

2SC5631

Silicon NPN Epitaxial
UHF / VHF Wide Band Amplifier

HITACHI

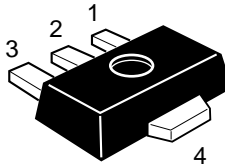
ADE-208-981A (Z)
2nd. Edition
Mar. 2001

Features

- High gain bandwidth product
 $f_T = 11$ GHz typ.
- High power gain and low noise figure ;
PG = 10 dB typ. , NF = 1.2 dB typ. at $f = 900$ MHz

Outline

UPAK



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

Note: Marking is "JR".

Absolute Maximum Ratings (Ta = 25°C)

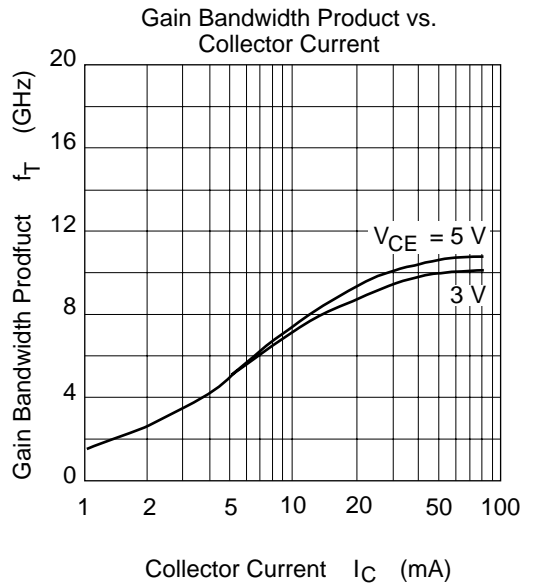
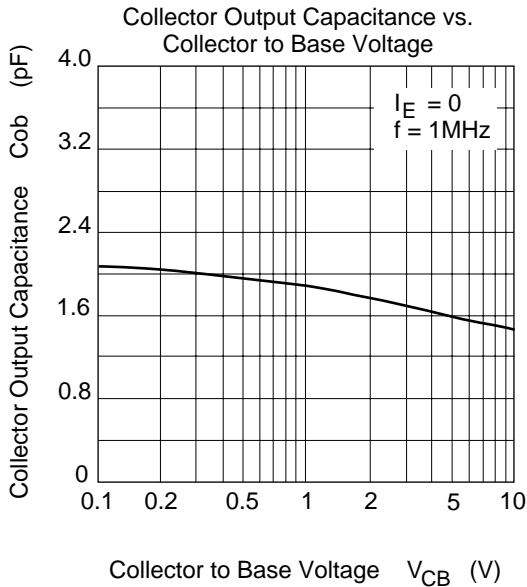
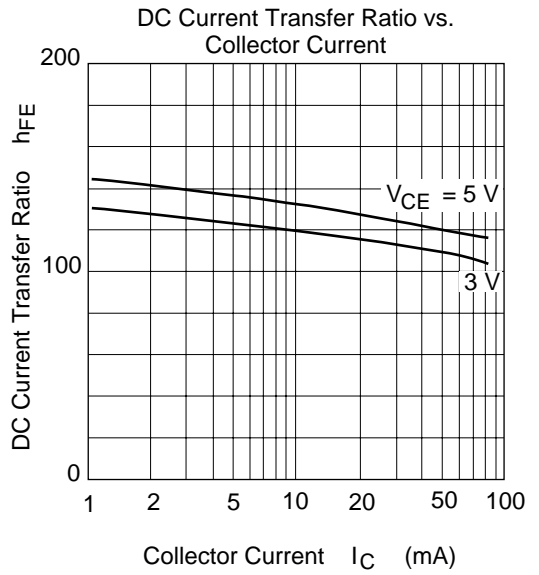
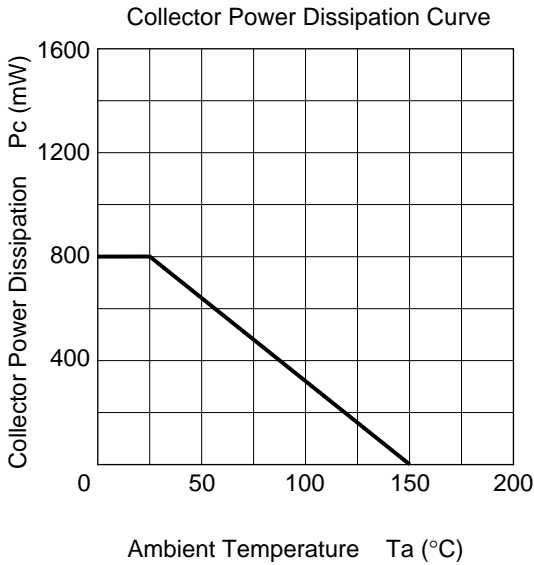
| Item | Symbol | Rated | Unit |
|------------------------------|-----------|-------------|------|
| Collector to base voltage | V_{CBO} | 15 | V |
| Collector to emitter voltage | V_{CEO} | 6 | V |
| Emitter to base voltage | V_{EBO} | 1.5 | V |
| Collector current | I_C | 80 | mA |
| Collector power dissipation | Pc | 800* | mW |
| Junction temperature | Tj | 150 | °C |
| Storage temperature | Tstg | -55 to +150 | °C |

