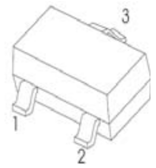
JIANGSU CHANGJIANG ELECTRONICS TECHNOLOGY CO., LTD

SOT-23 Plastic-Encapsulate Transistors

S9012 TRANSISTOR (PNP)

SOT－23



1. BASE
2. EMITTER
3. COLLECTOR

FEATURES

- High Collector Current
- Complementary To S9013
- Excellent h_{FE} Linearity

MARKING: 2T1

MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	-40	V
V_{CEO}	Collector-Emitter Voltage	-25	V
V_{EBO}	Emitter-Base Voltage	-5	V
I_C	Collector Current	-500	mA
P_C	Collector Power Dissipation	300	mW
$R_{\Theta JA}$	Thermal Resistance From Junction To Ambient	416	℃/W
T_j	Junction Temperature	150	℃
T_{stg}	Storage Temperature	-55~+150	℃

ELECTRICAL CHARACTERISTICS (T_a=25℃ unless otherwise specified)

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	I_C=-0.1mA, I_E=0	-40			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	I_C=-1mA, I_B=0	-25			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	I_E=-0.1mA, I_C=0	-5			V
Collector cut-off current	I_{CBO}	V_{CB}=-40V, I_E=0			-0.1	uA
Collector cut-off current	I_{CEO}	V_{CE}=-20V, I_B=0			-0.1	uA
Emitter cut-off current	I_{EBO}	V_{EB}=-5V, I_C=0			-0.1	uA
DC current gain	h_{FE}	V_{CE}=-1V, I_C=-50mA	120		400	
Collector-emitter saturation voltage	$V_{CE(sat)}$	I_C=-500mA, I_B=-50mA			-0.6	V
Base-emitter saturation voltage	$V_{BE(sat)}$	I_C=-500mA, I_B=-50mA			-1.2	V
Transition frequency	f_T	V_{CE}=-6V,I_C=-20mA, f=30MHz	150			MHz
Collector output capacitance	C_{ob}	V_{CB}=-10V, I_E=0, f=1MHz			5	pF

