

**WBFBP-03E Plastic-Encapsulate Transistors****TK3904LED03** TRANSISTOR (NPN)**DESCRIPTION**

- NPN single switching transistor ultra small SMD plastic package

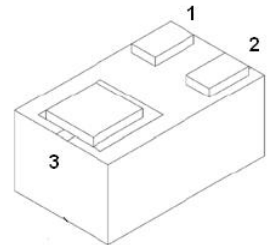
**FEATURE**

- Complementary to TK3906LED03
- Single General-Purpose Switching Transistor

**APPLICATION**

- General-Purpose Switching and Amplification

WBFBP-03E



1. BASE
2. EMITTER
3. COLLECTOR

**MARKING: 1N****TOP VIEW****MAXIMUM RATINGS (T<sub>a</sub>=25°C unless otherwise noted)**

Symbol	Parameter	Value	Unit	
V <sub>CB0</sub>	Collector-Base Voltage	60	V	
V <sub>CE0</sub>	Collector-Emitter Voltage	40	V	
V <sub>EBO</sub>	Emitter-Base Voltage	6	V	
I <sub>c</sub>	Collector Current -Continuous	200	mA	
P <sub>c</sub>	Collector Dissipation	Note1	100	mW
		Note2	590	mW
R <sub>θJA</sub>	Thermal Resistance from Junction to Ambient	Note1	1250	°C/W
		Note2	212	°C/W
T <sub>J</sub> , T <sub>stg</sub>	Operation Junction and Storage Temperature Range	-55~+150	°C	