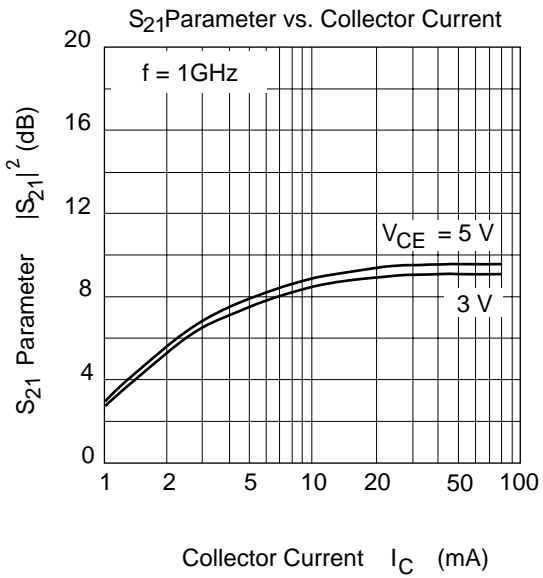
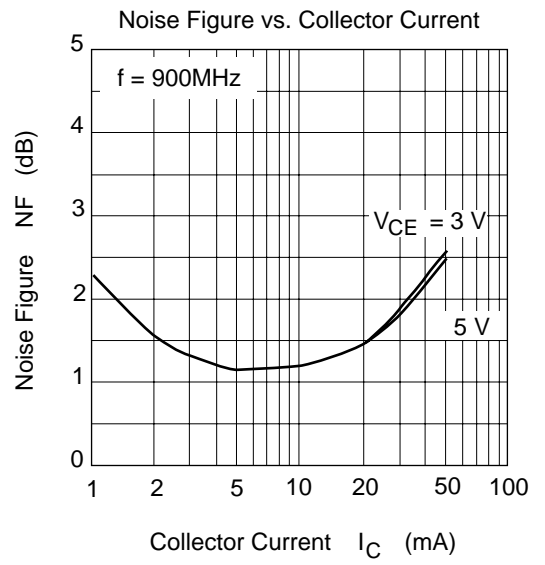
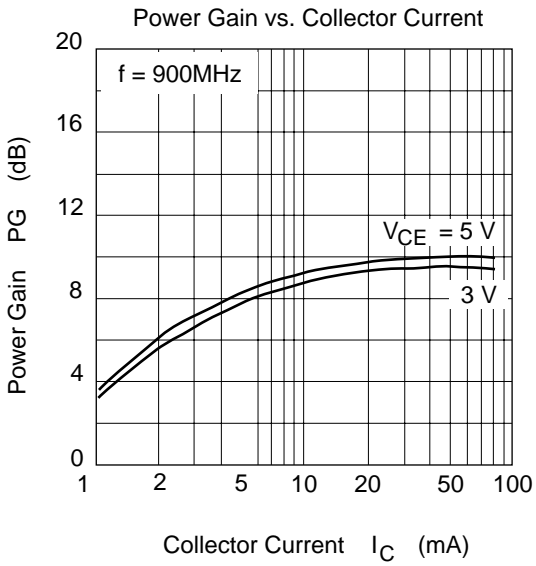
* When using alumina ceramic board (12.5 x 20 x 0.7 mm)

