DATA SHEET

NEC

NPN SILICON RF TRANSISTOR
2SC5432

NPN EPITAXIAL SILICON TRANSISTOR FOR HIGH-FREQUENCY LOW-NOISE AMPLIFICATION FLAT-LEAD 3-PIN THIN-TYPE ULTRA SUPER MINIMOLD

FEATURES

- Contains same chip as 2SC5006
- Flat-lead 3-pin thin-type ultra super minimold package

★ ORDERING INFORMATION

Part Number	Quantity	Supplying Form
2SC5432	50 pcs (Non reel)	• 8 mm wide embossed taping
2SC5432-T1	3 kpcs/reel	• Pin 3 (collector) face the perforation side of the tape

Remark To order evaluation samples, contact your nearby sales office.
The unit sample quantity is 50 pcs.

ABSOLUTE MAXIMUM RATINGS (T_A = +25°C)

Parameter	Symbol	Ratings	Unit
Collector to Base Voltage	V_{CBO}	20	V
Collector to Emitter Voltage	V_{CEO}	12	V
Emitter to Base Voltage	V_{EBO}	3	V
Collector Current	I_C	100	mA
Total Power Dissipation	P_{tot} Note	125	mW
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	−65 to +150	°C

Note Free air

Because this product uses high-frequency technology, avoid excessive static electricity, etc.

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The mark ★ shows major revised points.

ELECTRICAL CHARACTERISTICS (T_A = +25°C)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Collector Cut-off Current	I_{CBO}	V_{CB} = 10 V, I_E = 0 mA	–	–	1 000	nA
Emitter Cut-off Current	I_{EBO}	V_{EB} = 1 V, I_C = 0 mA	–	–	1 000	nA
DC Current Gain	h_{FE} Note 1	V_{CE} = 3 V, I_C = 7 mA	80	–	145	–
Gain Bandwidth Product	f_T	V_{CE} = 3 V, I_C = 7 mA, f = 1 GHz	3.0	4.5	–	GHz
Insertion Power Gain	$\lvert S_{21e} \rvert^2$	V_{CE} = 3 V, I_C = 7 mA, f = 1 GHz	7.0	10.0	–	dB
Noise Figure	NF	V_{CE} = 3 V, I_C = 7 mA, f = 1 GHz	–	1.4	2.5	dB
Reverse Transfer Capacitance	C_{re} Note 2	V_{CB} = 3 V, I_E = 0 mA, f = 1 MHz	–	0.7	1.5	pF

Notes 1. Pulse measurement: PW ≤ 350 μs, Duty Cycle ≤ 2%

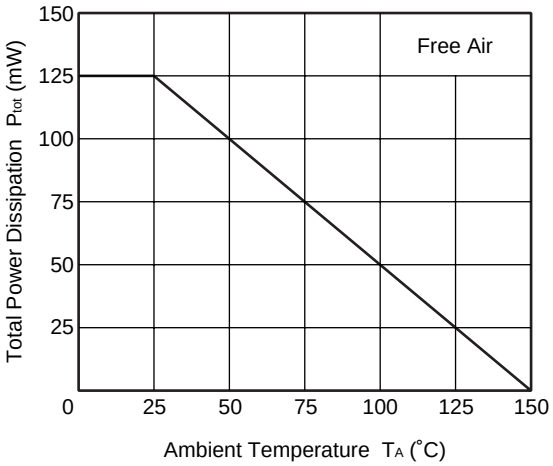
2. Collector to base capacitance when the emitter grounded

h_{FE} CLASSIFICATION

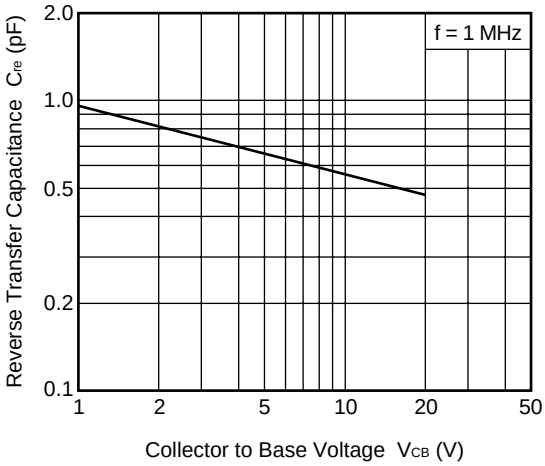
Rank	EB	FB
Marking	TC	TD
h_{FE} Value	80 to 110	100 to 145

