



**THE DATASHEET OF  
MMST4401-TP**



**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**

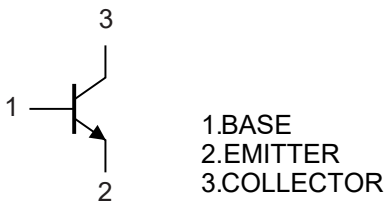
- Operating Junction Temperature Range: -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 625°C/W Junction to Ambient

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
Continuous Collector Current	$I_C$	600	mA
Power Dissipation	$P_D$	200	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.

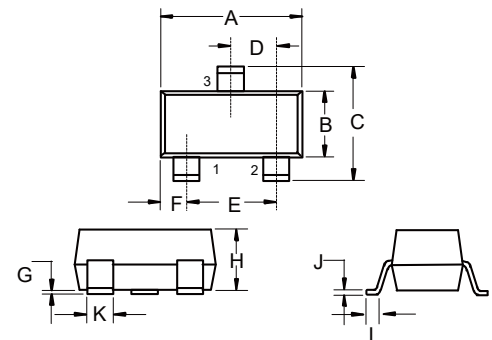
**Marking: K3X**

**Internal Structure**



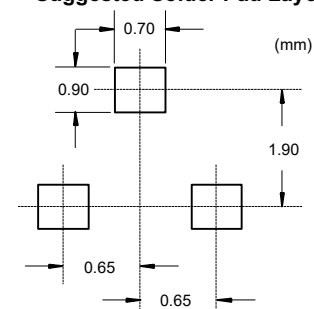
**NPN Small Signal Transistors**

**SOT-323**



DIM	DIMENSIONS				NOTE
	INCHES		MM		
	MIN	MAX	MIN	MAX	
A	0.071	0.087	1.80	2.20	
B	0.045	0.053	1.15	1.35	
C	0.083	0.096	2.10	2.45	
D	0.026		0.65		TYP.
E	0.047	0.055	1.20	1.40	
F	0.012	0.016	0.30	0.40	
G	0.000	0.004	0.00	0.10	
H	0.035	0.044	0.90	1.10	
J	0.002	0.010	0.05	0.25	
K	0.006	0.016	0.15	0.40	
L	0.010	0.018	0.26	0.46	

**Suggested Solder Pad Layout**



**Electrical Characteristics @ T<sub>A</sub>=25°C Unless Otherwise Specified**

Parameter	Symbol	Min	Typ	Max	Units	Conditions
Collector-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	60			V	I <sub>C</sub> =100μA, I <sub>E</sub> =0
Collector-Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	40			V	I <sub>C</sub> =1mA, I <sub>B</sub> =0
Emitter-Base Breakdown Voltage	V <sub>(BR)EBO</sub>	6			V	I <sub>E</sub> =100μA, I <sub>C</sub> =0
Collector Cutoff Current	I <sub>CBO</sub>			0.1	μA	V <sub>CB</sub> =35V, I <sub>E</sub> =0
Collector Cutoff Current	I <sub>CEO</sub>			0.1	μA	V <sub>CE</sub> =35V, I <sub>B</sub> =0
Emitter Cutoff Current	I <sub>EBO</sub>			0.1	μA	V <sub>EB</sub> =5V, I <sub>C</sub> =0
DC Current Gain	h <sub>FE(1)</sub>	100		300		V <sub>CE</sub> =1V, I <sub>C</sub> =150mA
	h <sub>FE(2)</sub>	40				V <sub>CE</sub> =2V, I <sub>C</sub> =500mA
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>			0.4	V	I <sub>C</sub> =150mA, I <sub>B</sub> =15mA
Base-Emitter Saturation Voltage	V <sub>BE(sat)</sub>			0.95	V	I <sub>C</sub> =150mA, I <sub>B</sub> =15mA
Transition Frequency	f <sub>T</sub>	250			MHz	V <sub>CE</sub> =10V, I <sub>C</sub> =20mA, f=100MHz
Delay Time	t <sub>d</sub>			15	ns	V <sub>CC</sub> =30V, I <sub>C</sub> =150μA,
Rise Time	t <sub>r</sub>			20	ns	V <sub>BE(off)</sub> =2V, I <sub>B1</sub> =15mA
Storage Time	t <sub>s</sub>			225	ns	V <sub>CC</sub> =30V, I <sub>C</sub> =150mA,
Fall Time	t <sub>f</sub>			30	ns	I <sub>B1</sub> =I <sub>B2</sub> =15mA
Output Capacitance	C <sub>ob</sub>			6.5	pF	V <sub>CB</sub> =10V, I <sub>E</sub> =0, f=1MHz

