

# General purpose transistor (dual transistors)

## EMZ1 / UMZ1N / IMZ1A

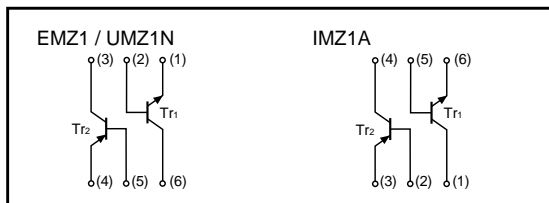
### ●Features

- 1) Both a 2SA1037AK chip and 2SC2412K chip in a EMT or UMT or SMT package.
- 2) Mounting possible with EMT3 or UMT3 or SMT3 automatic mounting machines.
- 3) Transistor elements are independent, eliminating interference.
- 4) Mounting cost and area can be cut in half.

### ●Structure

NPN / PNP epitaxial planar silicon transistor

### ●Equivalent circuit



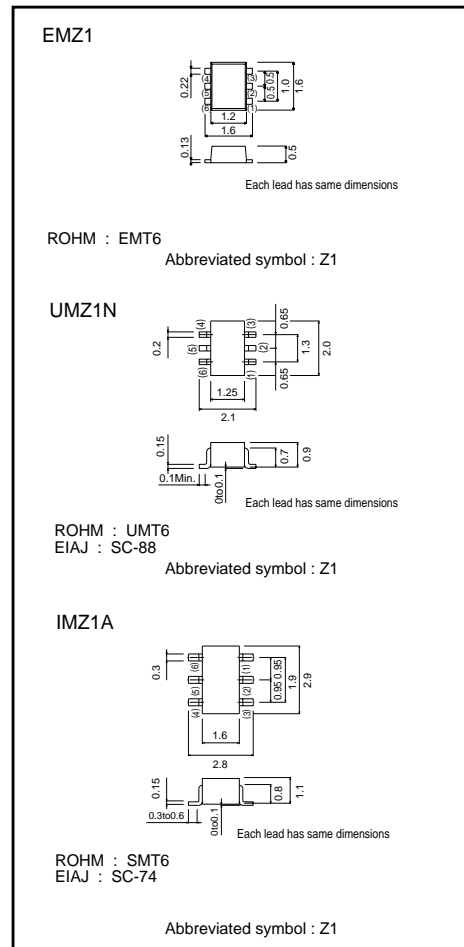
### ●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits		Unit
		Tr1	Tr2	
Collector-base voltage	V <sub>CBO</sub>	60	-60	V
Collector-emitter voltage	V <sub>CEO</sub>	50	-50	V
Emitter-base voltage	V <sub>EBO</sub>	7	-6	V
Collector current	I <sub>c</sub>	150	-150	mA
Power dissipation	EMZ1, UMZ1N	150 (TOTAL)		mW <sup>*1</sup> mW <sup>*2</sup>
	IMZ1A	300 (TOTAL)		
Junction temperature	T <sub>j</sub>	150		°C
Storage temperature	T <sub>stg</sub>	-55 to +150		°C

\*1 120mW per element must not be exceeded.

\*2 200mW per element must not be exceeded.

### ●External dimensions (Unit : mm)



## Transistors

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

## Tr1 (NPN)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV <sub>CBO</sub>	60	–	–	V	I <sub>C</sub> =50μA
Collector-emitter breakdown voltage	BV <sub>CEO</sub>	50	–	–	V	I <sub>C</sub> =1mA
Emitter-base breakdown voltage	BV <sub>EBO</sub>	7	–	–	V	I <sub>E</sub> =50μA
Collector cutoff current	I <sub>CBO</sub>	–	–	0.1	μA	V <sub>CB</sub> =60V
Emitter cutoff current	I <sub>EBO</sub>	–	–	0.1	μA	V <sub>EB</sub> =7V
Collector-emitter saturation voltage	V <sub>CE(sat)</sub>	–	–	0.4	V	I <sub>C</sub> /I <sub>B</sub> =50mA/5mA
DC current transfer ratio	h <sub>FE</sub>	120	–	560	–	V <sub>CE</sub> =6V, I <sub>C</sub> =1mA
Transition frequency	f <sub>T</sub>	–	180	–	MHz	V <sub>CE</sub> =12V, I <sub>E</sub> =–2mA, f=100MHz
Output capacitance	C <sub>ob</sub>	–	2	3.5	PF	V <sub>CB</sub> =12V, I <sub>E</sub> =0A, f=1MHz

