

NPN 100mA 50V Digital Transistor (Bias Resistor Built-in Transistor)

Parameter	Value
V <sub>CEO</sub>	50V
I <sub>C</sub>	100mA
R <sub>1</sub>	10kΩ

## Features

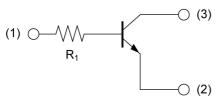
- 1) Built-In Biasing Resistor
- 2) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see inner circuit).
- 3) Only the on/off conditions need to be set for operation, making the circuit design easy.
- 4) Complementary PNP Types: DTA114T series

## Application

INVERTER, INTERFACE, DRIVER

## Inner circuit

DTC114TM/ DTC114TEB/ DTC114TUB

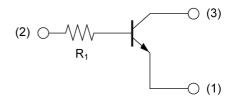


- (1) BASE
- (2) EMITTER
- (3) COLLECTOR

#### Outline

SOT-723	SOT-416FL
DTC114TM	DTC114TEB
(VMT3)	(EMT3F)
SOT-416	SOT-323FL (3)
DTC114TE	DTC114TUB
(EMT3)	(UMT3F)
SOT-323	SOT-346 (3)
DTC114TUA	DTC114TKA
(UMT3)	(SMT3)

## DTC114TE/ DTC114TUA/ DTC114TKA



- (1) EMITTER
- (2) BASE
- (3) COLLECTOR

## Packaging specifications

Part No.	Package	Package size	Taping code	Reel size (mm)	Tape width (mm)	Basic ordering unit.(pcs)	Marking
DTC114TM	SOT-723	1212	T2L	180	8	8000	04
DTC114TEB	SOT-416FL	1616	TL	180	8	3000	04
DTC114TE	SOT-416	1616	TL	180	8	3000	04
DTC114TUB	SOT-323FL	2021	TL	180	8	3000	04
DTC114TUA	SOT-323	2021	T106	180	8	3000	04
DTC114TKA	SOT-346	2928	T146	180	8	3000	04

# • Absolute maximum ratings ( $T_a = 25$ °C)

Pa	arameter	Symbol	Values	Unit
Collector-base voltage			50	V
Collector-emitter voltage		V <sub>CEO</sub>	50	V
Emitter-base voltage		V <sub>EBO</sub>	5	V
Collector current			100	mA
DTC114TM			150	
DTC114TEB			150	ma\A/
Down discipation	DTC114TE		150	
Power dissipation	DTC114TUB	P <sub>D</sub> *1	200	mW
	DTC114TUA		200	
	DTC114TKA		200	
Junction temperature		T <sub>j</sub>	150	°C
Range of storage tempera	ture	T <sub>stg</sub>	-55 to +150	°C

# ● Electrical characteristics (T<sub>a</sub> = 25°C)

Damanatan	0	O a sa distinua a		Values		
Parameter	Symbol	Conditions	Min.	Тур.	Max.	Unit
Collector-base breakdown voltage	BV <sub>CBO</sub>	I <sub>C</sub> = 50μA	50	-	-	V
Collector-emitter breakdown voltage	BV <sub>CEO</sub>	I <sub>C</sub> = 1mA	50	-	-	V
Emitter-base breakdown voltage	BV <sub>EBO</sub>	I <sub>E</sub> = 50μA	5	-	-	V
Collector cut-off current	I <sub>CBO</sub>	V <sub>CB</sub> = 50V	-	-	500	nA
Emitter cut-off current	I <sub>EBO</sub>	V <sub>EB</sub> = 4V	-	-	500	nA
Collector-emitter saturation voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> = 10mA, I <sub>B</sub> = 1mA	-	-	300	mV
DC current gain	h <sub>FE</sub>	V <sub>CE</sub> = 5V, I <sub>C</sub> = 1mA	100	250	600	-
Input resistance	R <sub>1</sub>	-	7	10	13	kΩ
Transition frequency	f <sub>T</sub> *2	V <sub>CE</sub> = 10V, I <sub>E</sub> = -5mA, f = 100MHz	-	250	-	MHz

<sup>\*1</sup> Each terminal mounted on a reference land.

