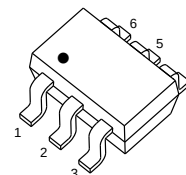
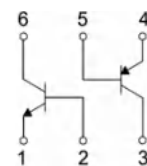




MMDT3946DW DUAL TRANSISTOR (NPN+PNP)

FEATURES

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



MAKING: K 46

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

SOT-363

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

NPN 3904 ELECTRICAL CHARACTERISTICS ($T_a=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Test conditions	Min	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C = 10\mu\text{A}$, $I_E = 0$	60		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
Collector cut-off current	I_{CEO}	$V_{CE} = 30\text{V}$, $I_B = 0$		0.5	μA
Emitter cut-off current	I_{EBO}	$V_{EB} = 5\text{V}$, $I_C = 0$		0.05	μA
DC current gain	$h_{FE(1)}$	$V_{CE} = 1\text{V}$, $I_C = 1\text{mA}$	70	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	$V_{CE(sat)1}$	$I_C = 10\text{mA}$, $I_B = 1\text{mA}$		0.2	V
	$V_{CE(sat)2}$	$I_C = 50\text{mA}$, $I_B = 5\text{mA}$		0.3	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	$V_{CE} = 20\text{V}$, $I_C = 20\text{mA}$, $f = 100\text{MHz}$	300		MHz
Noise figure	NF	$V_{CE} = 5\text{V}$, $I_C = 0.1\text{mA}$, $f = 1\text{KHz}$, $R_g = 1\text{K}\Omega$		5	dB
Output capacitance	C_{ob}	$V_{CB} = 5\text{V}$, $I_E = 0$, $f = 1\text{MHz}$		4	pF
Delay time	t_d	$V_{CC} = 3\text{V}$, $V_{BE} = 0.5\text{V}$ $I_C = 10\text{mA}$, $I_{B1} = -I_{B2} = 1\text{mA}$		35	nS
Rise time	t_r			35	nS
Storage time	t_s	$V_{CC} = 3\text{V}$, $I_C = 10\text{mA}$		200	nS
Fall time	t_f	$I_{B1} = -I_{B2} = 1\text{mA}$		50	nS



