

2N3904

NPN General Purpose Amplifier

Features

- Lead Free Finish/RoHS Compliant ("P" Suffix designates RoHS Compliant. See ordering information)
- € Capable of 625mW of Power Dissipation and 200mA I_c
- € Epoxy meets UL 94 V-0 flammability rating
- € Moisture Sensitivity Level 1
- € Through Hole Package
- € Halogen free available upon request by adding suffix "-HF"
- Operating Temperature: -55°C to +150°C
- Storage Temperature: -55°C to +150°C

Electrical Characteristics @ 25°C Unless Otherwise Specified

| Symbol | Parameter | Min | Max | Units |
|----------------------------|--|-----|-----|-------|
| OFF CHARACTERISTICS | | | | |
| 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 =10μA, I _E =0) | 60 | | Vdc |
| V _{(BR)EBO} | Emitter-Base Breakdown Voltage (I _E =10μA, I _C =0) | 6.0 | | Vdc |
| I _{BL} | Base Cutoff Current (V _{CE} =30Vdc, V _{BE} =3.0Vdc) | | 50 | nA |
| I _{CEX} | Collector Cutoff Current (V _{CE} =30Vdc, V _{BE} =3.0Vdc) | | 50 | nA |

ON CHARACTERISTICS

| | | | | |
|----------------------|--|------|--------------|-----|
| h _{FE} | DC Current Gain* (I _C =0.1mA, 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 =100mA, V _{CE} =1.0Vdc) | 40 | 300 | Vdc |
| | | 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) | | 0.2 0.4 | 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 |

SMALL-SIGNAL CHARACTERISTICS

| | | | | |
|------------------|--|-----|-----|-----|
| f _T | Current Gain-Bandwidth Product (I _C =10mA, V _{CE} =20Vdc, f=100MHz) | 250 | | MHz |
| C _{obo} | Output Capacitance (V _{CB} =5.0Vdc, I _E =0, f=1.0MHz) | | 4.0 | pF |
| C _{ibo} | Input Capacitance (V _{BE} =0.5Vdc, I _C =0, f=1.0MHz) | | 8.0 | pF |
| NF | Noise Figure (I _C =100μA, V _{CE} =5.0Vdc, R _S =1.0kΩ f=10Hz to 15.7kHz) | | 5.0 | dB |

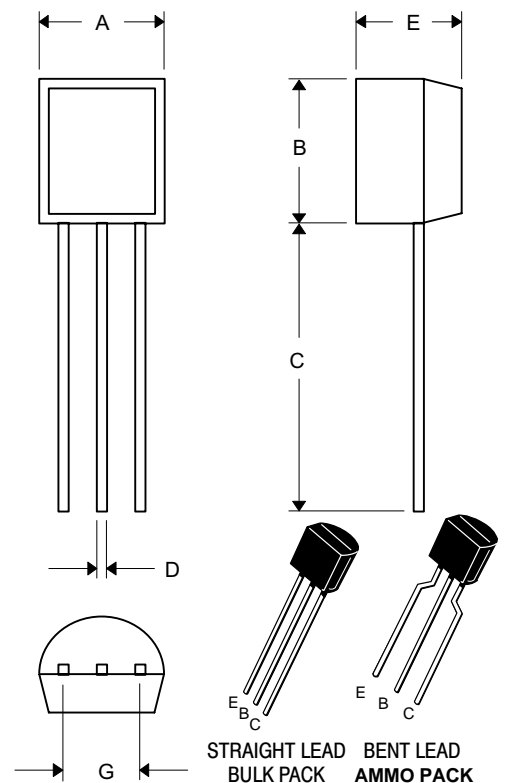
SWITCHING CHARACTERISTICS

| | | | | |
|----------------|--------------|--|-----|----|
| t _d | Delay Time | (V _{CC} =3.0Vdc, V _{BE} =0.5Vdc) | 35 | ns |
| t _r | Rise Time | (I _C =10mA, I _{B1} =1.0mA) | 35 | ns |
| t _s | Storage Time | (V _{CC} =3.0Vdc, I _C =10mA) | 200 | ns |
| t _f | Fall Time | (I _{B1} =I _{B2} =1.0mA) | 50 | ns |

*Pulse Width ≤ 300μs, Duty Cycle ≤ 2.0%

| Symbol | Characteristic | Max | Unit |
|------------------|---|-----|------|
| R _{θJA} | Thermal Resistance, Junction-to-Ambient | 200 | °C/W |

