



SSC3946GSG

Dual NPN+PNP Switching Transistor

➤ Features

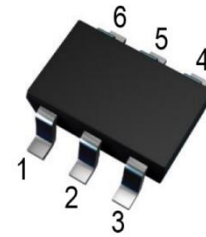
NPN:

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

PNP:

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

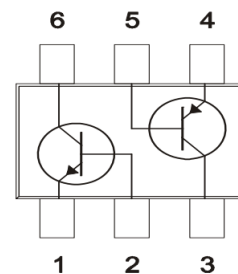
➤ Pin configuration



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.



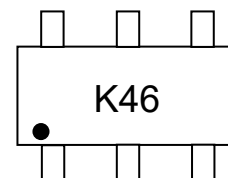
Circuit Diagram

➤ Applications

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

➤ Ordering Information

Device	Package	Shipping
SSC3946GSG	SOT-363	3000/Reel



Marking (Top View)



➤ **NPN 3904 Absolute Maximum Ratings**($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector-Base Voltage	V_{CB0}	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	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-55 to 150	$^{\circ}\text{C}$

➤ **NPN 3904 Electrical Characteristics** ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Collector-Base Breakdown Voltage	BV_{CB0}	$I_c=10\mu\text{A}, I_E=0$	60			V
Collector-emitter Breakdown Voltage	BV_{CEO}	$I_c=1\text{mA}, I_B=0$	40			V
Emitter -Base Breakdown Voltage	BV_{EBO}	$I_E=10\mu\text{A}, I_c=0$	5			V
Collector Cutoff Current	I_{CEX}	$V_{CE}=30\text{V}, V_{EB}=3\text{V}$			0.05	μA
Collector Cutoff Current	I_{CBO}	$V_{CB}=30\text{V}, I_E=0$			0.5	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=3\text{V}, I_c=0$			0.05	μA
DC Current Gain	h_{FE}	$V_{CE}=1\text{V}, I_c=0.1\text{mA}$	40			
		$V_{CE}=1\text{V}, I_c=1\text{mA}$	70			
		$V_{CE}=1\text{V}, I_c=10\text{mA}$	100		300	
		$V_{CE}=1\text{V}, I_c=50\text{mA}$	60			
		$V_{CE}=1\text{V}, I_c=100\text{mA}$	30			
Collector-Emitter Saturation Voltage	$V_{CE(sat)1}$	$I_c=10\text{mA}, I_B=1\text{mA}$			0.2	V
	$V_{CE(sat)2}$	$I_c=50\text{mA}, I_B=5\text{mA}$			0.3	V
Base-Emitter Saturation Voltage	$V_{BE(sat)1}$	$I_c=10\text{mA}, I_B=1\text{mA}$	0.65		0.85	V
	$V_{BE(sat)2}$	$I_c=50\text{mA}, I_B=5\text{mA}$			0.95	V
Transition frequency	f_T	$V_{CE}=20\text{V}, I_c=10\text{mA}$ $f=100\text{MHz}$	300			MHz
Collector output capacitance	C_{ob}	$V_{CB}=5\text{V}, I_E=0, f=1\text{MHz}$			4	pF
Noise figure	N_F	$V_{CE}=5\text{V}, I_c=0.1\text{mA},$ $f=1\text{kHz}, R_S=1\text{K}\Omega$			5	dB
Delay Time	t_d	$V_{CC}=3\text{V}, V_{BE(off)}=-0.5\text{V}$ $I_c=10\text{mA}, I_{B1}=1\text{mA}$			35	ns
Rise Time	t_r	$V_{CC}=3\text{V}, V_{BE(off)}=-0.5\text{V}$ $I_c=10\text{mA}, I_{B1}=1\text{mA}$			35	ns
Storage Time	t_s	$V_{CC}=3\text{V}, I_c=10\text{mA}$ $I_{B1}= -I_{B2}=1\text{mA}$			200	ns
Fall Time	t_f	$V_{CC}=3\text{V}, I_c=10\text{mA}$ $I_{B1}= -I_{B2}=1\text{mA}$			50	ns



➤ **PNP 3906 Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ unless otherwise noted)**

