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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

Cautions

Keep safety first in your circuit designs!

1. Renesas Technology Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage.

Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

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BRC144EMP Series

NPN Built-in Resistor Transistor MPAK Series
Inverter, Driver, Switching

RENESAS

ADE-208-1443B (Z)

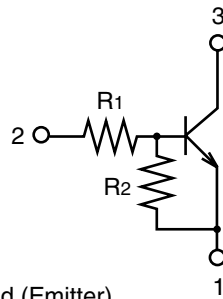
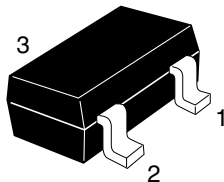
Rev.2
Sep. 2001

Features

- Built-in Resistor Type
- Simplifies Circuit Design
- Reduces Board Space
- Complementary pair with BRA144EMP series

Outline

MPAK



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

Note: Marking is shown in below.

Device	Marking	R1 (k Ω)	R2 (k Ω)
BRC144EMP	BG	47	47
BRC124EMP	DG	22	22
BRC114EMP	FG	10	10
BRC143EMP	HG	4.7	4.7
BRC123EMP	KG	2.2	2.2

Absolute Maximum Ratings

(Ta = 25°C)

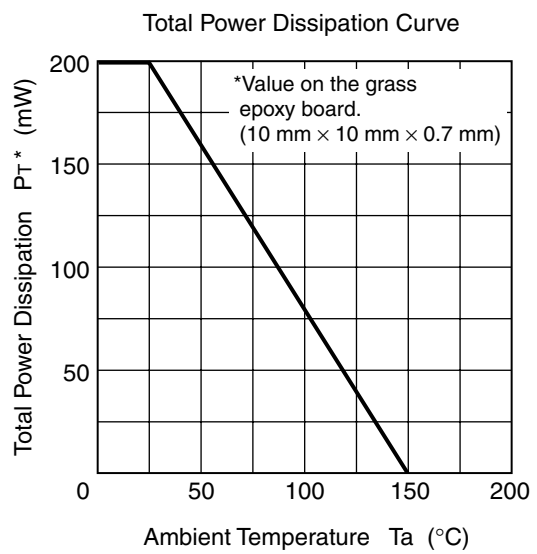
Item		Symbol	Ratings	Unit
Supply voltage		V_{CC}	50	V
Input voltage	BRC144EMP	V_I	-10 to +40	V
	BRC124EMP		-10 to +30	
	BRC114EMP		-10 to +20	
	BRC143EMP		-10 to +15	
	BRC123EMP		-10 to +12	
Output current		I_O	100	mA
Total power dissipation		P_T^{*1}	200	mW
Junction temperature		T_j	150	°C
Storage temperature		T_{stg}	-55 to +150	°C

