

Transistors

# General purpose transistor (isolated transistors)

## EMD29

DTB513Z □ and DTC114E □ A are housed independently in a EMT6 package.

●Applications

DC / DC converter  
Motor driver

●Features

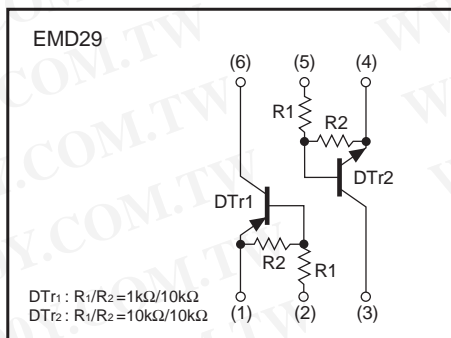
- 1) DT<sub>r1</sub> : PNP digital transistor  
DT<sub>r2</sub> : NPN digital transistor
- 2) Mounting possible with EMT3 automatic mounting machines.

●Structure

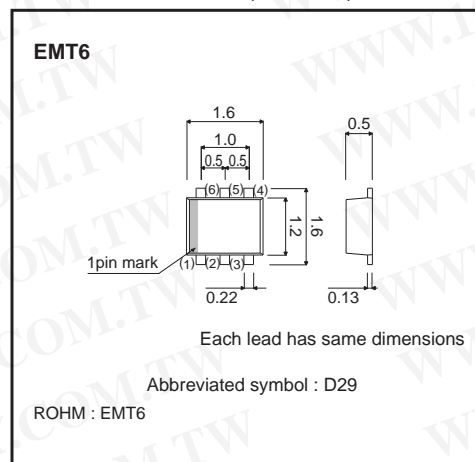
PNP / NPN Silicon epitaxial planar digital transistor

The following characteristics apply to both DT<sub>r1</sub> and DT<sub>r2</sub>.

●Equivalent circuit



●External dimensions (Unit : mm)



●Packaging specifications

Type	EMD29
Package	EMT6
Marking	D29
Code	T2R
Basic ordering unit (pieces)	8000

## Transistors

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

## DTr1

Parameter	Symbol	DTr1	Unit
Supply voltage	V <sub>CC</sub>	-12	V
Input voltage	V <sub>IN</sub>	-10 to +5	V
Output current	I <sub>C (MAX.)</sub>	-500	mA
Power dissipation	P <sub>d</sub>	120	mW *
Junction temperature	T <sub>j</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55 to +150	°C

\* Each terminal mounted on a recommended.

## DTr2

Parameter	Symbol	DTr2	Unit
Supply voltage	V <sub>CC</sub>	50	V
Input voltage	V <sub>IN</sub>	-10 to +40	V
Output current	I <sub>o</sub>	50	mA
	I <sub>C (MAX.)</sub>	100	
Power dissipation	P <sub>d</sub>	120	mW *
Junction temperature	T <sub>j</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55 to +150	°C

\* Each terminal mounted on a recommended.

## DTr1/DTr2

Parameter	Symbol	Limits	Unit
Power dissipation	P <sub>d</sub>	150(TOTAL)	mW *
Storage temperature	T <sub>stg</sub>	-55 to +125	°C

\* Each terminal mounted on a recommended.

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## Transistors

## ●Electrical characteristics (Ta=25°C)

## DTr1

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	V <sub>I(off)</sub>	–	–	–0.3	V	V <sub>CC</sub> = –5V / I <sub>o</sub> = –100uA
	V <sub>I(on)</sub>	–2.5	–	–	V	V <sub>O</sub> = –0.3V / I <sub>o</sub> = –20mA
Output voltage	V <sub>O(on)</sub>	–	–60	–300	mV	I <sub>o</sub> = –100mA, I <sub>i</sub> = –5mA
Input current	I <sub>i</sub>	–	–	–6.4	mA	V <sub>I</sub> = –5V
Output current	I <sub>o(off)</sub>	–	–	–0.5	μA	V <sub>CC</sub> = –12V / V <sub>I</sub> =0V
DC current gain	G <sub>i</sub>	140	–	–	–	V <sub>O</sub> = –2V / I <sub>o</sub> = –100mA
Transition frequency	* f <sub>T</sub>	–	260	–	MHz	V <sub>CE</sub> = –10V / I <sub>E</sub> =5mA, f=100MHz
Input resistance	R <sub>1</sub>	0.7	1.0	1.3	kΩ	–
Resistance ratio	R <sub>2</sub> /R <sub>1</sub>	8	10	12	–	–

\* Characteristics of built-in transistor.

## DTr2

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	V <sub>I(off)</sub>	–	–	0.5	V	V <sub>CC</sub> =5V / I <sub>o</sub> =100uA
	V <sub>I(on)</sub>	3	–	–	V	V <sub>O</sub> =0.3V / I <sub>o</sub> =2mA
Output voltage	V <sub>O(on)</sub>	–	100	300	mV	I <sub>o</sub> =10mA, I <sub>i</sub> =0.5mA
Input current	I <sub>i</sub>	–	–	880	μA	V <sub>I</sub> =5V
Output current	I <sub>o(off)</sub>	–	–	0.5	μA	V <sub>CC</sub> =50V / V <sub>I</sub> =0V
DC current gain	G <sub>i</sub>	30	–	–	–	V <sub>O</sub> =5V / I <sub>o</sub> =5mA
Transition frequency	* f <sub>T</sub>	–	250	–	MHz	V <sub>CE</sub> =10V / I <sub>E</sub> = –5mA, f=100MHz
Input resistance	R <sub>1</sub>	7	10	13	kΩ	–
Resistance ratio	R <sub>2</sub> /R <sub>1</sub>	0.8	1	1.2	–	–

\* Characteristics of built-in transistor.

