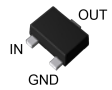
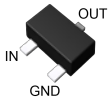
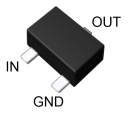
DTC024X series

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

Parameter	Value
V_{CC}	50V
$I_{C(MAX.)}$	100mA
R_1	22kΩ
R_2	47kΩ

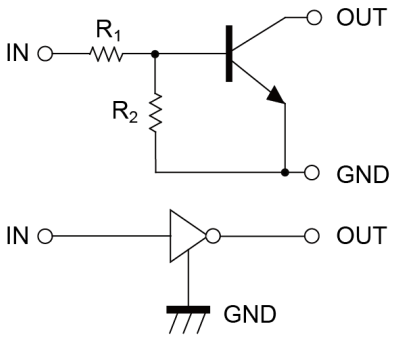
●Outline

VMT3  DTC024XM (SC-105AA)	EMT3F  DTC024XEB (SC-89)
UMT3F  DTC024XUB (SC-85)	

●Features

1) Built-In Biasing Resistors, R_1 = 22kΩ, R_2 = 47kΩ
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: DTA024X series
6) Lead Free/RoHS Compliant.

●Inner circuit



●Application

Switching circuit, Inverter circuit, Interface circuit, Driver circuit

●Packaging specifications

Part No.	Package	Package size	Taping code	Reel size (mm)	Tape width (mm)	Basic ordering unit.(pcs)	Marking
DTC024XM	VMT3	1212	T2L	180	8	8000	69
DTC024XEB	EMT3F	1616	TL	180	8	3000	69
DTC024XUB	UMT3F	2021	TL	180	8	3000	69

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●Absolute maximum ratings (T_a = 25°C)

Parameter		Symbol	Values	Unit
Supply voltage		V_{CC}	50	V
Input voltage		V_{IN}	40 to -7	V
Output current		I_O	50	mA
Collector current		$I_{C(MAX)}$*1	100	mA
Power dissipation	DTC024XM	P_D*2	150	mW
	DTC024XEB		150	
	DTC024XUB		200	
Junction temperature		T_j	150	℃
Range of storage temperature		T_{stg}	-55 to +150	℃

●Electrical characteristics (T_a = 25°C)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Input voltage	$V_{I(off)}$	V_{CC} = 5V, I_O = 100μA	-	-	0.5	V
	$V_{I(on)}$	V_O = 0.3V, I_O = 5mA	2.5	-	-	
Output voltage	$V_{O(on)}$	I_O / I_I = 5mA / 0.5mA	-	0.05	0.15	V
Input current	I_I	V_I = 5V	-	-	0.36	mA
Output current	$I_{O(off)}$	V_{CC} = 50V, V_I = 0V	-	-	500	nA
DC current gain	G_I	V_O = 10V, I_O = 5mA	80	-	-	-
Input resistance	R_1	-	15.4	22	28.6	kΩ
Resistance ratio	R_2/R_1	-	1.7	2.1	2.6	-
Transition frequency	f_T*1	V_{CE} = 10V, I_E = -5mA, f = 100MHz	-	250	-	MHz

*1 Characteristics of built-in transistor

*2 Each terminal mounted on a reference footprint

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●Electrical characteristic curves (T_a =25°C)

