

## Features

- Halogen Free. "Green" Device (Note 1)
- 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
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 556°C/W Junction to Ambient<sup>(Note 2)</sup>

Parameter	Symbol	Rating	Unit
Collector-Base Voltage	$V_{CBO}$	30	V
Collector-Emitter Voltage	$V_{CEO}$	30	V
Emitter-Base Voltage	$V_{EBO}$	10	V
Continuous Collector Current	$I_C$	300	mA
Power Dissipation	$P_D$	225	mW

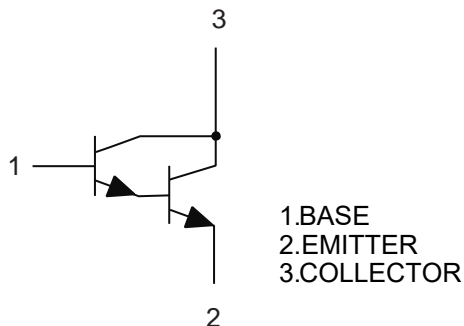
Note: 1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.  
2. Mounted on FR-5 PCB 1.0" x0.75" x0.062".

## Marking:

**MMBTA13: K2D**

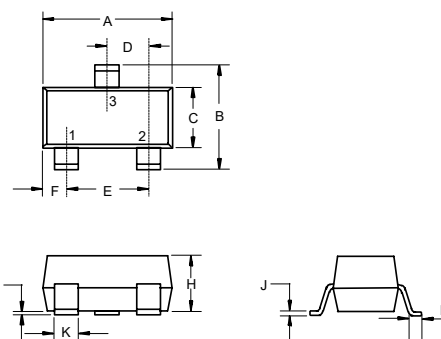
**MMBTA14: K3D**

## Internal Structure



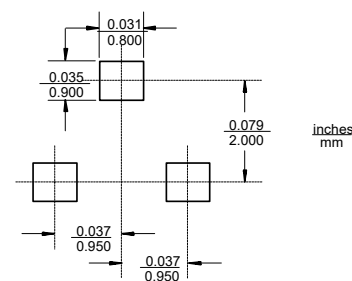
# NPN Darlington Amplifier Transistor

## SOT-23



DIM	DIMENSIONS				NOTE
	INCHES		MM		
	MIN	MAX	MIN	MAX	
A	0.110	0.120	2.80	3.04	
B	0.083	0.104	2.10	2.64	
C	0.047	0.055	1.20	1.40	
D	0.034	0.041	0.85	1.05	
E	0.067	0.083	1.70	2.10	
F	0.018	0.024	0.45	0.60	
G	0.0004	0.006	0.01	0.15	
H	0.035	0.043	0.90	1.10	
J	0.003	0.007	0.08	0.18	
K	0.012	0.020	0.30	0.51	
L	0.007	0.020	0.20	0.50	

## Suggested Solder Pad Layout



**Electrical Characteristics @  $T_A=25^\circ\text{C}$  Unless Otherwise Specified**

Parameter		Symbol	Min	Typ	Max	Units	Conditions
Collector Cutoff Current		$I_{CBO}$			0.1	$\mu\text{A}$	$V_{CB}=30\text{V}, I_E=0$
Emitter Cutoff Current		$I_{EBO}$			0.1	$\mu\text{A}$	$V_{EB}=10\text{V}, I_C=0$
DC Current Gain	MMBTA13	$h_{FE(1)}$	5000				$V_{CE}=5\text{V}, I_C=10\text{mA}$
	MMBTA14		10000				
	MMBTA13	$h_{FE(2)}$	10000				$V_{CE}=1\text{V}, I_C=150\text{mA}$
	MMBTA14		20000				
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$			1.5	V	$I_C=100\text{mA}, I_B=0.1\text{mA}$
Base-Emitter Voltage		$V_{BE}$			2.0	V	$V_{CE}=5\text{V}, I_C=100\text{mA}$
Transition Frequency		$f_T$	125			MHz	$V_{CE}=5\text{V}, I_C=10\text{mA}, f=100\text{MHz}$
Delay Time		$t_d$			10	ns	$V_{CC}=30\text{V}, V_{BE}=0.5\text{V}, I_C=150\text{mA}, I_{B1}=15\text{mA}$
Rise Time		$t_r$			25	ns	
Storage Time		$t_s$			225	ns	$V_{CC}=30\text{V}, I_C=150\text{mA}, I_{B1}=I_{B2}=15\text{mA}$
Fall Time		$t_f$			60	ns	
Output Capacitance		$C_{obo}$			8	pF	$V_{CB}=10\text{V}, I_E=0, f=1\text{MHz}$
Input Capacitance		$C_{ibo}$			15	pF	$V_{EB}=0.5\text{V}, I_C=0, f=1\text{MHz}$

