

FEATURES

- **HIGH LINEAR POWER:** $P_{1dB} = 2.8 \text{ W}$
- **HIGH GAIN:** $G_{1dB} = 6.5 \text{ dB}$
- **WIDE BANDWIDTH**
- **HERMETIC & LOW COST PLASTIC PACKAGES**
- **COMMON EMITTER**

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

SYMBOLS	PARAMETERS	UNITS	RATINGS
V _{CB0}	Collector to Base Voltage	V	45
V _{CE0}	Collector to Emitter Voltage	V	20
V _{EB0}	Emitter to Base Voltage	V	3
I _c	Collector Current		
	NEL2301	A	0.6
	NEL2302	A	1.1
	NEL2303	A	2
T _J	Junction Temperature	°C	200
T _{STG}	Storage Temperature	°C	-65 to +200
T _{SDR}	Soldering Temperature	°C	230 for 10 sec.

DESCRIPTION AND APPLICATIONS

This L-band linear power transistor series incorporates a Pt-Si/Ti/Pt/Au metallization system, emitter ballasting and silicon nitride passivation for performance and reliability. A variety of hermetic packages and a plastic package are available for wide band amplifier and oscillator applications.

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

PART NUMBER PACKAGE OUTLINE			NEL2301 20, 53, 54, 57, 63, 97			NEL2302 20, 53, 57, 63, 97			NEL2303 20, 53, 57, 63, 97		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
P _{TEST}	Output Power at Test Point* at V _{CE} = 15 V, f = 2.3 GHz, P _{IN} = 22 dBm, I _c = 200 mA P _{IN} = 27 dBm, I _c = 350 mA P _{IN} = 30 dBm, I _c = 600 mA	dBm dBm dBm	29	30		32	33		34	35	
P _{1dB}	Output Power at 1 dB Compression Point at V _{CE} = 15 V, f = 2.3 GHz I _c = 200 mA I _c = 350 mA I _c = 600 mA	dBm dBm dBm		29.5			32.5			34.5	
G _{1dB}	Gain at 1 dB Compression Point at V _{CE} = 15 V, f = 2.3 GHz I _c = 200 mA I _c = 350 mA I _c = 600 mA	dB dB dB		8			7.5			6.5	
η	Collector Efficiency	%		30			32			30	

*P_{IN} for the "20" package is 1.5 dB higher than the other packages.

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

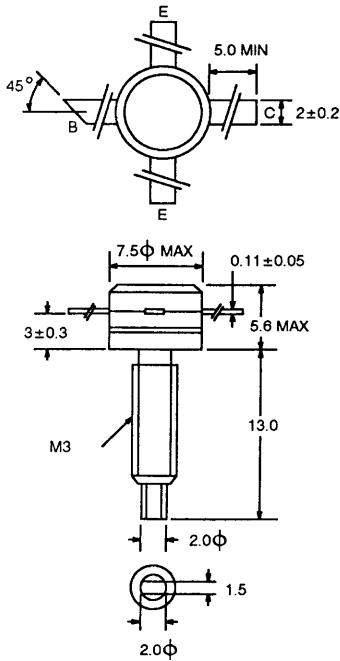
PART NUMBER PACKAGE OUTLINE			NEL2301 20, 53, 54, 57, 63, 97			NEL2302 20, 53, 57, 63, 97			NEL2303 20, 53, 57, 63, 97		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
BVCBO	Collector to Base Breakdown Voltage at $I_E = 0$ $I_C = 1\text{ mA}$ $I_C = 2\text{ mA}$ $I_C = 4\text{ mA}$	V V V	45			45			45		
BVCEO	Collector to Emitter Breakdown Voltage at $I_B = 0$ $I_C = 2.5\text{ mA}$ $I_C = 5\text{ mA}$ $I_C = 10\text{ mA}$	V V V	20			20			20		
BVEBO	Emitter to Base Breakdown Voltage at $I_C = 0$, $I_E = 0.5\text{ mA}$ $I_E = 1\text{ mA}$ $I_E = 2\text{ mA}$	V V V	3			3			3		
ICBO	Collector Cutoff Current at $V_{CB} = 30\text{ V}$, $I_E = 0$	mA			0.25			0.5			1
IEBO	Emitter Cutoff Current at $V_{EB} = 2\text{ V}$, $I_C = 0$	mA			0.25			0.5			1
hFE	DC Forward Current Gain at $V_{CE} = 5\text{ V}$, $I_C = 100\text{ mA}$ $I_C = 200\text{ mA}$ $I_C = 400\text{ mA}$		15	40	120	15	40	120	15	40	120
Cob	Output Capacitance at $V_{CB} = 20\text{ V}$, $f = 1\text{ MHz}$, $I_E = 0$	pF		1.2	2		2.4	4		5	8
$R\theta_{JC}$	Thermal Resistance (Junction-to-Case)	$^\circ\text{C/W}$			16			10			6
PT	Total Power Dissipation ($T_C = 25^\circ\text{C}$)	W			11			18			29

