

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

PART NUMBER EIAJ ¹ REGISTERED NUMBER PACKAGE OUTLINE			NE02100 00 (CHIP)			NE02107 07/07B ³		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX
f _T	Gain Bandwidth Product at V _{CE} = 10 V, I _C = 20 mA	GHz		4.5			4.5	
S ₂₁ ²	Insertion Power Gain at V _{CE} = 10 V, I _C = 20 mA, f = 0.5 GHz f = 1 GHz f = 2 GHz	dB dB dB	5.5	18.5 13 6.5		5.5	18.5 13 6.5	
NF _{MIN}	Minimum Noise Figure ² at V _{CE} = 10 V, I _C = 3 mA, f = 0.5 GHz V _{CE} = 10 V, I _C = 5 mA, f = 2 GHz	dB dB		1.5 2.7	4.5		1.5 2.7	4.5
I _{CBO}	Collector Cutoff Current at V _{CB} = 15 V, I _E = 0	μA			1.0			1.0
I _{EBO}	Emitter Cutoff Current at V _{EB} = 2 V, I _C = 0	μA			1.0			1.0
h _{FE}	Forward Current Gain at V _{CE} = 10 V, I _C = 20 mA		20	70	250	20	70	250
C _{CB}	Collector to Base Capacitance ⁴ at V _{CB} = 10 V, I _E = 0, f = 1 MHz	pF		0.6	1.0		0.6	1.0
R _{TH} (J-C)	Thermal Resistance (Junction to Case)	°C/W			70			90
R _{TH} (J-A)	Thermal Resistance (Junction to Ambient)	°C/W						500
P _T ⁵	Total Power Dissipation	mW	580		700	350		700

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

PART NUMBER EIAJ ¹ REGISTERED NUMBER PACKAGE OUTLINE			NE02133 2SC2351 33			NE02135 2SC2149 35			NE02139 2SC4092 39		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
f _T	Gain Bandwidth Product at V _{CE} = 10 V, I _C = 20 mA	GHz		4.5			4.5			4.5	
S _{21E} ²	Insertion Power Gain at V _{CE} = 10 V, I _C = 20 mA, f = 0.5 GHz f = 1 GHz f = 2 GHz	dB dB dB	9 4	15 10 5		5	18.5 13 5.7		9	10	
NF _{MIN}	Minimum Noise Figure ⁶ at V _{CE} = 10 V, I _C = 3 mA, f = 0.5 GHz V _{CE} = 10 V, I _C = 5 mA, f = 1 GHz f = 2 GHz	dB dB dB		1.5	3		1.5 2.7	4.0		1.5	
I _{CBO}	Collector Cutoff Current at V _{CB} = 15 V, I _E = 0	μA			1.0			1.0			1.0
I _{EBO}	Emitter Cutoff Current at V _{EB} = 2 V, I _C = 0	μA			1.0			1.0			1.0
h _{FE}	Forward Current Gain at V _{CE} = 10 V, I _C = 20 mA		40	70	200	20	70	250	40	70	200
C _{CB}	Collector to Base Capacitance ⁴ at V _{CB} = 10 V, I _E = 0, f = 1 MHz	pF		0.75	1.0		0.6	1.0		.75	
R _{TH} (J-C)	Thermal Resistance (Junction to Case)	°C/W						120			
R _{TH} (J-A)	Thermal Resistance (Junction to Ambient)	°C/W			666			600			500
P _T ⁵	Total Power Dissipation	mW			150	290		500			200

Notes:

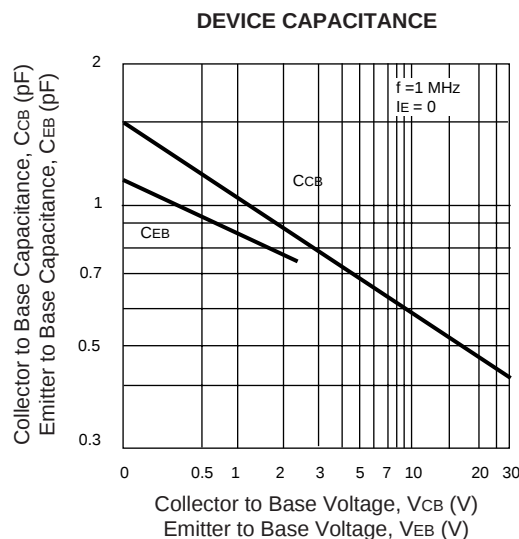
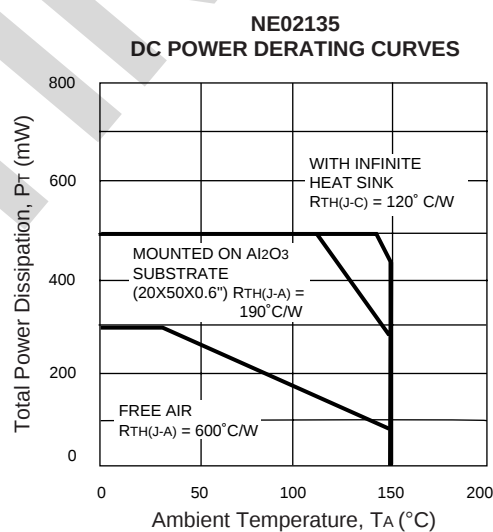
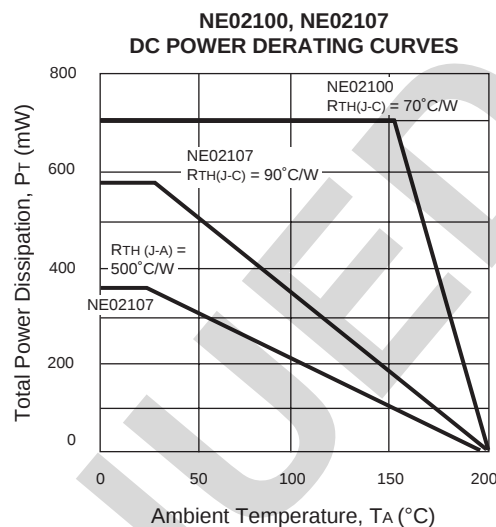
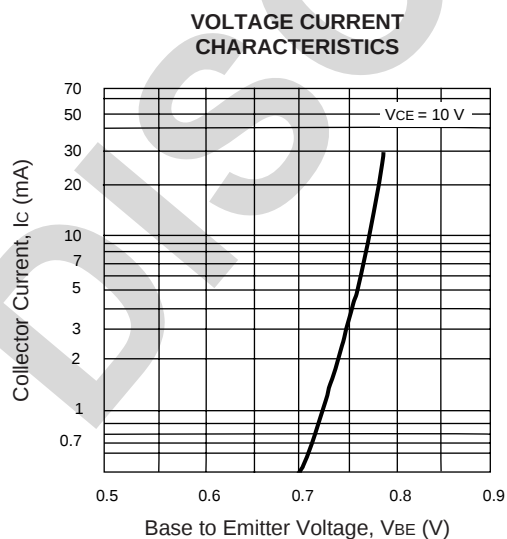
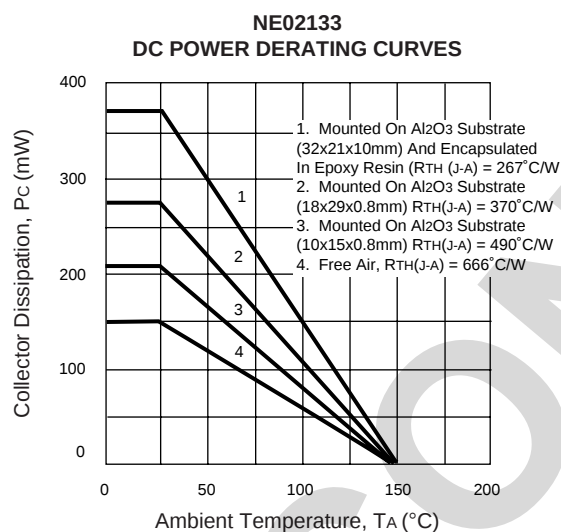
- Electronic Industrial Association of Japan.
- Input and output are tuned for optimum noise figures.
- Common base electrical characteristics see S-Parameters.
- C_{CB} measurement employs a three-terminal capacitance bridge incorporating a guard circuit. The emitter terminal shall be connected to the guard terminal.
- Minimum dissipations based on R_{TH} (J-A) for applications without effective heat sink, maximum dissipations based on R_{TH} (J-C) for applications with effective heat sink.
- Output and Input are tuned for minimum noise figure.