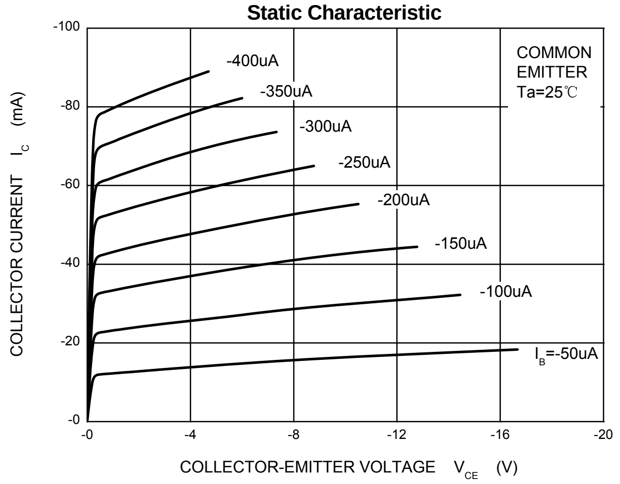
CLASSIFICATION OF h_{FE}

RANK	L	H	J
RANGE	120-200	200-350	300-400

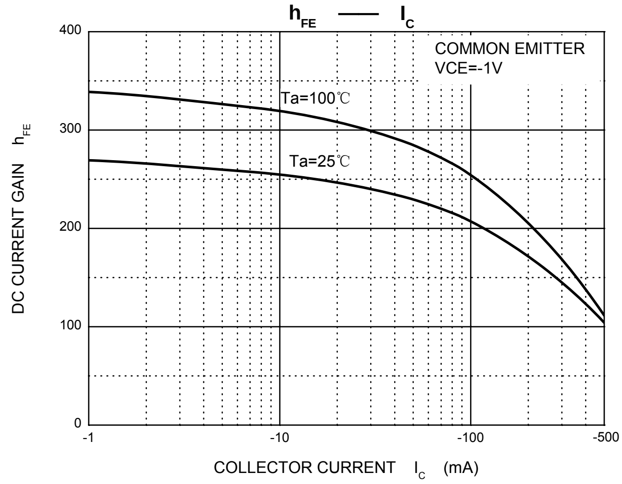
Typical Characterisitics

S9012

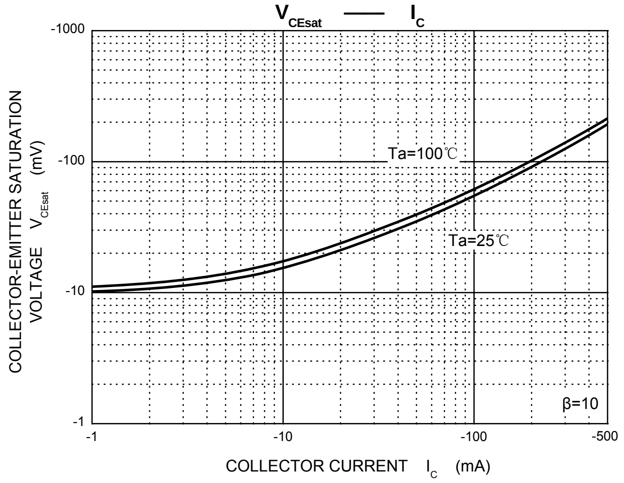
Static Characteristic



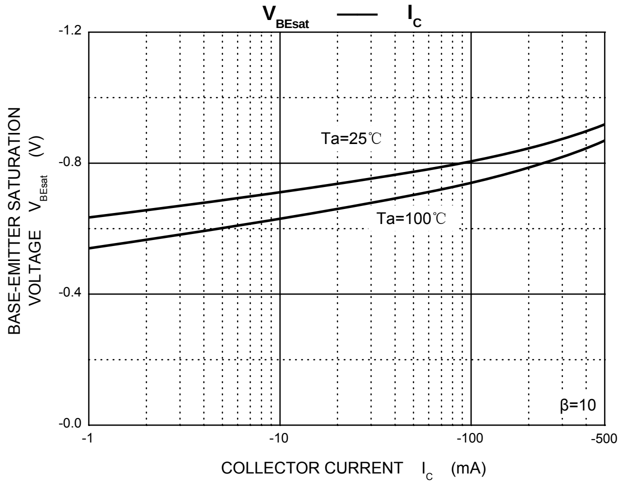
h_{FE} —— I_C



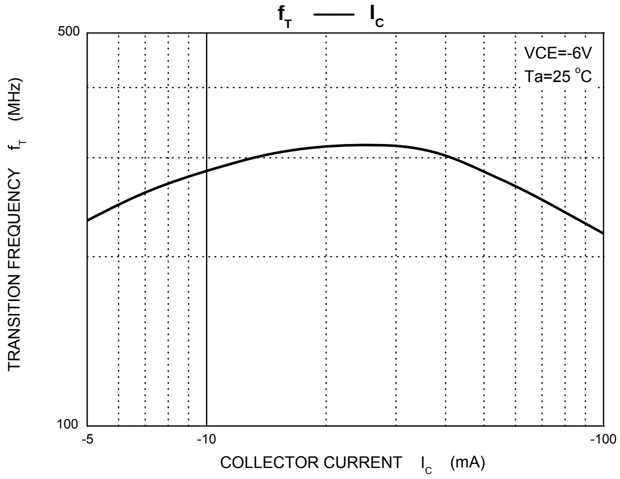
V_{CEsat} —— I_C



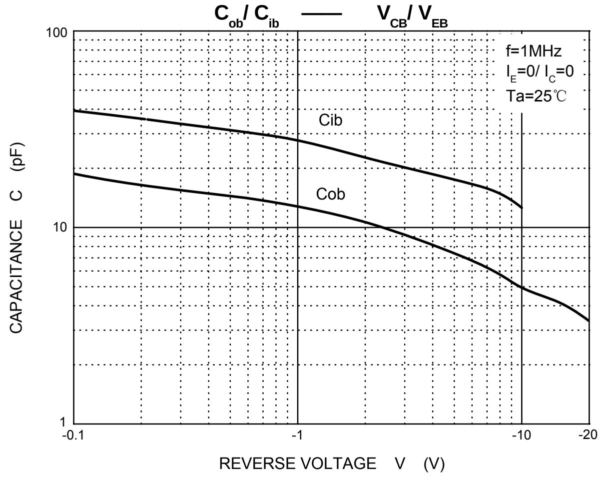
V_{BEsat} —— I_C



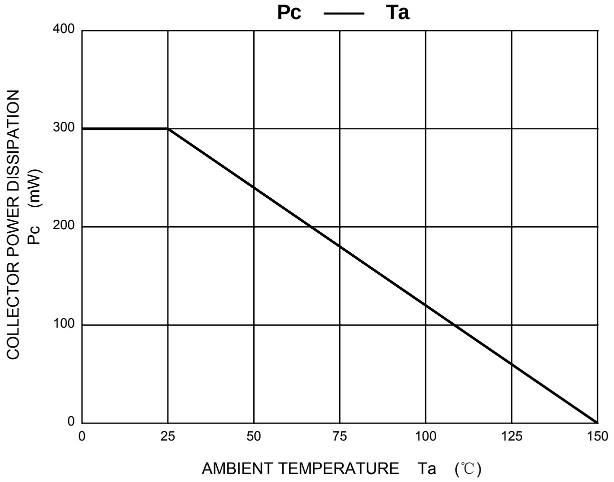
f_T —— I_C



C_{ob}/ C_{ib} —— V_{CB}/ V_{EB}

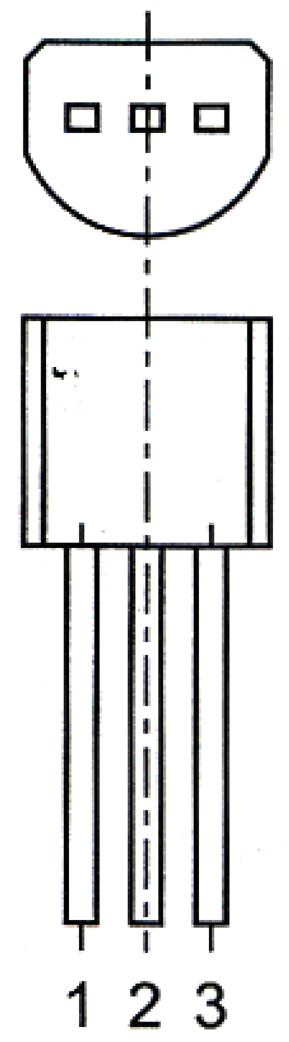


Pc —— Ta



TO-92 Plastic-Encapsulate Transistors

S9012 TRANSISTOR(PNP)



