

Parameter	Value
$V_{CC}$	12V
$I_{C(MAX.)}$	500mA
$R_1$	4.7k $\Omega$
$R_2$	47k $\Omega$

●Outline

SOT-723	SOT-416
DTD543ZM (VMT3)	DTD543ZE (EMT3)

●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

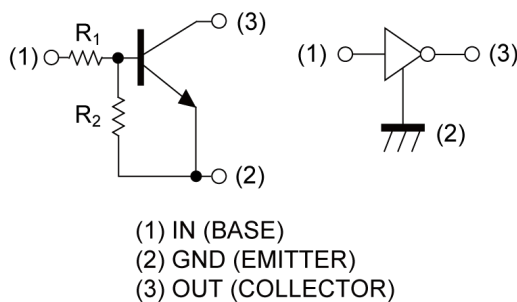
of almost completely eliminating parasitic effects.

●Application

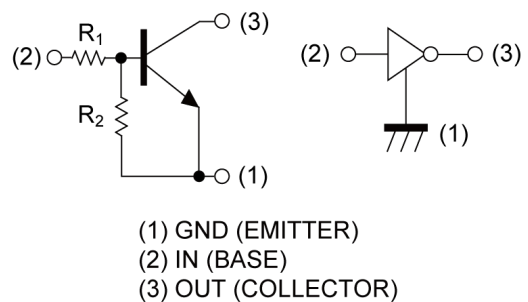
INVERTER, INTERFACE, DRIVER

●Inner circuit

DTD543ZM



DTD543ZE



●Packaging specifications

Part No.	Package	Package size	Taping code	Reel size (mm)	Tape width (mm)	Basic ordering unit.(pcs)	Marking
DTD543ZM	SOT-723 (VMT3)	1212	T2L	180	8	8000	Y23
DTD543ZE	SOT-416 (EMT3)	1616	TL	180	8	3000	Y23

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

Parameter		Symbol	Values	Unit
Supply voltage		$V_{CC}$	12	V
Input voltage		$V_{IN}$	-5 to 12	V
Collector current		$I_{C(MAX)}^{*1}$	500	mA
Power dissipation	DTD543ZM	$P_D^{*2}$	150	mW
	DTD543ZE		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	$V_{I(off)}$	$V_{CC} = 5\text{V}, I_O = 100\mu\text{A}$	-	-	0.3	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	$G_I$	$V_O = 2\text{V}, I_O = 100\text{mA}$	140	-	-	-
Input resistance	$R_1$	-	3.29	4.7	6.11	k $\Omega$
Resistance ratio	$R_2/R_1$	-	8	10	12	-
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)

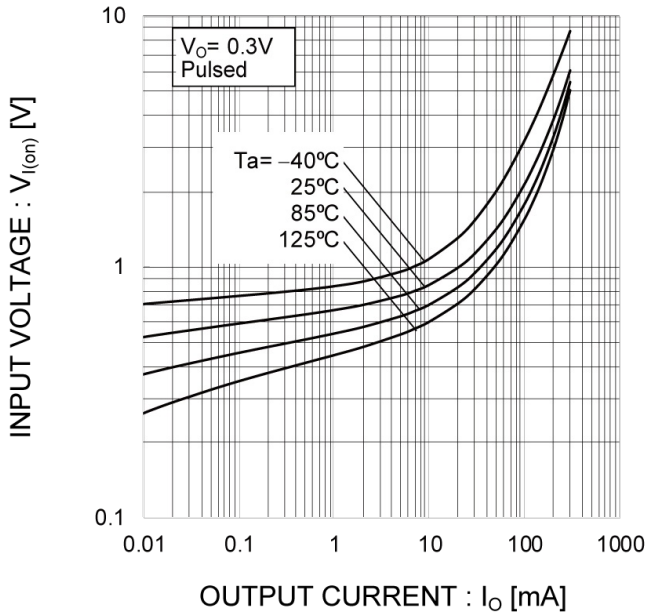


Fig.2 Output Current vs. Input Voltage (OFF Characteristics)

