# BRA144ECM Series

PNP Built-in Resistor Transistor CMPAK Series
Inverter, Driver, Switching

HITACHI

ADE-208-1444B (Z)

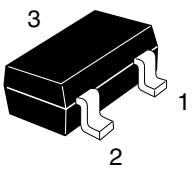
Rev.2
Sep. 2001

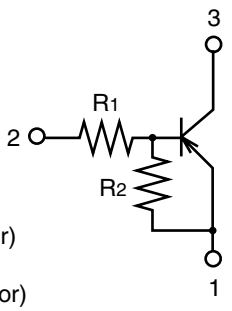
## Features

- Built–in Resistor Type
- Simplifies Circuit Design
- Reduces Board Space
- Complementary pair with BRC144ECM series

## Outline

CMPAK




1. Ground (Emitter)
2. Input (Base)
3. Output (Collector)

Note: Marking is shown in below.

| Device | Marking | R1 (kΩ) | R2 (kΩ) |
|---|---|---|---|
| BRA144ECM | AG | 47 | 47 |
| BRA124ECM | CG | 22 | 22 |
| BRA114ECM | EG | 10 | 10 |
| BRA143ECM | GG | 4.7 | 4.7 |
| BRA123ECM | JG | 2.2 | 2.2 |



Hitachi semiconductor

## Absolute Maximum Ratings

(Ta = 25°C)

| Item | | Symbol | Ratings | Unit |
|---|---|---|---|---|
| Supply voltage | | $V_{CC}$ | –50 | V |
| Input voltage | BRA144ECM | $V_I$ | +10 to –50 | V |
| | BRA124ECM | | +10 to –45 | |
| | BRA114ECM | | +10 to –30 | |
| | BRA143ECM | | +10 to –20 | |
| | BRA123ECM | | +10 to –15 | |
| Output current | | $I_O$ | –100 | mA |
| Total power dissipation | | $P_T$* | 150 | mW |
| Junction temperature | | Tj | 150 | °C |
| Storage temperature | | Tstg | –55 to +150 | °C |

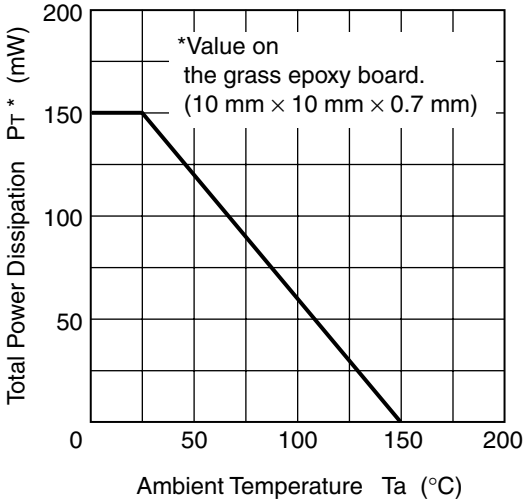
*Value on the glass epoxy board. (10 mm × 10 mm × 0.7 mm)

## Electrical Characteristics

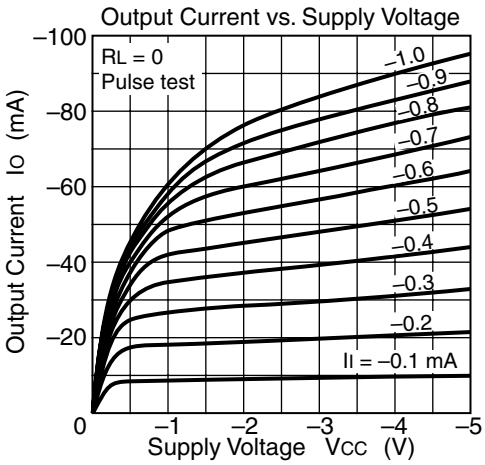
(Ta = 25°C)