TO-92

1.EMITTER

2.BASE

3.COLLECTOR

FEATURES

Power dissipation

P_{CM}: 0.625W (Tamb=25℃)

Collector current

I_{CM}: -0.5 A

Collector-base voltage

$V_{(BR)CBO}$: -40 V

Operating and storage junction temperature range

T_J, T_{stg}: -55℃ to + 150℃

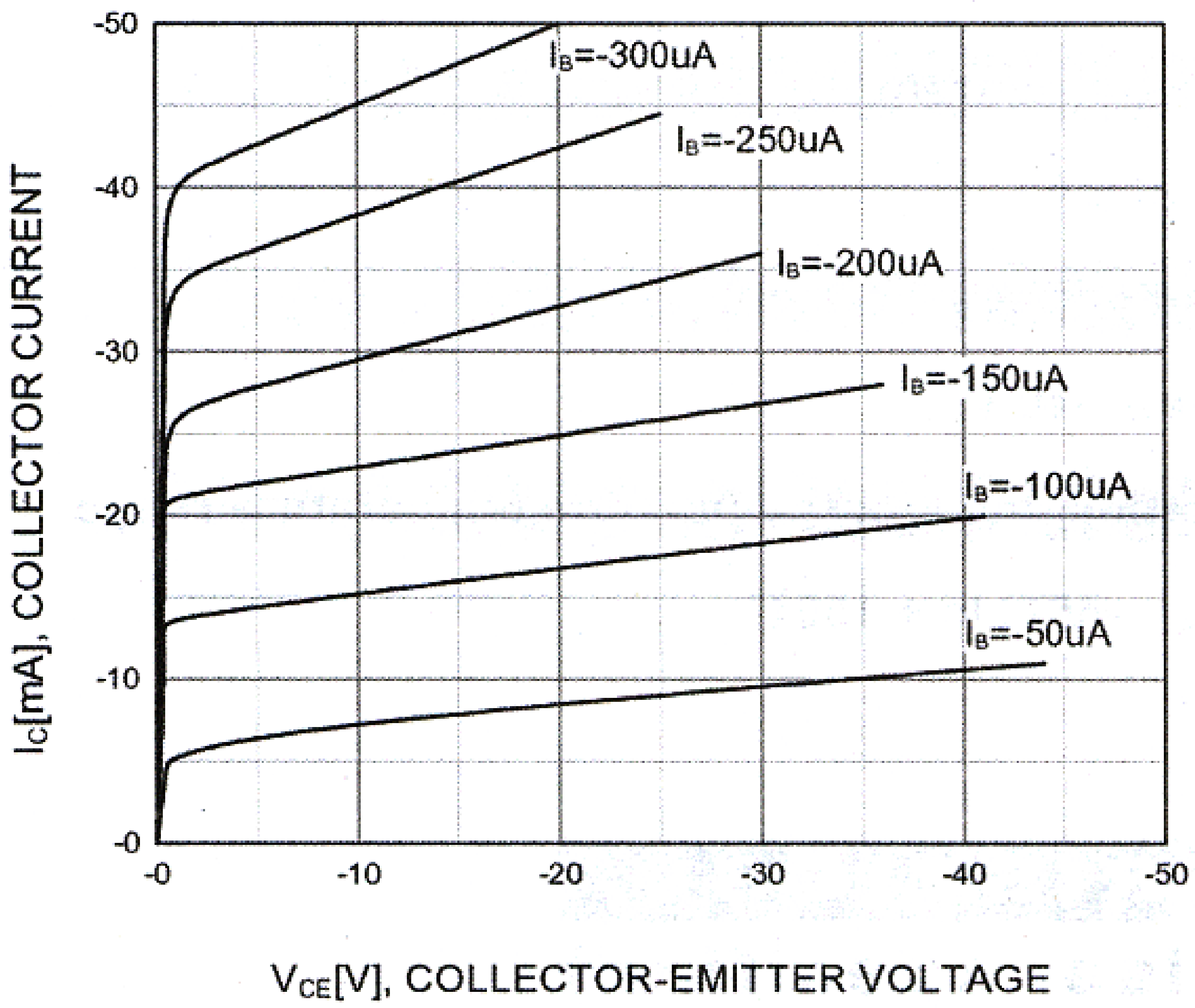
ELECTRICAL CHARACTERISTICS

(Tamb=25℃ unless otherwise specified)

