

Features

- Epitaxial Planar Die Construction
- Complementary NPN Type Available MMST3904
- 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

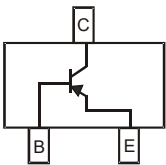
| Parameter | Symbol | Rating | Unit |
|--|-----------|--------|------|
| Collector-Base Voltage | V_{CBO} | -10 | V |
| Collector-Emitter Voltage | V_{CEO} | -10 | V |
| Emitter-Base Voltage | V_{EBO} | -5 | V |
| Collector Current ⁽²⁾ | I_C | -100 | mA |
| Collector Power Dissipation ⁽²⁾ | P_C | 200 | 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.

2. Valid provided that terminals are kept at ambient temperature.

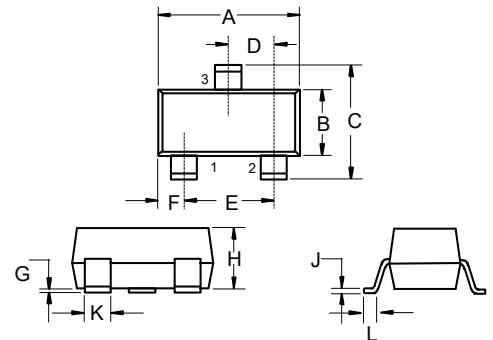
Marking: K5N

Internal Structure



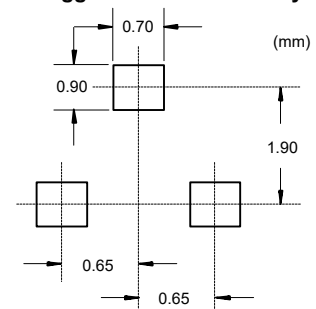
PNP Small Signal Transistors

SOT-323



| DIM | INCHES | | MM | | NOTE |
|-----|--------|-------|------|------|------|
| | 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 @ 25°C Unless Otherwise Specified

| Parameter | Symbol | Min | Typ | Max | Units | Conditions |
|---|---------------|-------|-----|-------|---------------|--|
| Collector-Base Breakdown Voltage ⁽³⁾ | $V_{(BR)CBO}$ | -40 | | | V | $I_C=-10\mu A, I_E=0$ |
| Collector-Emitter Breakdown Voltage ⁽³⁾ | $V_{(BR)CEO}$ | -40 | | | V | $I_C=-1mA, I_B=0$ |
| Emitter-Base Breakdown Voltage ⁽³⁾ | $V_{(BR)EBO}$ | -5 | | | V | $I_E=-10\mu A, I_C=0$ |
| Collector Cutoff Current ⁽³⁾ | I_{CEX} | | | -50 | nA | $V_{CE}=-30V, V_{EB(OFF)}=-3V$ |
| Base Cutoff Current ⁽³⁾ | I_{BL} | | | -50 | nA | $V_{CE}=-30V, V_{EB(OFF)}=-3V$ |
| DC Current Gain ⁽³⁾ | $h_{FE(1)}$ | 60 | | | | $V_{CE}=-1V, I_C=-0.1mA$ |
| | $h_{FE(2)}$ | 80 | | | | $V_{CE}=-1V, I_C=-1mA$ |
| | $h_{FE(3)}$ | 100 | | 300 | | $V_{CE}=-1V, I_C=-10mA$ |
| | $h_{FE(4)}$ | 60 | | | | $V_{CE}=-1V, I_C=-50mA$ |
| | $h_{FE(5)}$ | 30 | | | | $V_{CE}=-1V, I_C=-500mA$ |
| Collector-Emitter Saturation Voltage ⁽³⁾ | $V_{CE(sat)}$ | | | -0.2 | V | $I_C=-10mA, I_B=-1mA$ |
| | | | | -0.3 | V | $I_C=-50mA, I_B=-5mA$ |
| Base-Emitter Saturation Voltage ⁽³⁾ | $V_{BE(sat)}$ | -0.65 | | -0.85 | V | $I_C=-10mA, I_B=-1mA$ |
| | | | | -0.95 | V | $I_C=-50mA, I_B=-5mA$ |
| Output Capacitance | C_{cbo} | | | 4.5 | pF | $V_{CB}=-5V, I_E=0, f=1MHz$ |
| Input Capacitance | C_{ibo} | | | 10 | pF | $V_{EB}=-0.5V, I_C=0, f=1MHz$ |
| Input Impedance | h_{ie} | 2 | | 12 | K Ω | $V_{CE}=-10V, I_C=-1mA, f=1KHz$ |
| Voltage Feedback Ratio | h_{re} | 0.1 | | 10 | $\times 10^4$ | |
| Small Signal Current Gain | h_{fe} | 100 | | 400 | | |
| Output Admittance | h_{oe} | 3 | | 60 | μS | |
| Transition Frequency | f_T | 300 | | | MHz | $V_{CE}=-20V, I_C=-10mA, f=100MHz$ |
| Noise Figure | NF | | | 4 | dB | $V_{CE}=-5V, I_C=-0.1mA$ $R_S=1K\Omega, f=1KHz$ |
| Delay Time | t_d | | | 35 | ns | $V_{CC}=-3V, I_C=-10mA$ |
| Rise Time | t_r | | | 35 | ns | $V_{BE(OFF)}=-0.5V, I_{B1}=-1mA$ |
| Storage Time | t_s | | | 225 | ns | $V_{CC}=-3V, I_C=-10mA$ |
| Fall Time | t_f | | | 75 | ns | $I_{B1}=I_{B2}=-1mA$ |

