

# BRA144ETP Series

PNP Built-in Resistor Transistor TO-92 Series  
Inverter, Driver, Switching

## HITACHI

ADE-208-1446B (Z)

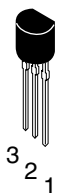
Rev.2  
Sep. 2001

### Features

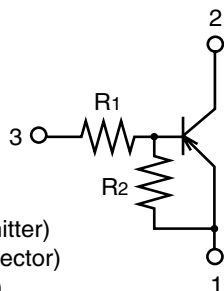
- Built-in Resistor Type
- Simplifies Circuit Design
- Reduces Board Space
- Complementary pair with BRC144ETP series

### Outline

TO-92



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



Note: Input resistance is shown in below

Device	R1 (k $\Omega$ )	R2 (k $\Omega$ )
BRA144ETP	47	47
BRA124ETP	22	22
BRA114ETP	10	10
BRA143ETP	4.7	4.7
BRA123ETP	2.2	2.2

# BRA144ETP Series

## Absolute Maximum Ratings

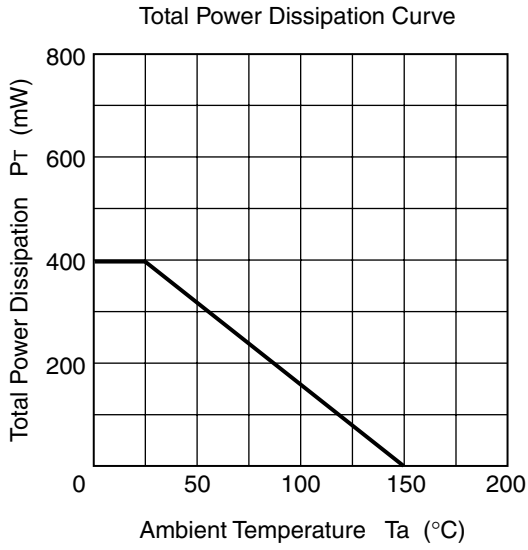
( $T_a = 25^\circ\text{C}$ )

Item		Symbol	Ratings	Unit
Supply voltage		$V_{CC}$	-50	V
Input voltage	BRA144ETP	$V_I$	+10 to -50	V
	BRA124ETP		+10 to -50	
	BRA114ETP		+10 to -50	
	BRA143ETP		+10 to -35	
	BRA123ETP		+10 to -24	
Output current		$I_o$	-100	mA
Total power dissipation		$P_T$	400	mW
Storage temperature		Tstg	-55 to +150	$^\circ\text{C}$

