EMH6 / UMH6N / IMH6A

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

Datasheet

Parameter	Tr1 and Tr2
V _{CC}	50V
I _{C(MAX.)}	100mA
R ₁	47kΩ
R_2	47kΩ

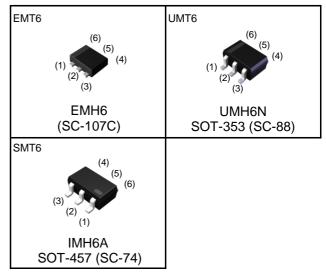
Features

- 1) Built-In Biasing Resistors, $R_1 = R_2 = 47k\Omega$.
- 2) Two DTC144E chips in one package.
- 3) 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.

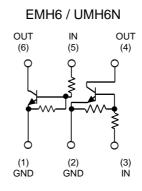
Application

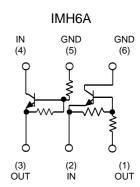
Inverter circuit, Interface circuit, Driver circuit

Outline



●Inner circuit





Packaging specifications

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Part No.	Package	Package size (mm)	Taping code	Reel size (mm)	Tape width (mm)	Basic ordering unit (pcs)	Marking
EMH6	EMT6	1616	T2R	180	8	8,000	H6
UMH6N	UMT6	2021	TR	180	8	3,000	H6
IMH6A	SMT6	2928	T108	180	8	3,000	H6

● Absolute maximum ratings (Ta = 25°C)

<For Tr1 and Tr2 in common>

Para	ameter	Symbol	Values	Unit
Supply voltage		V _{cc}	50	V
Input voltage		V _{IN}	−10 to +40	V
Output current		Io	30	mA
Collector current		I _{C(MAX.)} *1	100	mA
Power dissipation EMH6 / UMH6N IMH6A		P _D *2	150 (Total) ^{*3}	mW
		P_{D}	300 (Total)*4	mW
Junction temperature		T _j	150	°C
Range of storage temperature		T _{stg}	-55 to +150	°C

●Electrical characteristics(Ta = 25°C)

<For Tr1 and Tr2 in common>

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

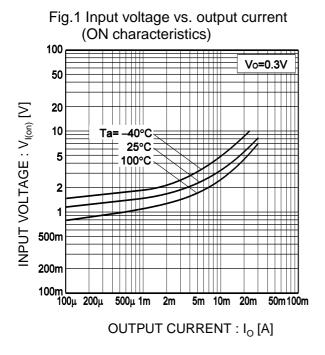
^{*1} Characteristics of built-in transistor

^{*2} Each terminal mounted on a reference footprint

^{*3 120}mW per element must not be exceeded.

^{*4 200}mW per element must not be exceeded.

●Electrical characteristic curves(Ta = 25°C)



(OFF characteristics) 10m Vcc=5V 5m Ta=100°C 2m 25°C OUTPUT CURRENT : Io [A] 1m 40°C 500µ 200μ 100μ 50µ 20μ 10µ 5μ 2μ 1μ 3.0 INPUT VOLTAGE : $V_{I(off)}[V]$

Fig.2 Output current vs. input voltage

30 Ta=25ºC 120µA 110µA OUTPUT CURRENT : Io [mA] 100µA DC CURRENT GAIN: G 90μΑ 20 80μΑ 70μA 60μΑ 10 50µA 40µA 30μΑ 0А 0 0 10 OUTPUT VOLTAGE : Vo [V]

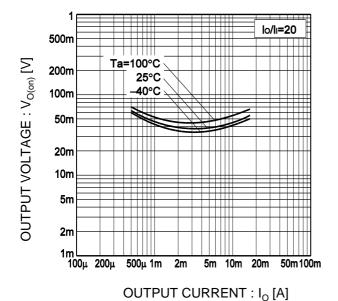
Fig.3 Output current vs. output voltage

Vo=5V 500 Ta=100°C 200 25°C 40°C 100 50 20 10 5 2 100μ 200μ 500μ 1m 2m 5m 10m 20m 50m 100m OUTPUT CURRENT : Io [A]