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

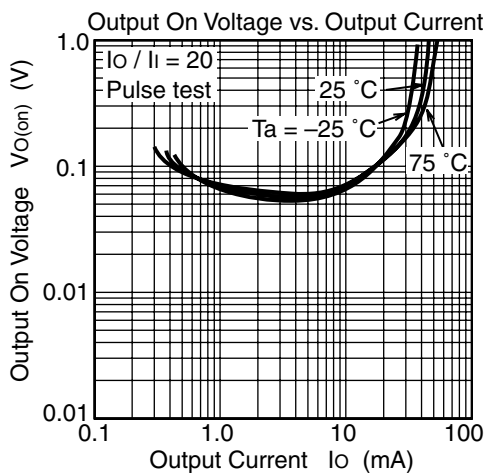
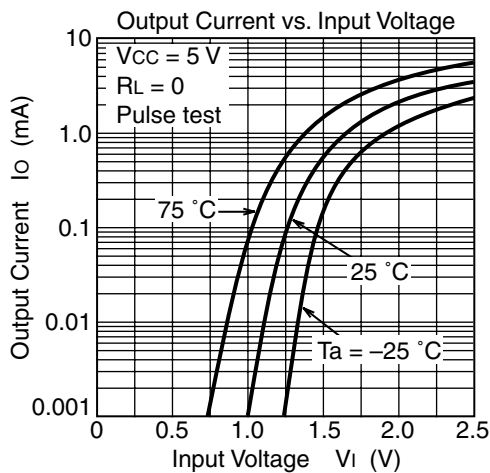
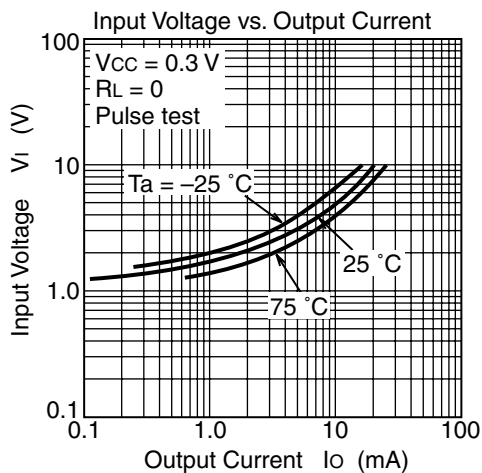
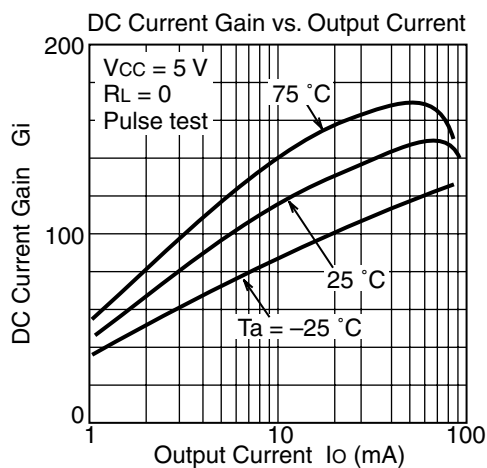
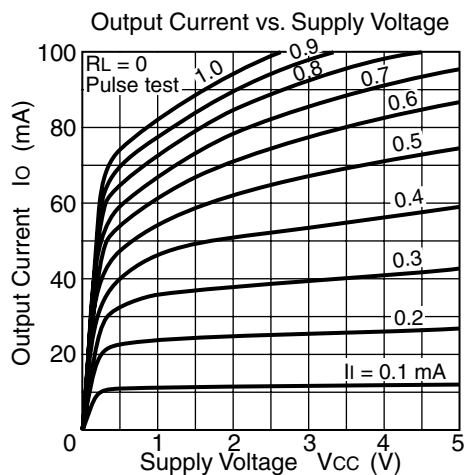
Electrical Characteristics

(Ta = 25°C)

