



**WBFBP-06C Power management Dual-transistors**

**FUMF21N** TRANSISTOR

**DESCRIPTION**

Silicon epitaxial planar transistor

**FEATURES**

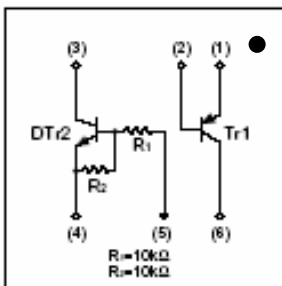
- 2SA2018 and DTC114E are housed independently in a package.
- Power switching circuit in a single package.
- Mounting cost and area can be cut in half.

**APPLICATION**

Power management circuit, mobile telephone quiver circuit  
For portable equipment:(i.e. Mobile phone,MP3, MD,CD-ROM, DVD-ROM, Note book PC, etc.)



●Equivalent circuits



**MARKING:F21**



TR1 MAXIMUM RATINGS T<sub>A</sub>=25°C unless otherwise noted

Symbol	Parameter	Value	Units
V <sub>CB0</sub>	Collector- Base Voltage	-15	V
V <sub>CEO</sub>	Collector-Emitter Voltage	-12	V
V <sub>EBO</sub>	Emitter-Base Voltage	-6	V
I <sub>C</sub>	Collector Current -Continuous	-0.5	A
P <sub>C</sub>	Collector Dissipation	0.15	W
T <sub>J</sub>	Junction Temperature	150	°C
T <sub>stg</sub>	Storage Temperature	-55-150	°C

DTR2 Absolute maximum ratings(T<sub>a</sub>=25°C)

Parameter	Symbol	Limits	Unit
Supply voltage	V <sub>CC</sub>	50	V
Input voltage	V <sub>IN</sub>	-10~40	V
Output current	I <sub>O</sub>	50	mA
	I <sub>C(MAX)</sub>	100	
Power dissipation	P <sub>d</sub>	150	mW
Junction temperature	T <sub>J</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55~150	°C

**TR1 ELECTRICAL CHARACTERISTICS (Tamb=25°C unless otherwise specified)**

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C=-10\mu A, I_E=0$	-15			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C=-1mA, I_B=0$	-12			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E=-10\mu A, I_C=0$	-6			V
Collector cut-off current	$I_{CBO}$	$V_{CB}=-15V, I_E=0$			-0.1	$\mu A$
Emitter cut-off current	$I_{EBO}$	$V_{EB}=-6V, I_C=0$			-0.1	$\mu A$
DC current gain	$h_{FE}$	$V_{CE}=-2V, I_C=-10mA$	270		680	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C=-200mA, I_B=-10mA$			-0.25	V
Transition frequency	$f_T$	$V_{CE}=-2V, I_C=-10mA, f=100MHz$		260		MHz
Collector output capacitance	$C_{ob}$	$V_{CB}=-10V, I_E=0, f=1MHz$		6.5		pF

**DTR2 Electrical characteristics (Ta=25°C)**

Parameter	Symbol	Min.	Typ	Max.	Unit	Conditions
Input voltage	$V_{I(off)}$			0.5	V	$V_{CC}=5V, I_O=100\mu A$
	$V_{I(on)}$	3				$V_O=0.3V, I_O=10mA$
Output voltage	$V_{O(on)}$			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	$\mu A$	$V_{CC}=50V, V_I=0$
DC current gain	$G_I$	30				$V_O=5V, I_O=5mA$
Input resistance	$R_I$	7	10	13	K $\Omega$	
Resistance ratio	$R_2/R_1$	0.8	1	1.2		
Transition frequency	$f_T$		250		MHz	$V_{CE}=10V, I_E=-5mA, f=100MHz$

# Typical Characteristics

TR1

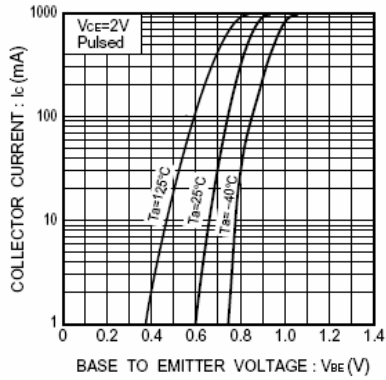


Fig.1 Grounded emitter propagation characteristics

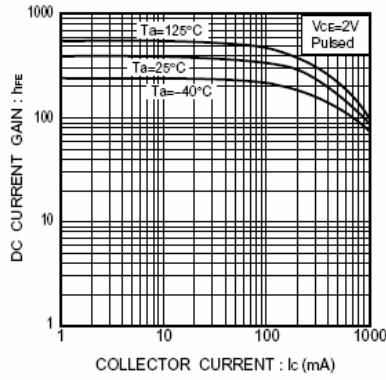


Fig.2 DC current gain vs. collector current

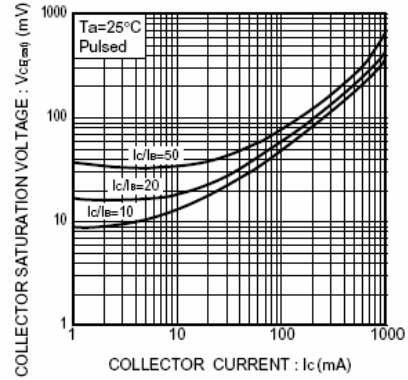


Fig.3 Collector-emitter saturation voltage vs. collector current ( I )