2

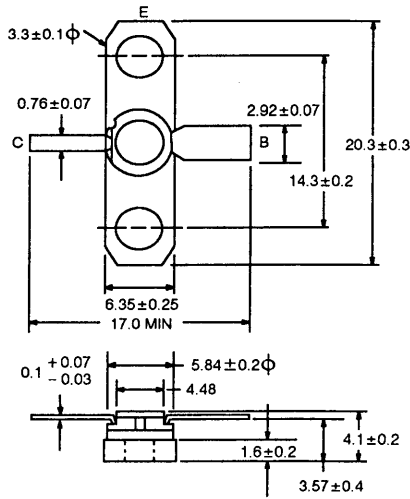
NEL2300 SERIES

OUTLINE DIMENSIONS (Units in mm)

OUTLINE 20

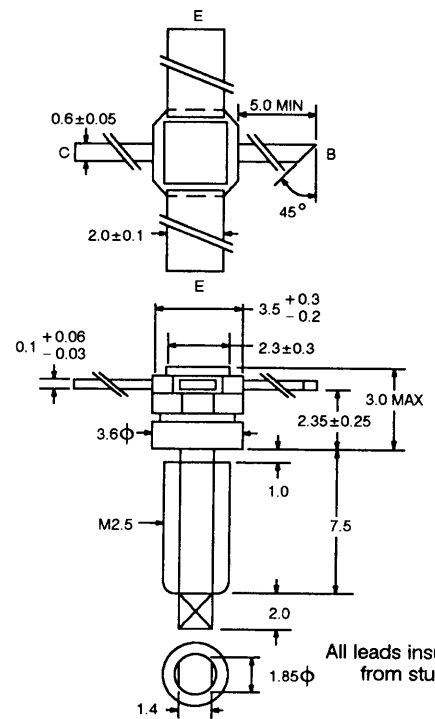


OUTLINE 53



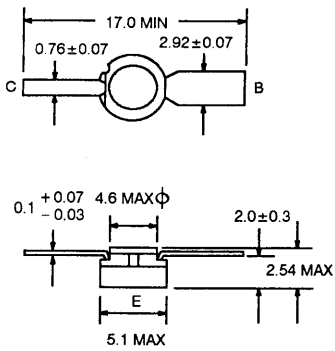
*53B has emitter and base reversed.

OUTLINE 54



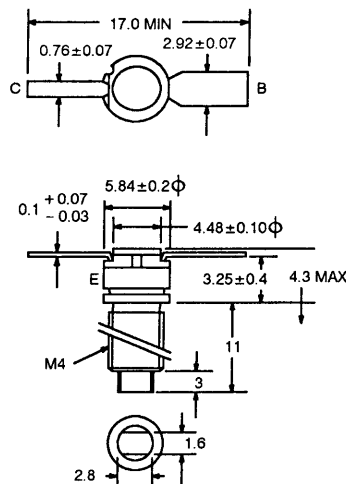
All leads insulated from stud.

OUTLINE 57

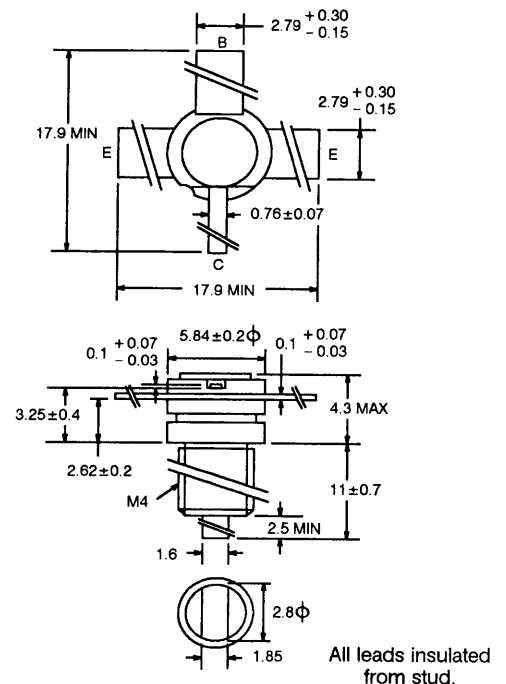


*57B has emitter and base reversed.

