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

DTC143EM / DTC143EE / DTC143EUA / DTC143EKA / DTC143ESA

●Applications

Inverter, Interface, Driver

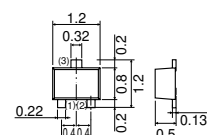
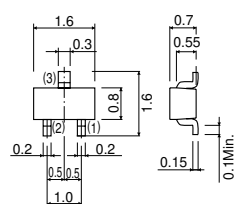
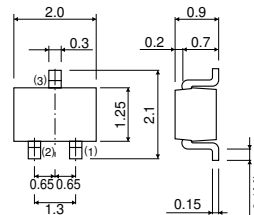
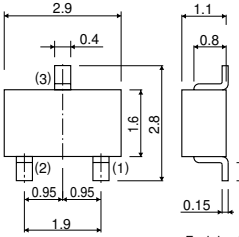
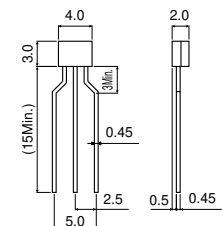
●Features

- 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)

<p>DTC143EM</p>  <p>ROHM : VMT3</p> <p>Abbreviated symbol : 23</p> <p>(1) IN (2) GND (3) OUT</p>	<p>DTC143EE</p>  <p>ROHM : EMT3</p> <p>Abbreviated symbol : 23</p> <p>(1) GND (2) IN (3) OUT</p>
<p>DTC143EUA</p>  <p>ROHM : UMT3 EIAJ : SC-70</p> <p>Abbreviated symbol : 23</p> <p>(1) GND (2) IN (3) OUT</p>	<p>DTC143EKA</p>  <p>ROHM : SMT3 EIAJ : SC-59</p> <p>Abbreviated symbol : 23</p> <p>(1) GND (2) IN (3) OUT</p> <p>Each lead has same dimensions</p>
<p>DTC143ESA</p>  <p>ROHM : SPT EIAJ : SC-72</p> <p>Abbreviated symbol : C143ES</p> <p>(1) GND (2) OUT (3) IN</p>	

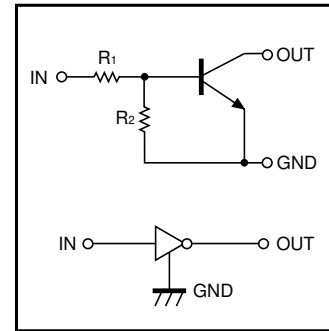
DTC143EM / DTC143EE / DTC143EUA DTC143EKA / DTC143ESA

Transistors

●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
DTC143EM		○	-	-	-	-
DTC143EE		-	○	-	-	-
DTC143EUA		-	-	○	-	-
DTC143EKA		-	-	-	○	-
DTC143ESA		-	-	-	-	○

●Equivalent circuit



$R_1=R_2=4.7k\Omega$

●Absolute maximum ratings ($T_a=25^\circ\text{C}$)

Parameter	Symbol	Limits					Unit
		DTC143EM	DTC143EE	DTC143EUA	DTC143EKA	DTC143ESA	
Supply voltage	V_{CC}	50					V
Input voltage	V_{IN}	-10 to +30					V
Output current	I_o	100					mA
	$I_{C(Max.)}$	100					
Power dissipation	P_D	150		200		300	mW
Junction temperature	T_j	150					$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150					$^\circ\text{C}$

●Electrical characteristics ($T_a=25^\circ\text{C}$)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	$V_{I(off)}$	-	-	0.5	V	$V_{CC}=5V, I_o=100\mu A$
	$V_{I(on)}$	3	-	-		$V_o=0.3V, I_o=20mA$
Output voltage	$V_{O(on)}$	-	0.1	0.3	V	$I_o/I_i=10mA/0.5mA$
Input current	I_i	-	-	1.8	mA	$V_i=5V$
Output current	$I_{O(off)}$	-	-	0.5	μA	$V_{CC}=50V, V_i=0V$
DC current gain	G_i	30	-	-	-	$V_o=5V, I_o=10mA$
Input resistance	R_i	3.29	4.7	6.11	$k\Omega$	-
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

DTC143EM / DTC143EE / DTC143EUA
 DTC143EKA / DTC143ESA

Transistors

●Electrical characteristic curves

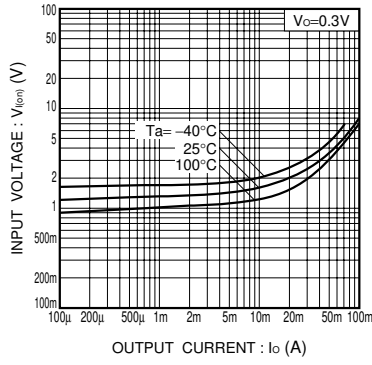


Fig.1 Input voltage vs. output current (ON characteristics)

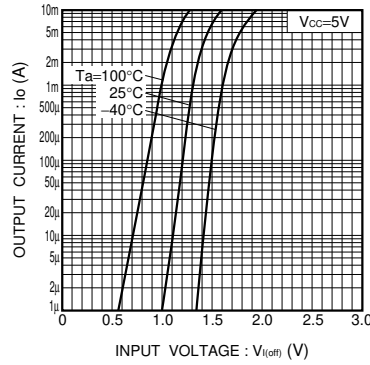


Fig.2 Output current vs. input voltage (OFF characteristics)

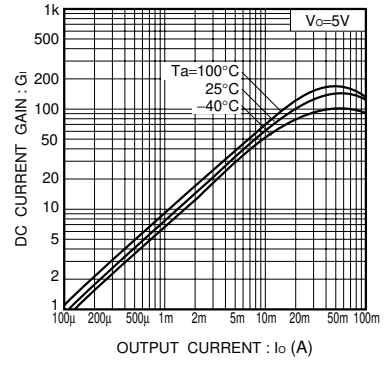


Fig.3 DC current gain vs. output current

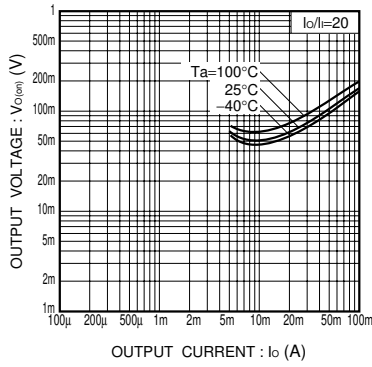


Fig.4 Output voltage vs. output current

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