MMDT3946

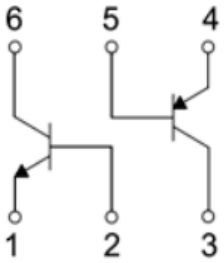
DUAL TRANSISTOR (NPN+PNP)

Features

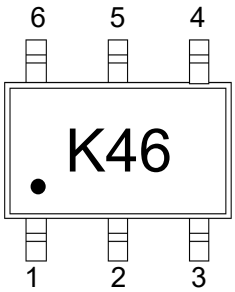
- Complementary Pair
- One 3904-Type NPN
  One 3906-Type PNP
- Epitaxial Planar Die Construction
- Ideal for Low Power Amplification and Switching



SOT-363 top view



Schematic diagram



K46: Device code

Solid dot = Pin1 indicator

Marking and pin assignment

Pb-Free RoHS Halogen-Free

Maximum Ratings(Ta=25℃ unless otherwise noted)

Symbol	Parameter	Value		Unit
		NPN	PNP	
V_{CBO}	Collector-Base Voltage	60	-40	V
V_{CEO}	Collector-Emitter Voltage	40	-40	V
V_{EBO}	Emitter-Base Voltage	5	-5	V
I_C	Collector Current	200	-200	mA
P_C	Collector Power Dissipation	200	200	mW
T_J,T_{stg}	Operation Junction and Storage Temperature Range	-55~+150	-55~+150	°C

Ordering Information (Example)

Type	Package	Marking	Minimum Package(pcs)	Inner Box Quantity(pcs)	Outer Carton Quantity(pcs)	Delivery Mode
MMDT3946	SOT-363	K46	3,000	45,000	180,000	7"reel

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

Symbol	Parameter	Condition	Min	Typ	Max	Unit
$V_{(BR)CBO}$	Collector-base breakdown voltage	I_C=10μA, I_E=0	60	--	--	V
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	I_C=1mA, I_B=0	40	--	--	V
$V_{(BR)EBO}$	Emitter-base breakdown voltage	I_E=10μA, I_C=0	5	--	--	V
I_{CBO}	Collector cut-off current	V_{CB}=30V , I_E=0V	--	--	50	nA
I_{CEO}	Collector cut-off current	V_{CE}=30V , I_B=0	--	--	500	nA
I_{EBO}	Emitter cut-off current	V_{EB}= 5V , I_C=0	--	--	50	nA
h_{FE}	DC current gain	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	--	--	
$V_{CE(sat)}$	Collector-emitter saturation voltage	I_C=10 mA, I_B= 1mA	--	--	0.2	V
		I_C=50 mA, I_B= 5mA	--	--	0.3	V
$V_{BE(sat)}$	Base-emitter saturation voltage	I_C=10 mA, I_B= 1mA	0.65	--	0.85	V
		I_C=50 mA, I_B= 5mA	--	--	0.95	V
f_T	Transition frequency	V_{CE}=20V, I_C= 20mA f=100MHz	300	--	--	MHz
NF	Noise figure	V_{CE}=5V,I_C=0.1mA f=1KHz,Rg=1K	--	--	4	dB
C_{ob}	Output capacitance	V_{CB}=5V,I_E=0,f=1MHz	--	--	4.5	pF
t_d	Delay time	V_{CC}=3V, V_{BE}=0.5V I_C=10mA,I_{B1}=-I_{B2}=1mA	--	--	35	ns
t_r	Rise time		--	--	35	ns
t_s	Storage time	V_{CC}=3V, I_C=10mA, I_{B1}= -I_{B2}=1mA	--	--	200	ns
t_f	Fall time		--	--	50	ns