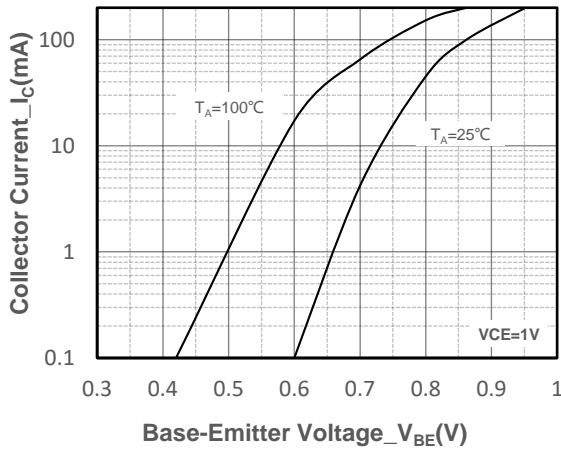
Parameter	Symbol	Value	Unit
Collector-Base Voltage	V_{CB0}	-40	V
Collector- Emitter Voltage	V_{CEO}	-40	V
Emitter-Base Voltage	V_{EBO}	-5	V
Collector Current-Continuous	I_C	-0.2	A
Collector Power Dissipation	P_C	200	mW
Junction Temperature	T_J	-55 to 150	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-55 to 150	$^{\circ}\text{C}$

➤ **PNP 3906 Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)**

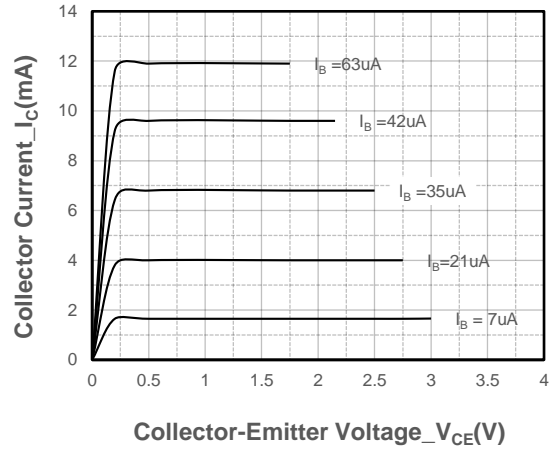
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Collector-Base Breakdown Voltage	BV_{CB0}	$I_C=-10\mu\text{A}, I_E=0$	-40			V
Collector-emitter Breakdown Voltage	BV_{CEO}	$I_C=-1\text{mA}, I_B=0$	-40			V
Emitter -Base Breakdown Voltage	BV_{EBO}	$I_E=-10\mu\text{A}, I_C=0$	-5			V
Collector Cutoff Current	I_{CEX}	$V_{CE}=-30\text{V}, V_{EB}=-3\text{V}$			-50	nA
Collector Cutoff Current	I_{CBO}	$V_{CB}=-30\text{V}, I_E=0$			-100	nA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=-5\text{V}, I_C=0$			-100	nA
DC Current Gain	h_{FE}	$V_{CE}=-1\text{V}, I_C=-10\text{mA}$	100		300	
		$V_{CE}=-1\text{V}, I_C=-0.1\text{mA}$	60			
		$V_{CE}=-1\text{V}, I_C=-100\text{mA}$	30			
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=-50\text{mA}, I_B=-5\text{mA}$			-0.4	V
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=-50\text{mA}, I_B=-5\text{mA}$			-0.95	V
Transition frequency	f_T	$V_{CE}=-20\text{V}, I_C=-10\text{mA}$ $f=100\text{MHz}$	250			MHz
Delay Time	t_d	$V_{CC}=-3\text{V}, V_{BE}=0.5\text{V}$ $I_C=-10\text{mA}, I_{B1}=-1\text{mA}$			35	ns
Rise Time	t_r				35	ns
Storage Time	t_s	$V_{CC}=-3\text{V}, I_C=-10\text{mA}$ $I_{B1}=-I_{B2}=-1\text{mA}$			225	ns
Fall Time	t_f				75	ns



