

NEC[®]**NPN SILICON HIGH
FREQUENCY TRANSISTOR****NE856
SERIES**T-31-15
T-31-17
T-31-21
T-33-05
T-31-23**FEATURES**

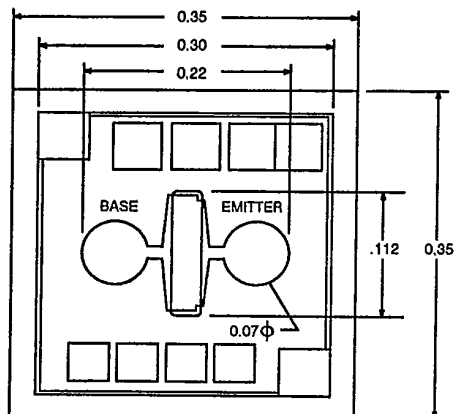
- **HIGH GAIN BANDWIDTH PRODUCT:** $f_T = 7 \text{ GHz}$
- **LOW NOISE FIGURE:** 1.1 dB at 1 GHz
- **HIGH COLLECTOR CURRENT:** 100 mA
- **LOW COST**

DESCRIPTION AND APPLICATIONS

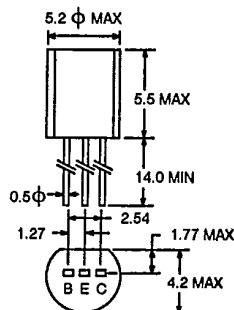
The NE856 series of NPN epitaxial silicon transistors is designed for low noise, high gain amplifiers. Low noise figures, high gain, and high current capability achieve wide dynamic range and excellent linearity. The NE856 series offers excellent performance and reliability at low cost. This is achieved by NEC's titanium, platinum, gold and direct nitride passivated base surface process. The NE856 series is available in chip form and in five low cost package styles.

OUTLINE DIMENSIONS (Units in mm)

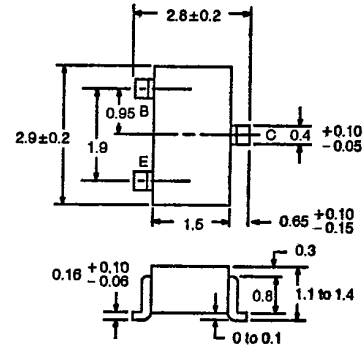
NE85600 (CHIP)
(Chip Thickness: 140 to 160 μm)



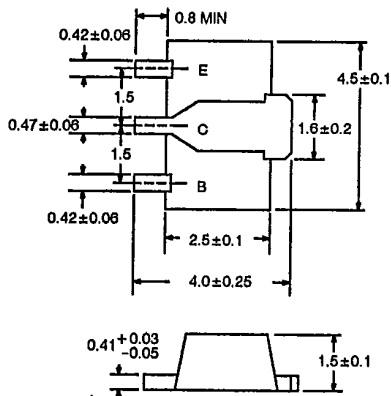
**OUTLINE 32
(TO-92)**



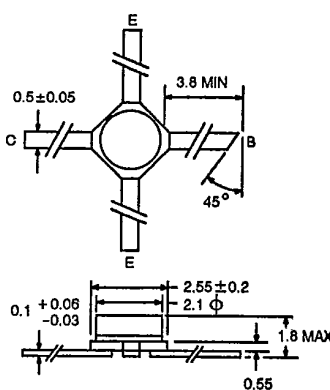
**OUTLINE 33
(SOT-23)**



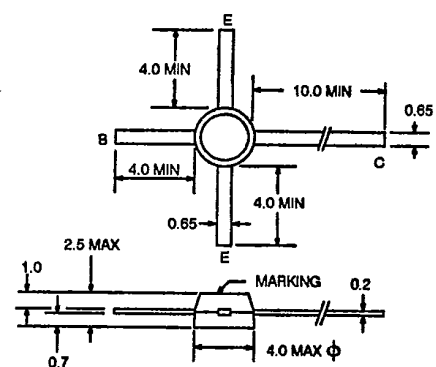
**OUTLINE 34
(SOT-89)**



**OUTLINE 35
(MICRO-X)**



**OUTLINE 37
(DISK-MOLD)**



T-31-17
T-31-21
T-33-05
T-31-23PERFORMANCE SPECIFICATIONS ($T_A = 25^\circ\text{C}$)

PART NUMBER EIAJ 1 REGISTERED NUMBER PACKAGE OUTLINE			NE85600 00 (CHIP)		NE85632 2SC3355 32			NE85633 2SC3356 33			NE85634 2SC3357 34			NE85635 2SC3603 35			NE85637 2SC3358 37		
SYMBOLS	PARAMETERS AND CONDITIONS		UNITS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
f _r	Gain Bandwidth Product at V _{CE} = 10 V, I _C = 20 mA		GHz		7.0			6.5		7.0				6.5			7.0		
S _{21E} ²	Insertion Power Gain at		dB																
	V _{CE} = 10 V, I _C = 20 mA, f = 1 GHz		dB	7.0	9.0			9.5		11.5				9.0		7.0	9.0	13.0	
MAG	Maximum Available Gain at		dB																
	V _{CE} = 10 V, I _C = 20 mA, f = 1 GHz		dB	10.0	12.0			11.0		13.0						10.0	12.0	15.0	
NF	Noise Figure at		dB																
	V _{CE} = 10 V, I _C = 7 mA, f = 1 GHz		dB					1.1		1.1	2.0			1.1				1.1 2.0	
	V _{CE} = 10 V, I _C = 7 mA, f = 2 GHz		dB	2.1	3.4										1.8	3.0			
GA	V _{CE} = 10 V, I _C = 40 mA, f = 1 GHz		dB					1.8	3.0										
	Associated Gain at		dB																
	V _{CE} = 10 V, I _C = 7 mA, f = 1 GHz		dB																
	V _{CE} = 10 V, I _C = 7 mA, f = 2 GHz		dB		10.0					9.0						10.0		12.0	
	V _{CE} = 10 V, I _C = 40 mA, f = 1 GHz		dB					9.0						11.0					

Note:

1. Electronic Industrial Association of Japan.

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

PART NUMBER EIAJ 1 REGISTERED NUMBER PACKAGE OUTLINE			NE85600 00 (CHIP)			NE85632 2SC3355 32			NE85633 2SC3356 33			NE85634 2SC3357 34			NE85635 2SC3603 35			NE85637 2SC3358 37			
SYMBOLS	PARAMETERS AND CONDITIONS		UNITS	MIN		TYP		MAX		MIN		TYP		MAX		MIN		TYP		MAX	
Icbo	Collector Cutoff Current at Vcb = 10 V, Ie = 0		μA						1.0						1.0						1.0
Iebo	Emitter Cutoff Current at Veb = 1 V, Ic = 0		μA						1.0						1.0						1.0
hFE	Forward Current Gain at VCE = 10 V, Ic = 20 mA			50	120	300	50	120	300	50	120	300	50	120	300	50	120	300	50	120	300
Cob	Output Capacitance at Vcb = 10 V, Ie = 0, f = 1 MHz		pF			0.5	1.0	0.65	1.0			0.65	1.0	1.0	1.5		0.5	1.0		0.65	1.0
Rth	Thermal Resistance (Junction-to-Ambient)		°C/W						210				625		62.5*						625
Pt	Total Power Dissipation		W			.70			.60			.20			2*		.58				.20

Notes:

- Electronic Industrial Association of Japan.
- Pulse width $\leq 350\text{ }\mu\text{s}$, duty cycle $\leq 2\%$ pulsed.
- C_{ob} measurement employs a three terminal capacitance bridge incorporating a guard circuit. The emitter terminal shall be connected to the guard terminal.
- With $2.5\text{ cm}^2 \times 0.7\text{ mm}$ ceramic substrate.

