# Power management (dual transistors) EMF21 / UMF21N

2SA2018 and DTC114E are housed independently in a EMT6 or UMT6 package.

### Application

Power management circuit

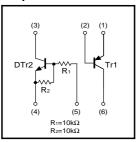
### ● Features

- 1) Power switching circuit in a single package.
- 2) Mounting cost and area can be cut in half.

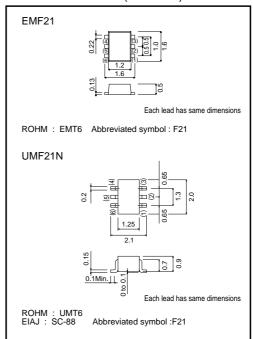
### ●Structure

Silicon epitaxial planar transistor

### Equivalent circuits



### ●External dimensions (Units : mm)



### ● Package, marking, and packaging specifications

Туре	EMF21	UMF21N
Package	EMT6	UMT6
Marking	F21	F21
Code	T2R	TR
Basic ordering unit(pieces)	8000	3000
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## ● Absolute maximum ratings (Ta=25°C)

### Tr1

Parameter	Symbol	Limits	Unit
Collector-base voltage	Vсво	-15	V
Collector-emitter voltage	Vceo	-12	V
Emitter-base voltage	Vево	-6	V
Collector current	Ic	-500	mA
Collector current	ICP	-1.0	A *1
Power dissipation	Pc	150(TOTAL)	mW *2
Junction temperature	Tj	150	°C
Range of storage temperature	Tstg	<b>−55~+150</b>	°C

### DTr2

Parameter	Symbol	Limits	Unit
Supply voltage	Vcc	50	V
Input voltage	Vin	-10 <b>~</b> +40	V
Collector current	Ic	100	mA *1
Output current	lo	50	mA
Power dissipation	Pc	150(TOTAL)	mW *2
Junction temperature	Tj	150	°C
Range of storage temperature	Tstg	-55~+150	°C

# ● Electrical characteristics (Ta=25°C)

### Tr1

Parameter	Symbol	Min.	Тур.	Max.	Unit	Conditions
Collector-emitter breakdown voltage	BVceo	-12	_	_	V	Ic=-1mA
Collector-base breakdown voltage	ВУсво	-15	_	_	V	Ic=-10μA
Emitter-base breakdown voltage	ВУЕВО	-6	_	_	V	I <sub>E</sub> =-10μA
Collector cut-off current	Ісво	_	_	-100	nA	Vcb=-15V
Emitter cut-off current	ІЕВО	_	_	-100	nA	V <sub>EB</sub> =-6V
Collector-emitter saturation voltage	VCE(sat)	_	-100	-250	mV	Ic=-200mA, I <sub>B</sub> =-10mA
DC current gain	hfe	270	_	680	_	Vce=-2V, Ic=-10mA
Transition frequency	f⊤	_	260	_	MHz	Vce=-2V, Ie=10mA, f=100MHz
Collector output capacitance	Cob	_	6.5	_	pF	Vcв=-10V, Ie=0mA, f=1MHz

### DTr2

Parameter	Symbol	Min.	Тур.	Max.	Unit	Conditions
lanut valta aa	VI(off)	-	-	0.5	.,	Vcc=5V, Io=100μA
Input voltage	VI(on)	3	-	_	٧	Vo=0.3V, Io=10mA
Output voltage	Vo(on)	-	0.1	0.3	V	lo/l=10mA/0.5mA
Input current	lı	-	_	0.88	mA	Vi=5V
Output current	IO(off)	-	-	0.5	μΑ	Vcc=50V, Vi=0V
DC current gain	Gı	30	_	_	-	Vo=5V, Io=5mA
Input resistance	R <sub>1</sub>	7	10	13	kΩ	_
Resistance ratio	R2/R1	0.8	1	1.2	-	-
Transition frequency	f⊤	ı	250	-	MHz	Vce=10V, Ie=-5mA, f=100MHz *

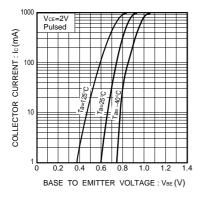
<sup>\*</sup> Transition frequency of the device

<sup>\*1</sup> Single pulse Pw=1ms
\*2 120mW per element must not be exceeded.
Each terminal mounted on a recommended land.

<sup>\*1</sup> Characteristics of built-in transistor. \*2 Each terminal mounted on a recommended land.

### Electrical characteristic curves

### Tr1



1000 OOLLECTOR CURRENT: Ic (mA)

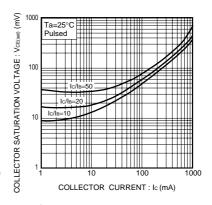
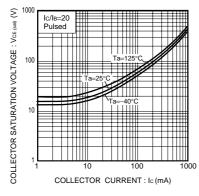
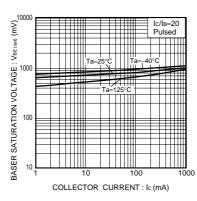


Fig.1 Grounded emitter propagation characteristics

Fig.2 DC current gain vs. collector current

Fig.3 Collector-emitter saturation voltage vs. collector current ( I )





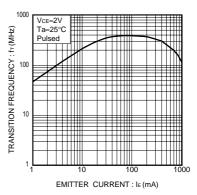


Fig.4 Collector-emitter saturation voltage vs. collector current ( II )

Fig.5 Base-emitter saturation voltage vs. collector current

Fig.6 Gain bandwidth product vs. emitter current

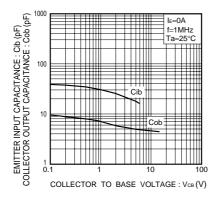


Fig.7 Collector output capacitance vs. collector-base voltage Emitter input capacitance vs. emitter-base voltage

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Fig.1 Input voltage vs. output current (ON characteristics)

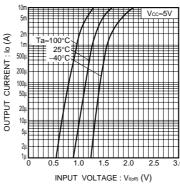


Fig.2 Output current vs. input voltage (OFF characteristics)

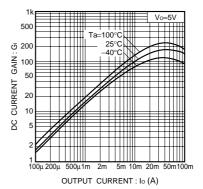


Fig.3 DC current gain vs. output current

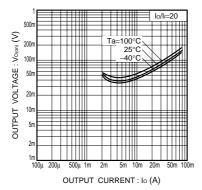


Fig.4 Output voltage vs. output current

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