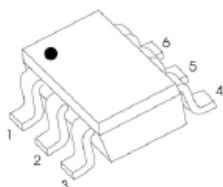
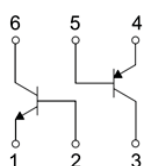


FEATURES

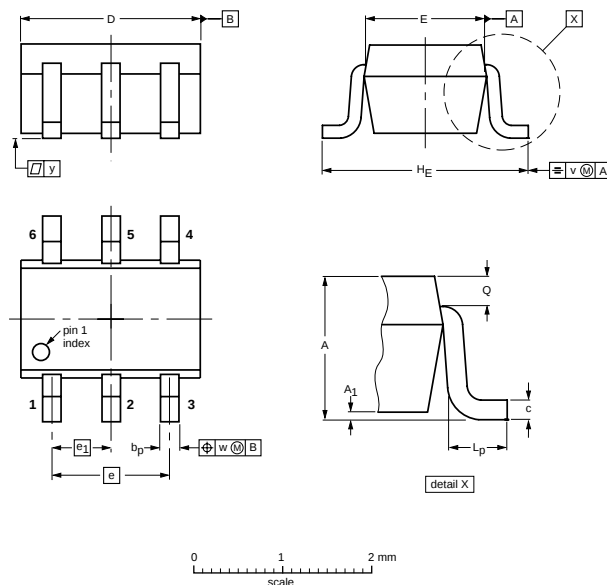
Complementary Pair
One 3904-Type NPN
One 3906-Type PNP
Epitaxial Planar Die Construction
Ideal for Low Power Amplification and Switching

MAKING: K 46



SOT-363

SOT-363



DIMENSIONS (mm are the original dimensions)

UNIT	A	A1 max	bp	c	D	E	e	e1	HE	Lp	Q	v	w	y
mm	1.1 0.8	0.1	0.30 0.20	0.25 0.10	2.2 1.8	1.35 1.15	1.3	0.65	2.2 2.0	0.45 0.15	0.25 0.15	0.2	0.2	0.1

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	Junction Temperature	150	$^{\circ}C$
T_{stg}	Storage Temperature	-55-150	$^{\circ}C$

MMDT3946DW

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	$h_{FE(1)}$	$V_{CE} = 1V, I_C = 1mA$	70	300	
	$h_{FE(2)}$	$V_{CE} = 1V, I_C = 10mA$	100		
	$h_{FE(3)}$	$V_{CE} = 1V, I_C = 50mA$	60		
	$h_{FE(4)}$	$V_{CE} = 1V, I_C = 100mA$	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

