

**Features**

- Low Voltage and Low Current
- Halogen Free Available Upon Request By Adding Suffix "-HF"
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

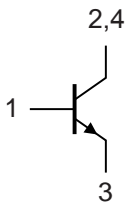
**Maximum Ratings @ 25°C Unless Otherwise Specified**

- Operating Junction Temperature Range: -55°C to +150°C
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- Thermal Resistance: 125°C/W Junction to Ambient

Parameter	Symbol	Rating	Unit
Collector-Base Voltage	$V_{CBO}$	60	V
Collector-Emitter Voltage	$V_{CEO}$	40	V
Emitter-Base Voltage	$V_{EBO}$	6	V
Collector Current	$I_C$	200	mA
Collector Power Dissipation	$P_C$	1	W

**Marking: ZT3904**

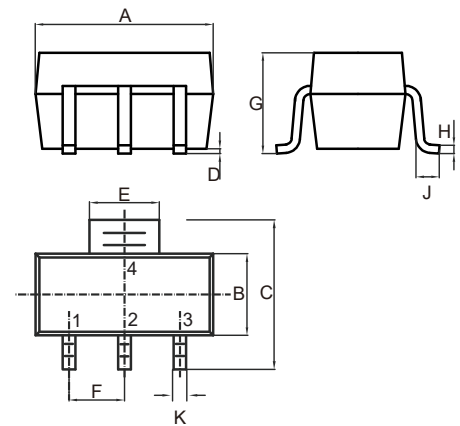
**Internal Structure**



1.BASE  
2,4.COLLECTOR  
3.EMITTER

**NPN  
General Purpose  
Amplifier**

**SOT-223**



DIM	DIMENSIONS				NOTE
	INCHES		MM		
	MIN	MAX	MIN	MAX	
A	0.248	0.264	6.30	6.70	
B	0.130	0.146	3.30	3.70	
C	0.264	0.287	6.70	7.30	
D	0.001	0.004	0.02	0.10	
E	0.114	0.122	2.90	3.10	
F	0.091		2.30		TYP.
G	---	0.071	---	1.80	
H	0.009	0.014	0.23	0.35	
J	0.030	---	0.75	---	
K	0.026	0.033	0.66	0.84	

**Electrical Characteristics @ 25°C Unless Otherwise Specified**

Parameter	Symbol	Min	Typ	Max	Units	Conditions
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	60			V	$I_C=10\mu A, I_E=0$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	40			V	$I_C=1mA, I_B=0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	6			V	$I_E=10\mu A, I_C=0$
Collector-Base Cutoff Current	$I_{CBO}$			50	nA	$V_{CB}=30V, I_E=0$
Collector Cutoff Current	$I_{CEX}$			50	nA	$V_{CE}=30V, V_{EB}=3V,$
Emitter-Base Cutoff Current	$I_{EBO}$			50	nA	$V_{EB}=5V, I_C=0$
DC Current Gain	$h_{FE1}$	40				$V_{CE}=1V, I_C=0.1mA$
	$h_{FE2}$	70				$V_{CE}=1V, I_C=1mA$
	$h_{FE3}$	100		300		$V_{CE}=1V, I_C=10mA$
	$h_{FE4}$	60				$V_{CE}=1V, I_C=50mA$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			0.2	V	$I_C=10mA, I_B=1mA$
				0.3	V	$I_C=50mA, I_B=5mA$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	0.65		0.85	V	$I_C=10mA, I_B=1mA$
				0.95	V	$I_C=50mA, I_B=5mA$
Transition Frequency	$f_T$	300			MHz	$V_{CE}=20V, I_C=10mA, f=100MHz$
Collector Output Capacitance	$C_{ob}$			4	pF	$V_{CB}=5V, I_E=0, f=1MHz,$
Delay Time	$t_d$			35	ns	$V_{CC}=3V, V_{BE(off)}=0.5V$
Rise Time	$t_r$			35	ns	$I_C=10mA, I_{B1}=-I_{B2}=1mA$
Storage Time	$t_s$			200	ns	$V_{CC}=3V, I_C=10mA$
Fall Time	$t_f$			50	ns	$I_{B1}=-I_{B2}=1mA$

