EMB2 / UMB2N / IMB2A

PNP -100mA -50V Complex Digital Transistors (Bias Resistor Built-in Transistors) Datasheet

Parameter	Tr1 and Tr2
V <sub>CC</sub>	-50V
I <sub>C(MAX.)</sub>	-100mA
R <sub>1</sub>	47kΩ
R <sub>2</sub>	<b>47</b> kΩ

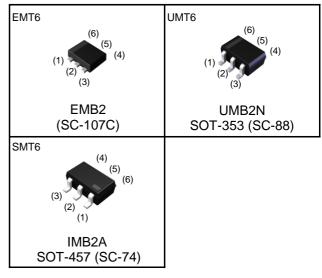
## Features

- 1) Built-In Biasing Resistors,  $R_1 = R_2 = 47k\Omega$ .
- 2) Two DTA144E chips in one package.
- Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see inner circuit).
- 4) The bias resistors consist of thin-film resistors with complete isolation to allow negative biasing of the input. They also have the advantage of completely eliminating parasitic effects.
- 5) Only the on/off conditions need to be set for operation, making the circuit design easy.
- 6) Lead Free/RoHS Compliant.

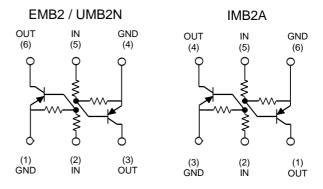
## Application

Inverter circuit, Interface circuit, Driver circuit

#### Outline



## Inner circuit



## •Packaging specifications

Part No.	Package	Package size (mm)	Taping code	Reel size (mm)	Tape width (mm)	Basic ordering unit (pcs)	Marking
EMB2	EMT6	1616	T2R	180	8	8,000	B2
UMB2N	UMT6	2021	TR	180	8	3,000	B2
IMB2A	SMT6	2928	T108	180	8	3,000	B2

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

<For Tr1 and Tr2 in common>

Para	ameter	Symbol	Values	Unit
Supply voltage		V <sub>CC</sub>	-50	V
Input voltage		V <sub>IN</sub>	-40 to +10	V
Output current		Ι <sub>ο</sub>	-30	mA
Collector current		<sup>*1</sup> ا <sub>C(MAX.)</sub>	-100	mA
Power dissipation	EMB3 / UMB3N	- P <sub>D</sub> <sup>*2</sup>	150 (Total) <sup>*3</sup>	mW
	IMB3A		300 (Total) <sup>*4</sup>	mW
Junction temperature		Tj	150	°C
Range of storage temperature		T <sub>stg</sub>	-55 to +150	°C

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

<For Tr1 and Tr2 in common>

Parameter	Symbol	Conditions	Min.	Тур.	Max.	Unit
Input voltage	V <sub>I(off)</sub>	$V_{CC} = -5V, I_{O} = -100 \mu A$	-	-	-0.5	V
Input voltage	V <sub>I(on)</sub>	$V_0 = -0.3V, I_0 = -2mA$	-3.0	-	-	V
Output voltage	V <sub>O(on)</sub>	$I_0 / I_1 = -10 \text{mA} / -0.5 \text{mA}$	-	-0.1	-0.3	V
Input current	I <sub>I</sub>	$V_1 = -5V$	-	-	-0.18	mA
Output current	I <sub>O(off)</sub>	$V_{CC} = -50V, V_1 = 0V$	-	-	-0.5	μA
DC current gain	Gı	$V_0 = -5V, I_0 = -5mA$	68	-	-	-
Input resistance	R <sub>1</sub>	-	32.9	47	61.1	kΩ
Resistance ratio	$R_2/R_1$	-	0.8	1	1.2	-
Transition frequency	f <sub>T</sub> *1	V <sub>CE</sub> = -10V, I <sub>E</sub> = 5mA, f = 100MHz	-	250	-	MHz