TYPICAL CHARACTERISTICS (Unless otherwise specified, T_A = +25°C)

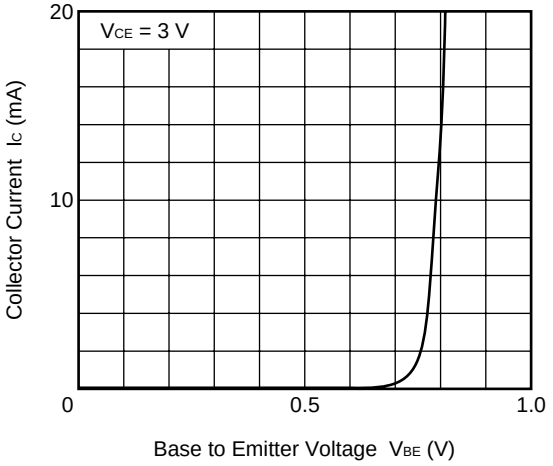
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



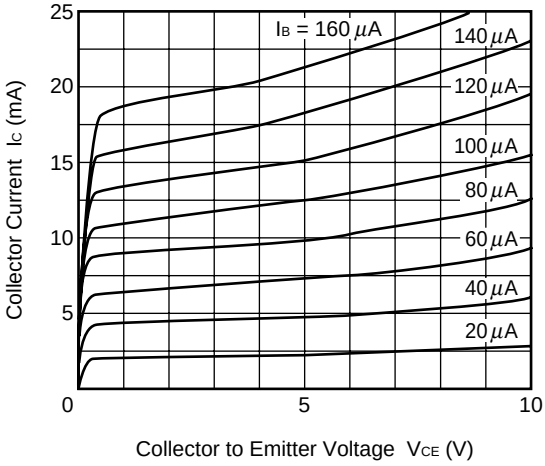
REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



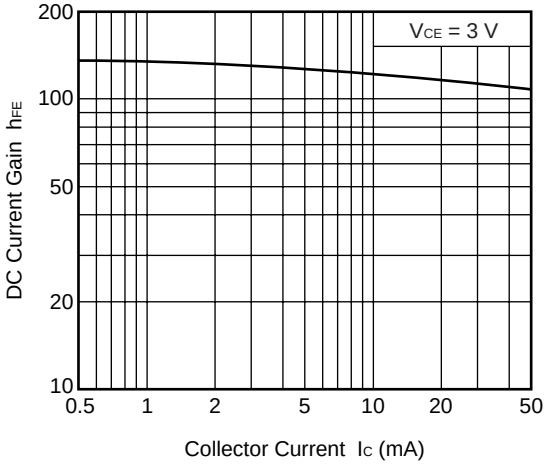
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



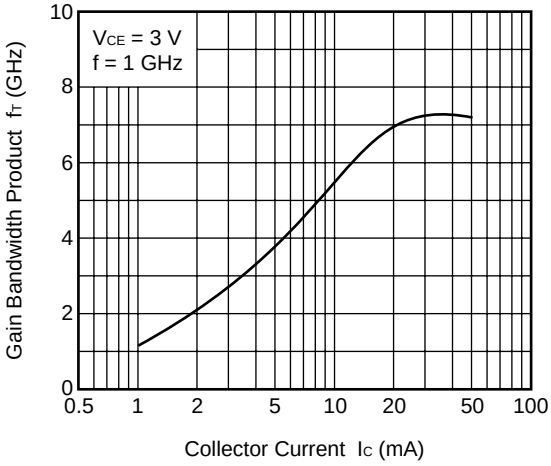
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