<sup>\*2</sup> Characteristics of built-in transistor

## ● Electrical characteristic curves(Ta=25°C)

Fig.1 Grounded emitter propagation characteristics

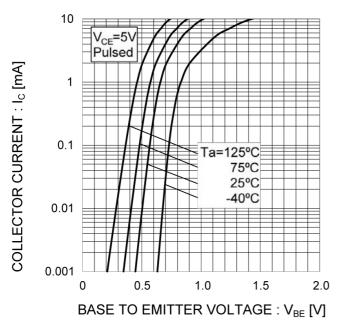
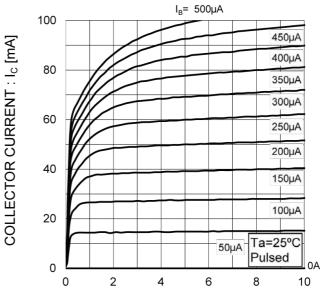


Fig.2 Typical Output Characteristics



COLLECTOR TO EMITTER VOLTAGE: V<sub>CE</sub> [V]

Fig.3 DC Current Gain vs. Collector

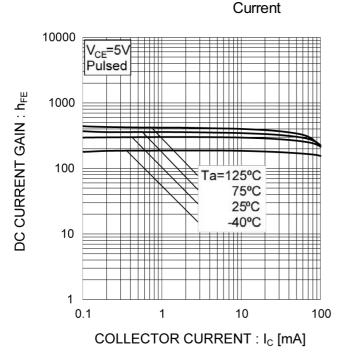
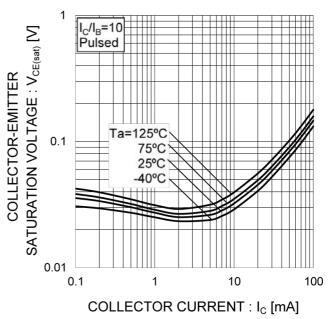
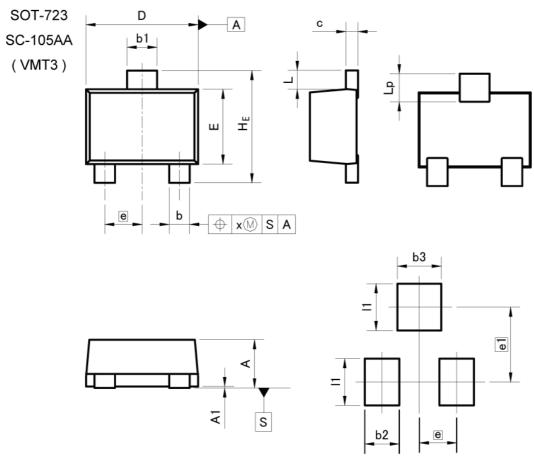


Fig.4 Collector-Emitter Saturation
Voltage vs. Collector Current





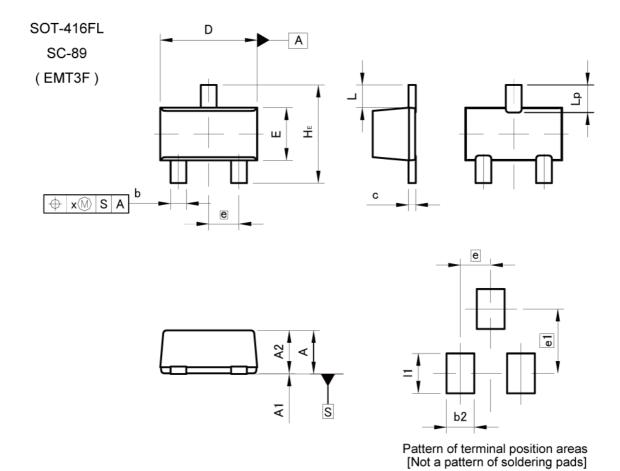
Pattern of terminal position areas [Not a pattern of soldering pads]

DIM -	MILIM	ETERS	INC	HES
DIM [	MIN	MAX	MIN	MAX
Α	0.45	0.55	0.018	0.022
A1	0.00	0.10	0.000	0.004
b	0.17	0.27	0.007	0.011
b1	0.27	0.37	0.011	0.015
С	0.08	0.18	0.003	0.007
D	1.10	1.30	0.043	0.051
E	0.70	0.90	0.028	0.035
е	0.4	40	0.0	02
HE	1.10	1.30	0.043	0.051
L	0.10	0.30	0.004	0.012
Lp	0.20	0.40	0.008	0.016
х	#	0.10	<u> </u>	0.004