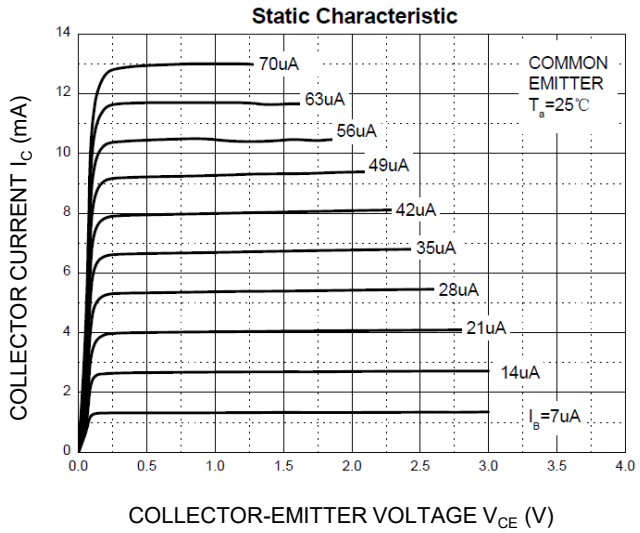
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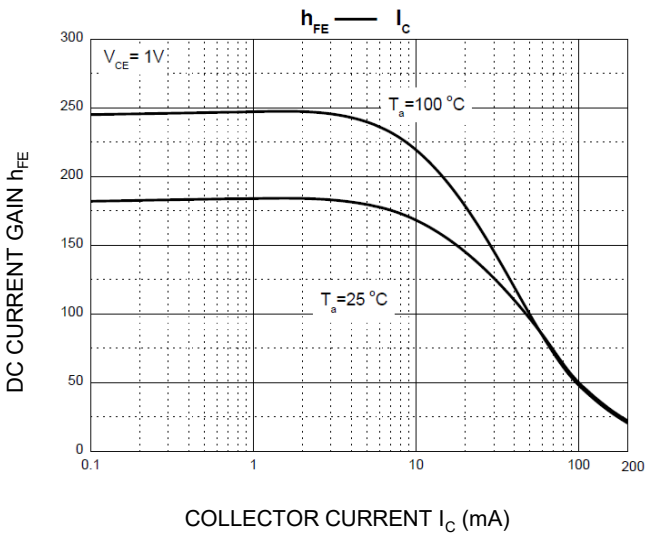
PNP 3906 Electrical Characteristics (TJ=25℃ unless otherwise noted)

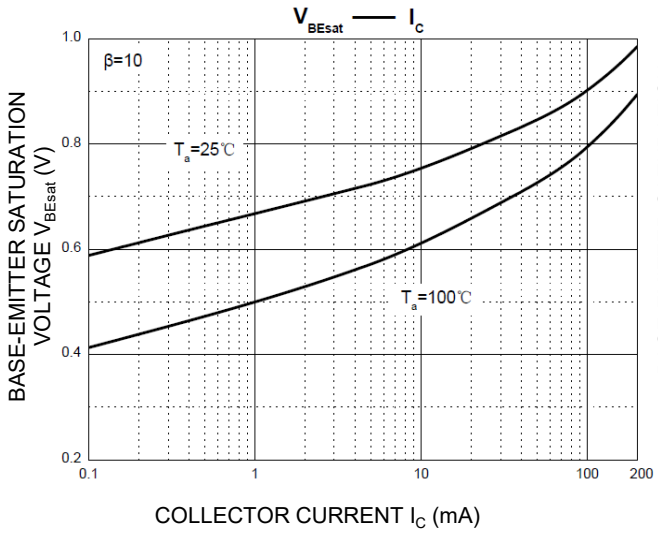
Symbol	Parameter	Condition	Min	Typ	Max	Unit
$V_{(BR)CBO}$	Collector-base breakdown voltage	I_C=-10μA, I_E=0	-40	--	--	V
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	I_C=-1mA, I_B=0	-40	--	--	V
$V_{(BR)EBO}$	Emitter-base breakdown voltage	I_E=-10μA, I_C=0	-5	--	--	V
I_{CBO}	Collector cut-off current	V_{CB}=-30 V , I_E=0	--	--	-50	nA
I_{EBO}	Base cut-off current	V_{EB}= -5V , I_C=0	--	--	-50	nA
h_{FE}	DC current gain	V_{CE}=-1V, I_C=-0.1mA	60	--	--	
		V_{CE}=-1V, I_C=-1mA	80	--	--	
		V_{CE}=-1V, I_C=-10mA	100	--	300	
		V_{CE}=-1V, I_C=-50mA	60	--	--	
		V_{CE}=-1V, I_C=-100mA	30	--	--	
$V_{CE(sat)}$	Collector-emitter saturation voltage	I_C=-10 mA, I_B=-1mA	--	--	-0.25	V
		I_C=-50 mA, I_B=-5mA	--	--	-0.4	V
$V_{BE(sat)}$	Base-emitter saturation voltage	I_C=-10 mA, I_B=-1mA	-0.65	--	-0.85	V
		I_C=-50 mA, I_B=-5mA	--	--	-0.95	V
f_T	Transition frequency	V_{CE}=-20V,I_C=-10mA,f=100MHz	250	--	--	MHz
NF	Noise figure	V_{CE}=-5V,I_C=-0.1mA f=1KHz,Rg=1K	--	--	4.5	dB
C_{ob}	Output capacitance	V_{CB}=-5V,I_E=0,f=1MHz	--	--	4	pF
t_d	Delay time	V_{CC}=-3V,I_C=-10mA V_{BE}=-0.5V,I_{B1}=I_{B2}=-1mA	--	--	35	ns
t_r	Rise time		--	--	35	ns
t_s	Storage time	V_{CC}=-3V,I_C=-10mA I_{B1}=- I_{B2}=- 1mA	--	--	225	ns
t_f	Fall time		--	--	75	ns