Electrical Characteristics (Ta = 25°C)

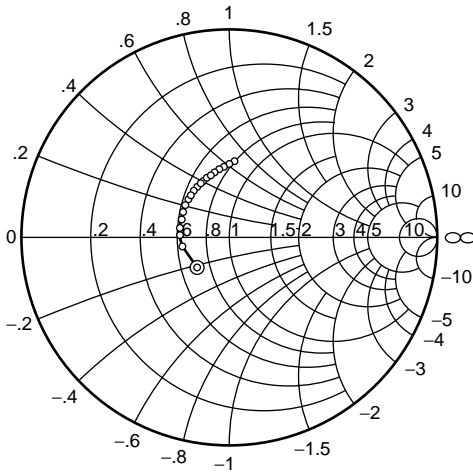
| Item | Symbol | Min | Typ | Max | Unit | Test Conditions |
|-------------------------------------|---------------|-----|-----|-----|---------|--|
| Collector to base breakdown voltage | $V_{(BR)CBO}$ | 15 | — | — | V | $I_C = 10 \mu A, I_E = 0$ |
| Collector cutoff current | I_{CBO} | — | — | 1 | μA | $V_{CB} = 12 V, I_E = 0$ |
| Collector cutoff current | I_{CEO} | — | — | 1 | mA | $V_{CE} = 6 V, R_{BE} = \infty$ |
| Emitter cutoff current | I_{EBO} | — | — | 10 | μA | $V_{EB} = 1.5 V, I_C = 0$ |
| DC current transfer ratio | h_{FE} | 80 | 120 | 160 | V | $V_{CE} = 5 V, I_C = 50 mA$ |
| Collector output capacitance | Cob | — | 1.6 | 2.2 | pF | $V_{CB} = 5 V, I_E = 0$ $f = 1 MHz$ |
| Gain bandwidth product | f_T | 8 | 11 | — | GHz | $V_{CE} = 5 V, I_C = 50 mA$ $f = 1 GHz$ |
| Power gain | PG | 7 | 10 | — | dB | $V_{CE} = 5 V, I_C = 50 mA$ $f = 900 MHz$ |
| Noise figure | NF | — | 1.2 | 1.9 | dB | $V_{CE} = 5 V, I_C = 5 mA$ $f = 900 MHz$ |

Main Characteristics





S11 Parameter vs. Frequency

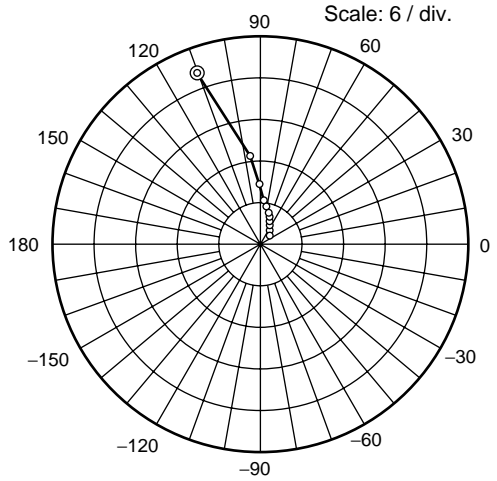


Condition : $V_{CE} = 3\text{ V}$, $I_C = 50\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

S21 Parameter vs. Frequency

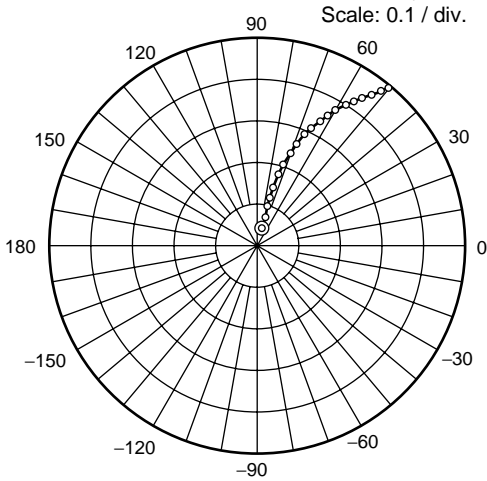


Condition : $V_{CE} = 3\text{ V}$, $I_C = 50\text{ mA}$

100 to 2000 MHz (100 MHz step)

