

Parameter	Value
$V_{CC}$	12V
$I_{C(MAX.)}$	500mA
$R_1$	4.7k $\Omega$
$R_2$	4.7k $\Omega$

### ● Outline

<p>SOT-723</p> <p>DTD543EM (VMT3)</p>	<p>SOT-416</p> <p>DTD543EE (EMT3)</p>
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### ● Features

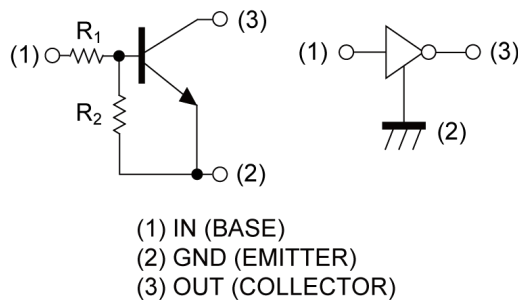
- 1)  $V_{CE(sat)}$  is lower than conventional products.
- 2) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see equivalent circuit).
- 3) The bias resistors consist of thin-film resistors with complete isolation to allow negative biasing of the input. They also have the advantage of almost completely eliminating parasitic effects.

### ● Application

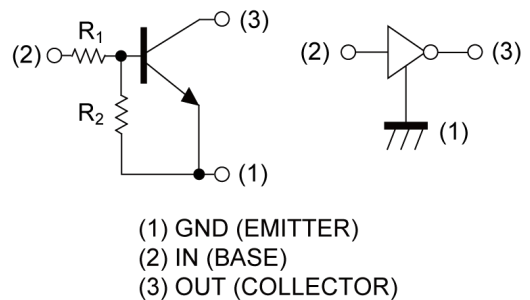
INVERTER, INTERFACE, DRIVER

### ● Inner circuit

DTD543EM



DTD543EE



### ● Packaging specifications

Part No.	Package	Package size	Taping code	Reel size (mm)	Tape width (mm)	Basic ordering unit.(pcs)	Marking
DTD543EM	SOT-723 (VMT3)	1212	T2L	180	8	8000	X23
DTD543EE	SOT-416 (EMT3)	1616	TL	180	8	3000	X23

● **Absolute maximum ratings** ( $T_a = 25^\circ\text{C}$ )

Parameter		Symbol	Values	Unit
Supply voltage		$V_{CC}$	12	V
Input voltage		$V_{IN}$	-10 to 12	V
Collector current		$I_{C(MAX)}^{*1}$	500	mA
Power dissipation	DTD543EM	$P_D^{*2}$	150	mW
	DTD543EE		150	
Junction temperature		$T_j$	150	$^\circ\text{C}$
Range of storage temperature		$T_{stg}$	-55 to +150	$^\circ\text{C}$

● **Electrical characteristics** ( $T_a = 25^\circ\text{C}$ )

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Input voltage	$V_{I(off)}$	$V_{CC} = 5\text{V}, I_O = 100\mu\text{A}$	-	-	0.5	V
	$V_{I(on)}$	$V_O = 0.3\text{V}, I_O = 20\text{mA}$	2.5	-	-	
Output voltage	$V_{O(on)}$	$I_O = 100\text{mA}, I_I = 5\text{mA}$	-	60	300	mV
Input current	$I_I$	$V_I = 5\text{V}$	-	-	1.4	mA
Output current	$I_{O(off)}$	$V_{CC} = 12\text{V}, V_I = 0\text{V}$	-	-	500	nA
DC current gain	$G_I$	$V_O = 2\text{V}, I_O = 100\text{mA}$	115	-	-	-
Input resistance	$R_1$	-	3.29	4.7	6.11	k $\Omega$
Resistance ratio	$R_2/R_1$	-	0.8	1.0	1.2	-
Transition frequency	$f_T^{*1}$	$V_{CE} = 10\text{V}, I_E = -5\text{mA}, f = 100\text{MHz}$	-	260	-	MHz

\*1 Characteristics of built-in transistor

\*2 Each terminal mounted on a reference land.

