

**WBFBP-03E Plastic-Encapsulate Transistors**

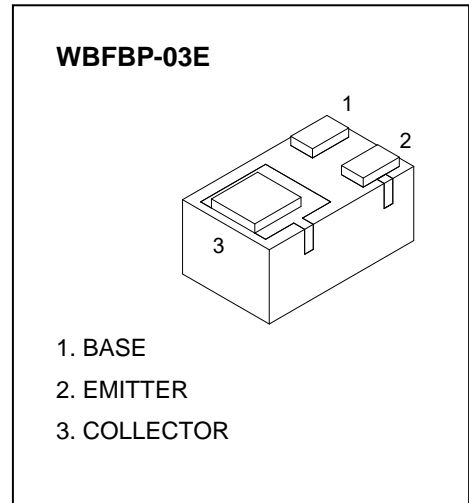
**TK3906LED03** TRANSISTOR (PNP)

**FEATURE**

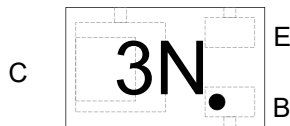
- Ultra Small SMD Plastic Package
- Epitaxial Planar Die Construction
- Complementary to TK3904LED03
- Available in Lead Free Version

**APPLICATION**

- General-Purpose Amplification and Switching Transistor for Portable Equipment :( i.e. Mobile phone, MP3, MD, CD-ROM, DVD-ROM, Note book PC, etc.)