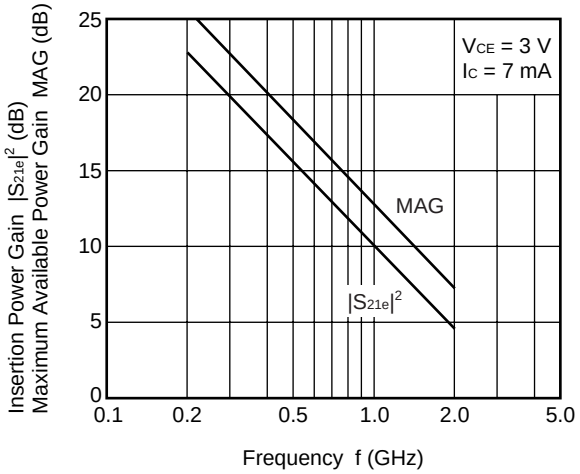
DC CURRENT GAIN vs. COLLECTOR CURRENT



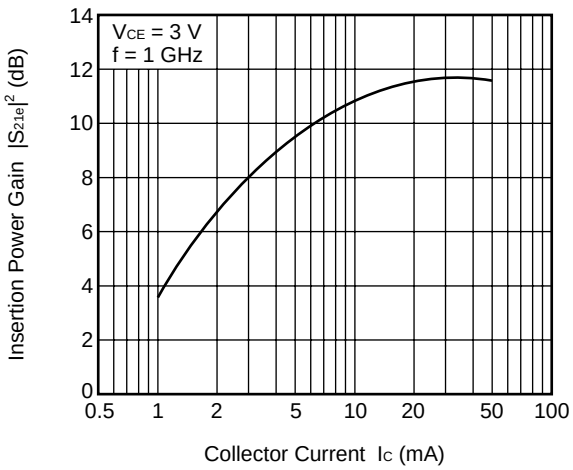
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



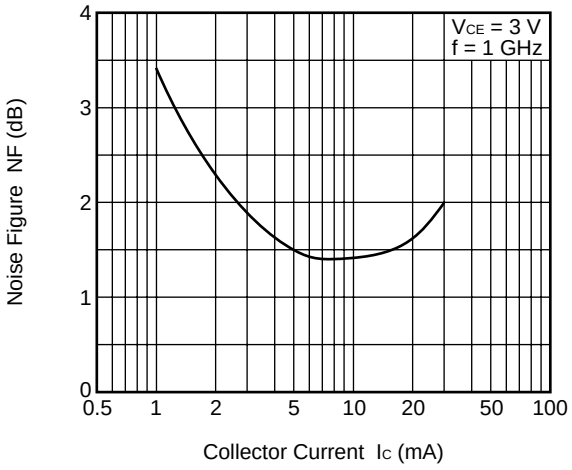
INSERTION POWER GAIN, MAG vs. FREQUENCY



INSERTION POWER GAIN vs. COLLECTOR CURRENT



NOISE FIGURE vs. COLLECTOR CURRENT



Remark The graphs indicate nominal characteristics.

S-PARAMETERS

V_{CE} = 1 V, I_C = 1 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}	
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
0.2	0.893	–49.6	3.192	143.8	0.119	59.2	0.903	–21.2
0.4	0.773	–90.6	2.404	117.2	0.180	37.9	0.720	–35.3
0.6	0.745	–117.4	1.906	97.3	0.203	25.0	0.610	–46.5
0.8	0.711	–135.9	1.603	84.7	0.205	15.4	0.564	–54.0
1.0	0.698	–150.3	1.331	74.2	0.206	9.1	0.537	–58.9
1.2	0.708	–161.3	1.148	64.2	0.199	6.5	0.511	–63.9
1.4	0.716	–168.6	1.025	55.8	0.183	6.9	0.492	–71.0
1.6	0.696	–176.0	0.916	50.0	0.165	7.9	0.483	–79.0
1.8	0.690	175.0	0.809	44.2	0.145	10.1	0.486	–86.7
2.0	0.714	167.7	0.719	39.0	0.131	13.9	0.482	–95.1
2.2	0.738	162.9	0.657	33.0	0.125	22.2	0.482	–106.0
2.4	0.750	158.7	0.619	29.3	0.126	32.3	0.508	–116.7
2.6	0.758	154.7	0.572	28.1	0.137	42.3	0.541	–124.7
2.8	0.770	150.9	0.513	26.2	0.152	50.5	0.559	–131.8
3.0	0.785	148.0	0.483	23.0	0.167	55.1	0.566	–139.6