**Curve Characteristics**

Fig. 1 - Static Characteristics

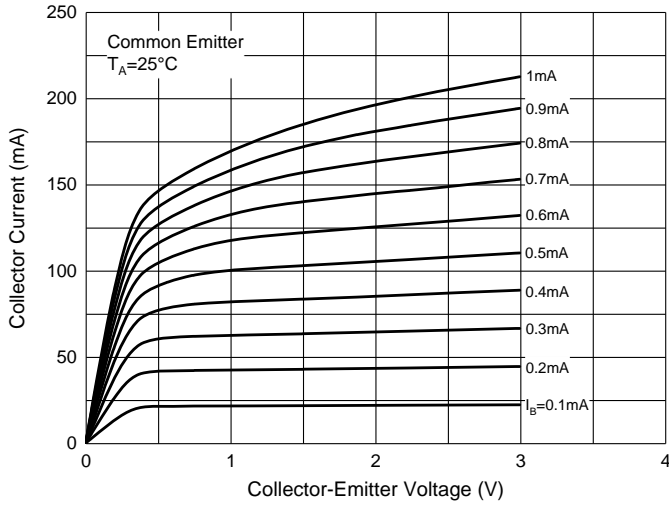


Fig. 2 - DC Current Gain Characteristics

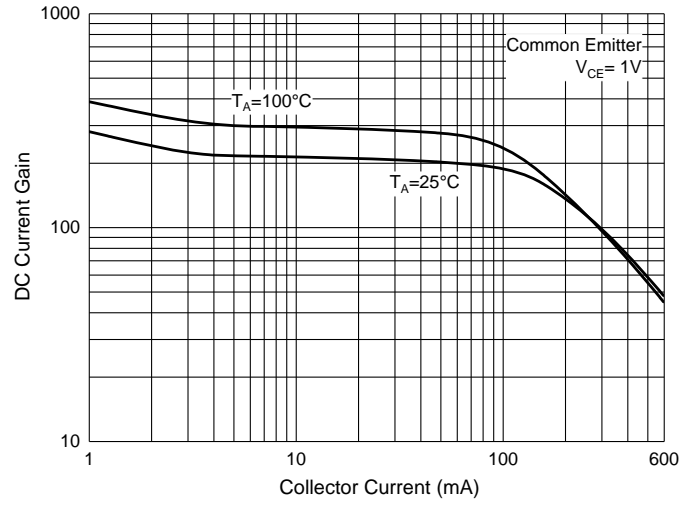


Fig. 3 - Base-Emitter Saturation Voltage Characteristics

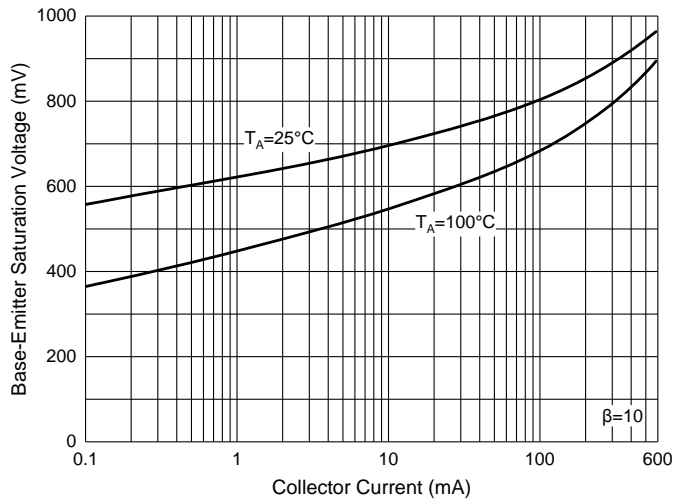


Fig. 4 - Collector-Emitter Saturation Voltage Characteristics