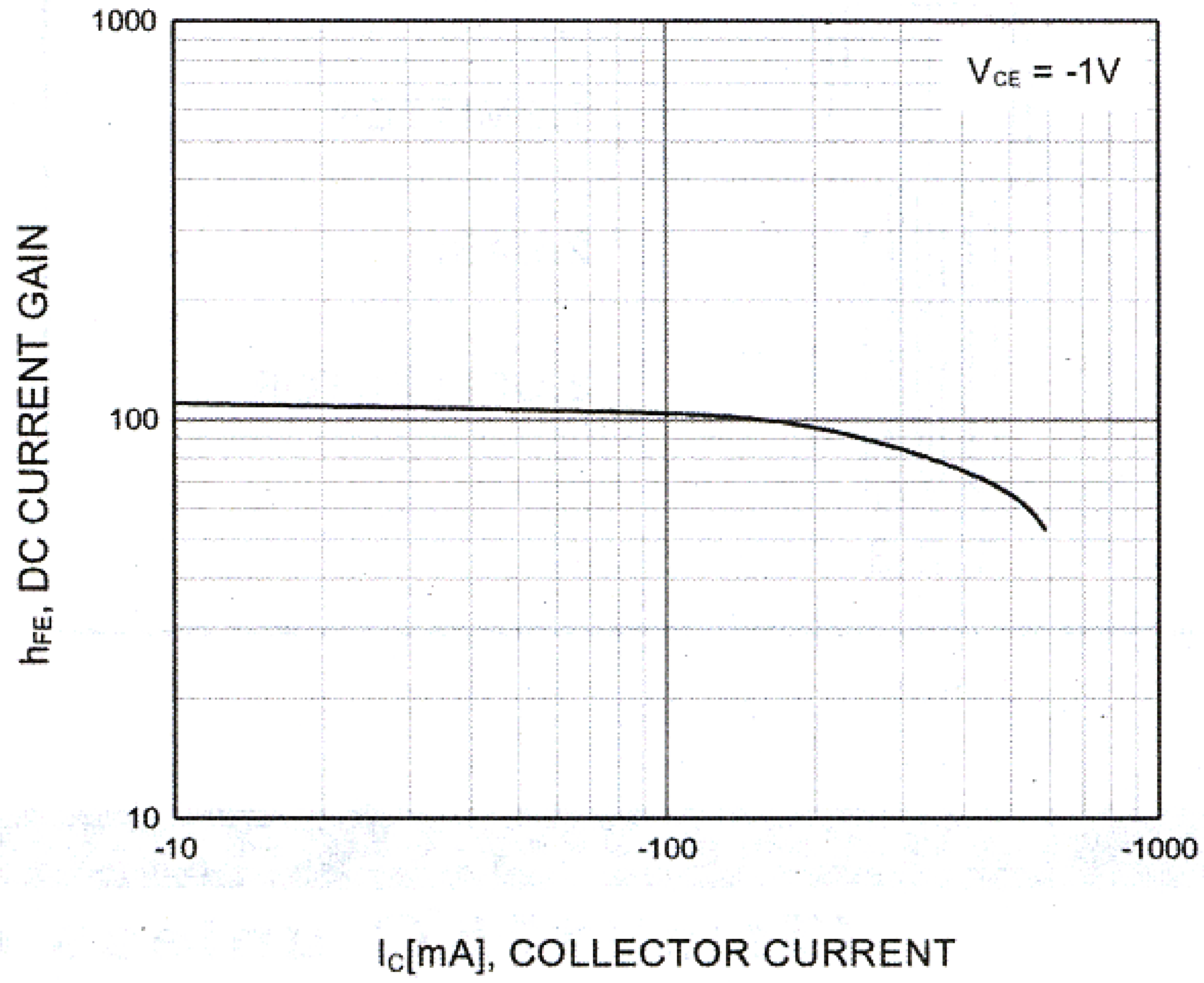
Parameter	Symbol	Test conditions	MIN	MAX	UNIT
Collector-base breakdown voltage	$V_{(BR)CBO}$	I_C= -100 μ A, I_E=0	-40		V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	I_C= -0.1 mA, I_B=0	-25		V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	I_E= -100 μ A, I_C=0	-5		V
Collector cut-off current	I_{CBO}	V_{CB}= -40 V, I_E=0		-0.1	μ A
Collector cut-off current	I_{CEO}	V_{CE}= -20 V, I_B=0		-0.2	μ A
Emitter cut-off current	I_{EBO}	V_{EB}= -5 V, I_C=0		-0.1	μ A
DC current gain	$h_{FE(1)}$	V_{CE}= -1 V, I_C= -50 mA	64	300	
	$h_{FE(2)}$	V_{CE}= -1 V, I_C= -500 mA	40		
Collector-emitter saturation voltage	V_{CEsat}	I_C= -500 mA, I_B= -50 mA		-0.6	V
Base-emitter saturation voltage	V_{BEsat}	I_C= -500 mA, I_B= -50 mA		-1.2	V
Base-emitter voltage	V_{EB}	I_E= -100mA		-1.4	V
Transition frequency	f_T	V_{CE}= -6 V, I_C= -20 mA f =30MHz	150		MHz