OUTLINE 63

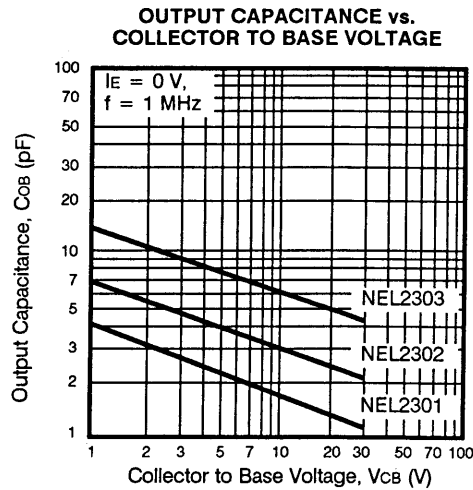


OUTLINE 97

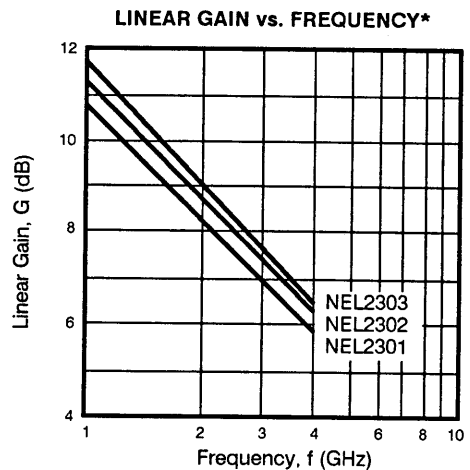
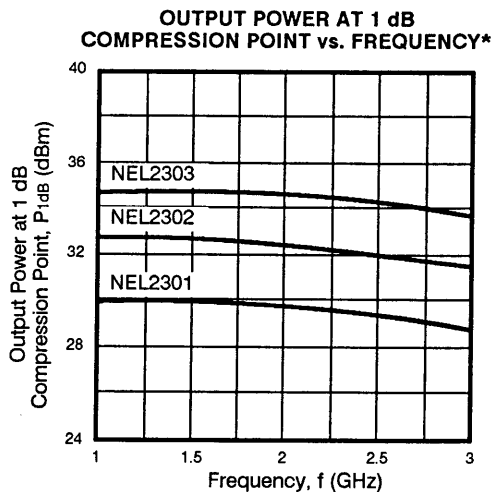
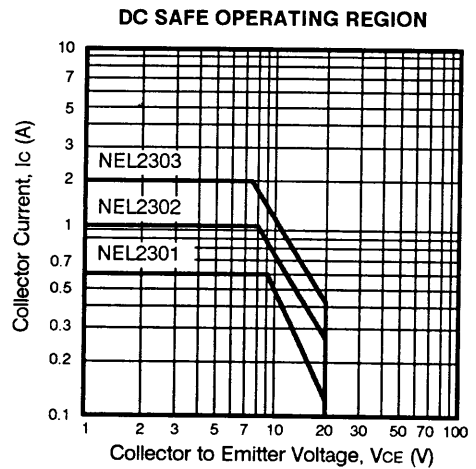
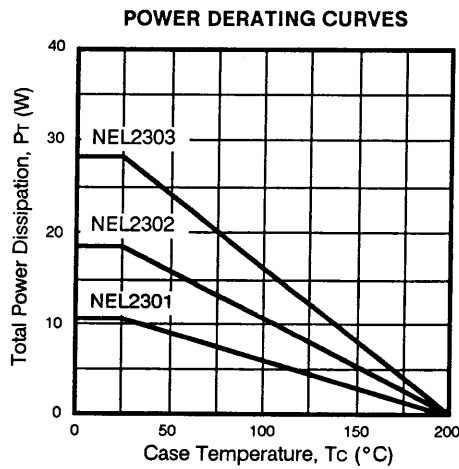


All leads insulated from stud.

