

# General Purpose Transistor (-50V, -0.15A)

**2SA1037AK / 2SA1576A / 2SA1774 / 2SA2029 /  
2SA933AS**

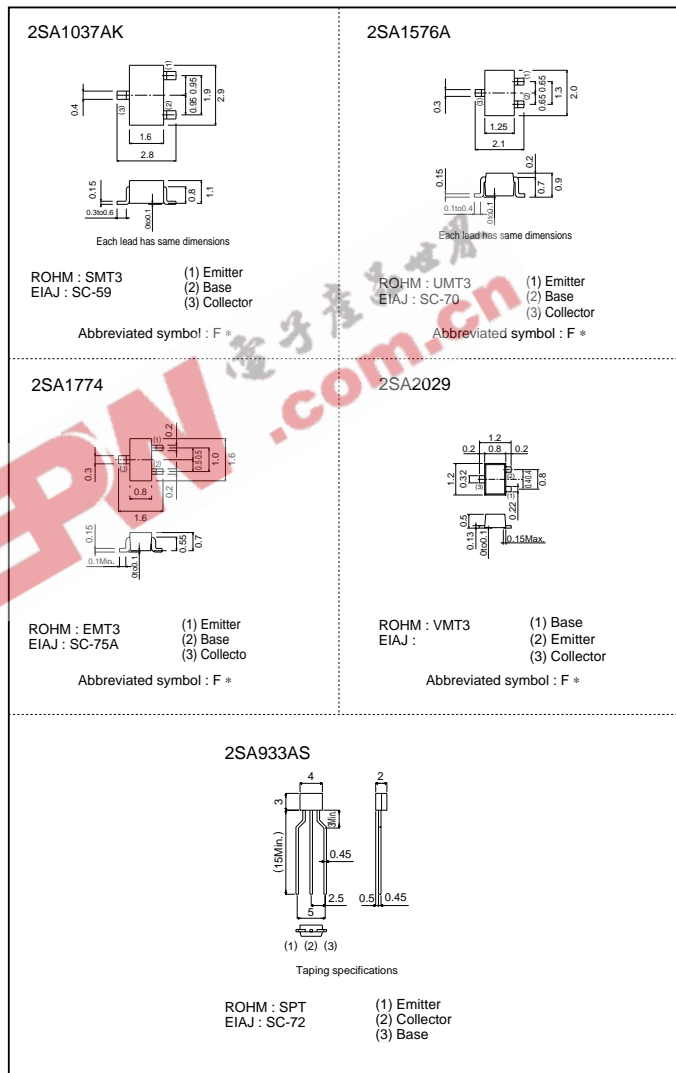
● **Features**

- 1) Excellent  $h_{FE}$  linearity.
- 2) Complements the 2SC2412K / 2SC4081 / 2SC4617 / 2SC5658 / 2SC1740S.

● **Structure**

Epitaxial planar type.  
PNP silicon transistor

● **External dimensions (Units : mm)**



\* Denotes  $h_{FE}$

2SA1037AK / 2SA1576A / 2SA1774 /  
2SA2029 / 2SA933AS

Transistors

●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-base voltage	V <sub>CB0</sub>	-60	V
Collector-emitter voltage	V <sub>CEO</sub>	-50	V
Emitter-base voltage	V <sub>EB0</sub>	-6	V
Collector current	I <sub>c</sub>	-0.15	A (DC)
Collector power dissipation	2SA1037AK, 2SA1576A	0.2	W
	2SA2029, 2SA1774	0.15	
	2SA933AS	0.3	
Junction temperature	T <sub>j</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55~+150	°C

●Electrical characteristics (Ta=25°C)

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>CEO</sub>	-50	-	-	V	I <sub>c</sub> =-1μA
Emitter-base breakdown voltage	BV <sub>EB0</sub>	-6	-	-	V	I <sub>E</sub> =-50μA
Collector cutoff current	I <sub>cBO</sub>	-	-	-0.1	μA	V <sub>CB</sub> =-60V
Emitter cutoff current	I <sub>EBO</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>E</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=30MHz
Output capacitance	C <sub>ob</sub>	-	4.0	5.0	pF	V <sub>CB</sub> =-12V, I <sub>E</sub> =0A, f=1MHz

●Packaging specifications and h<sub>FE</sub>

Type	h <sub>FE</sub>	Package	Taping				
		Code	T146	T106	TL	T2L	TP
		Basic ordering unit (pieces)	3000	3000	3000	8000	5000
2SA2029	QRS	-	-	-	○	-	
2SA1037AK	QRS	○	-	-	-	-	
2SA1576A	QRS	-	○	-	-	-	
2SA1774	QRS	-	-	○	-	-	
2SA933AS	QRS	-	-	-	-	○	

h<sub>FE</sub> values are classified as follows:

