NEC

NPN SILICON RF TRANSISTOR
2SC5434

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

FEATURES

- Contains same chip as 2SC5008
- Flat-lead 3-pin thin-type ultra super minimold package

★ ORDERING INFORMATION

Part Number	Quantity	Supplying Form
2SC5434	50 pcs (Non reel)	• 8 mm wide embossed taping
2SC5434-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}	10	V
Emitter to Base Voltage	V_{EBO}	1.5	V
Collector Current	I_C	35	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 = 5 mA	80	–	145	–
Gain Bandwidth Product	f_T	V_{CE} = 3 V, I_C = 5 mA, f = 2 GHz	5.5	8.0	–	GHz
Insertion Power Gain	$\lvert S_{21e} \rvert^2$	V_{CE} = 3 V, I_C = 5 mA, f = 2 GHz	5.5	7.5	–	dB
Noise Figure	NF	V_{CE} = 3 V, I_C = 5 mA, f = 2 GHz	–	1.9	3.2	dB
Reverse Transfer Capacitance	C_{re} Note 2	V_{CB} = 3 V, I_E = 0 mA, f = 1 MHz	–	0.3	0.7	pF

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

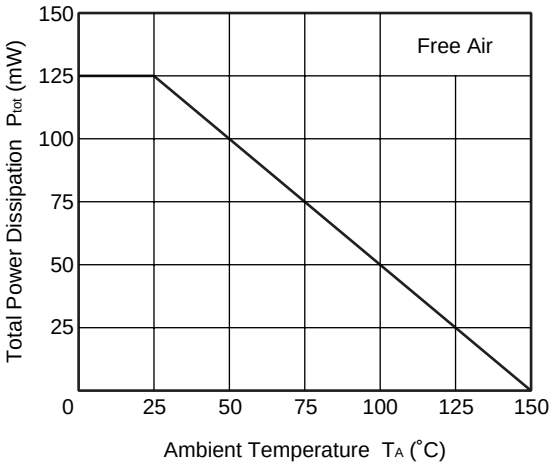
2. Collector to base capacitance when the emitter grounded

h_{FE} CLASSIFICATION

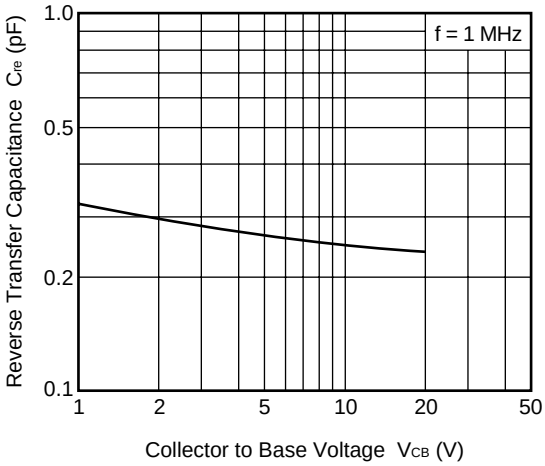
Rank	EB	FB
Marking	TH	TJ
h_{FE} Value	80 to 110	100 to 145

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

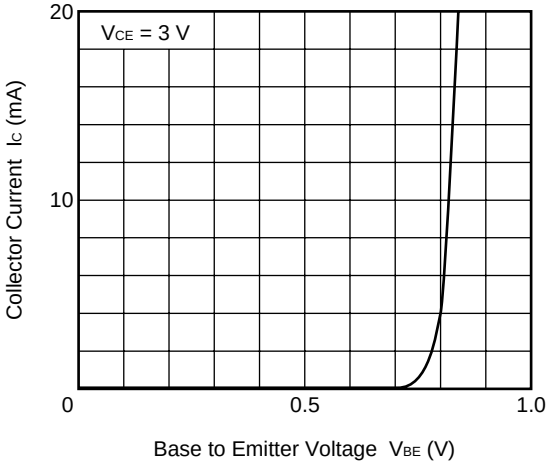
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



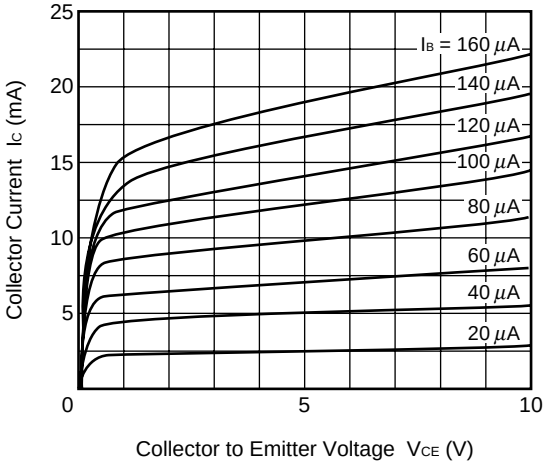
REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