TYPICAL DEVICE CHARACTERISTICS (TA = 25°C)



TYPICAL PERFORMANCE CHARACTERISTICS (TA = 25°C)

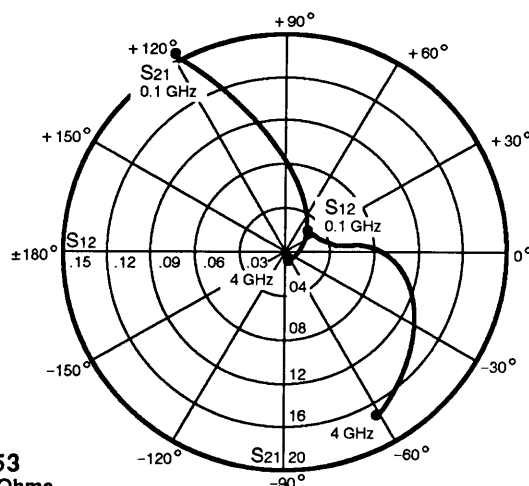
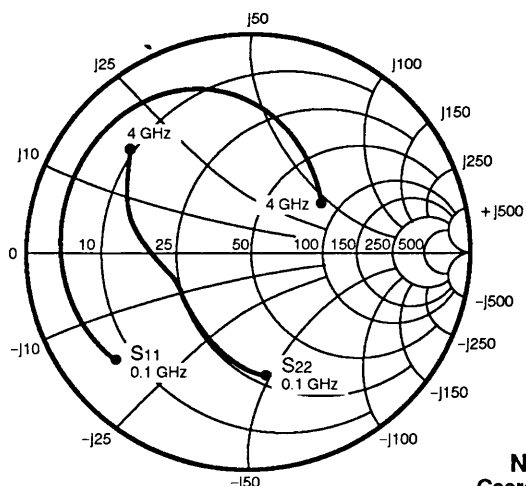


*Gain for the "20" package is 1.5 dB lower than the other packages.



NEL2300 SERIES

TYPICAL COMMON EMITTER SCATTERING PARAMETERS



NEL230153
Coordinates in Ohms
Frequency in GHz
(V_{CE} = 15 V, I_C = 200 mA)

S-MAGN AND ANGLES:

V_{CE} = 15 V, I_C = 200 mA

FREQUENCY (MHz)

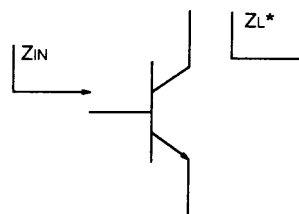
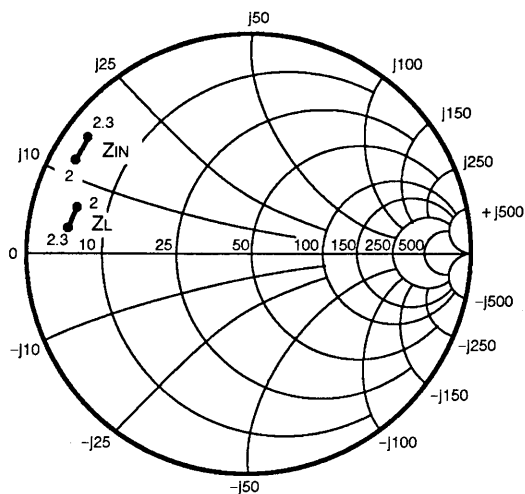
	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
100	.73	-147	20.34	118	.02	35	.59	-81
200	.82	-166	11.72	99	.03	19	.43	-111
500	.86	176	5.16	76	.03	15	.36	-146
1000	.88	160	2.65	51	.03	14	.38	-164
1500	.87	147	1.86	28	.04	13	.43	-168
2000	.84	134	1.48	5	.05	6	.47	-176
2500	.82	120	1.27	-16	.07	-2	.52	172
3000	.75	103	1.14	-39	.08	-14	.57	163
3500	.64	76	1.10	-65	.10	-33	.63	151
4000	.43	31	1.08	-99	.13	-63	.70	139

