SSC3946GSG

Dual NPN+PNP Switching Transistor

➢ Features

NPN:

VCB	VCE	VEB	IC
60V	40V	6V	0.2A

PNP:

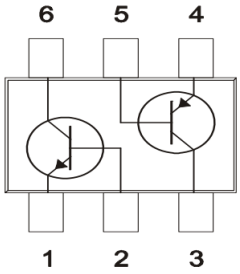
VCB	VCE	VEB	IC
-40V	-40V	-5V	-0.2A

➢ Pin configuration

SOT-363

➢ Description

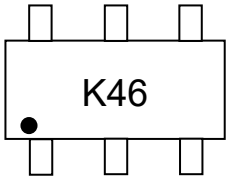
The dual NPN+PNP transistor is composed of a 3904-type NPN and a 3906-type PNP. The device is housed in the SOT-363 package, which is designed for low power amplification and switching.



Circuit Diagram

➢ Applications

- General purpose switching and amplification
- Telephony and professional communication equipment



Marking (Top View)

➢ Ordering Information

Device	Package	Shipping
SSC3946GSG	SOT-363	3000/Reel

➢ NPN 3904 Absolute Maximum Ratings(T_A=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	60	V
Collector- Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current-Continuous	I_C	0.2	A
Collector Power Dissipation	P_C	200	mW
Junction Temperature	T_J	-55 to 150	℃
Storage Temperature	T_{STG}	-55 to 150	℃

➢ NPN 3904 Electrical Characteristics (T_A=25℃ unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Collector-Base Breakdown Voltage	BV_{CBO}	I_C=10uA, I_E=0	60			V
Collector-emitter Breakdown Voltage	BV_{CEO}	I_C=1mA, I_B=0	40			V
Emitter -Base Breakdown Voltage	BV_{EBO}	I_E=10uA, I_C=0	5			V
Collector Cutoff Current	I_{CEX}	V_{CE}=30V, V_{EB}=3V			0.05	uA
Collector Cutoff Current	I_{CBO}	V_{CB}=30V, I_E=0			0.5	uA
Emitter Cutoff Current	I_{EBO}	V_{EB}=3V, I_C=0			0.05	uA
DC Current Gain	h_{FE}	V_{CE}=1V, I_C=0.1mA	40			
		V_{CE}=1V, I_C=1mA	70			
		V_{CE}=1V, I_C=10mA	100		300	
		V_{CE}=1V, I_C=50mA	60			
		V_{CE}=1V, I_C=100mA	30			
Collector-Emitter Saturation Voltage	$V_{CE(sat)1}$	I_C=10mA, I_B=1mA			0.2	V
	$V_{CE(sat)2}$	I_C=50mA, I_B=5mA			0.3	V
Base-Emitter Saturation Voltage	$V_{BE(sat)1}$	I_C=10mA, I_B=1mA	0.65		0.85	V
	$V_{BE(sat)2}$	I_C=50mA, I_B=5mA			0.95	V
Transition frequency	f_T	V_{CE}=20V, I_C=10mA f=100MHz	300			MHz
Collector output capacitance	Cob	V_{CB}=5V, I_E=0,f=1MHz			4	pF
Noise figure	N_F	V_{CE}=5V, Ic=0.1mA, f=1kHz, R_S=1KΩ			5	dB
Delay Time	t_d	V_{CC}=3V, $V_{BE(off)}$=-0.5V I_C=10mA, I_{B1}=1mA			35	ns
Rise Time	t_r	V_{CC}=3V, $V_{BE(off)}$=-0.5V I_C=10mA, I_{B1}=1mA			35	ns
Storage Time	t_s	V_{CC}=3V, I_C=10mA I_{B1}= -I_{B2}=1mA			200	ns
Fall Time	t_f	V_{CC}=3V, I_C=10mA I_{B1}= -I_{B2}=1mA			50	ns

