

**Silicon PNP transistor epitaxial type
AP963**

[Applications]

General purpose amplifier and switch
Suitable for small surface mount package built-in with shrinked die size

[Feature]

Equivalent performance with MMBT3906
High collector-emitter breakdown voltage $BV_{CEO} = -40V$
High collector current $I_C = -200mA$

[Absolute maximum ratings (Ta=25C)]

Characteristic	Symbol	Maximum ratings	Unit
Collector-base voltage	VCBO	-40	V
Collector-emitter voltage	VCEO	-40	V
Emitter-base voltage	VEBO	-5	V
Collector current	IC	-200	mA
Junction temperature	Tj	150	C
Storage temperature	Tstg	-55 to 150	C

[Electrical characteristics (Ta=25C)]

Characteristic	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BVCBO	-40	-	-	V	$I_C = -10\mu A, I_E = 0A$
Collector-emitter breakdown voltage	BVCEO	-40	-	-	V	$I_C = -1mA, I_B = 0A$
Emitter-base breakdown voltage	BVEBO	-5	-	-	V	$I_E = -10\mu A, I_C = 0A$
Collector cut-off current	ICEX	-	-	-50	nA	$V_{CE} = -30V, V_{EB} = -3V$
Emitter cut-off current	IEBO	-	-	-50	nA	$V_{EB} = -5, I_C = 0A$
DC current gain 1	hFE 1	60	-	-	-	$V_{CE} = -1V, I_C = -0.1mA$
DC current gain 2	hFE 2	80	-	-	-	$V_{CE} = -1V, I_C = -1mA$
DC current gain 3	hFE 3	100	-	300	-	$V_{CE} = -1V, I_C = -10mA$
DC current gain 4	hFE 4	60	-	-	-	$V_{CE} = -1V, I_C = -50mA$
DC current gain 5	hFE 5	30	-	-	-	$V_{CE} = -1V, I_C = -100mA$
Collector-emitter saturation voltage 1	$V_{CE(sat)1}$	-	-	-0.25	V	$I_C = -10mA, I_B = -1mA$
Collector-emitter saturation voltage 2	$V_{CE(sat)2}$	-	-	-0.4	V	$I_C = -50mA, I_B = -5mA$
Base-emitter saturation voltage 1	$V_{BE(sat)1}$	-0.65	-	-0.85	V	$I_C = -10mA, I_B = -1mA$
Base-emitter saturation voltage 2	$V_{BE(sat)2}$	-	-	-0.95	V	$I_C = -50mA, I_B = -5mA$
Transition frequency	f T	250	-	-	MHz	$V_{CE} = -20V, I_E = 10mA$
Output capacitance	Cob	-	-	4.5	pF	$V_{CB} = -5V, f = 1MHz, I_E = 0A$
Input capacitance	Cib	-	-	10	pF	$V_{EB} = -0.5V, f = 1MHz, I_E = 0A$
Delay Time	td	-	-	35	ns	$V_{CC} = -3V, V_{BE} = 0.5V$
Rise Time	tr	-	-	35	ns	$I_C = -10mA, I_{B1} = -1mA$
Storage Time	tstg	-	-	225	ns	$V_{CC} = -3V, I_C = -10mA$
Fall Time	tf	-	-	75	ns	$I_{B1} = -I_{B2} = -1mA$

Notice 1) These are measured data of transistors assembled by PHENITEC SEMICONDUCTOR Corp. and are for reference only.

Notice 2) The contents described herein are subject to change without notice.

Fig.1 hFE - IC
at VCE= -1V, Ta= 25C

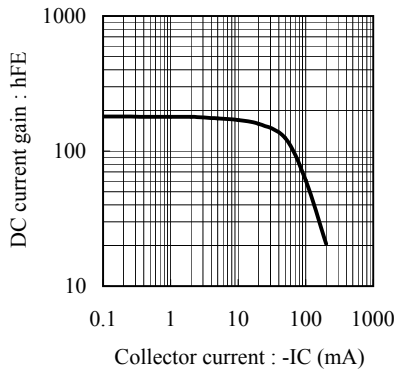


Fig.2 VCE(sat) - IC
at IC/IB= 10, Ta= 25C

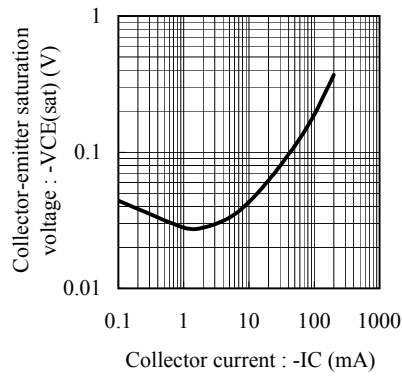


Fig.3 VBE(sat) - IC
at IC/IB= 10, Ta= 25C

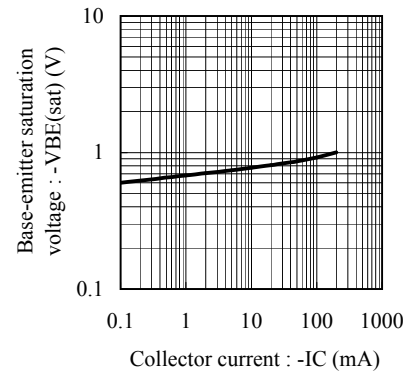


Fig.4 fT - IE
at VCE= -20V, Ta= 25C

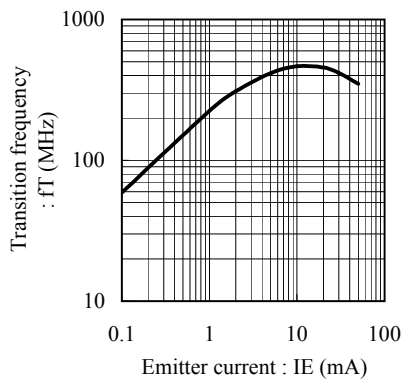


Fig.5 Cob - VCB
at f= 1MHz, Ta= 25C

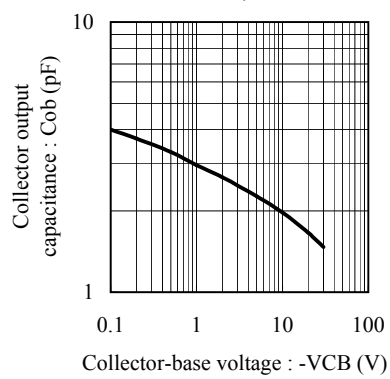


Fig.6 Cib - VEB
at f= 1MHz, Ta= 25C