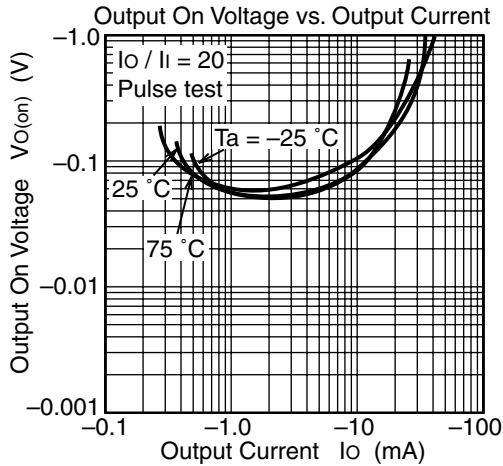
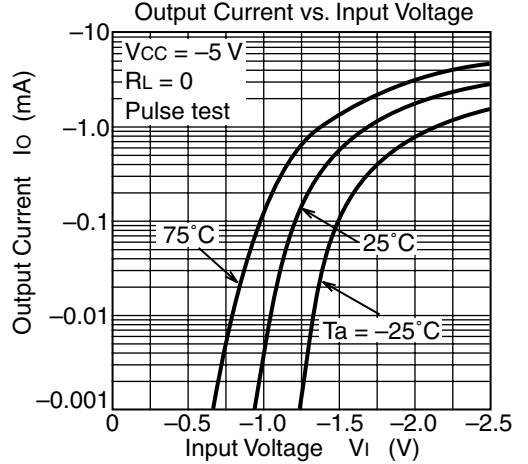
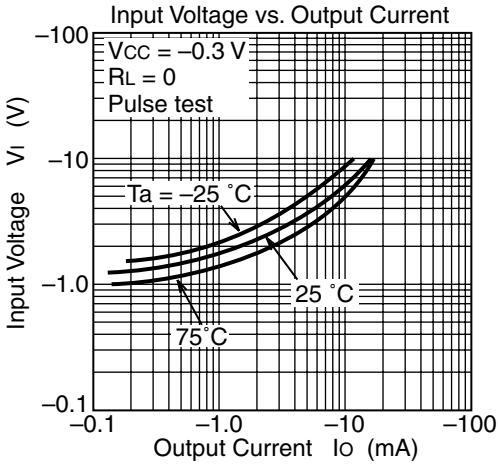
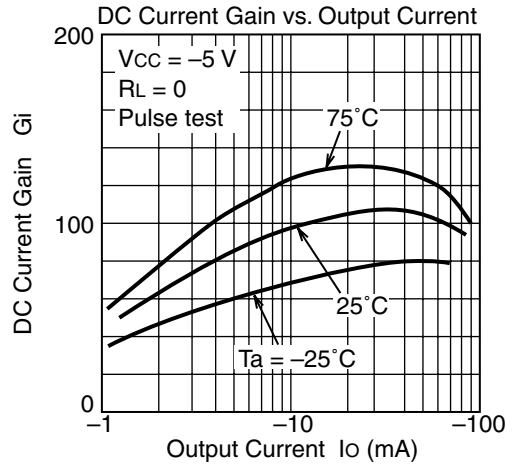
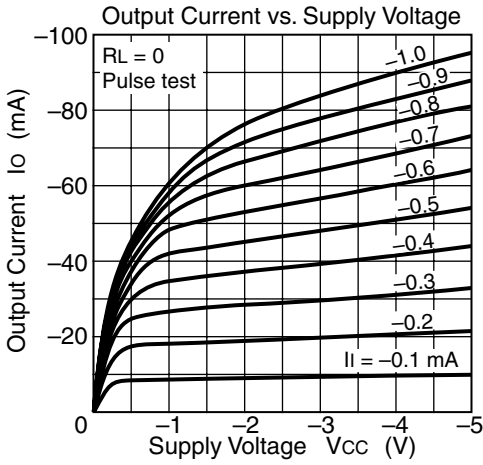
## Electrical Characteristics

(Ta = 25°C)

