

100mA/50V Digital transistors(with built-in resistors)

DTC024EM / DTC024EEB / DTC024EUB

●Features

- 1) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors. (See equivalent circuit)
- 2) 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.
- 3) Only the on/off conditions need to be set for operation, making the device design easy.

●Structure

NPN epitaxial planar silicon transistor
(Resistor built-in type)

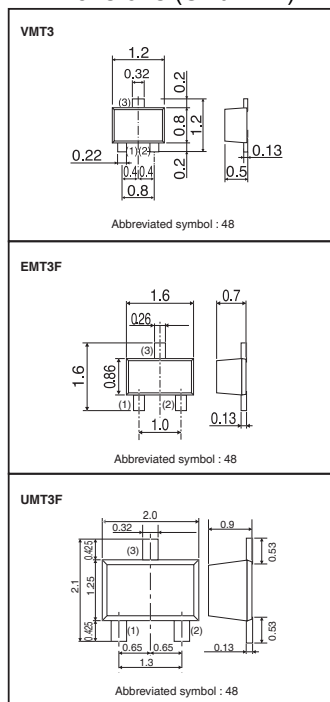
●Applications

Inverter, Interface, Driver

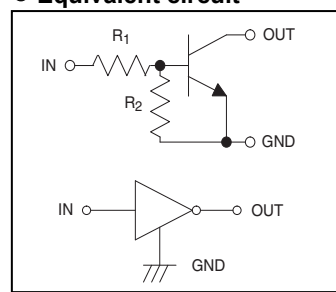
●Packaging specifications

Type	Package	VMT3	EMT3F	UMT3F
	Packaging Type	Taping	Taping	Taping
	Code	T2L	TL	TL
	Basic ordering unit (pieces)	8000	3000	3000
DTC024EM		○	-	-
DTC024EEB		-	○	-
DTC024EUB		-	-	○

●Dimensions (Unit : mm)



●Equivalent circuit



$$R_1=R_2=22k\Omega$$

●Absolute maximum (Ta=25°C)

Parameter	Symbol	Limits(DTC024E□)			Unit
		M	EB	UB	
Supply voltage	V_{CC}		50		V
Input voltage	V_{IN}		40		V
			-10		V
Collector current *1	$I_{C(max)}$		100		mA
Output current	I_O		30		mA
Power dissipation *2	P_D	150		200	mW
Junction temperature	T_j		150		°C
Range of storage temperature	T_{stg}		-55 to +150		°C

*1 Characteristics of built-in transistor

*2 Each terminal mounted on a reference land

●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Input voltage	$V_{I(off)}$	-	-	0.5	V	$V_{CC}=5V / I_O=100\mu A$
	$V_{I(on)}$	3.0	-	-	V	$V_O=0.3V / I_O=5mA$
Output voltage	$V_{O(on)}$	-	0.05	0.15	V	$I_O=5mA / I_I=0.5mA$
Input current	I_I	-	-	0.36	mA	$V_I=5V$
Output current	$I_{O(off)}$	-	-	500	nA	$V_{CC}=50V / V_I=0V$
DC current gain	G_I	60	-	-	-	$V_O=10V / I_O=5mA$
Transition frequency *	f_T	-	250	-	MHz	$V_{CE}=10V / I_E=-5mA$ $f=100MHz$
Input resistance	R_1	15.4	22	28.6	kΩ	
Resistance ratio	R_2/R_1	0.8	1.0	1.2	-	

* Characteristics of built-in transistor

●Electrical characteristics curves

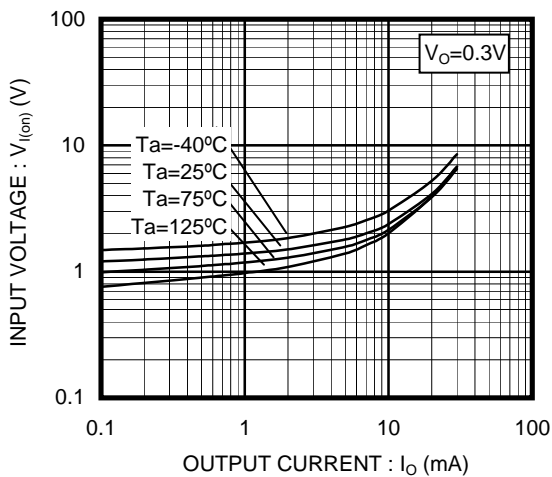


Fig.1 Input Voltage vs. Output Current (ON characteristics)

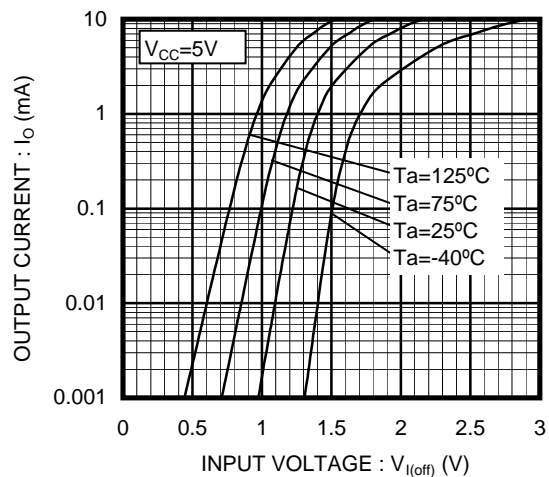


fig.2 Input Voltage vs. Output Current (OFF characteristics)

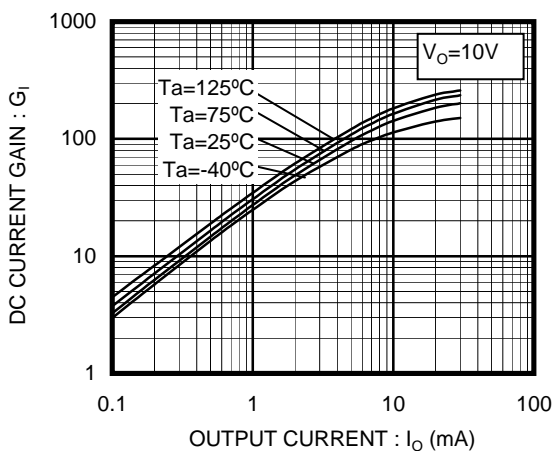


Fig.3 DC Current Gain vs. Output Current

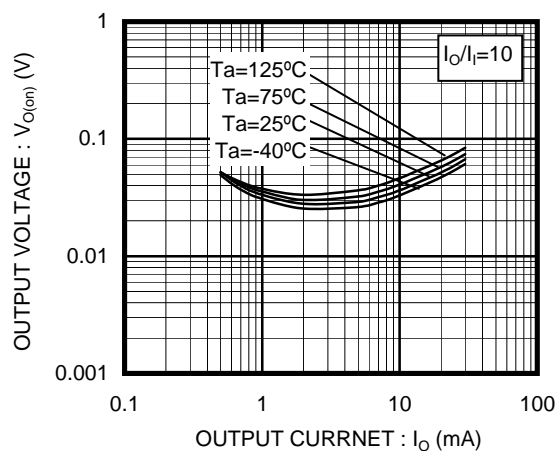


Fig.4 Output Voltage vs. Output Current

Notes

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