EMH3 / UMH3N / IMH3A

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

Datasheet

Parameter	Tr1 and Tr2
V_{CEO}	50V
I _{C(MAX.)}	100mA
R_1	4.7kΩ

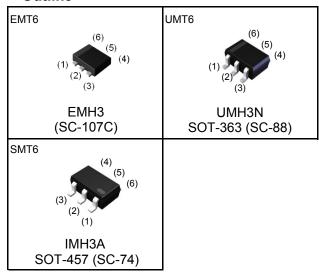
Features

- 1) Built-In Biasing Resistors.
- 2) Two DTC143T 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.

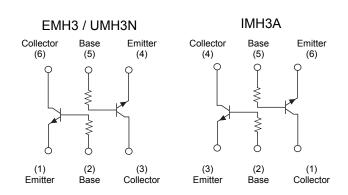
Application

Inverter circuit, Interface circuit, Driver circuit

Outline



•Inner circuit



Packaging specifications

Part No.	Package	Package size (mm)	Taping code	Reel size (mm)	Tape width (mm)	Basic ordering unit (pcs)	Marking
EMH3	EMT6	1616	T2R	180	8	8,000	H3
UMH3N	UMT6	2021	TN	180	8	3,000	H3
IMH3A	SMT6	2928	T110	180	8	3,000	H3

● Absolute maximum ratings (Ta = 25°C)

<For Tr1 and Tr2 in common>

Paramete	er	Symbol	Values	Unit
Collector-base voltage		V_{CBO}	50	V
Collector-emitter voltage		V_{CEO}	50	V
Emitter-base voltage		V_{EBO}	5	V
Collector current		I _{C(MAX.)} *1	100	mA
Collector Power dissipation EMH3 / UMH3N IMH3A		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
Collector-base breakdown voltage	BV _{CBO}	I _C = 50μA	50	-	-	V
Collector-emitter breakdown voltage	BV _{CEO}	I _C = 1mA	50	-	-	V
Emitter-base breakdown voltage	BV _{EBO}	I _E = 50μA	5	-	-	V
Collector cut-off current	I _{CBO}	V _{CB} = 50V	-	-	0.5	μΑ
Emitter cut-off current	I _{EBO}	V _{EB} = 4V	1	1	0.5	μА
Collector-emitter saturation voltage	V _{CE(sat)}	I _C / I _B = 5mA / 0.25mA	-	-	0.15	V
DC current gain	h _{FE}	V_{CE} = 5V , I_{C} = 1mA ,	100	250	600	-
Input resistance	R ₁	-	3.5	4.7	5.9	kΩ
Transition frequency	f _T *1	V _{CE} = 10V, I _E = -5mA, f = 100MHz	-	250	-	MHz

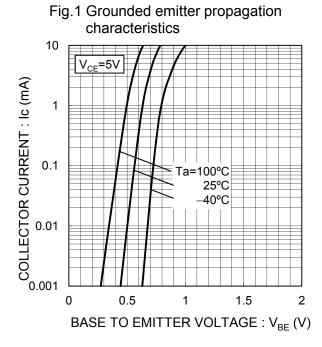
^{*1} Characteristics of built-in transistor

^{*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)



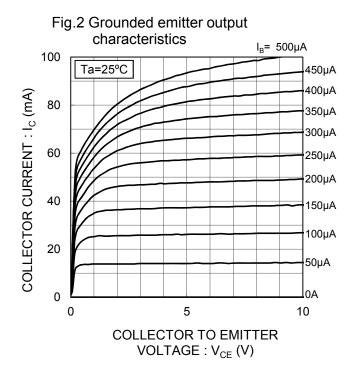
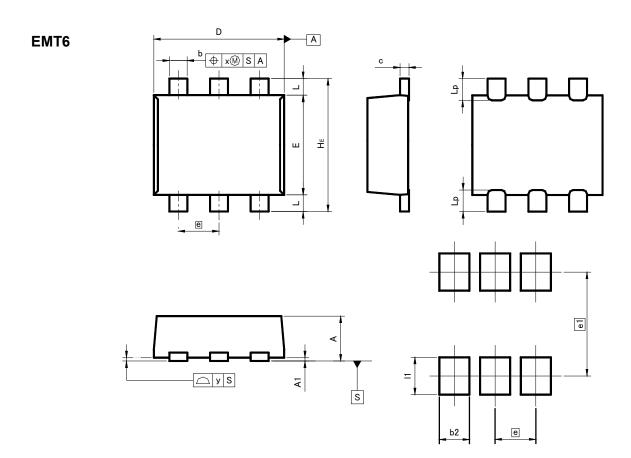