LARGE SIGNAL IMPEDANCES

NEL230153

Large Signal Impedances

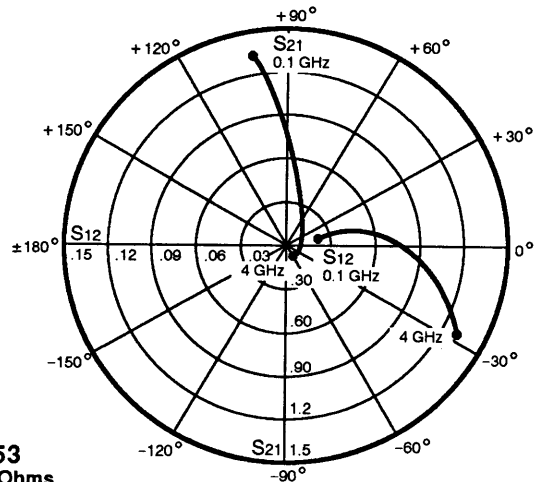
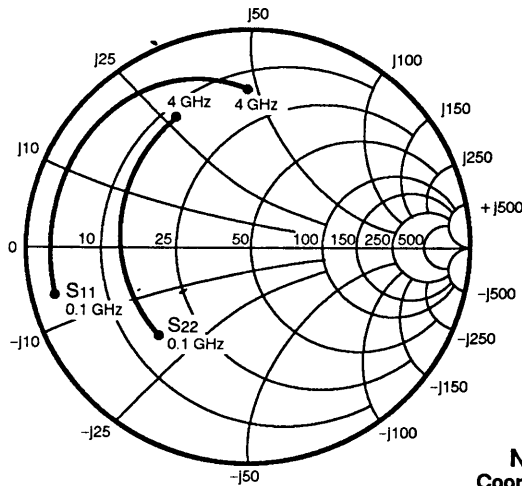
(V_{CE} = 15 V, I_C = 200 mA, P_{OUT} = 29 dBm)



FREQUENCY	Z _{IN}	Z _L *
2	3.3 + j13.5	6.6 + j6.5
2.3	3.3 + j16.8	6.6 + j3.6

*Z_L is optimum load impedance at rated output power.

TYPICAL COMMON EMITTER SCATTERING PARAMETERS



NEL230253
Coordinates in Ohms
Frequency in GHz
(Vce = 15 V, Ic = 350 mA)

S-MAGN AND ANGLES:

VCE = 15 V, IC = 350 mA

FREQUENCY (MHz)

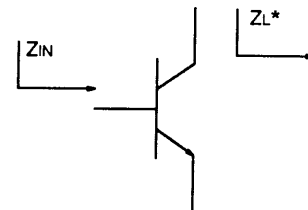
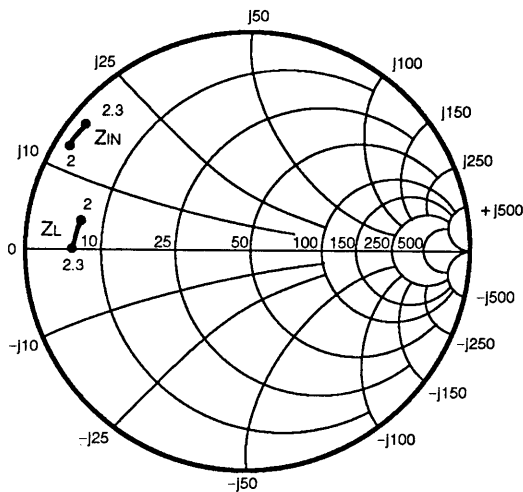
FREQUENCY (MHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
100	.87	-167	13.30	103	.02	20	.54	-134
200	.89	-176	7.04	90	.02	10	.52	-155
500	.91	174	3.00	73	.03	13	.53	-173
1000	.92	161	1.53	51	.04	17	.57	175
1500	.92	152	1.07	30	.04	17	.59	167
2000	.91	141	.84	9	.05	12	.60	159
2500	.90	130	.71	-8	.06	8	.61	151
3000	.86	120	.61	-27	.08	-1	.63	140
3500	.83	106	.58	-44	.10	-11	.65	129
4000	.75	90	.60	-65	.13	-28	.67	120

LARGE SIGNAL IMPEDANCES

NEL230253

Large Signal Impedances

(VCE = 15 V, Ic = 350 mA, POUT = 32 dBm)