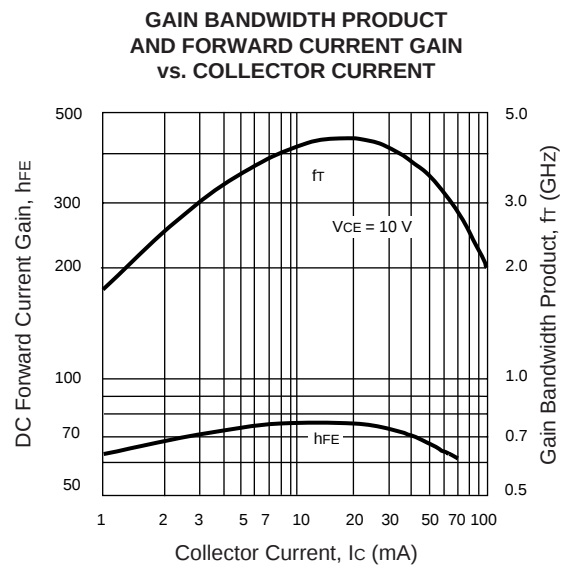
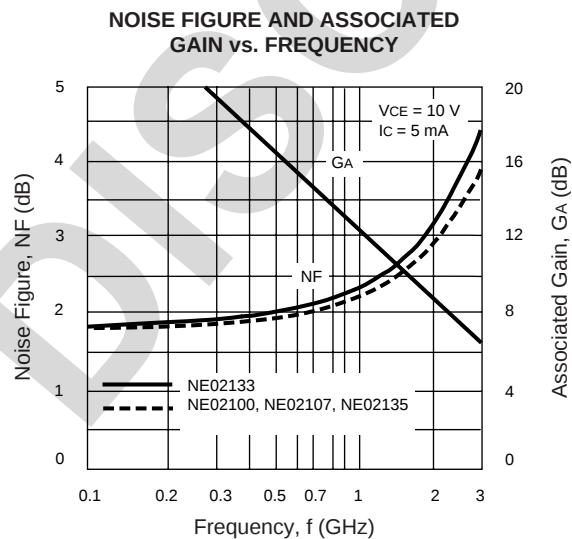
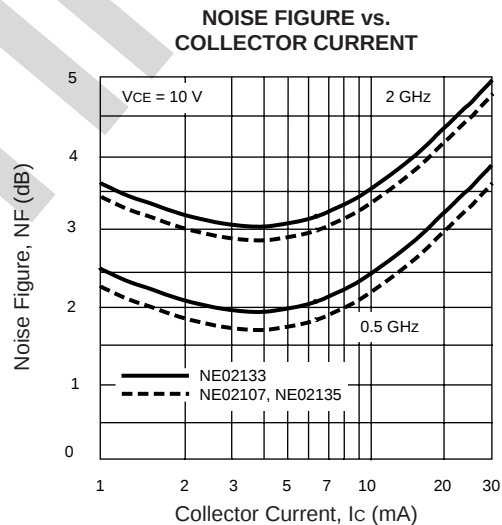
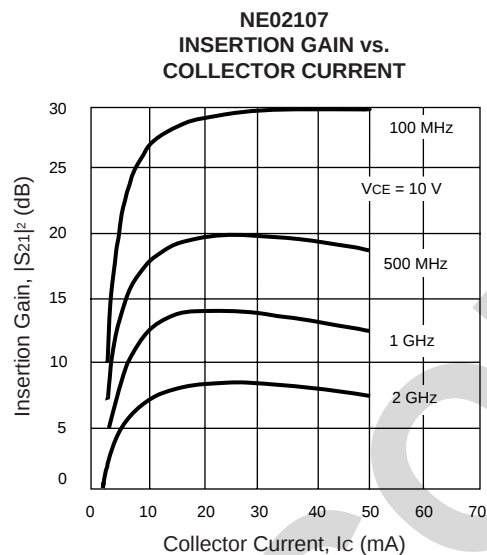
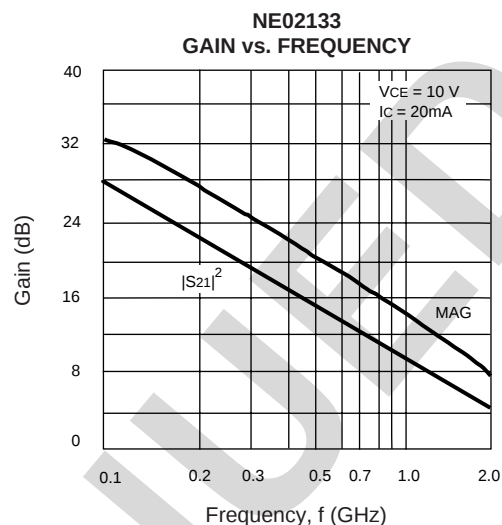
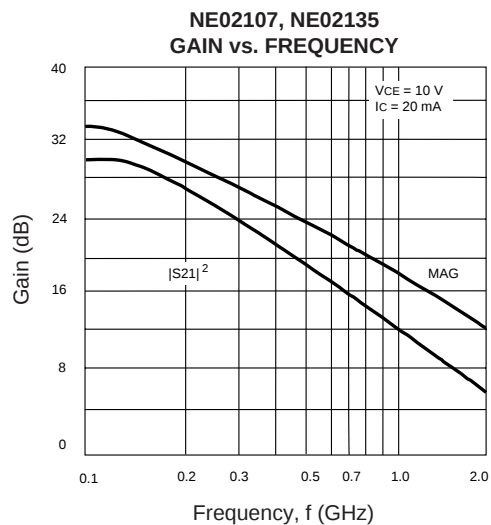
ABSOLUTE MAXIMUM RATINGS¹ ($T_A = 25^\circ\text{C}$)