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S12 Parameter vs. Frequency

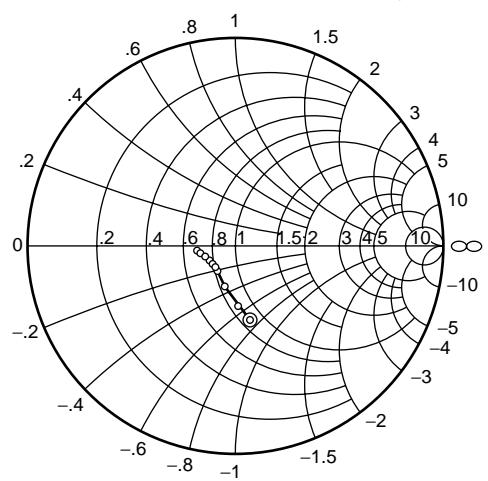


Condition : $V_{CE} = 3\text{ V}$, $I_C = 50\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

S22 Parameter vs. Frequency

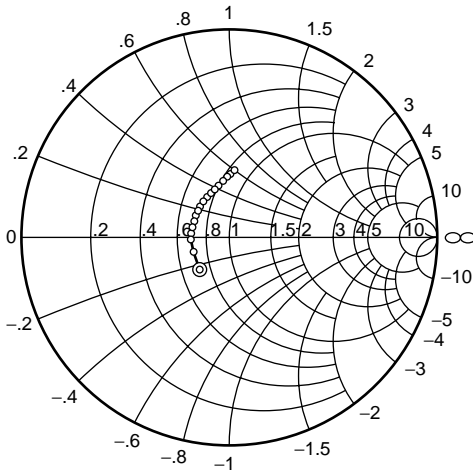


Condition : $V_{CE} = 3\text{ V}$, $I_C = 50\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

S11 Parameter vs. Frequency

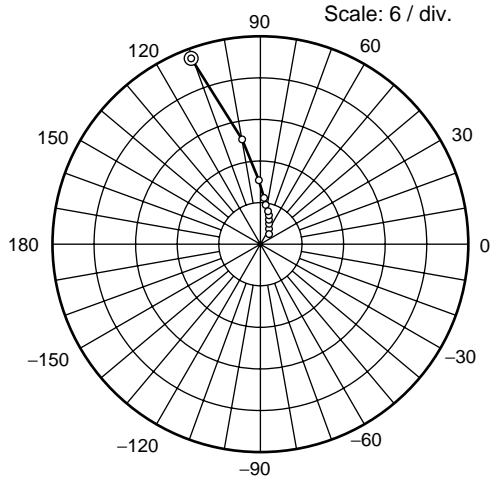


Condition : $V_{CE} = 5\text{ V}$, $I_C = 50\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

S21 Parameter vs. Frequency

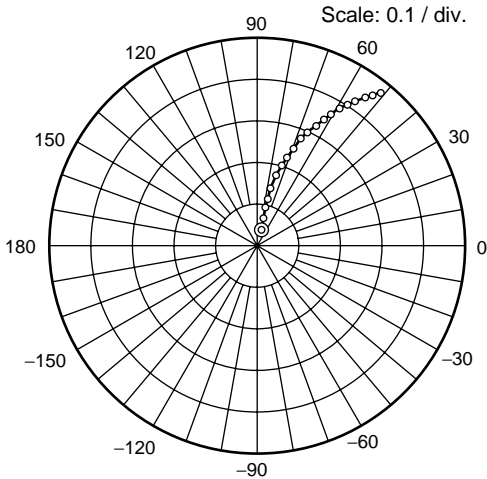


Condition : $V_{CE} = 5\text{ V}$, $I_C = 50\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

