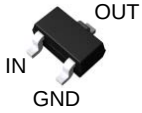
DTD543E series

NPN 500mA 12V Digital Transistors (Bias Resistor Built-in Transistors) Datasheet

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

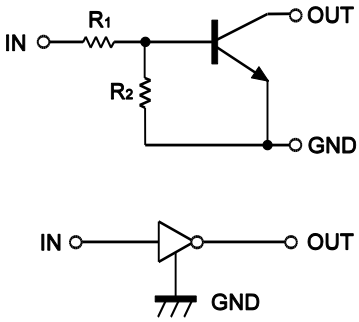
●Outline

VMT3	EMT3
	
DTD543EM (SC-105AA)	DTD543EE SOT-416 (SC-75A)

●Features

1) Built-In Biasing Resistors, $R_1 = R_2 = 4.7k\Omega$.
2) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see inner 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 completely eliminating parasitic effects.
4) Only the on/off conditions need to be set for operation, making the circuit design easy.
5) Complementary PNP Types :DTB543E series
6) Lead Free/RoHS Compliant.

●Inner circuit



●Application

Switching circuit, Inverter circuit, Interface circuit, Driver circuit

●Packaging specifications

Part No.	Package	Package size (mm)	Taping code	Reel size (mm)	Tape width (mm)	Basic ordering unit (pcs)	Marking
DTD543EM	VMT3	1212	T2L	180	8	8,000	X23
DTD543EE	EMT3	1616	TL	180	8	3,000	X23

●**Absolute maximum ratings** (Ta = 25°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	P_D *2	150	mW
Junction temperature	T_j	150	°C
Range of storage temperature	T_{stg}	−55 to +150	°C

●**Electrical characteristics**(Ta = 25°C)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input voltage	$V_{I(off)}$	V_{CC} = 5V, I_O = 100μA	-	-	0.5	V
	$V_{I(on)}$	V_O = 0.3V, I_O = 20mA	2.5	-	-	
Output voltage	$V_{O(on)}$	I_O / I_I = 100mA / 5mA	-	0.06	0.3	V
Input current	I_I	V_I = 5V	-	-	1.4	mA
Output current	$I_{O(off)}$	V_{CC} = 12V, V_I = 0V	-	-	0.5	μA
DC current gain	G_I	V_O = 2V, I_O = 100mA	115	-	-	-
Input resistance	R_1	-	3.29	4.7	6.11	kΩ
Resistance ratio	R_2/R_1	-	0.8	1	1.2	-
Transition frequency	f_T *1	V_{CE} = 10V, I_E = −5mA, f = 100MHz	-	260	-	MHz

*1 Characteristics of built-in transistor

*2 Each terminal mounted on a reference footprint

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

Fig.1 Input voltage vs. output current (ON characteristics)

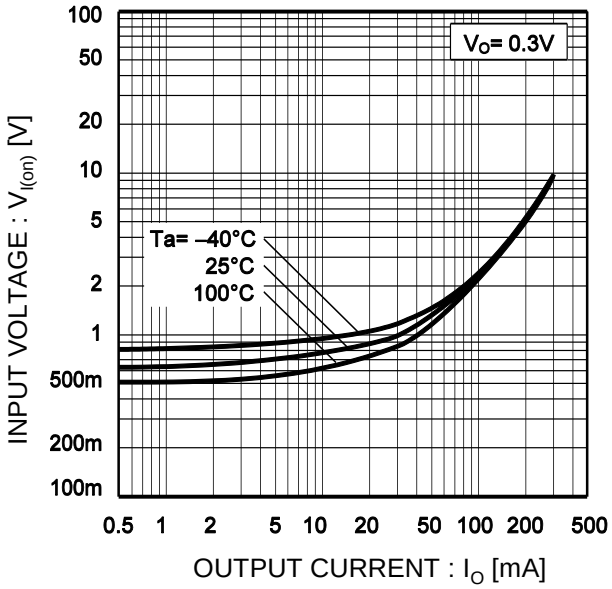


Fig.2 Output current vs. input voltage (OFF characteristics)