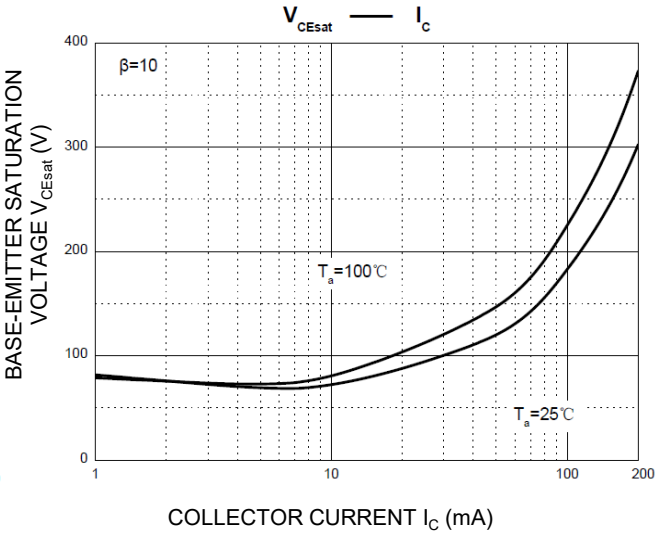
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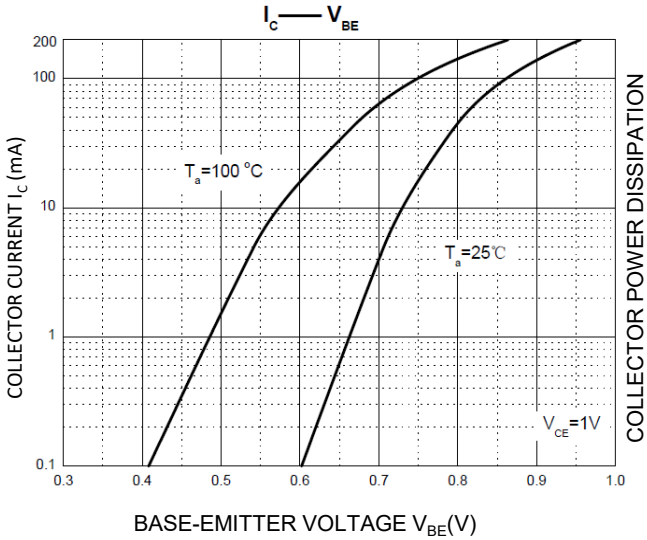
NPN 3904 Typical Operating Characteristics