DIM	MILIM	MILIMETERS IN		HES
DIM	MIN	MAX	MIN	MAX
b2	<u> </u>	0.37	544	0.015
b3	223	0.47	922	0.019
e1	0.	80	0.031	
11	<del>5</del> 98	0.50	250	0.020

Dimension in mm/inches



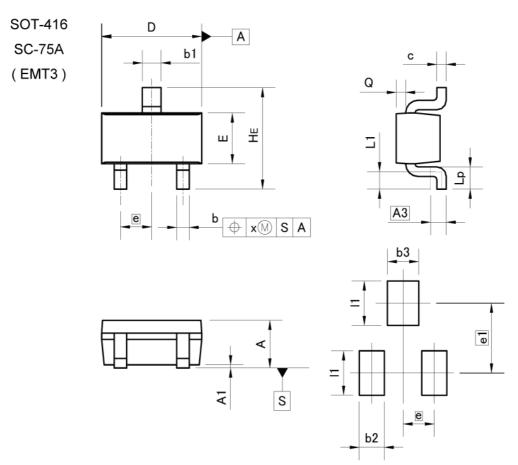


DIM -	MILIM	ETERS	INC	HES
DIM L	MIN	MAX	MIN	MAX
Α	0.65	0.85	0.026	0.033
A1	0.00	0.10	0.000	0.004
A2	0.60	0.80	0.024	0.031
b	0.21	0.36	0.008	0.014
С	0.08	0.18	0.003	0.007
D	1.50	1.70	0.059	0.067
E	0.76	0.96	0.030	0.038
е	0.9	0.50 0.0		20
HE	1.50	1.70	0.059	0.067
L	0.3	37	0.0	15
Lp	0.35	0.55	0.014	0.022
х		0.10	-	0.004

DIM -	MILIMETERS		INCHES	
DIM [	MIN	MAX	MIN	MAX
b2	<del>=</del> 1	0.46	-	0.018
e1		1.05	_	0.041
11	#	0.65		0.026

Dimension in mm/inches





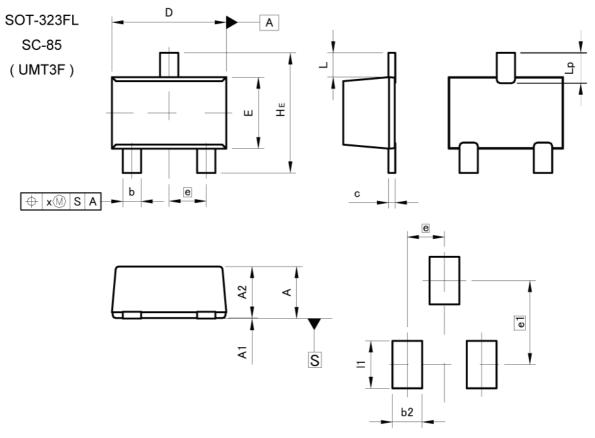
Pattern of terminal position areas [Not a pattern of soldering pads]

DIM	MILIM	ETERS	INC	HES
DIM [	MIN	MAX	MIN	MAX
Α	0.60	0.80	0.024	0.031
A1	0.00	0.10	0.000	0.004
A3	0.	25	0.0	10
b	0.15	0.30	0.006	0.012
b1	0.25	0.40	0.010	0.016
С	0.10	0.20	0.004	0.008
D	1.50	1.70	0.059	0.067
E	0.70	0.90	0.028	0.035
е	0.	50	0.020	
HE	1.40	1.80	0.055	0.071
L1	0.10	<u>#</u> 3	0.004	÷
Lp	0.15		0.006	255
Q	0.05	0.25	0.002	0.010
х	27	0.10	_	0.004

DIM	MILIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
b2	244	0.40	-	0.016
b3	10 <del>48</del>	0.50	; <del>; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; </del>	0.020
e1	1.	10	0.0	043
11		0.70	-	0.028