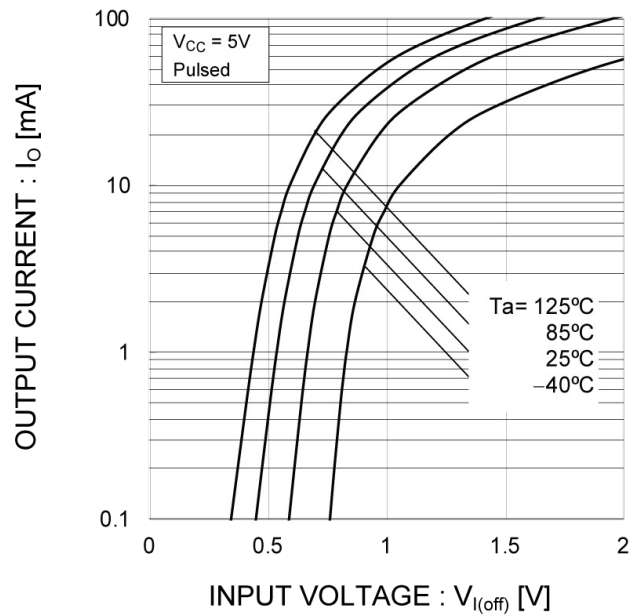


Fig.3 Output Current vs. Output Voltage

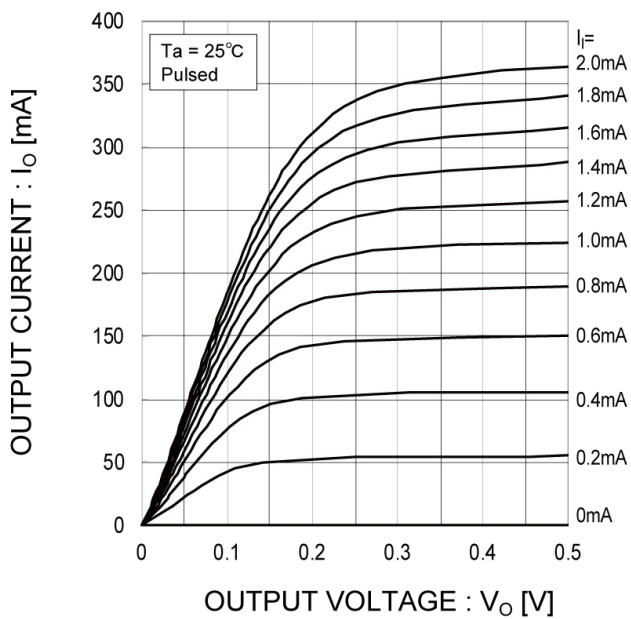
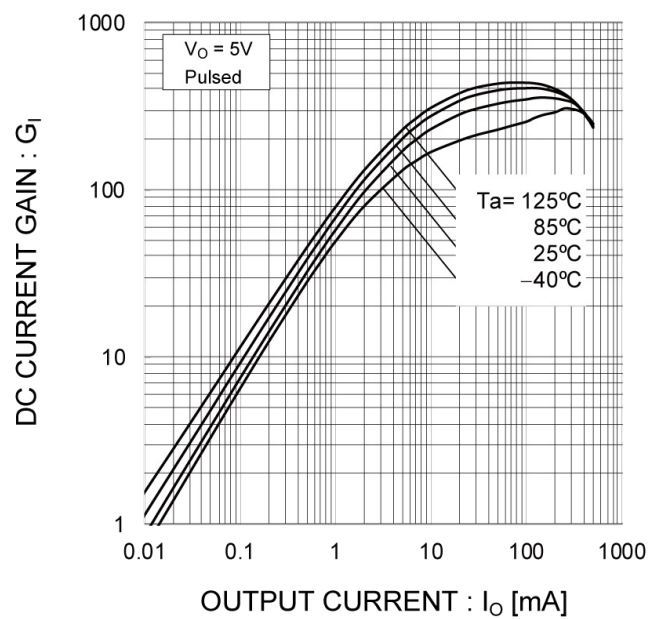
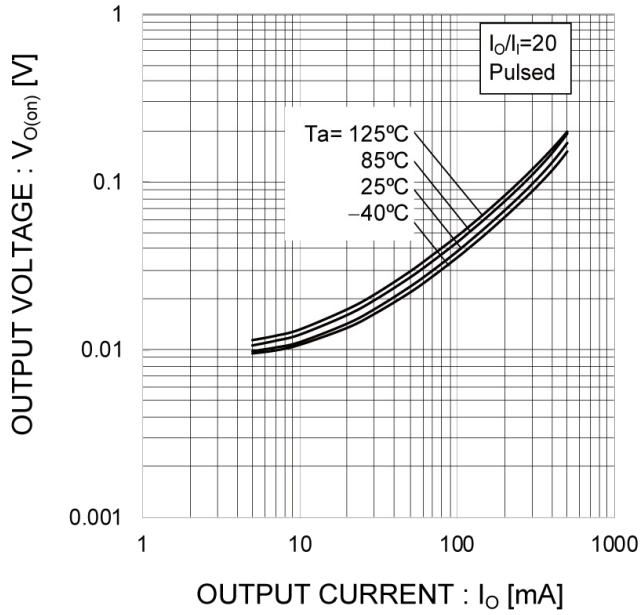


Fig.4 DC Current Gain vs. Output Current



● 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
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CLASS IV		CLASS III	

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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.
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- Confirm that operation temperature is within the specified range described in the product specification.
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- 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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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 Ionizer, friction prevention and temperature / humidity control).

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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 Cl<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, and NO<sub>2</sub>
  - [b] the temperature or humidity exceeds those recommended by ROHM
  - [c] the Products are exposed to direct sunshine or condensation
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2. 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.
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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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