

# General purpose transistor (isolated transistors)

## EMD29

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

### ●Applications

DC / DC converter  
Motor driver

### ●Features

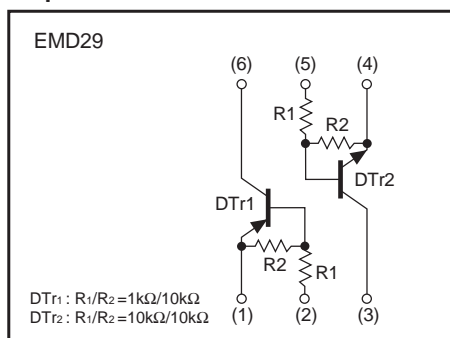
- 1) DT<sub>r1</sub> : PNP digital transistor  
DT<sub>r2</sub> : NPN digital transistor
- 2) Mounting possible with EMT3 automatic mounting machines.

### ●Structure

PNP / NPN Silicon epitaxial planar digital transistor

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

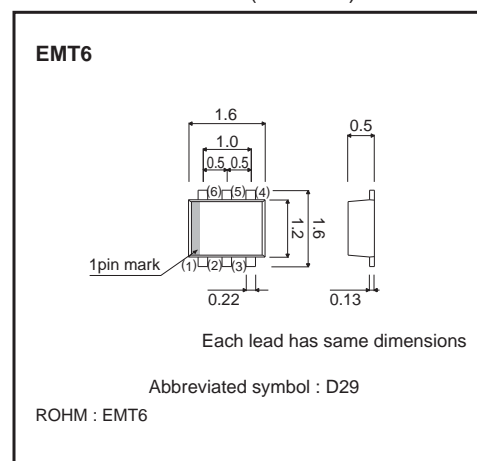
### ●Equivalent circuit



### ●Packaging specifications

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

### ●External dimensions (Unit : mm)



## Transistors

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### ●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.

## Transistors

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

## DTr1

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	$V_{I(off)}$	–	–	–0.3	V	$V_{CC} = -5V / I_o = -100\mu A$
	$V_{I(on)}$	–2.5	–	–	V	$V_o = -0.3V / I_o = -20mA$
Output voltage	$V_{O(on)}$	–	–60	–300	mV	$I_o = -100mA, I_i = -5mA$
Input current	$I_i$	–	–	–6.4	mA	$V_i = -5V$
Output current	$I_{O(off)}$	–	–	–0.5	$\mu A$	$V_{CC} = -12V / V_i = 0V$
DC current gain	$G_i$	140	–	–	–	$V_o = -2V / I_o = -100mA$
Transition frequency *	$f_T$	–	260	–	MHz	$V_{CE} = -10V / I_E = 5mA, f = 100MHz$
Input resistance	$R_1$	0.7	1.0	1.3	$k\Omega$	–
Resistance ratio	$R_2/R_1$	8	10	12	–	–

\* Characteristics of built-in transistor.

## DTr2

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	$V_o = 0.3V / I_o = 2mA$
Output voltage	$V_{O(on)}$	–	100	300	mV	$I_o = 10mA, I_i = 0.5mA$
Input current	$I_i$	–	–	880	$\mu A$	$V_i = 5V$
Output current	$I_{O(off)}$	–	–	0.5	$\mu A$	$V_{CC} = 50V / V_i = 0V$
DC current gain	$G_i$	30	–	–	–	$V_o = 5V / I_o = 5mA$
Transition frequency *	$f_T$	–	250	–	MHz	$V_{CE} = 10V / I_E = -5mA, f = 100MHz$
Input resistance	$R_1$	7	10	13	$k\Omega$	–
Resistance ratio	$R_2/R_1$	0.8	1	1.2	–	–

\* Characteristics of built-in transistor.

Transistors

●Electrical characteristic curves

DTr1

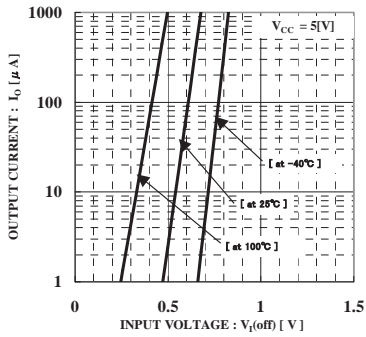


Fig.1 Output current vs. input voltage (OFF characteristics)