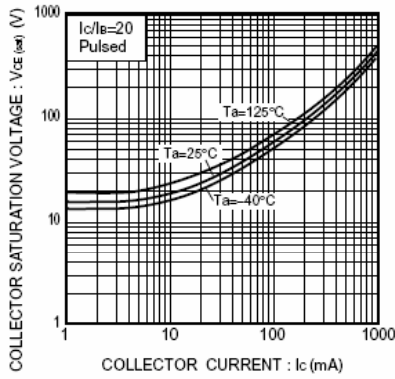


Fig.4 Collector-emitter saturation voltage vs. collector current ( II )

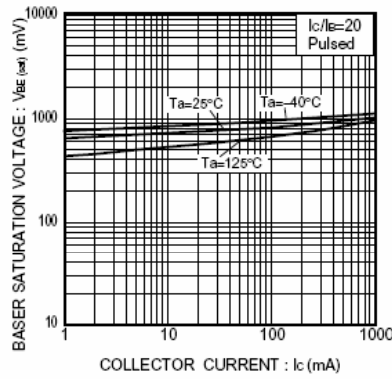


Fig.5 Base-emitter saturation voltage vs. collector current

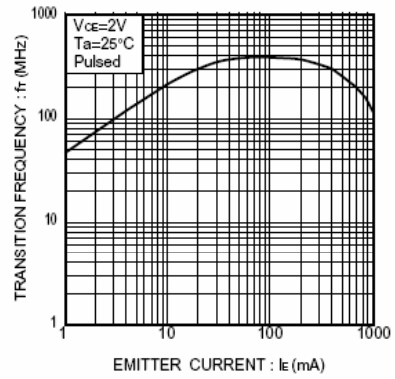


Fig.6 Gain bandwidth product vs. emitter current

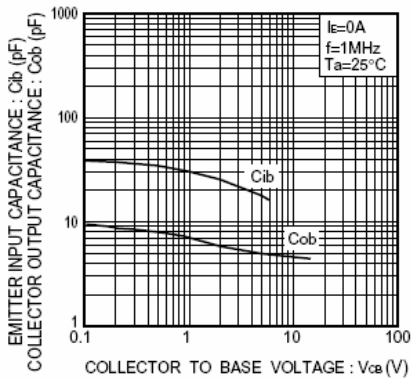


Fig.7 Collector output capacitance vs. collector-base voltage  
Emitter input capacitance vs. emitter-base voltage

# DTR2

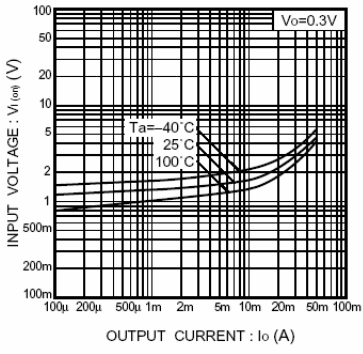


Fig.1 Input voltage vs. output current (ON characteristics)

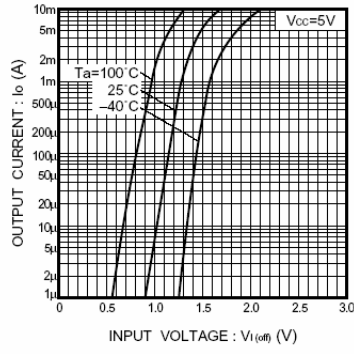


Fig.2 Output current vs. input voltage (OFF characteristics)