**MARKING: 3N**



Top View

**MAXIMUM RATINGS (T<sub>a</sub>=25°C unless otherwise noted)**

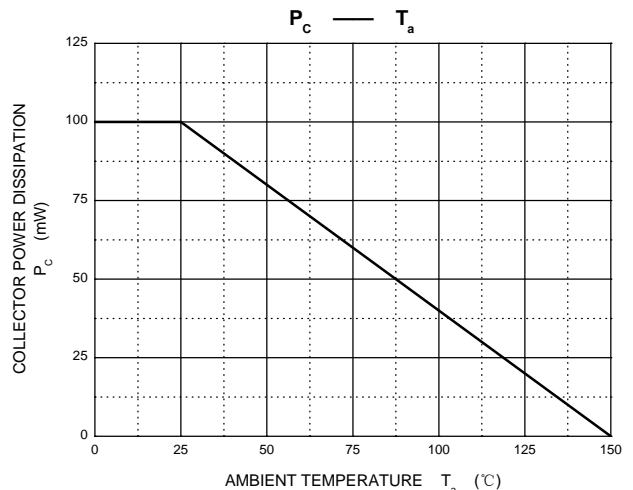
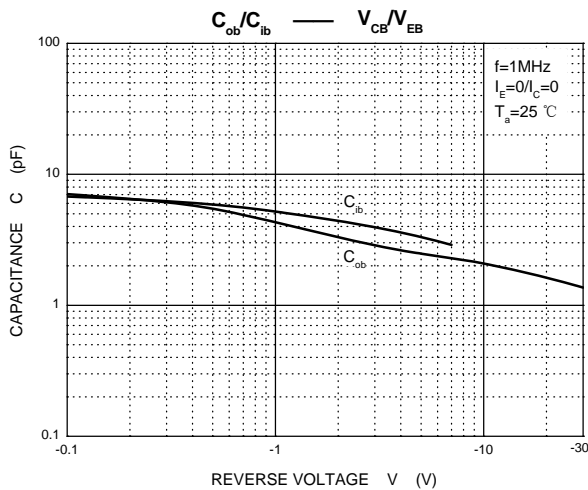
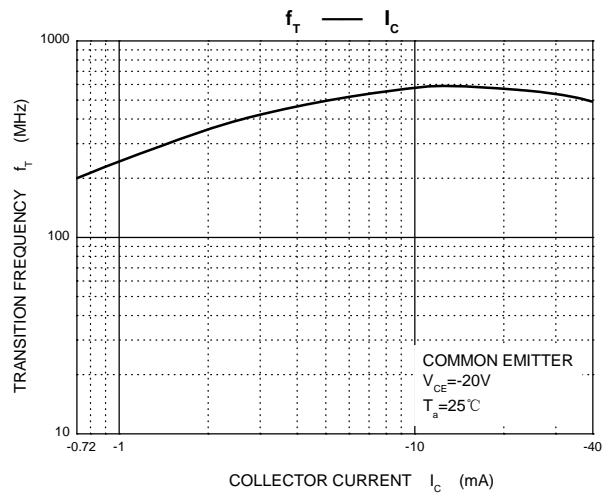
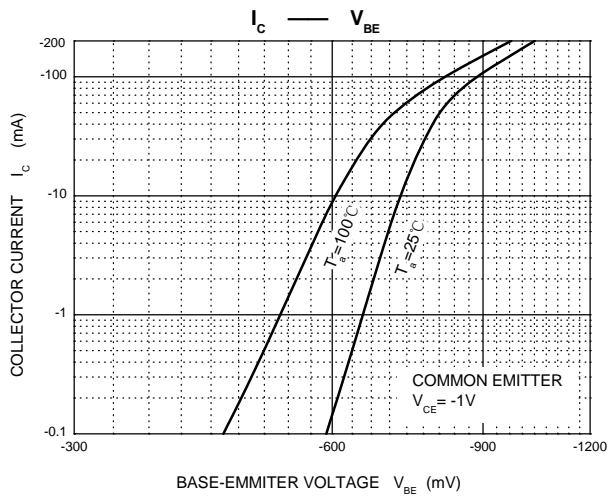
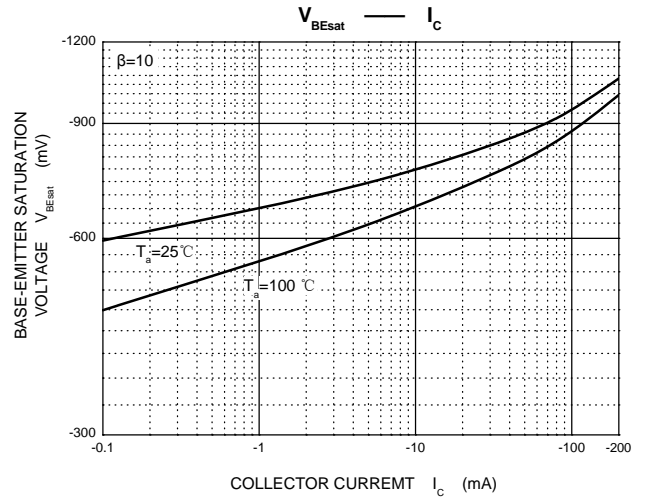
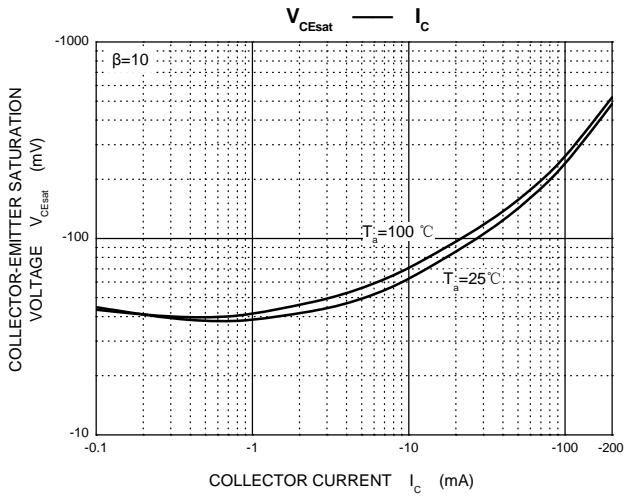
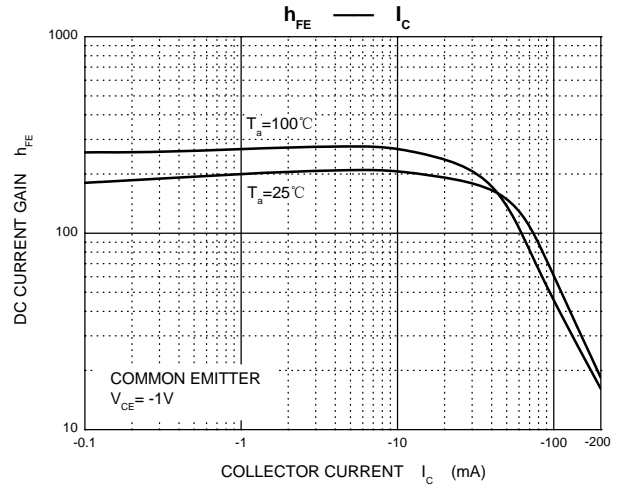
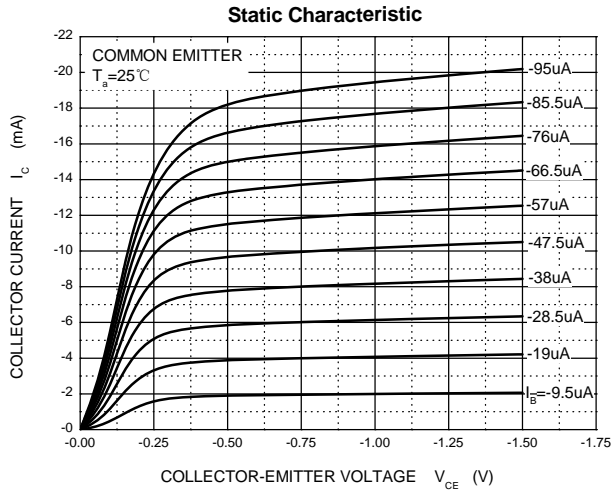
Symbol	Parameter	Value	Unit
V <sub>CBO</sub>	Collector-Base Voltage	-40	V
V <sub>CEO</sub>	Collector-Emitter Voltage	-40	V
V <sub>EBO</sub>	Emitter-Base Voltage	-5	V
I <sub>C</sub>	Collector Current	-200	mA
P <sub>C</sub>	Collector Power Dissipation	100	mW
R <sub>ΘJA</sub>	Thermal Resistance from Junction to Ambient	1250	°C/W
T <sub>J</sub> , T <sub>stg</sub>	Operation Junction and Storage Temperature Range	-55~+150	°C