Fig.3 DC Current gain vs. Collector Current 1k V_{CE}=5V 500 200 DC CURRENT GAIN: hFE Ta=100°C 100 25°C∰ 50 -40°C 20 10 5 2 100μ 200μ 500μ 1m 2m 5m 10m 20m 50m100m COLLECTOR CURRENT : I_C (mA)

Fig.4 Collector-emitter saturation voltage vs. Collector Current $I_C/I_B=20$ 500m **COLLECTOR SATURATION** 200m Ta=100°C VOLTAGE: V_{CE}(sat) (V) 25°C 100m 50m 10m 5m 2m 5m 10m 20m COLLECTOR CURRENT : I_C (mA)

●Dimensions (Unit : mm)



Patterm of terminal position areas

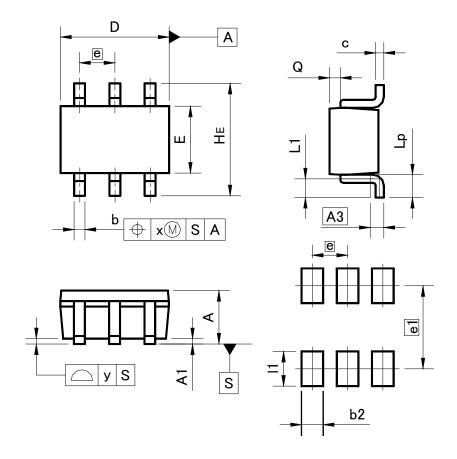
DIM	MILIMETERS		INC	HES
DIM	MIN	MAX	MIN	MAX
A1	0.00	0.10	0	0.004
Α	0.45	0.55	0.018	0.022
b	0.17	0.27	0.007	0.011
С	0.08	0.18	0.003	0.007
D	1.50	1.70	0.059	0.067
Е	1.10	1.30	0.043	0.051
е	0.	50	0.02	
HE	1.50	1.70	0.059	0.067
L	0.10	0.30	0.004	0.012
Lp	_	0.35	_	0.014
х	_	0.10	_	0.004
٧	_	0.10	_	0.004

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

Dimension in mm/inches

●Dimensions (Unit : mm)

UMT6



Patterm of terminal position areas

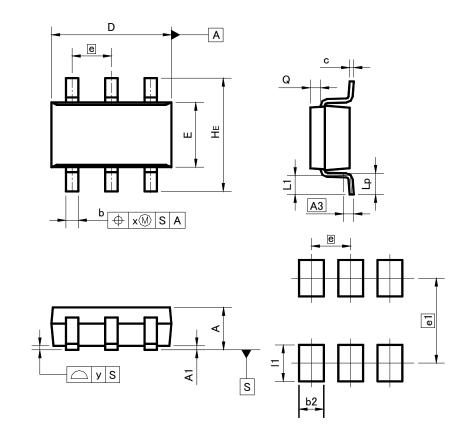
DIM	MILIMETERS		INCHES		
DIM	MIN	MAX	MIN	MAX	
Α	0.80	1.00	1	0.039	
A1	0.00	0.10	0	0.004	
A3	0.2	25	0.0	01	
b	0.15	0.30	0.006	0.012	
С	0.10	0.20	0.004	0.008	
D	1.90	2.10	0.075	0.083	
E	1.15	1.35	0.045	0.053	
е	0.65		0.03		
HE	2.00	2.20	0.079	0.087	
L1	0.20	0.50	0.008	0.02	
Lp	0.25	0.55	0.01	0.022	
Q	0.10	0.30	0.004	0.012	
х	_	0.10	-	0.004	
У	_	0.10	-	0.004	

DIM	MILIMETERS		INCHES		
MIN		MAX	MIN	MAX	
e1	1.55		0.06		
b2	-	0.40	ı	0.016	
11	- 0.65		-	0.026	

Dimension in mm/inches

●Dimensions (Unit : mm)

SMT6



Patterm of terminal position areas

DIM	MILIM	ETERS	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	
Е	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		
DIM	MIN	MAX	MIN	MAX	
e1	2.10		0.08		
b2		0.60	1	0.024	
11	-	0.90	ı	0.035	

Dimension in mm/inches

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