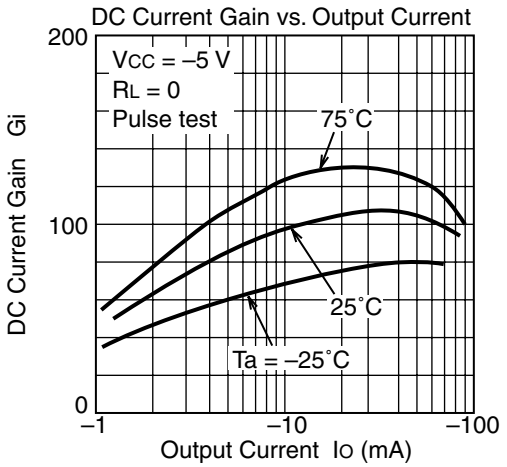
| Item | | Symbol | Min | Typ | Max | Unit | Test conditions |
|---|---|---|---|---|---|---|---|
| Input on voltage | BRA144ECM | $V_{I(on)}$ | –1.5 | — | –4.5 | V | $V_{CC}$ = –0.3 V, $I_O$ = –5 mA |
| | BRA124ECM | | –1.3 | — | –3.0 | | |
| | BRA114ECM | | –1.2 | — | –2.4 | | |
| | BRA143ECM | | –1.1 | — | –2.0 | | |
| | BRA123ECM | | –1.1 | — | –1.8 | | |
| Input off voltage | BRA144ECM | $V_{I(off)}$ | –1.0 | — | –1.5 | V | $V_{CC}$ = –5 V, $I_O$ = –100 µA |
| | BRA124ECM | | –1.0 | — | –1.5 | | |
| | BRA114ECM | | –1.0 | — | –1.5 | | |
| | BRA143ECM | | –1.0 | — | –1.5 | | |
| | BRA123ECM | | –1.0 | — | –1.5 | | |
| Output saturation voltage | | $V_{O(on)}$ | — | — | –0.3 | V | $I_O$ = –10 mA, $I_I$ = –0.5 mA |
| Output cutoff current | | $I_{O(off)}$ | — | — | –0.5 | µA | $V_{CC}$ = –50 V, $I_I$ = 0 |
| DC current transfer ratio | BRA144ECM | Gi | 70 | — | — | | $V_{CC}$ = –5 V, $I_O$ = –5 mA |
| | BRA124ECM | | 56 | — | — | | |
| | BRA114ECM | | 30 | — | — | | |
| | BRA143ECM | | 20 | — | — | | $V_{CC}$ = –5 V, $I_O$ = –10 mA |
| | BRA123ECM | | 20 | — | — | | $V_{CC}$ = –5 V, $I_O$ = –20 mA |
| Input resistance | BRA144ECM | $R_1$ | 33 | 47 | 61 | kΩ | |
| | BRA124ECM | | 15 | 22 | 28 | | |
| | BRA114ECM | | 7 | 10 | 13 | | |
| | BRA143ECM | | 3.3 | 4.7 | 6.1 | | |
| | BRA123ECM | | 1.5 | 2.2 | 2.8 | | |
| Resistance ratio | | $R_1/R_2$ | 0.8 | 1.0 | 1.2 | | |