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

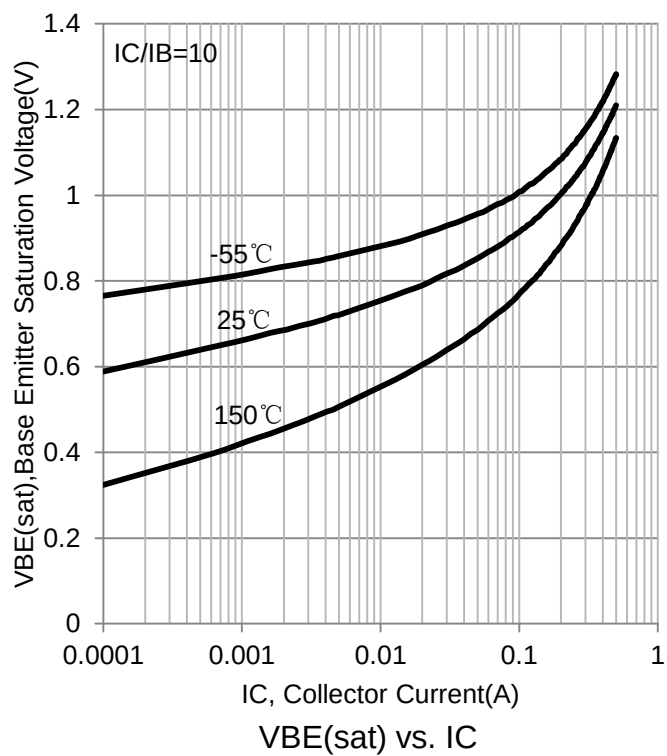
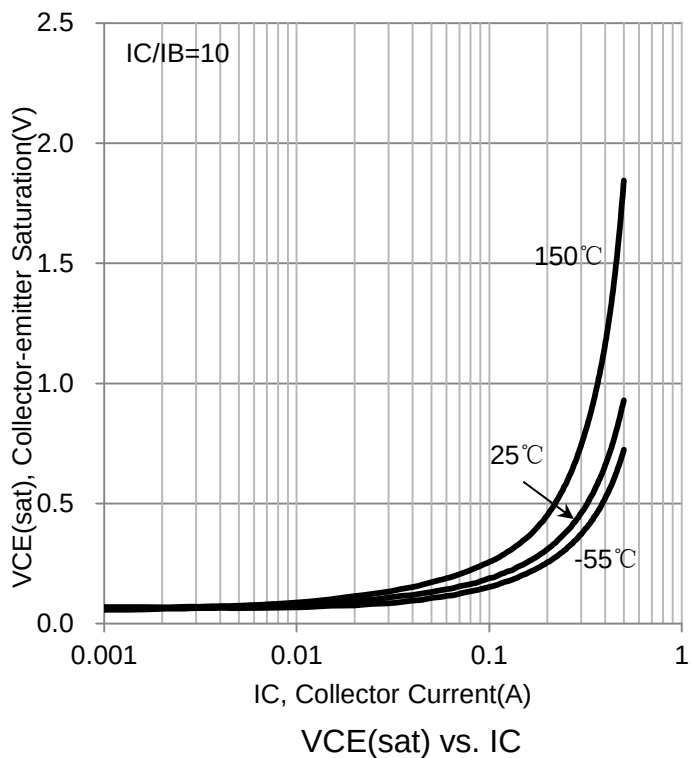
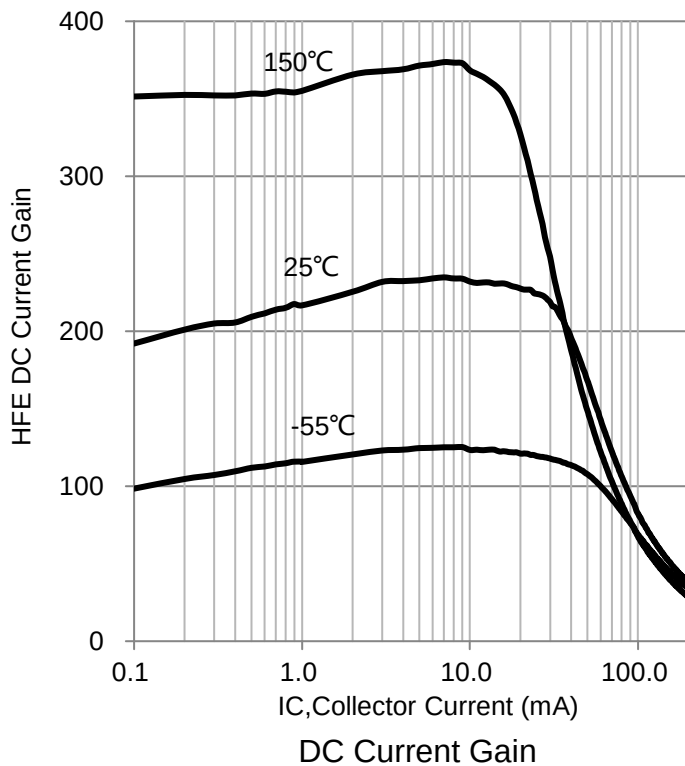
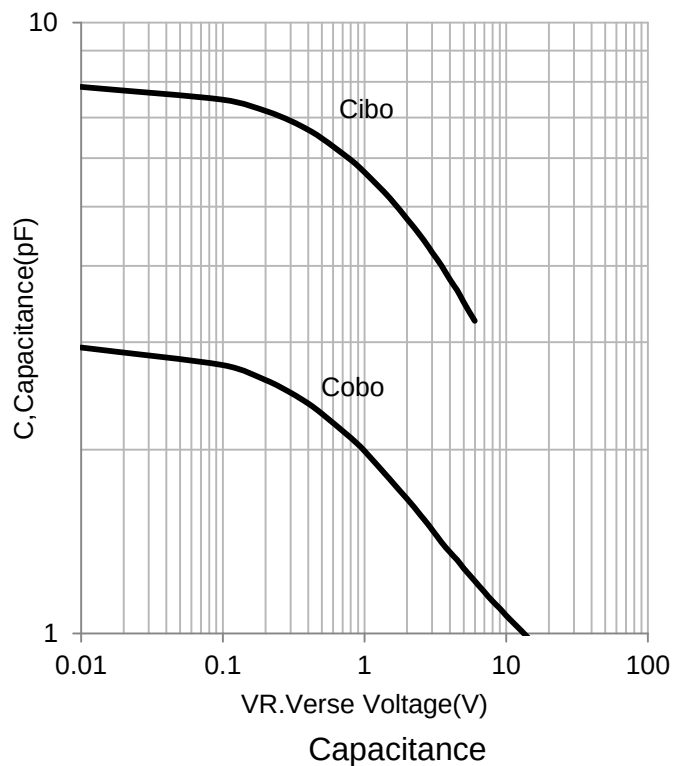
Symbol	Parameter	Value	Units
V_{CBO}	Collector-Base Voltage	-40	V
V_{CEO}	Collector-Emitter Voltage	-40	V
V_{EBO}	Emitter-Base Voltage	-5	V
I_C	Collector Current -Continuous	-0.2	A
P_C	Collector Power Dissipation	0.2	W
T_J	Junction Temperature	150	$^{\circ}\text{C}$
T_{stg}	Storage Temperature	-55-150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

