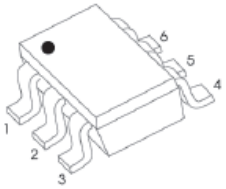
MMDT3946

DUAL TRANSISTOR (NPN+PNP)

SOT-363

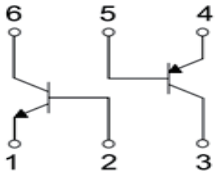


FEATURES

- 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 (T_a=25℃ 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	0.2	W
T_J,T_{stg}	Operation Junction and Storage Temperature Range	-55~+150	℃

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

Parameter	Symbol	Test conditions	Min	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	I_C = 10μA, 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= 10μA, I_C=0	5		V
Collector cut-off current	I_{CBO}	V_{CB}= 30 V , I_E=0		0.05	μA
Collector cut-off current	I_{CEO}	V_{CE}= 30 V , 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=10 mA, I_B= 1mA		0.2	V
	$V_{CE(sat)2}$	I_C=50 mA, I_B= 5mA		0.3	V
Base-emitter saturation voltage	$V_{BE(sat)1}$	I_C= 10 mA, I_B= 1mA	0.65	0.85	V
	$V_{BE(sat)2}$	I_C= 50 mA, 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,Rg=1KΩ		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

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MAXIMUM RATINGS(T_a=25℃ unless otherwise noted)

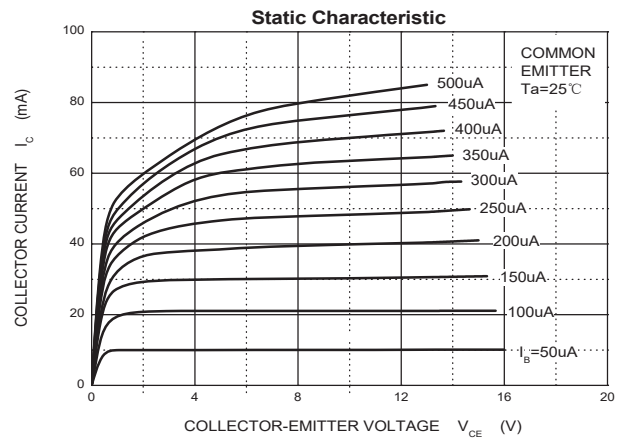
Symbol	Parameter	Value	Units
V_{CBO}	Collector-Base Voltage	-40	V
V_{CEO}	Collector-Emitter Voltage	-40	V
V_{EBO}	Emitter-Base Voltage	-5	V
I_C	Collector Current -Continuous	-0.2	A
P_C	Collector Power Dissipation	0.2	W
T_J,T_{stg}	Operation Junction and Storage Temperature Range	-55~+150	℃

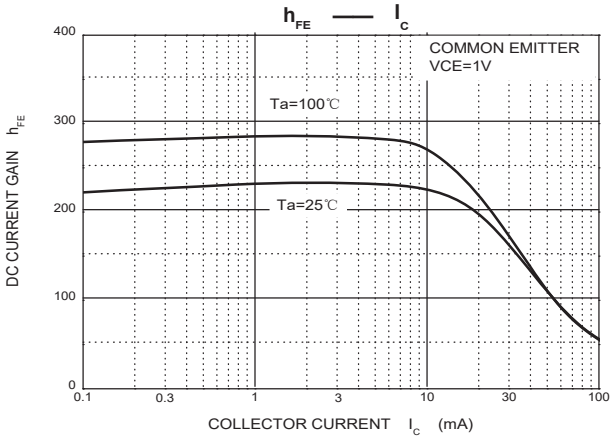
PNP 3906 ELECTRICAL CHARACTERISTICS (Ta=25℃ unless otherwise specified)