**Curve Characteristics**

Fig. 1 - Static Characteristics

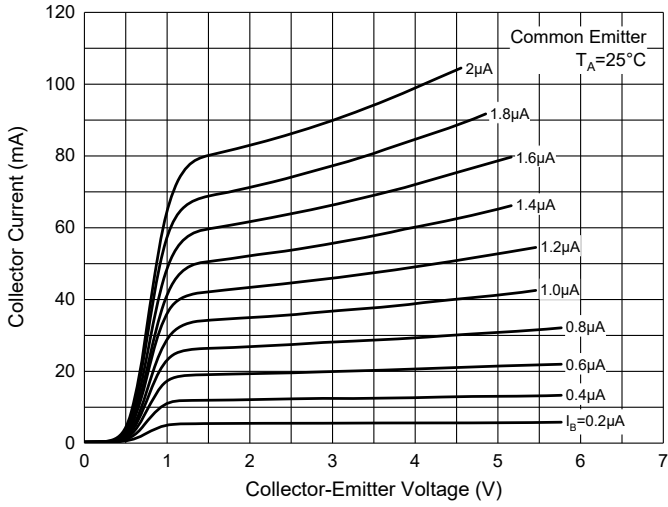


Fig. 2 - DC Current Gain Characteristics

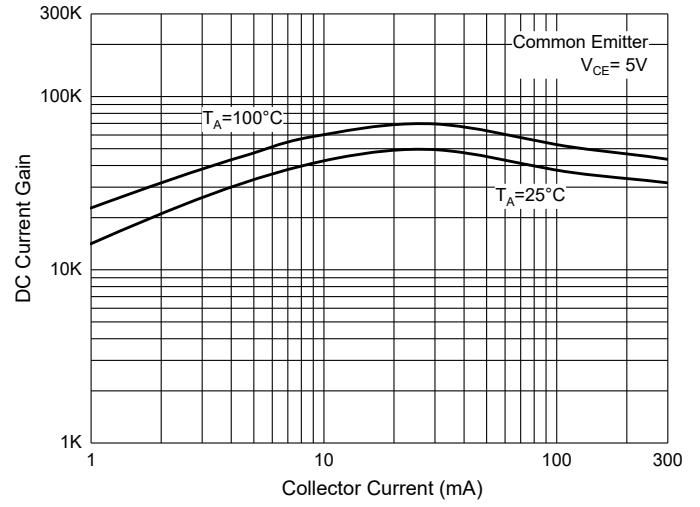


Fig. 3 - Collector-Emitter Saturation Voltage Characteristics

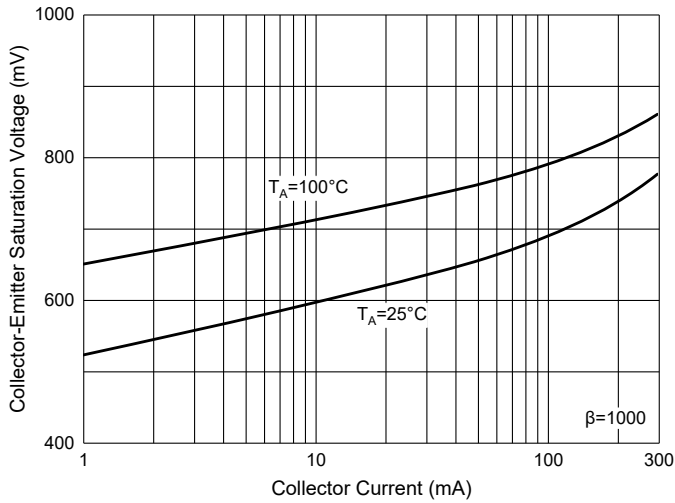


Fig. 4 - Base-Emitter Saturation Voltage Characteristics