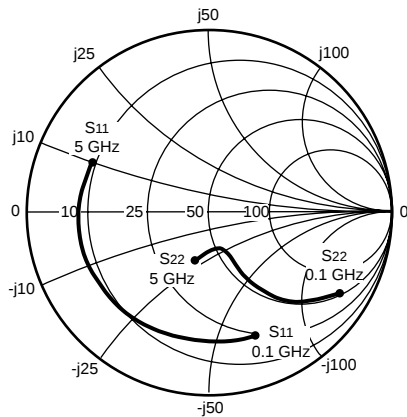
SYMBOLS	PARAMETERS	UNITS	RATINGS
V_{CB0}	Collector to Base Voltage	V	25
V_{CE0}	Collector to Emitter Voltage	V	12 ²
V_{EB0}	Emitter to Base Voltage	V	3
I_C	Collector Current	mA	70
T_J	Junction Temperature	$^\circ\text{C}$	200 ³
T_{STG}	Storage Temperature	$^\circ\text{C}$	-65 to +200 ⁴

Notes:

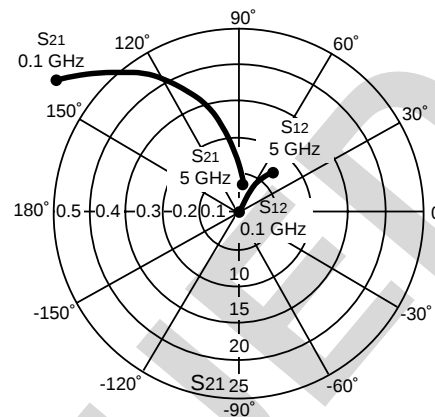
- Operation in excess of any one of these parameters may result in permanent damage.
- Typical $BV_{CE0} = 25\text{ V}$ for $R \leq 300\ \Omega$.
- Maximum T_J for the NE02133 and NE02139 is $+150^\circ\text{C}$.
- Maximum storage temperature for the NE02135 is -65 to $+150^\circ\text{C}$. Maximum storage temperature for the NE02133 and NE02139 is -55 to 150°C .

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

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

TYPICAL COMMON EMITTER SCATTERING PARAMETERS¹ ($T_A = 25^\circ\text{C}$)

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



NE02100

 $V_{CE} = 10\text{ V}$, $I_C = 5\text{ mA}$

FREQUENCY (MHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG ² (dB)
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG		
100	.84	-32	11.83	160	.03	70	.94	-16	.11	26.4
500	.75	-114	7.22	113	.07	36	.56	-45	.29	19.9
1000	.73	-150	4.13	89	.09	27	.39	-51	.54	16.9
1500	.71	-164	2.85	76	.09	27	.36	-56	.77	15.0
2000	.71	-173	2.16	66	.10	28	.33	-61	.97	13.5
2500	.71	-179	1.75	57	.10	30	.33	-67	1.14	10.1
3000	.70	176	1.49	49	.11	32	.34	-73	1.25	8.3
3500	.70	172	1.28	42	.12	33	.35	-80	1.35	6.9
4000	.70	168	1.13	34	.12	34	.37	-88	1.41	5.9
4500	.70	165	1.02	27	.13	34	.39	-94	1.47	4.9
5000	.70	161	.92	20	.14	35	.41	-100	1.49	4.2

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

FREQUENCY (MHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG ² (dB)
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG		
100	.75	-47	20.04	153	.02	65	.89	-24	.11	29.2
500	.72	-137	9.40	105	.05	34	.41	-57	.39	22.5
1000	.72	-162	4.97	86	.06	34	.27	-62	.69	19.0
1500	.71	-173	3.37	75	.07	38	.23	-66	.92	16.8
2000	.71	-179	2.56	66	.08	41	.22	-71	1.09	13.2
2500	.71	176	2.05	58	.09	43	.23	-76	1.19	10.9
3000	.71	172	1.74	51	.10	44	.24	-82	1.27	9.2
3500	.71	168	1.50	44	.11	44	.25	-88	1.31	7.9
4000	.70	165	1.33	37	.12	44	.27	-95	1.36	6.8
4500	.70	162	1.19	30	.13	44	.29	-100	1.39	5.9
5000	.70	159	1.08	24	.14	43	.31	-106	1.39	5.1