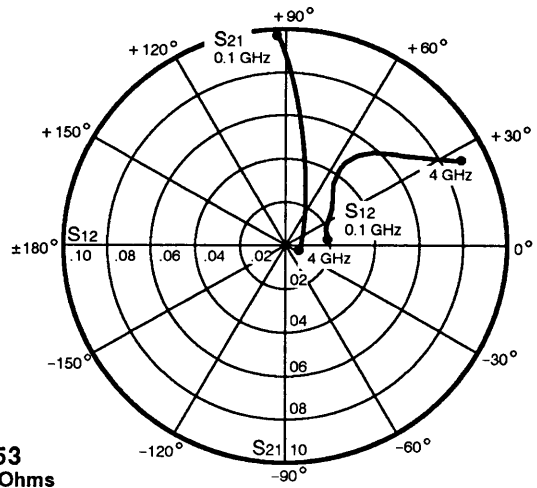
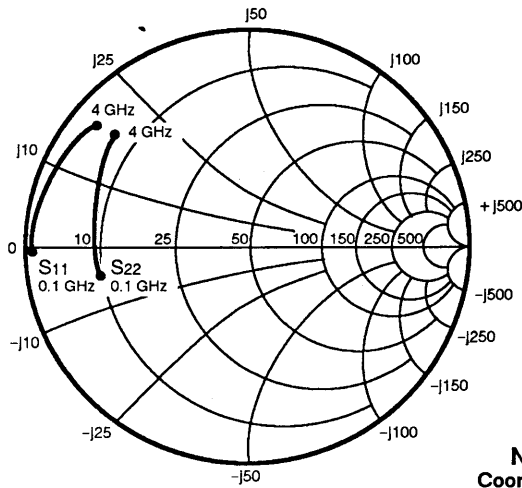


FREQUENCY	Z _{IN}	Z _L *
2	2 + j14	7 + j2.5
2.3	2 + j17	7 - j0

*Z_L is optimum load impedance at rated output power.



TYPICAL COMMON EMITTER SCATTERING PARAMETERS



NEL230353
 Coordinates in Ohms
 Frequency in GHz
 (V_{CE} = 17 V, I_c = 600 mA)

S-MAGN AND ANGLES:

V_{CE} = 17 V, I_C = 600 mA

FREQUENCY (MHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
100	.96	-179	9.98	93	.02	15	.67	-168
200	.96	178	5.20	86	.02	6	.68	-177
500	.95	173	2.11	73	.02	26	.70	175
1000	.97	167	1.11	55	.03	35	.72	165
1500	.97	161	.72	39	.03	41	.74	157
2000	.92	155	.54	24	.04	40	.75	154
2500	.94	152	.43	12	.05	43	.74	150
3000	.92	148	.35	2	.06	37	.77	145
3500	.91	143	.33	-8	.07	33	.78	140
4000	.90	139	.32	-17	.09	28	.80	138



2.3 GHz POWER OSCILLATOR TRANSISTOR

NEX2300 SERIES

FEATURES

- HIGH POWER: 3.2 W AT 2.3 GHz
- HIGH EFFICIENCY: 30%
- LOW AM & FM NOISE
- HIGH RELIABILITY
- COMMON COLLECTOR

DESCRIPTION AND APPLICATIONS

The NEX2300 series is an NPN transistor using NEC's advanced Stepped Electrode Transistor (SET) structure with emitter ballasting resistors. The Pt-Si/Ti/Pt/Au metallization system assures optimum reliability. The series is provided in grounded collector hermetic packages ideal for power oscillator applications in L thru S-bands.

PERFORMANCE SPECIFICATIONS (TA = 25°C)

PART NUMBER PACKAGE OUTLINE			NEX2301 64, 65, 87	NEX2302 64, 65	NEX2303 64, 65
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	TYP	TYP	TYP
Posc	Oscillator Power Output at VCE = 18 V, f = 2.3 GHz IE = 250 mA IE = 350 mA IE = 600 mA	W W W	1.6	2	3.2

ELECTRICAL CHARACTERISTICS (TA = 25°C)

PART NUMBER PACKAGE OUTLINE			NEX2301 87			NEX2301 64, 65			NEX2302 64, 65			NEX2303 64, 65		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
IcBO	Collector Cutoff Current at Vcb = 30 V, IE = 0	mA			0.25			0.25			0.5			1
IEBO	Emitter Cutoff Current at VEB = 2 V, Ic = 0	mA			0.25			0.25			0.5			1
hFE	Forward Current Gain at VCE = 5 V, Ic = 100 mA Ic = 200 mA Ic = 400 mA		15	40	120	15	40	120	15	40	120	15	40	120
COB	Output Capacitance at Vcb = 20 V, IE = 0	pF		1.5	2.5		2.5	4		3.7	5		6.2	8
RTH	Thermal Resistance (Junction-to-Case)	°C/W			25			16			10			6
PT	Total Power Dissipation	W			7			11			17.5			29