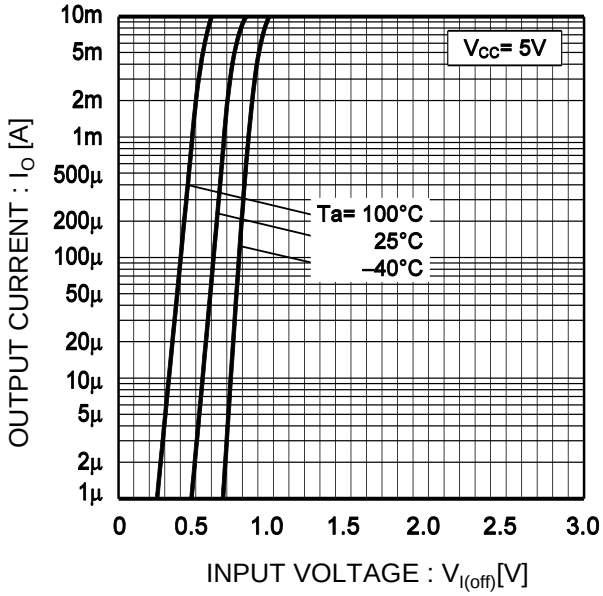


Fig.3 Output current vs. output voltage

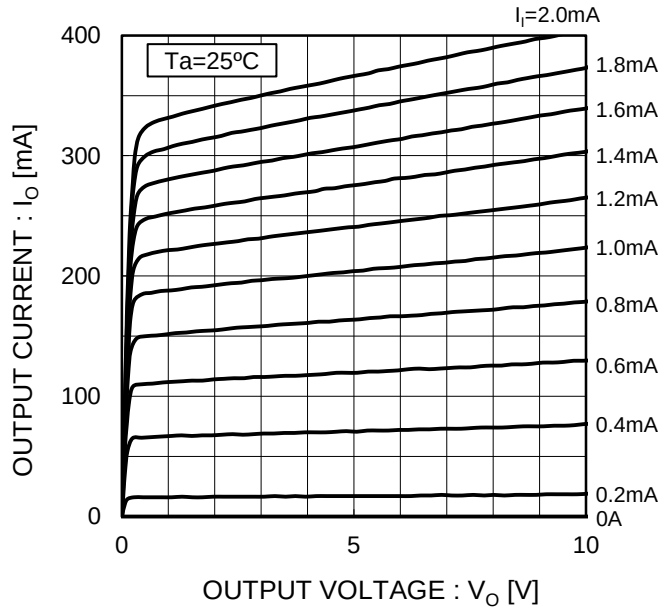
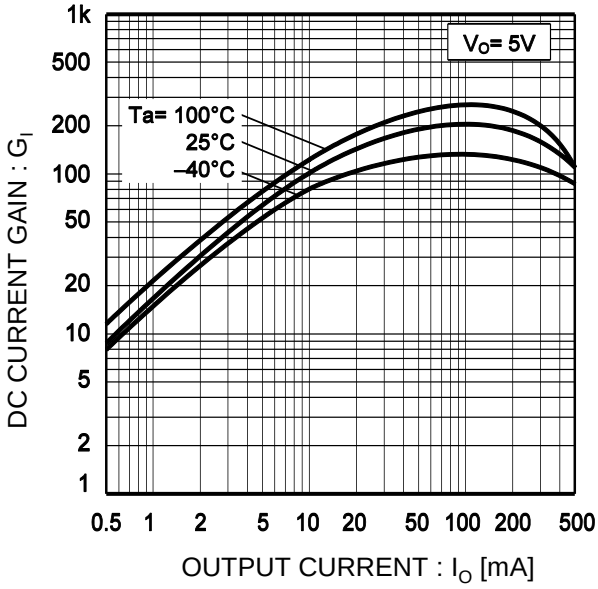
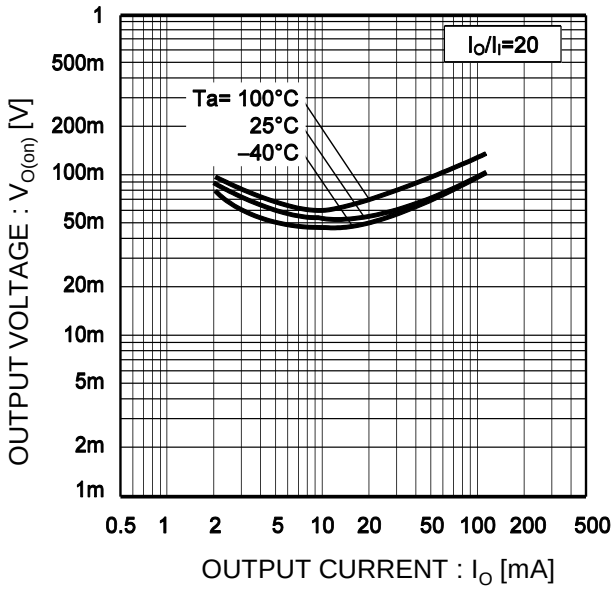


Fig.4 DC current gain vs. output current



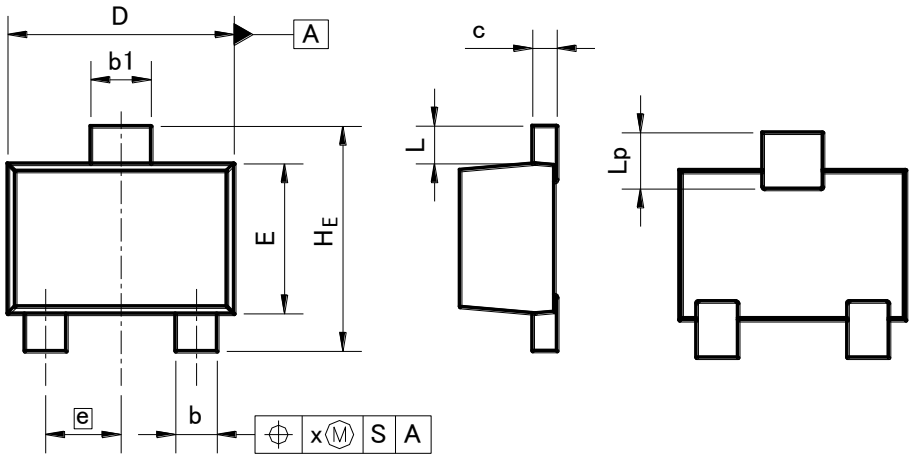
●**Electrical characteristic curves**(Ta = 25°C)