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

FREQUENCY (MHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG ² (dB)
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG		
100	.68	-70	29.75	145	.02	59	.81	-33	.14	31.6
500	.72	-152	10.58	99	.04	37	.30	-65	.53	24.3
1000	.72	-170	5.42	84	.05	43	.19	-69	.87	20.4
1500	.72	-178	3.65	74	.06	48	.17	-73	1.05	16.4
2000	.72	177	2.74	66	.07	50	.17	-78	1.17	13.2
2500	.72	172	2.21	58	.09	51	.17	-83	1.23	11.3
3000	.71	169	1.86	51	.10	52	.19	-87	1.27	9.7
3500	.71	166	1.61	44	.11	51	.20	-93	1.30	8.4
4000	.71	162	1.42	38	.12	51	.22	-99	1.34	7.3
4500	.71	160	1.28	31	.13	49	.24	-105	1.33	6.4
5000	.71	157	1.15	25	.14	48	.27	-109	1.34	5.6

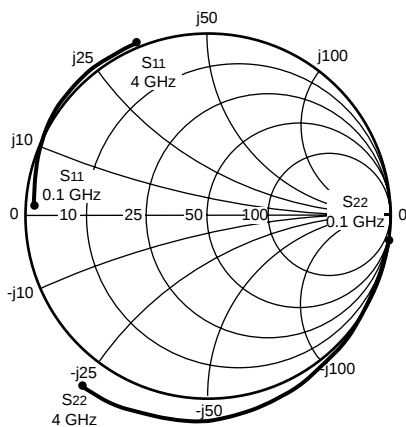
Notes:

1. S-Parameters include bond wires.

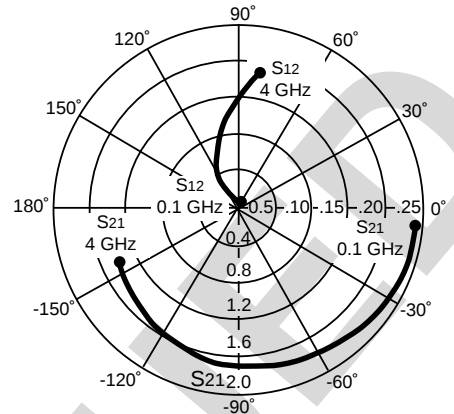
BASE: Total 1 wire (s), 1 per bond pad, 0.0115 (291 μm) long each wire. EMITTER: Total 2 wire (s), 1 per side, 0.015" (393 μm) long each wire.
 COLLECTOR: Total 1 wire (s), 1 per bond pad, 0.0072" (182 μm) long each wire. WIRE: 0.0007" (17.7 μm) dia., gold.

2. Gain Calculations:

$$\text{MAG} = \frac{|S_{21}|}{|S_{12}|} \left(K \pm \sqrt{K^2 - 1} \right). \text{ When } K \leq 1, \text{ MAG is undefined and MSG values are used. } \text{MSG} = \frac{|S_{21}|}{|S_{12}|}, K = \frac{1 + |\Delta|^2 - |S_{11}|^2 - |S_{22}|^2}{2 |S_{12}| |S_{21}|}, \Delta = S_{11} S_{22} - S_{21} S_{12}$$

TYPICAL COMMON BASE SCATTERING PARAMETERS (T_A = 25°C)

Coordinates in Ohms
Frequency in GHz
(V_{CB} = 10 V, I_c = 20 mA)



NE02107B

V_{CB} = 10 V, I_c = 5 mA

FREQUENCY	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG ¹
(MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG		(dB)
100	.79	175	1.77	-10	.01	106	1.01	-9	-0.477	22.480
500	.79	170	1.78	-24	.01	111	1.02	-22	-0.808	22.504
1000	.79	163	1.72	-44	.01	117	1.05	-40	-1.645	22.355
1500	.83	157	1.71	-64	.03	109	1.09	-58	-1.076	17.559
2000	.83	149	1.57	-87	.06	106	1.09	-75	-0.782	14.177
2500	.87	145	1.53	-99	.08	103	1.08	-81	-0.574	12.816
3000	.87	136	1.40	-122	.11	95	1.11	-96	-0.484	11.047
3500	.87	126	1.21	-140	.13	86	1.10	-111	-0.427	9.688
4000	.86	117	1.12	-164	.17	76	1.08	-125	-0.180	8.188

V_{CB} = 10 V, I_c = 10 mA

100	.88	177	1.84	-6	.01	-31	1.01	-6	0.671	22.648
500	.88	171	1.84	-19	.01	112	1.00	-18	-0.431	22.648
1000	.87	164	1.83	-38	.01	132	1.05	-36	-1.429	22.625
1500	.90	159	1.82	-57	.03	118	1.08	-53	-0.950	17.830
2000	.92	152	1.72	-76	.06	117	1.10	-69	-0.857	14.574
2500	.95	144	1.68	-92	.08	108	1.09	-81	-0.707	13.222
3000	.96	135	1.57	-113	.12	98	1.13	-96	-0.601	11.167
3500	.96	125	1.45	-135	.15	88	1.12	-111	-0.458	9.853
4000	.95	116	1.33	-156	.18	77	1.10	-126	-0.317	8.686

V_{CB} = 10 V, I_c = 20 mA

100	.92	176	1.90	-6	.01	56	1.02	-6	0.315	22.788
500	.93	171	1.89	-19	.01	139	1.01	-18	-0.850	22.765
1000	.92	164	1.89	-37	.01	129	1.05	-36	-1.189	22.765
1500	.96	159	1.88	-55	.03	126	1.09	-53	-0.960	17.970
2000	.97	152	1.81	-75	.06	119	1.10	-69	-0.832	14.795
2500	1.01	142	1.75	-90	.09	110	1.09	-80	-0.727	12.888
3000	1.02	132	1.67	-110	.12	100	1.13	-95	-0.658	11.435
3500	1.03	121	1.55	-132	.15	89	1.13	-110	-0.532	10.142
4000	1.02	112	1.42	-154	.18	79	1.12	-125	-0.388	8.970