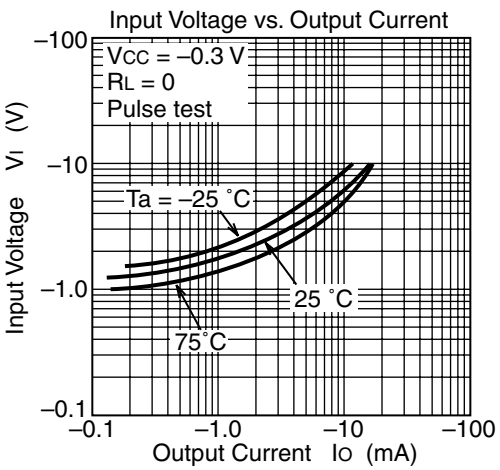
Total Power Dissipation Curve

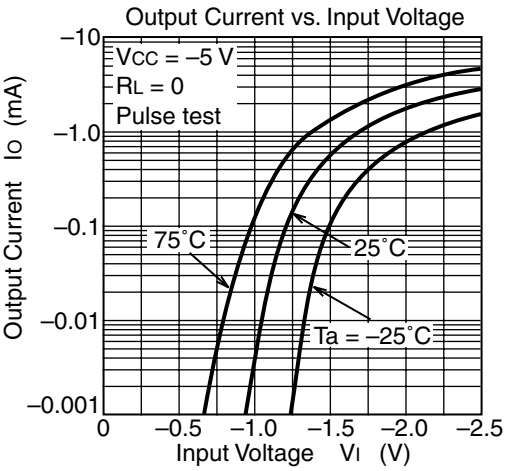


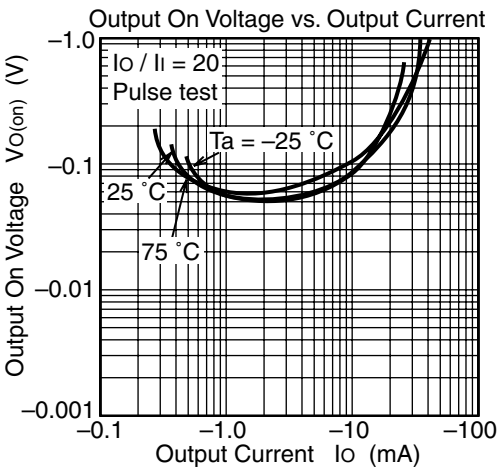
## Main Characteristics (BRA144ECM)