MMDT3946DW

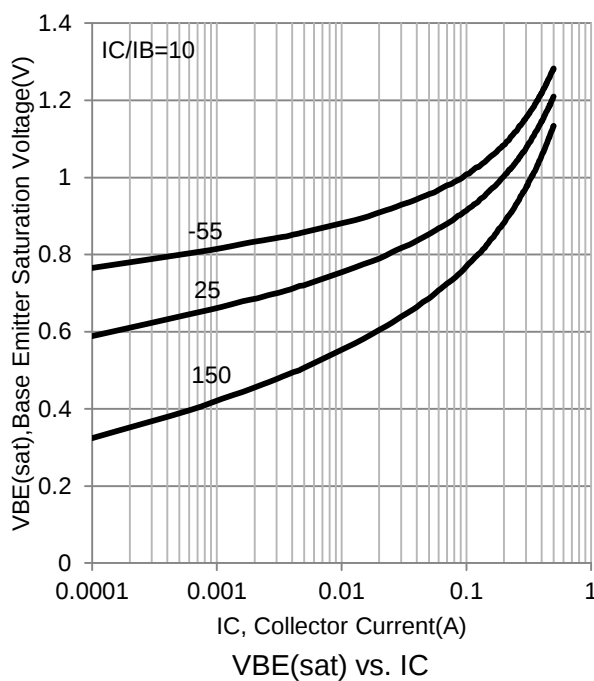
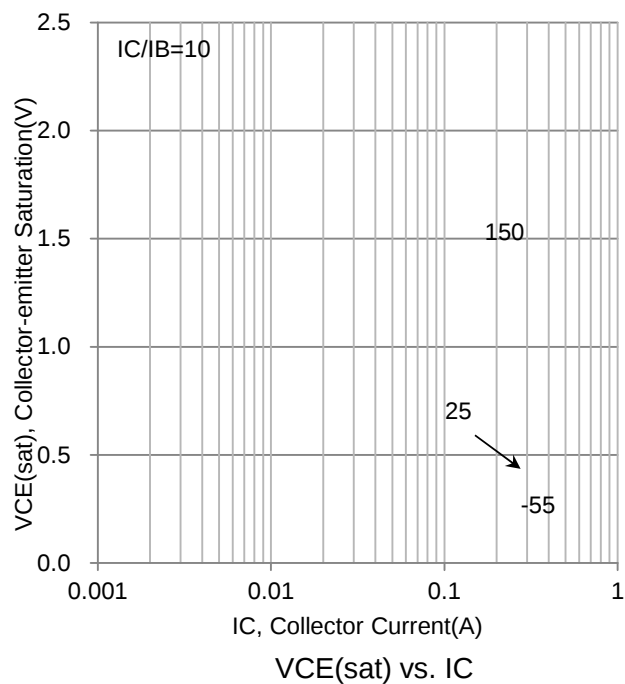
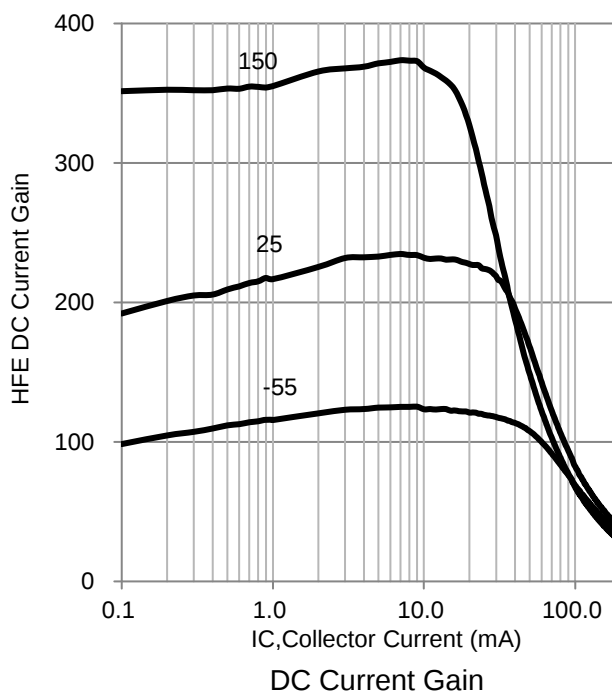
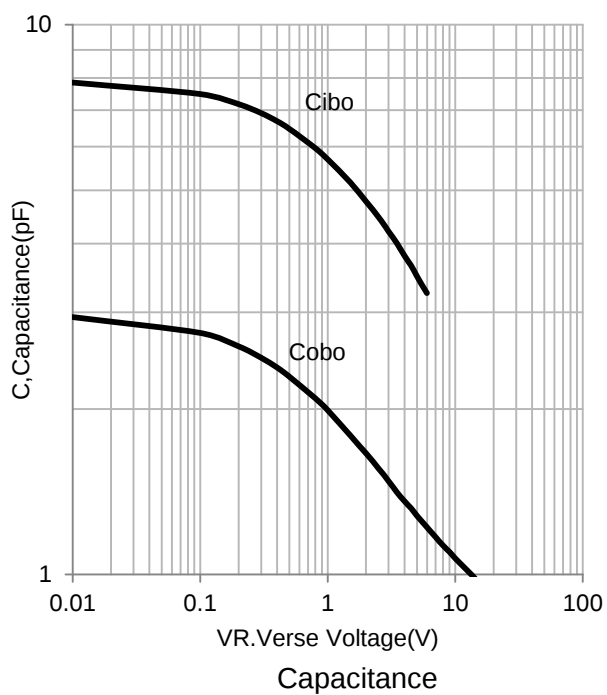
MAXIMUM RATINGS($T_a=25^{\circ}\text{C}$ unless otherwise noted)

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	$^{\circ}\text{C}$
T_{stg}	Storage Temperature	-55-150	$^{\circ}\text{C}$

PNP 3906 ELECTRICAL CHARACTERISTICS ($T_a=25^{\circ}\text{C}$ unless otherwise specified)

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

MMBT3904 Typical Characteristics



MMBT3906 Typical Characteristics

