



Micro Commercial Components



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MMST3906

Features

- Epitaxial Planar Die Construction
- Complementary NPN Type available (MMST3904)
- Ultra-small surface mount package
- Marking : K5N
- 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 | 40 | V |
| V_{EBO} | Emitter-Base Voltage | 5.0 | V |
| I_C | Collector Current-Continuous ⁽¹⁾ | 200 | mA |
| P_C | Power dissipation ⁽¹⁾ | 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 |
|--------|-----------|-----|-----|-------|
|--------|-----------|-----|-----|-------|

OFF CHARACTERISTICS ⁽²⁾

| | | | | |
|---------------|--|-----|-----|------|
| $V_{(BR)CEO}$ | Collector-Emitter Breakdown Voltage ($I_C=1.0mA$, $I_B=0$) | 40 | --- | Vdc |
| $V_{(BR)CBO}$ | Collector-Base Breakdown Voltage ($I_C=10uA$, $I_E=0$) | 40 | --- | Vdc |
| $V_{(BR)EBO}$ | Collector-Emitter Breakdown Voltage ($I_E=10uA$, $I_C=0$) | 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 ⁽²⁾

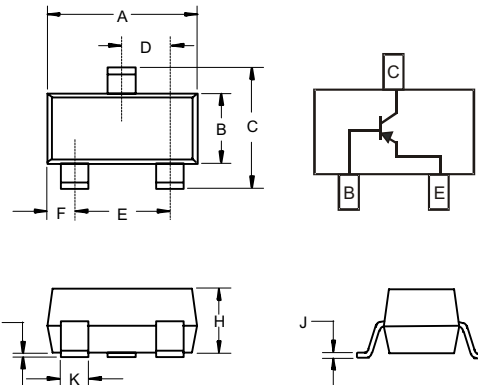
| | | | | |
|---------------|--|-----------------------------|--------------|-----|
| h_{FE} | DC Current Gain ($I_C=100uA$, $V_{CE}=1.0Vdc$) ($I_C=1.0mA$, $V_{CE}=1.0Vdc$) ($I_C=10mA$, $V_{CE}=1.0Vdc$) ($I_C=50mA$, $V_{CE}=1.0Vdc$) ($I_C=500mA$, $V_{CE}=1.0Vdc$) | 60 80 100 60 30 | --- | --- |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage ($I_C=10mA$, $I_B=1.0mA$) ($I_C=50mA$, $I_B=5.0mA$) | --- | 0.20 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%

PNP Small Signal Transistors

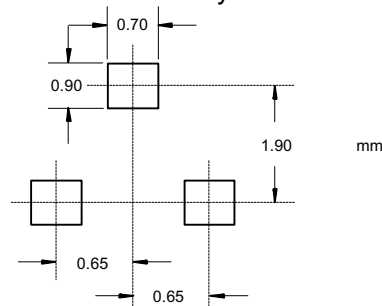
SOT-323



DIMENSIONS

| DIM | INCHES | | MM | | NOTE |
|-----|--------------|------|-------------|------|------|
| | MIN | MAX | MIN | MAX | |
| A | .071 | .087 | 1.80 | 2.20 | |
| B | .045 | .053 | 1.15 | 1.35 | |
| C | .083 | .096 | 2.10 | 2.45 | |
| 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 | .006 | .016 | .15 | .40 | |

Suggested Solder Pad Layout



MMST3906

SMALL SIGNAL CHARACTERISTICS

| | | | | | |
|------------------|--|---|-----|-----|--------------------|
| C _{obo} | Output Capacitance (V _{CB} =5.0Vdc, f=1.0MHz, I _E =0) | | --- | 4.5 | pF |
| C _{ibo} | Input Capacitance (V _{EB} =0.5Vdc, f=1.0MHz, I _C =0) | | --- | 10 | pF |
| h _{ie} | Input Impedance | V _{CE} =10Vdc, I _C =1.0mA, f=1.0KHz | 2.0 | 12 | kohms |
| h _{re} | Voltage Feedback Ratio | | 0.1 | 10 | X 10 ⁻⁴ |
| h _{fe} | Small Signal Current Gain | | 100 | 400 | --- |
| h _{oe} | Output Admittance | | 3.0 | 60 | uS |
| f _T | Current Gain-Bandwidth Product (V _{CE} =20Vdc, I _C =10mA, f=100MHz) | | 300 | --- | MHz |
| NF | Noise Figure (V _{CE} =5.0Vdc, I _C =100uA, R _S =1.0KOHMS, f=1.0KHz) | | --- | 4.0 | dB |

SWITCHING CHARACTERISTICS

| | | | | | |
|-------|--------------|---|-----|-----|----|
| t_d | Delay Time | $V_{CC}=3.0Vdc$, $I_C=10mA$, $V_{BE(off)}=0.5Vdc$, $I_{B1}=1.0mA$ | --- | 35 | ns |
| t_r | Rise Time | $V_{CC}=3.0Vdc$, $I_C=10mA$, $I_{B1}=1.0mA$ | --- | 35 | ns |
| t_s | Storage Time | $V_{CC}=3.0Vdc$, $I_C=10mA$, $I_{B1}=I_{B2}=1.0mA$ | --- | 225 | ns |
| t_f | Fall Time | $V_{CC}=3.0Vdc$, $I_C=10mA$, $I_{B1}=I_{B2}=1.0mA$ | --- | 75 | ns |

Ordering Information :

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

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

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