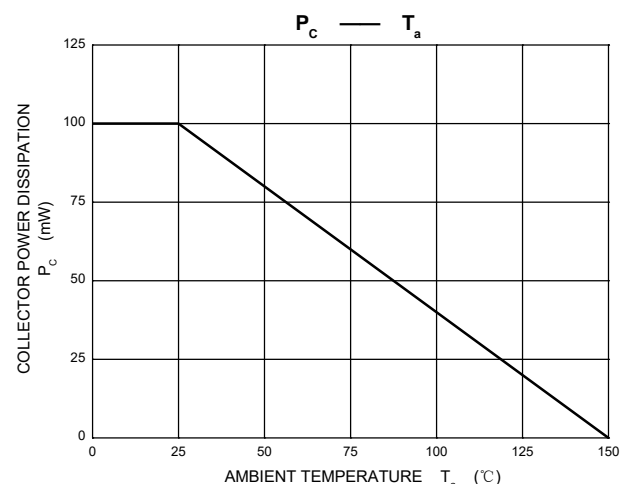
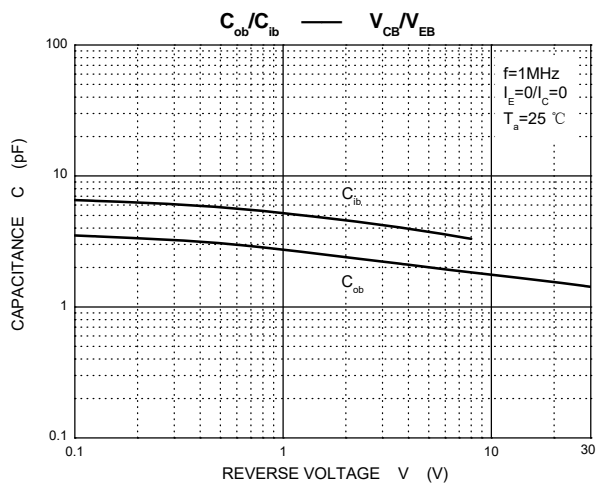
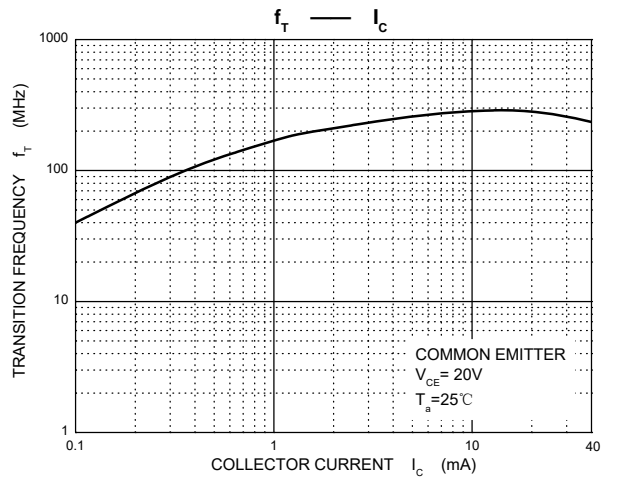
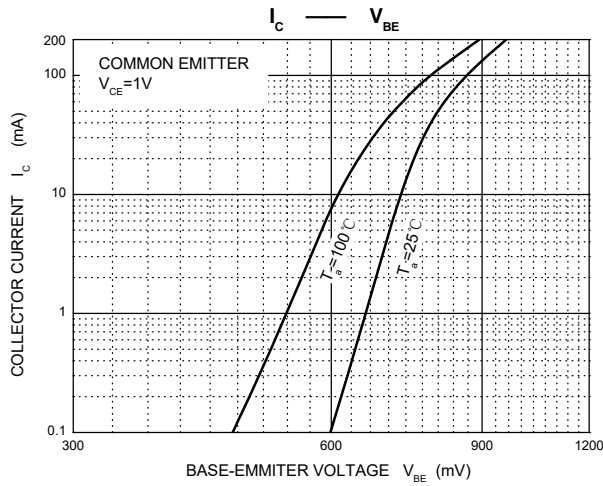
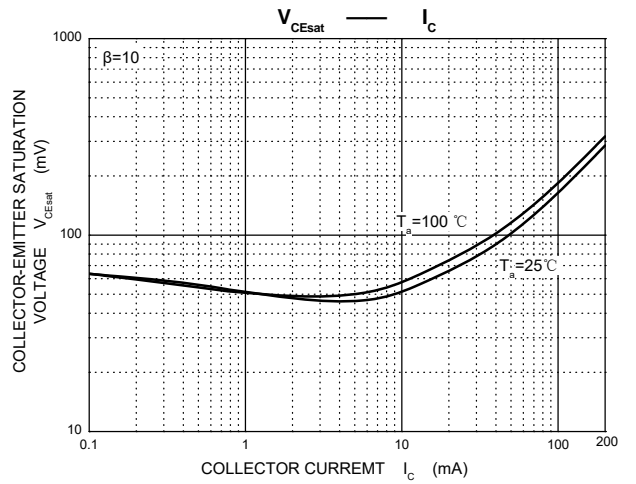
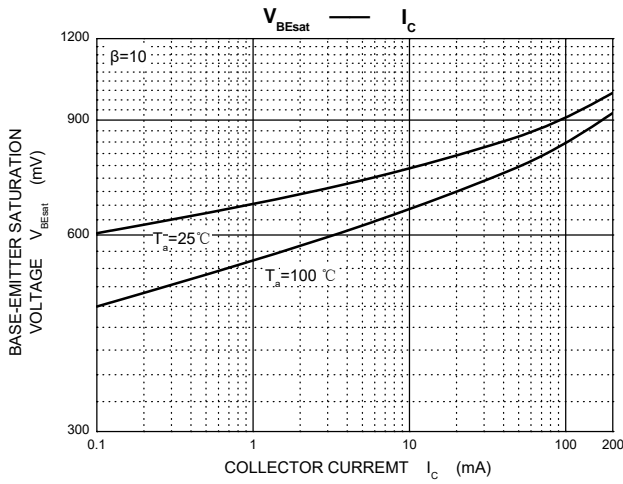
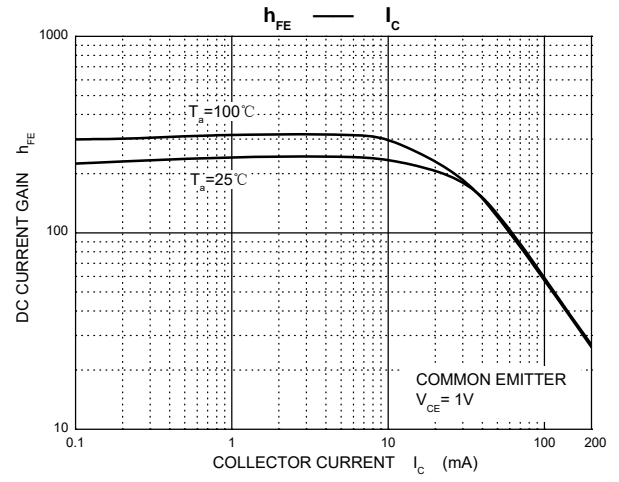
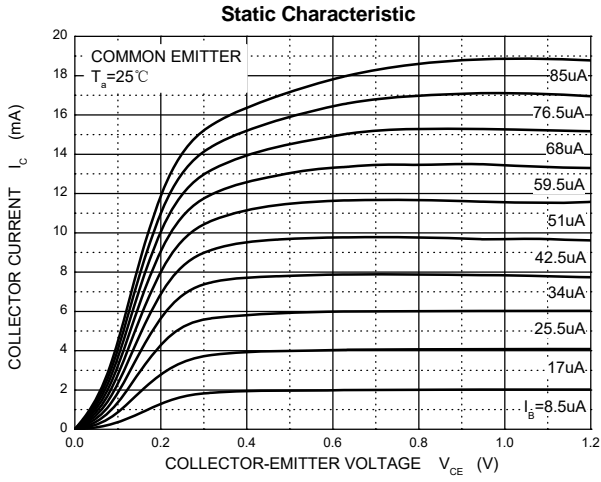
Note:1. Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