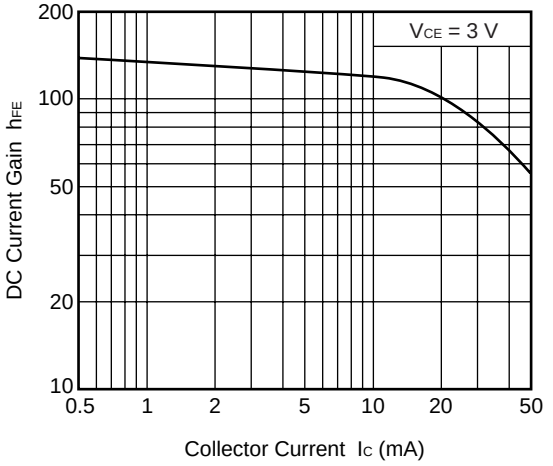
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



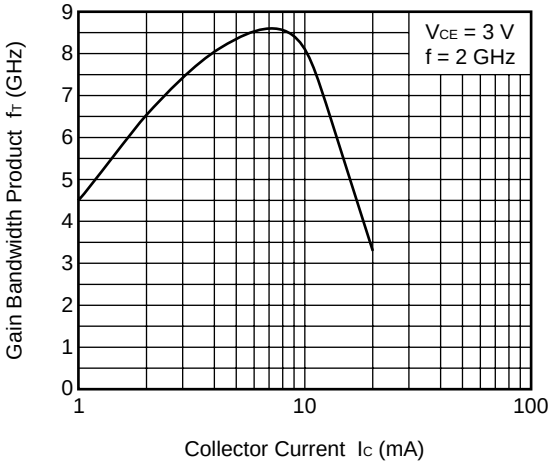
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



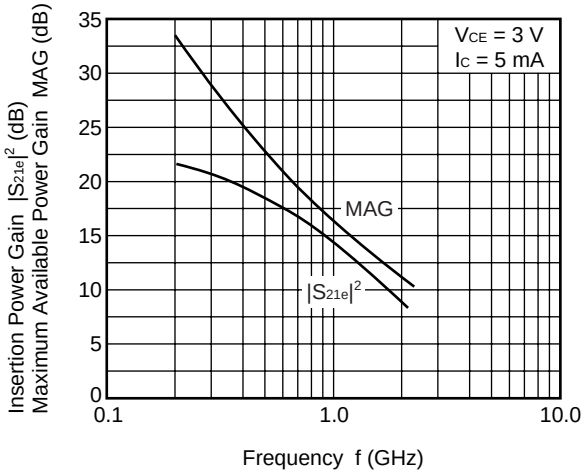
DC CURRENT GAIN vs. COLLECTOR CURRENT



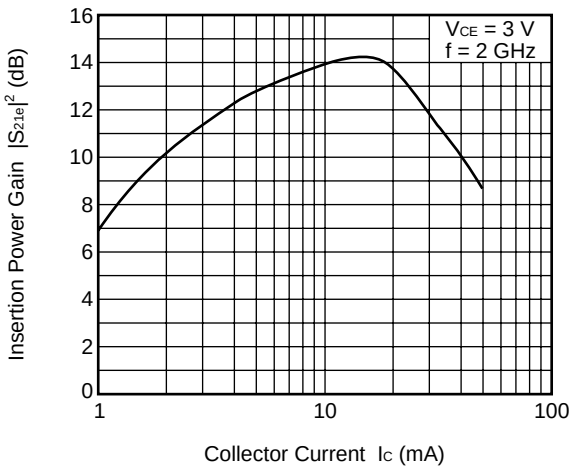
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