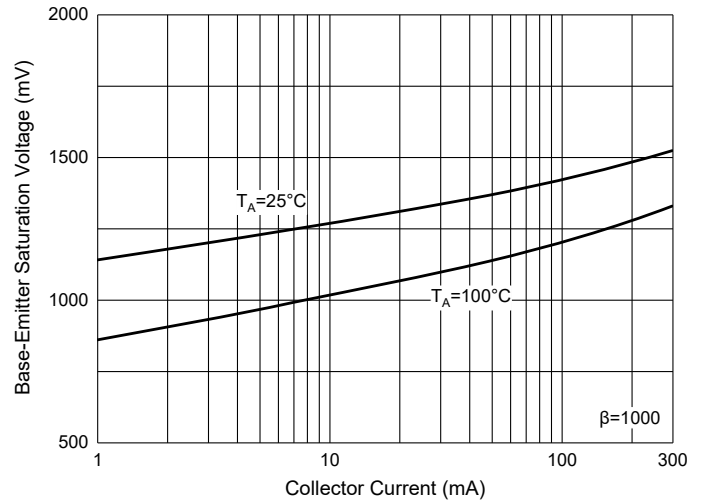


Fig. 5 - Base-Emitter Voltage Characteristics

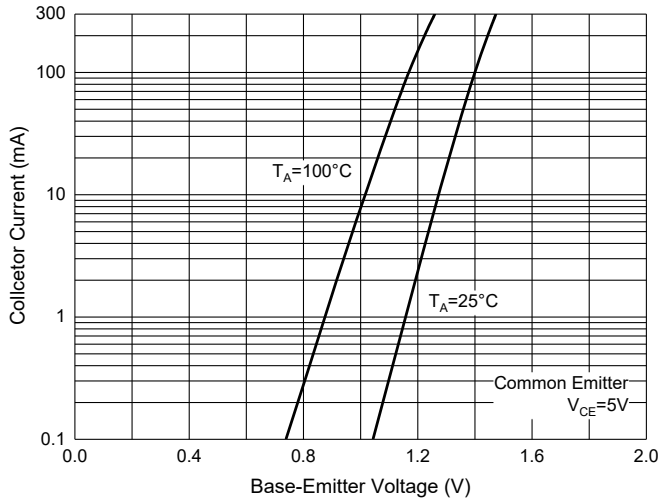
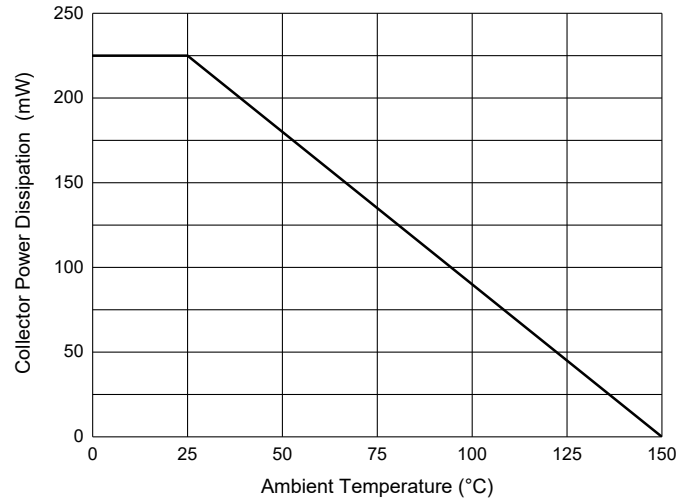


Fig. 6 - Collector Power Derating Curve



## Ordering Information

Device	Packing
Part Number-TP	Tape&Reel: 3Kpcs/Reel

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