2

NE856 SERIES

T-31-17

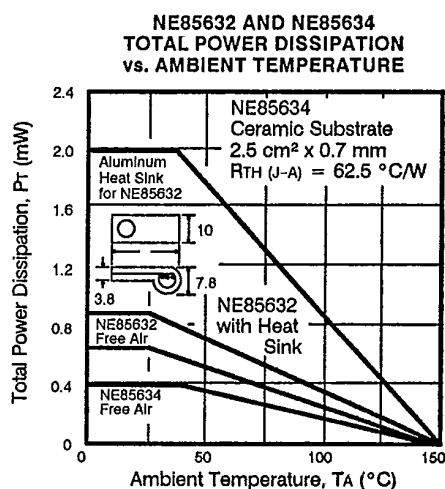
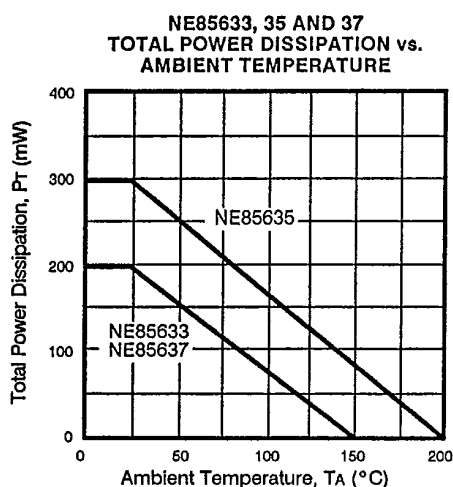
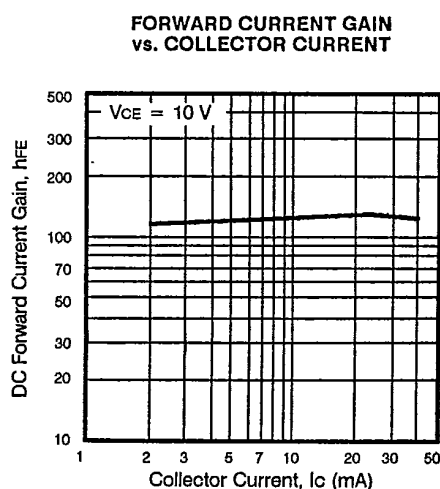
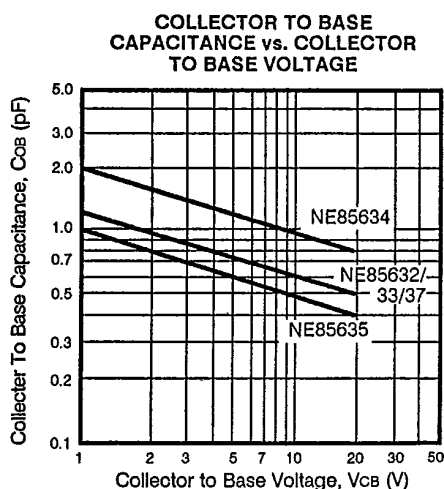
T-31-21

T-33-05

T-31-23

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

SYMBOLS	PARAMETERS	UNITS	RATINGS
V_{CB0}	Collector to Base Voltage	V	20
V_{CE0}	Collector to Emitter Voltage	V	12
V_{EB0}	Emitter to Base Voltage	V	3.0
I_C	Collector Current	mA	100
T_J	Junction Temperature	$^\circ\text{C}$	200*
T_{STG}	Storage Temperature	$^\circ\text{C}$	-65 to +150

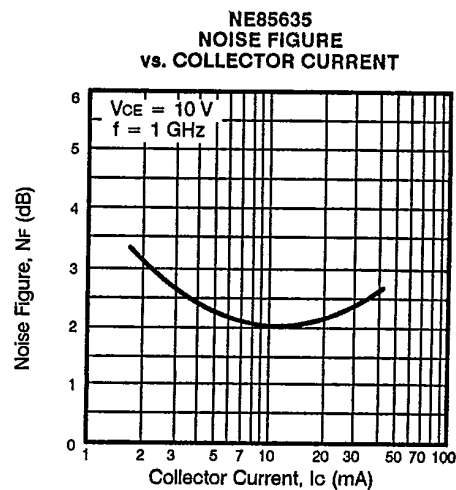
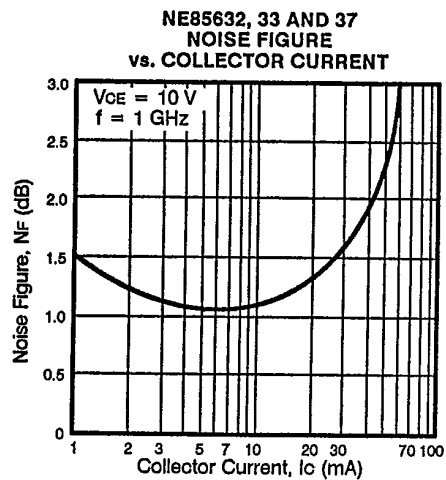
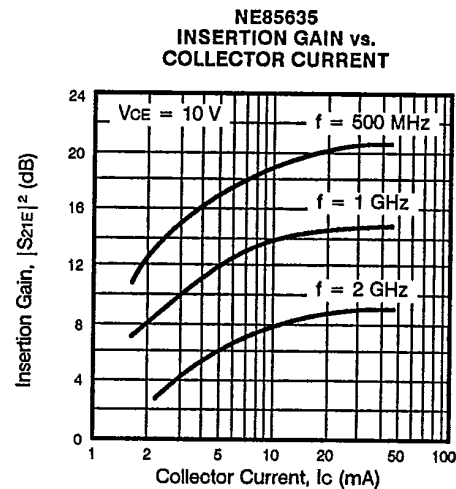
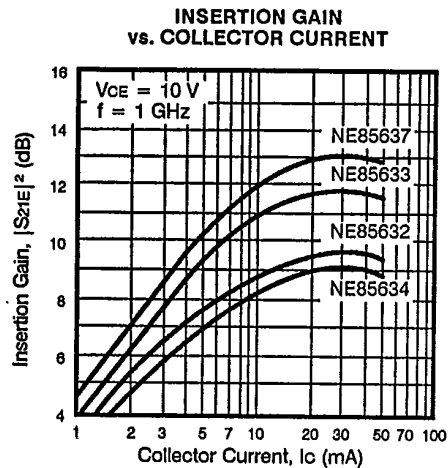
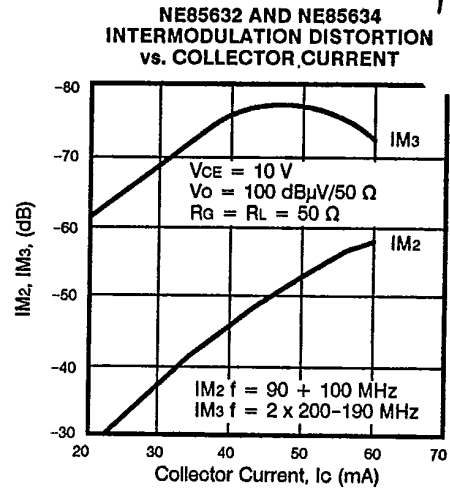
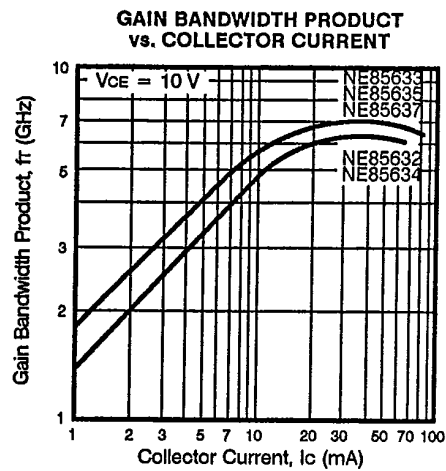
*Maximum T_J for the NE85632/33/34 & 37 is +150 $^\circ\text{C}$ **TYPICAL DEVICE CHARACTERISTICS** ($T_A = 25^\circ\text{C}$)**TYPICAL PERFORMANCE CHARACTERISTICS** ($T_A = 25^\circ\text{C}$)