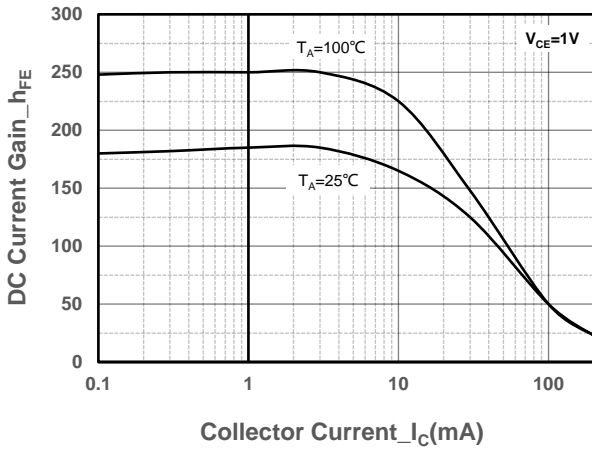
➤ **NPN 3904 Typical Performance Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)**



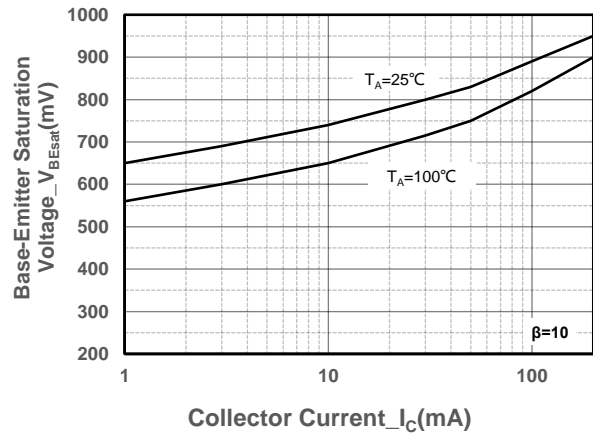
Collector Current vs. Base-Emitter Voltage



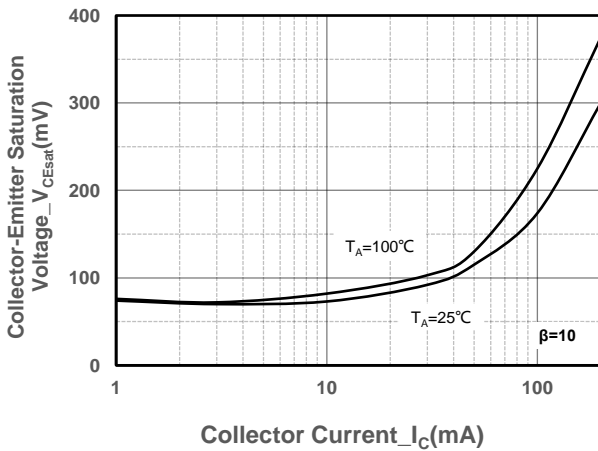
Collector Current vs. Collector-Emitter Voltage



