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

DTC143TM / DTC143TE / DTC143TUA / DTC143TKA / DTC143TSA

●Applications

Inverter, Interface, Driver

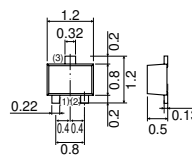
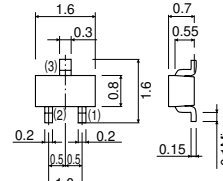
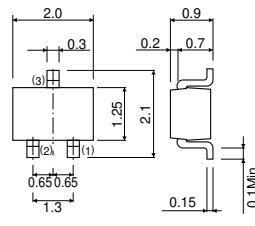
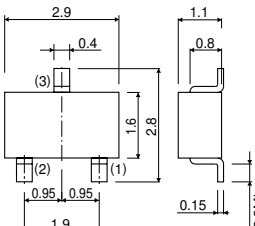
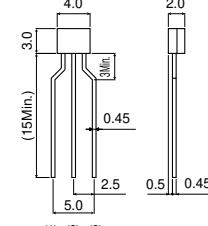
●Features

- 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

PNP epitaxial planar silicon transistor (Resistor built-in type)

●External dimensions (Unit : mm)

<p>DTC143TM</p>  <p>ROHM : VMT3</p> <p>Abbreviated symbol : 03</p> <p>(1) Base (2) Emitter (3) Collector</p>	<p>DTC143TE</p>  <p>ROHM : EMT3</p> <p>Abbreviated symbol : 03</p> <p>(1) Emitter (2) Base (3) Collector</p>
<p>DTC143TUA</p>  <p>ROHM : UMT3 EIAJ : SC-70</p> <p>Abbreviated symbol : 03</p> <p>Each lead has same dimensions</p> <p>(1) Emitter (2) Base (3) Collector</p>	<p>DTC143TKA</p>  <p>ROHM : SMT3 EIAJ : SC-59</p> <p>Abbreviated symbol : 03</p> <p>Each lead has same dimensions</p> <p>(1) Emitter (2) Base (3) Collector</p>
<p>DTC143TSA</p>  <p>ROHM : SPT EIAJ : SC-72</p> <p>Abbreviated symbol : C143TS</p> <p>(1) Emitter (2) Collector (3) Base</p>	

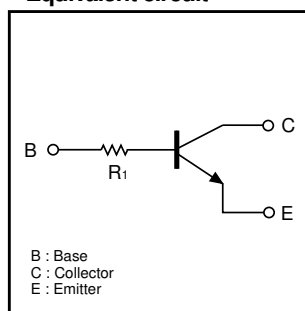
DTC143TM / DTC143TE / DTC143TUA DTC143TKA / DTC143TSA

Transistors

●Packaging specifications

Part No.	Package	VMT3	EMT3	UMT3	SMT3	SPT
	Package type	Taping	Taping	Taping	Taping	Taping
	Code	T2L	TL	T106	T146	TP
	Basic ordering unit (pieces)	8000	3000	3000	3000	5000
DTC143TM	○	-	-	-	-	-
DTC143TE	-	○	-	-	-	-
DTC143TUA	-	-	○	-	-	-
DTC143TKA	-	-	-	○	-	-
DTC143TSA	-	-	-	-	-	○

●Equivalent circuit



B : Base
C : Collector
E : Emitter

$R_1=4.7k\Omega$

●Absolute maximum ratings (Ta=25°C)

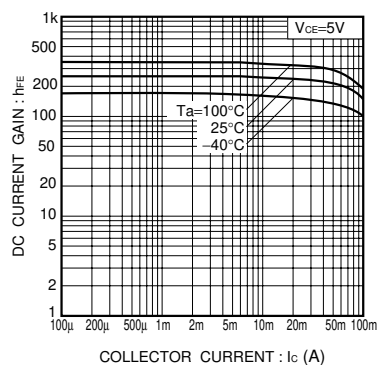
Parameter	Symbol	Limits					Unit
		DTC143TM	DTC143TE	DTC143TUA	DTC143TKA	DTC143TSA	
Collector-base voltage	V_{CBO}	50					V
Collector-emitter voltage	V_{CEO}	50					V
Emitter-base voltage	V_{EBO}	5					V
Collector current	I_C	100					mA
Collector power dissipation	P_C	150		200		300	mW
Junction temperature	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_{CBO}	50	-	-	V	$I_C=50\mu A$
Collector-emitter breakdown voltage	BV_{CEO}	50	-	-	V	$I_C=1mA$
Emitter-base breakdown voltage	BV_{EBO}	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	$I_C/I_B=5mA/0.25mA$
DC current transfer ratio	h_{FE}	100	250	600	-	$I_C=1mA, V_{CE}=5V$
Input resistance	R_1	3.29	4.7	6.11	$k\Omega$	-
Transition frequency	f_T *	-	250	-	MHz	$V_{CE}=10V, I_E=-5mA, f=100MHz$

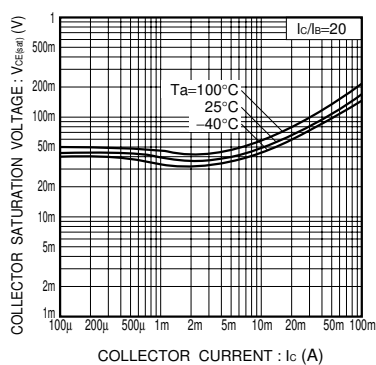
* Characteristics of built-in transistor

●Electrical characteristic curves



COLLECTOR CURRENT : I_C (A)

Fig.1 DC current gain vs. collector current



COLLECTOR CURRENT : I_C (A)

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

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