CLASSIFICATION OF $H_{FE(1)}$

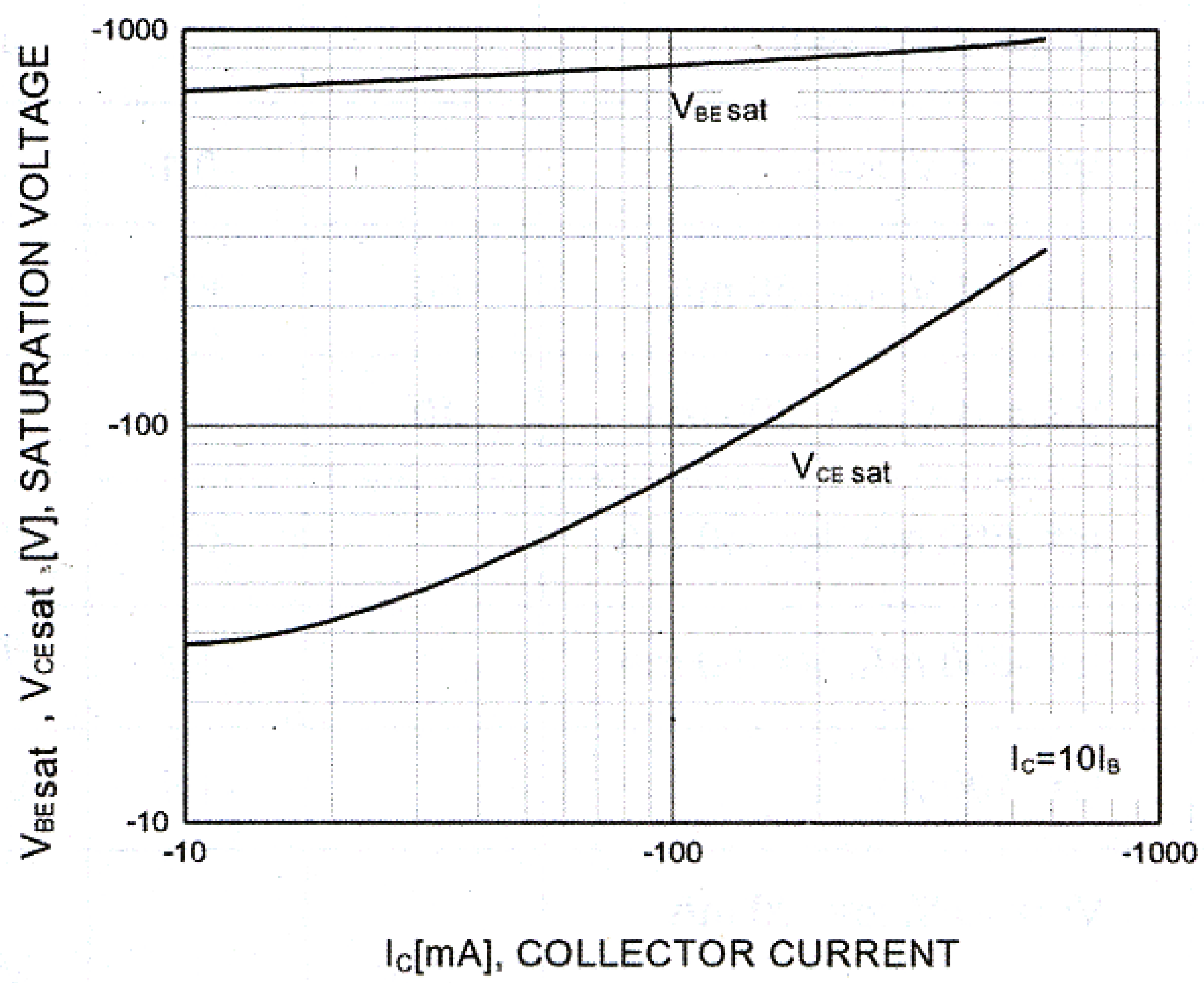
Rank	D	E	F	G	H	I
Range	64-91	78-112	96-135	112-166	144-202	190-300