2.Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector1cm<sup>2</sup>.

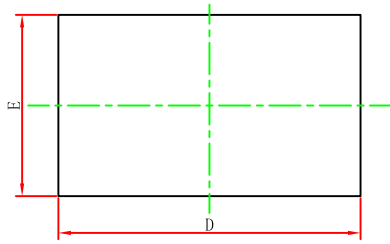
**ELECTRICAL CHARACTERISTICS (Ta=25°C unless otherwise specified)**

Parameter	Symbol	Test conditions	Min	Typ	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	$V_{(BR)EBO}$	$I_E=10\mu A, I_C=0$	6			V
Collector cut-off current	$I_{CBO}$	$V_{CB}=60V, I_E=0$			0.1	$\mu A$
Collector cut-off current	$I_{CEX}$	$V_{CE}=30V, V_{BE(off)}=3V$			50	nA
Emitter cut-off current	$I_{EBO}$	$V_{EB}=5V, I_C=0$			0.1	$\mu A$
DC current gain	$h_{FE}$	$V_{CE}=1V, I_C=10mA$	100		300	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C=50mA, I_B=5mA$			0.3	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C=50mA, I_B=5mA$			0.95	V
Transition frequency	$f_T$	$V_{CE}=20V, I_C=10mA, f=100MHz$	300			MHz
Delay time	$t_d$	$V_{CC}=3V, V_{BE(off)}=0.5V,$			35	ns
Rise time	$t_r$	$I_C=10mA, I_{B1}=1mA$			35	ns
Storage time	$t_s$	$V_{CC}=3V, I_C=10mA, I_{B1}=\phantom{1mA}$			200	ns
Fall time	$t_f$	$I_{B2}=1mA$			50	ns