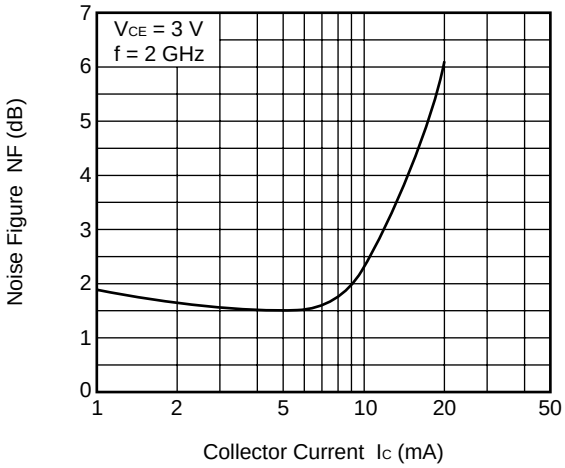
INSERTION POWER GAIN, MAG vs. FREQUENCY



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	0.954	–14.1	3.423	163.2	0.045	78.6	0.979	–8.8
0.4	0.865	–27.4	3.090	148.0	0.081	66.6	0.906	–17.1
0.6	0.772	–42.4	2.783	133.9	0.113	57.5	0.818	–26.4
0.8	0.714	–54.6	2.594	122.0	0.134	50.4	0.768	–34.5
1.0	0.637	–63.9	2.450	113.2	0.150	44.2	0.731	–38.8
1.2	0.557	–72.2	2.206	105.8	0.164	39.3	0.676	–41.1
1.4	0.489	–81.2	1.991	97.0	0.177	36.8	0.618	–43.9
1.6	0.432	–90.6	1.871	89.4	0.180	35.9	0.563	–47.2
1.8	0.388	–99.1	1.743	83.4	0.181	34.3	0.525	–51.1
2.0	0.339	–109.2	1.602	77.9	0.180	31.3	0.495	–54.6
2.2	0.310	–120.9	1.499	71.1	0.185	29.5	0.464	–57.8
2.4	0.305	–132.1	1.432	65.2	0.188	28.9	0.434	–62.7
2.6	0.298	–140.4	1.388	61.1	0.192	29.4	0.418	–67.8
2.8	0.290	–148.7	1.313	57.7	0.188	29.9	0.414	–71.7
3.0	0.286	–157.6	1.234	53.0	0.186	29.5	0.398	–74.8

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	0.845	–26.5	8.141	152.0	0.040	72.5	0.914	–17.3
0.4	0.659	–47.9	6.589	131.2	0.067	57.7	0.740	–29.5
0.6	0.531	–66.7	5.355	115.3	0.084	50.6	0.604	–38.8
0.8	0.439	–79.3	4.509	104.9	0.093	47.4	0.530	–44.1
1.0	0.359	–89.4	3.893	97.9	0.102	45.4	0.478	–45.5
1.2	0.297	–100.0	3.419	91.6	0.112	44.9	0.428	–45.3
1.4	0.258	–110.8	2.999	84.5	0.122	45.7	0.385	–46.1
1.6	0.229	–121.7	2.665	79.2	0.129	47.7	0.346	–47.8
1.8	0.206	–133.2	2.416	75.4	0.135	49.2	0.319	–50.4
2.0	0.194	–147.5	2.179	71.0	0.140	48.6	0.297	–53.1
2.2	0.199	–160.3	2.002	65.7	0.149	48.3	0.274	–55.7
2.4	0.211	–169.1	1.890	61.0	0.160	48.4	0.253	–60.1
2.6	0.222	–176.6	1.809	58.0	0.173	49.1	0.239	–65.3
2.8	0.232	176.3	1.694	55.4	0.178	50.2	0.232	–69.8
3.0	0.247	170.1	1.579	51.5	0.183	50.1	0.221	–73.5

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	0.744	–36.0	10.973	143.7	0.037	66.0	0.845	–22.7
0.4	0.518	–61.7	8.030	121.2	0.057	54.5	0.624	–34.4
0.6	0.395	–80.9	6.108	106.2	0.068	51.2	0.494	–40.8
0.8	0.313	–93.7	4.965	97.5	0.076	50.9	0.429	–43.5
1.0	0.253	–105.4	4.187	91.5	0.086	50.8	0.390	–43.2
1.2	0.213	–118.2	3.630	86.0	0.096	51.6	0.353	–41.8
1.4	0.193	–130.2	3.144	79.8	0.108	53.2	0.321	–41.9
1.6	0.180	–142.3	2.769	75.2	0.119	55.2	0.291	–43.1
1.8	0.171	–155.1	2.510	72.0	0.127	56.8	0.270	–45.6
2.0	0.175	–168.7	2.254	68.0	0.134	56.6	0.252	–48.0
2.2	0.191	–179.1	2.066	63.1	0.145	55.9	0.234	–50.6
2.4	0.208	174.7	1.952	58.8	0.157	55.2	0.214	–55.0
2.6	0.233	168.8	1.864	56.0	0.172	55.7	0.201	–60.4
2.8	0.238	163.5	1.739	53.8	0.180	56.8	0.194	–65.4
3.0	0.255	159.3	1.620	50.0	0.186	56.2	0.185	–69.8