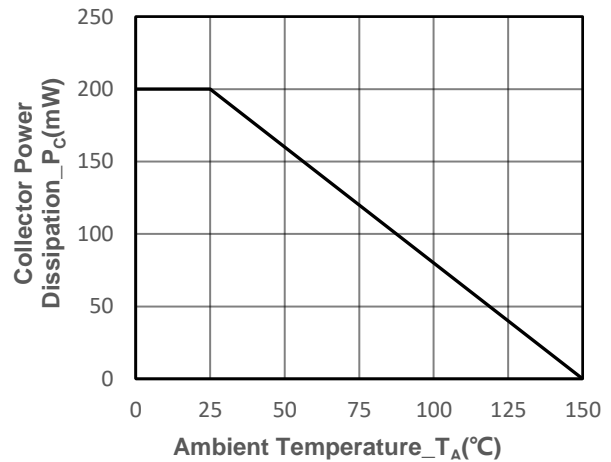
DC Current Gain vs. Collector Current



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



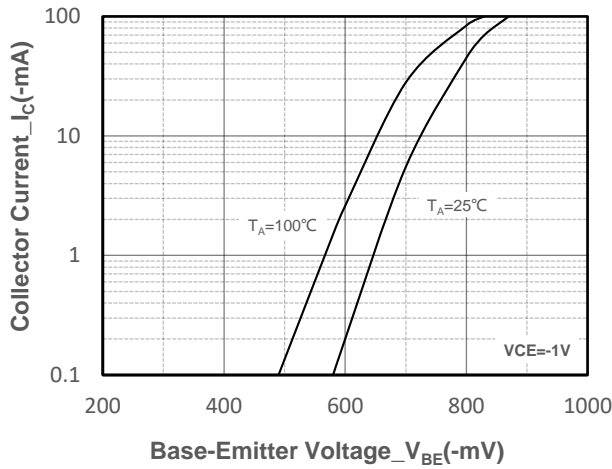
$V_{CE(sat)}$ vs. Collector Current



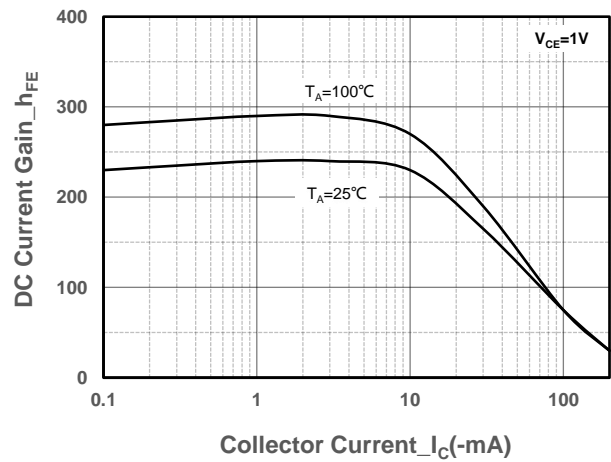
Power derating vs. Ambient temperature



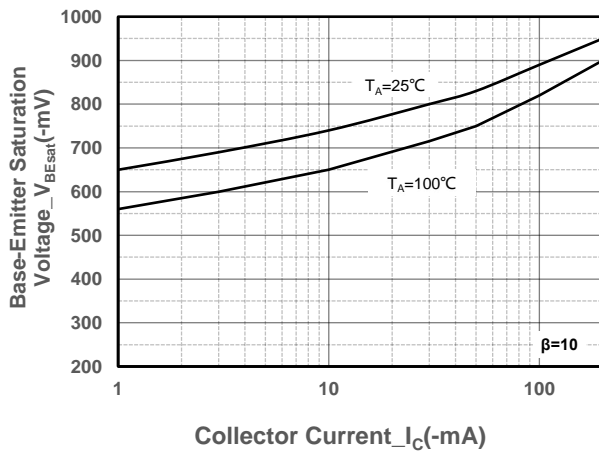
➤ **PNP 3906 Typical Performance Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)**



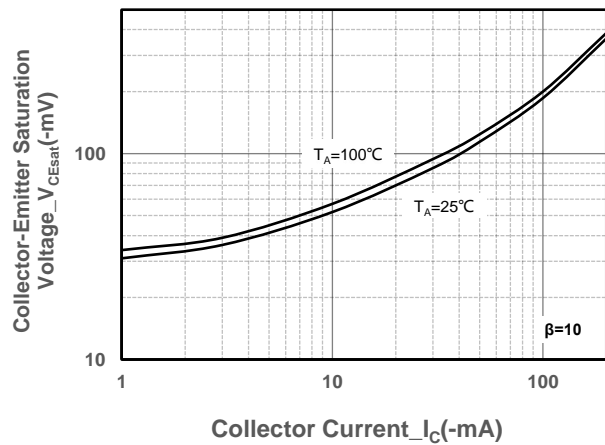
Collector Current vs. Base-Emitter Voltage