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	$V_{CC}=-3\text{V}, V_{BE}=-0.5\text{V}$ $I_C=-10\text{mA}, I_{B1}=-I_{B2}=-1\text{mA}$			35	nS
Rise time	t_r				35	nS
Storage time	t_s	$V_{CC}=-3\text{V}, I_C=-10\text{mA}$ $I_{B1}=-I_{B2}=-1\text{mA}$			225	nS
Fall time	t_f				75	nS

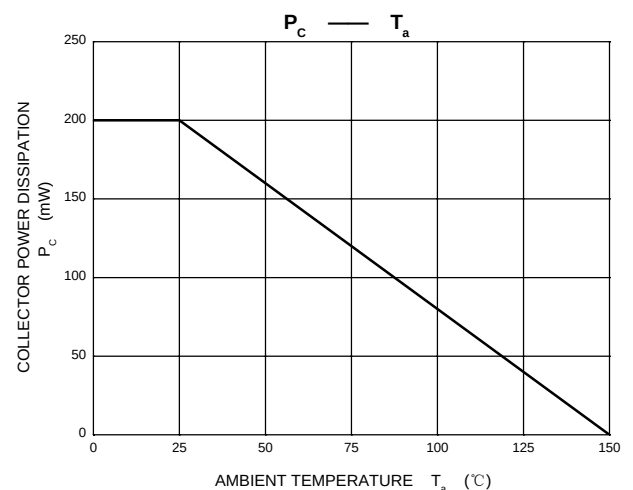
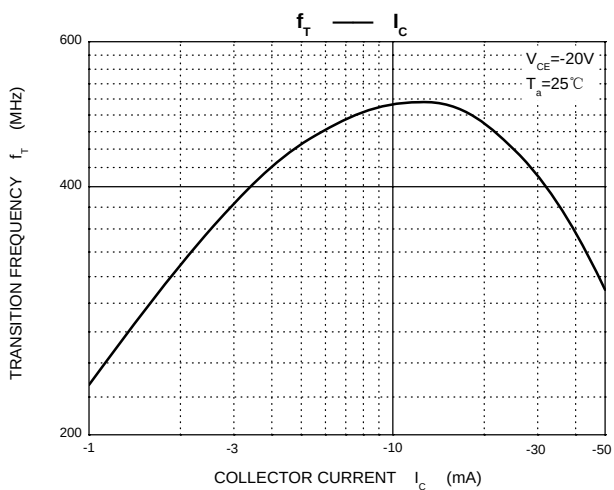
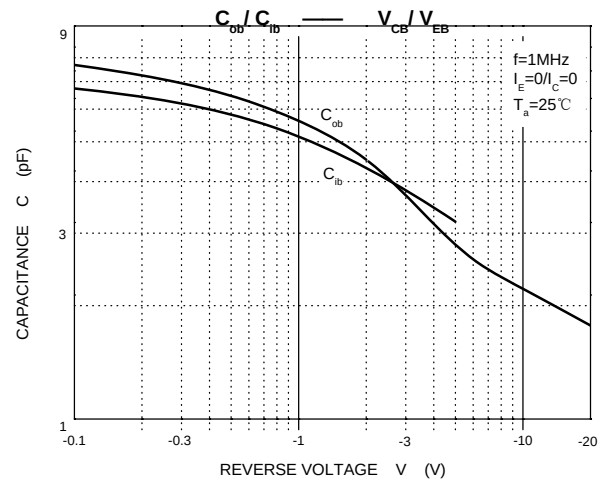
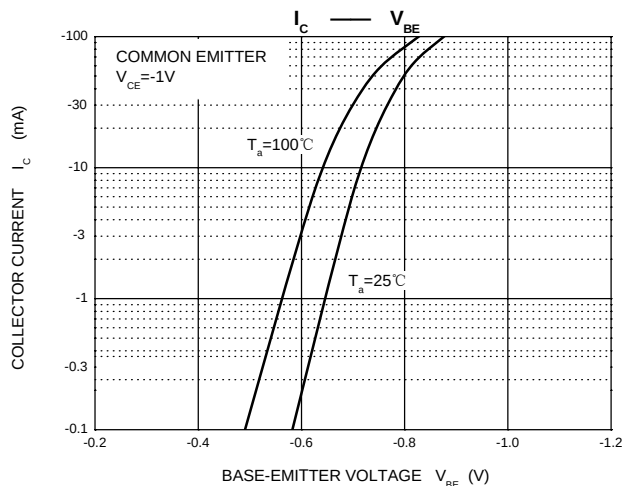
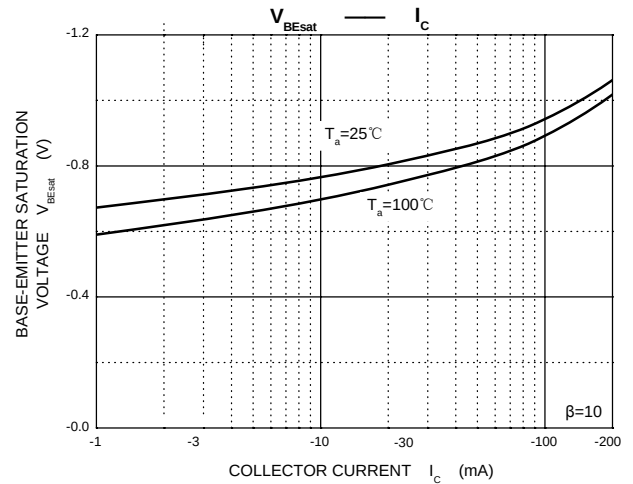
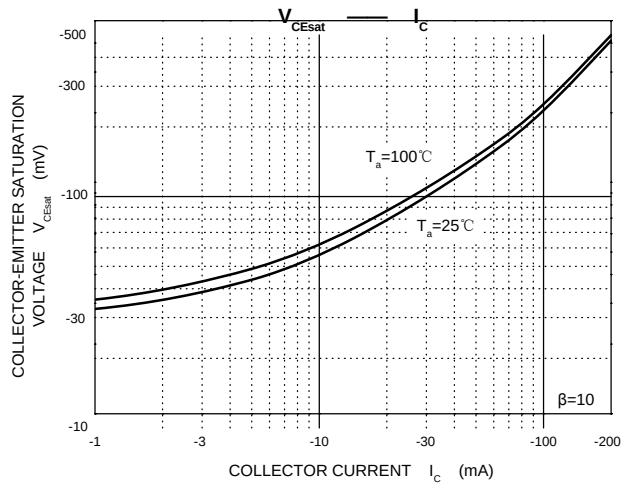
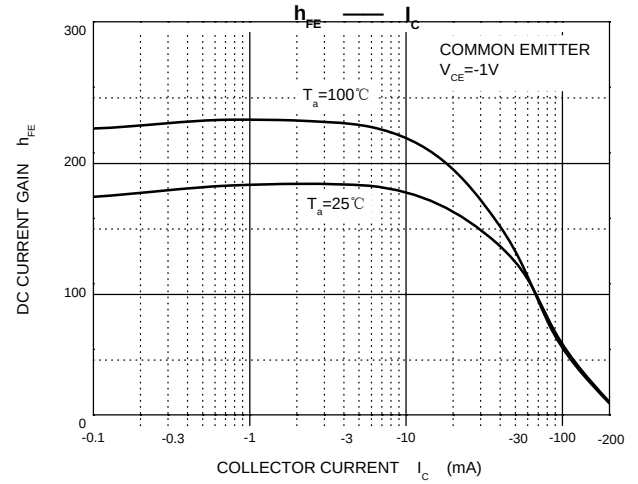
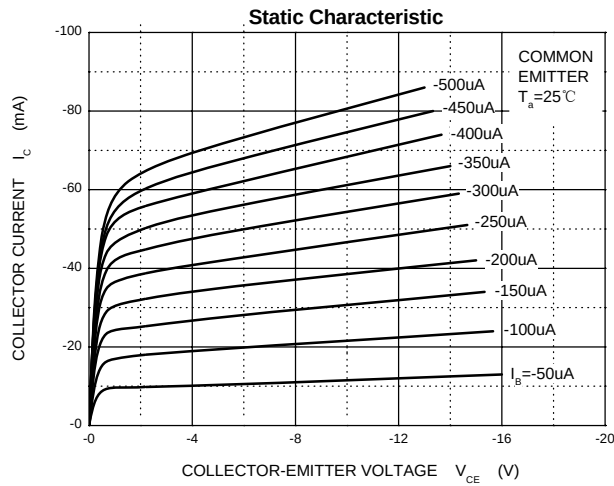


