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

DTC123JM / DTC123JE / DTC123JUA DTC123JKA / DTC123JSA

●Applications

Inverter, Interface, Driver

●Features

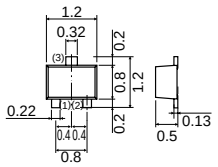
1) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see the equivalent circuit).
2) The bias resistors consist of thin-film resistors with complete isolation to allow negative biasing of the input. They also have the advantage of almost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

●External dimensions (Unit : mm)

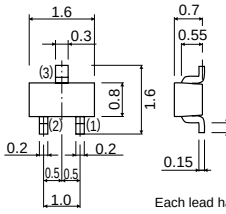
DTC123JM



(1) IN
(2) GND
(3) OUT

ROHM : VMT3
Each lead has same dimensions
Abbreviated symbol : E42

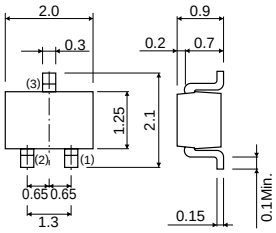
DTC123JE



(1) GND
(2) IN
(3) OUT

ROHM : EMT3
Each lead has same dimensions
Abbreviated symbol : E42

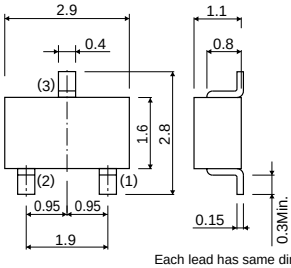
DTC123JUA



(1) GND
(2) IN
(3) OUT

ROHM : UMT3
EIAJ : SC-70
Each lead has same dimensions
Abbreviated symbol : 142

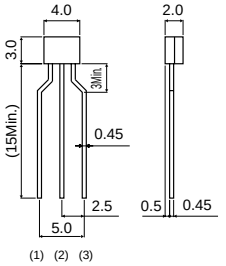
DTC123JKA



(1) GND
(2) IN
(3) OUT

ROHM : SMT3
EIAJ : SC-59
Each lead has same dimensions
Abbreviated symbol : E42

DTC123JSA



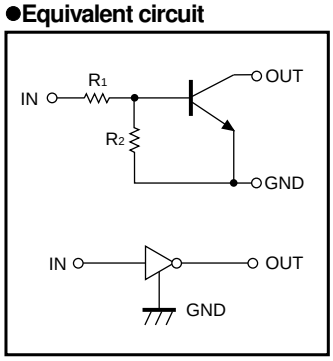
(1) GND
(2) OUT
(3) IN

ROHM : SPT
EIAJ : SC-72
Abbreviated symbol : C123JS

●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
DTC123JM		○	–	–	–	–
DTC123JE		–	○	–	–	–
DTC123JUA		–	–	○	–	–
DTC123JKA		–	–	–	○	–
DTC123JSA		–	–	–	–	○

●Equivalent circuit



R_1=2.2kΩ, R_2=47kΩ

●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits					Unit
		DTC123JM	DTC123JE	DTC123JUA	DTC123JKA	DTC123JSA	
Supply voltage	V_{CC}	50					V
Input voltage	V_{IN}	−5 to +12					V
Output current	I_O	100					mA
	$I_{C(Max.)}$	100					
Power dissipation	Pd	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
	$V_{I(on)}$	1.1	–	–		V_O=0.3V, I_O=5mA
Output voltage	$V_{O(on)}$	–	0.1	0.3	V	I_O/I_I=5mA/0.25mA
Input current	I_I	–	–	3.6	mA	V_I=5V
Output current	$I_{O(off)}$	–	–	0.5	μA	V_{CC}=50V, V_I=0V
DC current gain	G_I	80	–	–	–	V_O=5V, I_O=10mA
Input resistance	R_1	1.54	2.2	2.86	kΩ	–
Resistance ratio	R_2/R_1	17	21	26	–	–
Transition frequency	f_T*	–	250	–	MHz	V_{CE}=10V, I_E= −5mA, f=100MHz

*Characteristics of built-in transistor

●**Electrical characteristic curves**

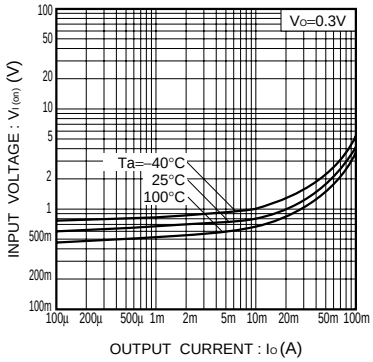


Fig.1 Input voltage vs. output current (ON characteristics)

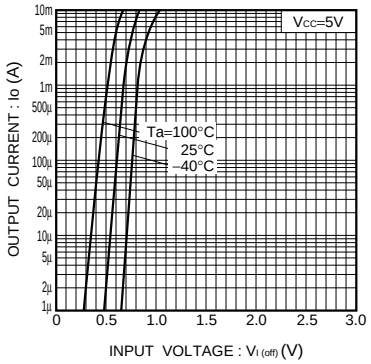


Fig.2 Output current vs. input voltage (OFF characteristics)

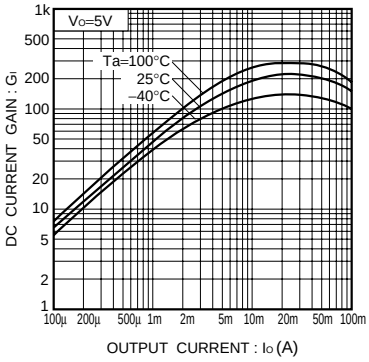


Fig.3 DC current gain vs. output current

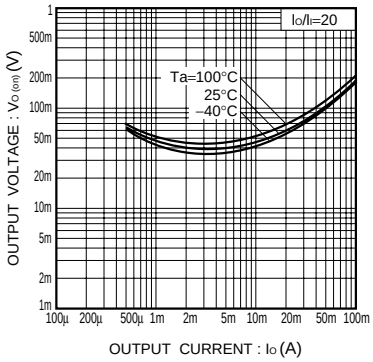


Fig.4 Output voltage vs. output current

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