T-31-17

T-31-21

T-33-05

T-31-23

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

2

T-31-15

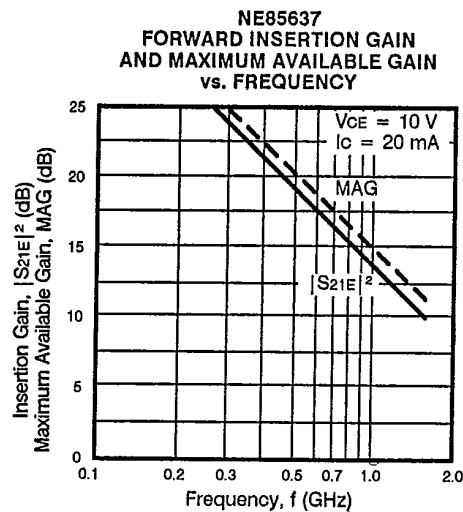
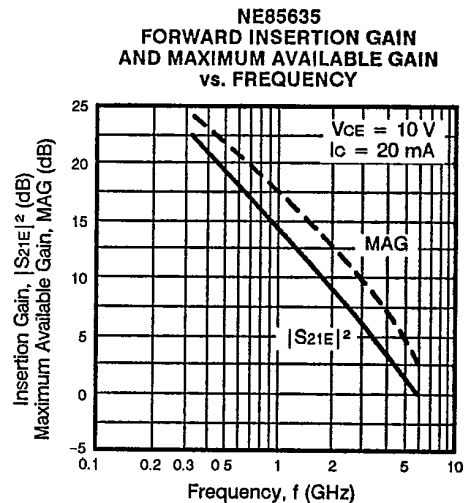
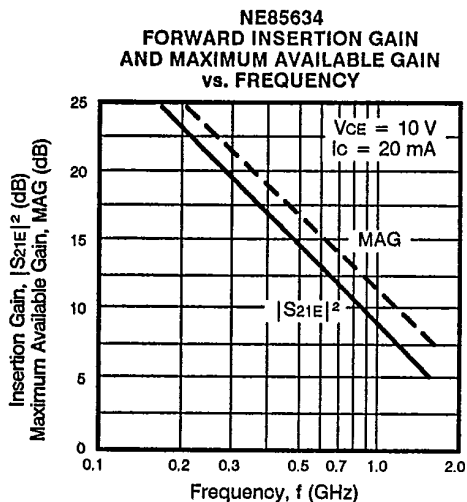
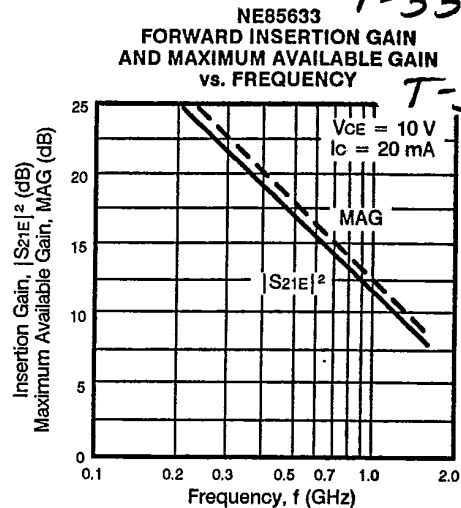
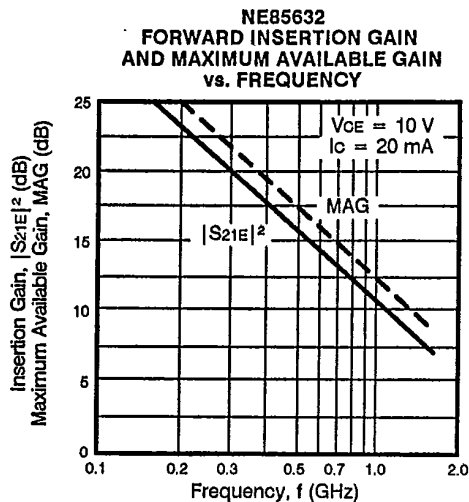
T-31-17

T-31-21

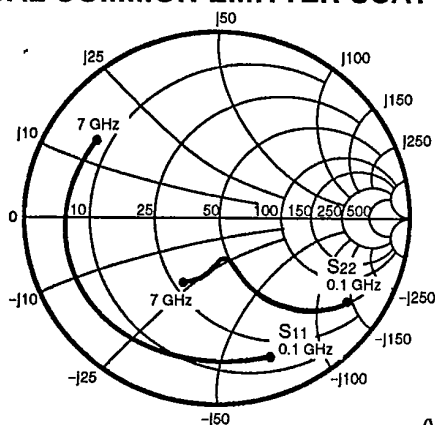
T-33-05

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

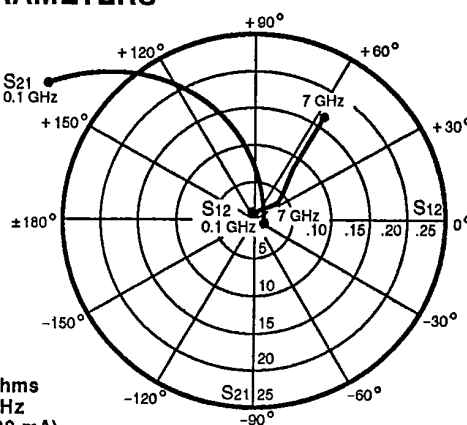
T-31-23



TYPICAL COMMON EMITTER SCATTERING PARAMETERS



NE85600
Coordinates in Ohms
Frequency in GHz
(VCE = 10 V, IC = 20 mA)



