Power management (dual transistors) UMF5N

2SA2018 and DTC144EE are housed independently in a UMT package.

Application

Power management circuit

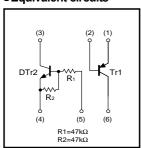
● Features

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

●Structure

Silicon epitaxial planar transistor

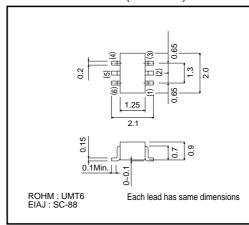
●Equivalent circuits



Packaging specifications

Туре	UMF5N
Package	UMT6
Marking	F5
Code	TR
Basic ordering unit (pieces)	3000

●External dimensions (Units : mm)



●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-base voltage	Vсво	-15	V
Collector-emitter voltage	Vceo	-12	V
Emitter-base voltage	VEBO	-6	V
Collector ourrent	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	−55~+150	°C

DTr2

Parameter	Symbol	Limits	Unit
Supply voltage	Vcc	50	V
Input voltage	Vin	-10 ~ +40	V
Collector current	lc	100	mA *1
Output current	lo	30	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 _E =-10μA
Collector cut-off current	Ісво	_	-	-100	nA	VcB=-15V
Emitter cut-off current	ІЕВО	_	_	-100	nA	V _{EB} =-6V
Collector-emitter saturation voltage	VcE(sat)	_	-100	-250	mV	Ic=-200mA, I _B =-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	VcB=-10V, IE=0mA, f=1MHz

DTr2

Parameter	Symbol	Min.	Тур.	Max.	Unit	Conditions
Input voltage	VI(off)	_	_	0.5	V	Vcc=5V, Io=100μA
	VI(on)	3.0	_	_	V	Vo=0.3V, Io=2mA
Output voltage	Vo(on)	_	100	300	mV	Vo=10mA, I:=0.5mA
Input current	lı	_	_	180	μΑ	V=5V
Output current	IO(off)	_	_	500	nA	Vcc=50V, Vi=0V
DC current gain	Gı	68	_	_	_	Vo=5V, Io=5mA
Transition frequency	f⊤	_	250	_	MHz	VcE=10V, IE=-5mA, f=100MHz *
Input resistance	R ₁	32.9	47	61.1	kΩ	_
Resistance ratio	R2/R1	0.8	1.0	1.2	_	_

^{*}Characteristics of built-in transistor.

^{*1} Single pulse Pw=1ms
*2 120mW per element must not be exceeded.
Each terminal mounted on a recommended land.

^{*1} Characteristics of built-in transistor.
*2 120mW per element must not be exceeded.
Each terminal mounted on a recommended land.

•Electrical characteristic curves

Tr1

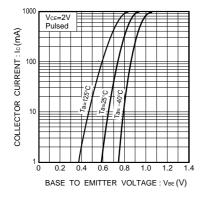


Fig.1 Grounded emitter propagation characteristics

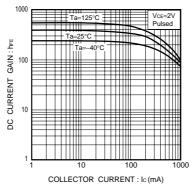


Fig.2 DC current gain vs. collector current

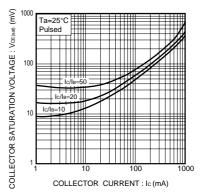


Fig.3 Collector-emitter saturation voltage vs. collector current (I)

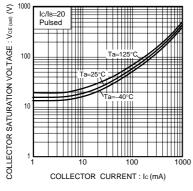


Fig.4 Collector-emitter saturation voltage vs. collector current (II)

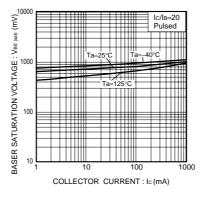


Fig.5 Base-emitter saturation voltage vs. collector current

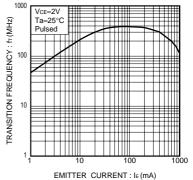


Fig.6 Gain bandwidth product vs. emitter current

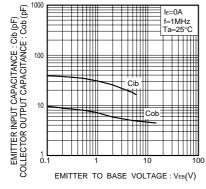


Fig.7 Collector output capacitance vs. collector-base voltage Emitter input capacitance vs. emitter-base voltage

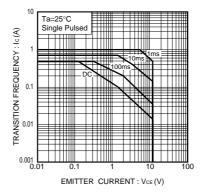


Fig.8 Safe operation area

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100 50 (S) 20 Ta=-40°C 100°C 100°C

Fig.9 Input voltage vs. output current (ON characteristics)

OUTPUT CURRENT: Io (A)

500μ 1m

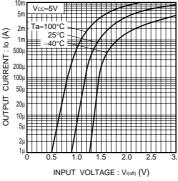


Fig.10 Output current vs. input voltage (OFF characteristics)

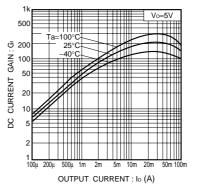


Fig.11 DC current gain vs. output

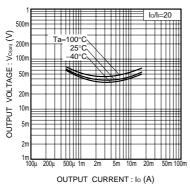


Fig.12 Output voltage vs. output current

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