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

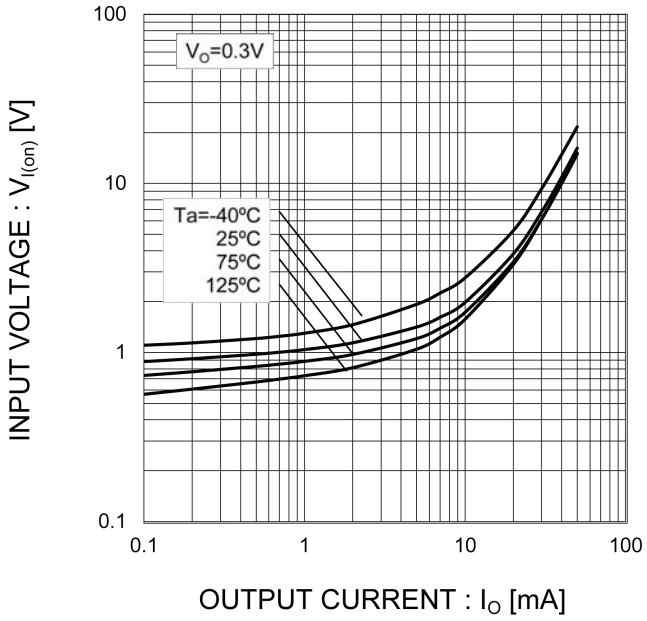


Fig.2 Output current vs. input voltage (OFF characteristics)

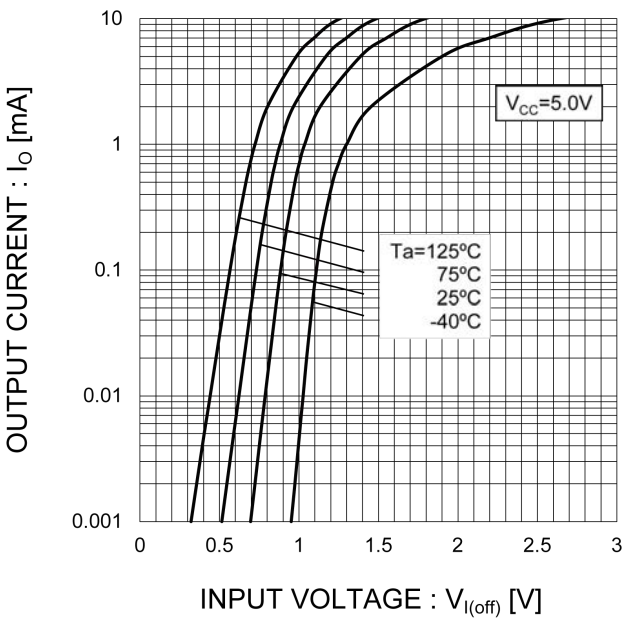


Fig.3 Output current vs. output voltage

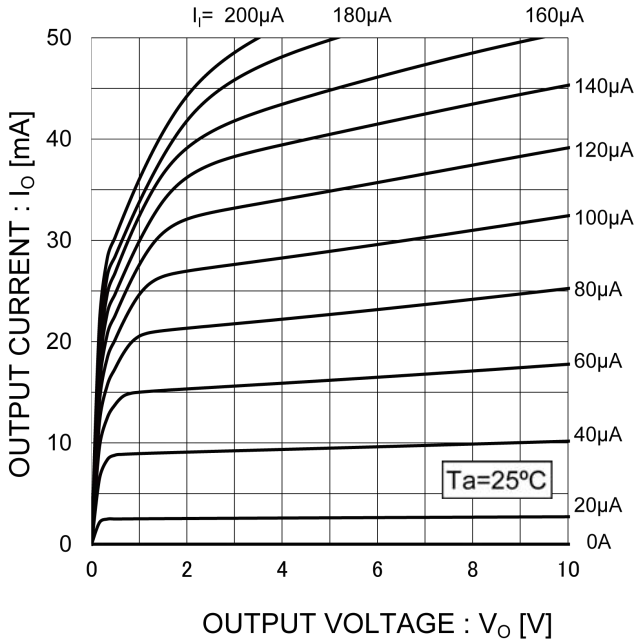
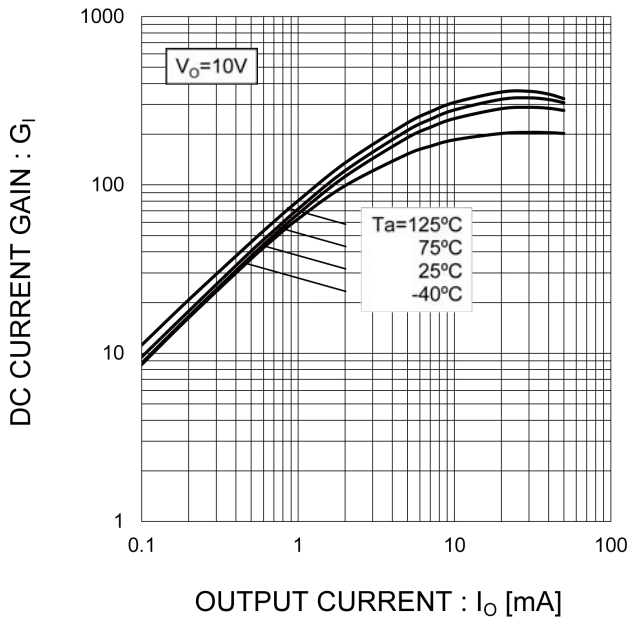