Note: 3.Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2.0\%$

Curve Characteristics

Fig. 1 - Static Characteristics

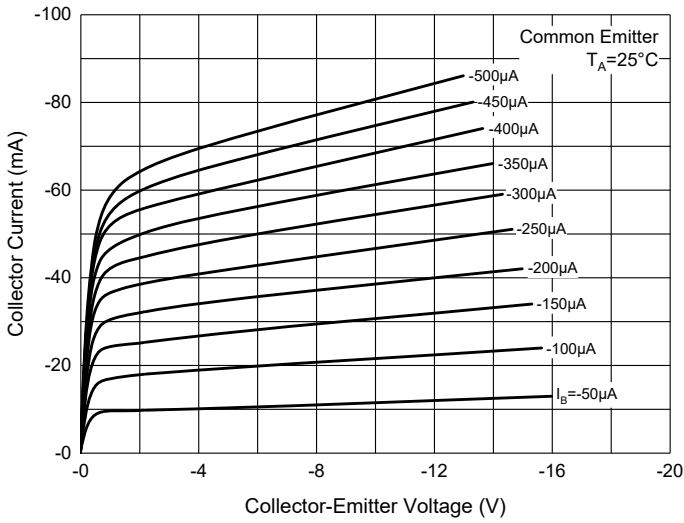


Fig. 2 - DC Current Gain Characteristics

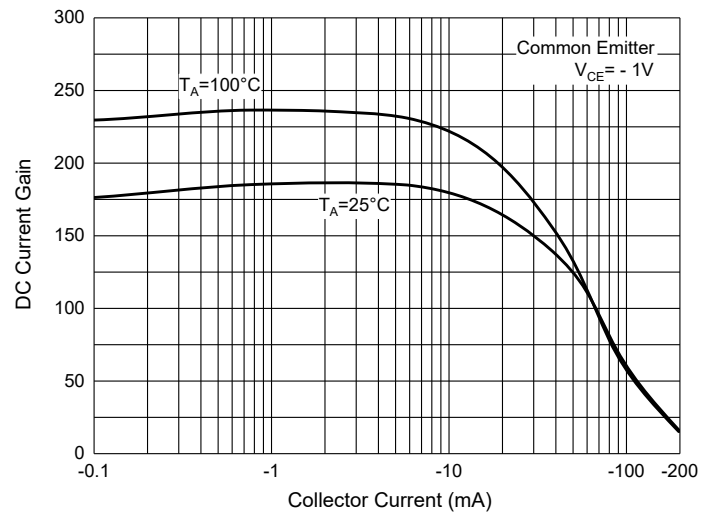


Fig. 3 - Collector-Emmitter Saturation Voltage Characteristics

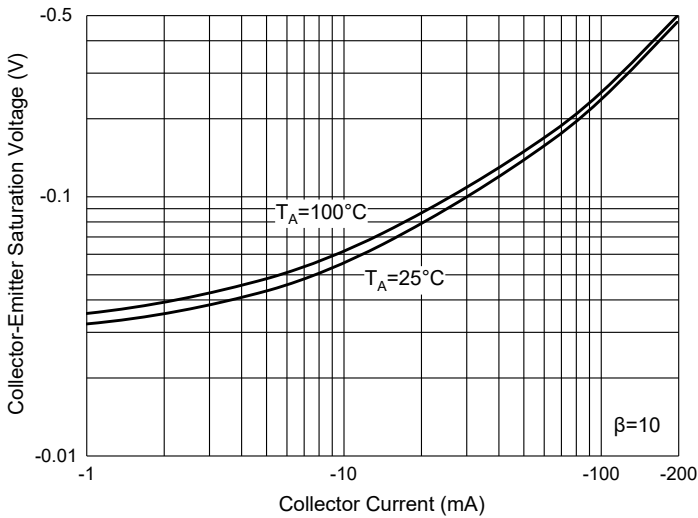