2

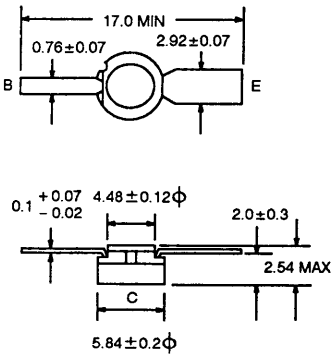
NEX2300 SERIES

ABSOLUTE MAXIMUM RATINGS (TA = 25°C)

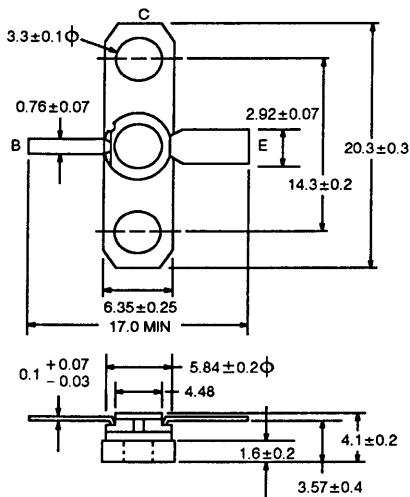
PART NUMBER PACKAGE OUTLINE			NEX2301 64, 65, 87	NEX2302 64, 65	NEX2303 64, 65
SYMBOLS	CHARACTERISTICS	UNITS	RATINGS	RATINGS	RATINGS
V _{CB0}	Collector to Base Voltage	V	45	45	45
V _{CE0}	Collector to Emitter Voltage	V	20	20	20
V _{EB0}	Emitter to Base Voltage	V	3	3	3
I _c	Collector Current	A	0.6	1.1	2
T _J	Junction Temperature	°C	200	200	200
T _{STG}	Storage Temperature	°C	-65 to +200	-65 to +200	-65 to +200

OUTLINE DIMENSIONS (Units in mm)

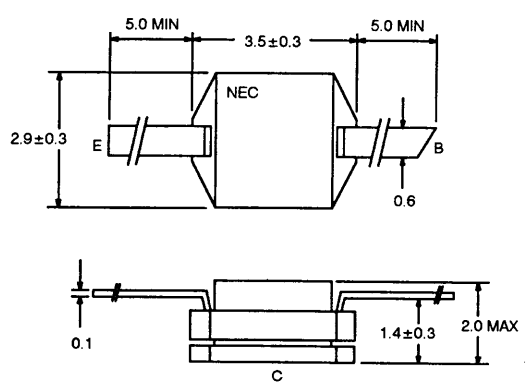
OUTLINE 64



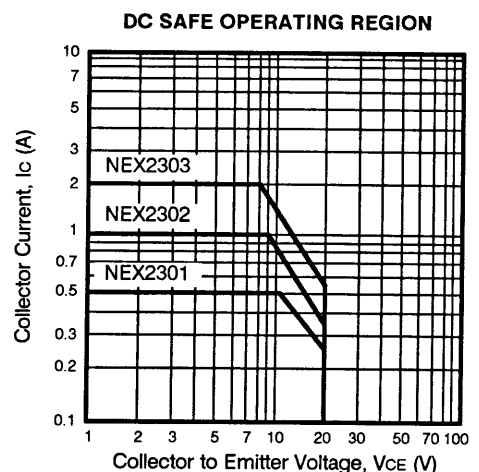
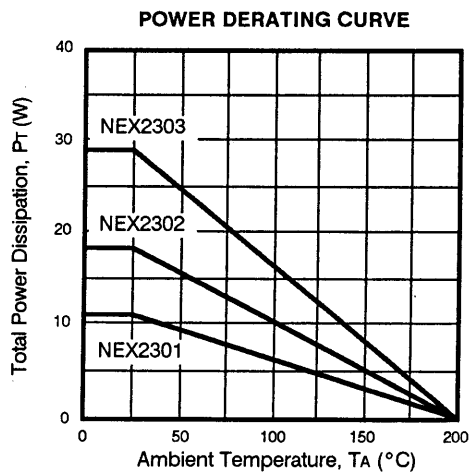
OUTLINE 65



OUTLINE 87



TYPICAL DEVICE CHARACTERISTICS (TA = 25 °C)



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