MMBT3904 Typical Characteristics



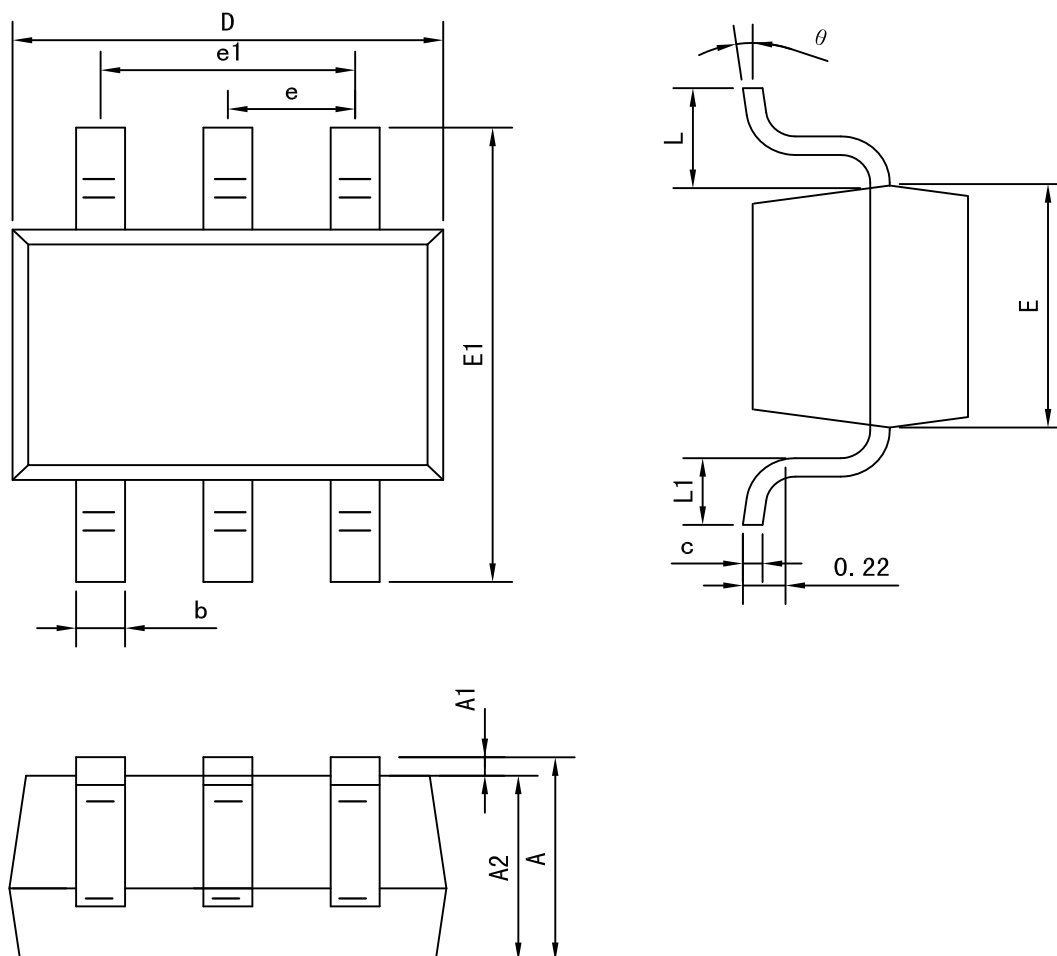


MMBT3906 Typical Characteristics





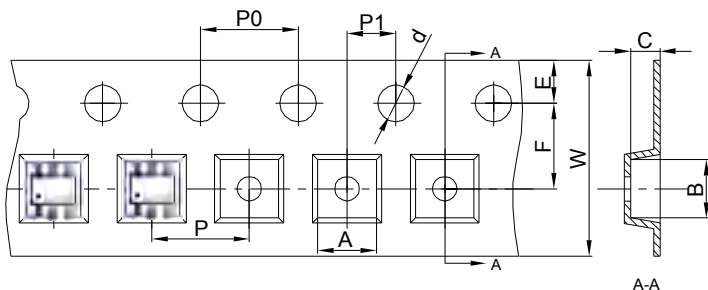
SOT-363 Package outline dimensions



Symbol	Dimension in Millimeters	
	Min	Max
A	0.900	1.100
A1	0.000	0.100
A2	0.900	1.000
b	0.150	0.350
c	0.080	0.150
D	2.000	2.200
E	1.150	1.350
E1	2.150	2.450
e	0.650 TYP	
e1	1.200	1.400
L	0.525 REF	
L1	0.260	0.460
θ	0°	8°



SOT-363 Embossed Carrier Tape



Packaging Description:

SOT-363 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 7" or 17.8cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
SOT-363	2.25	2.55	1.20	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00

SOT-363 Tape Leader and Trailer