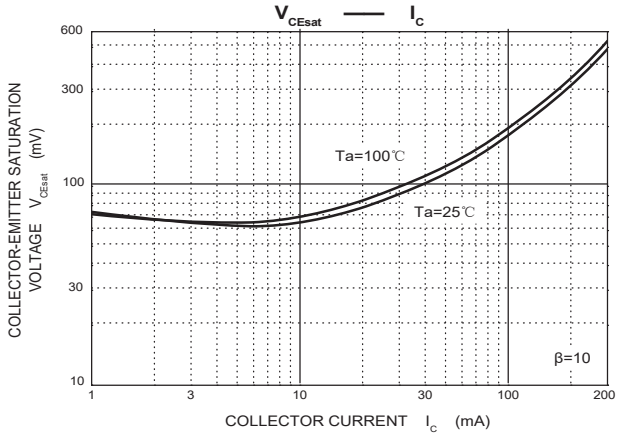
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	I_C=-10μA,I_E=0	-40			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	I_C=-1mA,I_B=0	-40			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	I_E=-10μA,I_C=0	-5			V
Collector cut-off current	I_{CBO}	V_{CB}=-30V,I_E=0			-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,Rg=1KΩ			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

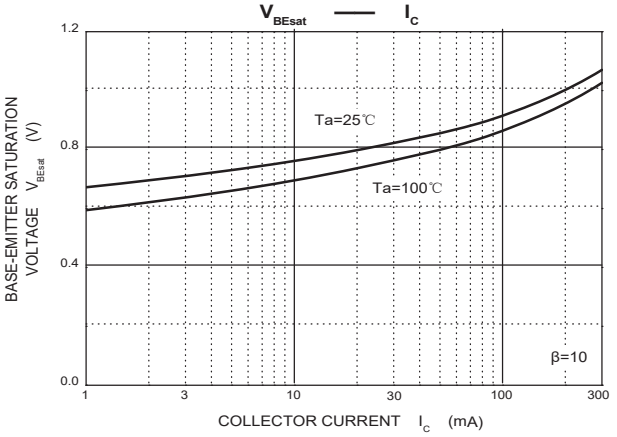
WPMtek

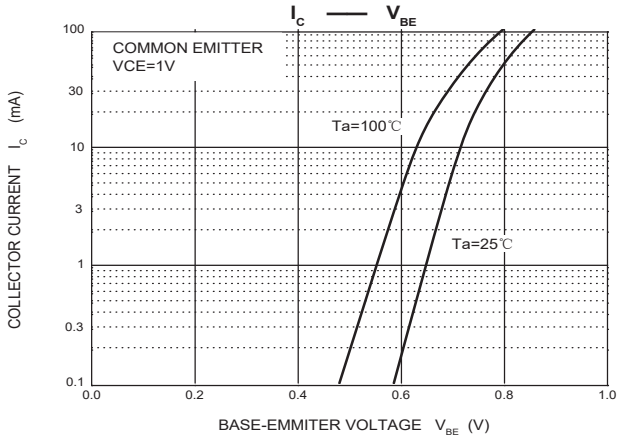
Typical Characteristics (NPN)

