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

DTC114WE / DTC114WUA / DTC114WKA / DTC114WSA

●Applications
Inverter, Interface, Driver

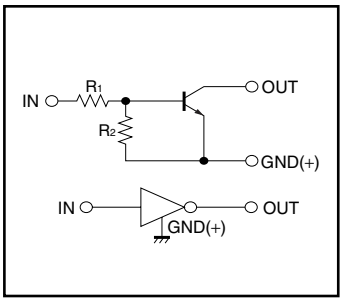
●Features
1) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors.
2) The bias resistors consist of thin-film resistors with complete isolation to allow negative biasing of the input, and parasitic effects are almost completely eliminated.
3) Only the on / off conditions need to be set for operation, making the device design easy.
4) Higher mounting densities can be achieved.

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

●Packaging specifications

	Package	EMT3	UMT3	SMT3	SPT
	Packaging type	Taping	Taping	Taping	Taping
	Code	TL	T106	T146	TP
Part No.	Basic ordering unit (pieces)	3000	3000	3000	5000
DTC114WE		○	–	–	–
DTC114WUA		–	○	–	–
DTC114WKA		–	–	○	–
DTC114WSA		–	–	–	○

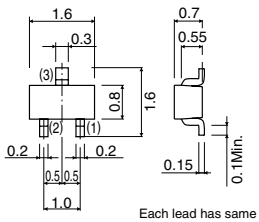
●Equivalent circuit



R_1=10kΩ / R_2=4.7kΩ

●External dimensions (Unit : mm)

EMT3
(SC-75A)
<SOT-416>

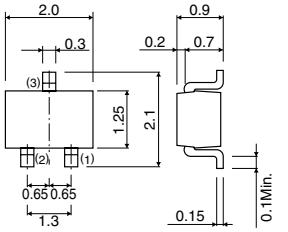


(1) GND
(2) IN
(3) OUT

Each lead has same dimensions

Abbreviated symbol : 84

UMT3
<SC-70>

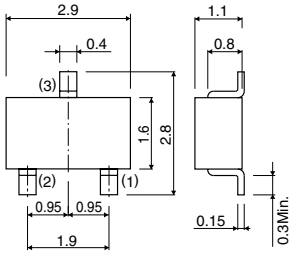


(1) GND
(2) IN
(3) OUT

Each lead has same dimensions

Abbreviated symbol : 84

SMT3
<SC-59>

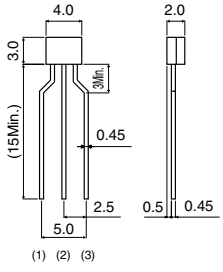


(1) GND
(2) IN
(3) OUT

Each lead has same dimensions

Abbreviated symbol : 84

SPT
(SC-72)



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

Abbreviated symbol : C114WS

●**Absolute maximum ratings** (Ta=25°C)

Parameter		Symbol	Limits	Unit
Supply voltage		V_{CC}	50	V
Input voltage		V_I	−10 to +30	V
Output current		I_O	100	mA
		$I_{C(Max.)}$	100	
Power dissipation	DTC114WE	P_D	150 *	mW
	DTC114WUA / DTC114WKA		200 *	
	DTC114WSA		300 *	
Junction temperature		Tj	150	°C
Storage temperature		Tstg	−55 to +150	°C

* When mounted on the recommended land

●**External characteristics** (Unit: mm)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	$V_{I(off)}$	–	–	0.8	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=10mA, I_I=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	24	–	–	–	I_O=10mA, V_O=5V
Input resistance	R_1	7	10	13	kΩ	–
Resistance ratio	R_2/R_1	0.37	0.47	0.57	–	–
Transition frequency	f_T *	–	250	–	MHz	V_{CE}=10V, I_E= −5mA, f=100MHz

* Characteristics of built-in transistor

●**Electrical characteristics curves**

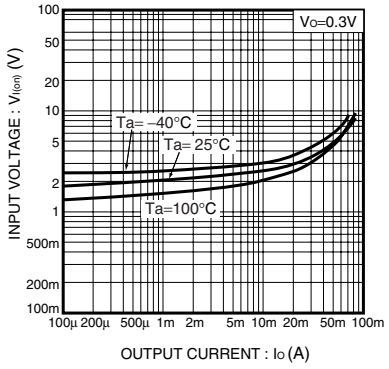


Fig.1 Input voltage vs. Output current (ON characteristics)

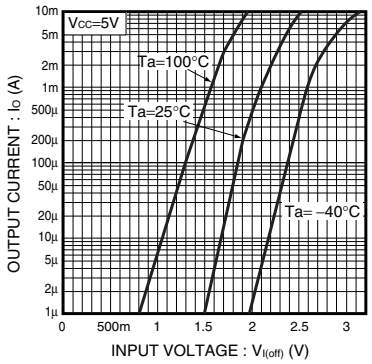


Fig.2 Output current vs. Input voltage (OFF characteristics)

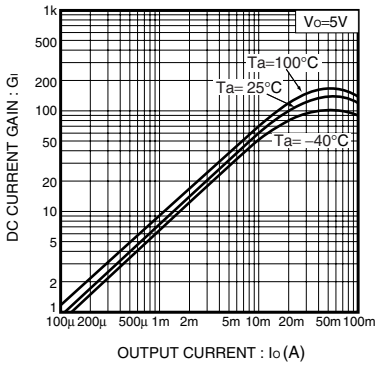


Fig.3 DC current gain vs. Output current

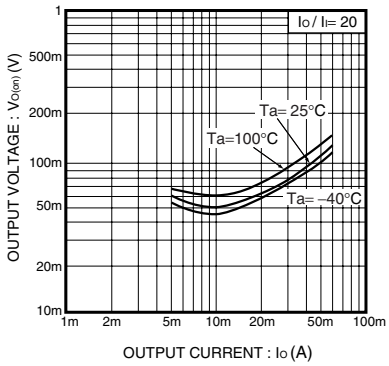


Fig.4 Output voltage vs. Output current

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