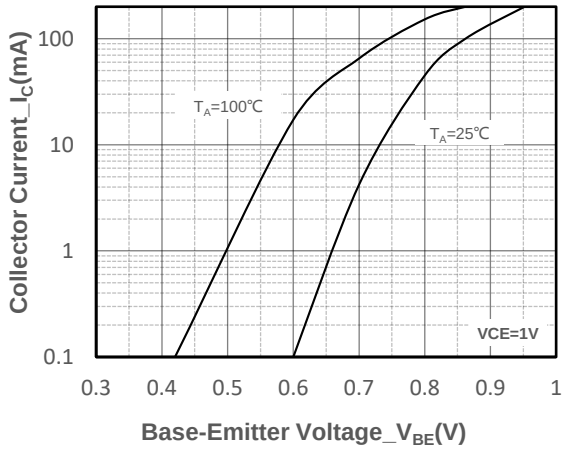
➢ PNP 3906 Absolute Maximum Ratings (T_A=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-40	V
Collector- Emitter Voltage	V_{CEO}	-40	V
Emitter-Base Voltage	V_{EBO}	-5	V
Collector Current-Continuous	I_C	-0.2	A
Collector Power Dissipation	P_C	200	mW
Junction Temperature	T_J	-55 to 150	℃
Storage Temperature	T_{STG}	-55 to 150	℃

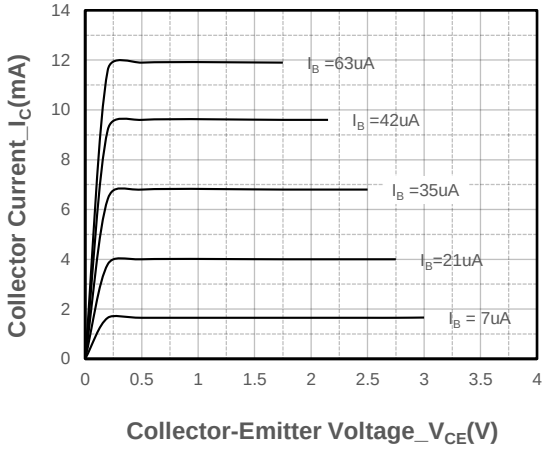
➢ PNP 3906 Electrical Characteristics (T_A=25℃ unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Collector-Base Breakdown Voltage	BV_{CBO}	I_C=-10uA, I_E=0	-40			V
Collector-emitter Breakdown Voltage	BV_{CEO}	I_C=-1mA, I_B=0	-40			V
Emitter -Base Breakdown Voltage	BV_{EBO}	I_E=-10uA, I_C=0	-5			V
Collector Cutoff Current	I_{CEX}	V_{CE}=-30V, V_{EB}=-3V			-50	nA
Collector Cutoff Current	I_{CBO}	V_{CB}=-30V, I_E=0			-100	nA
Emitter Cutoff Current	I_{EBO}	V_{EB}=-5V, I_C=0			-100	nA
DC Current Gain	h_{FE}	V_{CE}=-1V, I_C=-10mA	100		300	
		V_{CE}=-1V, I_C=-0.1mA	60			
		V_{CE}=-1V, I_C=-100mA	30			
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=-50mA, I_B=-5mA			-0.4	V
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	I_C=-50mA, I_B=-5mA			-0.95	V
Transition frequency	f_T	V_{CE}=-20V, I_C=-10mA f=100MHz	250			MHz
Delay Time	t_d	V_{CC}=-3V, V_{BE}=0.5V			35	ns
Rise Time	t_r	I_C=-10mA, I_{B1}=-1mA			35	ns
Storage Time	t_s	V_{CC}=-3V, I_C=-10mA			225	ns
Fall Time	t_f	I_{B1}=-I_{B2}=-1mA			75	ns

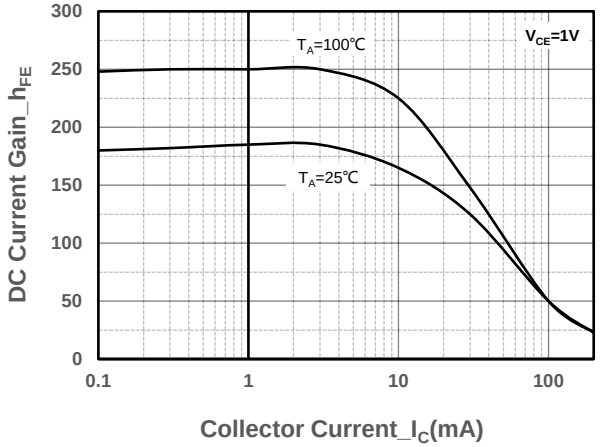
➢ NPN 3904 Typical Performance Characteristics (T_A=25℃ unless otherwise noted)