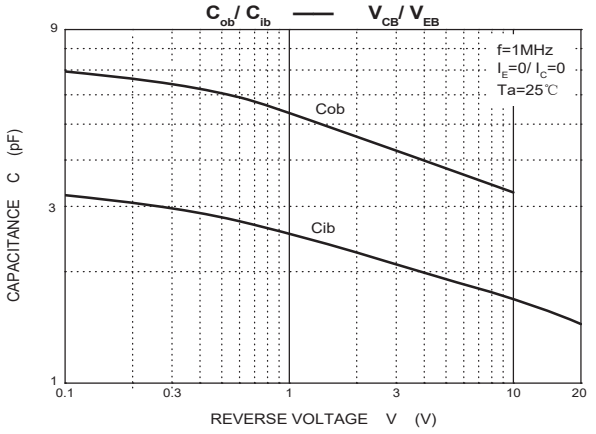


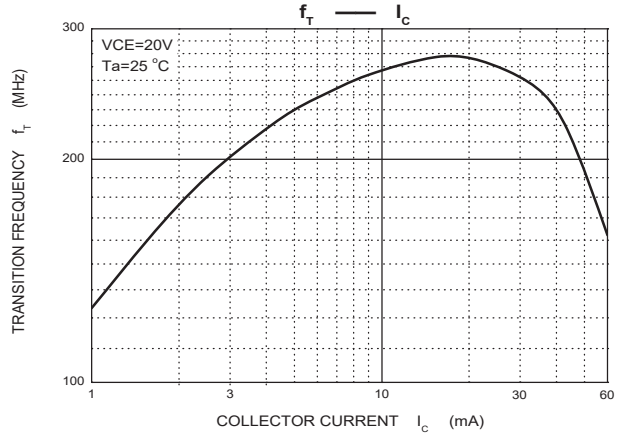


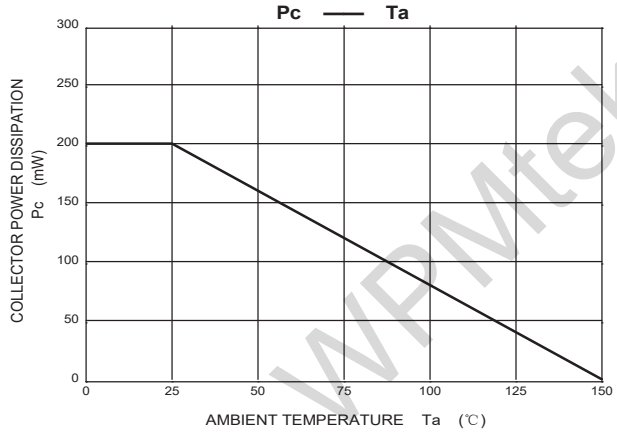






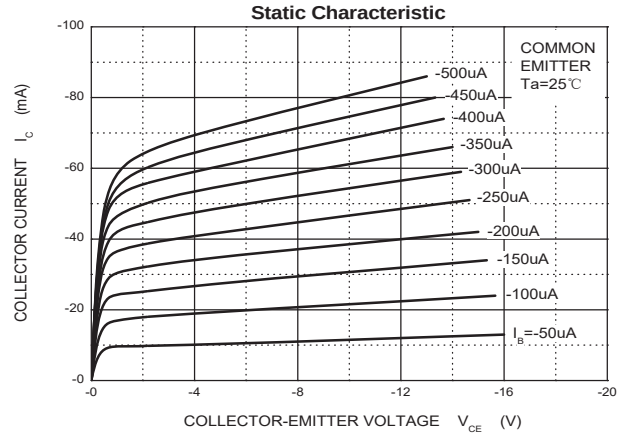


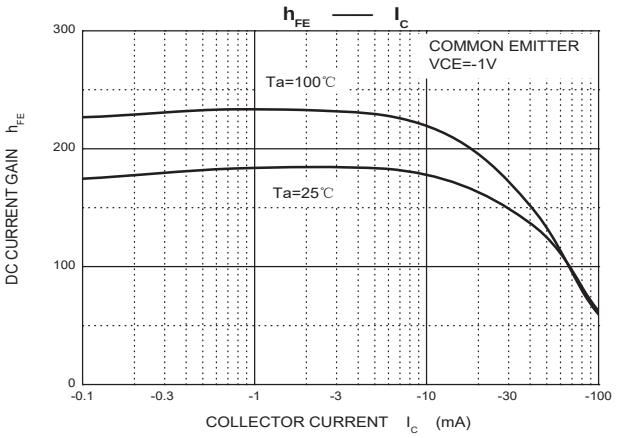