**Curve Characteristics**

Fig. 1 - Static Characteristics

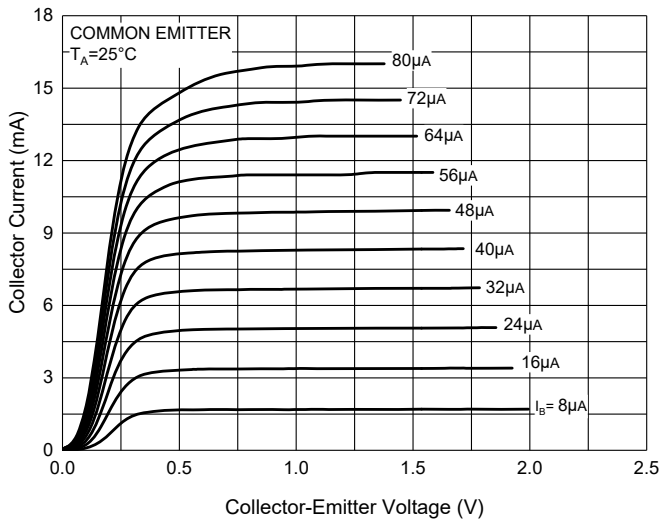


Fig. 2 - DC Current Gain Characteristics

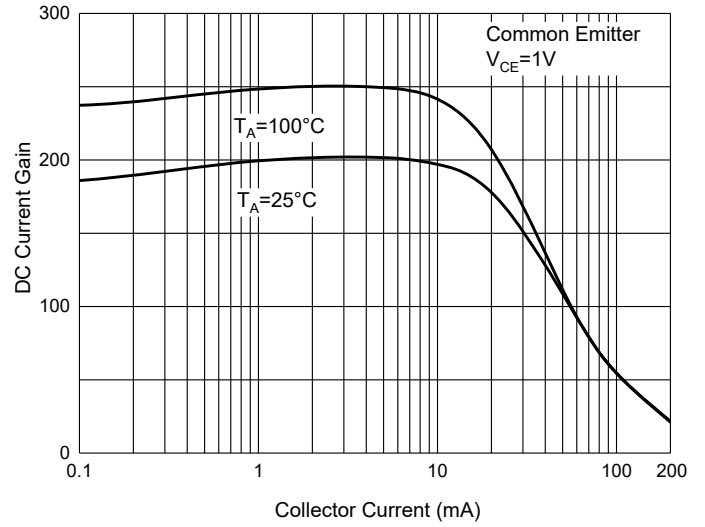


Fig. 3 - Collector-Emitter Saturation Voltage Characteristics

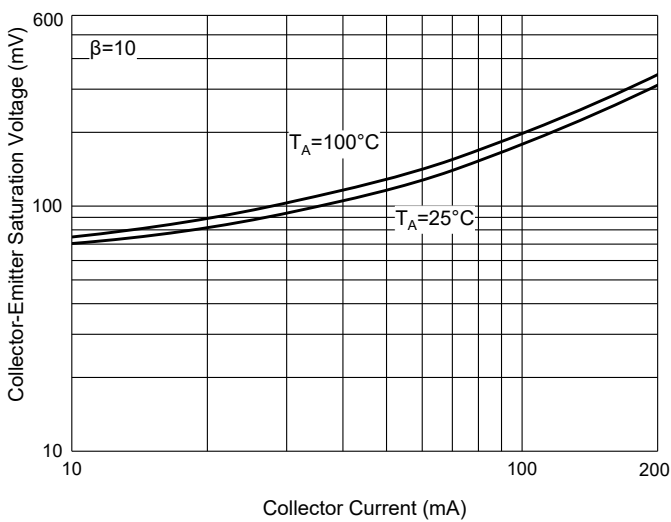


Fig. 4 - Base-Emitter Saturation Voltage Characteristics

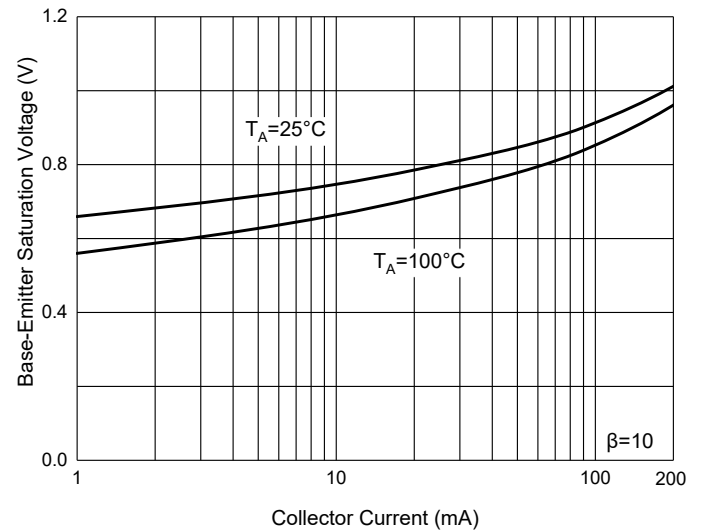