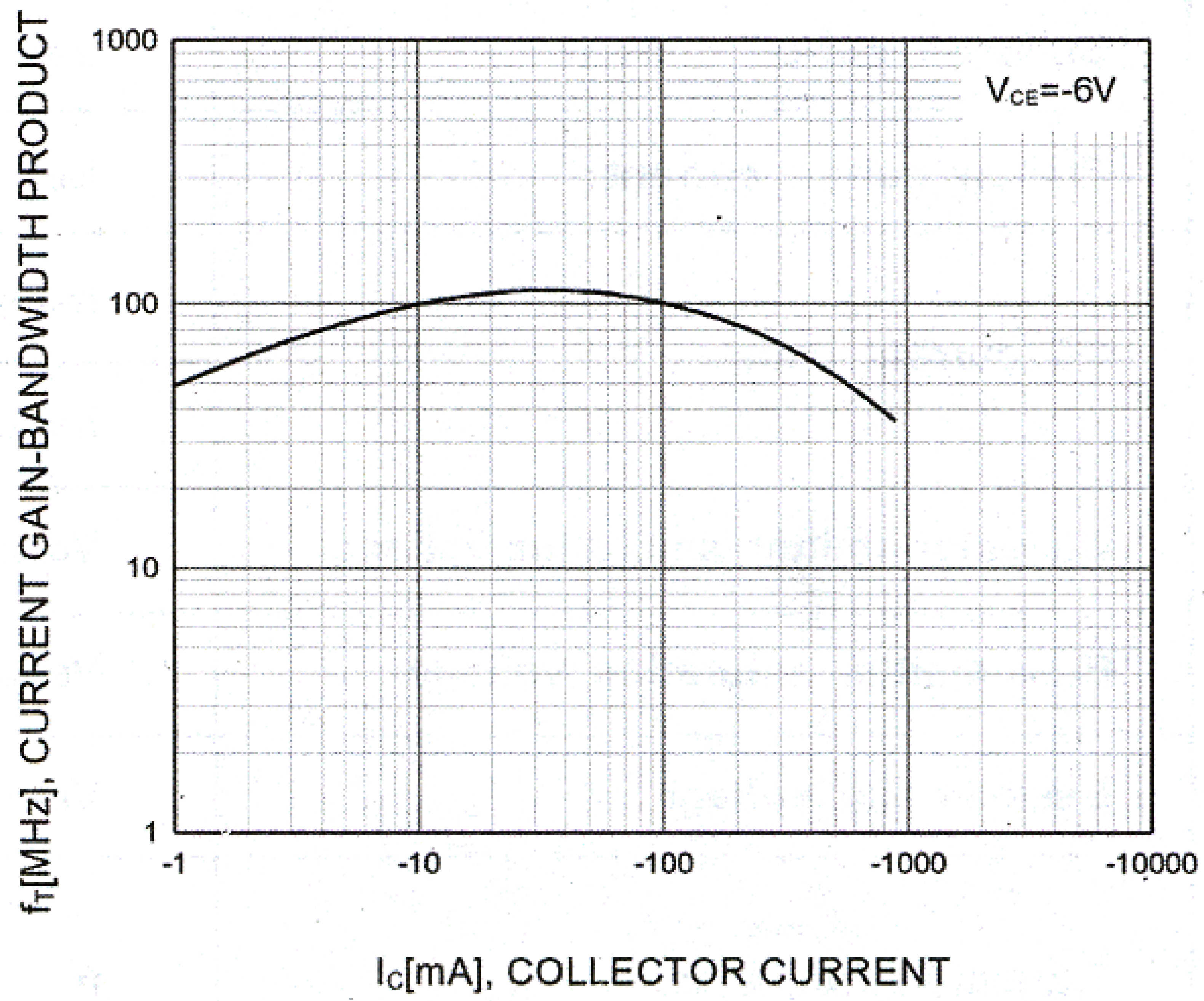
Static Characteristic



DC current Gain



Base-Emitter Saturation Voltage
Collector-Emitter Saturation Voltage



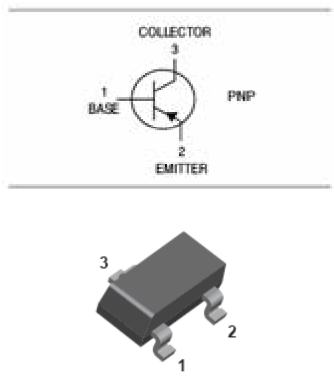
Current Gain Bandwidth Product

PNP Silicon Epitaxial Planar Transistor S9012

FEATURES

Lead-free

- High Collector Current.(I_C= -500mA)
- Complementary To S9013.
- Excellent H_{FE} Linearity.



SOT-23

APPLICATIONS

- High Collector Current.

ORDERING INFORMATION

Type No.	Marking	Package Code
S9012	2T1	SOT-23

MAXIMUM RATING @ Ta=25℃ unless otherwise specified

Symbol	**Parameter**	**Value**	**Units**
V_{CBO}	Collector-Base Voltage	-40	V
V_{CEO}	Collector-Emitter Voltage	-25	V
V_{EBO}	Emitter-Base Voltage	-5	V
I_C	Collector Current -Continuous	-500	mA
P_C	Collector Dissipation	300	mW
T_j,T_{stg}	Junction and Storage Temperature	-55~150	℃

PNP Silicon Epitaxial Planar Transistor **S9012**

ELECTRICAL CHARACTERISTICS @ Ta=25℃ unless otherwise specified

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Collector-base breakdown voltage	$V_{(BR)CBO}$	I_C=-100μA,I_E=0	-40			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	I_C=-1mA,I_B=0	-25			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	I_E=-100μA,I_C=0	-5			V
Collector cut-off current	I_{CBO}	V_{CB}=-40V,I_E=0			-0.1	μA
Collector cut-off current	I_{CEO}	V_{CE}=-20V,I_B=0			-0.1	μA
Emitter cut-off current	I_{EBO}	V_{EB}=-5V,I_C=0			-0.1	μA
DC current gain	h_{FE}	V_{CE}=-1V,I_C=-50mA	120		400	
Collector-emitter saturation voltage	$V_{CE(sat)}$	I_C=-500mA, I_B= -50mA			-0.6	V
Base-emitter saturation voltage	$V_{BE(sat)}$	I_C=-500mA, I_B= -50mA			-1.2	V
Transition frequency	f_T	V_{CE}=-6V, I_C= -20mA f=30MHz	150			MHz
Collector output capacitance	C_{ob}	V_{CB}=-10V,I_E=0,f=1MHz			5	pF