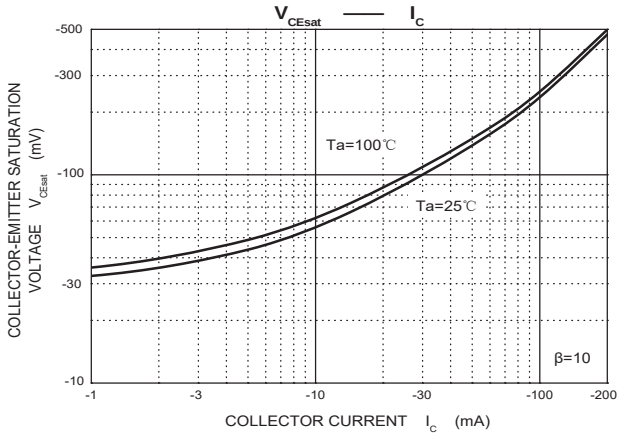


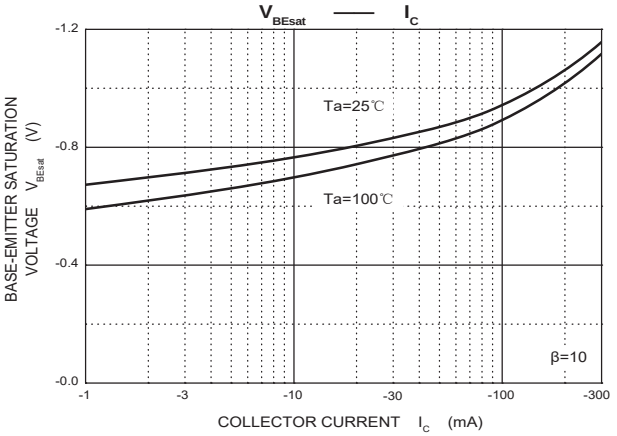
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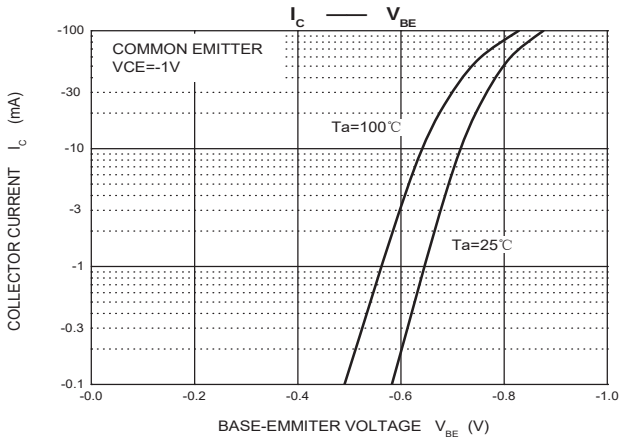
Typical Characteristics (PNP)