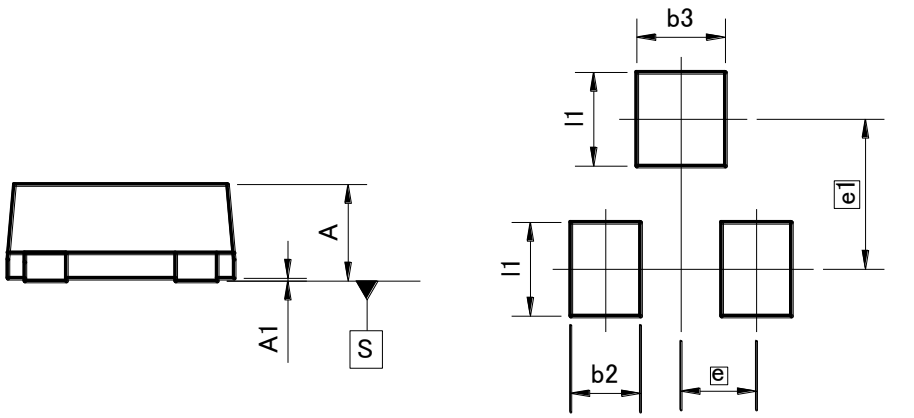
Fig.5 Output voltage vs. output current



●**Dimensions** (Unit : mm)

VMT3





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

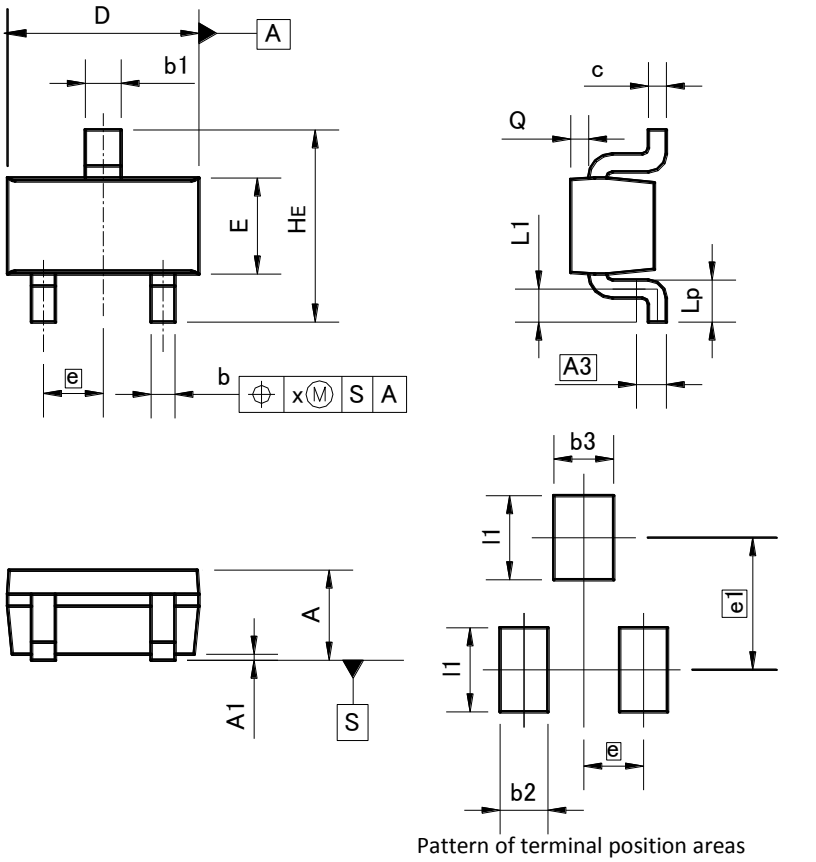
DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.45	0.55	0.018	0.022
A1	0.00	0.10	0.000	0.004
b	0.17	0.27	0.007	0.011
b1	0.27	0.37	0.011	0.015
c	0.08	0.18	0.003	0.007
D	1.10	1.30	0.043	0.051
E	0.70	0.90	0.028	0.035
e	0.40		0.02	
HE	1.10	1.30	0.043	0.051
L	0.10	0.30	0.004	0.012
Lp	0.20	0.40	0.008	0.016
x	−	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	
l1	−	0.50	−	0.020

Dimension in mm / inches

●**Dimensions** (Unit : mm)

EMT3



Pattern of terminal position areas
[Not a recommended 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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