●Electrical characteristic curves ( $T_a=25^\circ\text{C}$ )

Fig.1 Input Voltage vs. Output Current (ON Characteristics)

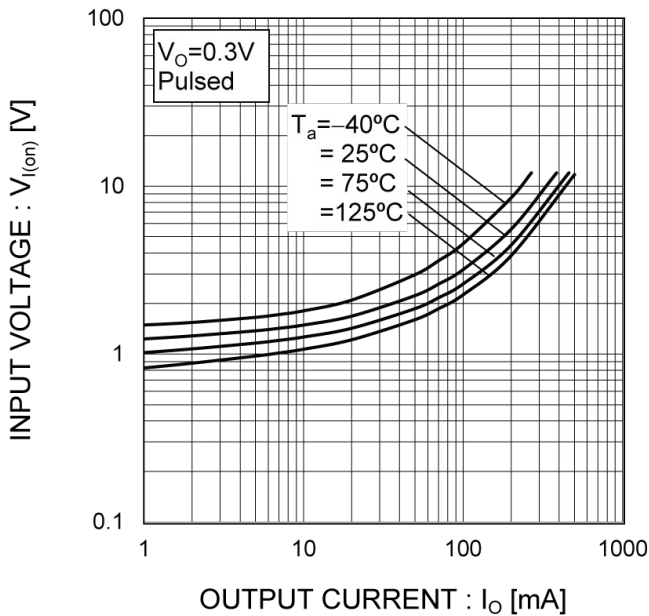


Fig.2 Output Current vs. Input Voltage (OFF Characteristics)