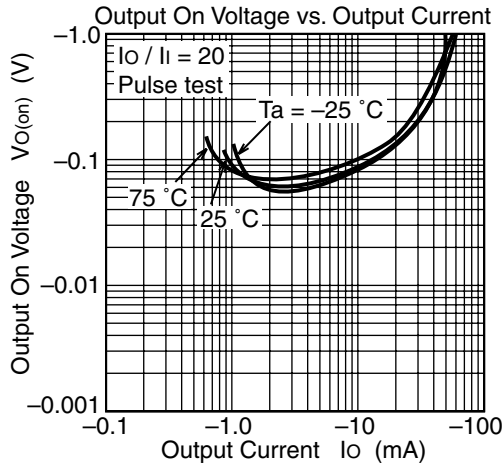
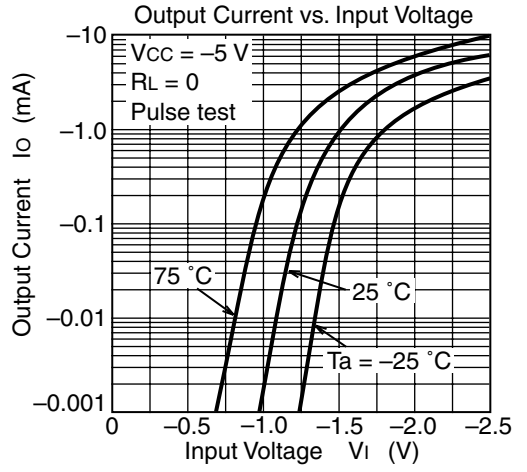
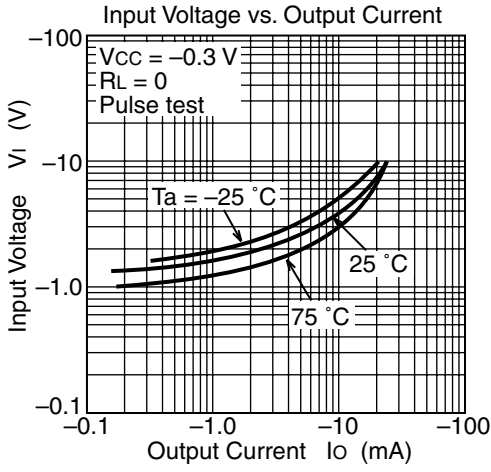
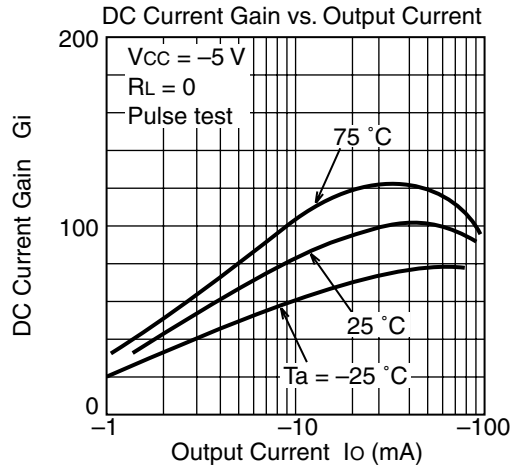
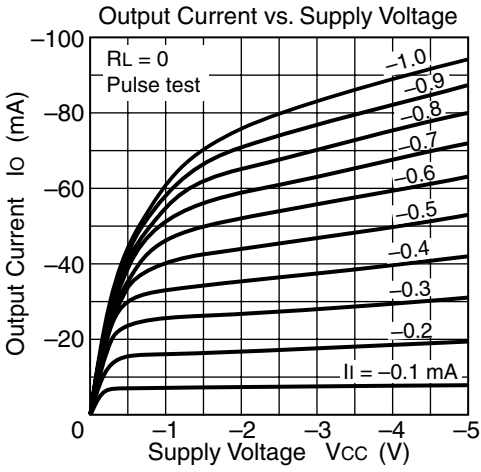
Item		Symbol	Min	Typ	Max	Unit	Test conditions	
Input on voltage	BRA144ETP	$V_{I(on)}$	-1.5	—	-4.5	V	$V_{cc} = -0.3 V,$ $I_o = -5 mA$	
	BRA124ETP		-1.3	—	-3.0			
	BRA114ETP		-1.2	—	-2.4			
	BRA143ETP		-1.1	—	-2.0			
	BRA123ETP		-1.1	—	-1.8			
Input off voltage	BRA144ETP	$V_{I(off)}$	-1.0	—	-1.5	V	$V_{cc} = -5 V,$ $I_o = -100 \mu A$	
	BRA124ETP		-1.0	—	-1.5			
	BRA114ETP		-1.0	—	-1.5			
	BRA143ETP		-1.0	—	-1.5			
	BRA123ETP		-1.0	—	-1.5			
Output saturation current		$V_{O(on)}$	—	—	-0.3	V	$I_o = -10 mA,$ $I_i = -0.5 mA$	
Output cutoff current		$I_{O(off)}$	—	—	-0.5	$\mu A$	$V_{cc} = -50 V, I_i = 0$	
DC current transfer ratio	BRA144ETP	$G_i$	70	—	—		$V_{cc} = -5 V, I_o = -5 mA$	
	BRA124ETP		56	—	—			
	BRA114ETP		30	—	—			
	BRA143ETP		20	—	—			$V_{cc} = -5 V, I_o = -10 mA$
	BRA123ETP		20	—	—			$V_{cc} = -5 V, I_o = -20 mA$
Input resistance	BRA144ETP	$R_i$	33	47	61	k $\Omega$		
	BRA124ETP		15	22	28			
	BRA114ETP		7	10	13			
	BRA143ETP		3.3	4.7	6.1			
	BRA123ETP		1.5	2.2	2.8			
Resistance ratio		$R_1/R_2$	0.8	1.0	1.2			



