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

DTC124EM / DTC124EE / DTC124EUA / DTC124EKA / DTC124ESA

●Applications

Inverter, Interface, Driver

●Features

- 1) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see the 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

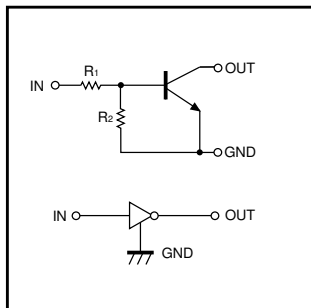
NPN epitaxial planar silicon transistor
(Resistor built-in type)

●Packaging specifications

Type	Package	VMT3	EMT3	UMT3	SMT3	SPT
	Packaging type	Taping	Taping	Taping	Taping	Taping
	Code	T2L	TL	T106	T146	TP
	Basic ordering unit (pieces)	8000	3000	3000	3000	5000

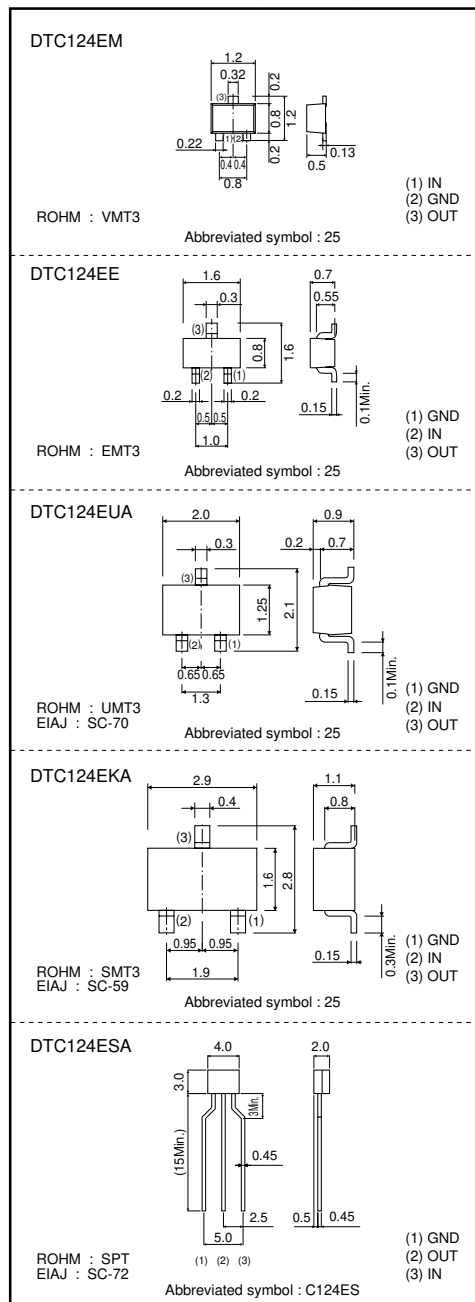
DTC124EM	○	-	-	-	-
DTC124EE	-	○	-	-	-
DTC124EUA	-	-	○	-	-
DTC124EKA	-	-	-	○	-
DTC124ESA	-	-	-	-	○

●Equivalent circuit



$R_1=R_2=22k\Omega$

●External dimensions (Unit : mm)



DTC124EM / DTC124EE / DTC124EUA / DTC124EKA / DTC124ESA

Transistor

●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits					Unit
		DTC124EM	DTC124EE	DTC124EUA	DTC124EKA	DTC124ESA	
Supply voltage	V _{CC}	50					V
Input voltage	V _{IN}	-10 to +40					V
Output current	I _o	30					mA
	I _{C(Max.)}	100					
Power dissipation	P _d	150		200		300	mW
Junction temperature	T _j	150					°C
Storage temperature	T _{stg}	-55 to +150					°C

●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	V _{I(off)}	-	-	0.5	V	V _{CC} =5V, I _o =100μA
	V _{I(on)}	3	-	-		V _o =0.2V, I _o =5mA
Output voltage	V _{O(on)}	-	0.1	0.3	V	I _o /I _i =10mA/0.5mA
Input current	I _i	-	-	0.36	mA	V _i =5V
Output current	I _{O(off)}	-	-	0.5	μA	V _{CC} =50V, V _i =0V
DC current gain	G _i	56	-	-	-	V _o =5V, I _o =5mA
Input resistance	R ₁	15.4	22	28.6	kΩ	-
Resistance ratio	R ₂ /R ₁	0.8	1	1.2	-	-
Transition frequency	f _t *	-	250	-	MHz	V _{CE} =10V, I _E =-5mA, f=100MHz

* Characteristics of built-in transistor

●Electrical characteristic curves

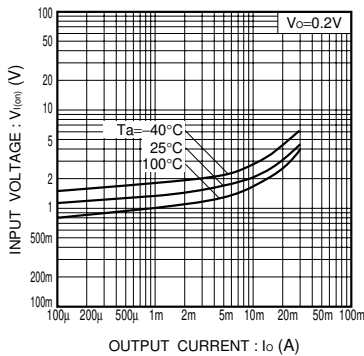


Fig.1 Input voltage vs. output current (ON characteristics)

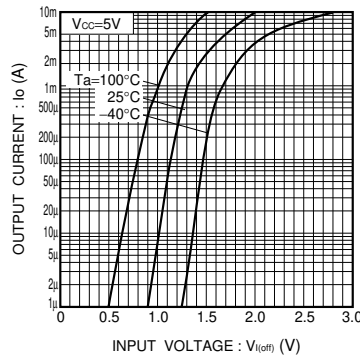


Fig.2 Output current vs. input voltage (OFF characteristics)

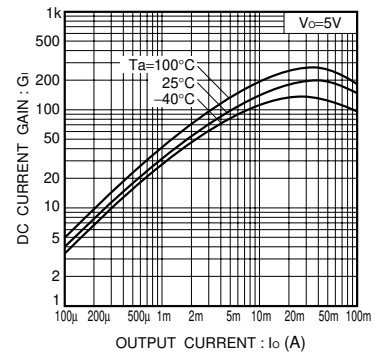


Fig.3 DC current gain vs. output current

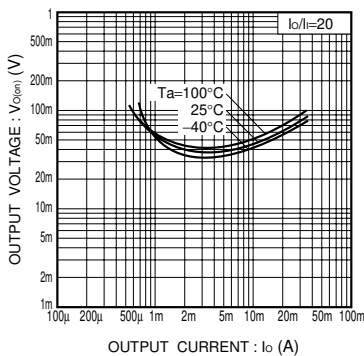


Fig.4 Output voltage vs. output current

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