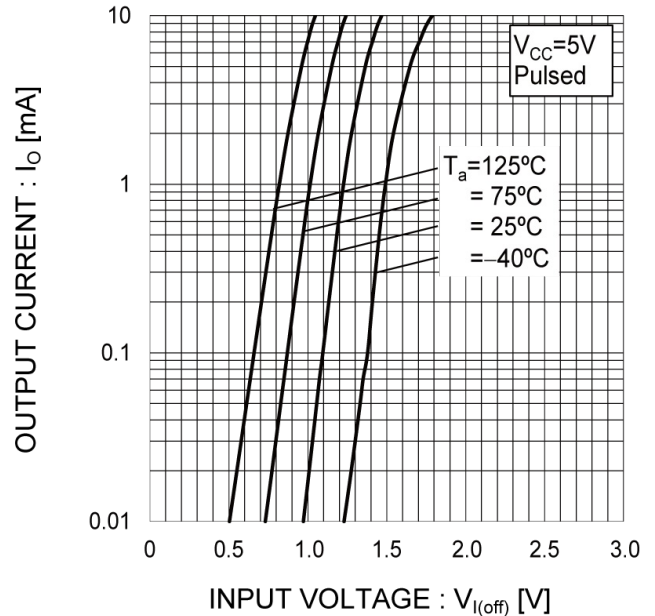


Fig.3 Output Current vs. Output Voltage

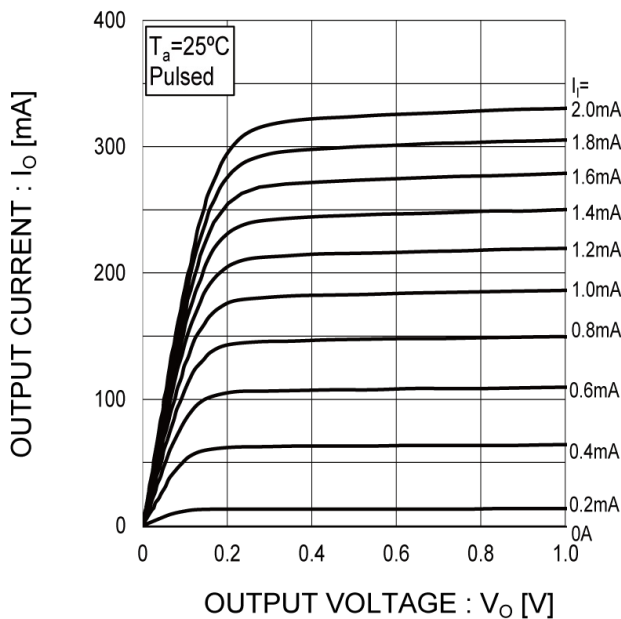
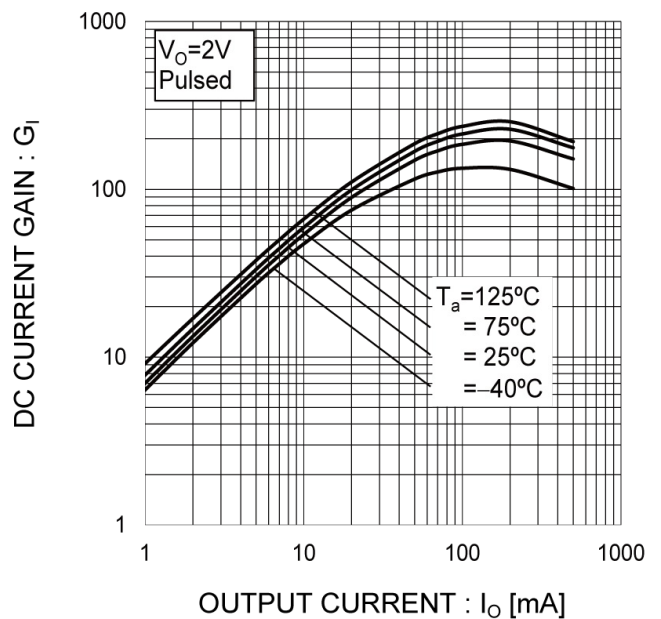
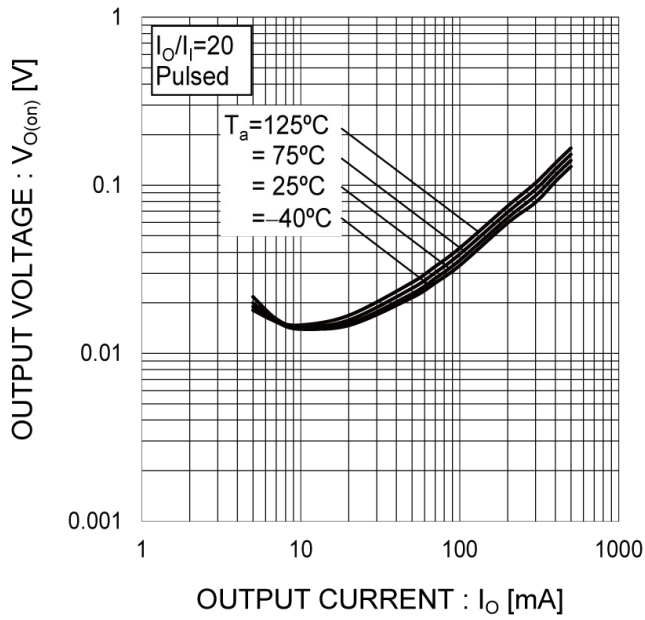


Fig.4 DC Current Gain vs. Output Current



● Electrical characteristic curves ( $T_a = 25^\circ\text{C}$ )

Fig.5 Output Voltage vs. Output Current



●Dimensions

SOT-723  
SC-105AA  
(VMT3)



