

Transistors

Power management (dual transistors)

EMF21 / UMF21N

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

●Application

Power management circuit

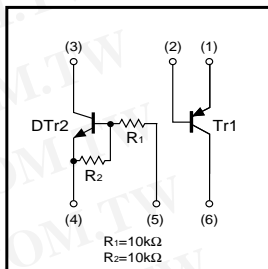
●Features

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

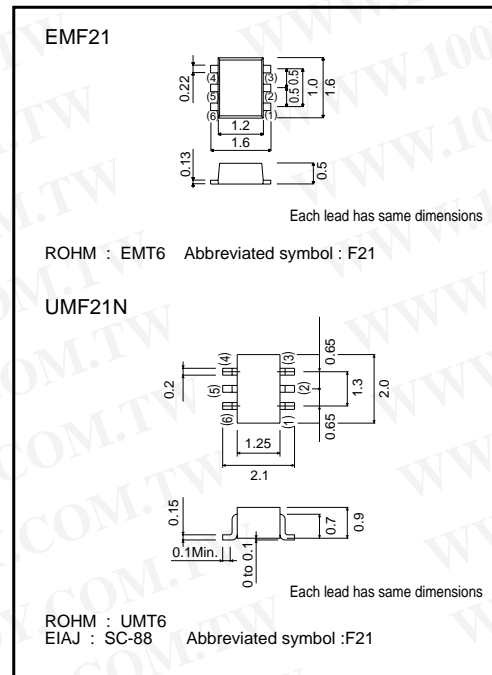
●Structure

Silicon epitaxial planar transistor

●Equivalent circuits



●External dimensions (Units : mm)



●Package, marking, and packaging specifications

Type	EMF21	UMF21N
Package	EMT6	UMT6
Marking	F21	F21
Code	T2R	TR
Basic ordering unit(pieces)	8000	3000

Transistors

●Absolute maximum ratings (Ta=25°C)

Tr1

Parameter	Symbol	Limits	Unit
Collector-base voltage	V _{CB0}	-15	V
Collector-emitter voltage	V _{CE0}	-12	V
Emitter-base voltage	V _{EB0}	-6	V
Collector current	I _c	-500	mA
	I _{cP}	-1.0	A *1
Power dissipation	P _c	150(TOTAL)	mW *2
Junction temperature	T _j	150	°C
Range of storage temperature	T _{stg}	-55~+150	°C

*1 Single pulse P_w=1ms

*2 120mW per element must not be exceeded.

Each terminal mounted on a recommended land.

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DTr2

Parameter	Symbol	Limits	Unit
Supply voltage	V _{CC}	50	V
Input voltage	V _{IN}	-10~+40	V
Collector current	I _c	100	mA *1
Output current	I _o	50	mA
Power dissipation	P _c	150(TOTAL)	mW *2
Junction temperature	T _j	150	°C
Range of storage temperature	T _{stg}	-55~+150	°C

*1 Characteristics of built-in transistor.

*2 Each terminal mounted on a recommended land.

●Electrical characteristics (Ta=25°C)

Tr1

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-emitter breakdown voltage	BV _{CEO}	-12	-	-	V	I _c =-1mA
Collector-base breakdown voltage	BV _{CB0}	-15	-	-	V	I _c =-10μA
Emitter-base breakdown voltage	BV _{EB0}	-6	-	-	V	I _E =-10μA
Collector cut-off current	I _{cBO}	-	-	-100	nA	V _{CB} =-15V
Emitter cut-off current	I _{EBO}	-	-	-100	nA	V _{EB} =-6V
Collector-emitter saturation voltage	V _{CE(sat)}	-	-100	-250	mV	I _c =-200mA, I _B =-10mA
DC current gain	h _{FE}	270	-	680	-	V _{CE} =-2V, I _c =-10mA
Transition frequency	f _T	-	260	-	MHz	V _{CE} =-2V, I _E =10mA, f=100MHz
Collector output capacitance	C _{ob}	-	6.5	-	pF	V _{CB} =-10V, I _E =0mA, f=1MHz

DTr2

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	V _{I(off)}	-	-	0.5	V	V _{CC} =5V, I _o =100μA
	V _{I(on)}	3	-	-		V _o =0.3V, I _o =10mA
Output voltage	V _{O(on)}	-	0.1	0.3	V	I _o /I _i =10mA/0.5mA
Input current	I _i	-	-	0.88	mA	V _i =5V
Output current	I _{o(off)}	-	-	0.5	μA	V _{CC} =50V, V _i =0V
DC current gain	G _i	30	-	-	-	V _o =5V, I _o =5mA
Input resistance	R _i	7	10	13	kΩ	-
Resistance ratio	R ₂ /R ₁	0.8	1	1.2	-	-
Transition frequency	f _T	-	250	-	MHz	V _{CE} =10V, I _E =-5mA, f=100MHz *

