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With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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Micro Commercial Components



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## MMST3904

### Features

- Epitaxial Planar Die Construction
- Complementary PNP Type available (MMST3906)
- Ultra-small surface mount package
- Marking : K2N
- Lead Free Finish/RoHS Compliant ("P" Suffix designates RoHS Compliant. See ordering information)
- Epoxy meets UL 94 V-0 flammability rating
- Moisture Sensitivity Level 1
- Halogen free available upon request by adding suffix "-HF"

### Maximum Ratings

Symbol	Rating	Rating	Unit
$V_{CEO}$	Collector-Emitter Voltage	40	V
$V_{CBO}$	Collector-Base Voltage	60	V
$V_{EBO}$	Emitter-Base Voltage	6.0	V
$I_C$	Collector Current-Continuous <sup>(1)</sup>	200	mA
$P_C$	Power dissipation <sup>(1)</sup>	200	mW
$T_J$	Junction Temperature	-55 to +150	°C
$T_{STG}$	Storage Temperature	-55 to +150	°C

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

Symbol	Parameter	Min	Max	Units
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#### OFF CHARACTERISTICS <sup>(2)</sup>

$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage ( $I_C=1.0mA$ , $I_B=0$ )	40	---	Vdc
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage ( $I_C=10uA$ , $I_E=0$ )	60	---	Vdc
$V_{(BR)EBO}$	Collector-Emitter Breakdown Voltage ( $I_C=10uA$ , $I_C=0$ )	5.0	---	Vdc
$I_{CEX}$	Collector-Base Cutoff Current ( $V_{CE}=30Vdc$ , $V_{EB(OFF)}=3.0Vdc$ )	---	50	nAdc
$I_{BL}$	Emitter-Base Cutoff Current ( $V_{CE}=30Vdc$ , $V_{EB(OFF)}=3.0Vdc$ )	---	50	nAdc

#### ON CHARACTERISTICS <sup>(2)</sup>

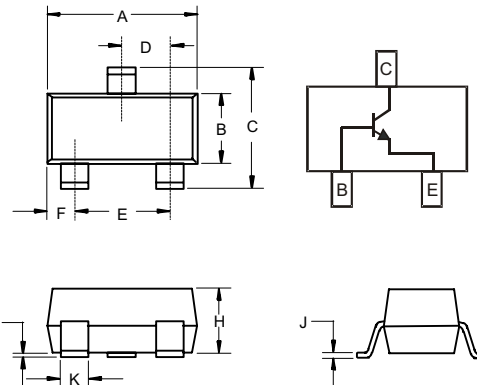
$h_{FE}$	DC Current Gain ( $I_C=100uA$ , $V_{CE}=1.0Vdc$ ) ( $I_C=1.0mA$ , $V_{CE}=1.0Vdc$ ) ( $I_C=10mA$ , $V_{CE}=1.0Vdc$ ) ( $I_C=50mA$ , $V_{CE}=1.0Vdc$ ) ( $I_C=500mA$ , $V_{CE}=1.0Vdc$ )	40 70 100 60 30	---	---
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage ( $I_C=10mA$ , $I_B=1.0mA$ ) ( $I_C=50mA$ , $I_B=5.0mA$ )	---	0.25 0.30	Vdc
$V_{BE(sat)}$	Base-Emitter Saturation Voltage ( $I_C=10mA$ , $I_B=1.0mA$ ) ( $I_C=50mA$ , $I_B=5.0mA$ )	0.65 ---	0.85 0.95	Vdc

Note: 1. Valid provided that terminals are kept at ambient temperature.

2. Pulse test: Pulse width<300us, duty cycle<2%

## NPN Small Signal Transistors

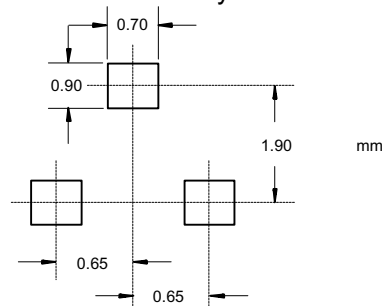
### SOT-323



#### DIMENSIONS

DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	.071	.087	1.80	2.20	
B	.045	.053	1.15	1.35	
C	.079	.087	2.00	2.20	
D	.026 Nominal		0.65Nominal		
E	.047	.055	1.20	1.40	
F	.012	.016	.30	.40	
G	.000	.004	.000	.100	
H	.035	.039	.90	1.00	
J	.004	.010	.100	.250	
K	.012	.016	.30	.40	

#### Suggested Solder Pad Layout



**SMALL SIGNAL CHARACTERISTICS**

C <sub>obo</sub>	Output Capacitance (V <sub>CB</sub> =5.0Vdc, f=1.0MHz, I <sub>E</sub> =0)		---	4.0	pF
C <sub>ibo</sub>	Input Capacitance (V <sub>EB</sub> =0.5Vdc, f=1.0MHz, I <sub>C</sub> =0)		---	8.0	pF
h <sub>ie</sub>	Input Impedance	V <sub>CE</sub> =10Vdc, I <sub>C</sub> =1.0mAdc, f=1.0KHz	1.0	10	kohms
h <sub>re</sub>	Voltage Feedback Ratio		0.5	8.0	X 10 <sup>-4</sup>
h <sub>fe</sub>	Small Signal Current Gain		100	400	---
h <sub>oe</sub>	Output Admittance		1.0	40	uS
f <sub>T</sub>	Current Gain-Bandwidth Product (V <sub>CE</sub> =20Vdc, I <sub>C</sub> =10mAdc, f=100MHz)		300	---	NHz
NF	Noise Figure (V <sub>CE</sub> =5.0Vdc, I <sub>C</sub> =100uAdc, R <sub>C</sub> =1.0KOHMS, f=1.0KHz)		---	5.0	dB

**SWITCHING CHARACTERISTICS**

$t_d$	Delay Time	$V_{CC}=3.0Vdc$ , $I_C=100\mu A$ , $V_{BE(off)}=0.5Vdc$ , $I_{B1}=1.0mA$	---	35	ns
$t_r$	Rise Time		---	35	ns

## Ordering Information :

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

Note : Adding "-HF" suffix for halogen free, eg. Part Number-TP-HF

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