## Tr2 (PNP)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV <sub>CBO</sub>	–60	–	–	V	I <sub>C</sub> =–50μA
Collector-emitter breakdown voltage	BV <sub>CEO</sub>	–50	–	–	V	I <sub>C</sub> =–1mA
Emitter-base breakdown voltage	BV <sub>EBO</sub>	–6	–	–	V	I <sub>E</sub> =–50μA
Collector cutoff current	I <sub>CBO</sub>	–	–	–0.1	μA	V <sub>CB</sub> =–60V
Emitter cutoff current	I <sub>EBO</sub>	–	–	–0.1	μA	V <sub>EB</sub> =–6V
Collector-emitter saturation voltage	V <sub>CE(sat)</sub>	–	–	–0.5	V	I <sub>C</sub> /I <sub>B</sub> =–50mA/–5mA
DC current transfer ratio	h <sub>FE</sub>	120	–	560	–	V <sub>CE</sub> =–6V, I <sub>C</sub> =–1mA
Transition frequency	f <sub>T</sub>	–	140	–	MHz	V <sub>CE</sub> =–12V, I <sub>E</sub> =2mA, f=100MHz
Output capacitance	C <sub>ob</sub>	–	4	5	PF	V <sub>CB</sub> =–12V, I <sub>E</sub> =0A, f=1MHz

## ●Packaging specifications

Type	Package	Taping		
	Code	T2R	TR	T108
	Basic ordering unit (pieces)	8000	3000	3000
EMZ1	○	—	—	—
UMZ1N	—	○	—	—
IMZ1A	—	—	—	○

## ●Electrical characteristic curves

## Tr1 (NPN)

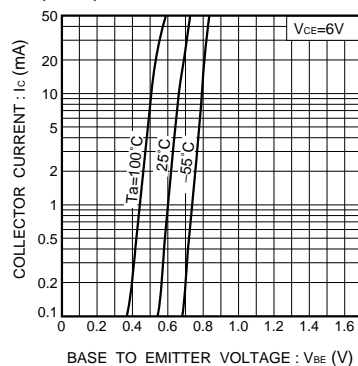


Fig.1 Grounded emitter propagation characteristics

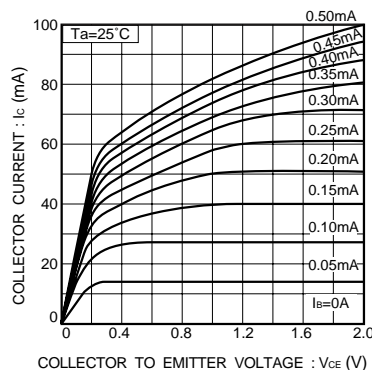


Fig.2 Grounded emitter output characteristics ( I )

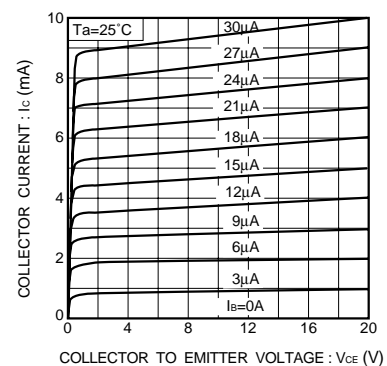


Fig.3 Grounded emitter output characteristics ( II )

Transistors

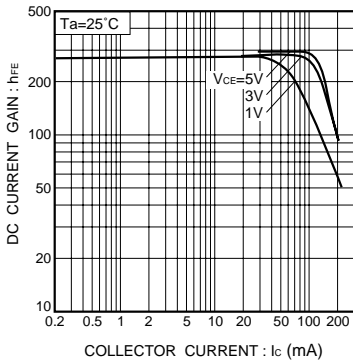


Fig.4 DC current gain vs. collector current ( I )

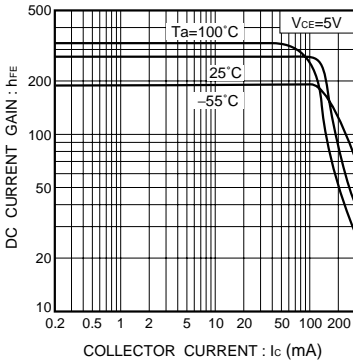


Fig.5 DC current gain vs. collector current ( II )