Dimension in mm/inches





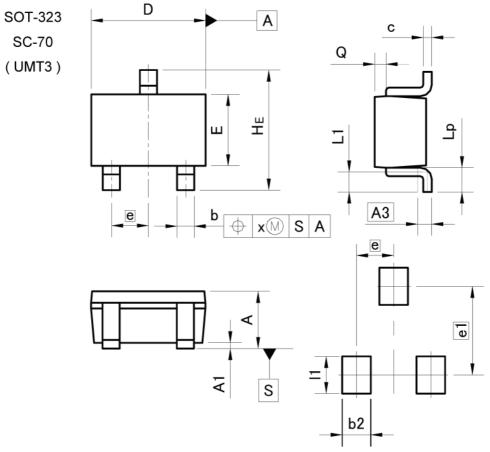
Pattern of terminal position areas [Not a pattern of soldering pads]

DIM	MILIM	ETERS	INC	HES
DIM	MIN	MAX	MIN	MAX
Α	0.85	1.05	0.033	0.041
A1	0.00	0.10	0.000	0.004
A2	0.80	1.00	0.031	0.039
b	0.27	0.42	0.011	0.017
С	0.08	0.18	0.003	0.007
D	1.90	2.10	0.075	0.083
E	1.15	1.35	0.045	0.053
е	0.0	<del>3</del> 5	0.0	26
HE	2.00	2.20	0.079	0.087
L	0.4	25	0.0	17
Lp	0.43	0.63	0.017	0.025
х	=	0.10	-	0.004

DIM	MILIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
b2	<del>-</del> s	0.52	-	0.020
e1	1.47		0.0	58
11	<del></del> k	0.83	-	0.033

Dimension in mm/inches





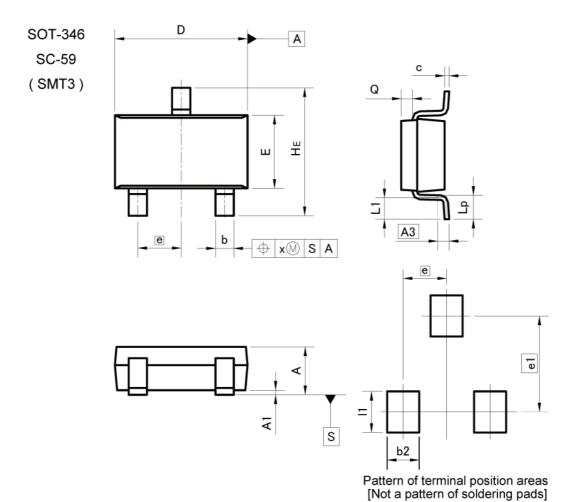
Pattern of terminal position areas [Not a pattern of soldering pads]

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
Α	0.80	1.00	0.031	0.039
A1	0.00	0.10	0.000	0.004
A3	0.25		0.010	
b	0.25	0.40	0.010	0.016
С	0.10	0.20	0.004	0.008
D	1.90	2.10	0.075	0.083
E	1.15	1.35	0.045	0.053
е	0.65		0.0	26
HE	2.00	2.20	0.079	0.087
L1	0.10	0.40	0.004	0.016
Lp	0.25	0.55	0.010	0.022
Q	0.10	0.30	0.004	0.012
х	=	0.10	-	0.004

DIM	MILIMETERS		INCHES		
DIM	MIN	MAX	MIN	MAX	
b2	<u>644</u> 9	0.50	<u>~</u>	0.020	
e1	1.55		0.0	0.061	
11	<del>-</del>	0.65	1000	0.026	

Dimension in mm/inches





DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
Α	1.00	1.30	0.039	0.051
A1	0.00	0.10	0.000	0.004
A3	0.	25	0.010	
b	0.35	0.50	0.014	0.020
С	0.09	0.25	0.004	0.010
D	2.80	3.00	0.110	0.118
E	1.50	1.80	0.059	0.071
е	0.95		0.0	37
HE	2.60	3.00	0.102	0.118
L1	0.30	0.60	0.012	0.024
Lp	0.40	0.70	0.016	0.028
Q	0.20	0.30	0.008	0.012
х	-3	0.10	47	0.004
у	-	0.10	8 <del>-</del>	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	-2	0.60	×=	0.024
e1	2.10		0.083	
11	-8	0.90	<del>(=</del>	0.035