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●Electrical characteristic curves

DTr1

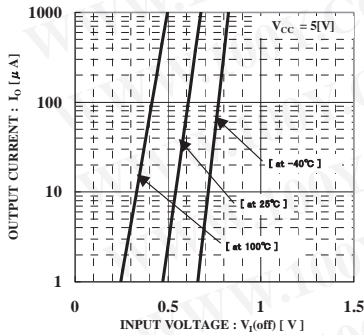


Fig.1 Output current vs. input voltage (OFF characteristics)

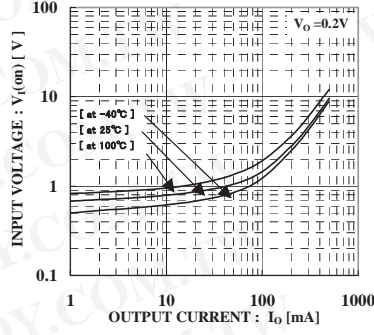


Fig.2 Input voltage vs. output current (ON characteristics) I

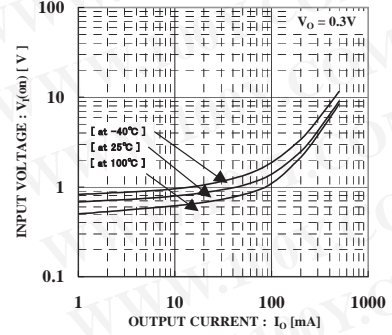


Fig.3 Input voltage vs. output current (ON characteristics) II

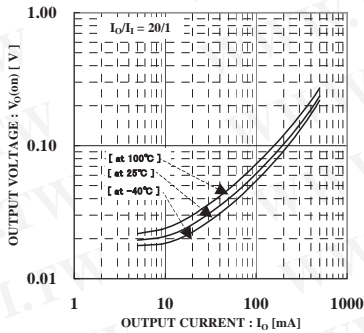


Fig.4 Output voltage vs. output current I

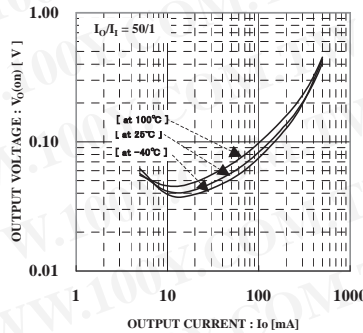


Fig.5 Output voltage vs. output current II

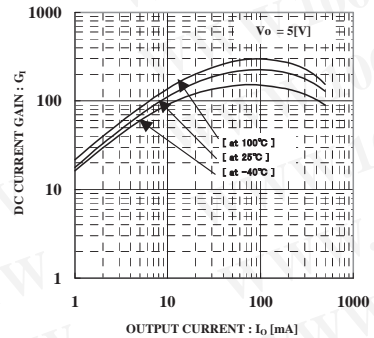


Fig.6 DC current gain vs. output current

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DTr2

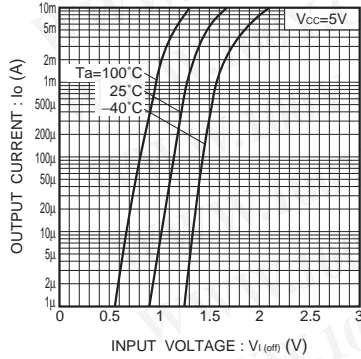


Fig.7 Output current vs. input voltage (OFF characteristics)

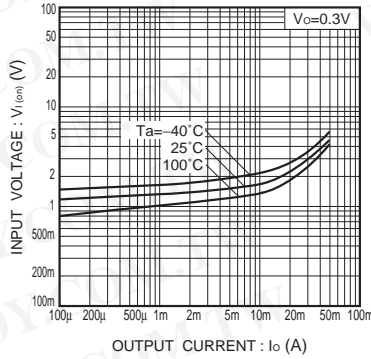


Fig.8 Input voltage vs. output current (ON characteristics)

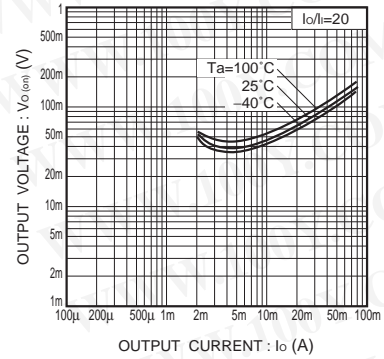


Fig.9 Output voltage vs. output current

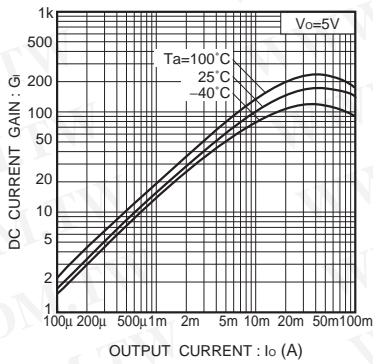


Fig.10 DC current gain vs. output current

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