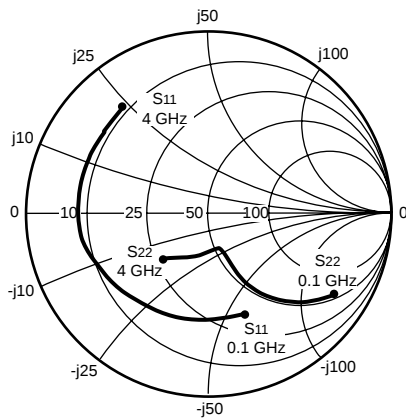
V_{CB} = 10 V, I_c = 40 mA

100	.95	176	1.93	-7	.01	-74	1.02	-7	0.239	22.856
600	.94	171	1.91	-20	.01	116	1.01	-19	-0.583	22.810
1000	.94	163	1.91	-38	.01	133	1.05	-36	-1.140	22.810
1500	.98	158	1.90	-57	.03	126	1.09	-53	-0.901	18.016
2000	.99	151	1.83	-77	.06	119	1.10	-69	-0.798	14.843
2500	1.04	141	1.81	-92	.09	111	1.09	-81	-0.727	13.034
3000	1.05	132	1.72	-115	.12	100	1.13	-97	-0.591	11.563
3500	1.05	120	1.58	-136	.15	88	1.13	-113	-0.502	10.226
4000	1.03	111	1.46	-157	.18	77	1.10	-127	-0.341	9.091

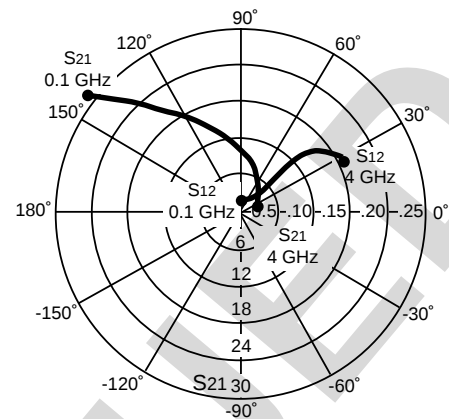
Note:

1. Gain Calculations:

$$\text{MAG} = \frac{|S_{21}|}{|S_{12}|} \left(K \pm \sqrt{K^2 - 1} \right). \text{ When } K \leq 1, \text{ MAG is undefined and MSG values are used. } \text{MSG} = \frac{|S_{21}|}{|S_{12}|}, K = \frac{1 + |\Delta|^2 - |S_{11}|^2 - |S_{22}|^2}{2 |S_{12} S_{21}|}, \Delta = S_{11} S_{22} - S_{21} S_{12}$$

TYPICAL COMMON EMITTER SCATTERING PARAMETERS ($T_A = 25^\circ\text{C}$)

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



NE02107

 $V_{CE} = 10\text{ V}$, $I_C = 5\text{ mA}$

FREQUENCY	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG ¹
(MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG		(dB)
100	.82	-36	13.90	157	.01	73	.95	-16	0.022	31.430
500	.70	-125	7.38	107	.07	35	.54	-47	0.345	20.230
1000	.68	-161	4.17	82	.08	25	.39	-59	0.628	17.170
1500	.68	-178	2.87	66	.09	24	.38	-68	0.783	15.036
2000	.68	170	2.18	53	.10	26	.37	-78	0.928	13.385
2500	.67	159	1.73	40	.11	22	.38	-90	1.081	10.227
3000	.67	151	1.49	28	.12	23	.40	-102	1.116	8.867
3500	.68	142	1.27	17	.13	19	.43	-112	1.119	7.802
4000	.68	134	1.16	6	.14	17	.45	-122	1.101	7.249

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

100	.69	-54	22.57	150	.01	69	.89	-23	0.085	33.535
500	.67	-145	9.37	100	.05	36	.39	-58	0.489	22.728
1000	.67	-172	5.00	79	.06	36	.27	-70	0.821	19.208
1500	.67	175	3.40	65	.08	37	.26	-77	0.907	16.284
2000	.67	165	2.57	53	.09	40	.25	-87	1.071	12.933
2500	.67	15	2.07	41	.11	35	.28	-97	1.052	11.355
3000	.67	146	1.80	30	.12	34	.31	-108	1.074	10.096
3500	.67	137	1.53	20	.14	30	.34	-116	1.046	9.080
4000	.67	130	1.41	8	.15	23	.36	-125	1.023	8.803

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

100	.58	-79	31.63	142	.01	65	.81	-32	0.170	35.001
500	.67	-161	10.57	95	.03	45	.28	-68	0.774	25.470
1000	.67	179	5.47	77	.04	46	.19	-78	1.205	18.622
1500	.67	168	3.70	64	.07	46	.19	-84	1.041	15.998
2000	.67	159	2.78	53	.09	48	.20	-96	1.077	13.207
2500	.67	150	2.26	42	.11	44	.23	-105	1.058	11.658
3000	.68	142	1.96	31	.12	39	.25	-114	1.063	10.601
3500	.67	134	1.68	21	.14	36	.28	-122	1.065	9.238
4000	.68	127	1.53	9	.16	27	.31	-128	0.947	9.806

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

100	.55	-96	35.99	137	.01	63	.75	-37	0.236	35.562
500	.67	-167	10.79	93	.02	48	.24	-69	1.157	24.914
1000	.68	176	5.52	75	.04	53	.17	-77	1.192	18.752
1500	.68	166	3.75	63	.07	52	.17	-83	1.028	16.271
2000	.68	158	2.81	52	.09	53	.18	-96	1.065	13.383
2500	.68	148	2.26	41	.11	46	.21	-106	1.057	11.669
3000	.68	141	1.96	30	.13	42	.24	-115	1.008	11.227
3500	.68	133	1.66	20	.14	38	.27	-123	1.066	9.175
4000	.68	126	1.51	9	.16	29	.30	-131	0.984	9.749

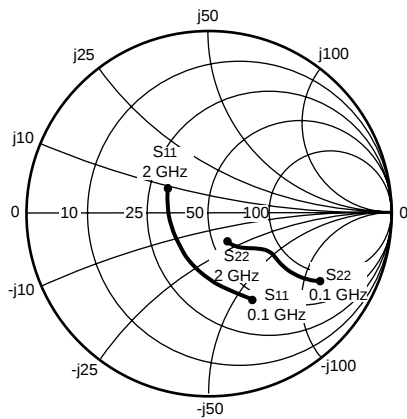
Note:

1. Gain Calculations:

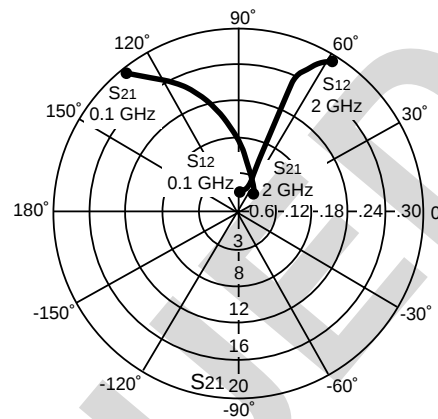
$$\text{MAG} = \frac{|S_{21}|}{|S_{12}|} \left(K \pm \sqrt{K^2 - 1} \right). \text{ When } K \leq 1, \text{ MAG is undefined and MSG values are used. } \text{MSG} = \frac{|S_{21}|}{|S_{12}|}, K = \frac{1 + |\Delta|^2 - |S_{11}|^2 - |S_{22}|^2}{2 |S_{12} S_{21}|}, \Delta = S_{11} S_{22} - S_{21} S_{12}$$

NE021 SERIES

TYPICAL COMMON EMITTER SCATTERING PARAMETERS (T_A = 25°C)



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



NE02133

V_{CE} = 10 V, I_C = 5 mA

FREQUENCY (MHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG ¹ (dB)
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG		
100	.80	-37	13.53	150	.03	73	.91	-18	0.178	26.542
200	.63	-63	10.48	129	.04	59	.72	-29	0.477	24.183
500	.37	-114	5.56	99	.09	61	.48	-38	0.795	17.908
1000	.27	-158	3.02	76	.15	60	.40	-41	0.988	13.039
1500	.27	172	2.16	63	.21	63	.34	-49	1.039	8.914
2000	.29	151	1.74	49	.27	58	.31	-62	1.031	7.022

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

100	.66	-48	19.53	139	.02	79	.81	-27	0.235	29.897
200	.46	-78	13.52	118	.03	58	.58	-35	0.761	26.539
500	.27	-129	6.29	93	.09	67	.38	-36	0.900	18.444
1000	.21	-169	3.31	74	.16	66	.34	-40	0.993	13.157
1500	.23	165	2.35	62	.23	64	.29	-47	1.007	9.593
2000	.26	146	1.87	50	.29	59	.26	-62	1.011	7.438

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

100	.51	-61	19.37	129	.02	79	.70	-32	0.497	29.861
200	.33	-91	15.04	109	.03	64	.48	-35	0.909	27.001
500	.21	-143	6.57	89	.08	71	.33	-32	1.010	18.522
1000	.19	-177	3.41	72	.16	69	.32	-37	1.005	12.847
1500	.21	160	2.41	61	.24	67	.26	-45	1.006	9.524
2000	.24	142	1.92	49	.30	59	.23	-59	1.013	7.369

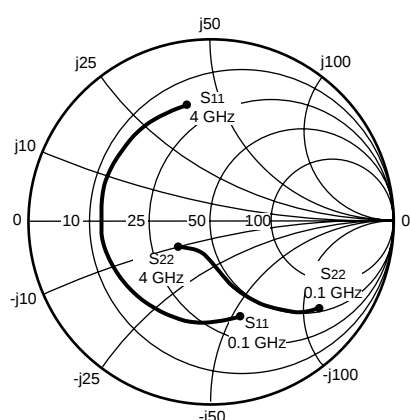
Note:

1. Gain Calculations:

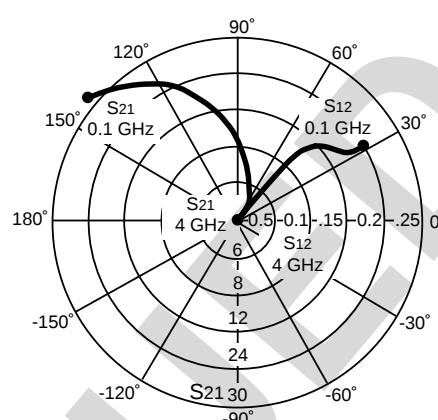
$$\text{MAG} = \frac{|S_{21}|}{|S_{12}|} \left(K \pm \sqrt{K^2 - 1} \right). \text{ When } K \leq 1, \text{ MAG is undefined and MSG values are used. } \text{MSG} = \frac{|S_{21}|}{|S_{12}|}, K = \frac{1 + |\Delta|^2 - |S_{11}|^2 - |S_{22}|^2}{2 |S_{12} S_{21}|}, \Delta = S_{11} S_{22} - S_{21} S_{12}$$

MAG = Maximum Available Gain

MSG = Maximum Stable Gain

TYPICAL COMMON EMITTER SCATTERING PARAMETERS ($T_A = 25^\circ\text{C}$)

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



NE02135

 $V_{CE} = 10\text{ V}$, $I_C = 5\text{ mA}$

FREQUENCY (MHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG ¹ (dB)
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG		
100	.84	-36	13.82	156	.02	73	.94	-18	0.023	28.395
500	.68	-126	7.18	106	.08	35	.51	-53	0.368	19.530
1000	.66	-163	4.02	81	.09	27	.34	-66	0.664	16.500
1500	.65	178	2.75	64	.10	27	.31	-74	0.890	14.393
2000	.65	163	2.10	52	.12	30	.31	-83	0.960	12.430
2500	.66	151	1.68	39	.13	26	.31	-95	1.075	9.441
3000	.66	141	1.46	27	.14	26	.33	-106	1.125	8.030
3500	.67	129	1.24	17	.16	26	.36	-116	1.099	6.974
4000	.68	121	1.14	5	.17	23	.38	-127	1.069	6.656