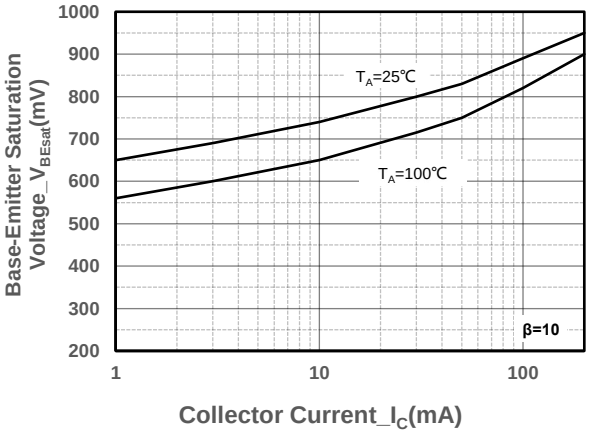
Collector Current vs. Base-Emitter Voltage



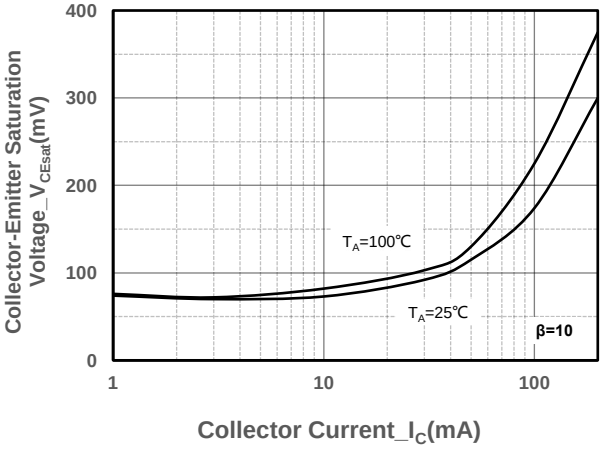
Collector Current vs. Collector-Emitter Voltage