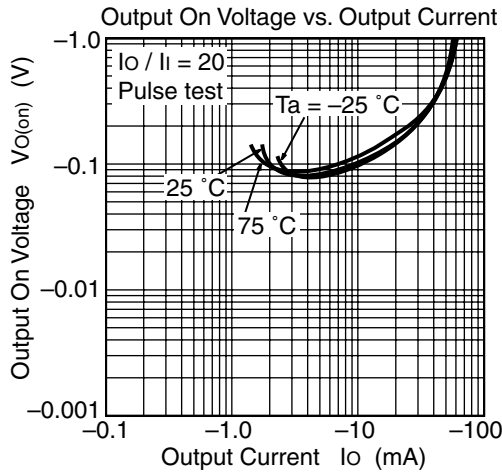
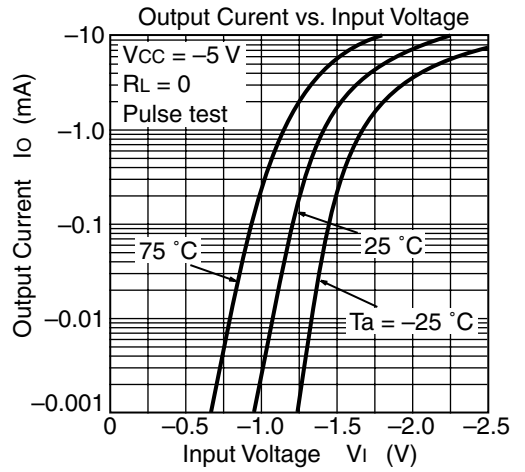
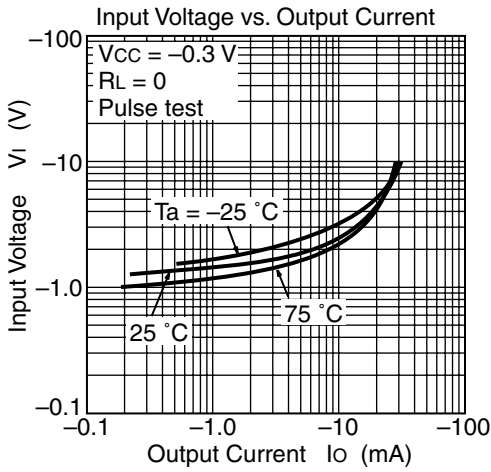
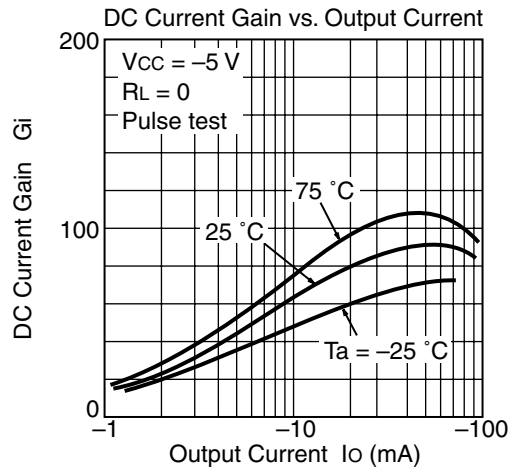
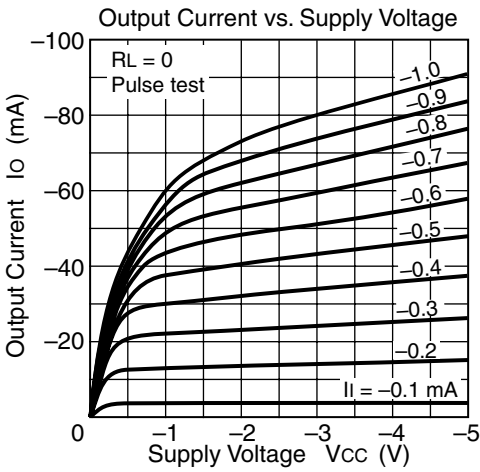
Main Characteristics (BRA144ETP)