V_{CE} = 1 V, I_C = 3 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}	
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
0.2	0.754	–77.4	7.160	130.9	0.097	48.5	0.729	–40.9
0.4	0.668	–121.7	4.630	106.0	0.126	32.9	0.469	–61.1
0.6	0.644	–143.9	3.356	90.7	0.134	27.4	0.359	–73.2
0.8	0.630	–158.8	2.664	82.0	0.136	25.4	0.306	–80.5
1.0	0.634	–169.7	2.194	74.8	0.140	25.3	0.271	–86.0
1.2	0.653	–177.1	1.850	67.1	0.145	27.6	0.250	–92.7
1.4	0.656	178.0	1.633	60.6	0.148	31.6	0.242	–100.8
1.6	0.640	172.0	1.448	56.1	0.151	36.1	0.241	–108.6
1.8	0.643	164.6	1.275	51.3	0.153	39.6	0.245	–116.1
2.0	0.667	159.3	1.139	46.5	0.158	41.4	0.248	–125.3
2.2	0.686	155.7	1.048	40.8	0.169	43.4	0.265	–135.7
2.4	0.698	152.5	0.988	36.7	0.181	45.9	0.295	–143.4
2.6	0.706	149.3	0.923	34.8	0.199	48.4	0.322	–148.5
2.8	0.721	146.4	0.833	32.1	0.211	50.5	0.346	–153.8
3.0	0.737	144.5	0.779	27.2	0.220	51.6	0.365	–159.7

V_{CE} = 1 V, I_C = 5 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}	
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
0.2	0.678	–95.9	9.388	123.0	0.082	44.1	0.611	–54.6
0.4	0.630	–137.1	5.585	100.5	0.100	34.1	0.363	–78.9
0.6	0.615	–155.7	3.937	87.4	0.109	33.2	0.274	–93.7
0.8	0.609	–168.4	3.084	80.3	0.115	34.5	0.228	–103.2
1.0	0.620	–177.6	2.528	74.3	0.124	36.8	0.203	–112.2
1.2	0.641	176.7	2.121	67.5	0.135	39.3	0.192	–121.5
1.4	0.640	172.7	1.868	61.6	0.147	43.0	0.194	–129.8
1.6	0.626	167.2	1.656	57.6	0.157	46.4	0.199	–136.6
1.8	0.632	160.6	1.451	53.2	0.164	48.6	0.203	–144.2
2.0	0.657	155.8	1.300	48.9	0.173	49.0	0.214	–152.4
2.2	0.673	152.8	1.192	43.4	0.187	48.9	0.238	–160.2
2.4	0.685	149.8	1.128	39.5	0.203	49.5	0.265	–164.8
2.6	0.693	146.9	1.055	37.7	0.222	50.5	0.289	–168.2
2.8	0.708	144.3	0.960	35.0	0.232	51.6	0.311	–172.0
3.0	0.722	142.8	0.895	30.3	0.240	51.6	0.331	–176.2

V_{CE} = 3 V, I_C = 1 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}	
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
0.2	0.914	–43.7	3.280	148.3	0.086	62.7	0.936	–15.4
0.4	0.795	–82.1	2.575	123.7	0.139	43.0	0.792	–26.4
0.6	0.769	–109.7	2.086	104.4	0.161	30.5	0.689	–35.5
0.8	0.731	–128.9	1.783	91.7	0.164	21.2	0.648	–42.3
1.0	0.711	–144.3	1.498	81.7	0.166	14.9	0.630	–46.3
1.2	0.715	–156.5	1.286	72.2	0.162	12.3	0.603	–49.8
1.4	0.721	–164.7	1.146	63.6	0.148	13.5	0.578	–54.9
1.6	0.700	–172.6	1.029	57.8	0.134	15.4	0.559	–61.5
1.8	0.690	177.9	0.913	52.0	0.117	19.5	0.557	–68.5
2.0	0.711	170.1	0.817	46.8	0.107	25.1	0.552	–75.6
2.2	0.735	164.8	0.741	40.6	0.106	35.2	0.538	–84.3
2.4	0.746	160.3	0.702	36.4	0.110	46.3	0.547	–94.8
2.6	0.751	156.2	0.654	34.8	0.127	55.4	0.575	–103.4
2.8	0.763	152.2	0.587	32.3	0.146	63.2	0.589	–110.3
3.0	0.777	149.2	0.552	28.5	0.164	67.4	0.588	–118.0