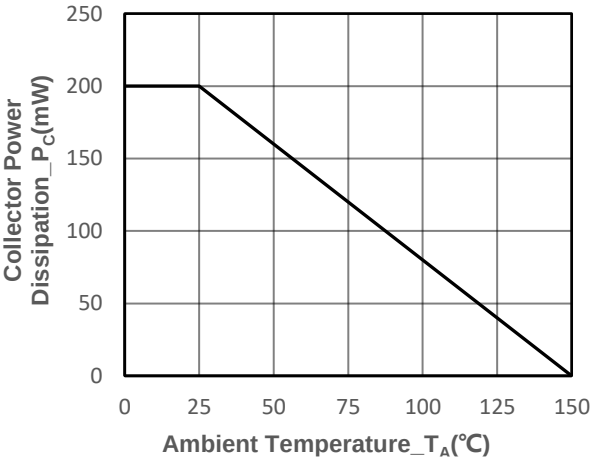
DC Current Gain vs. Collector Current



$V_{BE(sat)}$ vs. Collector Current

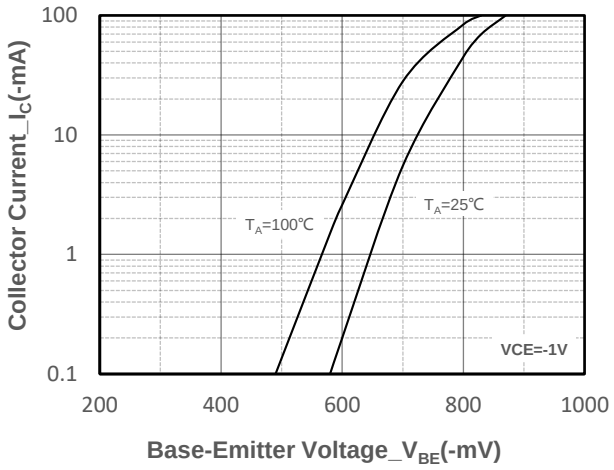


$V_{CE(sat)}$ vs. Collector Current

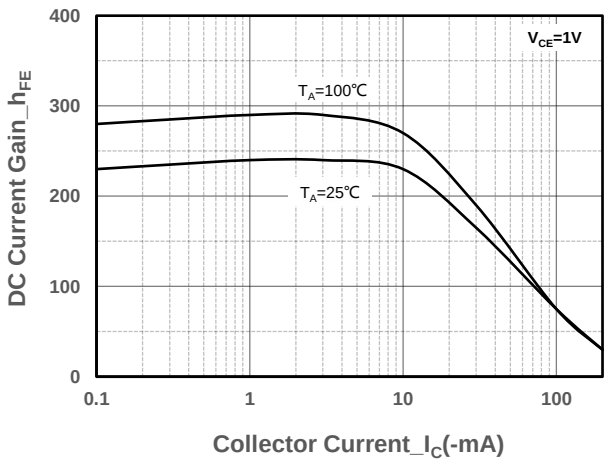


Power derating vs. Ambient temperature

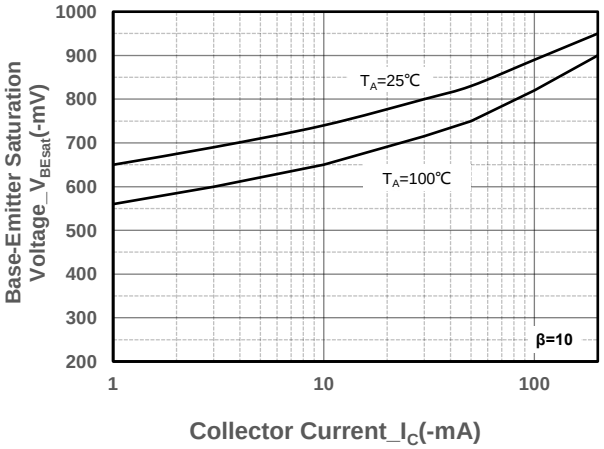
➢ PNP 3906 Typical Performance Characteristics (T_A=25℃ unless otherwise noted)



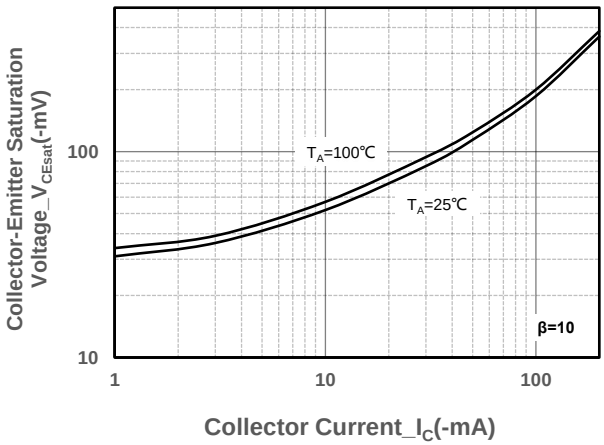
Collector Current vs. Base-Emitter Voltage