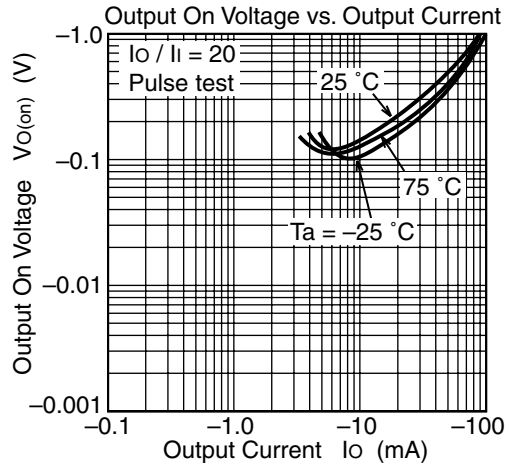
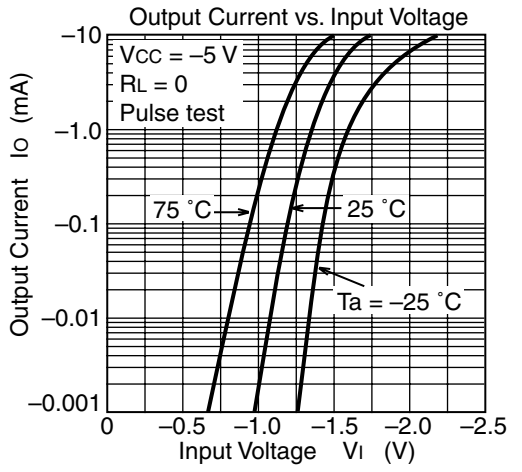
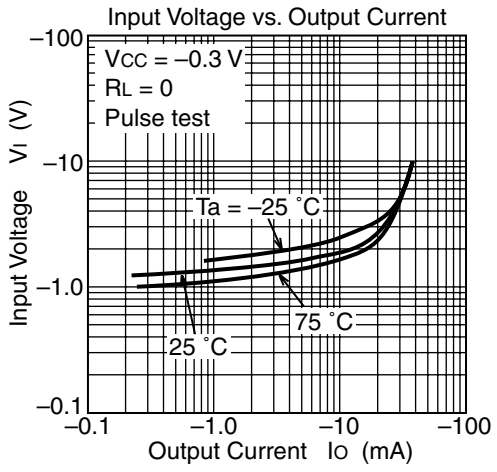
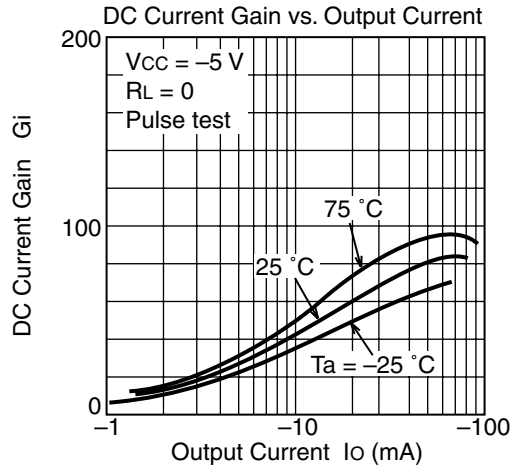
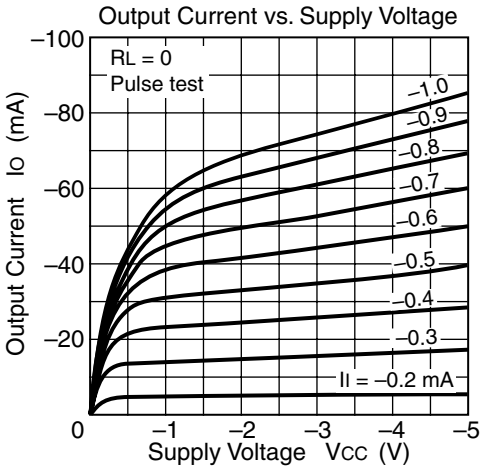
**Main Characteristics (BRA124ETP)**