S-MAGN AND ANGLES:

VCE = 10 V, IC = 7 mA

FREQUENCY (MHz)

S11

S12

S21

S22

100	.87	-37	15.42	157	0.02	69	.93	-17
200	.84	-70	13.92	140	0.04	53	.79	-30
300	.81	-96	11.97	127	0.05	43	.67	-38
400	.80	-113	10.14	117	0.06	36	.57	-42
500	.80	-126	8.68	111	0.06	32	.51	-44
600	.79	-135	7.57	105	0.06	29	.46	-46
700	.79	-141	6.52	100	0.06	27	.43	-46
800	.78	-148	5.88	97	0.06	26	.40	-47
900	.78	-152	5.29	94	0.06	25	.38	-48
1000	.78	-156	4.86	91	0.06	25	.36	-49
2000	.78	-176	2.51	72	0.07	29	.33	-55
3000	.78	175	1.67	57	0.08	36	.35	-65
4000	.77	167	1.30	45	0.09	44	.38	-77
5000	.77	160	1.05	33	0.10	50	.42	-89
6000	.77	153	.87	23	0.12	54	.47	-101
7000	.77	147	.75	15	0.15	56	.51	-113

VCE = 10 V, IC = 20 mA

100	.76	-68	32.67	145	0.02	60	.82	-31
200	.75	-107	23.94	125	0.03	43	.60	-48
300	.76	-129	17.83	113	0.03	35	.46	-56
400	.77	-141	14.01	106	0.04	33	.37	-60
500	.76	-149	11.49	101	0.04	31	.31	-62
600	.76	-155	9.73	97	0.04	33	.28	-63
700	.76	-159	8.38	94	0.04	32	.25	-63
800	.76	-163	7.40	91	0.04	33	.23	-64
900	.77	-166	6.60	89	0.04	34	.22	-65
1000	.76	-168	5.97	87	0.04	35	.21	-65
2000	.76	178	3.03	72	0.06	48	.19	-70
3000	.76	171	2.05	59	0.07	53	.21	-79
4000	.76	164	1.58	48	0.09	56	.24	-88
5000	.76	157	1.29	37	0.11	57	.28	-98
6000	.75	151	1.09	27	0.13	58	.33	-106
7000	.76	146	.95	18	0.16	58	.38	-116

VCE = 10 V, IC = 30 mA

100	.73	-79	37.25	140	0.02	53	.77	-35
200	.75	-118	25.60	120	0.03	41	.53	-52
300	.75	-138	18.54	109	0.03	34	.40	-59
400	.76	-148	14.43	103	0.03	35	.32	-62
500	.76	-155	11.77	98	0.03	33	.27	-63
600	.76	-160	9.89	95	0.03	33	.24	-63
700	.76	-164	8.53	92	0.03	36	.22	-63
800	.76	-167	7.50	90	0.04	38	.20	-64
900	.76	-169	6.68	87	0.04	40	.19	-64
1000	.76	-171	6.04	86	0.04	42	.19	-64
2000	.76	176	3.08	71	0.06	52	.17	-70
3000	.76	170	2.07	59	0.07	57	.19	-78
4000	.75	163	1.60	48	0.09	59	.23	-87
5000	.76	156	1.30	37	0.11	60	.27	-97
6000	.75	151	1.10	27	0.14	60	.31	-106
7000	.76	145	.95	18	0.16	59	.37	-116

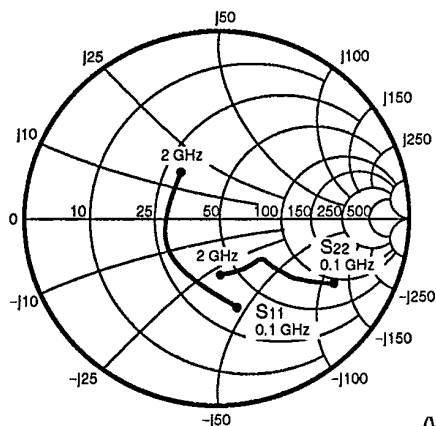
Note: S-parameters include bond wires.

Base: Total 1 wire (s), 1 per bond pad, 0.0093" (236 μm) long each wire.

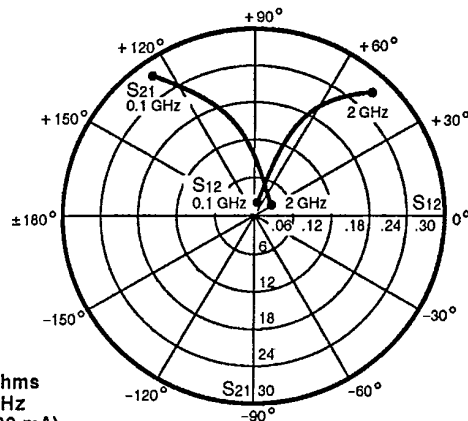
Collector: Total 1 wire (s), 1 per bond pad, 0.0083" (210 μm) long each wire.

Emitter: Total 2 wire (s), 1 per side, 0.0304" (772 μm) long each wire.

Wire: 0.0007" (17.7 μm) Dia., gold.

NE856 SERIES
TYPICAL COMMON EMITTER SCATTERING PARAMETERS


NE85632
Coordinates in Ohms
Frequency in GHz
(V_{CE} = 10 V, I_C = 20 mA)


S-MAGN AND ANGLES:

VCE = 10 V, IC = 7 mA

FREQUENCY (MHz)

	S ₁₁	S ₂₁	S ₁₂	S ₂₂
100	.71 -50	16.63 141	.02 70	.85 -22
200	.54 -84	11.97 119	.04 55	.66 -34
500	.40 -134	5.98 91	.08 58	.44 -43
1000	.34 -173	3.26 66	.13 58	.40 -52
1500	.34 163	2.33 48	.18 57	.39 -70
2000	.37 140	1.94 29	.24 47	.39 -88

VCE = 10 V, IC = 10 mA

	S ₁₁	S ₂₁	S ₁₂	S ₂₂
100	.62 -58	20.35 135	.02 70	.80 -26
200	.45 -95	13.62 113	.03 55	.59 -36
500	.35 -141	6.44 89	.07 63	.39 -42
1000	.31 -177	3.46 65	.13 60	.36 -51
1500	.31 160	2.46 48	.19 57	.35 -70
2000	.34 138	2.04 30	.25 46	.35 -88