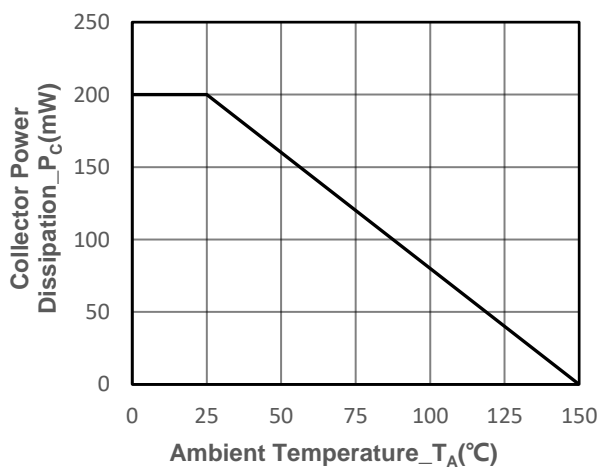
DC Current Gain vs. Collector Current



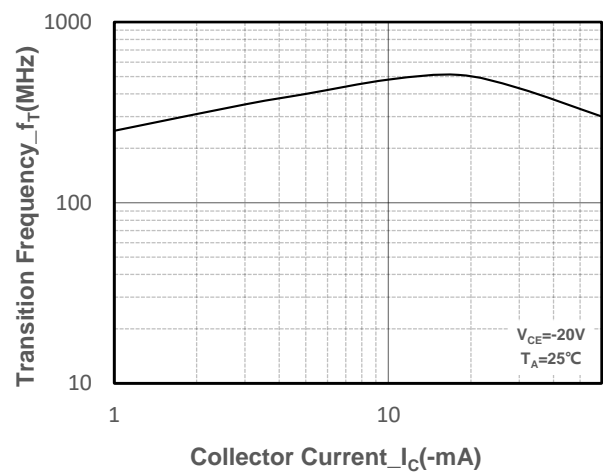
$V_{BE(sat)}$ vs. Collector Current



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



Power derating vs. Ambient temperature

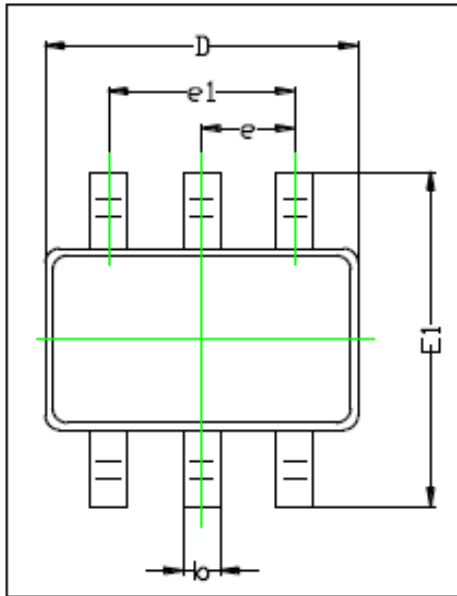


Transition Frequency vs. Collector Current

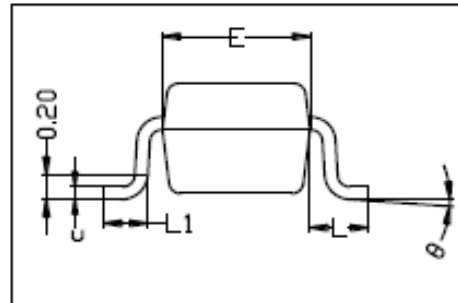
➤ Package Information

SOT-363

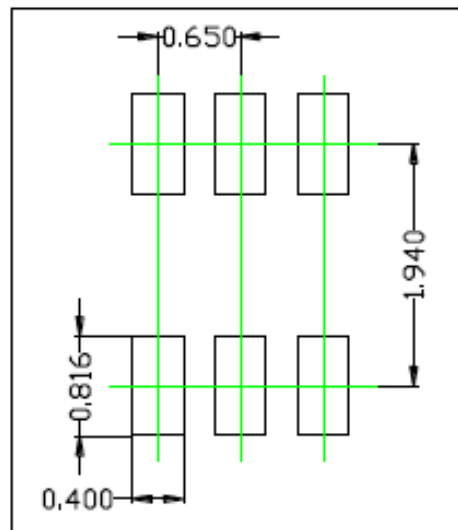
TOP VIEW



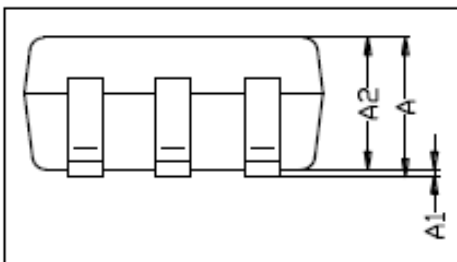
SIDE VIEW



SOLDERING PATTERN



FRONT VIEW



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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