**ELECTRICAL CHARACTERISTICS (T<sub>a</sub>=25°C unless otherwise specified)**

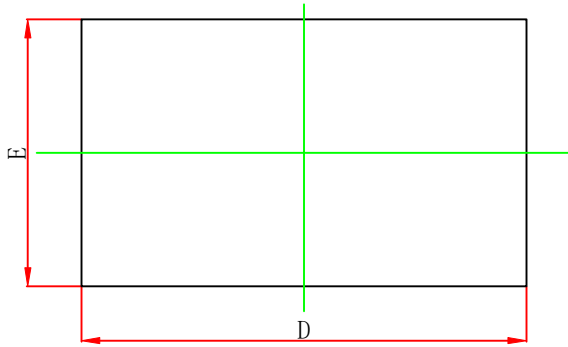
Parameter	Symbol	Test condition	Min	Typ	Max	Unit
Collector-base breakdown voltage	V <sub>(BR)CBO</sub>	I <sub>C</sub> =-10μA, I <sub>E</sub> =0	-40			V
Collector-emitter breakdown voltage	V <sub>(BR)CEO</sub>	I <sub>C</sub> =-1mA, I <sub>B</sub> =0	-40			V
Emitter-base breakdown voltage	V <sub>(BR)EBO</sub>	I <sub>E</sub> =-10μA, I <sub>C</sub> =0	-5			V
Collector cut-off current	I <sub>CEX</sub>	V <sub>CE</sub> =-30V, V <sub>EB(off)</sub> =-3V			-50	nA
Emitter cut-off current	I <sub>EBO</sub>	V <sub>EB</sub> =-5V, I <sub>C</sub> =0			-100	nA
DC current gain	h <sub>FE(1)</sub>	V <sub>CE</sub> =-1V, I <sub>C</sub> =-0.1mA	60			
	h <sub>FE(2)</sub>	V <sub>CE</sub> =-1V, I <sub>C</sub> =-1mA	80			
	h <sub>FE(3)</sub>	V <sub>CE</sub> =-1V, I <sub>C</sub> =-10mA	100		300	
	h <sub>FE(4)</sub>	V <sub>CE</sub> =-1V, I <sub>C</sub> =-50mA	60			
	h <sub>FE(5)</sub>	V <sub>CE</sub> =-1V, I <sub>C</sub> =-100mA	30			
Collector-emitter saturation voltage	V <sub>CE(sat)1</sub>	I <sub>C</sub> =-10mA, I <sub>B</sub> =-1mA			-0.25	V