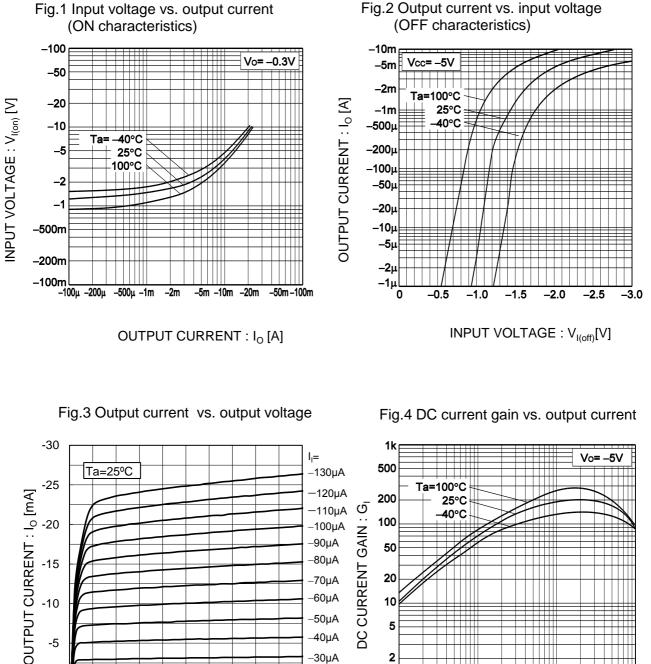
\*1 Characteristics of built-in transistor

\*2 Each terminal mounted on a reference footprint

\*3 120mW per element must not be exceeded.

\*4 200mW per element must not be exceeded.

## •Electrical characteristic curves(Ta = 25°C)



-60µA

-50µA

–40µA

-30µA

0A

-10

10

5

2 1

-100µ -200µ

-500µ -1m

-2m

OUTPUT CURRENT : Io [A]

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-10

-5

0

0

-5

OUTPUT VOLTAGE : Vo [V]

-5m -10m -20m

-50m -100m

## •Electrical characteristic curves(Ta = 25°C)

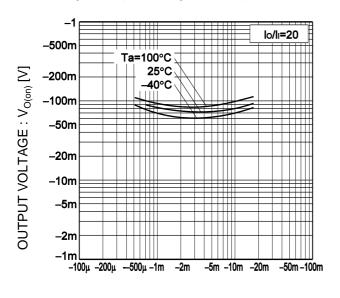
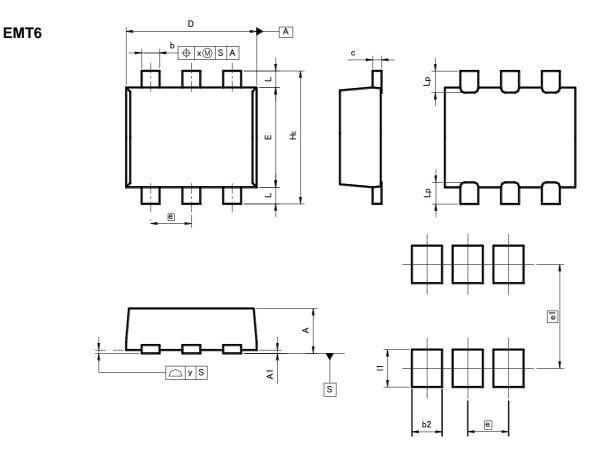


Fig.5 Output voltage vs. output current

OUTPUT CURRENT : I<sub>O</sub> [A]