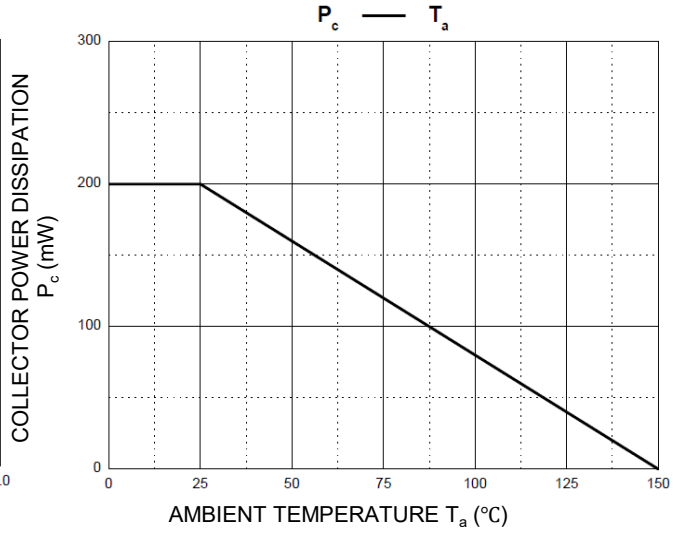






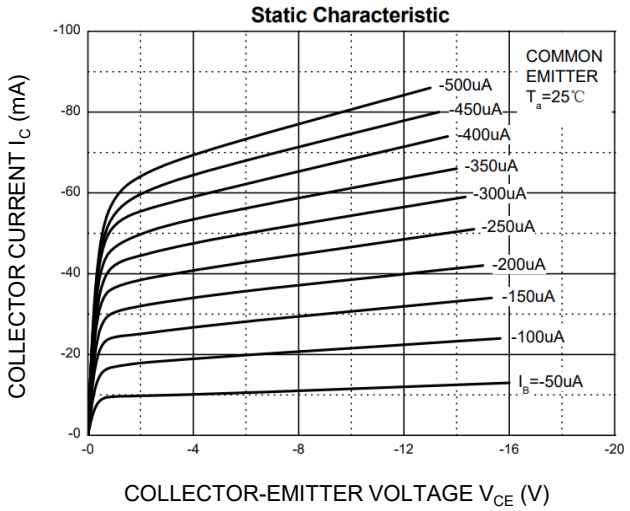


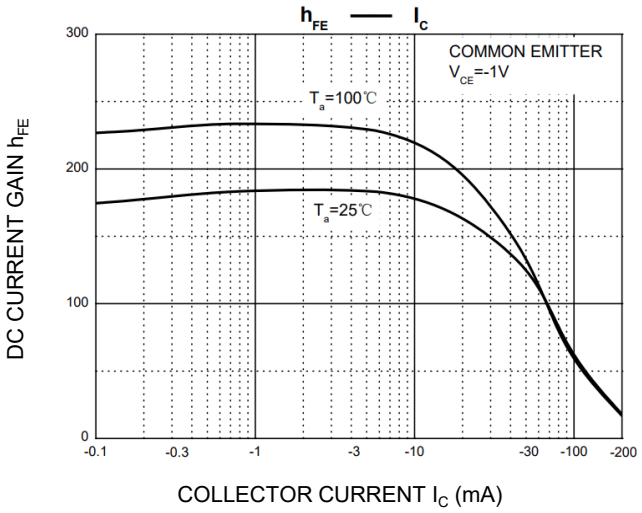


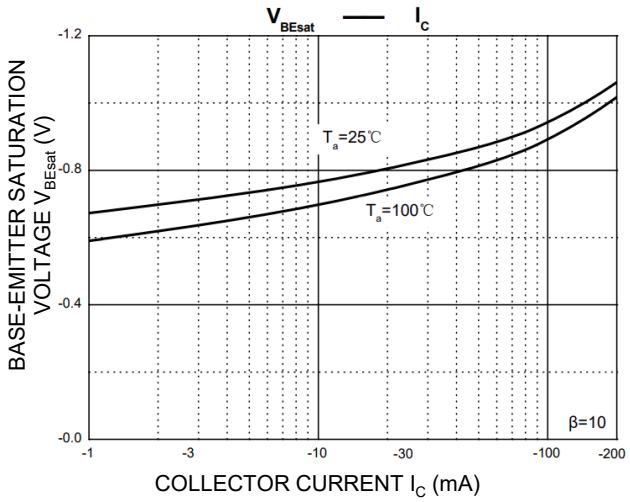


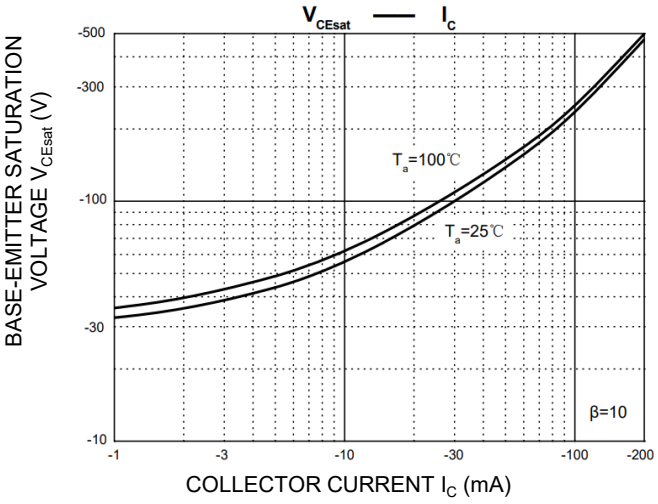
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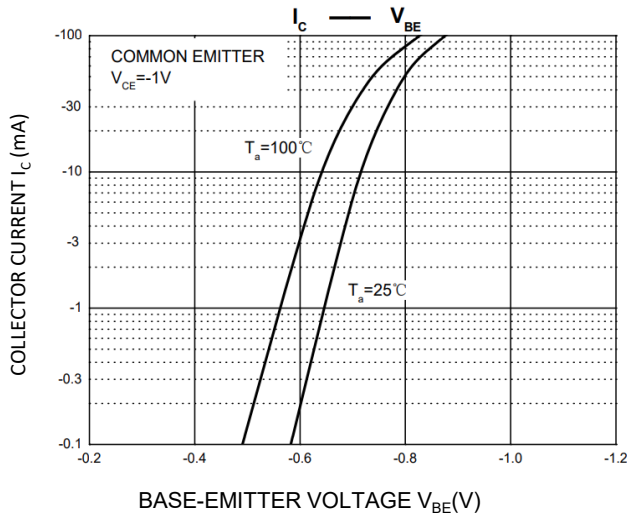
PNP 3906 Typical Operating Characteristics