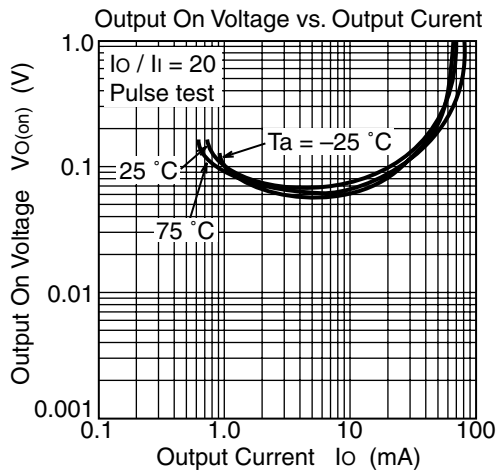
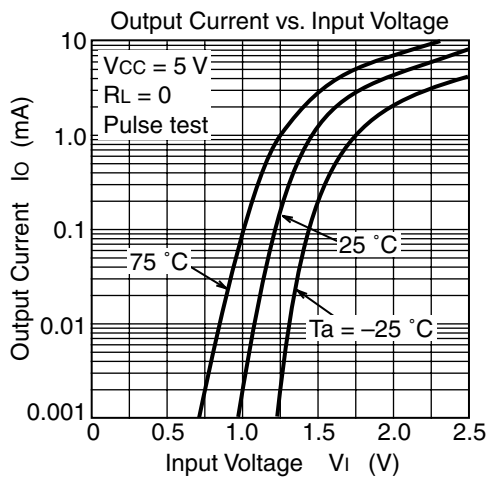
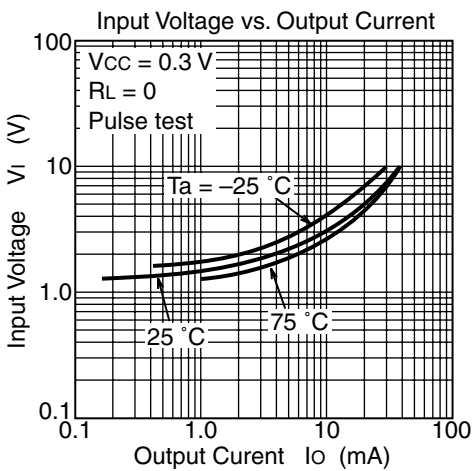
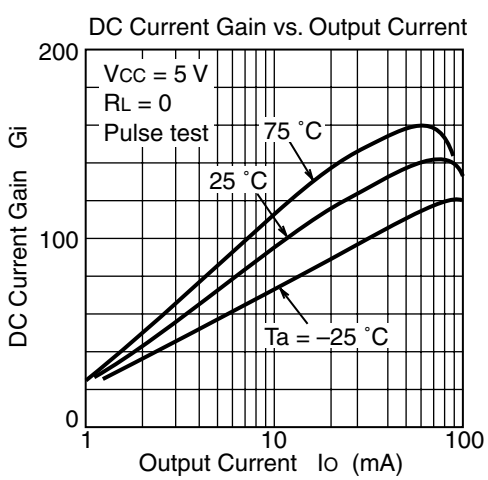
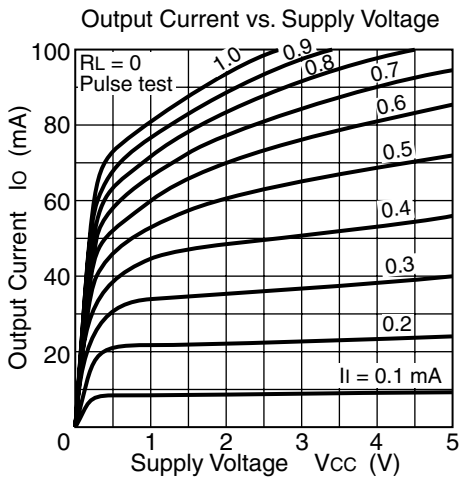
Item		Symbol	Min	Typ	Max	Unit	Test conditions
Input on voltage	BRC144EMP	$V_{I(on)}$	1.5	—	4.5	V	$V_{CC} = 0.3 \text{ V}, I_o = 5 \text{ mA}$
	BRC124EMP		1.3	—	3.0		
	BRC114EMP		1.2	—	2.4		
	BRC143EMP		1.1	—	2.0		
	BRC123EMP		1.1	—	1.8		
Input off voltage	BRC144EMP	$V_{I(off)}$	1.0	—	1.5	V	$V_{CC} = 5 \text{ V}, I_o = 100 \mu\text{A}$
	BRC124EMP		1.0	—	1.5		
	BRC114EMP		1.0	—	1.5		
	BRC143EMP		1.0	—	1.5		
	BRC123EMP		1.0	—	1.5		
Output saturation voltage		$V_{O(on)}$	—	—	0.3	V	$I_o = 10 \text{ mA}, I_i = 0.5 \text{ mA}$
Output cutoff current		$I_{O(off)}$	—	—	0.5	μA	$V_{CC} = 50 \text{ V}, I_i = 0$
DC current transfer ratio	BRC144EMP	G_i	70	—	—		$V_{CC} = 5 \text{ V}, I_o = 5 \text{ mA}$
	BRC124EMP		56	—	—		
	BRC114EMP		30	—	—		
	BRC143EMP		20	—	—		$V_{CC} = 5 \text{ V}, I_o = 10 \text{ mA}$
	BRC123EMP		20	—	—		$V_{CC} = 5 \text{ V}, I_o = 20 \text{ mA}$
Input resistance	BRC144EMP	R_i	33	47	61	$\text{k}\Omega$	
	BRC124EMP		15	22	28		
	BRC114EMP		7	10	13		
	BRC143EMP		3.3	4.7	6.1		
	BRC123EMP		1.5	2.2	2.8		
Resistance ratio		R_1/R_2	0.8	1.0	1.2		



