

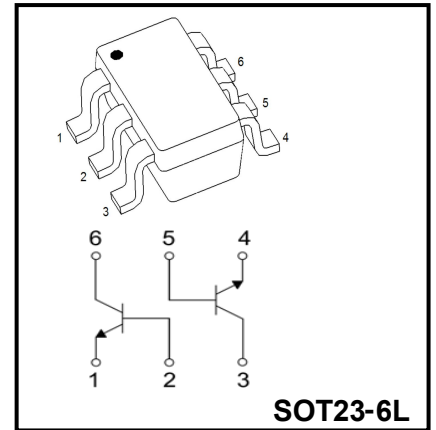
Plastic-Encapsulate Transistors

DUAL TRANSISTOR (NPN+PNP)

FEATURES

- ◆ Complementary Pair
- ◆ One 3904-Type NPN
One 3906-Type PNP
- ◆ Epitaxial Planar Die Construction
- ◆ Ideal for Low Power Amplification and Switching

MAKING: K46



MAXIMUM RATINGS (Ta=25°C unless otherwise noted)

Symbol	Parameter	Value	Units
V_{CBO}	Collector-Base Voltage	60	V
V_{CEO}	Collector-Emitter Voltage	40	V
V_{EBO}	Emitter-Base Voltage	5	V
I_C	Collector Current -Continuous	0.2	A
P_C	Collector Power Dissipation	0.3	W
T_J	Junction Temperature	150	°C
T_{stg}	Storage Temperature	-55-150	°C

NPN 3904 ELECTRICAL CHARACTERISTICS (Ta=25°C unless otherwise specified)

Parameter	Symbol	Test conditions	Min	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C = 10\mu A, I_E = 0$	60		V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = 1mA, I_B = 0$	40		V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E = 10\mu A, I_C = 0$	5		V
Collector cut-off current	I_{CBO}	$V_{CB} = 30V, I_E = 0$		0.05	μA
Collector cut-off current	I_{CEO}	$V_{CE} = 30V, I_B = 0$		0.5	μA
Emitter cut-off current	I_{EBO}	$V_{EB} = 5V, I_C = 0$		0.05	μA
DC current gain	$h_{FE(1)}$	$V_{CE} = 1V, I_C = 0.1mA$	40		
	$h_{FE(2)}$	$V_{CE} = 1V, I_C = 1mA$	70		
	$h_{FE(3)}$	$V_{CE} = 1V, I_C = 10mA$	100	300	
	$h_{FE(4)}$	$V_{CE} = 1V, I_C = 50mA$	60		
	$h_{FE(5)}$	$V_{CE} = 1V, I_C = 100mA$	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	$V_{CE} = 20V, I_C = 20mA, f = 100MHz$	300		MHz
Noise figure	NF	$V_{CE} = 5V, I_C = 0.1mA, f = 1KHz, R_g = 1K\Omega$		5	dB
Output capacitance	C_{ob}	$V_{CB} = 5V, I_E = 0, f = 1MHz$		4	pF
Delay time	t_d	$V_{CC} = 3V, V_{BE} = 0.5V$		35	nS
Rise time	t_r	$I_C = 10mA, I_{B1} = -I_{B2} = 1mA$		35	nS
Storage time	t_s	$V_{CC} = 3V, I_C = 10mA$		200	nS
Fall time	t_f	$I_{B1} = -I_{B2} = 1mA$		50	nS

MAXIMUM RATINGS(Ta=25℃ unless otherwise noted)