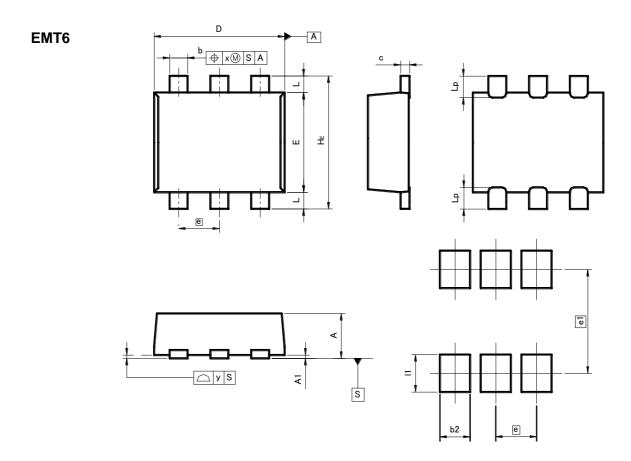
Fig.4 DC current gain vs. output current

●Electrical characteristic curves(Ta = 25°C)

Fig.5 Output voltage vs. output current



●Dimensions (Unit : mm)



Patterm of terminal position areas

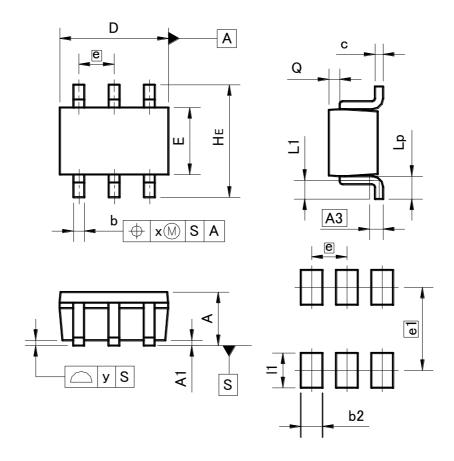
DIM	MILIMI	ETERS	INC	HES
DIIVI	MIN	MAX	MIN	MAX
A1	0.00	0.10	0	0.004
Α	0.45	0.55	0.018	0.022
b	0.17	0.27	0.007	0.011
С	0.08	0.18	0.003	0.007
D	1.50	1.70	0.059	0.067
E	1.10	1.30	0.043	0.051
е	0.9	50	0.02	
HE	1.50	1.70	0.059	0.067
L	0.10	0.30	0.004	0.012
Lp	_	0.35	-	0.014
х	_	0.10	_	0.004
V	_	0.10	_	0.004

DIM	MILIMETERS		INCHES		
MIN		MAX	MIN	MAX	
e1	1.25		0.049		
b2	_	- 0.37		0.015	
l1	_	0.45	_	0.018	

Dimension in mm/inches

●Dimensions (Unit : mm)

UMT6



Patterm of terminal position areas

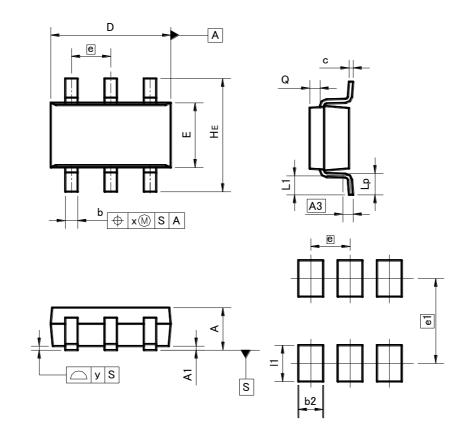
DIM	MILIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
Α	0.80	1.00	ı	0.039
A1	0.00	0.10	0	0.004
A3	0.2	25	0.0	01
b	0.15	0.30	0.006	0.012
С	0.10	0.20	0.004	0.008
D	1.90	2.10	0.075	0.083
E	1.15	1.35	0.045	0.053
е	0.65		0.03	
HE	2.00	2.20	0.079	0.087
L1	0.20	0.50	0.008	0.02
Lp	0.25	0.55	0.01	0.022
Q	0.10	0.30	0.004	0.012
х	-	0.10	_	0.004
У	-	0.10	-	0.004

DIM	MILIMI	MILIMETERS		HES
DIM MIN		MAX	MIN	MAX
e1	1.55		0.06	
b2	_	0.40	1	0.016
11	_	0.65	-	0.026

Dimension in mm/inches

●Dimensions (Unit : mm)

SMT6



Patterm of terminal position areas

DIM	MILIMETERS		INCHES		
DIM	MIN	MAX	MIN	MAX	
Α	1.00	1.30	0.039	0.051	
A1	0.00	0.10	0	0.004	
A3	0.3	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	
E	1.50	1.80	0.059	0.071	
е	0.9	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		
MIN		MAX	MIN	MAX	
e1	2.10		0.08		
b2		0.60		0.024	
11	_	- 0.90		0.035	

Dimension in mm/inches

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