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

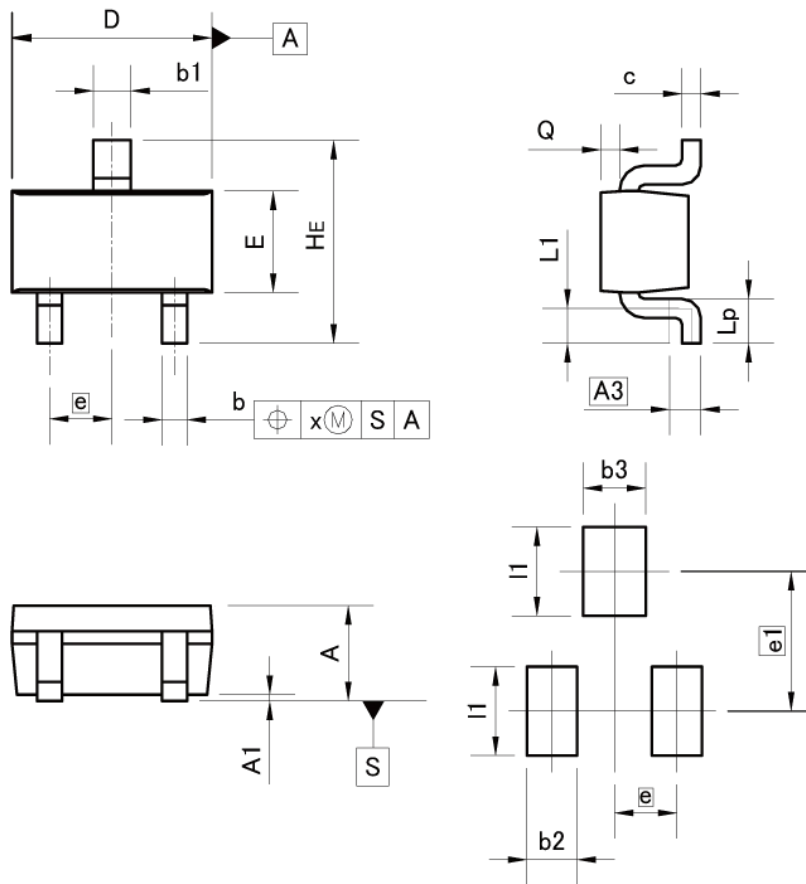
DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.45	0.55	0.018	0.022
A1	0.00	0.10	0.000	0.004
b	0.17	0.27	0.007	0.011
b1	0.27	0.37	0.011	0.015
c	0.08	0.18	0.003	0.007
D	1.10	1.30	0.043	0.051
E	0.70	0.90	0.028	0.035
e	0.40		0.02	
HE	1.10	1.30	0.043	0.051
L	0.10	0.30	0.004	0.012
Lp	0.20	0.40	0.008	0.016
x	-	0.10	-	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	-	0.37	-	0.015
b3	-	0.47	-	0.019
e1	0.80		0.031	
I1	-	0.50	-	0.020

Dimension in mm/inches

●Dimensions

SOT-416  
SC-75A  
(EMT3)



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

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.60	0.80	0.024	0.031
A1	0.00	0.10	0.000	0.004
A3	0.25		0.010	
b	0.15	0.30	0.006	0.012
b1	0.25	0.40	0.010	0.016
c	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
e	0.50		0.020	
HE	1.40	1.80	0.055	0.071
L1	0.10	-	0.004	-
Lp	0.15	-	0.006	-
Q	0.05	0.25	0.002	0.010
x	-	0.10	-	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	-	0.40	-	0.016
b3	-	0.50	-	0.020
e1	1.10		0.043	
l1	-	0.70	-	0.028

Dimension in mm/inches

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JAPAN	USA	EU	CHINA
CLASS III	CLASS III	CLASS II b	CLASS III
CLASS IV		CLASS III	

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  - 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>
  - Use of our Products in places where the Products are exposed to static electricity or electromagnetic waves
  - Use of our Products in proximity to heat-producing components, plastic cords, or other flammable items
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  - Use of the Products in places subject to dew condensation
- The Products are not subject to radiation-proof design.
- Please verify and confirm characteristics of the final or mounted products in using the Products.
- 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.
- De-rate Power Dissipation (Pd) depending on Ambient temperature (Ta). When used in sealed area, confirm the actual ambient temperature.
- Confirm that operation temperature is within the specified range described in the product specification.
- ROHM shall not be in any way responsible or liable for failure induced under deviant condition from what is defined in this document.

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- When a highly active halogenous (chlorine, bromine, etc.) flux is used, the residue of flux may negatively affect product performance and reliability.
- 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.

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1. Product performance and soldered connections may deteriorate if the Products are stored in the places where:
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  - [b] the temperature or humidity exceeds those recommended by ROHM
  - [c] the Products are exposed to direct sunshine or condensation
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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.

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#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.