

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

DTC114TM / DTC114TE / DTC114TUA / DTC114TKA / DTC114TSA

●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)

DTC114TM ROHM : VMT3 Abbreviated symbol : 04 (1) Base (2) Emitter (3) Collector	DTC114TE ROHM : EMT3 Abbreviated symbol : 04 (1) Emitter (2) Base (3) Collector
DTC114TUA ROHM : UMT3 EIAJ : SC-70 Abbreviated symbol : 04 (1) Emitter (2) Base (3) Collector Each lead has same dimensions	DTC114TKA ROHM : SMT3 EIAJ : SC-59 Abbreviated symbol : 04 (1) Emitter (2) Base (3) Collector Each lead has same dimensions
DTC114TSA ROHM : SPT EIAJ : SC-72 Abbreviated symbol : C114TS (1) Emitter (2) Collector (3) Base	

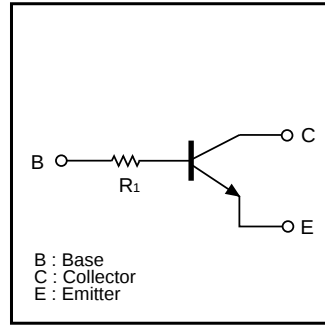
DTC114TM / DTC114TE / DTC114TUA DTC114TKA / DTC114TSA

Transistors

●Packaging specifications

	Package	VMT3	EMT3	UMT3	SMT3	SPT
	Package type	Taping	Taping	Taping	Taping	Taping
	Code	T2L	TL	T106	T146	TP
Part No.	Basic ordering unit (pieces)	8000	3000	3000	3000	5000
DTC114TM		○	—	—	—	—
DTC114TE		—	○	—	—	—
DTC114TUA		—	—	○	—	—
DTC114TKA		—	—	—	○	—
DTC114TSA		—	—	—	—	○

●Equivalent circuit



$R_1=10k\Omega$

●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits					Unit
		DTA114TM	DTA114TE	DTA114TUA	DTA114TKA	DTA114TSA	
Collector-base voltage	V_{CB0}	50					V
Collector-emitter voltage	V_{CE0}	50					V
Emitter-base voltage	V_{EB0}	5					V
Collector current	I_C	100					mA
Collector power dissipation	P_C	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
Collector-base breakdown voltage	BV_{CB0}	50	—	—	V	$I_C=50\mu A$
Collector-emitter breakdown voltage	BV_{CE0}	50	—	—	V	$I_C=1mA$
Emitter-base breakdown voltage	BV_{EB0}	5	—	—	V	$I_E=50\mu A$
Collector cutoff current	I_{CBO}	—	—	0.5	μA	$V_{CB}=50V$
Emitter cutoff current	I_{EBO}	—	—	0.5	μA	$V_{EB}=4V$
Collector-emitter saturation voltage	$V_{CE(sat)}$	—	—	0.3	V	$I_C/I_B=10mA/1mA$
DC current transfer ratio	h_{FE}	100	250	600	—	$V_{CE}=5V, I_C=1mA$
Input resistance	R_1	7	10	13	$k\Omega$	—
Transition frequency	f_T *	—	250	—	MHz	$V_{CE}=10V, I_E=-5mA, f=100MHz$

* Characteristics of built-in transistor

Transistors

●Electrical characteristic curves

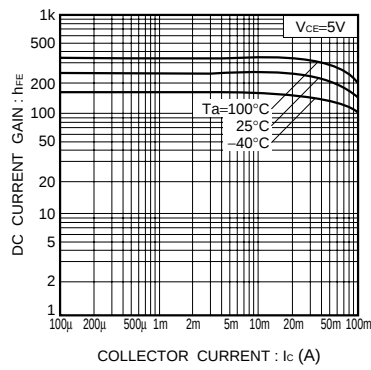


Fig.1 DC current gain vs. collector current

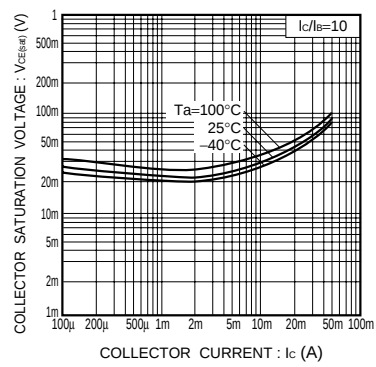


Fig.2 Collector-emitter saturation voltage vs. collector current

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