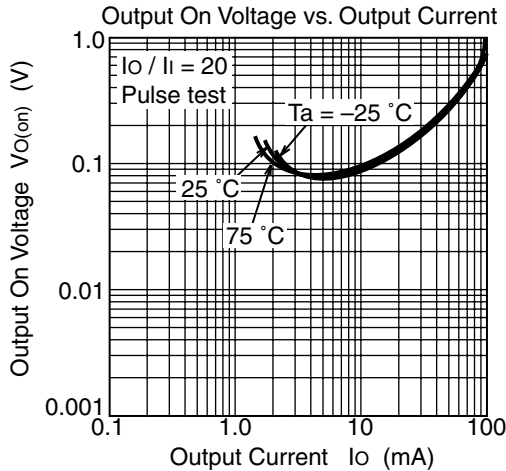
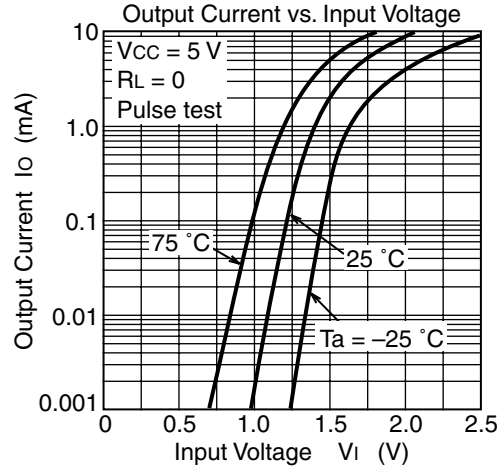
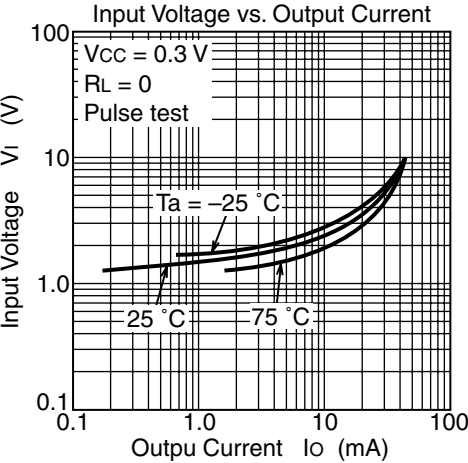
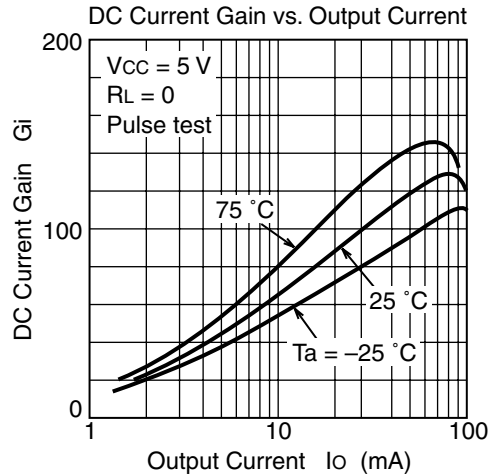
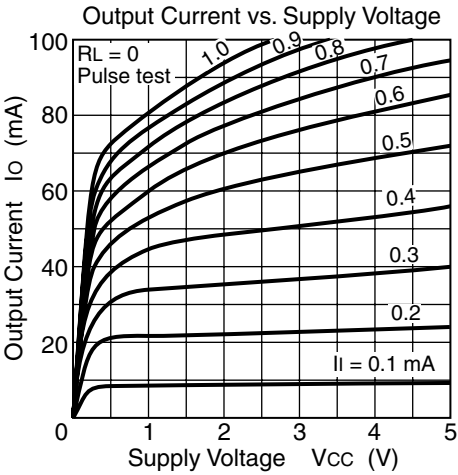
Main Characteristics (BRC144EMP)