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	0.959	–12.8	3.416	164.4	0.038	79.7	0.984	–7.5
0.4	0.880	–24.9	3.110	150.1	0.070	68.7	0.922	–14.6
0.6	0.792	–38.9	2.829	136.8	0.097	60.3	0.843	–22.9
0.8	0.739	–50.7	2.654	125.2	0.118	53.8	0.801	–30.5
1.0	0.669	–59.5	2.539	116.6	0.132	47.5	0.774	–34.6
1.2	0.590	–67.2	2.307	109.5	0.146	42.7	0.726	–36.6
1.4	0.520	–75.5	2.081	100.9	0.159	40.4	0.670	–39.0
1.6	0.458	–84.6	1.965	93.1	0.163	39.4	0.616	–42.0
1.8	0.412	–92.6	1.839	87.1	0.164	38.3	0.579	–45.6
2.0	0.360	–101.7	1.698	81.6	0.165	35.1	0.551	–49.1
2.2	0.324	–112.8	1.590	74.9	0.169	33.6	0.523	–51.9
2.4	0.313	–124.0	1.520	68.9	0.173	32.9	0.491	–56.0
2.6	0.303	–132.2	1.474	64.5	0.177	33.6	0.474	–60.7
2.8	0.291	–140.2	1.401	61.1	0.174	34.2	0.471	–64.4
3.0	0.281	–149.5	1.315	56.6	0.172	34.3	0.457	–67.1

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	0.866	–23.3	8.242	154.2	0.034	73.1	0.934	–14.4
0.4	0.693	–42.6	6.829	134.4	0.058	61.3	0.784	–24.9
0.6	0.565	–60.3	5.662	118.8	0.075	54.0	0.657	–33.3
0.8	0.474	–72.1	4.819	108.1	0.084	51.0	0.588	–38.5
1.0	0.390	–80.9	4.196	101.0	0.092	48.6	0.543	–39.9
1.2	0.321	–89.8	3.702	94.7	0.102	47.7	0.495	–39.5
1.4	0.274	–99.4	3.260	87.8	0.111	48.6	0.453	–40.0
1.6	0.237	–109.3	2.889	82.1	0.119	50.7	0.413	–41.4
1.8	0.209	–119.5	2.590	77.8	0.124	52.1	0.386	–43.8
2.0	0.187	–133.1	2.383	74.0	0.130	51.9	0.365	–46.2
2.2	0.183	–147.1	2.189	68.7	0.138	51.5	0.344	–48.2
2.4	0.190	–157.5	2.066	63.9	0.148	51.3	0.321	–51.6
2.6	0.197	–166.2	1.982	60.8	0.161	52.3	0.306	–55.8
2.8	0.204	–174.4	1.861	58.4	0.167	53.7	0.299	–59.6
3.0	0.215	178.1	1.735	54.5	0.171	53.6	0.289	–62.5

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	0.777	–30.9	11.368	147.0	0.032	69.9	0.883	–18.7
0.4	0.562	–53.6	8.634	125.2	0.051	57.8	0.688	–29.1
0.6	0.431	–71.4	6.753	109.9	0.062	53.9	0.559	–35.3
0.8	0.344	–82.7	5.525	100.7	0.071	53.6	0.496	–38.3
1.0	0.273	–91.9	4.677	94.6	0.080	53.4	0.460	–38.2
1.2	0.220	–102.3	4.070	88.9	0.089	53.9	0.424	–36.8
1.4	0.189	–113.6	3.534	82.8	0.099	54.9	0.391	–36.7
1.6	0.165	–125.3	3.113	78.1	0.109	57.1	0.358	–37.6
1.8	0.149	–138.6	2.768	74.2	0.118	58.9	0.336	–39.7
2.0	0.143	–154.5	2.513	70.6	0.125	58.9	0.319	–42.1
2.2	0.153	–168.3	2.326	65.9	0.135	58.2	0.303	–43.9
2.4	0.167	–177.1	2.189	61.6	0.146	57.8	0.282	–47.1
2.6	0.180	175.5	2.092	58.8	0.160	58.0	0.266	–51.3
2.8	0.194	168.8	1.955	56.7	0.168	59.4	0.259	–55.2
3.0	0.210	163.5	1.819	53.1	0.174	59.0	0.252	–58.5

