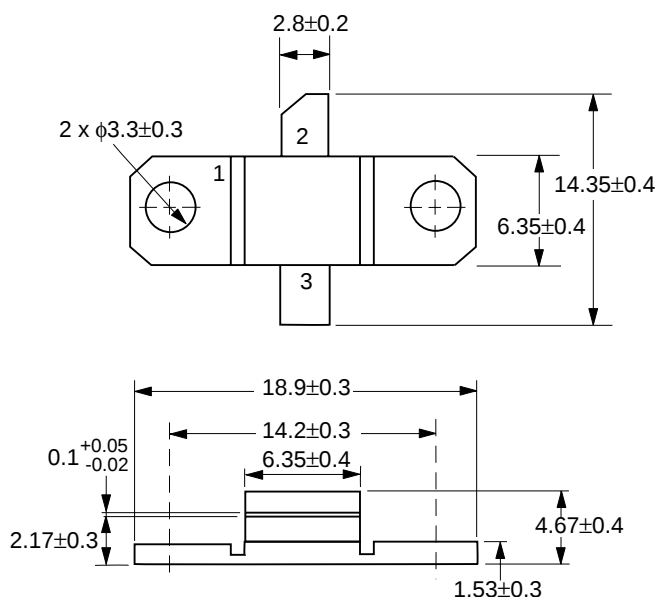
- **HIGH OUTPUT POWER:**
5 W Class A, 16 W Class AB
- **USEABLE FROM 1.8 TO 2.0 GHz**
- **HIGH LINEAR GAIN:**
13.5 dB Class A, 11.0 dB Class AB
- **HIGH EFFICIENCY:**
35% Class A, 55% Class AB
- **LOW IM DISTORTION**
- **COMMON EMITTER CONFIGURATION**

DESCRIPTION

NEL2012F03-24 is an NPN Silicon Epitaxial Microwave Power Transistor designed for 1.84 to 1.97 GHz, 24 Volt PCS Base Station Transmitter Applications. The device is usable from 1.8 to 2.0 GHz with bias as low as 8-10 Volts, and can deliver 5 W out Class A at 20 V, and 16 W at 24 V, Class AB, with high gain and low distortion. The chips employ emitter ballast resistors and gold metallization for superior reliability and consistent performance and are packaged in industry standard, flange mount ceramic packages.

OUTLINE DIMENSIONS (Units in mm)

PACKAGE OUTLINE F03



ELECTRICAL CHARACTERISTICS (T_c = 25°C)

PART NUMBER PACKAGE OUTLINE				NEL2012F03-24 F03			TEST CONDITIONS
	SYMBOLS	CHARACTERISTICS	UNITS	MIN	TYP	MAX	
Functional Characteristics	P _{1dB}	Power Out at 1 dB Compression Class A Class AB	W W	12	5 16		f = 1.97 GHz V _{CC} = 20 V; I _{cq} = 750 mA V _{CC} = 24 V; I _{cq} = 75 mA
	G _L	Linear Gain Class A Class AB	dB dB		13.8 10.9		V _{CC} = 20 V; I _{cq} = 750 mA V _{CC} = 24 V; I _{cq} = 75 mA
	η _c	Collector Efficiency at 1 dB Gain Compression Class A Class AB	% %	40	35 55		V _{CC} = 20 V; I _{cq} = 750 mA V _{CC} = 24 V; I _{cq} = 75 mA
	IM ₃	3rd Order Intermodulation Class A Class AB	dBc dBc		-35 -33		Δf = 100 KHz P _{OUT} = 2.5 W PEP P _{OUT} = 12 W PEP
	VSWR	Load mismatch Tolerance, Class AB			10:1		P _{OUT} = 12 W PEP; Any Phase
Electrical DC Characteristics	BV _{CER}	Collector-Emitter Breakdown	V	30	85		I _c = 8.0 mA; R _{be} = 10 Ω
	BV _{CEO}	Collector-Emitter Breakdown	V	18	22		I _c = 8.0 mA; Open Base
	BV _{CBO}	Collector Base Breakdown	V	45	85		I _c = 8.0 mA; Open Emitter
	BV _{EBO}	Emitter Base Breakdown	V	3	4.4		I _c = 20 mA; Open Collector
	h _{FE}	DC Current Gain		30	100	150	V _{CE} = 5.0 V; I _c = 800 mA
	R _{TH}	Thermal Resistance (channel to case)	°C/W			4.2	
	C _{ob}	Output Capacitance	pF		12.6		V _{CB} = 24 V; f = 1.0 MHz

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

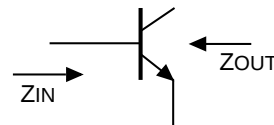
SYMBOLS	PARAMETERS	UNITS	RATINGS
V _{CBO}	Collector-Base Voltage	V	45
V _{CEO}	Collector-Emitter Voltage	V	18
V _{EB0}	Emitter to Base Voltage	V	3.0
I _C	Collector Current	A	4
P _T	Total Power Dissipation	W	41.5
T _J	Junction Temperature	°C	200
T _{STG}	Storage Temperature	°C	-65 to +150

Note:

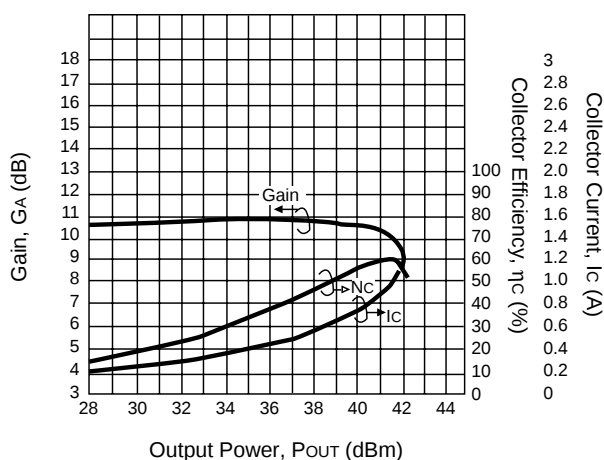
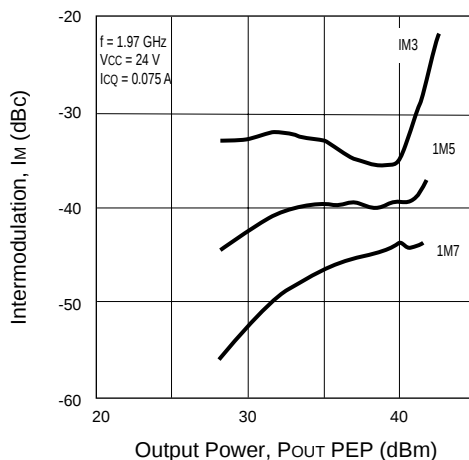
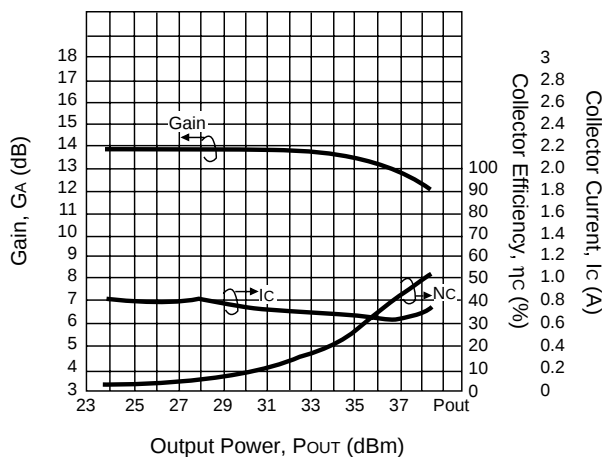
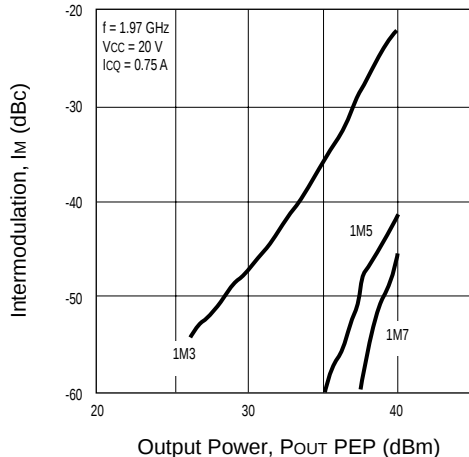
1. Operation in excess of any one of these parameters may result in permanent damage.

LARGE SIGNAL IMPEDANCES

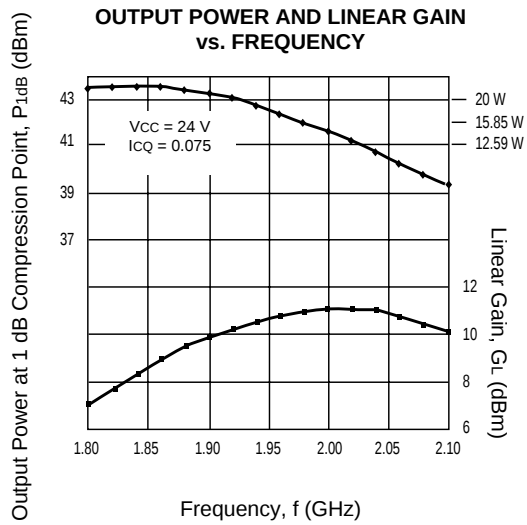
f(GHz)	Z _{IN} (Ω)	Z _{OUT} (Ω)
1.8	4.3 + j8.9	2.6 + j2.2
1.9	3.1 + j7.4	2.4 + j1.3
1.97	2.6 + j6.3	2.2 + j0.6
2.0	2.4 + j5.9	2.2 + j0.4



Values provided in the large signal impedance table for Z_{LOAD} will optimize the output match for optimum P_{OUT}. Values for Z_{SOURCE} will optimize the input match for return loss. Impedance is referenced to the device package edge.

TYPICAL PERFORMANCE CURVES ($T_A = 25^\circ\text{C}$)**CLASS AB GAIN, COLLECTOR EFFICIENCY AND COLLECTOR CURRENT vs. OUTPUT POWER****CLASS AB INTERMODULATION vs. OUTPUT POWER****CLASS A GAIN, COLLECTOR EFFICIENCY AND COLLECTOR CURRENT vs. OUTPUT POWER****CLASS A INTERMODULATION vs. OUTPUT POWER**

TYPICAL PERFORMANCE CURVES (T_A = 25°C)



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