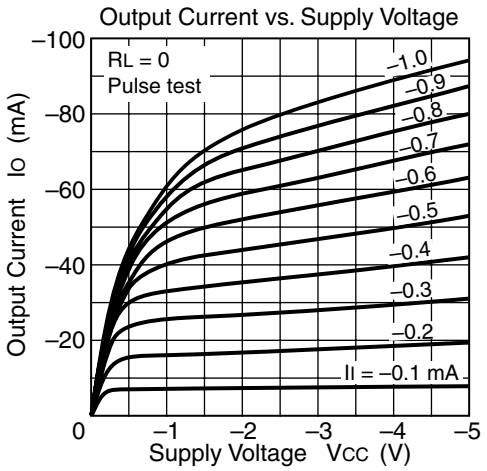



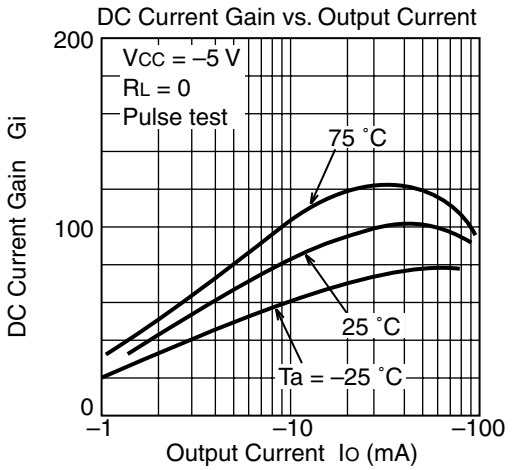



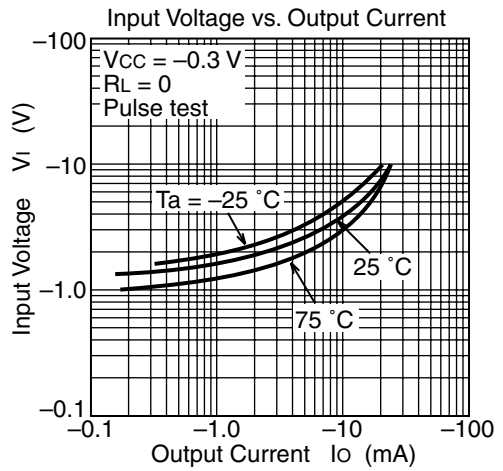



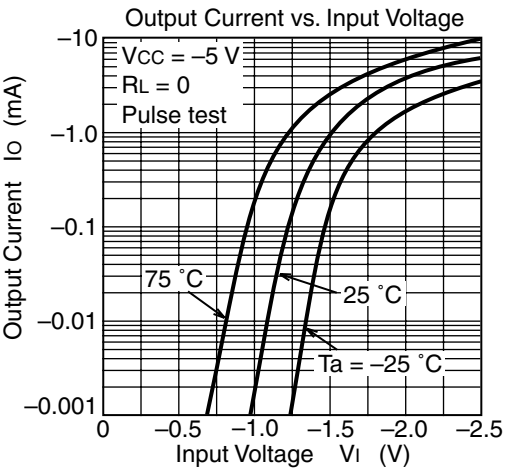



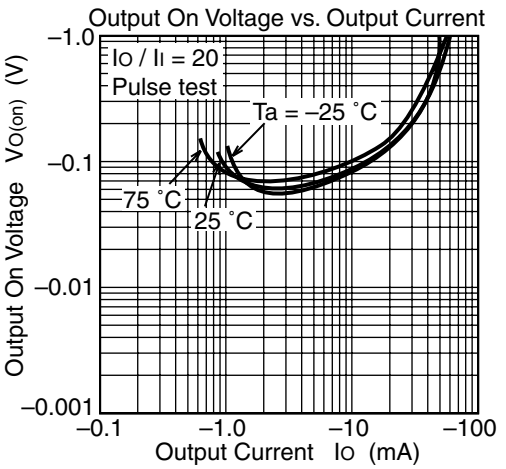
## Main Characteristics (BRA124ECM)