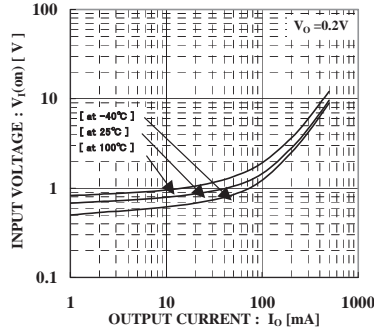


Fig.2 Input voltage vs. output current (ON characteristics) I

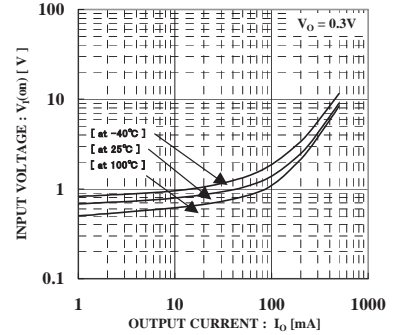


Fig.3 Input voltage vs. output current (ON characteristics) II

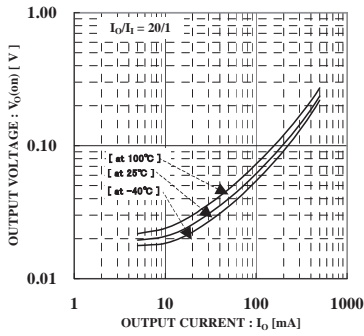


Fig.4 Output voltage vs. output current I

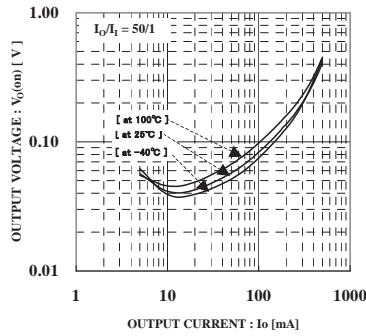


Fig.5 Output voltage vs. output current II

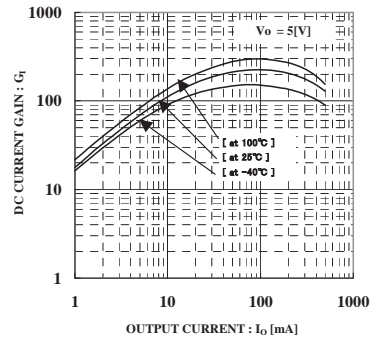


Fig.6 DC current gain vs. output current

Transistors

DTr2

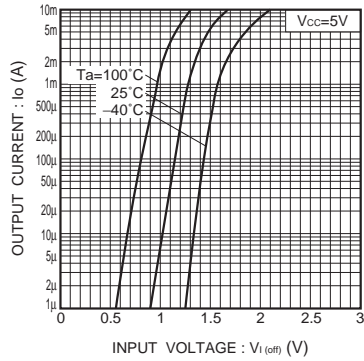


Fig.7 Output current vs. input voltage (OFF characteristics)

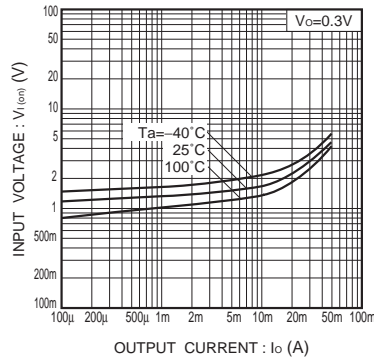


Fig.8 Input voltage vs. output current (ON characteristics)

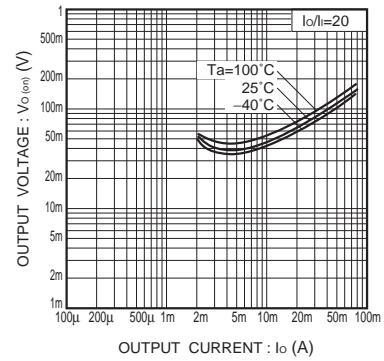


Fig.9 Output voltage vs. output current

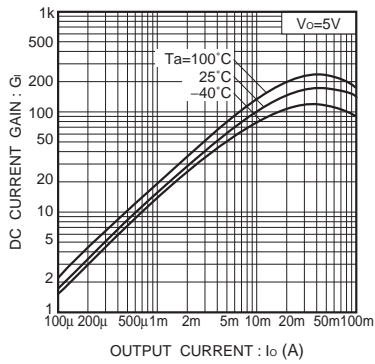


Fig.10 DC current gain vs. output current

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