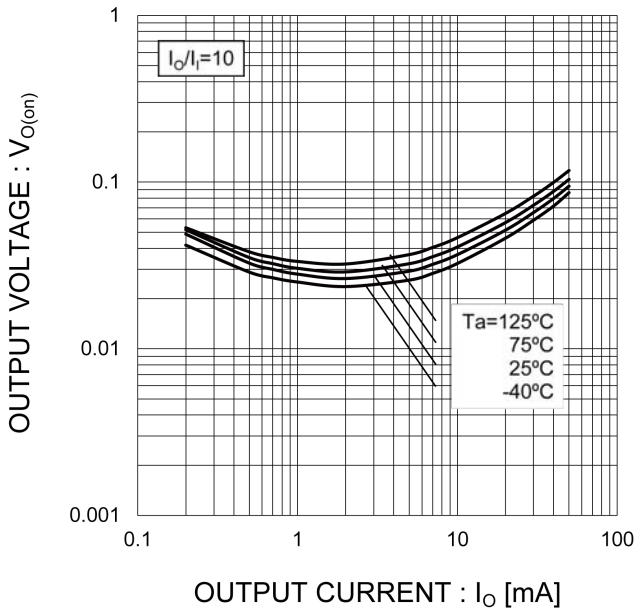
Fig.4 DC current gain vs. output current



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●Electrical characteristic curves (T_a =25°C)