CLASSIFICATION OF $h_{FE(1)}$

Rank	L	H	J
Range	120-200	200-350	300-400
MARKING	2T1		

PNP Silicon Epitaxial Planar Transistor S9012

TYPICAL CHARACTERISTICS @ Ta=25℃ unless otherwise specified

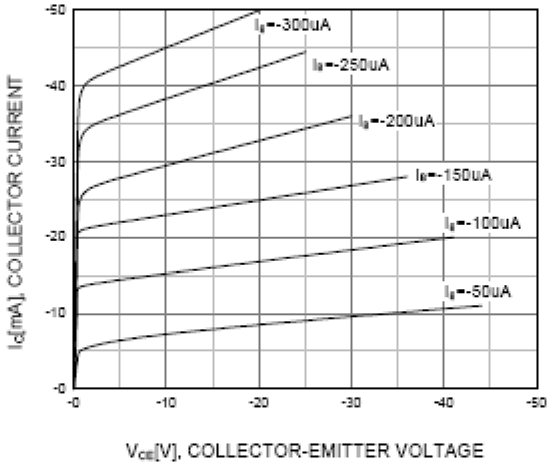


Figure 1. Static Characteristic

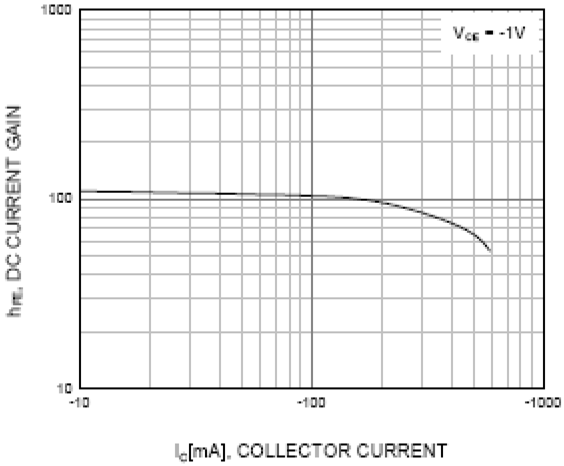


Figure 2. DC current Gain

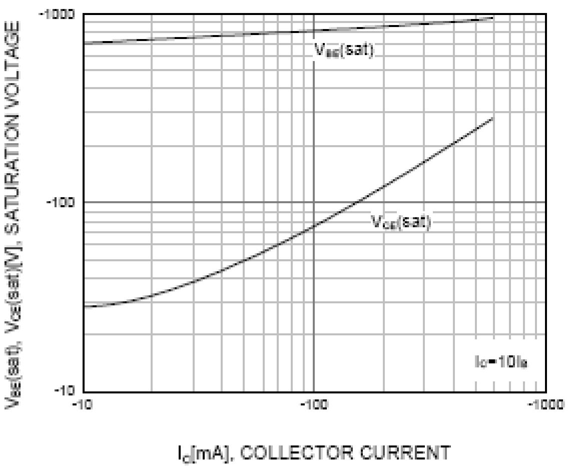


Figure 3. Base-Emitter Saturation Voltage
Collector-Emitter Saturation Voltage

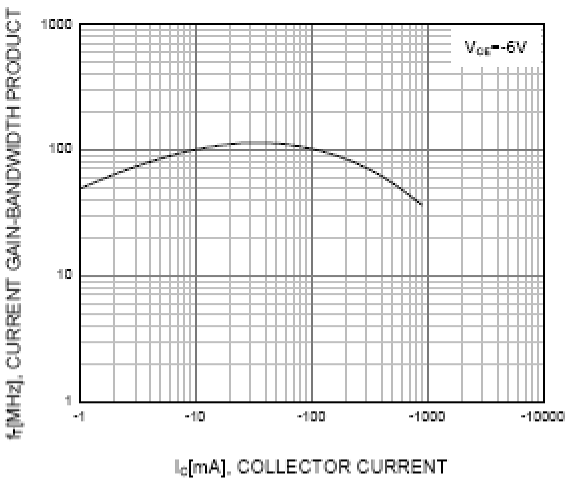
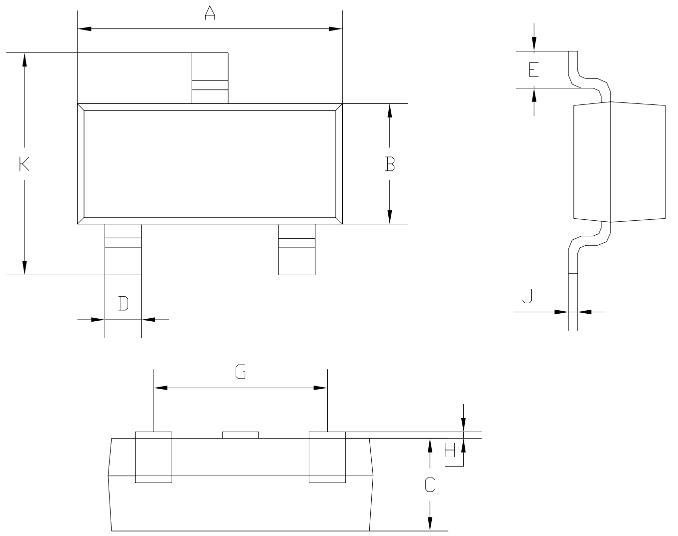