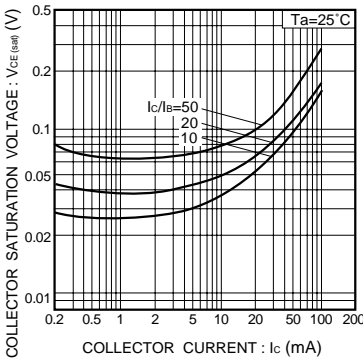


Fig.6 Collector-emitter saturation voltage vs. collector current ( I )

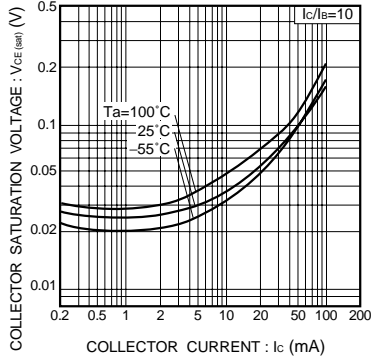


Fig.7 Collector-emitter saturation voltage vs. collector current ( II )

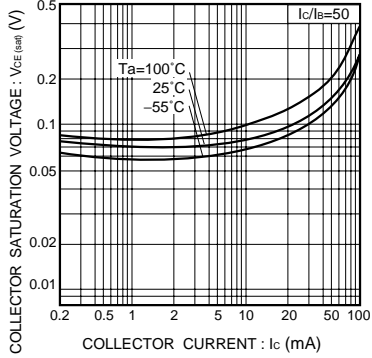


Fig.8 Collector-emitter saturation voltage vs. collector current ( III )

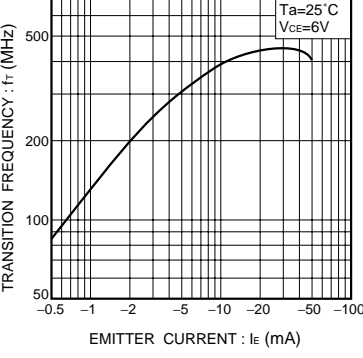


Fig.9 Gain bandwidth product vs. emitter current

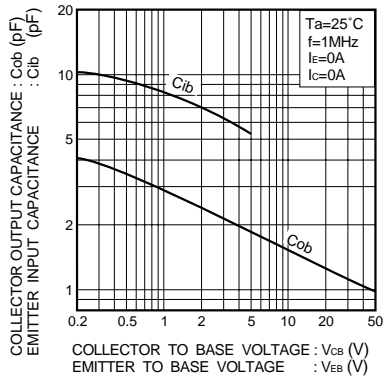


Fig.10 Collector output capacitance vs. collector-base voltage  
Emitter input capacitance vs. emitter-base voltage

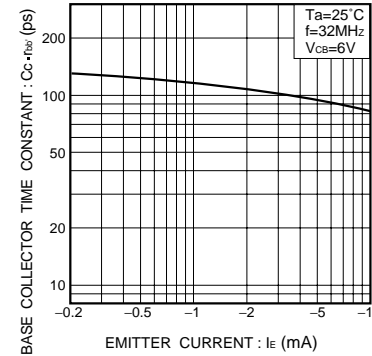


Fig.11 Base-collector time constant vs. emitter current

Transistors

T<sub>r2</sub> (PNP)

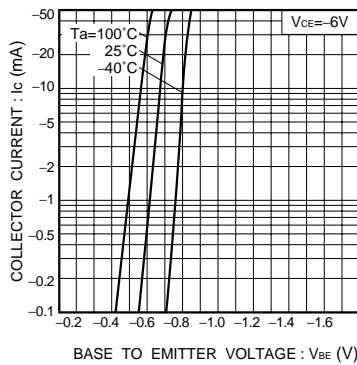


Fig.12 Grounded emitter propagation characteristics

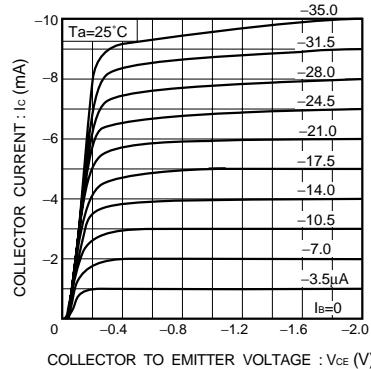


Fig.13 Grounded emitter output characteristics ( I )