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

100	0.666	-50	23.536	149	0.004	65	0.854	-28	0.634	37.697
500	0.592	-147	9.285	99	0.033	39	0.363	-72	0.859	24.493
1000	0.604	-179	4.955	77	0.051	39	0.276	-82	1.128	17.700
1500	0.595	163	3.288	63	0.073	39	0.240	-87	1.172	14.054
2000	0.609	152	2.527	46	0.109	36	0.195	-104	1.138	11.397
2500	0.615	139	2.022	39	0.132	41	0.204	-115	1.180	9.287
3000	0.632	126	1.726	28	0.152	38	0.212	-125	1.168	8.071
3500	0.642	114	1.439	12	0.175	27	0.233	-135	1.155	6.763
4000	0.649	104	1.315	5	0.199	27	0.256	-144	1.113	6.156

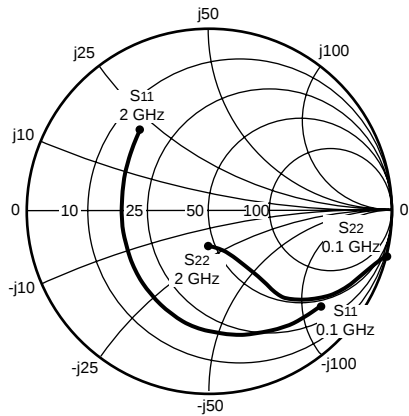
 $V_{CE} = 10\text{ V}$, $I_C = 20\text{ mA}$

100	0.545	-74	32.448	140	0.002	67	0.763	-38	1.982	36.428
500	0.593	-163	10.200	94	0.020	46	0.270	-80	1.428	23.189
1000	0.602	173	5.276	75	0.040	49	0.217	-89	1.445	17.244
1500	0.605	158	3.505	61	0.072	50	0.188	-93	1.210	14.212
2000	0.616	148	2.718	46	0.108	44	0.161	-110	1.115	11.942
2500	0.623	135	2.159	39	0.133	48	0.176	-120	1.142	9.815
3000	0.639	123	1.841	29	0.156	43	0.188	-128	1.110	8.698
3500	0.644	111	1.549	13	0.180	32	0.210	-135	1.094	7.477
4000	0.649	102	1.411	6	0.205	32	0.232	-142	1.060	6.881

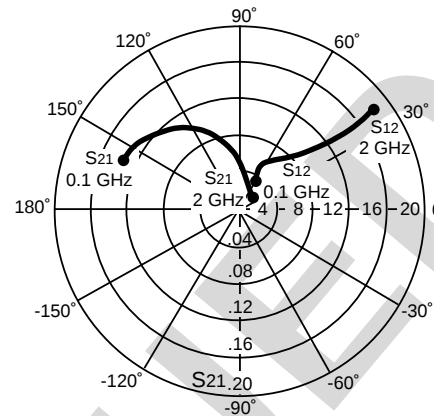
 $V_{CE} = 10\text{ V}$, $I_C = 30\text{ mA}$

100	.58	-95	35.35	134	.01	59	.72	-40	0.275	35.484
500	.64	-169	10.11	91	.03	50	.22	-82	0.958	25.276
1000	.65	173	5.15	74	.06	55	.14	-97	1.016	18.563
1500	.65	162	3.49	62	.08	63	.14	-103	1.103	14.446
2000	.66	152	2.63	52	.11	54	.15	-112	1.058	12.315
2500	.66	141	2.10	39	.13	46	.17	-122	1.095	10.207
3000	.66	132	1.82	29	.15	42	.19	-129	1.086	9.052
3500	.67	122	1.54	20	.17	38	.22	-137	1.089	7.748
4000	.68	115	1.44	9	.20	31	.24	-146	0.970	8.573

See note on next page.

TYPICAL COMMON EMITTER SCATTERING PARAMETERS (T_A = 25°C)

Coordinates in Ohms
Frequency in GHz
(V_{CE} = 10 V, I_C = 5 mA)



NE02139

V_{CE} = 10 V, I_C = 5 mA

FREQUENCY (MHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG ¹ (dB)
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG		
100	.78	-39	13.96	156	.027	63	.91	-21	0.167	27.135
200	.71	-74	11.81	131	.058	62	.77	-36	0.329	21.430
400	.57	-114	7.51	107	.081	42	.54	-50	0.563	18.797
600	.50	-143	5.68	93	.093	39	.42	-56	0.738	16.985
800	.49	-164	4.16	72	.104	37	.35	-59	0.860	15.398
1000	.49	-180	3.50	81	.117	37	.30	-63	0.938	14.105
1200	.51	168	2.83	55	.129	37	.27	-66	0.977	12.978
1400	.52	160	2.59	63	.144	36	.25	-73	1.017	11.247
1600	.53	150	2.19	49	.155	38	.22	-79	1.046	9.850
1800	.53	142	2.09	42	.173	36	.21	-88	1.059	8.908
2000	.56	135	1.79	36	.181	36	.19	-98	1.096	8.065

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

100	.63	-58	20.38	145	.025	58	.81	-31	0.267	29.113
200	.56	-98	15.27	119	.039	60	.61	-45	0.534	23.790
400	.47	-139	8.90	98	.062	44	.39	-57	0.773	20.566
600	.45	-164	6.48	87	.073	50	.30	-60	0.912	18.320
800	.45	180	4.66	76	.091	49	.25	-63	0.984	16.309
1000	.47	168	3.89	69	.109	50	.21	-68	1.023	13.826
1200	.48	157	3.13	61	.126	48	.18	-71	1.038	12.288
1400	.50	152	2.86	54	.143	44	.17	-80	1.044	11.116
1600	.51	143	2.41	48	.160	46	.14	-88	1.045	10.104
1800	.52	136	2.30	42	.181	42	.14	-99	1.048	9.263
2000	.54	130	1.97	36	.191	41	.12	-113	1.084	8.371

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

100	.53	-82	25.86	136	.021	35	.72	-41	0.435	30.904
200	.47	-121	17.23	110	.033	61	.48	-51	0.711	25.017
400	.43	-157	9.44	92	.051	50	.30	-58	0.905	21.298
600	.44	-177	6.74	83	.069	57	.23	-60	0.971	18.616
800	.45	170	4.82	74	.090	55	.20	-61	1.024	15.561
1000	.46	161	4.01	67	.107	54	.16	-66	1.044	13.619
1200	.48	152	3.23	39	.127	54	.14	-71	1.028	12.483
1400	.50	147	2.95	53	.149	50	.13	-80	1.035	11.252
1600	.51	139	2.48	47	.164	50	.10	-91	1.038	10.206
1800	.52	133	2.36	41	.187	45	.10	-104	1.030	9.506
2000	.55	127	2.02	36	.197	44	.09	-121	1.055	8.680

