EMG4 / UMG4N / FMG4A

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	10kΩ

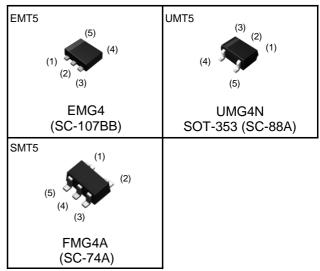
Features

- 1) Built-In Biasing Resistors.
- 2) Two DTC114T chips in one package.
- 3) Emitter-common type.
- 4) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see inner circuit).
- 5) 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.
- 6) Only the on/off conditions need to be set for operation, making the circuit design easy.
- 7) Lead Free/RoHS Compliant.

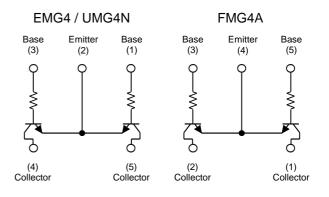
Application

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
EMG4	EMT5	1616	T2R	180	8	8,000	G4
UMG4N	UMT5	2021	TR	180	8	3,000	G4
FMG4A	SMT5	2928	T148	180	8	3,000	G4

● Absolute maximum ratings (Ta = 25°C)

<For Tr1 and Tr2 in common>

Paramete	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 EMG4 / UMG4N FMG4A		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	1	-	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	μΑ
Collector-emitter saturation voltage	V _{CE(sat)}	$I_C / I_B = 10mA / 1mA$	ı	ı	0.3	V
DC current gain	h _{FE}	V_{CE} = 5V , I_{C} = 1mA ,	100	250	600	-
Input resistance	R ₁	-	7	10	13	kΩ
Transition frequency	f _T *1	$V_{CE} = 10V, I_{E} = -5mA,$ f = 100MHz	-	250	-	MHz

^{*1} Characteristics of built-in transistor

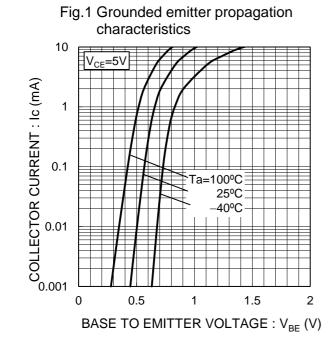
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^{*2} Each terminal mounted on a reference footprint

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

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

●Electrical characteristic curves(Ta = 25°C)



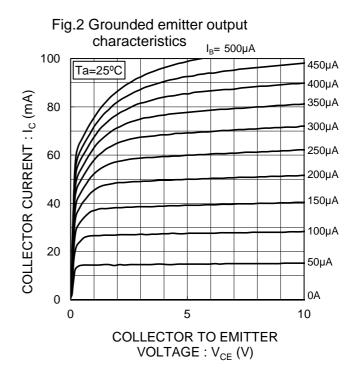
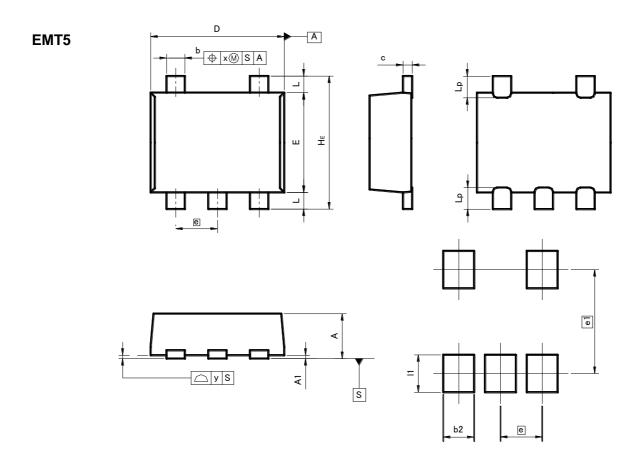