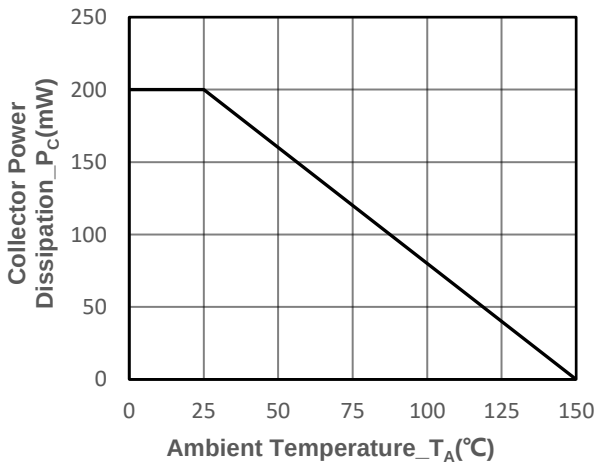
DC Current Gain vs. Collector Current



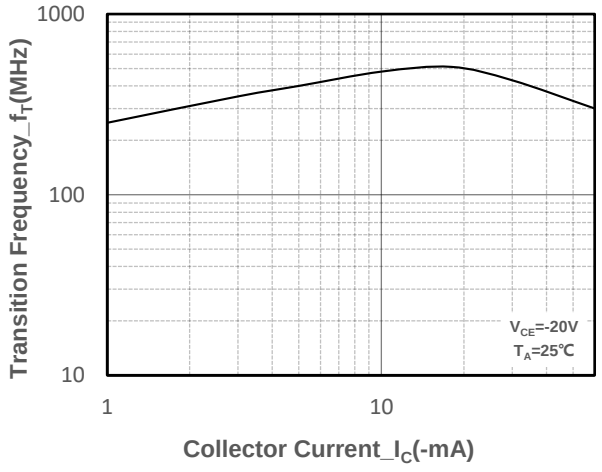
$V_{BE(sat)}$ vs. Collector Current



$V_{CE(sat)}$ vs. Collector Current



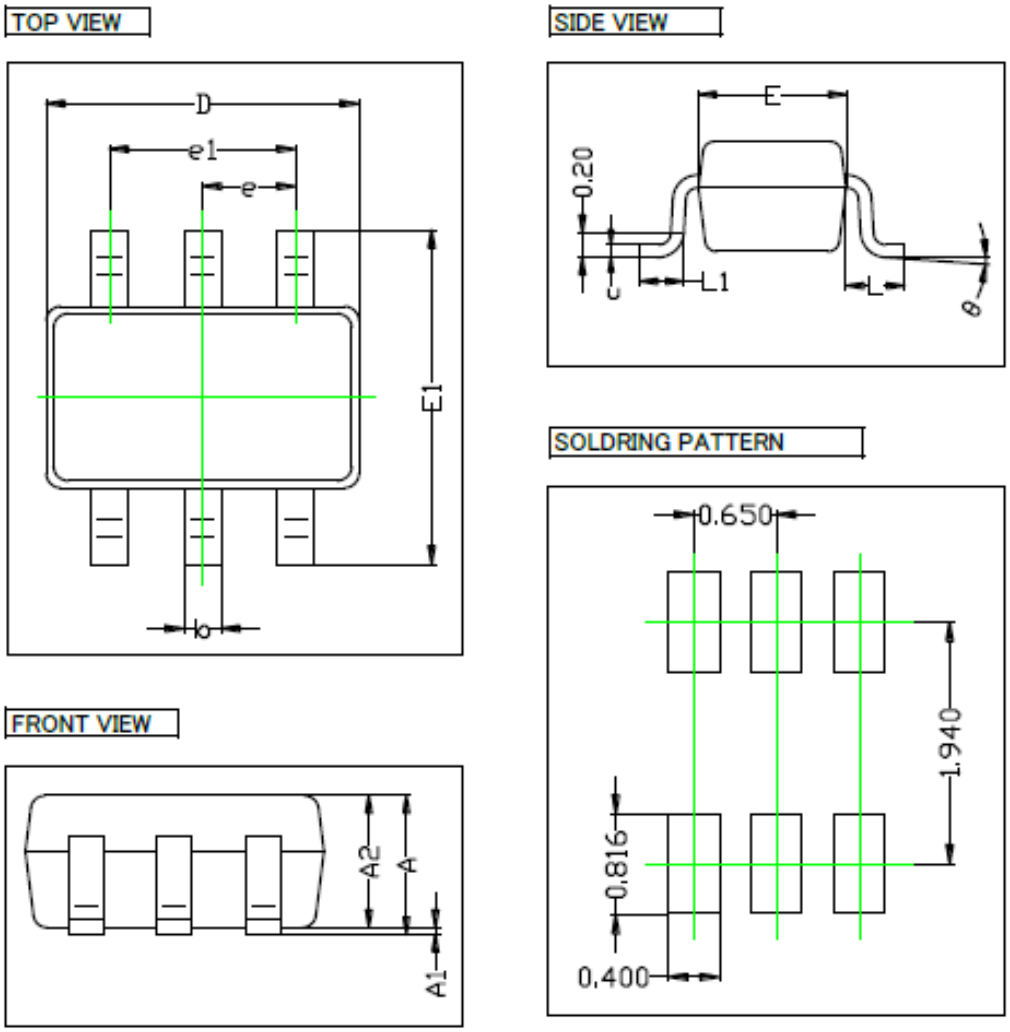
Power derating vs. Ambient temperature



Transition Frequency vs. Collector Current

➢ Package Information

SOT-363



SYMBOL	DIMENSIONS IN MILLIMETER	
	MIN	MAX
A	0.900	1.000
A1	0.000	0.100
A2	0.900	1.000
b	0.150	0.300
c	0.100	0.150
D	2.000	2.200
E	1.150	1.350
E1	2.150	2.400
e	0.650 TYP.	
e1	1.200	1.400
L	0.525 REF.	
L1	0.260	0.450
θ	0°	8°

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