EMG9 / UMG9N / FMG9A

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	10k Ω
R_2	10kΩ

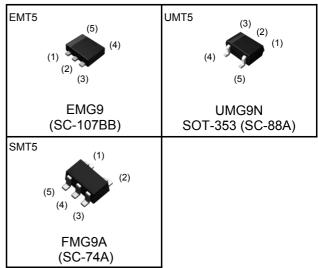
Features

- 1) Built-In Biasing Resistors, $R_1 = R_2 = 10k\Omega$.
- 2) Two DTC114E chips in one package.
- 3) Emitter(GND)-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.

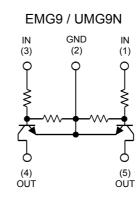
Application

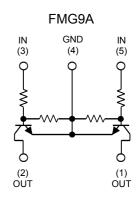
Inverter circuit, Interface circuit, Driver circuit

Outline



•Inner circuit





Packaging specifications

Part No.	Package	Package size (mm)	Taping code	Reel size (mm)	Tape width (mm)	Basic ordering unit (pcs)	Marking
EMG9	EMT5	1616	T2R	180	8	8,000	G9
UMG9N	UMT5	2021	TR	180	8	3,000	G9
FMG9A	SMT5	2928	T148	180	8	3,000	G9

● Absolute maximum ratings (Ta = 25°C)

<For Tr1 and Tr2 in common>

Parame	er	Symbol	Values	Unit
Supply voltage		V_{CC}	50	V
Input voltage		V_{IN}	-10 to +40	V
Output current		I _O	50	mA
Collector current		I _{C(MAX.)} *1	100	mA
Power dissipation EMG9 / UMG9N		P _D *2	150 (Total) ^{*3}	mW
FMG9A		P_{D}	300 (Total) ^{*4}	mW
Junction temperature		T _j	150	°C
Range of storage temperature	9	T _{stg}	−55 to +150	°C

●Electrical characteristics(Ta = 25°C)

<For Tr1 and Tr2 in common>

Parameter	Symbol	Conditions	Min.	Тур.	Max.	Unit
lanut voltage	$V_{I(off)}$	$V_{CC} = 5V, I_{O} = 100 \mu A$	-	-	0.5	V
Input voltage	$V_{I(on)}$	$V_{\rm O} = 0.3 V, I_{\rm O} = 10 \text{mA}$	3	-	-	V
Output voltage	$V_{O(on)}$	I _O / I _I = 10mA / 0.5mA	-	0.1	0.3	V
Input current	l ₁	V _I = 5V	-	-	0.88	mA
Output current	I _{O(off)}	$V_{CC} = 50V, V_I = 0V$	-	-	0.5	μА
DC current gain	G _I	$V_O = 5V$, $I_O = 5mA$	30	-	-	-
Input resistance	R ₁	-	7	10	13	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

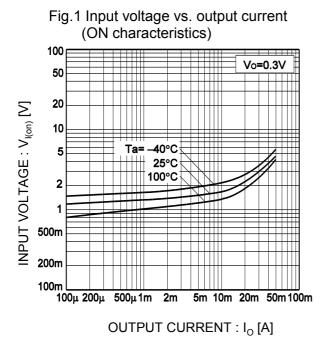
^{*1} Characteristics of built-in transistor

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

Fig.2 Output current vs. input voltage

Fig.3 Output current vs. output voltage

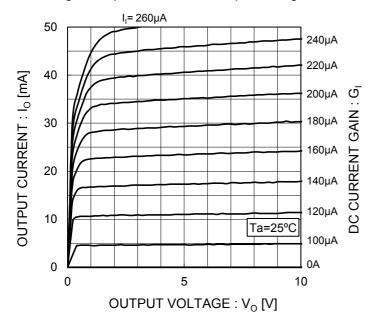
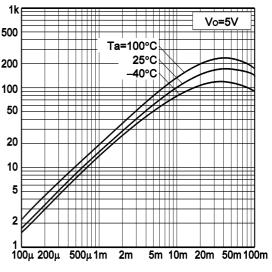


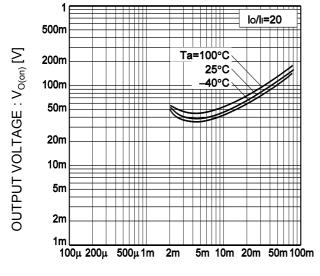
Fig.4 DC current gain vs. output current



OUTPUT CURRENT : Io [A]