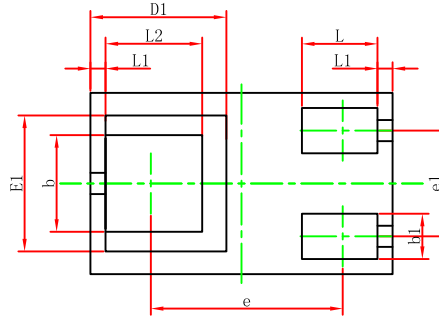
# Typical Characteristics



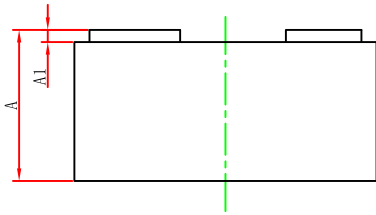
## WBFBP-03E Package Outline Dimensions



TOP VIEW



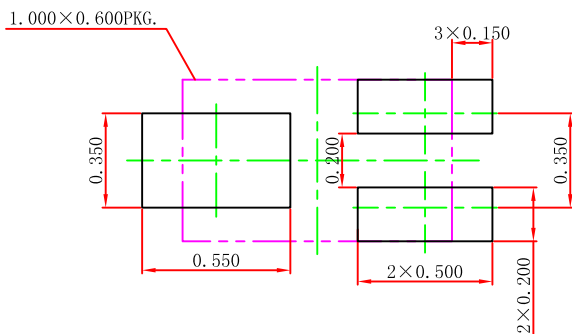
BOTTOM VIEW



SIDE 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
D	0.950	1.050	0.037	0.041
E	0.550	0.650	0.022	0.026
D1	0.450REF.		0.018REF.	
E1	0.450REF.		0.018REF.	
b	0.270	0.370	0.011	0.015
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:**

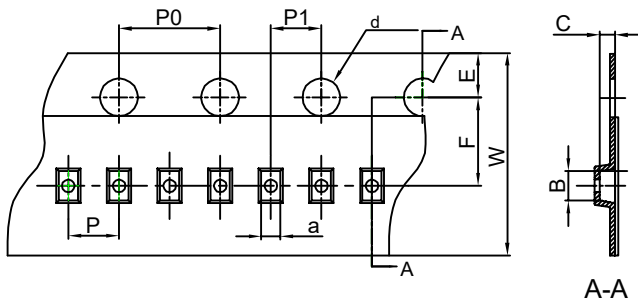
1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.050\text{mm}$ .
3. The pad layout is for reference purposes only.

**NOTICE**

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

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

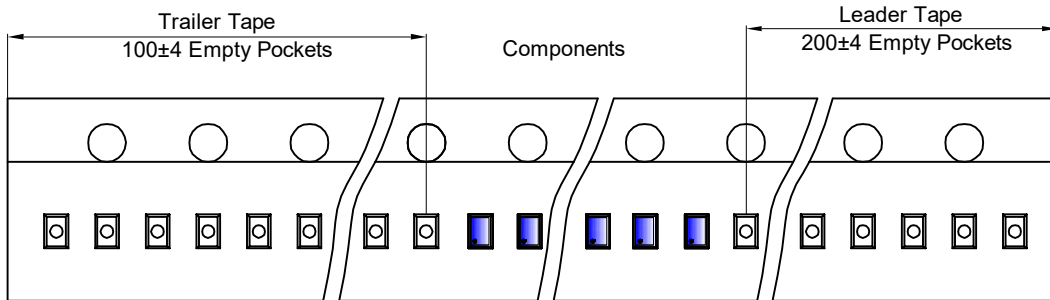


#### Packaging Description:

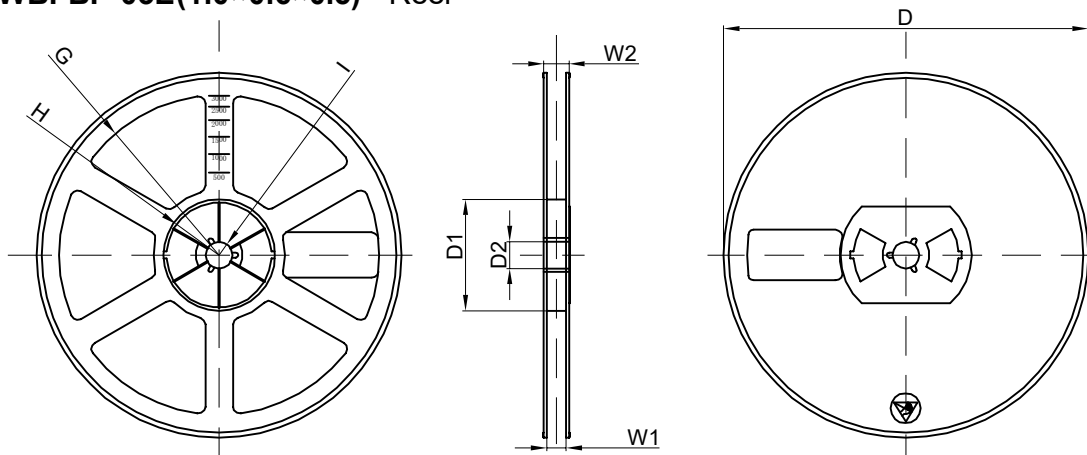
**WBFBP-03E(1.0×0.6×0.5)** parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. 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	

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