Fig. 4 - Base-Emmitter Saturation Voltage Characteristics

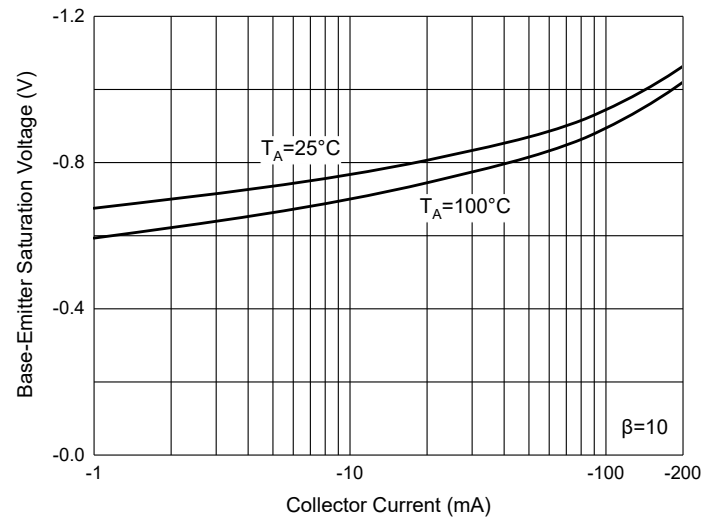


Fig. 5 - Base-Emmitter Voltage Characteristics

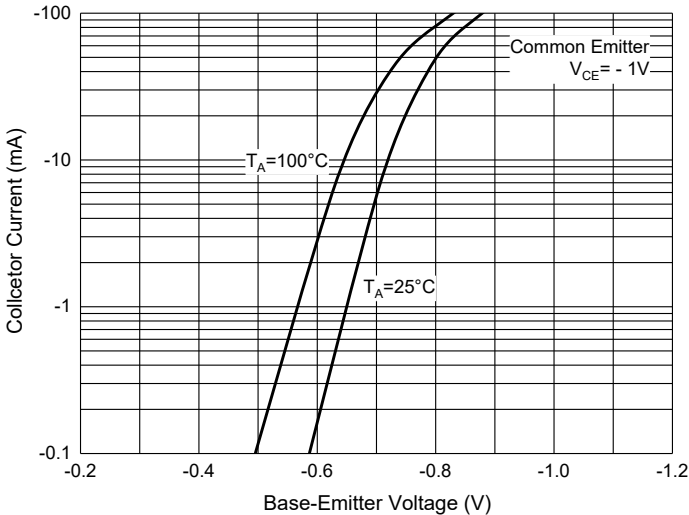
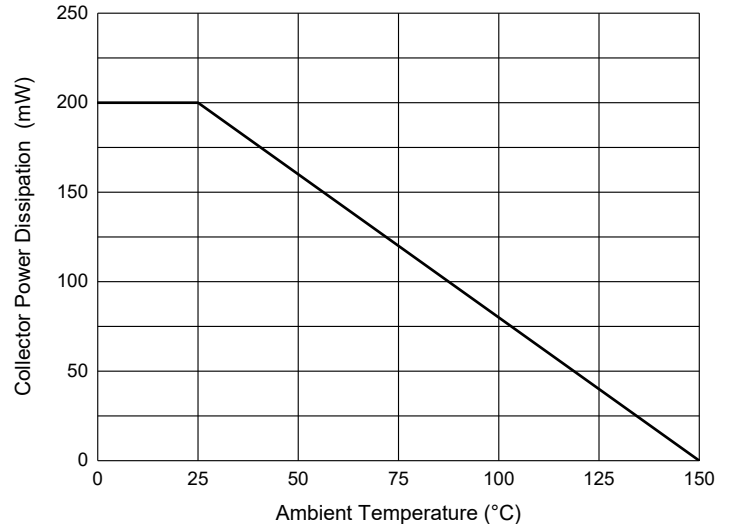


Fig. 6 - Collector Power Derating Curve



Ordering Information

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

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