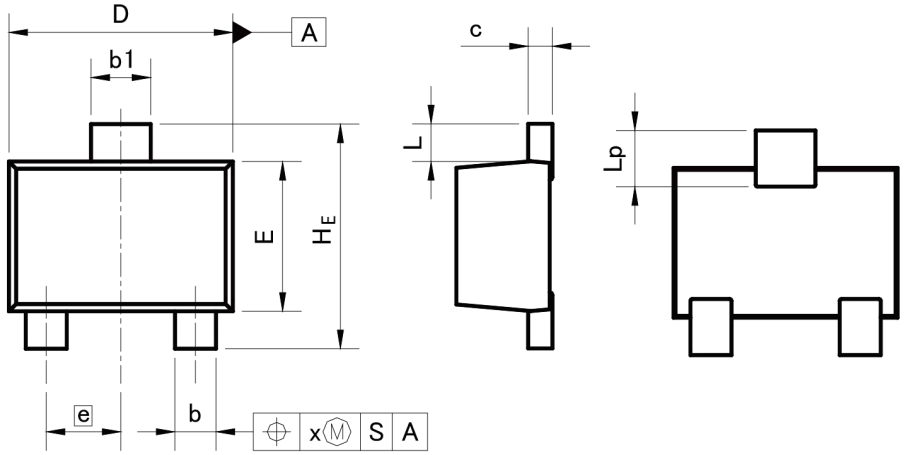
Fig.5 Output voltage vs. output current

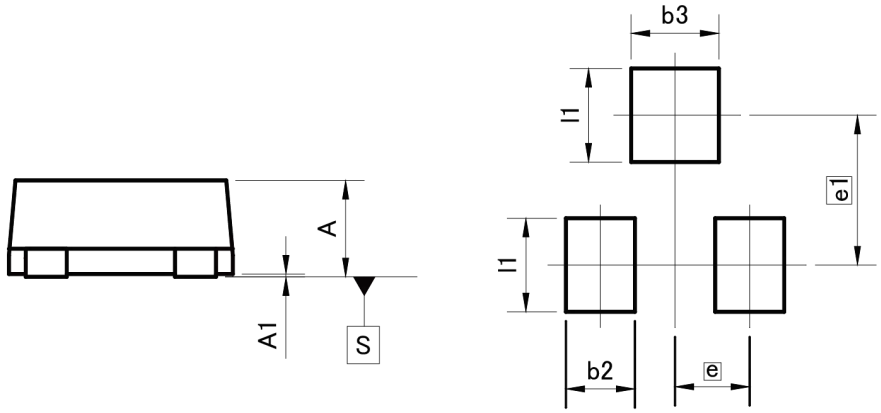


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●Dimensions

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

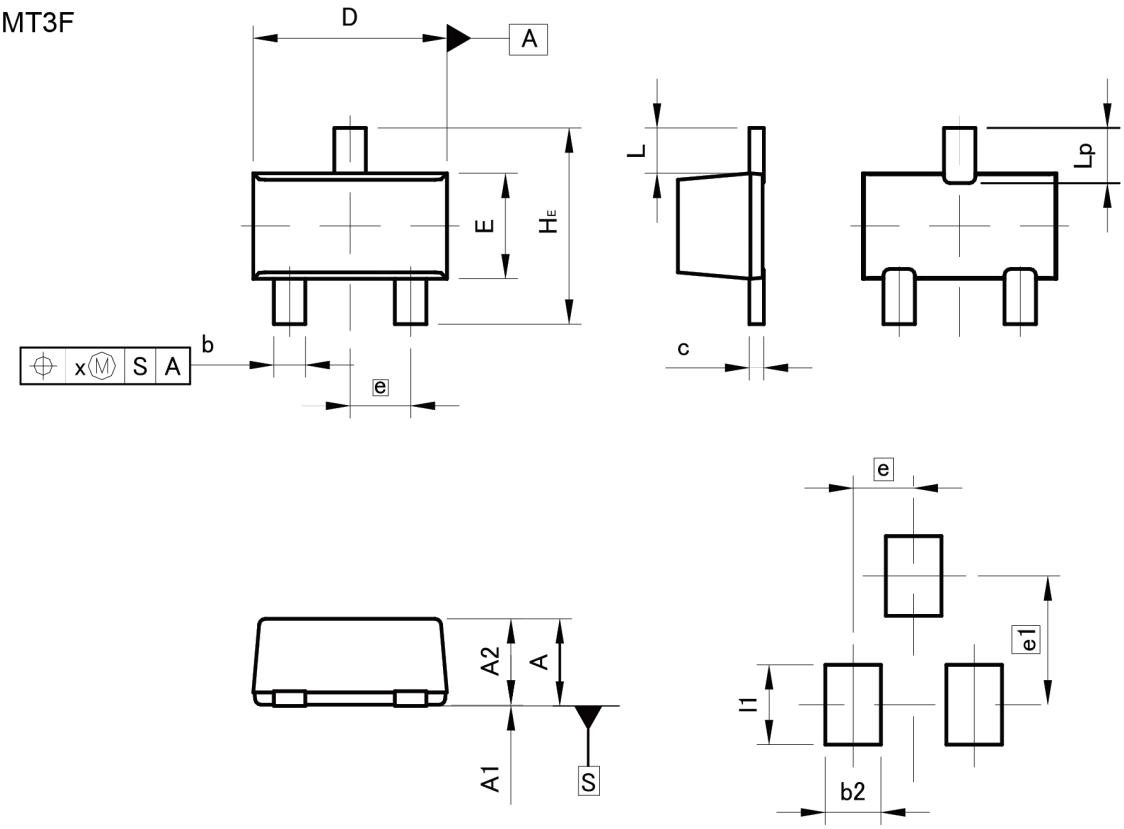
DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	−	0.37	−	0.015
b3	−	0.47	−	0.019
e1	0.80		0.031	
l1	−	0.50	−	0.020