V_{CE} = 3 V, I_C = 7 mA, Z_O = 50 Ω

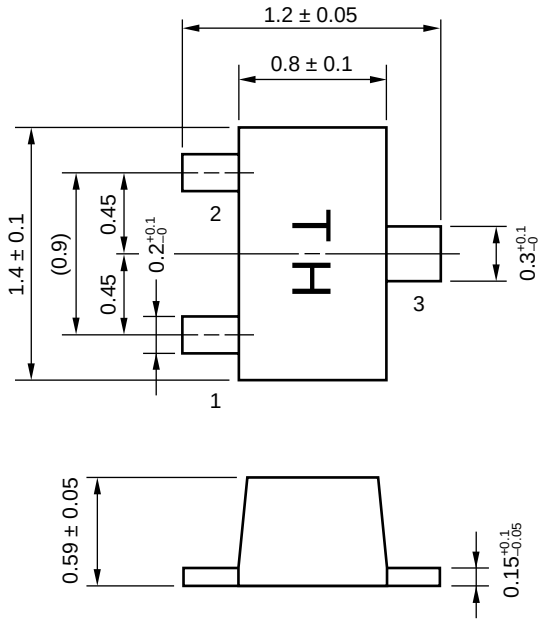
Frequency	S_{11}		S_{21}		S_{12}		S_{22}	
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
0.2	0.687	–38.0	13.645	140.8	0.030	66.7	0.830	–21.6
0.4	0.458	–63.0	9.604	118.2	0.044	58.2	0.613	–30.3
0.6	0.339	–80.5	7.166	104.1	0.054	56.2	0.497	–34.0
0.8	0.264	–92.0	5.746	96.1	0.062	57.4	0.447	–35.5
1.0	0.210	–102.5	4.830	90.8	0.072	58.2	0.422	–34.6
1.2	0.172	–115.0	4.162	85.7	0.082	59.5	0.396	–32.8
1.4	0.153	–127.5	3.604	80.1	0.093	60.3	0.370	–32.5
1.6	0.141	–140.3	3.164	76.0	0.105	62.1	0.343	–33.4
1.8	0.134	–154.2	2.816	72.5	0.114	64.1	0.324	–35.5
2.0	0.139	–168.8	2.546	69.0	0.122	64.1	0.309	–38.2
2.2	0.155	–179.6	2.355	64.7	0.133	63.2	0.296	–40.0
2.4	0.172	173.9	2.219	60.5	0.145	62.2	0.276	–43.1
2.6	0.187	168.0	2.120	57.9	0.159	62.4	0.261	–47.1
2.8	0.203	162.6	1.983	55.9	0.170	63.3	0.255	–51.5
3.0	0.221	159.0	1.843	52.3	0.176	62.9	0.247	–54.9

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	0.589	–46.2	15.156	134.5	0.027	63.5	0.772	–23.5
0.4	0.366	–73.1	9.926	112.1	0.038	58.9	0.561	–28.9
0.6	0.265	–91.3	7.179	99.2	0.048	59.0	0.465	–30.3
0.8	0.205	–104.1	5.703	92.4	0.056	61.0	0.429	–31.0
1.0	0.165	–117.4	4.740	87.6	0.066	62.6	0.415	–30.3
1.2	0.143	–132.6	4.069	82.7	0.077	63.9	0.398	–28.6
1.4	0.135	–145.6	3.508	77.5	0.088	64.8	0.377	–28.4
1.6	0.131	–158.5	3.075	73.8	0.100	65.9	0.353	–29.4
1.8	0.133	–171.6	2.729	70.5	0.110	68.1	0.335	–31.9
2.0	0.146	176.2	2.474	67.2	0.120	67.3	0.323	–35.1
2.2	0.166	168.7	2.285	62.9	0.130	66.7	0.312	–37.1
2.4	0.184	164.3	2.154	58.8	0.143	65.6	0.293	–40.2
2.6	0.200	159.7	2.057	56.3	0.158	65.6	0.278	–44.5
2.8	0.218	155.6	1.918	54.3	0.168	66.4	0.273	–49.0
3.0	0.236	152.9	1.785	50.7	0.175	65.8	0.265	–52.6

★ **PACKAGE DIMENSIONS**

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



PIN CONNECTIONS

1. Emitter
2. Base
3. Collector

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▶**Business issue**

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▶**Technical issue**

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