

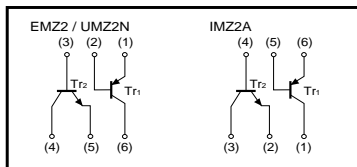
# Power management (dual transistors)

## EMZ2 / UMZ2N / IMZ2A

### ●Feature

- 1) Both a 2SA1037AK chip and 2SC2412K chip in a EMT or UMT or SMT package.

### ●Equivalent circuits



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

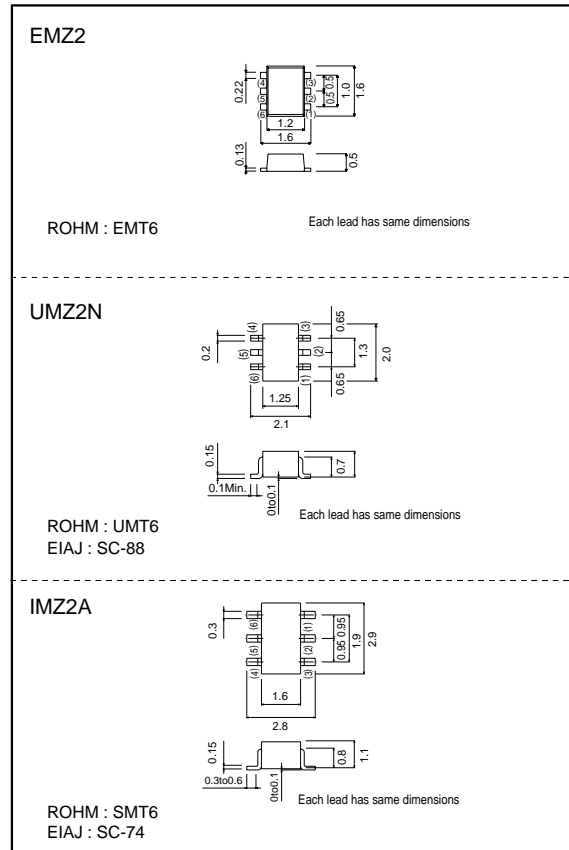
Parameter	Symbol	Limits		Unit
		Tr1	Tr2	
Collector-base voltage	V <sub>CB0</sub>	-60	60	V
Collector-emitter voltage	V <sub>CE0</sub>	-50	50	V
Emitter-base voltage	V <sub>EB0</sub>	-6	7	V
Collector current	I <sub>c</sub>	-150	150	mA
Collector power dissipation	P <sub>c</sub>	150 (TOTAL)		mW
		300 (TOTAL)		
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.

### ●Package, marking, and packaging specifications

Part No.	EMZ2	UMZ2N	IMZ2A
Package	EMT6	UMT6	SMT6
Marking	Z2	Z2	Z2
Code	T2R	TR	T108
Basic ordering unit (pieces)	8000	3000	3000

### ●External dimensions (Unit : mm)



Transistors

●Electrical characteristics (Ta=25°C)

Tr1 (PNP)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV <sub>CB0</sub>	-60	-	-	V	I <sub>c</sub> = -50μA
Collector-emitter breakdown voltage	BV <sub>CE0</sub>	-50	-	-	V	I <sub>c</sub> = -1mA
Emitter-base breakdown voltage	BV <sub>EB0</sub>	-6	-	-	V	I <sub>E</sub> = -50μA
Collector cutoff current	I <sub>CB0</sub>	-	-	-0.1	μA	V <sub>CB</sub> = -60V
Emitter cutoff current	I <sub>EB0</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

\* Transition frequency of the device.

Tr2 (NPN)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV <sub>CB0</sub>	60	-	-	V	I <sub>c</sub> = 50μA
Collector-emitter breakdown voltage	BV <sub>CE0</sub>	50	-	-	V	I <sub>c</sub> = 1mA
Emitter-base breakdown voltage	BV <sub>EB0</sub>	7	-	-	V	I <sub>E</sub> = 50μA
Collector cutoff current	I <sub>CB0</sub>	-	-	0.1	μA	V <sub>CB</sub> = 60V
Emitter cutoff current	I <sub>EB0</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

\* Transition frequency of the device.

●Electrical characteristics curves

PNP Tr

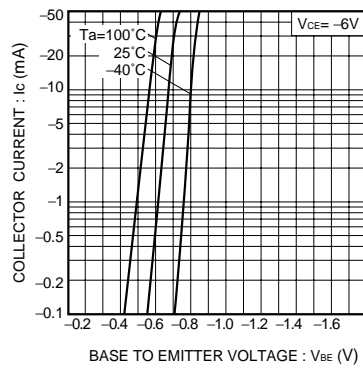


Fig.1 Grounded emitter propagation characteristics

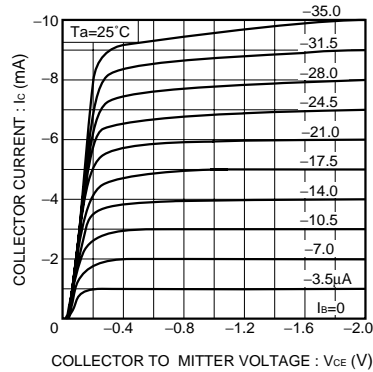


Fig.2 Grounded emitter output characteristics (I)