Dimension in mm/inches

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●Dimensions

EMT3F



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

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	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
c	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
e	0.50		0.020	
HE	1.50	1.70	0.059	0.067
L	0.37		0.015	
Lp	0.35	0.55	0.014	0.022
x	–	0.10	–	0.004

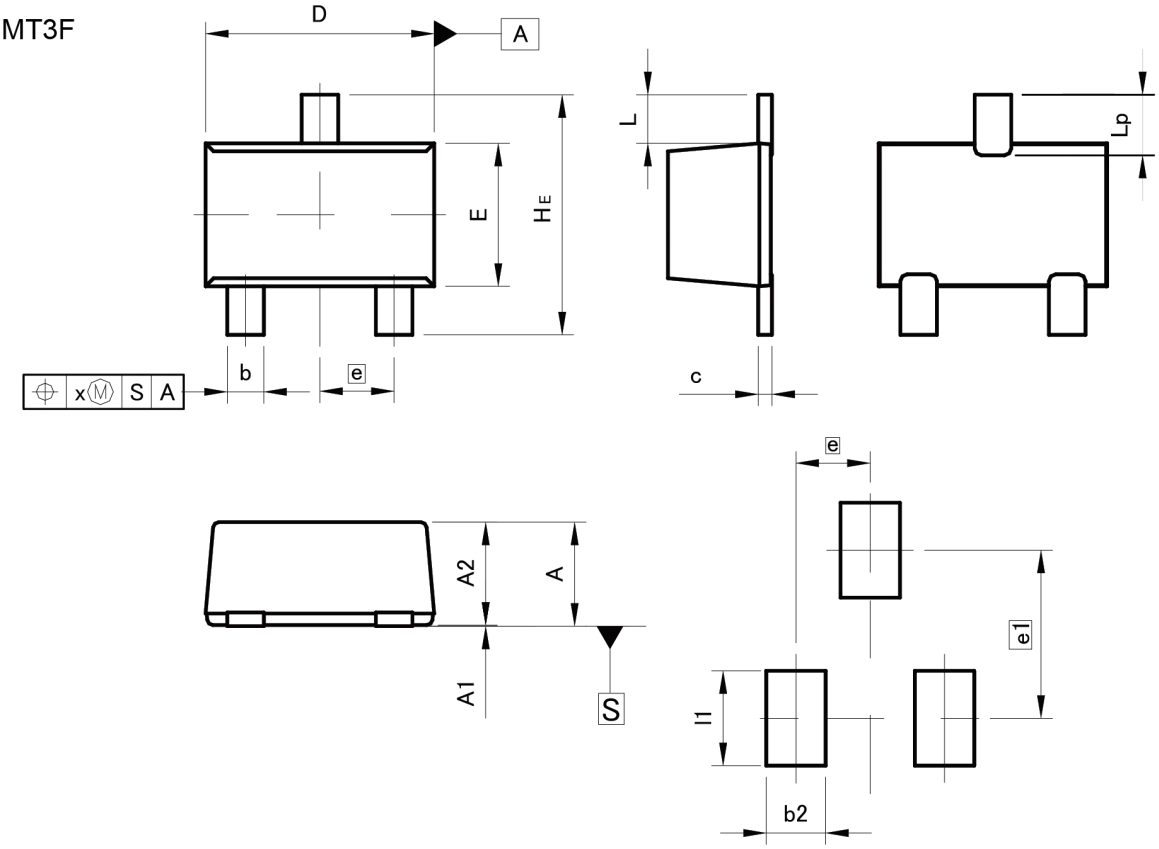
DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	–	0.46	–	0.018
e1	–	1.05	–	0.041
l1	–	0.65	–	0.026

Dimension in mm/inches

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●Dimensions

UMT3F



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

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	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
c	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
e	0.65		0.026	
HE	2.00	2.20	0.079	0.087
L	0.43		0.017	
Lp	0.43	0.63	0.017	0.025
x	–	0.10	–	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	–	0.52	–	0.020
e1	1.47		0.058	
l1	–	0.83	–	0.033

Dimension in mm/inches

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