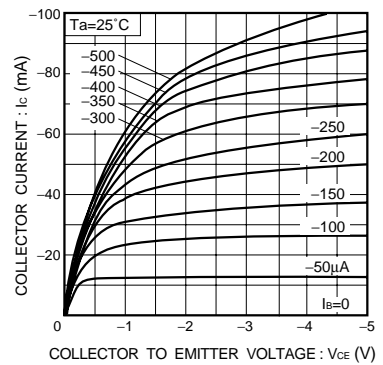


Fig.14 Grounded emitter output characteristics ( II )

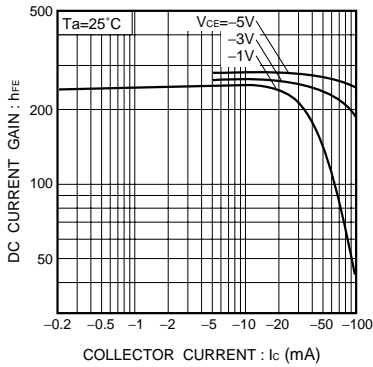


Fig.15 DC current gain vs. collector current ( I )

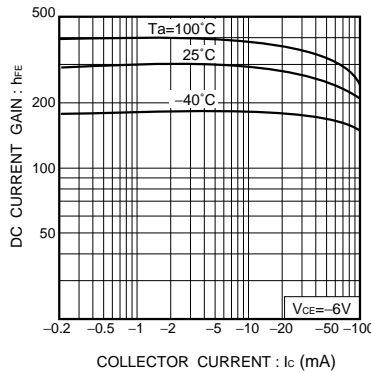


Fig.16 DC current gain vs. collector current ( II )

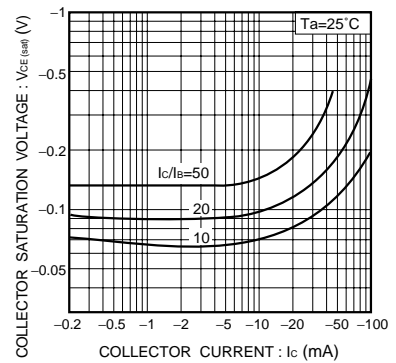


Fig.17 Collector-emitter saturation voltage vs. collector current ( I )

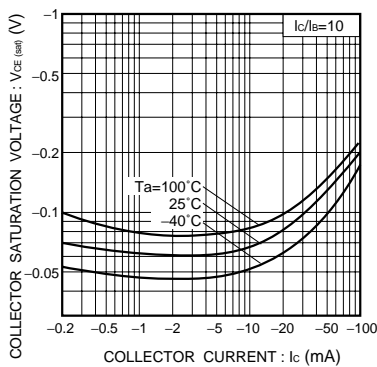


Fig.18 Collector-emitter saturation voltage vs. collector current ( II )

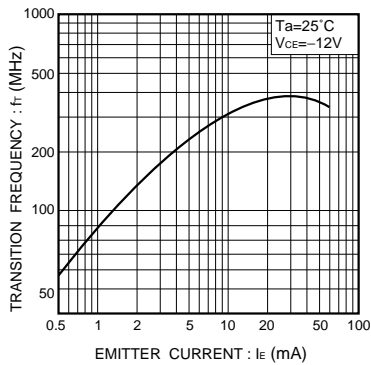


Fig.19 Gain bandwidth product vs. emitter current

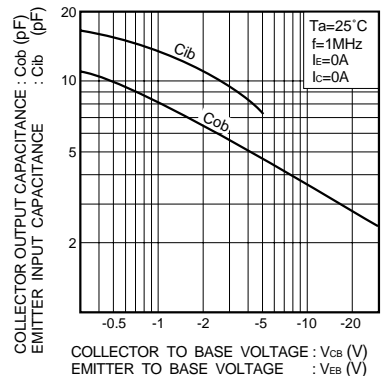


Fig.20 Collector output capacitance vs. collector-base voltage  
Emitter input capacitance vs. emitter-base voltage

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