Fig. 5 - Base-Emitter Voltage Characteristics

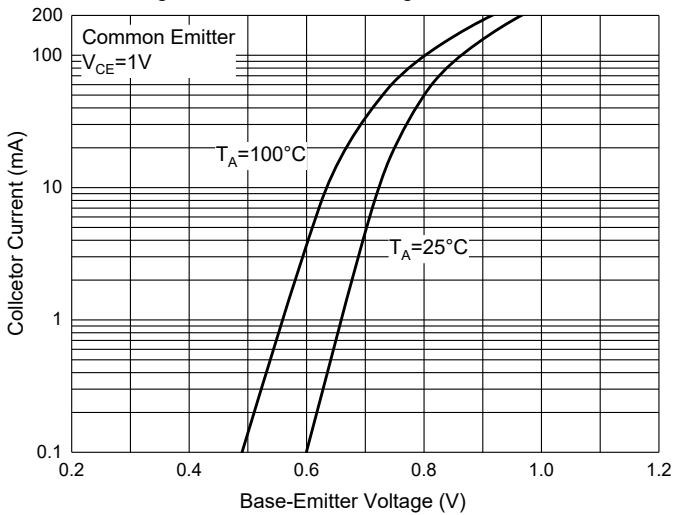
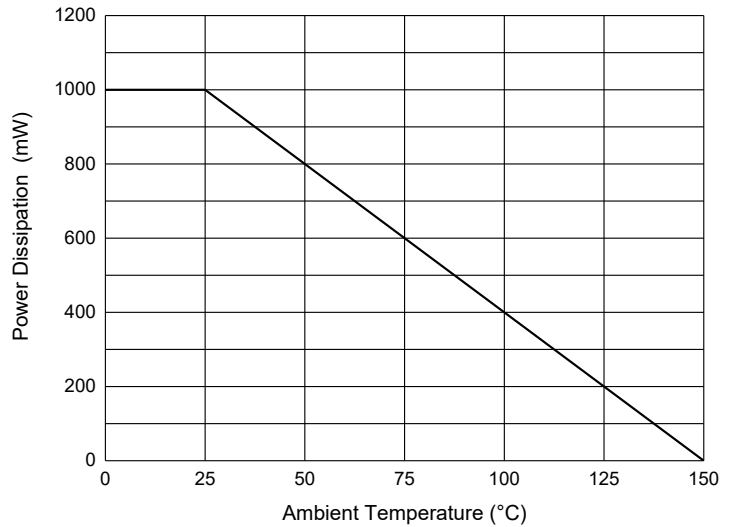


Fig. 6 - Power Derating Curve



## Ordering Information

Device	Packing
Part Number-TP	Tape&Reel: 2.5Kpcs/Reel

Note : Adding "-HF" Suffix For Halogen Free, eg. Part Number-TP-HF

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