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

DTC114EB / DTC114EM / DTC114EE / DTC114EUA / DTC114EKA

●Applications
Inverter, Interface, Driver

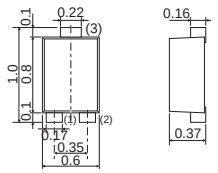
●Features

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)

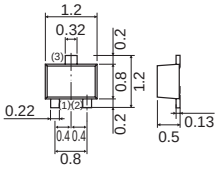
●Dimensions (Unit : mm)

DTC114EB



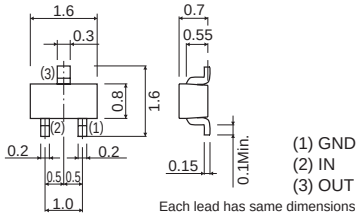
ROHM : **VMN3**
Each lead has same dimensions
Abbreviated symbol : 24

DTC114EM



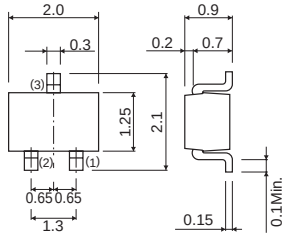
ROHM : VMT3
Each lead has same dimensions
Abbreviated symbol : 24

DTC114EE



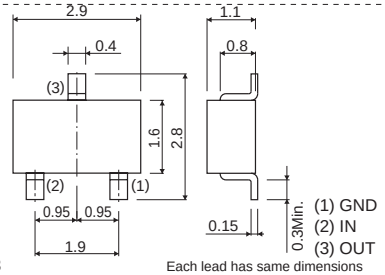
ROHM : EMT3
Each lead has same dimensions
Abbreviated symbol : 24

DTC114EUA



ROHM : UMT3
EIAJ : SC-70
Each lead has same dimensions
Abbreviated symbol : 24

DTC114EKA

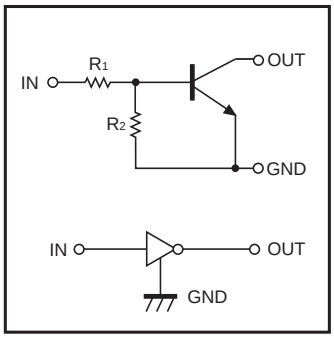


ROHM : SMT3
EIAJ : SC-59
Each lead has same dimensions
Abbreviated symbol : 24

●Packaging specifications

	Package	VMN3	VMT3	EMT3	UMT3	SMT3
	Packaging type	Taping	Taping	Taping	Taping	Taping
	Code	T2L	T2L	TL	T106	T146
Part No.	Basic ordering unit (pieces)	8000	8000	3000	3000	3000
DTC114EB		○	–	–	–	–
DTC114EM		–	○	–	–	–
DTC114EE		–	–	○	–	–
DTC114EUA		–	–	–	○	–
DTC114EKA		–	–	–	–	○

●Equivalent circuit



R_1=R_2=10kΩ

●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits					Unit
		DTC114EB	DTC114EM	DTC114EE	DTC114EUA	DTC114EKA	
Supply voltage	V_{CC}	50					V
Input voltage	V_{IN}	–10 to +40					V
Output current	I_O	50					mA
	$I_{C(Max.)}$	100					
Power dissipation	P_D	150			200		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=10mA
Output voltage	$V_{O(on)}$	–	0.1	0.3	V	I_O/I_I=10mA/0.5mA
Input current	I_I	–	–	0.88	mA	V_I=5V
Output current	$I_{O(off)}$	–	–	0.5	μA	V_{CC}=50V, V_I=0V
DC current gain	G_I	30	–	–	–	V_O=5V, I_O=5mA
Input resistance	R_1	7	10	13	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

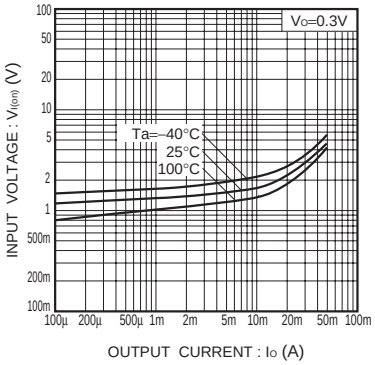


Fig.1 Input voltage vs. output current (ON characteristics)

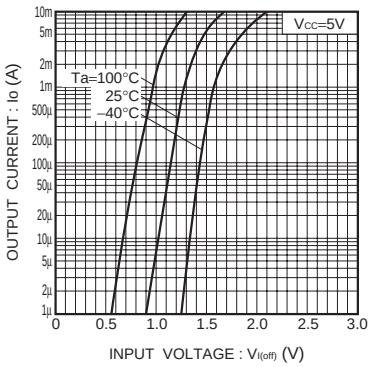


Fig.2 Output current vs. input voltage (OFF characteristics)

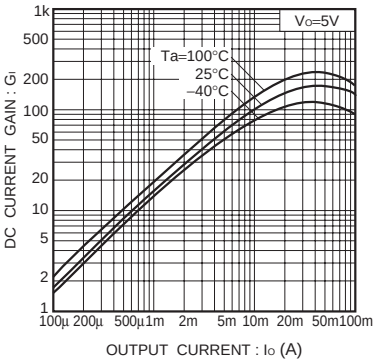


Fig.3 DC current gain vs. output current

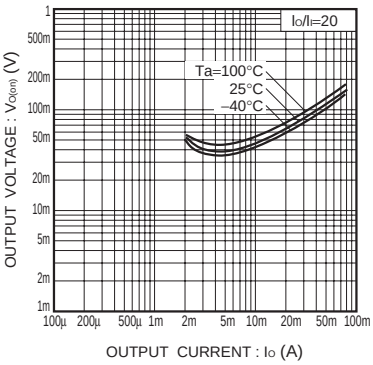


Fig.4 Output voltage vs. output current

Notes

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