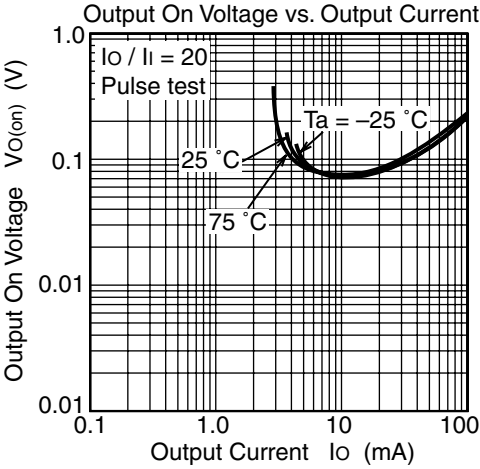
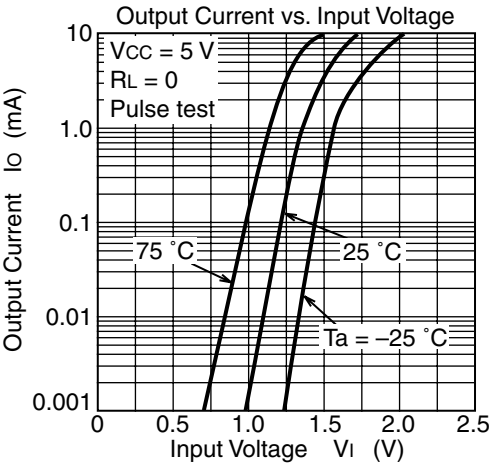
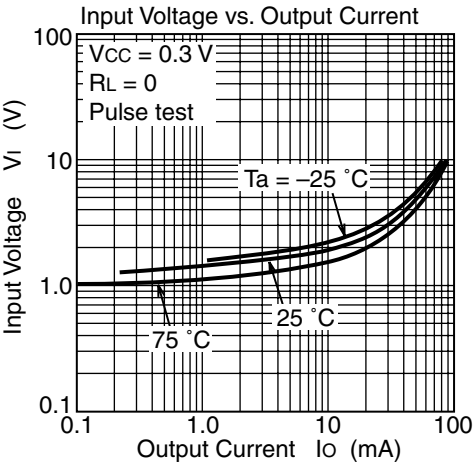
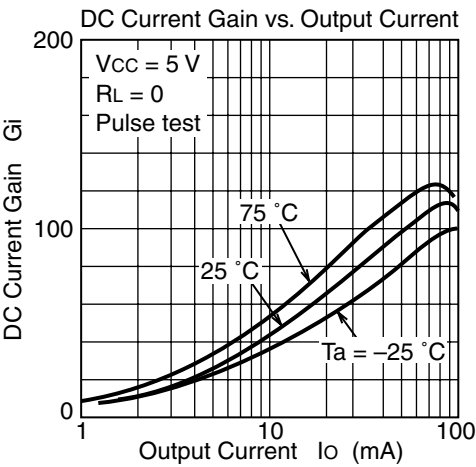
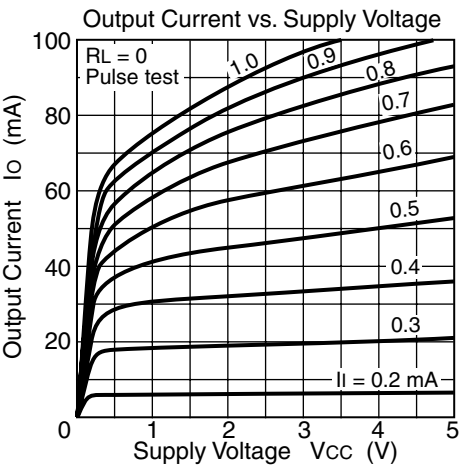
Main Characteristics (BRC124EMP)