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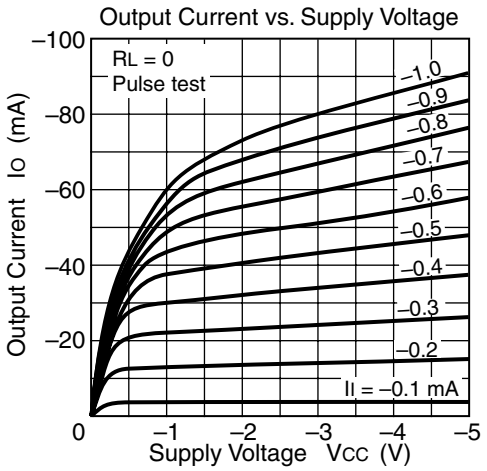
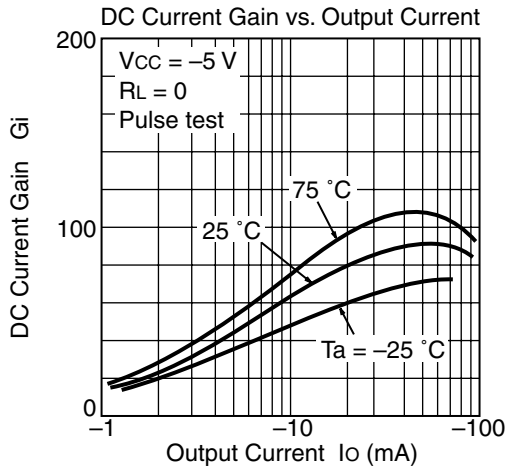
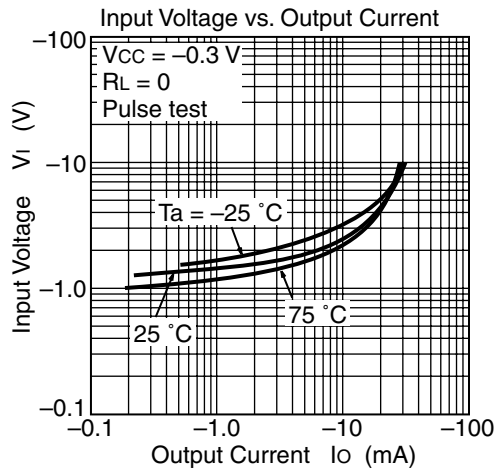
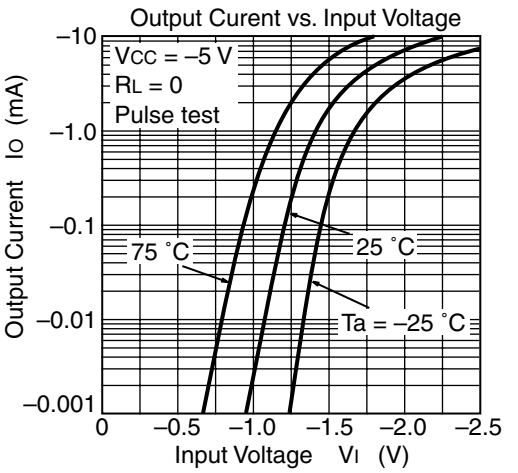
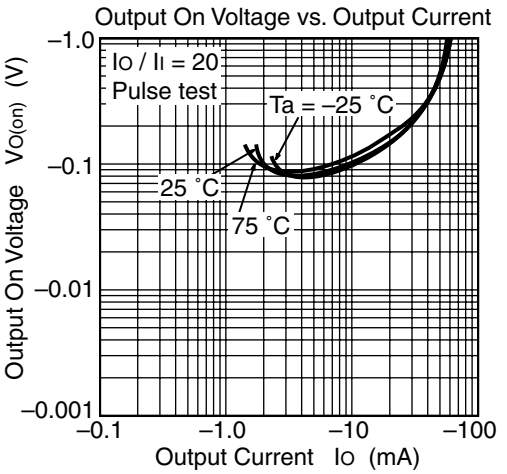