Fig.3 DC Current gain vs. Collector Current 1k V_{CE}=5V 500 200 DC CURRENT GAIN: hFE Ta=100°C 100 \blacksquare 25°C 50 -40°C 20 10 5 2 100μ 200μ 500μ 1m 2m 5m 10m 20m 50m100m COLLECTOR CURRENT : I_C (mA)

Fig.4 Collector-emitter saturation voltage vs. Collector Current $I_{C}/I_{B}=10$ 500m 200m **COLLECTOR SATURATION** VOLTAGE: V_{CE}(sat) (V) Ta=100°C 100m 25°C 50m 40°C 20m 10m 5m 2m 1m 100μ 200μ 500μ1m 2m 5m 10m 20m 50m100m COLLECTOR CURRENT : I_C (mA)

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●Dimensions (Unit : mm)



Patterm of terminal position areas

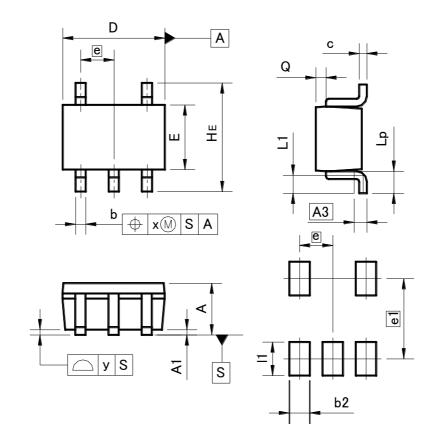
DIM	MILIMETERS		INCHES		
DIIVI	MIN	MAX	MIN	MAX	
A1	0.00	0.10	0	0.004	
Α	0.45	0.55	0.018	0.022	
b	0.17	0.27	0.007	0.011	
С	0.08	0.18	0.003	0.007	
D	1.50	1.70	0.059	0.067	
E	1.10	1.30	0.043	0.051	
е	0.9	50	0.02		
HE	1.50	1.70	0.059	0.067	
L	0.10	0.30	0.004	0.012	
Lp	_	0.35	-	0.014	
х	_	0.10	_	0.004	
У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

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

Dimension in mm/inches

●Dimensions (Unit : mm)

UMT5



Patterm of terminal position areas

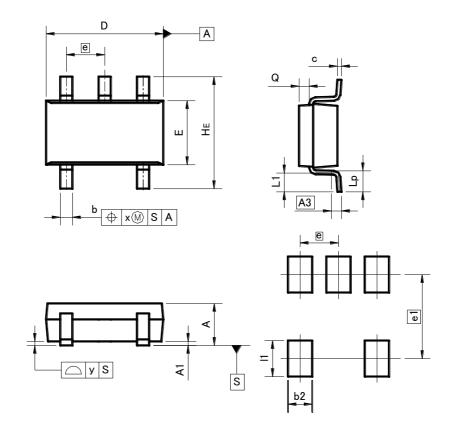
DIM	MILIMI	MILIMETERS		HES
DIM	MIN	MAX	MIN	MAX
Α	0.80	1.00	0.031	0.039
A1	0.00	0.10	0	0.004
A3	0.3	25	0.0	01
b	0.15	0.30	0.006	0.012
С	0.10	0.20	0.004	0.008
D	1.90	2.10	0.075	0.083
E	1.15	1.35	0.045	0.053
е	0.0	65	0.03	
HE	2.00	2.20	0.079	0.087
L1	0.20	0.50	0.008	0.02
Lp	0.25	0.55	0.01	0.022
Q	0.10	0.30	0.004	0.012
х		0.10	_	0.004
У	_	0.10	_	0.004

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

Dimension in mm/inches

●Dimensions (Unit : mm)

SMT5



Patterm of terminal position areas

DIM	MILIMETERS		INC	HES	
DIM	MIN	MAX	MIN	MAX	
Α	1.00	1.30	ı	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	- 1	0.008	
У	=	0.10	- 1	0.004	

DIM	MILIMETERS		INCHES		
DIM	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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