V_{CE} = 3 V, I_C = 3 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}	
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
0.2	0.782	–65.7	7.726	136.8	0.073	54.2	0.804	–29.6
0.4	0.669	–109.9	5.283	111.9	0.101	38.4	0.563	–43.8
0.6	0.639	–134.2	3.921	95.9	0.111	32.3	0.445	–52.1
0.8	0.616	–150.6	3.139	87.0	0.113	30.0	0.392	–56.7
1.0	0.614	–163.0	2.608	79.9	0.118	30.2	0.358	–59.1
1.2	0.629	–171.7	2.194	72.4	0.122	32.5	0.331	–61.7
1.4	0.633	–177.4	1.930	65.7	0.126	37.3	0.309	–66.8
1.6	0.617	176.2	1.716	61.1	0.128	42.2	0.296	–73.3
1.8	0.618	168.4	1.514	56.2	0.132	46.7	0.289	–79.9
2.0	0.642	162.5	1.349	51.7	0.137	49.0	0.285	–87.4
2.2	0.663	158.6	1.234	45.8	0.148	51.7	0.280	–97.0
2.4	0.676	155.2	1.167	41.4	0.162	54.2	0.292	–107.5
2.6	0.684	151.9	1.091	39.2	0.180	56.7	0.314	–115.4
2.8	0.698	148.7	0.985	36.2	0.195	59.3	0.330	–122.1
3.0	0.716	146.7	0.920	31.1	0.205	60.7	0.341	–129.2

V_{CE} = 3 V, I_C = 5 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}	
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
0.2	0.693	–81.4	10.462	129.2	0.063	50.6	0.699	–39.3
0.4	0.610	–125.1	6.572	105.9	0.083	39.0	0.442	–54.7
0.6	0.588	–146.4	4.723	92.0	0.093	37.7	0.334	–62.8
0.8	0.575	–160.7	3.713	84.4	0.098	38.5	0.284	–67.1
1.0	0.582	–171.3	3.072	78.2	0.106	41.1	0.250	–69.7
1.2	0.600	–178.3	2.566	71.8	0.116	43.9	0.226	–73.2
1.4	0.603	177.2	2.253	65.9	0.127	47.9	0.209	–79.7
1.6	0.590	171.4	1.997	61.8	0.135	51.6	0.199	–86.9
1.8	0.594	164.4	1.754	57.5	0.144	54.6	0.195	–94.5
2.0	0.619	159.2	1.563	53.1	0.153	55.4	0.192	–103.2
2.2	0.638	155.9	1.430	47.6	0.167	55.7	0.194	–114.4
2.4	0.651	152.8	1.352	43.4	0.182	56.3	0.211	–124.6
2.6	0.660	149.8	1.268	41.3	0.201	57.3	0.231	–131.6
2.8	0.677	147.0	1.149	38.5	0.214	58.8	0.249	–137.8
3.0	0.694	145.3	1.071	33.6	0.222	59.1	0.264	–144.5