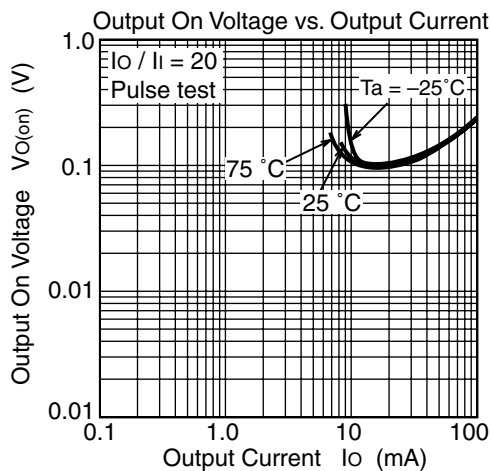
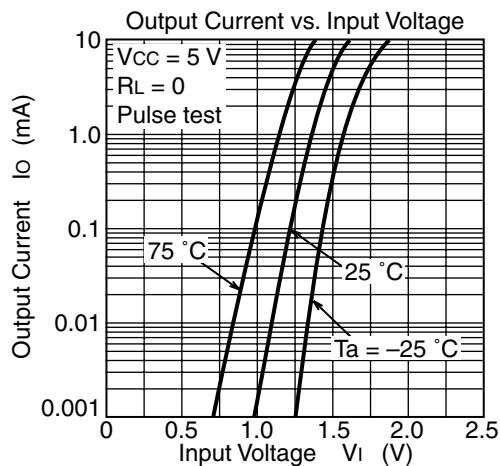
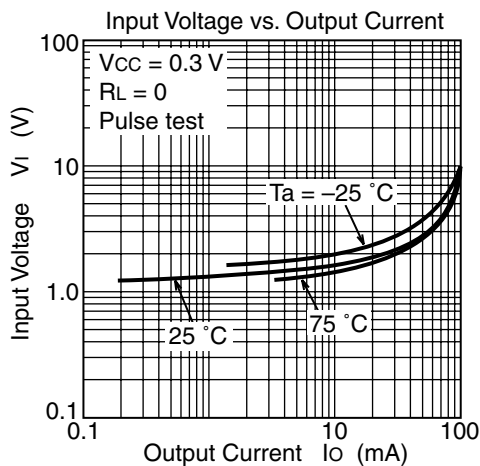
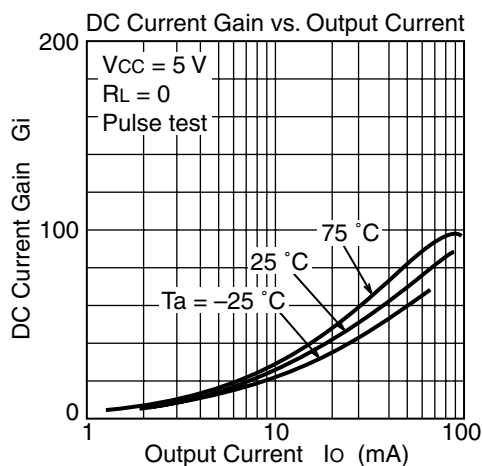
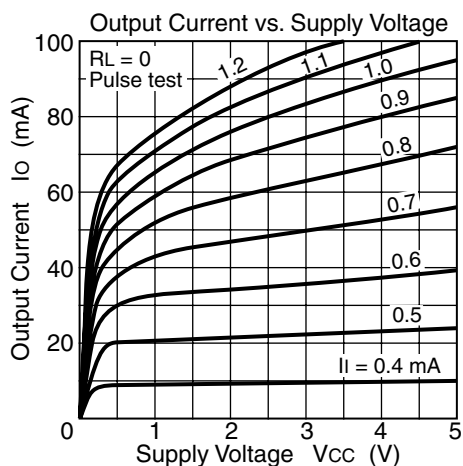
Main Characteristics (BRC114EMP)



Main Characteristics (BRC143EMP)



Main Characteristics (BRC123EMP)



Taping Specification

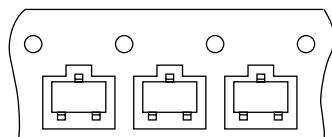
There are two different size reels in MPAK packaging.