Item	Q	R	S
h <sub>FE</sub>	120~270	180~390	270~560

Transistors

●Electrical characteristic curves

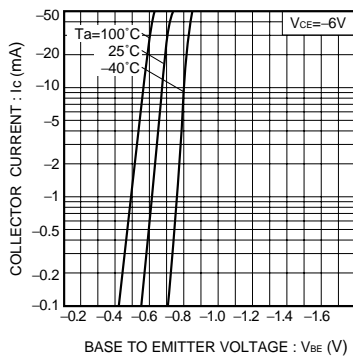


Fig.1 Grounded emitter propagation characteristics

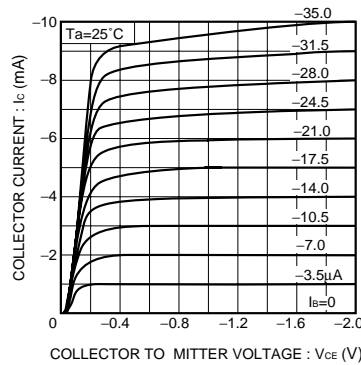


Fig.2 Grounded emitter output characteristics (I)

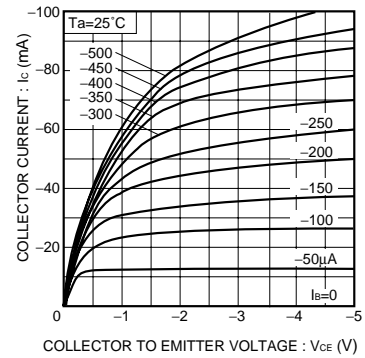


Fig.3 Grounded emitter output characteristics (II)

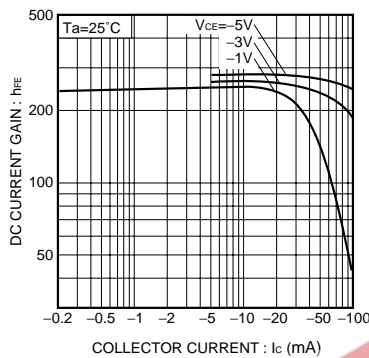


Fig.4 DC current gain vs. collector current (I)

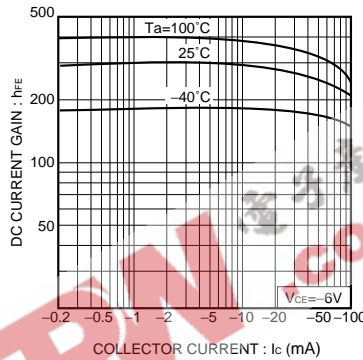


Fig.5 DC current gain vs. collector current (II)

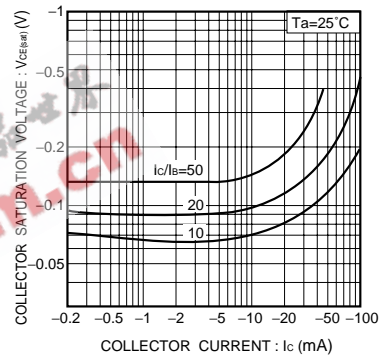


Fig.6 Collector-emitter saturation voltage vs. collector current (I)

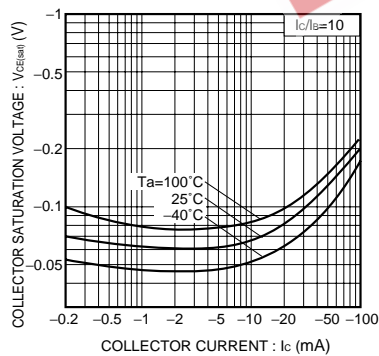


Fig.7 Collector-emitter saturation voltage vs. collector current (II)

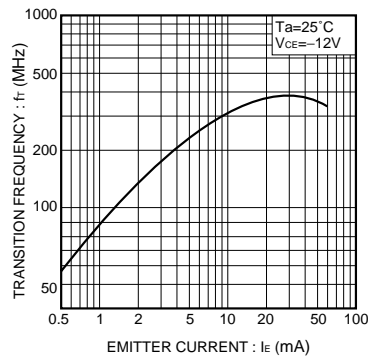


Fig.8 Gain bandwidth product vs. emitter current

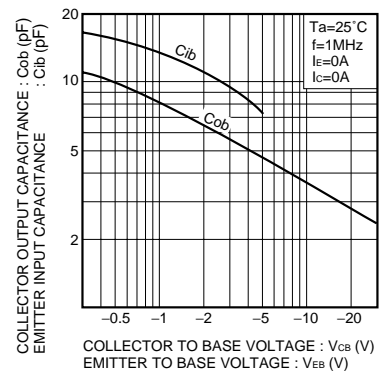


Fig.9 Collector output capacitance vs. collector-base voltage  
Emitter input capacitance vs. emitter-base voltage