## •Dimensions (Unit : mm)



## Patterm of terminal position areas

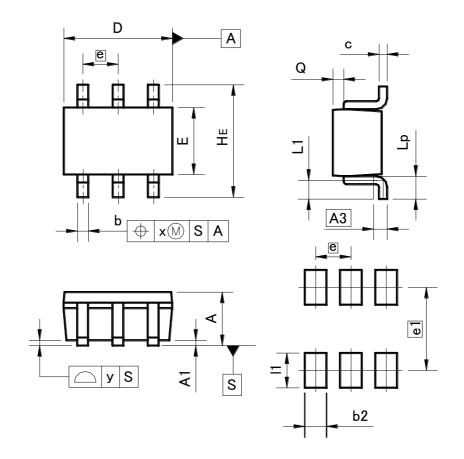
DIM	MILIM	ETERS	INC	HES	
DIM	MIN	MAX	MIN	MAX	
A1	0.00	0.10	0	0.004	
Α	0.45	0.55	0.018	0.022	
b	0.17	0.27	0.007	0.011	
с	0.08	0.18	0.003	0.007	
D	1.50	1.70	0.059	0.067	
E	1.10	1.30	0.043	0.051	
е	0.	50	0.02		
HE	1.50	1.70	0.059	0.067	
L	0.10	0.30	0.004	0.012	
Lp	_	0.35	_	0.014	
x	-	0.10	_	0.004	
У	_	0.10	_	0.004	

DIM	MILIMETERS		INC	HES	
DIM	MIN	MAX	MIN	MAX	
e1	1.25		0.049		
b2	_	0.37	-	0.015	
1	-	0.45	-	0.018	

Dimension in mm/inches

## •Dimensions (Unit : mm)

UMT6



#### Patterm of terminal position areas

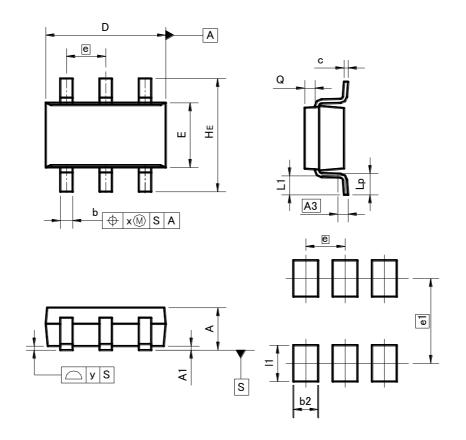
DIM	MILIM	ETERS	INC	HES	
DIM	MIN	MAX	MIN	MAX	
А	0.80	1.00	-	0.039	
A1	0.00	0.10	0	0.004	
A3	0.2	25	0.0	01	
b	0.15	0.30	0.006	0.012	
С	0.10	0.20	0.004	0.008	
D	1.90	2.10	0.075	0.083	
Е	1.15	1.35	0.045	0.053	
е	0.0	65	0.03		
HE	2.00	2.20	0.079	0.087	
L1	0.20	0.50	0.008	0.02	
Lp	0.25	0.55	0.01	0.022	
Q	0.10	0.30	0.004	0.012	
х	_	0.10	_	0.004	
У	_	0.10	_	0.004	

DIM	MILIMETERS		INC	HES	
DIM	MIN	MAX	MIN	MAX	
e1	1.55		0.06		
b2	-	0.40	-	0.016	
1	-	0.65	-	0.026	

Dimension in mm/inches

## •Dimensions (Unit : mm)

SMT6



## Patterm of terminal position areas

DIM	MILIM	ETERS	INC	HES	
DIM	MIN	MAX	MIN	MAX	
А	1.00	1.30	0.039	0.051	
A1	0.00	0.10	0	0.004	
A3	0.	25	0.0	01	
b	0.25	0.40	0.01	0.016	
С	0.09	0.25	0.004	0.01	
D	2.80	3.00	0.11	0.118	
Е	1.50	1.80	0.059	0.071	
е	0.	95	0.04		
HE	2.60	3.00	0.102	0.118	
L1	0.30	0.60	0.012	0.024	
Lp	0.40	0.70	0.016	0.028	
Q	0.20	0.30	0.008	0.012	
х	_	0.20	-	0.008	
У	_	0.10	-	0.004	

DIM	MILIMETERS		INCHES		
DIM	MIN MAX		MIN	MAX	
e1	2.10		0.08		
b2		0.60	-	0.024	
1	_	0.90	-	0.035	

Dimension in mm/inches

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