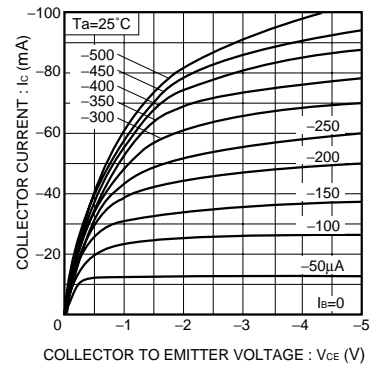


Fig.3 Grounded emitter output characteristics (II)

Transistors

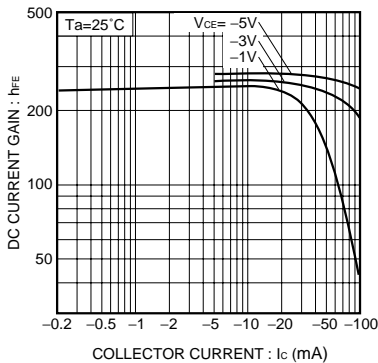


Fig.4 DC current gain vs. collector current (I)

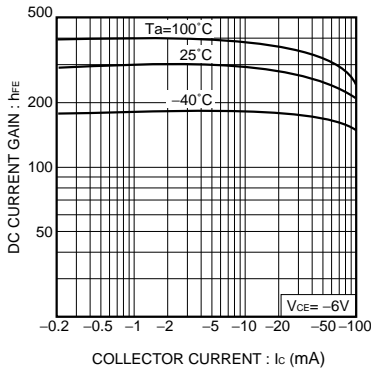


Fig.5 DC current gain vs. collector current (II)

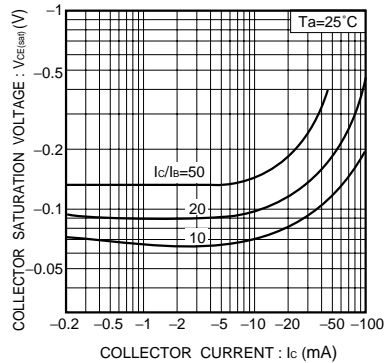


Fig.6 Collector-emitter saturation voltage vs. collector current (I)

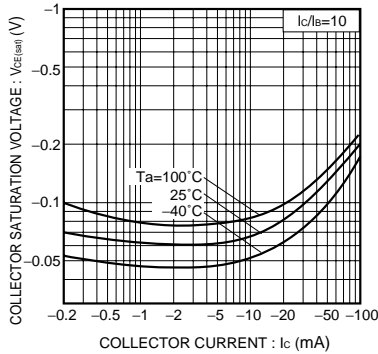


Fig.7 Collector-emitter saturation voltage vs. collector current (II)

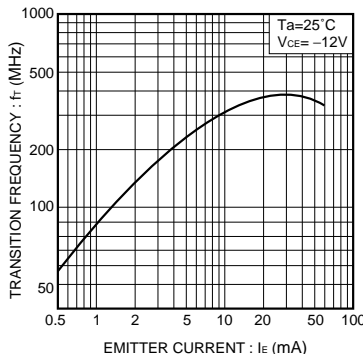


Fig.8 Gain bandwidth product vs. emitter current

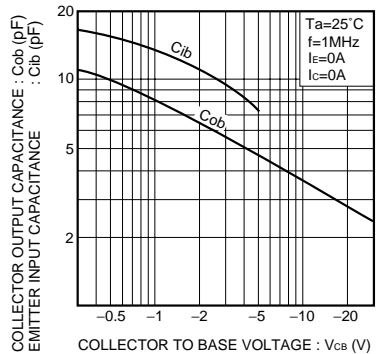


Fig.9 Collector output capacitance vs. collector-base voltage and emitter input capacitance vs. emitter-base voltage

NPN Tr

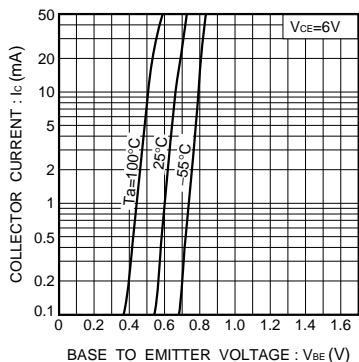


Fig.10 Grounded emitter propagation characteristics

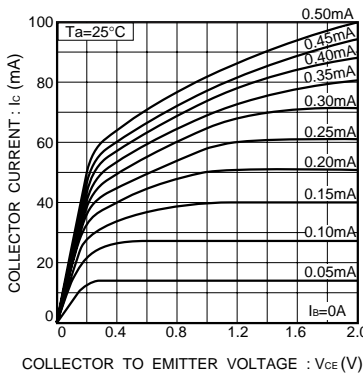


Fig.11 Grounded emitter output characteristics ( I )