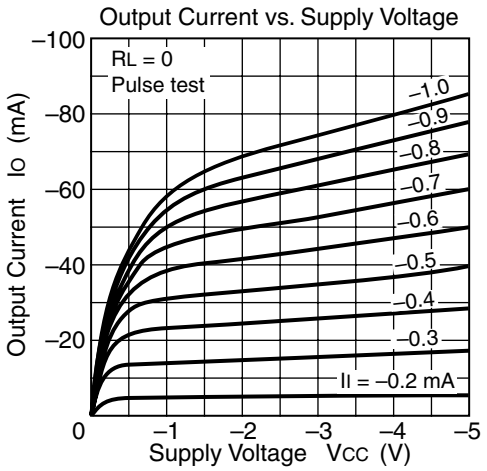



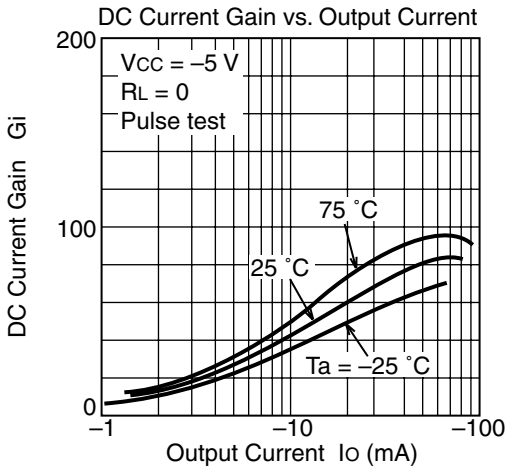



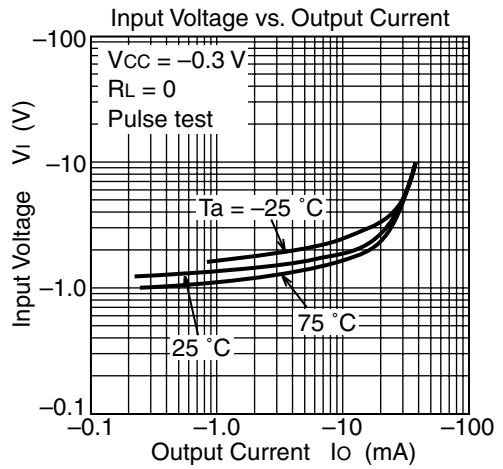



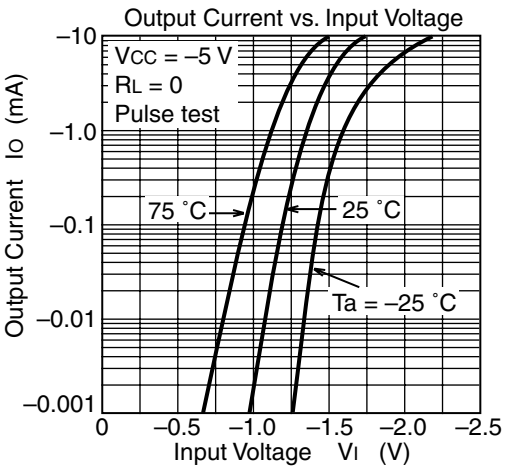



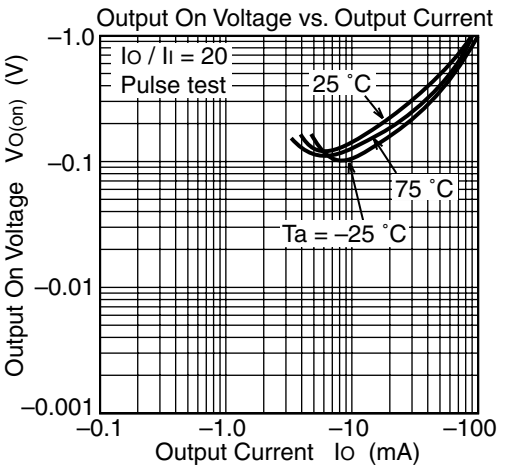
## Main Characteristics (BRA143ECM)