Figure 4. Current Gain Bandwidth Product

PNP Silicon Epitaxial Planar Transistor **S9012**

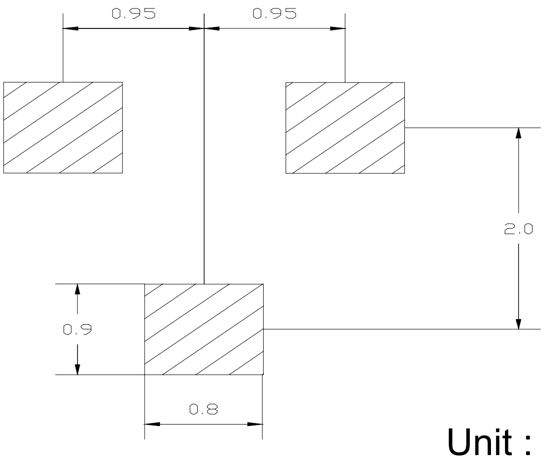
PACKAGE OUTLINE

Plastic surface mounted package SOT-23



SOT-23		
Dim	Min	Max
A	2.85	2.95
B	1.25	1.35
C	1.0Typical	
D	0.37	0.43
E	0.35	0.48
G	1.85	1.95
H	0.02	0.1
J	0.1Typical	
K	2.35	2.45
All Dimensions in mm		

SOLDERING FOOTPRINT



Unit : mm

PACKAGE INFORMATION

Device	Package	Shipping
S9012	SOT-23	3000/Tape&Reel

·M·C·C·

Micro Commercial Components
20736 Marilla Street Chatsworth
CA 91311
Phone: (818) 701-4933
Fax: (818) 701-4939

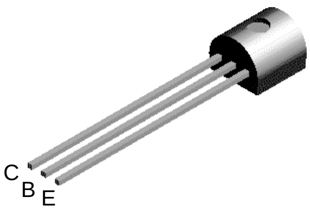
S9012

PNP Silicon Transistors

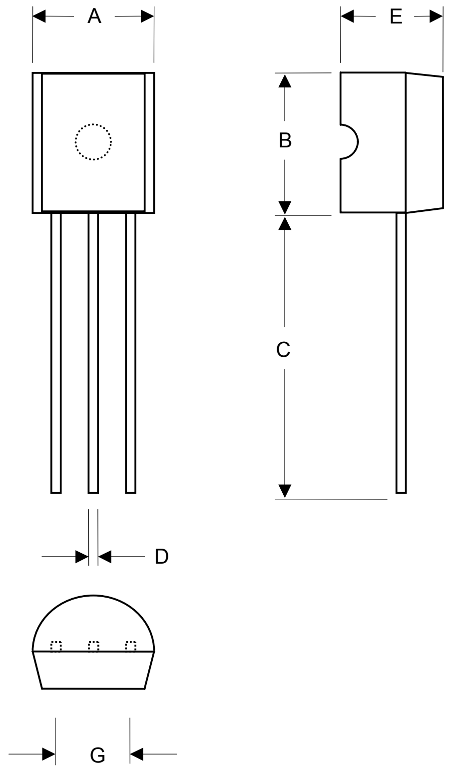
Features

- TO-92 Plastic-Encapsulate Transistors
- Capable of 0.625Watts(Tamb=25^{O}C) of Power Dissipation.
- Collector-current 0.5A
- Collector-base Voltage 40V
- Operating and storage junction temperature range: -55^{O}C to +150^{O}C
- Marking Code: S9012

Pin Configuration



TO-92



DIMENSIONS					
	INCHES		MM		
DIM	MIN	MAX	MIN	MAX	NOTE
A	.175	.185	4.45	4.70	
B	.175	.185	4.46	4.70	
C	.500	---	12.7	---	
D	.016	.020	0.41	0.63	
E	.135	.145	3.43	3.68	
G	.095	.105	2.42	2.67	

Electrical Characteristics @ 25^{0}C Unless Otherwise Specified

Symbol	Parameter	Min	Max	Units
OFF CHARACTERISTICS				
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage (I_C=100uAdc, I_E=0)	40	---	Vdc
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage (I_C=0.1mAdc, I_B=0)	25	---	Vdc
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage (I_E=100uAdc, I_C=0)	5.0	---	Vdc
I_{CBO}	Collector Cutoff Current (V_{CB}=40Vdc, I_E=0)	---	0.1	uAdc
I_{CEO}	Collector Cutoff Current (V_{CE}=20Vdc, I_B=0)	---	0.2	uAdc
I_{EBO}	Emitter Cutoff Current (V_{EB}=5.0Vdc, I_C=0)	---	0.1	uAdc
ON CHARACTERISTICS				
$h_{FE(1)}$	DC Current Gain (I_C=50mAdc, V_{CE}=1.0Vdc)	64	300	---
$h_{FE(2)}$	DC Current Gain (I_C=500mAdc, V_{CE}=1.0Vdc)	40	---	---
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage (I_C=500mAdc, I_B=50mAdc)	---	0.6	Vdc
$V_{BE(sat)}$	Base-Emitter Saturation Voltage (I_C=500mAdc, I_B=50mAdc)	---	1.2	Vdc
V_{EB}	Base- Emitter Voltage (I_E=100mAdc)	---	1.4	Vdc
SMALL-SIGNAL CHARACTERISTICS				
f_T	Transistor Frequency (I_C=20mAdc, V_{CE}=6.0Vdc, f=30MHz)	150	---	MHz

CLASSIFICATION OF $H_{FE(1)}$

Rank	E	F	G	H	I
Range	78-112	96-135	112-166	144-220	190-300