	$V_{CE(sat)2}$	$I_C=-50mA, I_B=-5mA$			-0.4	V
<b>Base-emitter saturation voltage</b>	$V_{BE(sat)1}$	$I_C=-10mA, I_B=-1mA$	-0.65		-0.85	V
	$V_{BE(sat)2}$	$I_C=-50mA, I_B=-5mA$			-0.95	V
<b>Transition frequency</b>	$f_T$	$V_{CE}=-20V, I_C=-10mA, f=100MHz$	250			MHz
<b>Collector output capacitance</b>	$C_{ob}$	$V_{CB}=-5V, I_E=0, f=1MHz$			4.5	pF
<b>Base Input capacitance</b>	$C_{ib}$	$V_{EB}=-0.5V, I_E=0, f=1MHz$			10	pF
<b>Noise figure</b>	NF	$V_{CE}=-5V, I_E=-0.1mA, f=1kHz,$ $R_G=1k\Omega$			4	dB
<b>Delay time</b>	$t_d$	$V_{CC}=-3V, V_{BE(OFF)}=0.5V,$ $I_C=-10mA, I_{B1}=-1mA$			35	ns
<b>Rise time</b>	$t_r$				35	ns
<b>Storage time</b>	$t_s$	$V_{CC}=-3V, I_C=-10mA,$ $I_{B1}= I_{B2}=-1mA$			225	ns
<b>Fall time</b>	$t_f$				75	ns

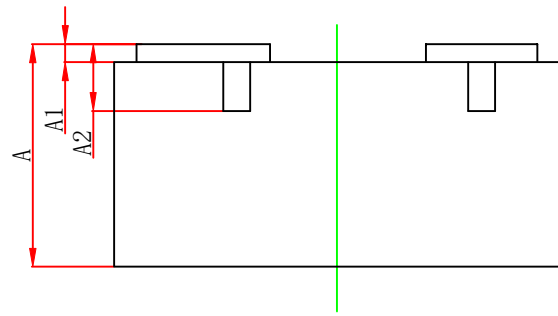
# Typical Characteristics



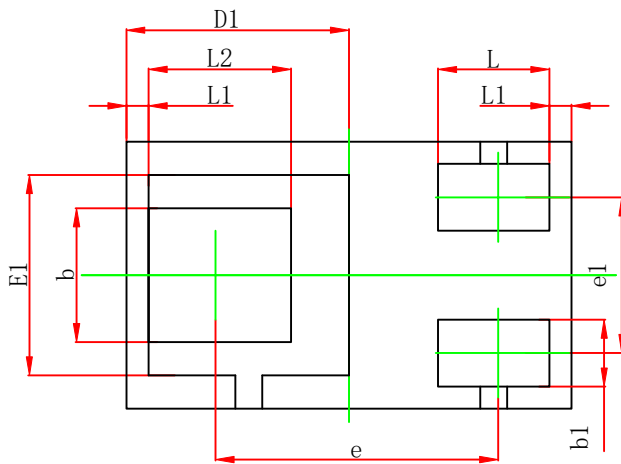
## WBFBP-03E Package Outline Dimensions



TOP VIEW



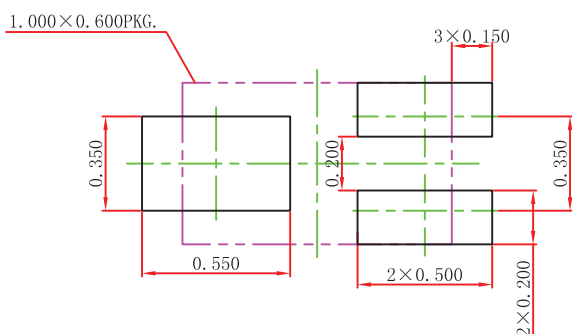
SIDE VIEW



BOTTOM VIEW

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.450	0.550	0.018	0.022
A1	0.010	0.100	0.000	0.004
A2	0.150REF.		0.006REF.	
D	0.950	1.050	0.037	0.041
E	0.550	0.650	0.022	0.026
D1	0.500REF.		0.020REF.	
E1	0.450REF.		0.018REF.	
b	0.250	0.350	0.010	0.014
b1	0.100	0.200	0.004	0.008
e	0.635REF.		0.025REF.	
e1	0.300	0.400	0.012	0.016
L	0.200	0.300	0.008	0.012
L1	0.050REF.		0.002REF.	
L2	0.270	0.370	0.011	0.015

## WBFBP-03E Suggested Pad Layout



**Note:**

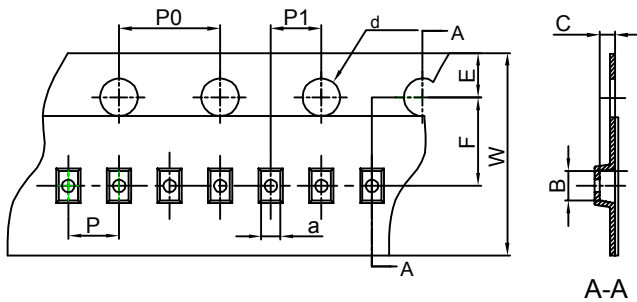
1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.050\text{mm}$ .
3. The pad layout is for reference purposes only.