VCE = 10 V, IC = 20 mA

	S ₁₁	S ₂₁	S ₁₂	S ₂₂
100	.45 -78	26.73 125	.01 69	.68 -31
200	.32 -116	15.88 105	.02 62	.47 -37
500	.28 -154	7.03 85	.07 70	.32 -40
1000	.27 175	3.72 64	.14 63	.32 -50
1500	.28 155	2.63 47	.20 58	.31 -70
2000	.30 134	2.17 30	.26 45	.31 -88

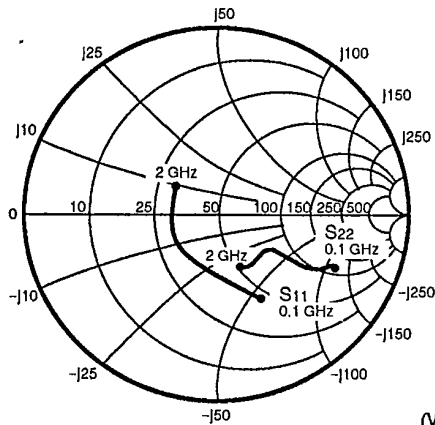
VCE = 10 V, IC = 30 mA

	S ₁₁	S ₂₁	S ₁₂	S ₂₂
100	.37 -90	29.24 120	.01 71	.62 -33
200	.28 -128	16.64 101	.02 64	.42 -36
500	.27 -160	7.19 83	.07 72	.30 -37
1000	.26 172	3.79 63	.14 64	.30 -48
1500	.27 153	2.67 47	.21 58	.29 -69
2000	.30 133	2.20 30	.27 46	.30 -88

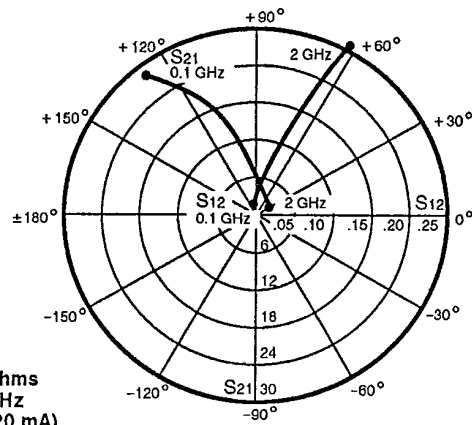
VCE = 10 V, IC = 50 mA

	S ₁₁	S ₂₁	S ₁₂	S ₂₂
100	.30 -102	29.24 115	.01 75	.56 -31
200	.23 -144	16.12 99	.01 69	.41 -32
500	.24 -179	6.89 83	.07 73	.31 -33
1000	.26 152	3.63 65	.14 65	.28 -39
1500	.29 132	2.53 51	.19 59	.24 -41
2000	.33 118	2.01 37	.24 49	.23 -49

TYPICAL COMMON EMITTER SCATTERING PARAMETERS



NE85633
Coordinates in Ohms
Frequency in GHz
($V_{CE} = 10\text{ V}$, $I_C = 20\text{ mA}$)



S-MAGN AND ANGLES:

VCE = 10 V, IC = 7 mA

FREQUENCY (MHz)

	S11		S21		S12		S22	
100	.77	-43	16.55	145	.01	71	.88	-18
200	.57	-74	12.28	123	.04	58	.70	-28
500	.36	-126	6.20	95	.08	61	.49	-34
1000	.29	-163	3.38	76	.12	64	.44	-41
1500	.27	171	2.36	62	.18	66	.45	-52
2000	.30	155	1.89	49	.23	62	.45	-64

2

VCE = 10 V, IC = 10 mA

	S11		S21		S12		S22	
100	.69	-50	20.27	139	.01	74	.83	-22
200	.48	-82	14.10	117	.03	59	.64	-31
500	.30	-134	6.67	93	.07	66	.44	-33
1000	.25	-168	3.59	75	.13	66	.41	-41
1500	.23	168	2.50	62	.19	66	.41	-52
2000	.26	152	2.00	50	.25	62	.42	-64

VCE = 10 V, IC = 20 mA

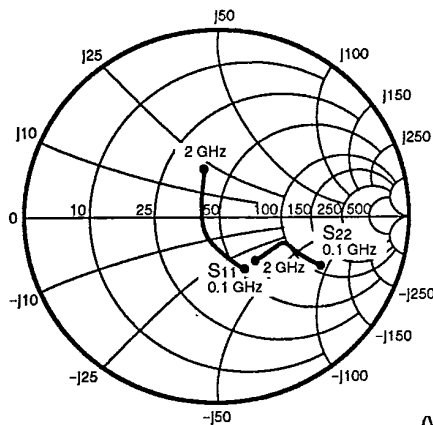
	S11		S21		S12		S22	
100	.56	-64	26.42	129	.01	69	.72	-27
200	.35	-96	16.30	109	.02	64	.53	-32
500	.24	-147	7.22	89	.07	71	.38	-31
1000	.21	-175	3.81	73	.13	69	.37	-40
1500	.20	162	2.64	62	.20	67	.38	-53
2000	.23	149	2.10	49	.26	61	.37	-65

VCE = 10 V, IC = 30 mA

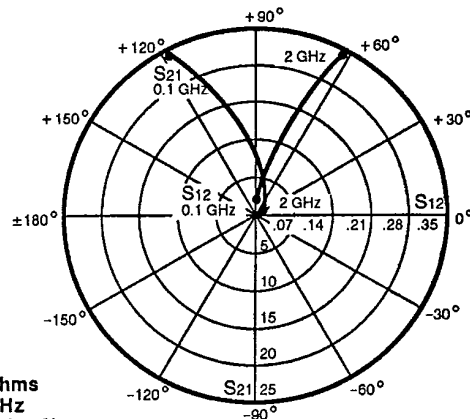
	S11		S21		S12		S22	
100	.49	-72	28.53	124	.01	68	.67	-27
200	.30	-104	16.78	105	.02	66	.49	-30
500	.23	-154	7.25	88	.07	73	.37	-29
1000	.21	-179	3.83	72	.13	70	.36	-39
1500	.20	160	2.64	61	.20	67	.37	-52
2000	.23	147	2.11	49	.26	61	.37	-65

NE856 SERIES

TYPICAL COMMON EMITTER SCATTERING PARAMETERS



NE85634
Coordinates in Ohms
Frequency in GHz
(VCE = 10 V, IC = 20 mA)



S-MAGN AND ANGLES:

VCE = 10 V, IC = 7 mA

FREQUENCY (MHz)

	S11		S21		S12		S22	
100	.64	-50	15.46	136	.03	70	.81	-23
200	.41	-81	10.42	114	.04	61	.61	-30
500	.21	-133	4.90	90	.10	69	.43	-29
1000	.19	166	2.67	70	.17	69	.39	-34
1500	.23	135	1.93	58	.25	68	.37	-46
2000	.31	119	1.62	46	.32	63	.37	-59

VCE = 10 V, IC = 10 mA

	S11		S21		S12		S22	
100	.55	-58	18.40	130	.02	68	.74	-26
200	.32	-89	11.55	109	.04	63	.54	-22
500	.17	-143	5.22	88	.10	72	.39	-20
1000	.16	156	2.83	70	.18	70	.37	-30
1500	.20	127	2.02	58	.26	68	.34	-45
2000	.28	114	1.69	46	.33	62	.34	-59