* Transition frequency of the device

Transistors

●Electrical characteristic curves

Tr1

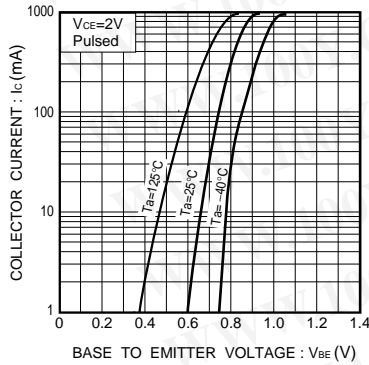


Fig.1 Grounded emitter propagation characteristics

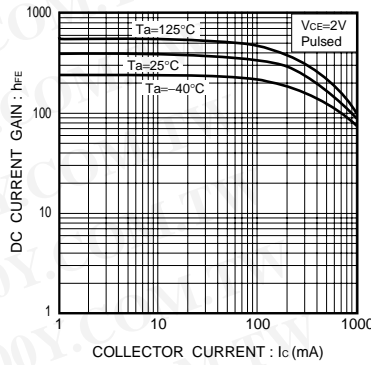


Fig.2 DC current gain vs. collector current

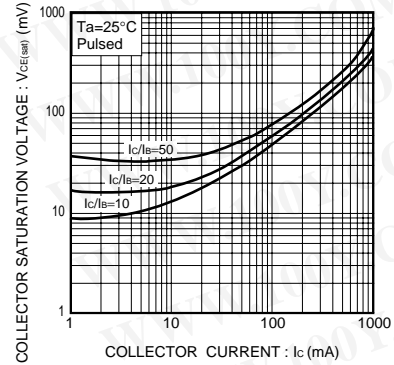


Fig.3 Collector-emitter saturation voltage vs. collector current (I)

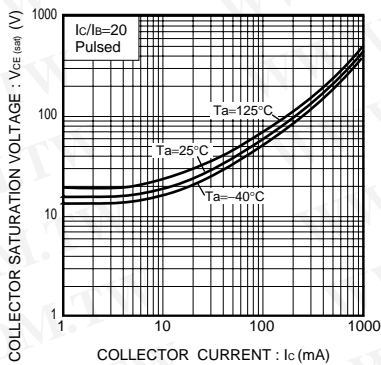


Fig.4 Collector-emitter saturation voltage vs. collector current (II)

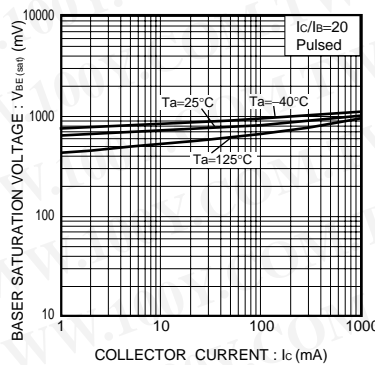


Fig.5 Base-emitter saturation voltage vs. collector current

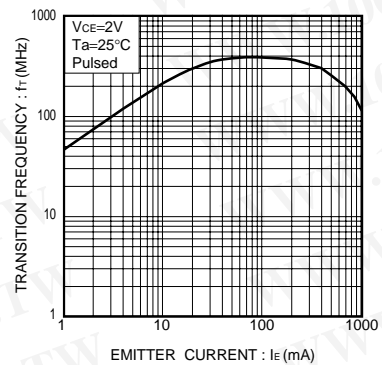


Fig.6 Gain bandwidth product vs. emitter current

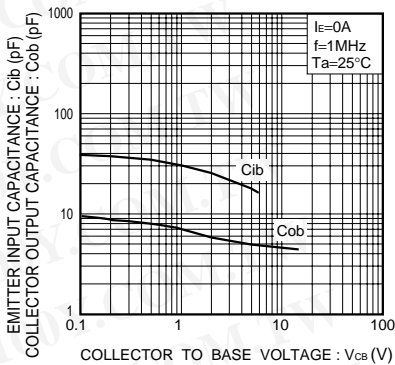


Fig.7 Collector output capacitance vs. collector-base voltage
Emitter input capacitance vs. emitter-base voltage

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DTr2

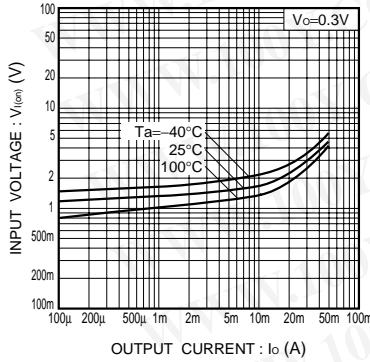


Fig.1 Input voltage vs. output current (ON characteristics)

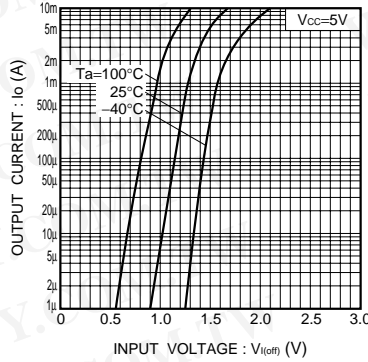


Fig.2 Output current vs. input voltage (OFF characteristics)

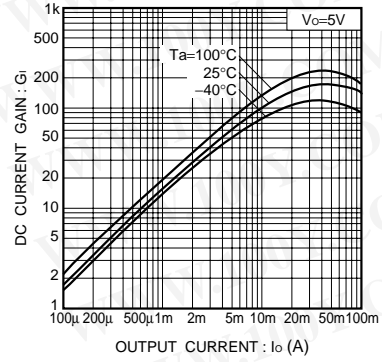


Fig.3 DC current gain vs. output current

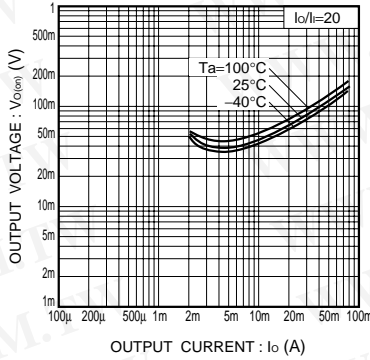


Fig.4 Output voltage vs. output current

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Appendix

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