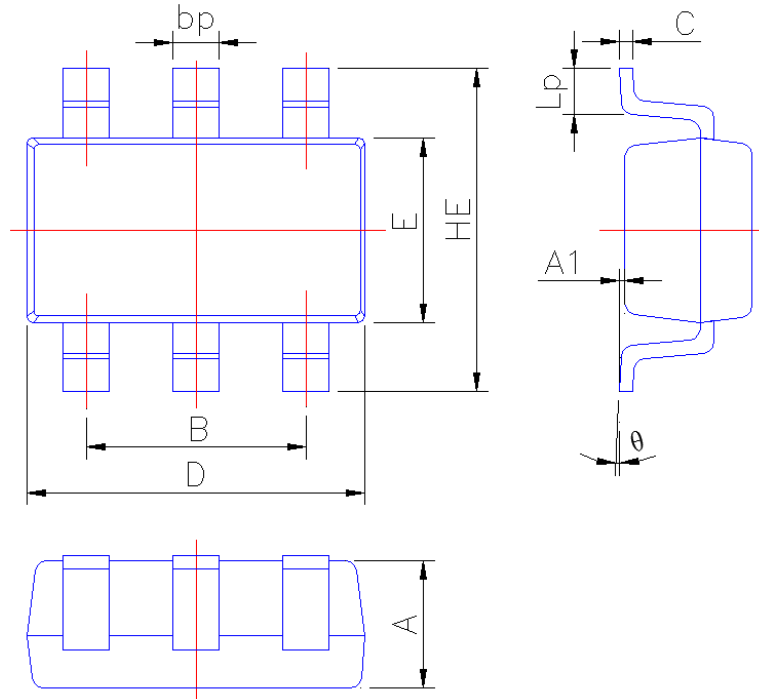
Symbol	Parameter	Value	Units
V_{CBO}	Collector-Base Voltage	-40	V
V_{CEO}	Collector-Emitter Voltage	-40	V
V_{EBO}	Emitter-Base Voltage	-5	V
I_C	Collector Current -Continuous	-0.2	A
P_C	Collector Power Dissipation	0.2	W
T_J	Junction Temperature	150	℃
T_{stg}	Storage Temperature	-55-150	℃

PNP 3906 ELECTRICAL CHARACTERISTICS (Ta=25℃ unless otherwise specified)

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C=-10\mu A, I_E=0$	-40			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C=-1mA, I_B=0$	-40			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E=-10\mu A, I_C=0$	-5			V
Collector cut-off current	I_{CBO}	$V_{CB}=-30V, I_E=0$			-0.05	μA
Emitter cut-off current	I_{EBO}	$V_{EB}=-5V, I_C=0$			-0.05	μA
DC current gain	$h_{FE(1)}$	$V_{CE}=-1V, I_C=-0.1mA$	60			
	$h_{FE(2)}$	$V_{CE}=-1V, I_C=-1mA$	80			
	$h_{FE(3)}$	$V_{CE}=-1V, I_C=-10mA$	100		300	
	$h_{FE(4)}$	$V_{CE}=-1V, I_C=-50mA$	60			
	$h_{FE(5)}$	$V_{CE}=-1V, I_C=-100mA$	30			
Collector-emitter saturation voltage	$V_{CE(sat)1}$	$I_C=-10mA, I_B=-1mA$			-0.25	V
	$V_{CE(sat)2}$	$I_C=-50mA, I_B=-5mA$			-0.4	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	$V_{CE}=-20V, I_C=-10mA, f=100MHz$	250			MHz
Collector output capacitance	C_{ob}	$V_{CB}=-5V, I_E=0, f=1MHz$			4.5	pF
Noise figure	NF	$V_{CE}=-5V, I_C=-0.1mA, f=1KHz, R_g=1K\Omega$			4	dB
Delay time	t_d	$V_{CC}=-3V, V_{BE}=-0.5V, I_C=-10mA, I_{B1}=-I_{B2}=-1mA$			35	nS
Rise time	t_r				35	nS
Storage time	t_s	$V_{CC}=-3V, I_C=-10mA, I_{B1}=-I_{B2}=-1mA$			225	nS
Fall time	t_f				75	nS

Package Outline

SOT23-6L



Symbol	Dimension in Millimeters	
	Min	Max
A	1.05	1.20
A1	0.010	0.100
B	1.80	2.00
bp	0.35	0.50
C	0.12	0.20
D	2.80	3.00
E	1.50	1.70
HE	2.60	3.00
Lp	0.25	0.55
θ	2°	6°

Summary of Packing Options

Package	Packing Description	Packing Quantity	Industry Standard
SOT23-6L	Tape/Reel, 7" reel	3000	EIA-481-1