VCE = 10 V, IC = 20 mA

	S11		S21		S12		S22	
100	.36	-72	23.03	118	.02	72	.61	-29
200	.19	-105	13.04	101	.04	72	.44	-29
500	.11	-163	5.60	85	.10	76	.34	-25
1000	.14	137	3.01	68	.19	71	.33	-32
1500	.19	115	2.15	58	.28	67	.30	-47
2000	.26	106	1.78	47	.34	61	.30	-60

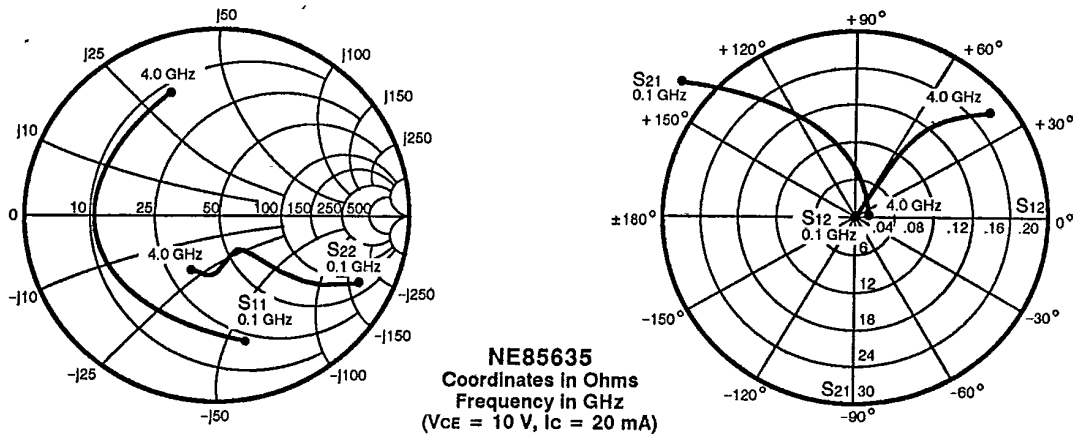
VCE = 10 V, IC = 30 mA

	S11		S21		S12		S22	
100	.28	-81	24.62	113	.01	72	.55	-28
200	.14	-118	13.40	98	.03	75	.41	-26
500	.11	-176	5.69	84	.11	79	.33	-22
1000	.14	131	3.05	68	.19	72	.32	-31
1500	.19	112	2.16	58	.28	68	.30	-47
2000	.25	104	1.81	47	.35	60	.30	-60

VCE = 10 V, IC = 50 mA

	S11		S21		S12		S22	
100	.21	-97	24.92	109	.01	80	.50	-26
200	.13	-141	13.24	96	.03	79	.39	-22
500	.13	173	5.56	83	.10	80	.33	-20
1000	.17	134	2.98	67	.19	72	.33	-30
1500	.21	114	2.11	57	.28	68	.31	-45
2000	.28	107	1.77	46	.35	62	.31	-59

TYPICAL COMMON EMITTER SCATTERING PARAMETERS



S-MAGN AND ANGLES:

 $V_{CE} = 10\text{ V}$, $I_C = 7\text{ mA}$

FREQUENCY (MHz)

	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
100	.82	-47	18.86	154	.00	35	.91	-16
500	.68	-141	8.12	100	.02	34	.45	-41
1000	.66	-169	4.29	77	.03	34	.36	-48
1500	.66	174	2.94	64	.04	39	.38	-53
2000	.65	160	2.29	50	.05	42	.34	-61
2500	.67	145	1.81	37	.10	44	.38	-76
3000	.69	134	1.57	24	.12	46	.40	-89
3500	.69	123	1.31	11	.15	39	.41	-100
4000	.71	112	1.20	1	.16	39	.43	-111

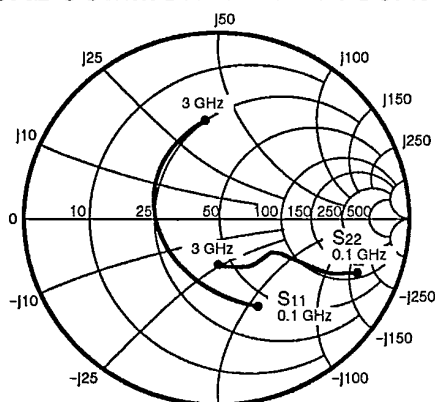
2

 $V_{CE} = 10\text{ V}$, $I_C = 20\text{ mA}$

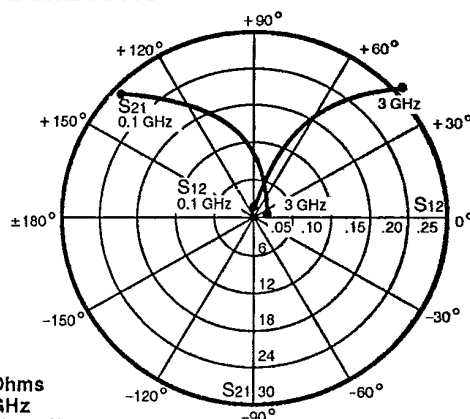
100	.65	-78	34.20	141	.00	9	.79	-27
500	.64	-162	10.38	93	.00	43	.26	-49
1000	.62	179	5.32	75	.02	52	.21	-56
1500	.62	167	3.62	63	.04	53	.23	-56
2000	.62	153	2.80	50	.06	54	.19	-63
2500	.64	140	2.22	39	.11	50	.25	-82
3000	.65	131	1.92	26	.14	48	.27	-94
3500	.67	120	1.62	14	.16	38	.28	-105
4000	.68	110	1.48	4	.17	38	.30	-115

 $V_{CE} = 10\text{ V}$, $I_C = 30\text{ mA}$

100	.61	-91	38.48	135	.00	7	.73	-31
500	.63	-168	10.75	91	.00	46	.23	-48
1000	.62	176	5.47	74	.02	57	.19	-56
1500	.62	164	3.71	62	.04	59	.21	-55
2000	.62	152	2.86	50	.06	57	.17	-61
2500	.65	139	2.28	38	.12	52	.22	-83
3000	.65	130	1.96	27	.14	49	.22	-94
3500	.67	120	1.66	15	.16	43	.26	-105
4000	.68	110	1.51	5	.18	38	.27	-118

NE856 SERIES**TYPICAL COMMON EMITTER SCATTERING PARAMETERS**

NE85637
Coordinates in Ohms
Frequency in GHz
(V_{CE} = 10 V, I_C = 20 mA)

**S-MAGN AND ANGLES:**V_{CE} = 10 V, I_C = 7 mA

FREQUENCY (MHz)

	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
100	.77	-42	17.36	149	.01	72	.91	-16
500	.46	-136	7.22	97	.06	50	.53	-31
1000	.44	-179	3.90	73	.08	56	.44	-36
1500	.44	158	2.69	57	.12	55	.43	-44
2000	.47	139	2.05	43	.16	57	.43	-55
2500	.51	121	1.68	28	.19	51	.38	-71
3000	.55	108	1.45	15	.23	46	.38	-88