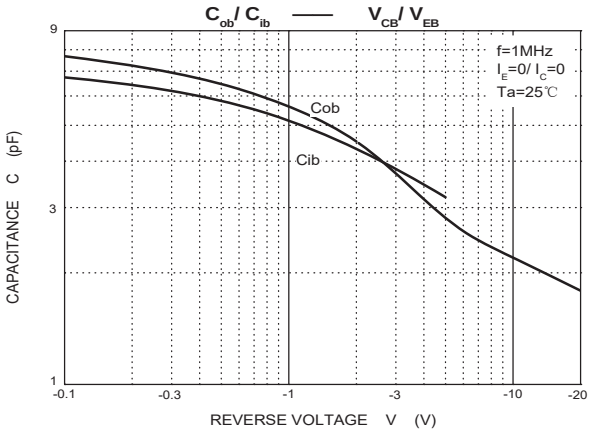


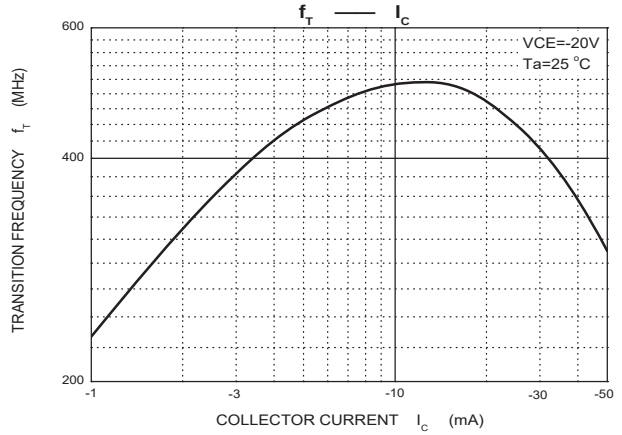


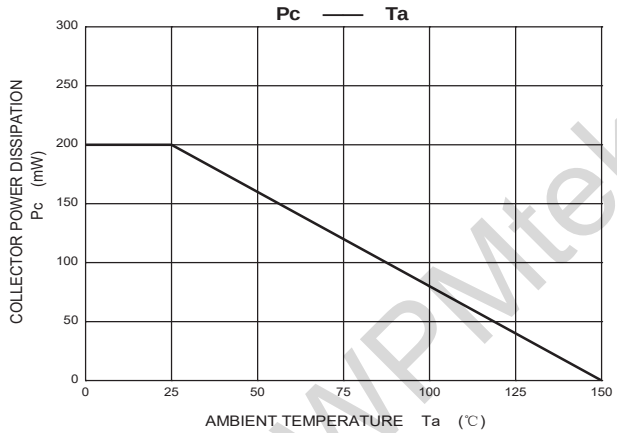






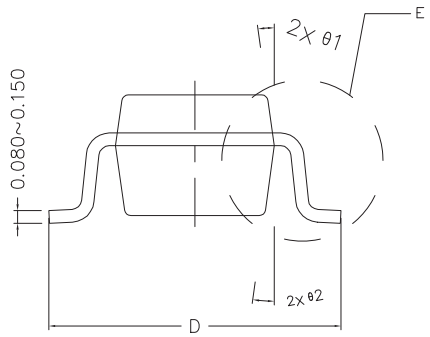




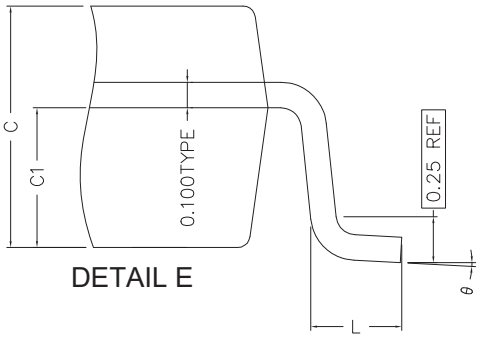


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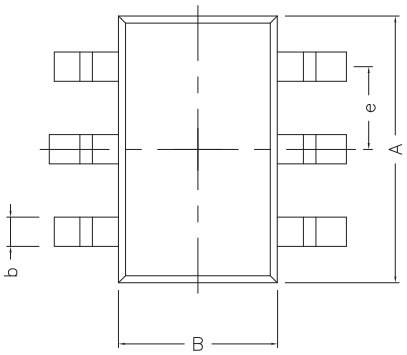
SOT-363 Package Outline Dimensions



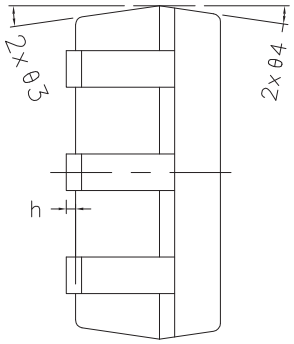
SIDE VIEW



DETAIL E



TOP VIEW



SIDE VIEW

COMMON DIMENSIONS (UNITS OF MEASURE IS mm)			
	MIN	NORMAL	MAX
A	2.000	2.100	2.200
B	1.150	1.250	1.350
C	0.900	0.950	1.000
C1	0.500	0.550	0.600
D	2.100	2.300	2.500
L	0.220	0.360	0.500
b	0.200	0.250	0.400
h	0.020	0.050	0.100
e	0.650 TYPE		
θ_1	8° TYPE		
θ_2	8° TYPE		
θ_3	8° TYPE		
θ_4	8° TYPE		
θ	0~8° TYPE		

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