Note:

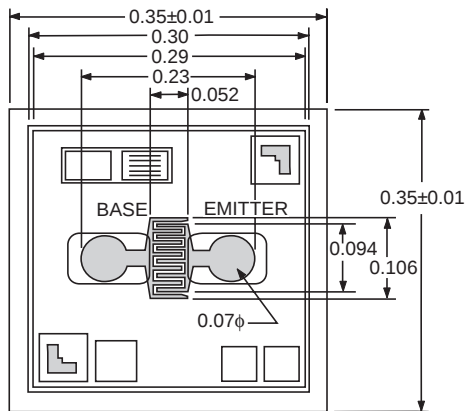
1. Gain Calculations:

$$\text{MAG} = \frac{|S_{21}|}{|S_{12}|} \left(K \pm \sqrt{K^2 - 1} \right). \text{ When } K \leq 1, \text{ MAG is undefined and MSG values are used. } \text{MSG} = \frac{|S_{21}|}{|S_{12}|}, K = \frac{1 + |\Delta|^2 - |S_{11}|^2 - |S_{22}|^2}{2 |S_{12} S_{21}|}, \Delta = S_{11} S_{22} - S_{21} S_{12}$$

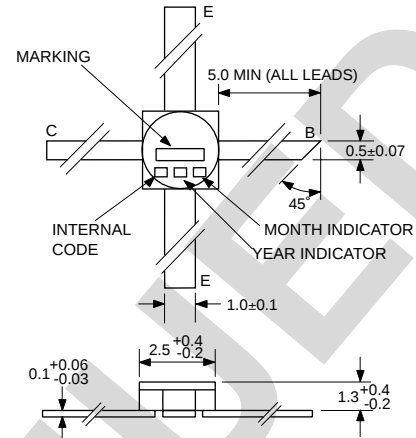
MAG = Maximum Available Gain, MSG = Maximum Stable Gain

OUTLINE DIMENSIONS (Units in mm)

NE02100 (CHIP)

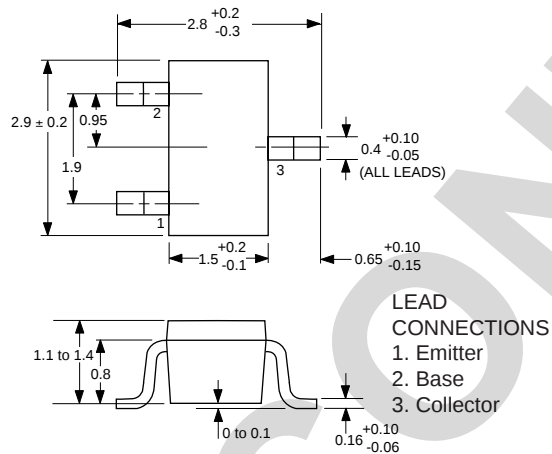
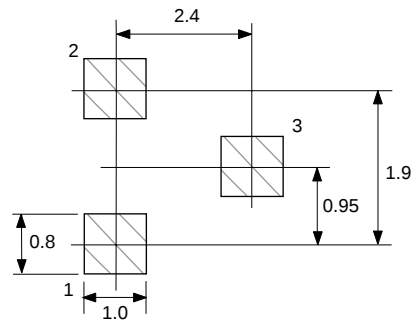


PACKAGE OUTLINE 07

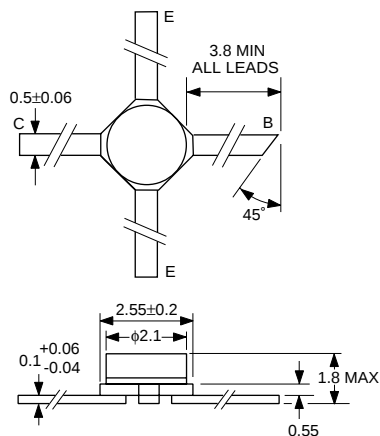


*07B has emitter and base reversed..

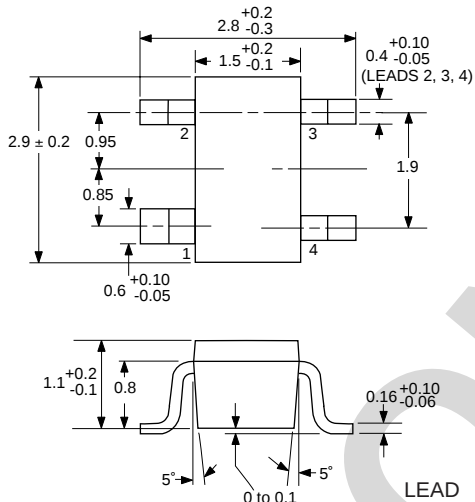
PACKAGE OUTLINE 33

PACKAGE OUTLINE 33
RECOMMENDED P.C.B. LAYOUT

PACKAGE OUTLINE 35 (MICRO-X)

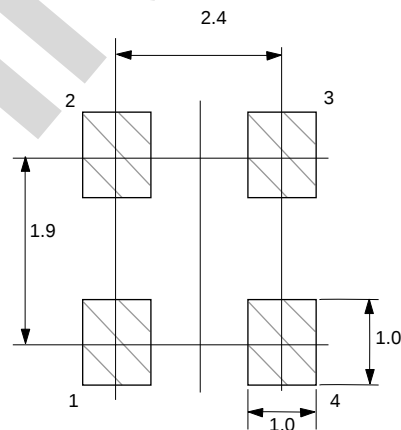


PACKAGE OUTLINE 39 (SOT-23)



LEAD
CONNECTIONS
1. Collector
2. Emitter
3. Base
4. Emitter

PACKAGE OUTLINE 39 RECOMMENDED P.C.B. LAYOUT



ORDERING INFORMATION

PART NUMBER	QUANTITY	PACKAGING
NE02100	100	Waffle Pack
NE02107/NE02107B	1	Hard Pack
NE02133-T1B	3000	Tape & Reel
NE02135	1	ESD Bag
NE02139-T1	3000	Tape & Reel

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