V_{CE} = 3 V, I_C = 7 mA, Z_O = 50 Ω

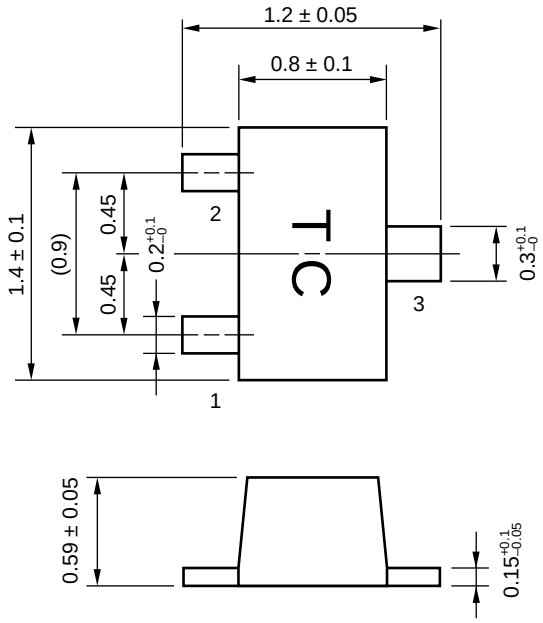
Frequency	S_{11}		S_{21}		S_{12}		S_{22}	
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
0.2	0.630	–95.3	12.557	123.1	0.055	47.9	0.609	–47.7
0.4	0.576	–136.3	7.443	101.8	0.071	41.3	0.359	–64.2
0.6	0.561	–155.0	5.246	89.3	0.082	42.8	0.264	–72.8
0.8	0.554	–167.6	4.082	82.7	0.091	46.0	0.218	–77.8
1.0	0.565	–176.8	3.362	77.2	0.103	49.4	0.187	–81.9
1.2	0.586	177.4	2.865	71.2	0.115	51.8	0.166	–87.6
1.4	0.588	173.6	2.459	66.0	0.130	54.6	0.154	–95.8
1.6	0.577	168.2	2.176	62.2	0.142	56.9	0.150	–104.6
1.8	0.583	161.8	1.908	58.2	0.152	58.9	0.149	–113.3
2.0	0.607	157.1	1.700	54.2	0.163	58.5	0.150	–123.7
2.2	0.625	154.1	1.551	48.8	0.178	57.8	0.161	–134.8
2.4	0.639	151.3	1.468	44.7	0.194	57.4	0.181	–143.4
2.6	0.649	148.5	1.382	42.7	0.214	57.8	0.199	–148.6
2.8	0.665	145.8	1.256	40.1	0.227	58.5	0.219	–153.9
3.0	0.681	144.3	1.171	35.5	0.235	58.6	0.236	–159.5

V_{CE} = 3 V, I_C = 10 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}	
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
0.2	0.575	–108.7	14.215	118.3	0.048	48.3	0.524	–55.9
0.4	0.548	–145.7	8.064	98.2	0.062	45.8	0.295	–73.7
0.6	0.540	–161.8	5.617	87.4	0.075	49.0	0.213	–84.1
0.8	0.539	–173.0	4.354	81.5	0.087	53.0	0.173	–90.5
1.0	0.554	179.0	3.577	76.4	0.101	55.6	0.148	–97.4
1.2	0.574	174.1	3.038	70.8	0.117	57.3	0.132	–105.9
1.4	0.574	170.8	2.610	65.9	0.133	58.8	0.128	–115.7
1.6	0.565	165.8	2.306	62.4	0.148	60.3	0.128	–124.7
1.8	0.573	159.7	2.021	58.6	0.160	61.6	0.131	–134.0
2.0	0.598	155.4	1.802	54.8	0.172	60.7	0.137	–144.8
2.2	0.615	152.6	1.643	49.7	0.186	59.3	0.154	–154.6
2.4	0.628	150.0	1.553	45.8	0.204	58.4	0.176	–160.5
2.6	0.639	147.3	1.460	43.9	0.223	58.3	0.195	–164.7
2.8	0.655	144.8	1.331	41.4	0.236	58.7	0.214	–168.6
3.0	0.671	143.5	1.237	36.9	0.243	58.1	0.233	–172.8

★ **PACKAGE DIMENSIONS**

FLAT-LEAD 3-PIN THIN-TYPE ULTRA SUPER MINIMOLD (UNIT: mm)



PIN CONNECTIONS

1. Emitter
2. Base
3. Collector

- **The information in this document is current as of February, 2002. The information is subject to change without notice. For actual design-in, refer to the latest publications of NEC's data sheets or data books, etc., for the most up-to-date specifications of NEC semiconductor products. Not all products and/or types are available in every country. Please check with an NEC sales representative for availability and additional information.**
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- NEC semiconductor products are classified into the following three quality grades:
  "Standard", "Special" and "Specific". The "Specific" quality grade applies only to semiconductor products developed based on a customer-designated "quality assurance program" for a specific application. The recommended applications of a semiconductor product depend on its quality grade, as indicated below. Customers must check the quality grade of each semiconductor product before using it in a particular application.
  "Standard": Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots
  "Special": Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)
  "Specific": Aircraft, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems and medical equipment for life support, etc.
  The quality grade of NEC semiconductor products is "Standard" unless otherwise expressly specified in NEC's data sheets or data books, etc. If customers wish to use NEC semiconductor products in applications not intended by NEC, they must contact an NEC sales representative in advance to determine NEC's willingness to support a given application.
  (Note)
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▶**Business issue**

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▶**Technical issue**

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