Main Characteristics (BRA114ETP)

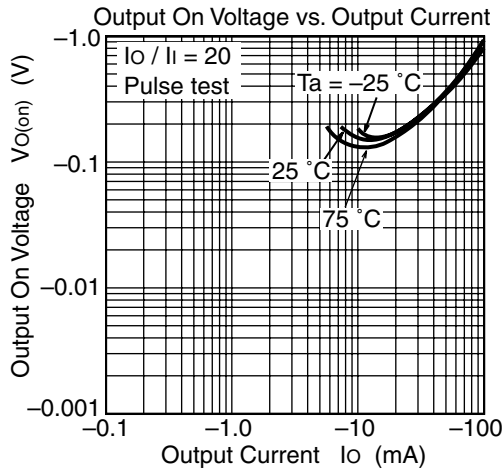
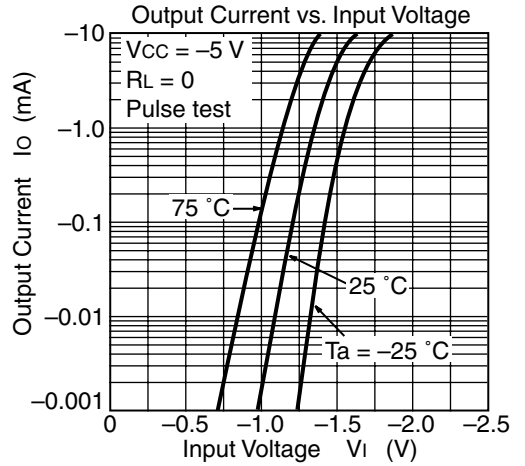
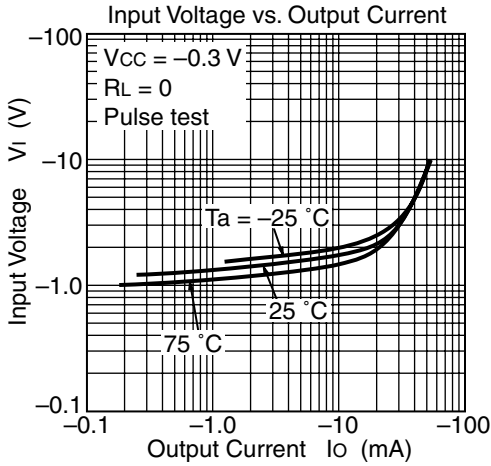
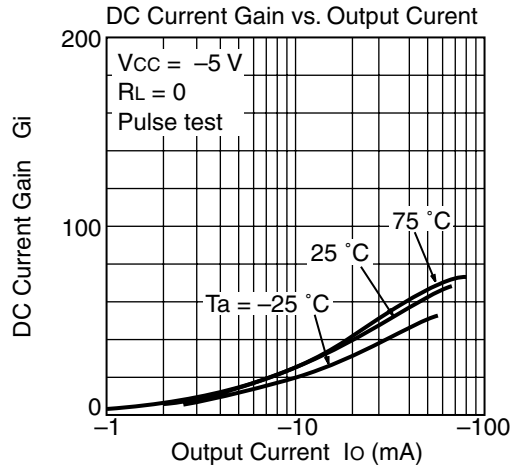
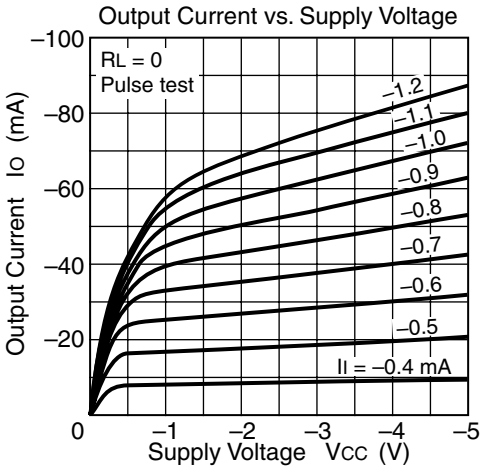


