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

DTC144EM / DTC144EE / DTC144EUA / DTC144EKA / DTC144ESA

●Applications

Inverter, Interface, Driver

●Features

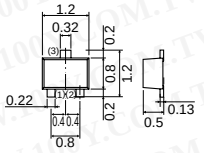
1) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see equivalent circuit).
2) The bias resistors consist of thin-film resistors with complete isolation to allow negative biasing of the input. They also have the advantage of almost 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)

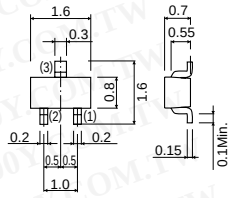
●External dimensions (Unit : mm)

DTC144EM



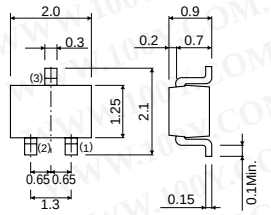
ROHM : VMT3
Abbreviated symbol : 26
(1) IN
(2) GND
(3) OUT

DTC144EE



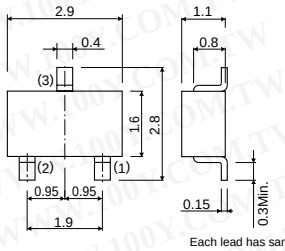
ROHM : EMT3
Abbreviated symbol : 26
(1) GND
(2) IN
(3) OUT

DTC144EUA



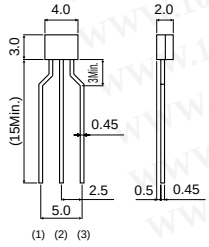
ROHM : UMT3
EIAJ : SC-70
Each lead has same dimensions
Abbreviated symbol : 26
(1) GND
(2) IN
(3) OUT

DTC144EKA



ROHM : SMT3
EIAJ : SC-59
Each lead has same dimensions
Abbreviated symbol : 26
(1) GND
(2) IN
(3) OUT

DTC144ESA

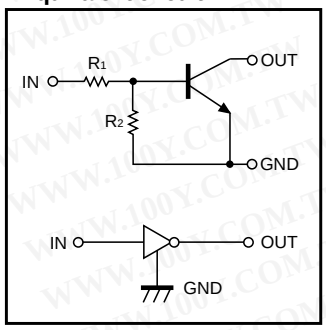


ROHM : SPT
EIAJ : SC-72
Abbreviated symbol : C144ES
(1) GND
(2) OUT
(3) IN

●Packaging specifications

Part No.	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
DTC144EM		○	–	–	–	–
DTC144EE		–	○	–	–	–
DTC144EUA		–	–	○	–	–
DTC144EKA		–	–	–	○	–
DTC144ESA		–	–	–	–	○

●Equivalent circuit



$R_1=R_2=47k\Omega$

●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits					Unit
		DTC144EM	DTC144EE	DTC144EUA	DTC144EKA	DTC144ESA	
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	Tj	150					°C
Storage temperature	Tstg	−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=0.3V, I_O=2mA
Output voltage	$V_{O(on)}$	–	0.1	0.3	V	I_O/I_I=10mA/0.5mA
Input current	I_I	–	–	0.18	mA	V_I=5V
Output current	$I_{O(off)}$	–	–	0.5	μA	V_{CC}=50V, V_I=0V
DC current gain	G_I	68	–	–	–	V_O=5V, I_O=5mA
Input resistance	R_1	32.9	47	61.1	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**

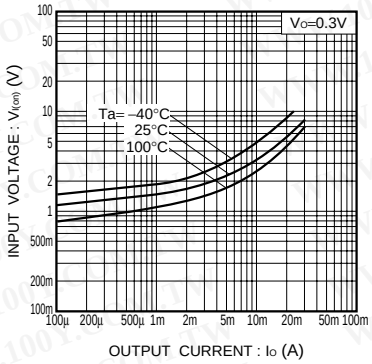


Fig.1 Input voltage vs. output current (ON characteristics)

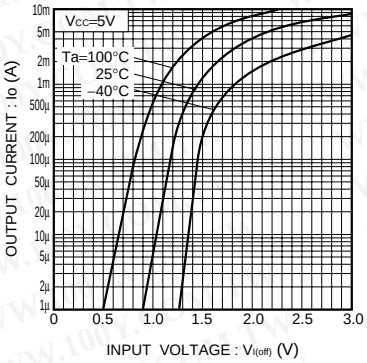


Fig.2 Output current vs. input voltage (OFF characteristics)

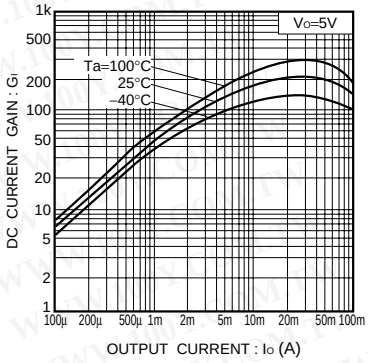


Fig.3 DC current gain vs. output current

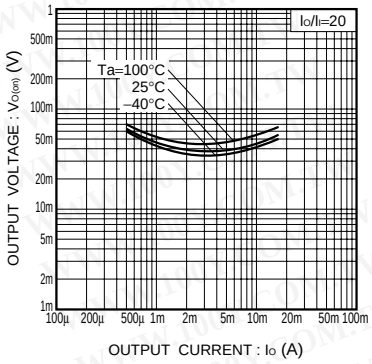


Fig.4 Output voltage vs. output current

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