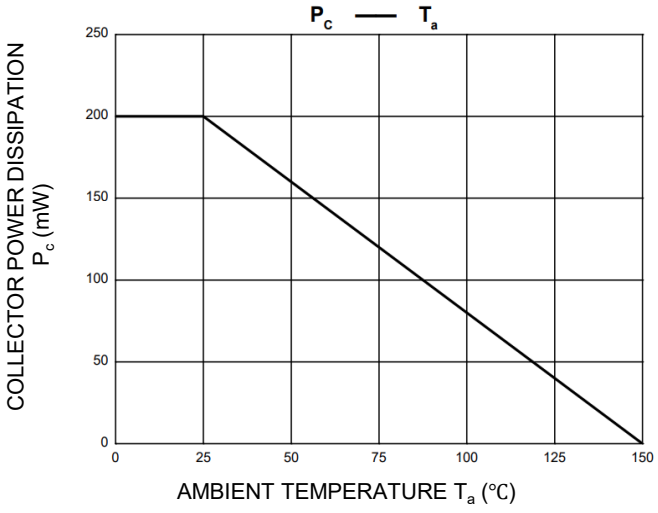






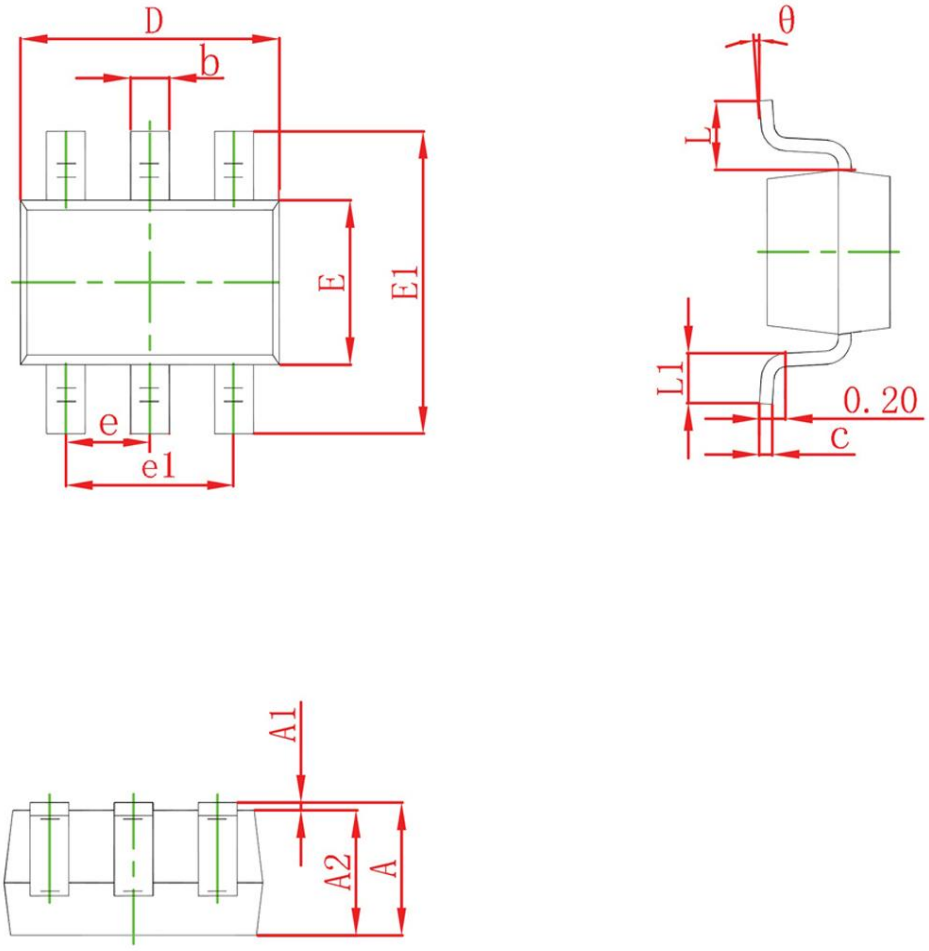






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SOT-363 Package information



Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.100	0.150	0.004	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.400	0.085	0.094
e	0.650TYP		0.026TYP	
e1	1.200	1.400	0.047	0.055
L	0.525REF		0.021REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

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