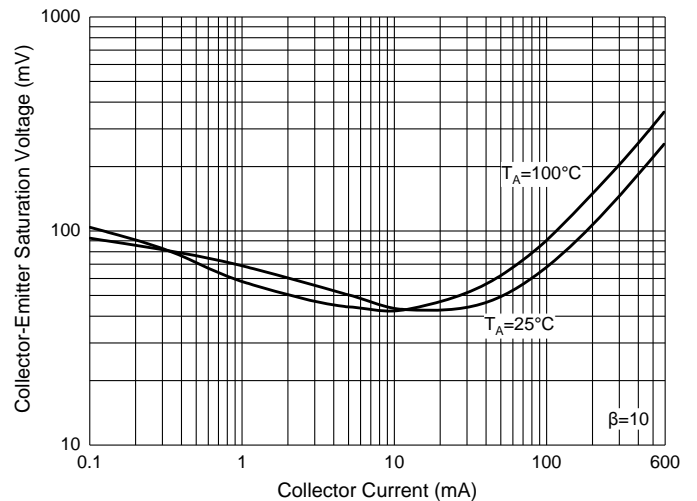


Fig. 5 - Base-Emitter Voltage Characteristics

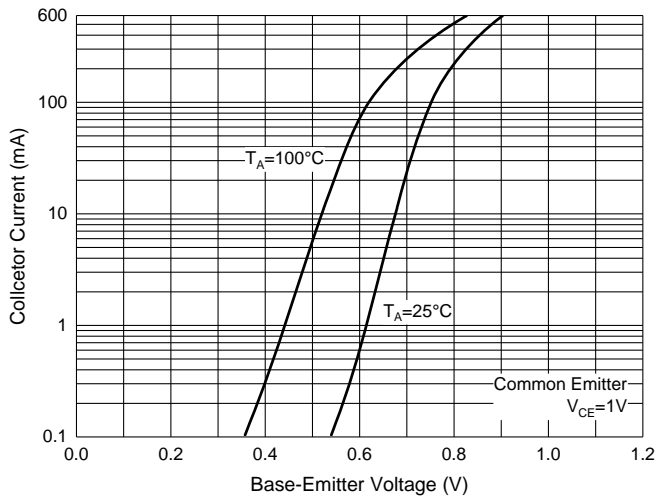
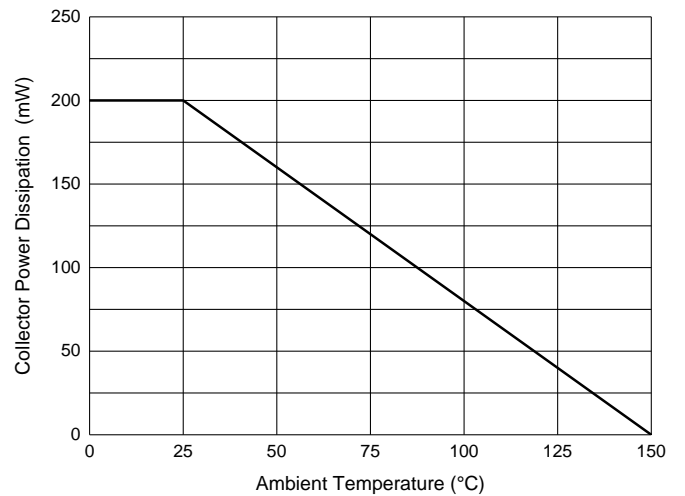


Fig. 6 - Collector Power Derating Curve



## Ordering Information

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

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