S12 Parameter vs. Frequency

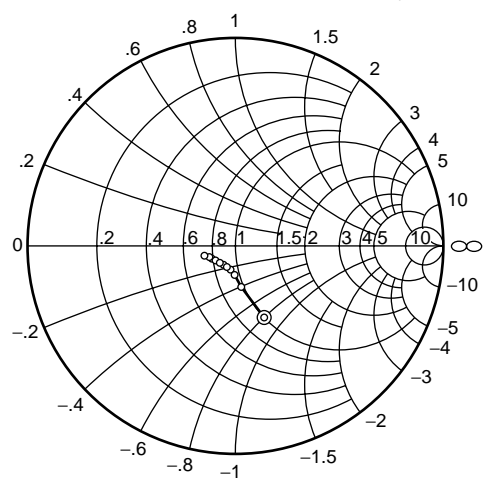


Condition : $V_{CE} = 5\text{ V}$, $I_C = 50\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

S22 Parameter vs. Frequency



Condition : $V_{CE} = 5\text{ V}$, $I_C = 50\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

Sparameter ($V_{CE} = 3V, I_C = 50 \text{ mA}, Z_o = 50 \Omega$)

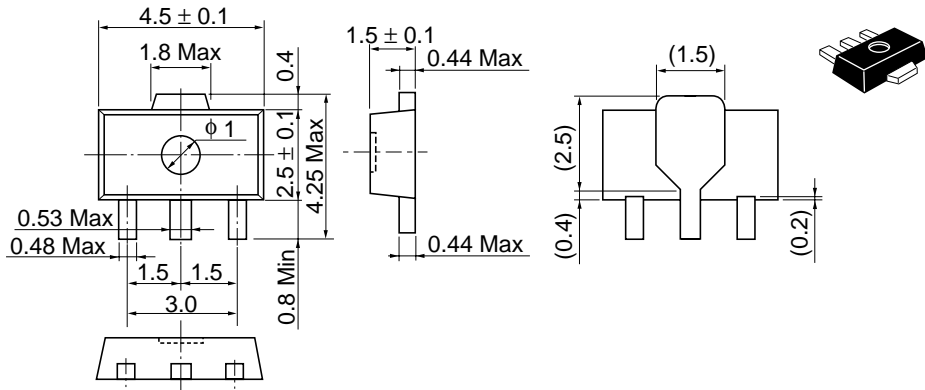
| f (MHz) | S11 | | S21 | | S12 | | S22 | |
|---------|-------|--------|-------|-------|--------|------|-------|--------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 100 | 0.234 | -135.7 | 26.57 | 109.9 | 0.0299 | 75.5 | 0.353 | -77.7 |
| 200 | 0.233 | -165.2 | 13.47 | 96.1 | 0.0575 | 78.0 | 0.199 | -99.6 |
| 300 | 0.234 | 179.3 | 8.92 | 89.7 | 0.0863 | 77.8 | 0.153 | -112.5 |
| 400 | 0.238 | 170.1 | 6.70 | 84.9 | 0.114 | 76.9 | 0.135 | -121.8 |
| 500 | 0.242 | 161.2 | 5.37 | 81.2 | 0.142 | 75.4 | 0.127 | -128.3 |
| 600 | 0.249 | 153.9 | 4.52 | 77.8 | 0.169 | 73.9 | 0.124 | -133.5 |
| 700 | 0.250 | 145.9 | 3.89 | 74.5 | 0.196 | 72.2 | 0.125 | -138.0 |
| 800 | 0.259 | 140.4 | 3.43 | 71.4 | 0.223 | 70.4 | 0.126 | -141.3 |
| 900 | 0.267 | 134.2 | 3.08 | 68.6 | 0.249 | 68.4 | 0.128 | -145.0 |
| 1000 | 0.274 | 128.0 | 2.80 | 65.8 | 0.275 | 66.9 | 0.131 | -147.7 |
| 1100 | 0.282 | 123.5 | 2.58 | 63.2 | 0.299 | 65.0 | 0.136 | -150.3 |
| 1200 | 0.290 | 119.2 | 2.40 | 60.3 | 0.323 | 63.2 | 0.140 | -153.0 |
| 1300 | 0.297 | 114.2 | 2.25 | 57.9 | 0.346 | 61.3 | 0.144 | -155.6 |
| 1400 | 0.307 | 109.6 | 2.12 | 55.9 | 0.367 | 59.7 | 0.149 | -158.1 |
| 1500 | 0.318 | 105.3 | 2.01 | 53.4 | 0.389 | 57.8 | 0.153 | -160.5 |
| 1600 | 0.324 | 101.7 | 1.92 | 51.3 | 0.409 | 56.2 | 0.159 | -162.7 |
| 1700 | 0.334 | 97.7 | 1.83 | 48.6 | 0.430 | 54.4 | 0.163 | -165.1 |
| 1800 | 0.345 | 93.9 | 1.77 | 46.8 | 0.448 | 52.8 | 0.170 | -167.9 |
| 1900 | 0.357 | 91.6 | 1.72 | 44.6 | 0.468 | 50.9 | 0.174 | -170.2 |
| 2000 | 0.366 | 87.9 | 1.65 | 42.6 | 0.485 | 49.5 | 0.180 | -172.6 |