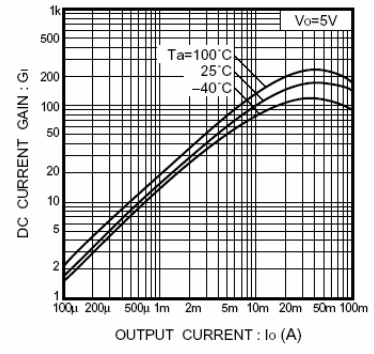


Fig.3 DC current gain vs. output current

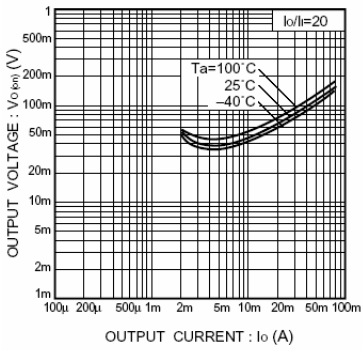
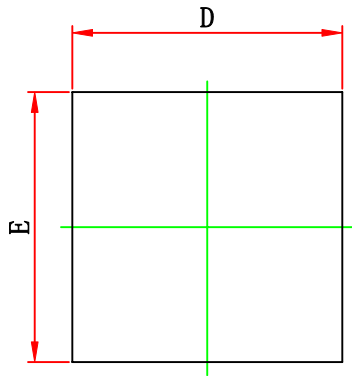


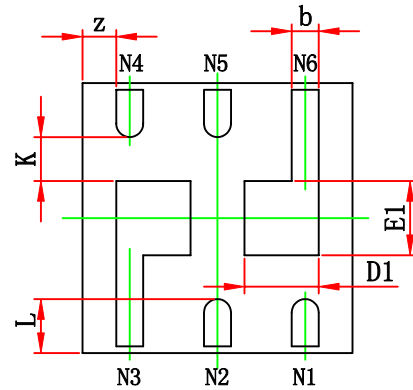
Fig.4 Output voltage vs. output current



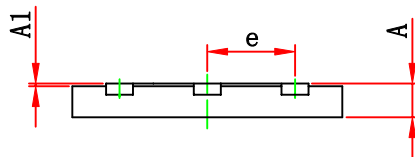
### WBFBP-06C(2×2×0.5) PACKAGE OUTLINE DIMENSIONS



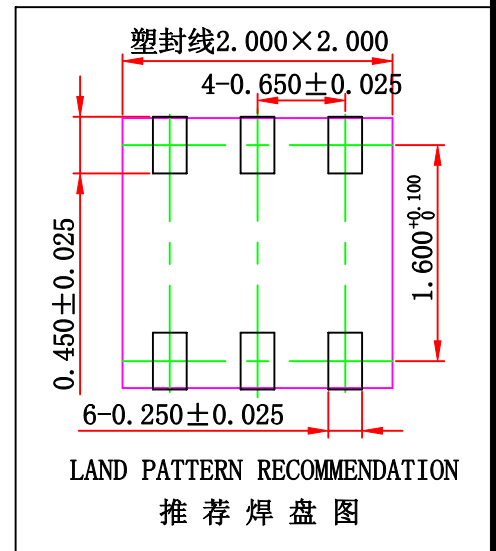
TOP VIEW



BOTTOM VIEW

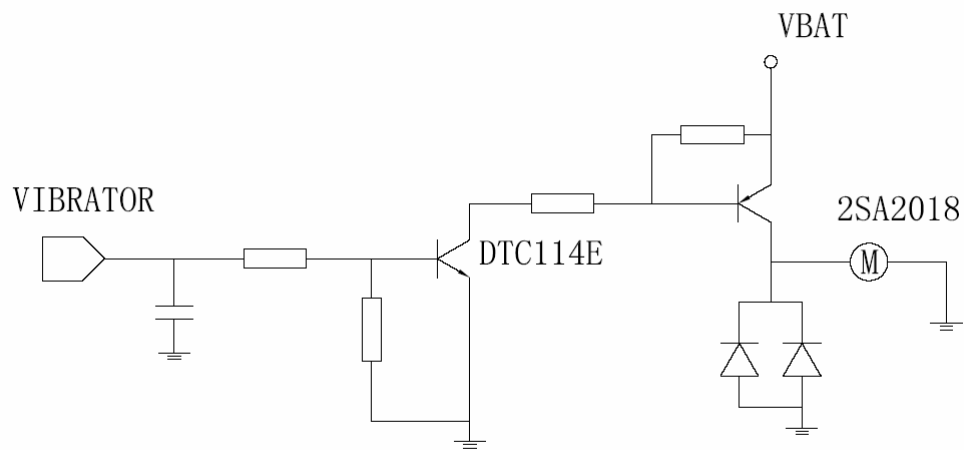


SIDE VIEW



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.450	0.550	0.018	0.022
A1	0.000	0.100	0.000	0.004
b	0.150	0.250	0.006	0.010
D	1.900	2.100	0.075	0.083
E	1.900	2.100	0.075	0.083
D1	0.550 REF.		0.022 REF.	
E1	0.550 REF.		0.022 REF.	
e	0.650 TYP.		0.026 TYP.	
L	0.400 REF.		0.016 REF.	
k	0.300 REF.		0.012 REF.	
z	0.500 REF.		0.020 REF.	

## APPLICATION CIRCUITS



mobile telephone quiver circuit