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**



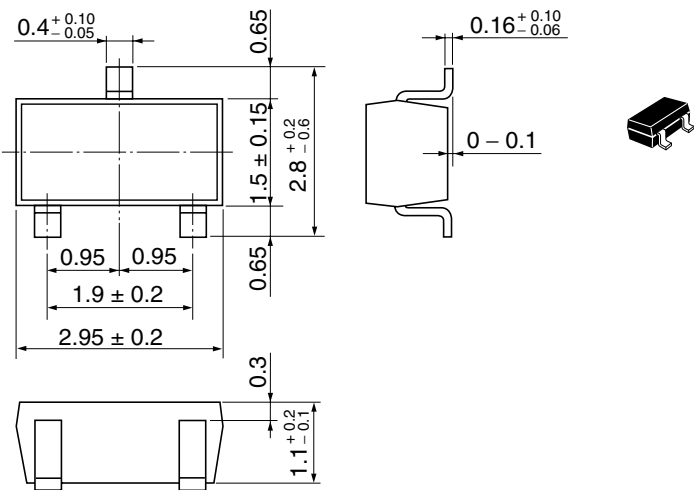
Marking face is up.
Center lead goes to left.

Direction of feed



Package Dimensions

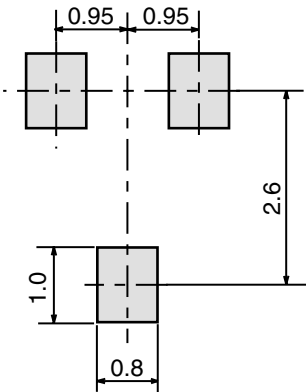
Unit: mm



Hitachi Code	MPAK
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.011 g

Footprint

MPAK



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Sales Offices

HITACHI

Hitachi, Ltd.

Semiconductor & Integrated Circuits
Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan
Tel: (03) 3270-2111 Fax: (03) 3270-5109

URL <http://www.hitachisemiconductor.com/>

For further information write to:

Hitachi Semiconductor (America) Inc.
179 East Tasman Drive
San Jose, CA 95134
Tel: <1> (408) 433-1990
Fax: <1> (408) 433-0223

Hitachi Europe Ltd.
Electronic Components Group
Whitebrook Park
Lower Cookham Road
Maidenhead
Berkshire SL6 8YA, United Kingdom
Tel: <44> (1628) 585000
Fax: <44> (1628) 585200

Hitachi Europe GmbH
Electronic Components Group
Dornacher Straße 3
D-85622 Feldkirchen
Postfach 201, D-85619 Feldkirchen
Germany
Tel: <49> (89) 9 9180-0
Fax: <49> (89) 9 29 30 00

Hitachi Asia Ltd.
Hitachi Tower
16 Collyer Quay #20-00
Singapore 049318
Tel: <65>-538-6533/538-8577
Fax: <65>-538-6933/538-3877
URL: <http://semiconductor.hitachi.com.sg>

Hitachi Asia Ltd.
(Taipei Branch Office)
4/F, No. 167, Tun Hwa North Road
Hung-Kuo Building
Taipei (105), Taiwan
Tel: <886>-(2)-2718-3666
Fax: <886>-(2)-2718-8180
Telex: 23222 HAS-TP
URL: <http://www.hitachi.com.tw>

Hitachi Asia (Hong Kong) Ltd.
Group III (Electronic Components)
7/F., North Tower
World Finance Centre,
Harbour City, Canton Road
Tsim Sha Tsui, Kowloon Hong Kong
Tel: <852>-(2)-735-9218
Fax: <852>-(2)-730-0281
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