Dimension in mm/inches



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Our Products are designed and manufactured for application in ordinary electronic equipments (such as AV equipment, OA equipment, telecommunication equipment, home electronic appliances, amusement equipment, etc.). If you intend to use our Products in devices requiring extremely high reliability (such as medical equipment (Note 1), transport equipment, traffic equipment, aircraft/spacecraft, nuclear power controllers, fuel controllers, car equipment including car accessories, safety devices, etc.) and whose malfunction or failure may cause loss of human life, bodily injury or serious damage to property ("Specific Applications"), please consult with the ROHM sales representative in advance. Unless otherwise agreed in writing by ROHM in advance, ROHM shall not be in any way responsible or liable for any damages, expenses or losses incurred by you or third parties arising from the use of any ROHM's Products for Specific Applications.

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JÁPAN	USA	EU	CHINA
CLASSⅢ	СГУССШ	CLASS II b	CLASSⅢ
CLASSIV	CLASSⅢ	CLASSⅢ	CLASSIII

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  - [b] Use of our Products outdoors or in places where the Products are exposed to direct sunlight or dust
  - [c] Use of our Products in places where the Products are exposed to sea wind or corrosive gases, including Cl<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, and NO<sub>2</sub>
  - [d] Use of our Products in places where the Products are exposed to static electricity or electromagnetic waves
  - [e] Use of our Products in proximity to heat-producing components, plastic cords, or other flammable items
  - [f] Sealing or coating our Products with resin or other coating materials
  - [g] Use of our Products without cleaning residue of flux (even if you use no-clean type fluxes, cleaning residue of flux is recommended); or Washing our Products by using water or water-soluble cleaning agents for cleaning residue after soldering
  - [h] Use of the Products in places subject to dew condensation
- 4. The Products are not subject to radiation-proof design.
- 5. Please verify and confirm characteristics of the final or mounted products in using the Products.
- 6. In particular, if a transient load (a large amount of load applied in a short period of time, such as pulse. is applied, confirmation of performance characteristics after on-board mounting is strongly recommended. Avoid applying power exceeding normal rated power; exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.
- 7. De-rate Power Dissipation depending on ambient temperature. When used in sealed area, confirm that it is the use in the range that does not exceed the maximum junction temperature.
- 8. Confirm that operation temperature is within the specified range described in the product specification.
- 9. ROHM shall not be in any way responsible or liable for failure induced under deviant condition from what is defined in this document.

#### **Precaution for Mounting / Circuit board design**

- 1. When a highly active halogenous (chlorine, bromine, etc.) flux is used, the residue of flux may negatively affect product performance and reliability.
- 2. In principle, the reflow soldering method must be used on a surface-mount products, the flow soldering method must be used on a through hole mount products. If the flow soldering method is preferred on a surface-mount products, please consult with the ROHM representative in advance.

For details, please refer to ROHM Mounting specification

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#### **Precaution for Electrostatic**

This Product is electrostatic sensitive product, which may be damaged due to electrostatic discharge. Please take proper caution in your manufacturing process and storage so that voltage exceeding the Products maximum rating will not be applied to Products. Please take special care under dry condition (e.g. Grounding of human body / equipment / solder iron, isolation from charged objects, setting of lonizer, friction prevention and temperature / humidity control).

## **Precaution for Storage / Transportation**

- 1. Product performance and soldered connections may deteriorate if the Products are stored in the places where:
  - [a] the Products are exposed to sea winds or corrosive gases, including Cl2, H2S, NH3, SO2, and NO2
  - [b] the temperature or humidity exceeds those recommended by ROHM
  - [c] the Products are exposed to direct sunshine or condensation
  - [d] the Products are exposed to high Electrostatic
- Even under ROHM recommended storage condition, solderability of products out of recommended storage time period
  may be degraded. It is strongly recommended to confirm solderability before using Products of which storage time is
  exceeding the recommended storage time period.
- 3. Store / transport cartons in the correct direction, which is indicated on a carton with a symbol. Otherwise bent leads may occur due to excessive stress applied when dropping of a carton.
- 4. Use Products within the specified time after opening a humidity barrier bag. Baking is required before using Products of which storage time is exceeding the recommended storage time period.

#### **Precaution for Product Label**

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