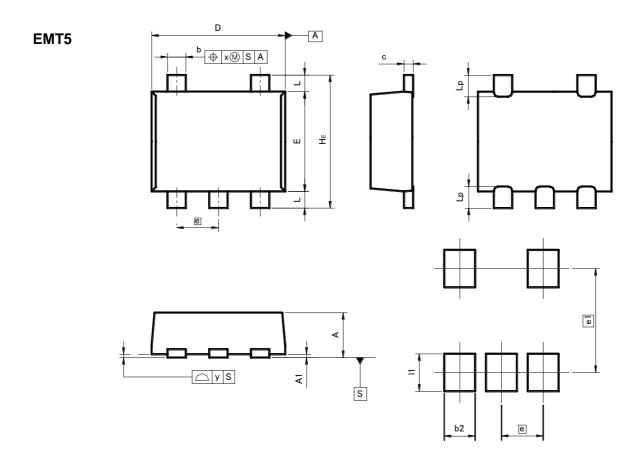
●Electrical characteristic curves (Ta = 25°C)

Fig.5 Output voltage vs. output current



OUTPUT CURRENT : I_O [A]

●Dimensions (Unit : mm)



Patterm of terminal position areas

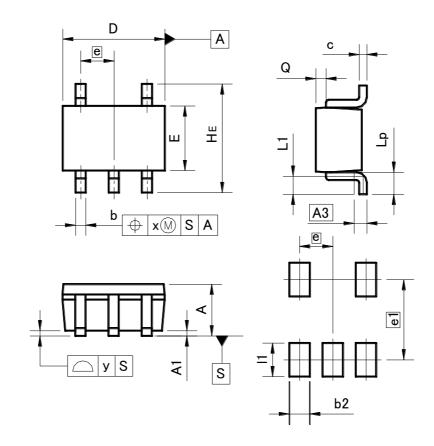
DIM	MILIMETERS		INCHES		
DIM	MIN	MAX	MIN	MAX	
A1	0.00	0.10	0	0.004	
Α	0.45	0.55	0.018	0.022	
b	0.17	0.27	0.007	0.011	
С	0.08	0.18	0.003	0.007	
D	1.50	1.70	0.059	0.067	
E	1.10	1.30	0.043	0.051	
е	0.9	50	0.02		
HE	1.50	1.70	0.059	0.067	
L	0.10	0.30	0.004	0.012	
Lp	_	0.35	_	0.014	
х	_	0.10	_	0.004	
У	_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

DIM	MILIM	ETERS	INCHES		
DIM MIN		MAX	MIN	MAX	
e1	1.25		0.049		
b2	_	0.37	ı	0.015	
11	_	0.45	ı	0.018	

Dimension in mm/inches

●Dimensions (Unit : mm)

UMT5



Patterm of terminal position areas

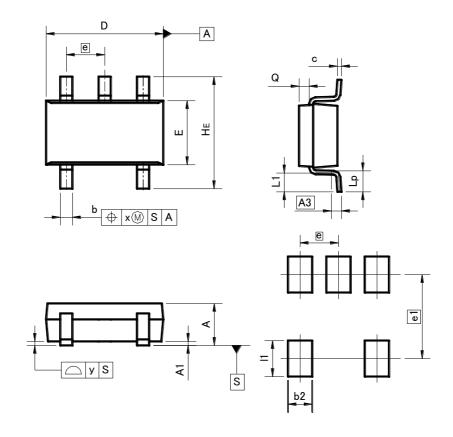
DIM	MILIMETERS		INCHES		
DIM	MIN	MAX	MIN	MAX	
Α	0.80	1.00	0.031	0.039	
A1	0.00	0.10	0	0.004	
A3	0.3	25	0.0	01	
b	0.15	0.30	0.006	0.012	
С	0.10	0.20	0.004	0.008	
D	1.90	2.10	0.075	0.083	
E	1.15	1.35	0.045	0.053	
е	0.0	65	0.03		
HE	2.00	2.20	0.079	0.087	
L1	0.20	0.50	0.008	0.02	
Lp	0.25	0.55	0.01	0.022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

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

Dimension in mm/inches

●Dimensions (Unit : mm)

SMT5



Patterm of terminal position areas

DIM	MILIMETERS		INCHES		
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		0.008	
у		0.10		0.004	

DIM	MILIMETERS		INCHES		
DIM	MIN	MAX	MIN	MAX	
e1	2.	2.10		0.08	
b2		0.60	_	0.024	
11	-	0.90	-	0.035	

Dimension in mm/inches

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