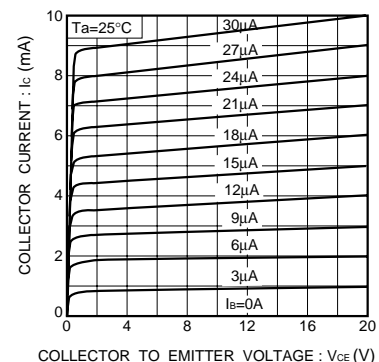


Fig.12 Grounded emitter output characteristics ( II )

Transistors

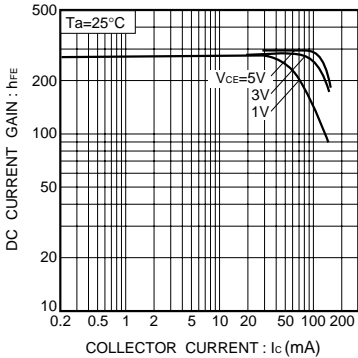


Fig.13 DC current gain vs. collector current ( I )

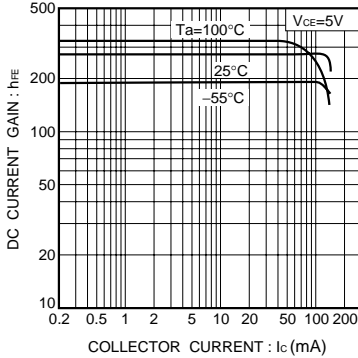


Fig.14 DC current gain vs. collector current ( II )

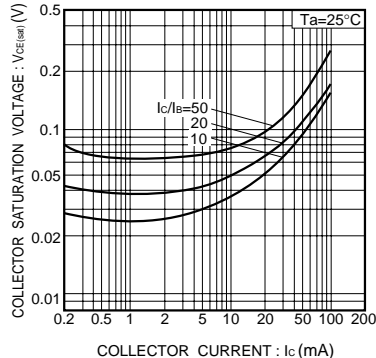


Fig.15 Collector-emitter saturation voltage vs. collector current

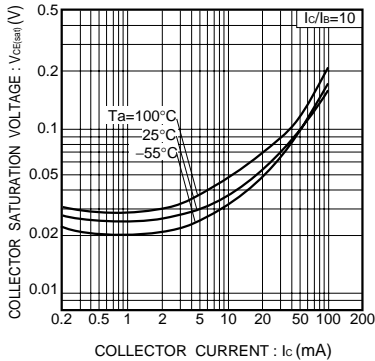


Fig.16 Collector-emitter saturation voltage vs. collector current ( I )

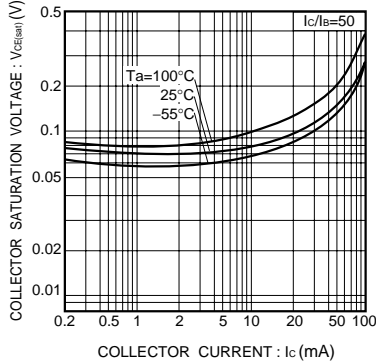


Fig.17 Collector-emitter saturation voltage vs. collector current (II)

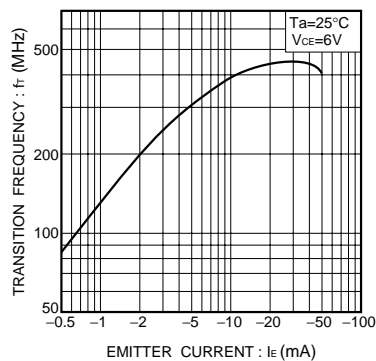


Fig.18 Gain bandwidth product vs. emitter current

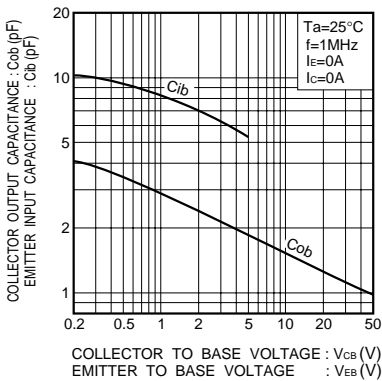


Fig.19 Collector output capacitance vs. collector-base voltage  
Emitter input capacitance vs. emitter-base voltage

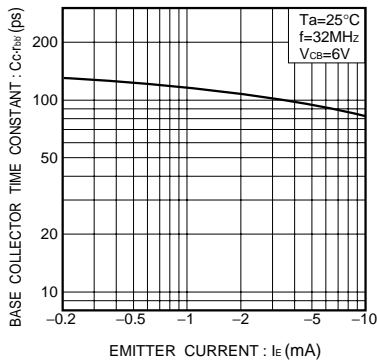


Fig.20 Base-collector time constant vs. emitter current

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