**Main Characteristics (BRA143ETP)**





Main Characteristics (BRA123ETP)

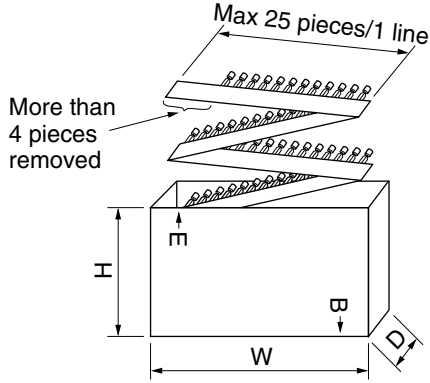


## Taping Specification

Purchasing Identification Code: Type No. + Grade + TZ

The tape is held in every 25 pitches to a hold box.

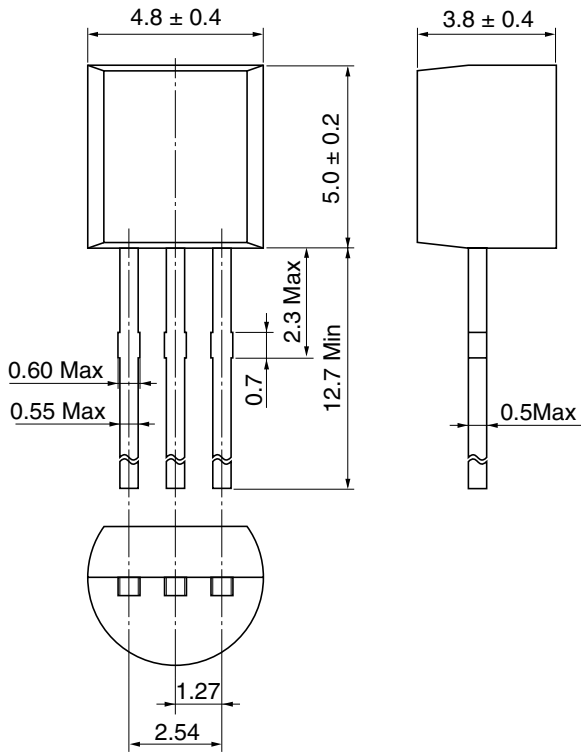
Packing quantity is 2500 pieces.



W	H	D	Unit: mm
336	262	47	

**Package Dimensions**

As of January, 2001  
Unit: mm



Hitachi Code	TO-92 (1)
JEDEC	Conforms
EIAJ	Conforms
Mass (reference value)	0.25 g

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### Hitachi, Ltd.

Semiconductor & Integrated Circuits  
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### For further information write to:

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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
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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 : <a href="http://www.hitachi.com.tw">http://www.hitachi.com.tw</a>
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