V_{CE} = 10 V, I_C = 10 mA

100	.69	-50	21.85	144	.01	69	.87	-19
500	.41	-145	7.89	93	.05	56	.47	-31
1000	.40	175	4.19	72	.09	61	.40	-35
1500	.41	153	2.88	56	.12	58	.39	-44
2000	.44	135	2.18	43	.16	57	.39	-54
2500	.48	119	1.80	29	.21	50	.34	-69
3000	.52	107	1.54	16	.24	44	.32	-86

V_{CE} = 10 V, I_C = 20 mA

100	.55	-68	29.93	134	.01	70	.78	-25
500	.35	-160	8.73	89	.05	64	.40	-29
1000	.37	168	4.52	70	.09	67	.35	-33
1500	.38	150	3.12	56	.13	61	.34	-42
2000	.41	134	2.37	43	.18	58	.33	-53
2500	.45	117	1.96	30	.22	50	.29	-69
3000	.49	106	1.69	17	.26	43	.27	-87

V_{CE} = 10 V, I_C = 30 mA

100	.48	-80	33.45	129	.01	69	.72	-25
500	.34	-167	8.88	87	.05	66	.38	-26
1000	.37	165	4.60	69	.09	69	.34	-31
1500	.37	148	3.15	55	.13	62	.33	-41
2000	.40	133	2.40	43	.18	59	.33	-52
2500	.45	116	1.98	29	.22	50	.28	-67
3000	.48	106	1.70	16	.26	43	.26	-86

V_{CE} = 10 V, I_C = 40 mA

100	.45	-89	34.86	125	.01	70	.69	-26
500	.35	-171	8.79	86	.05	71	.38	-24
1000	.37	163	4.51	68	.09	70	.34	-30
1500	.38	147	3.09	55	.13	63	.34	-39
2000	.41	131	2.37	42	.18	59	.34	-52
2500	.45	115	1.95	28	.22	49	.29	-68
3000	.49	105	1.68	15	.26	42	.27	-86

Additional Power Silicon Bipolar Products

PART NUMBER	PACKAGE CODE	ABSOLUTE MAXIMUM RATINGS					ELECTRICAL CHARACTERISTICS		
		V _{CEO} (V)	V _{CER} ² (V)	I _C (A)	R _{TH} ³ (C/W)	P _T (W)	h _{FE}		
							V _{CE} (V)	I _C ⁴ (mA)	TYP
NEL130681-12	81	35	18	2.0	10.0	19.5	10.0	0.3	60
NEL132081-12	81	35	18	6.0	4.0	50.0	10.0	0.5	60
NEM054029-28	29	55	18 ⁵	6.0	2.0	88.0	10.0	1.5	60
NEM056029-28	29	55	18 ⁵	12.0	1.1	160.0	10.0	2.0	60
NEM050C29-28	29	55	18 ⁵	15.0	0.9	200.0	10.0	3.0	60
NE1005E-20	21	45	45	1.0	16.0	11.0	10.0	0.5	60
NE1010E-20	21	45	45	2.0	8.0	22.0	10.0	1.0	60
NEM1706B-20	94	45	45	1.8	8.0	21.0	3.0	1.6	60
NEM1712B-20	94	45	45	3.6	5.0	35.0	3.0	3.2	60
NEM1725B-20	94	45	45	7.2	2.4	72.0	3.0	6.4	60
NEM2003B-20	94	45	45	0.9	15.0	11.7	3.0	0.8	40
NEM2010B-20	94	45	45	2.7	5.5	31.8	3.0	2.4	40
NEM2015B-20	94	45	45	4.5	4.5	39.0	3.0	4.0	40
NEM2305B-20	94	45	45	2.4	6.0	29.2	3.0	0.8	
NEM2310B-20	94	45	45	3.6	4.5	38.9	3.0	2.4	
NEM2701B-20	94	45	45	0.6	16.0	10.9	3.0	0.6	70
NEM2703B-20	94	45	45	1.2	10.0	17.5	3.0	1.2	70
NEM2705B-20	94	45	45	2.4	6.0	29.3	3.0	2.4	70
NEM2708B-20	94	45	45	3.6	4.5	38.9	3.0	4.8	70
NE300100	CHIP	45	45	0.6			5.0	0.1	70
NE3001B-20	53B	45	45	0.6	16.0	10.9	5.0	0.1	70
NE300157B-20	57B	45	45	0.6	16.0	10.9	5.0	0.1	70
NE300300	CHIP	45	45	1.2			5.0	0.2	70
NE3003B-20	53B	45	45	1.2	10.0	17.5	5.0	0.2	70
NE300357B-20	57B	45	45	1.2	10.0	17.5	5.0	0.2	70
NE3005B-20	53B	45	45	2.4	6.0	29.2	5.0	0.4	70
NE300557B-20	57B	45	45	2.4	6.0	29.2	5.0	0.4	70
NEM3001B-20	94	45	45	0.6	16.0	10.9	3.0	0.6	70
NEM3003B-20	94	45	45	1.2	10.0	17.5	3.0	1.2	70
NEM3005B-20	94	45	45	2.4	6.0	29.2	3.0	2.4	70
NEM3008B-20	94	45	45	3.6	4.5	38.9	3.0	4.8	70
NEM3501B-20	94	45	45	0.6	16.0	10.9	3.0	0.6	70
NEM3503B-20	94	45	45	1.2	10.0	17.5	3.0	1.2	70
NEM3505B-20	94	45	45	2.4	6.0	29.2	3.0	2.4	70
NEM3508B-20	94	45	45	3.6	4.5	38.9	3.0	4.8	70
NE420100	CHIP	45	45	0.6			5.0	0.1	70
NE4201B-20	53B	45	45	0.6	16.0	10.9	5.0	0.1	70
NE420157B-20	57B	45	45	0.6	16.0	10.9	5.0	0.1	70
NE4203B-20	53B	45	45	1.2	10.0	17.5	5.0	0.2	70
NE420357B-20	57B	45	45	1.2	10.0	17.5	5.0	0.2	70
NEM4201B-20	94	45	45	0.6	16.0	10.9	3.0	0.6	70
NEM4203B-20	94	45	45	1.2	10.0	17.5	3.0	1.2	70
NEM4205B-20	94	45	45	2.4	6.0	29.3	3.0	2.4	70

Notes:

1. NEM series has internal matching
2. V_{CER}, R_{BE} = 10Ω
3. Junction to case
4. Pulsed
5. V_{CEO}

Additional Power Silicon Bipolar Products

PART ¹ NUMBER	PACKAGE CODE	PERFORMANCE SPECIFICATIONS							FREQUENCY BAND (GHz)
		Vcc (V)	f (GHz)	CLASS	P _{OUT}		GAIN (dB)	η _c (%)	
					(dBm)	(W)			
NEL130681-12	81	13.5	1.3	A	37.5	5.6	7.5	55	1.0 to 1.5
NEL132081-12	81	13.5	1.3	A	42.0	15.8	6.0	60	1.0 to 1.5
NEM054029-28	29	28.0	0.4	C/AB	46.0	39.8	10.0	65	0.4
NEM056029-28	29	28.0	0.4	C/AB	48.0	63.1	8.0	62	0.4
NEM050C29-28	29	28.0	0.4	C/AB	50.0	100.0	7.0	60	0.4
NE1005E-20	21	18.0	1.0	C	37.8	6.0	4.8	70	0.5 to 1.0
NE1010E-20	21	18.0	1.0	C	40.0	11.2	4.0	65	0.5 to 1.0
NEM1706B-20	94	20.0	1.65	C	38.5	7.1	8.5	54	1.5 to 1.7
NEM1712B-20	94	20.0	1.65	C	41.5	14.0	8.5	54	1.5 to 1.7
NEM1725B-20	94	20.0	1.65	C	44.0	25.1	8.0	50	1.5 to 1.7
NEM2003B-20	94	20.0	1.9	C	34.7	3.0	8.7	45	1.7 to 2.0
NEM2010B-20	94	20.0	1.9	C	40.2	10.5	7.2	45	1.7 to 2.0
NEM2015B-20	94	20.0	1.9	C	41.7	14.8	6.7	45	1.7 to 2.0
NEM2305B-20	94	20.0	2.2	C	37.5	5.6	7.5	50	1.8 to 2.2
NEM2310B-20	94	20.0	2.2	C	40.5	11.2	7.5	50	1.8 to 2.2
NEM2701B-20	94	20.0	2.7	C	32.5	1.8	9.5	40	2.3 to 2.7
NEM2703B-20	94	20.0	2.7	C	35.5	3.5	8.5	40	2.3 to 2.7
NEM2705B-20	94	20.0	2.7	C	37.5	5.6	7.5	40	2.3 to 2.7
NEM2708B-20	94	20.0	2.7	C	39.5	8.9	6.5	40	2.3 to 2.7
NE300100	CHIP	20.0	3.0	C	33.0	2.0	10.0	35	1.0 to 3.4
NE3001B-20	53B	20.0	3.0	C	33.0	2.0	10.0	35	1.7 to 3.4
NE300157B-20	57B	20.0	3.0	C	33.0	2.0	10.0	35	1.7
NE300300	CHIP	20.0	3.0	C	35.0	3.2	8.0	32	1.0
NE3003B-20	53B	20.0	3.0	C	35.0	3.2	8.0	32	1.7
NE300357B-20	57B	20.0	3.0	C	35.0	3.2	8.0	32	1.7
NE3005B-20	53B	20.0	3.0	C	37.3	5.4	6.3	28	1.7
NE300557B-20	57B	20.0	3.0	C	37.3	5.4	6.3	28	1.7
NEM3001B-20	94	20.0	3.0	C	35.5	3.5	8.5	37	2.7
NEM3003B-20	94	20.0	3.0	C	35.5	3.5	8.5	37	2.7
NEM3005B-20	94	20.0	3.0	C	37.5	5.6	7.8	36	2.7
NEM3008B-20	94	20.0	3.0	C	39.5	8.9	6.5	35	2.7
NEM3501B-20	94	20.0	3.5	C	32.0	1.6	9.0	36	3.1
NEM3503B-20	94	20.0	3.5	C	35.5	3.5	7.5	36	3.1
NEM3505B-20	94	20.0	3.5	C	37.5	5.6	6.5	33	3.1
NEM3508B-20	94	20.0	3.5	C	39.0	8.9	5.0	33	3.1
NE420100	CHIP	20.0	4.2	C	32.0	1.6	8.0	30	2.0
NE4201B-20	53B	20.0	4.2	C	32.0	1.6	8.0	30	3.0
NE420157B-20	57B	20.0	4.2	C	32.0	1.6	8.0	30	3.0
NE4203B-20	53B	20.0	4.2	C	35.0	3.2	5.0	30	3.0
NE420357B-20	57B	20.0	4.2	C	35.0	3.2	5.0	30	3.0
NEM4201B-20	94	20.0	4.2	C	32.0	1.6	8.0	30	3.7
NEM4203B-20	94	20.0	4.2	C	35.0	3.2	5.0	30	3.7
NEM4205B-20	94	20.0	4.2	C	37.0	5.0	4.0	25	3.7

Note:

1. NEM series has internal matching



Additional Small Signal and Medium Power Silicon Bipolar Products

T-33-01
T-31-01

N E C/ CALIFORNIA

15E D ■ 6427414 0001517 6 ■

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PART NUMBER	PACKAGE CODE	ABSOLUTE MAXIMUM RATINGS				ELECTRICAL CHARACTERISTICS				
		V _{CEO} (V)	I _C (mA)	P _T (W)	T _{STG} °(C)	h _{FE}			C _{CB}	
						V _{CE} (V)	I _C (mA)	TYP	V _{CB} (V)	(pF) TYP
NE32700	CHIP	12	50		-65 to +200	5	10	100	5	0.9
NE32702	02	12	50	0.30	-65 to +200	5	10	100	5	0.9
NE32708	08	12	50	0.30	-65 to +200	5	10	100	5	0.9
NE32740A	40A	12	50	0.30	-65 to +200	5	10	100	5	1.1
NE32740B	40B	12	50	0.30	-65 to +200	5	10	100	5	1.1
NE46700	CHIP	18	150			10	50	100	10	1.1
NE46734	34	18	150	2.00	-65 to +150	10	50	100	10	1.1
NE59300	CHIP	-12	30			-10	10	60	-10	0.9
NE99532	32	18	250	0.60	-55 to +150	10	50	60	10	3.0

PART NUMBER	PACKAGE CODE	PERFORMANCE SPECIFICATIONS										
		f _T			S _{21E} ²		MAG (dB)	NF _{OPT}				G _A (dB)
		V _{CE} (V)	I _C (mA)	(GHz)	f (GHz)	(dB)		V _{CE} (V)	I _C (mA)	f (GHz)	(dB)	
				TYP		TYP	TYP				TYP	TYP
NE32700	CHIP	5	15	3.0	1.0		13	5	3	0.07	1.0	
NE32702	02	5	15	3.0	1.0	10	13	5	3	1.0	3.5	8.0
NE32708	08	5	15	3.0	1.0	10	13	5	3	1.0	3.4	8.0
NE32740A	40A	5	15	3.0			5					
NE32740B	40B	5	15	3.0								
NE46700	CHIP	10	50	4.0				10	30	0.5	2.4	12.0
NE46734	34	10	50	4.0	0.5	12.5		10	30	0.5	2.4	12.0
NE59300	CHIP	-10	10	2.5	1.0		7	-10	3	0.5	3.0	
									P _{OUT}			(dBm)
									V _{CE} (V)	P _{IN} (dBm)	f (GHz)	
												TYP
NE99532	32	10	50	2.5	0.5	9.5	15		12.6	15	0.5	25