**NOTICE**

JSCJ reserves the right to make modifications, enhancements, improvements, corrections or other changes without further notice to any product herein. JSCJ does not assume any liability arising out of the application or use of any product described herein.

## WBFBP-03E(1.0×0.6×0.5) Tape and Reel

### WBFBP-03E(1.0×0.6×0.5) Embossed Carrier Tape

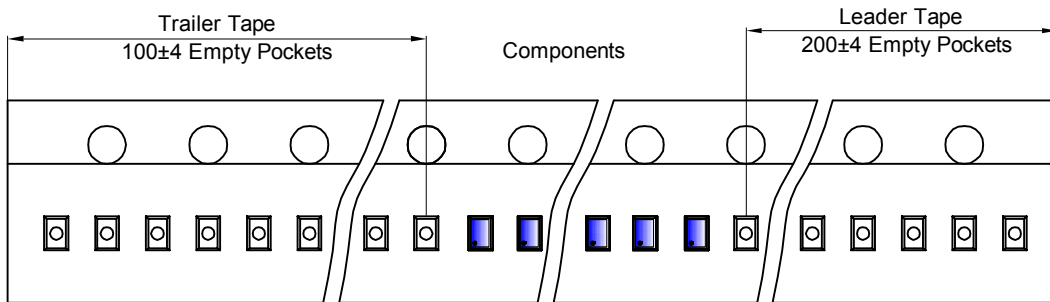


#### Packaging Description:

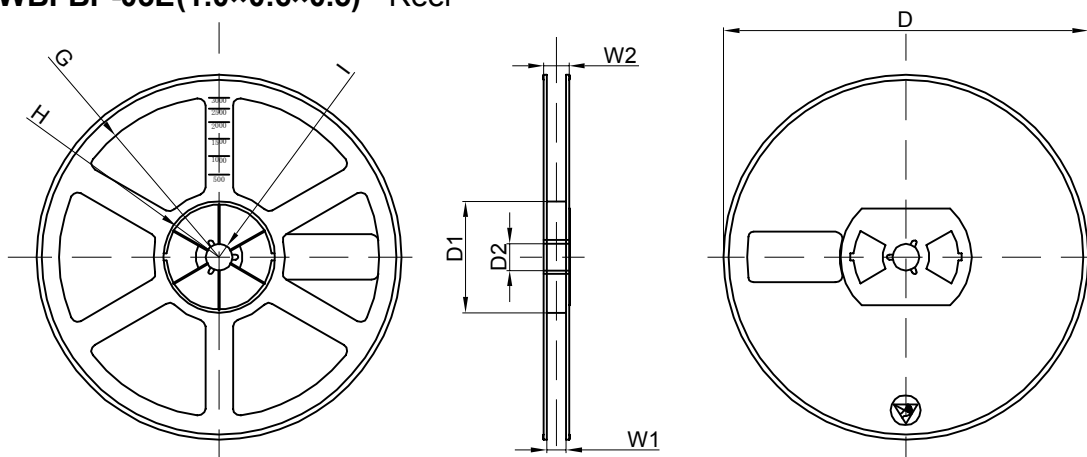
**WBFBP-03E(1.0×0.6×0.5)** parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 10,000 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
<b>WBFBP-03E(1.0×0.6×0.5)</b>	0.66	1.15	0.66	Ø1.50	1.75	3.50	4.00	2.00	2.00	8.00

### WBFBP-03E(1.0×0.6×0.5) Tape Leader and Trailer



### WBFBP-03E(1.0×0.6×0.5) Reel



Dimensions are in millimeter								
Reel Option	D	D1	D2	G	H	I	W1	W2
7" Dia	Ø178.00	54.40	13.00	R78.00	R25.60	R6.50	9.50	12.30

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
10000 pcs	7 inch	150,000 pcs	203×203×195	600,000 pcs	438×438×220	