



Features

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

Package Marking and Ordering Information

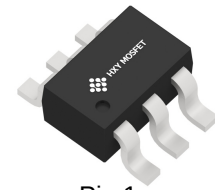
Product ID	Pack	Marking	Qty(PCS)
MMDT3946-7-F	SOT-363	K46	3000

Maximum Ratings (Ta=25°C unless otherwise noted)

Symbol	Parameter	Value	Unit
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	200	mA
P_C	Collector Power Dissipation	200	mW
$R_{\theta JA}$	Thermal Resistance From Junction To Ambient	625	°C/W
T_J, T_{stg}	Operation Junction And Storage Temperature Range	-55~+150	°C

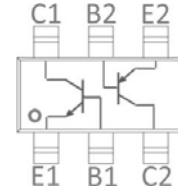
NPN 3904 Electrical Characteristics (Ta=25°C unless otherwise noted)

Symbol	Parameter	Test conditions	Min	Typ	Max	Unit
$V_{(BR)CBO}$	Collector-base breakdown voltage	$I_C=10\mu A, I_E=0$	60			V
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	$I_C=1mA, I_B=0$	40			V
$V_{(BR)EBO}$	Emitter-base breakdown voltage	$I_E=10\mu A, I_C=0$	5			V
I_{CEO}	Collector cut-off current	$V_{CE}=30V, I_B=0$			50	nA
I_{CBO}	Collector cut-off current	$V_{CB}=30V, I_E=0$			50	nA
I_{EBO}	Emitter cut-off current	$V_{EB}=5V, I_C=0$			50	nA
$h_{FE(1)}$	DC current gain(1)	$V_{CE}=1V, I_C=100\mu A$	40			
$h_{FE(2)}$	DC current gain(2)	$V_{CE}=1V, I_C=1mA$	70			
$h_{FE(3)}$	DC current gain(3)	$V_{CE}=1V, I_C=10mA$	100		300	
$h_{FE(4)}$	DC current gain(4)	$V_{CE}=1V, I_C=50mA$	60			
$h_{FE(5)}$	DC current gain(5)	$V_{CE}=1V, I_C=100mA$	30			
$V_{CE(sat)}$	Collector-emitter saturation voltage	$I_C=10mA, I_B=1mA$			0.2	V
		$I_C=50mA, I_B=5mA$			0.3	V
$V_{BE(sat)}$	Base-emitter saturation voltage	$I_C=10mA, I_B=1mA$	0.65		0.85	V
		$I_C=50mA, I_B=5mA$			0.95	V
f_T	Transition frequency	$V_{CE}=20V, I_C=10mA, f=100MHz$	300			MHz
C_{ob}	Collector output capacitance	$V_{CB}=5V, I_E=0, f=1MHz$			4	pF
NF	Noise figure	$V_{CE}=5V, I_C=0.1mA, f=1kHz, R_g=1K\Omega$			5	dB
t_d	Delay time	$V_{CC}=3V, V_{BE(off)}=0.5V, I_C=10mA, I_{B1}=I_{B2}=1mA$			35	ns
t_r	Rise time				35	ns
t_s	Storage time	$V_{CC}=3V, I_C=10mA, I_{B1}=I_{B2}=1mA$			225	ns
t_f	Fall time				75	ns



Pin 1

SOT-363



Pin 1



Maximum Ratings (Ta=25°C unless otherwise noted)

Symbol	Parameter	Value	Unit
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	-200	mA
P _C	Collector Power Dissipation	200	mW
R _{ΘJA}	Thermal Resistance From Junction To Ambient	625	°C/W
T _J , T _{stg}	Operation Junction And Storage Temperature Range	-55~+150	°C

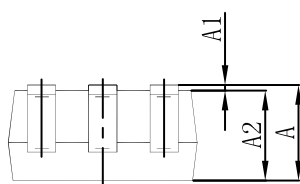
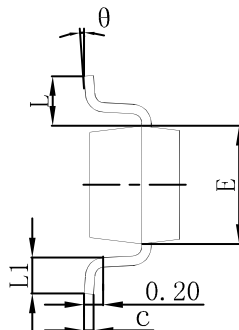
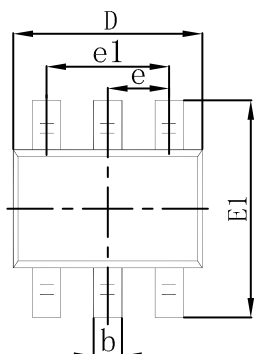
PNP 3906 Electrical Characteristics (Ta=25°C unless otherwise noted)

Symbol	Parameter	Test conditions	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 _{CEX} *	Collector cut-off current	V _{CE} =-30V, V _{EB(off)} =-3V			-50	nA
I _{CBO}	Collector cut-off current	V _{CB} =-30V, I _E =0			-50	nA
I _{EBO}	Base cut-off current	V _{EB} =-5V, I _E =0			-50	nA
h _{FE(1)} *	DC current gain(1)	V _{CE} =-1V, I _C =-100μA	60			
h _{FE(2)} *	DC current gain(2)	V _{CE} =-1V, I _C =-1mA	80			
h _{FE(3)} *	DC current gain(3)	V _{CE} =-1V, I _C =-10mA	100		300	
h _{FE(4)} *	DC current gain(4)	V _{CE} =-1V, I _C =-50mA	60			
h _{FE(5)} *	DC current gain(5)	V _{CE} =-1V, I _C =-100mA	30			
V _{CE(sat)} *	Collector-emitter saturation voltage	I _C =-10mA, I _B =-1mA			-0.25	V
		I _C =-50mA, I _B =-5mA			-0.4	V
V _{BE(sat)} *	Base-emitter saturation voltage	I _C =-10mA, I _B =-1mA	-0.65		-0.85	V
		I _C =-50mA, I _B =-5mA			-0.95	V
f _T	Transition frequency	V _{CE} =-20V, I _C =-10mA, f=100MHz	250			MHz
C _{ob}	Collector output capacitance	V _{CB} =-5V, I _E =0, f=1MHz			4.5	pF
NF	Noise figure	V _{CE} =-5V, I _C =-0.1mA, f=1kHz, R _g =1KΩ			4	dB
t _d	Delay time	V _{CC} =-3V, V _{BE(off)} =-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			225	ns
t _f	Fall time				75	ns

*Pulse test: pulse width ≤300μs, duty cycles ≤ 2.0%.

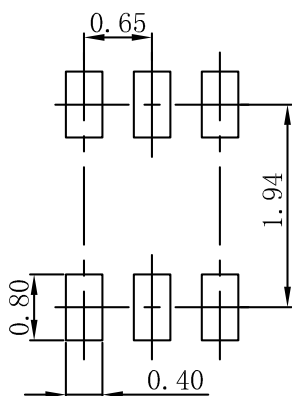


SOT-363 Package Outline Dimensions



Symbol	Dimensions In Millimeters		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	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
theta	0°	8°	0°	8°

SOT-363 Suggested Pad Layout



Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.



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