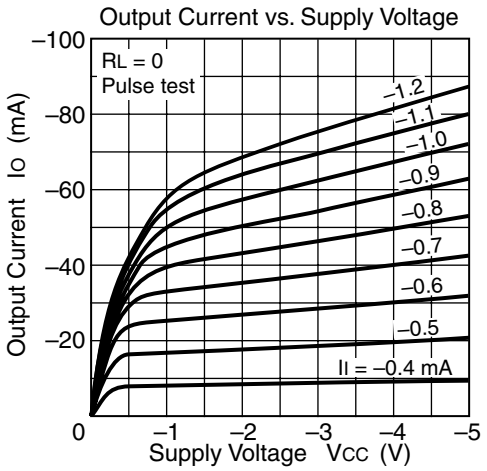



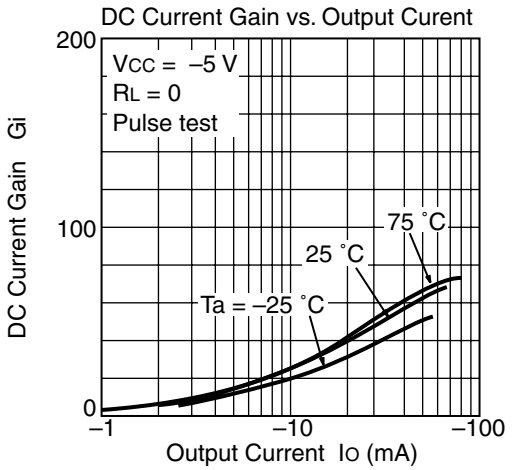



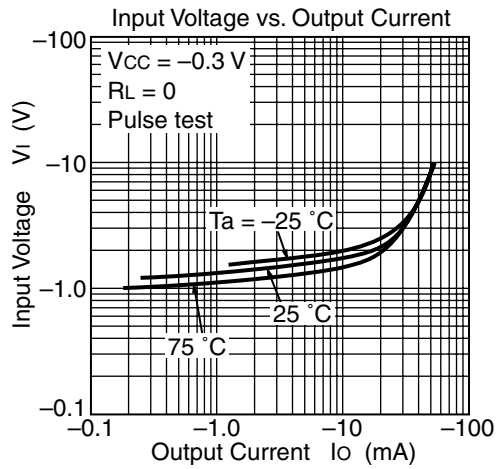



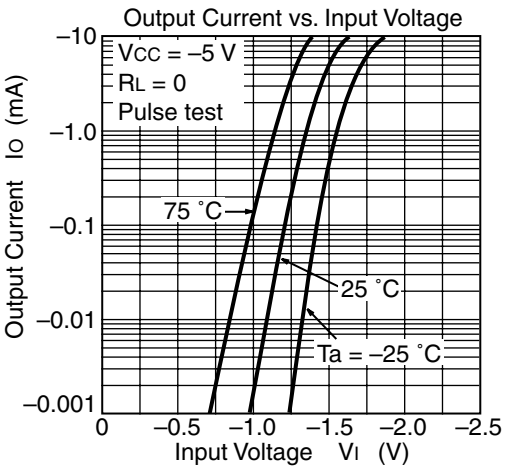



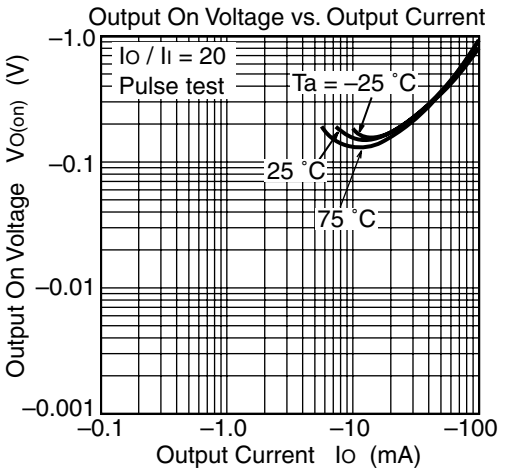
## Main Characteristics (BRA123ECM)



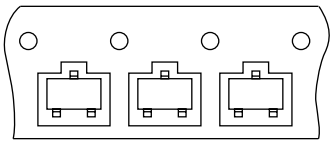
## Taping Specification

There are two different size reels in CMPAK packaging.

Packing to “Left” direction

Purchasing Identification Code

Standard Reel 3000 pcs/reel: Type No. + Mark **TL**
Large Reel 12000 pcs/reel: Type No. + Mark **UL**

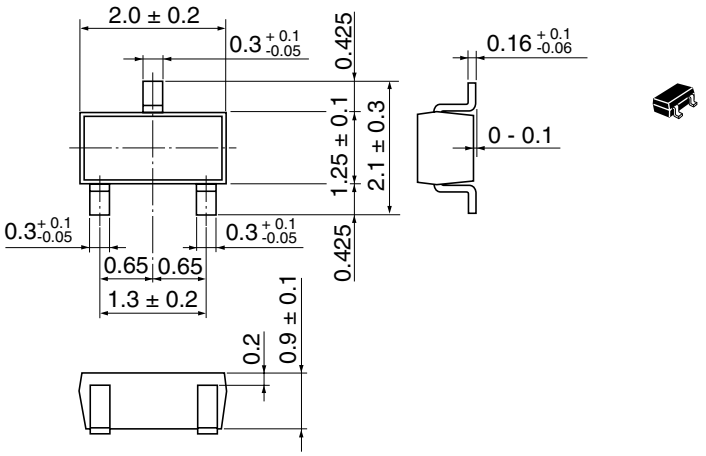


Marking face is up.
Center lead goes to left.

Direction of feed

## Package Dimensions

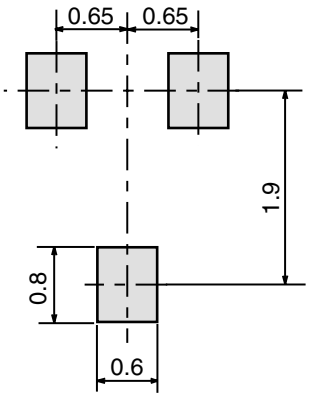
As of January, 2001
Unit: mm




| | |
|---|---|
| Hitachi Code | CMPAK |
| JEDEC | — |
| EIAJ | Conforms |
| Mass (reference value) | 0.006 g |

## Footprint

CMPAK



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