Sparameter ($V_{CE} = 5V, I_C = 50 \text{ mA}, Z_o = 50 \Omega$)

| f (MHz) | S11 | | S21 | | S12 | | S22 | |
|---------|-------|--------|-------|-------|--------|------|-------|--------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 100 | 0.205 | -123.9 | 28.04 | 110.8 | 0.0284 | 74.9 | 0.360 | -69.1 |
| 200 | 0.193 | -159.6 | 14.24 | 96.9 | 0.0547 | 78.2 | 0.197 | -84.5 |
| 300 | 0.190 | -177.1 | 9.44 | 90.2 | 0.0820 | 78.3 | 0.145 | -92.5 |
| 400 | 0.193 | 169.9 | 7.09 | 85.3 | 0.109 | 77.5 | 0.123 | -99.0 |
| 500 | 0.201 | 162.0 | 5.68 | 81.8 | 0.135 | 76.3 | 0.112 | -104.1 |
| 600 | 0.206 | 153.7 | 4.76 | 78.4 | 0.162 | 74.6 | 0.107 | -109.5 |
| 700 | 0.206 | 145.4 | 4.11 | 75.1 | 0.188 | 72.9 | 0.105 | -113.7 |
| 800 | 0.221 | 139.0 | 3.62 | 72.2 | 0.213 | 71.3 | 0.105 | -117.6 |
| 900 | 0.224 | 132.6 | 3.25 | 69.4 | 0.238 | 69.4 | 0.106 | -121.8 |
| 1000 | 0.234 | 126.8 | 2.94 | 66.6 | 0.262 | 67.8 | 0.110 | -125.4 |
| 1100 | 0.243 | 120.8 | 2.72 | 64.0 | 0.286 | 66.0 | 0.113 | -128.7 |
| 1200 | 0.249 | 116.8 | 2.53 | 61.3 | 0.309 | 64.3 | 0.117 | -132.0 |
| 1300 | 0.261 | 111.3 | 2.36 | 59.0 | 0.331 | 62.5 | 0.120 | -135.5 |
| 1400 | 0.270 | 107.4 | 2.23 | 56.9 | 0.353 | 60.9 | 0.125 | -138.7 |
| 1500 | 0.280 | 103.5 | 2.10 | 54.5 | 0.373 | 59.1 | 0.129 | -142.0 |
| 1600 | 0.285 | 99.1 | 2.01 | 52.1 | 0.393 | 57.6 | 0.135 | -144.9 |
| 1700 | 0.298 | 95.4 | 1.92 | 50.3 | 0.414 | 56.0 | 0.139 | -148.1 |
| 1800 | 0.312 | 91.8 | 1.84 | 47.6 | 0.431 | 54.3 | 0.145 | -151.3 |
| 1900 | 0.321 | 87.9 | 1.79 | 45.7 | 0.450 | 52.5 | 0.148 | -154.5 |
| 2000 | 0.330 | 85.6 | 1.71 | 43.8 | 0.467 | 51.4 | 0.155 | -157.5 |

Package Dimensions

As of January, 2001
Unit: mm



| | |
|------------------------|----------|
| Hitachi Code | UPAK |
| JEDEC | — |
| EIAJ | Conforms |
| Mass (reference value) | 0.050 g |

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