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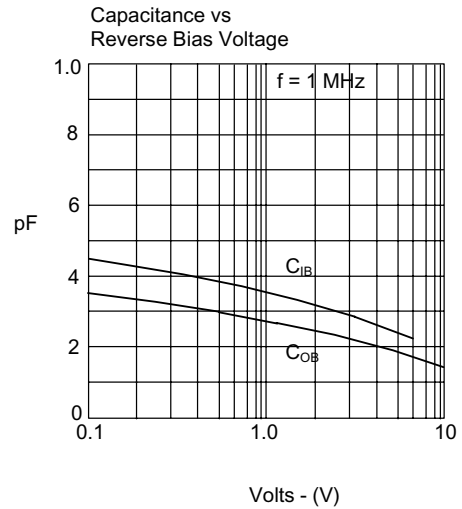
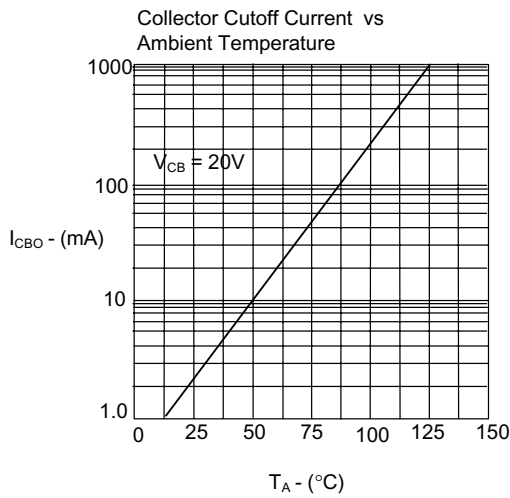
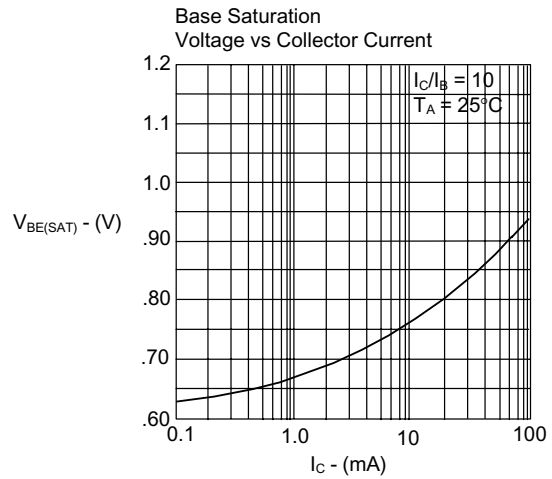
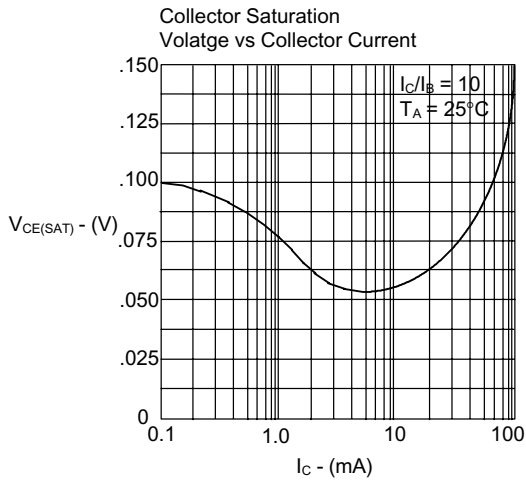
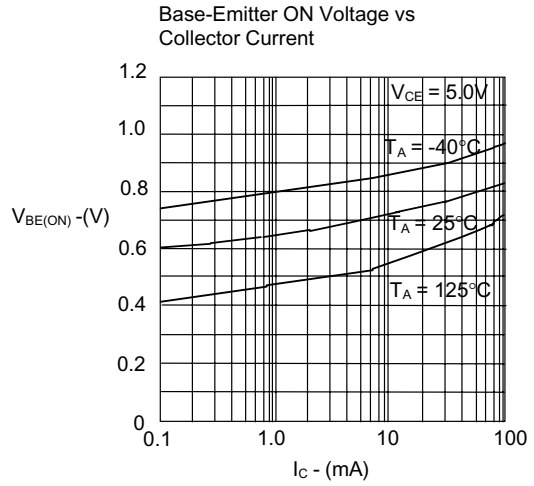
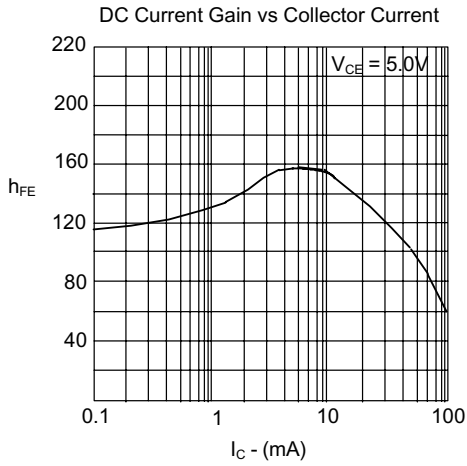


STRAIGHT LEAD BULK PACK BENT LEAD AMMO PACK

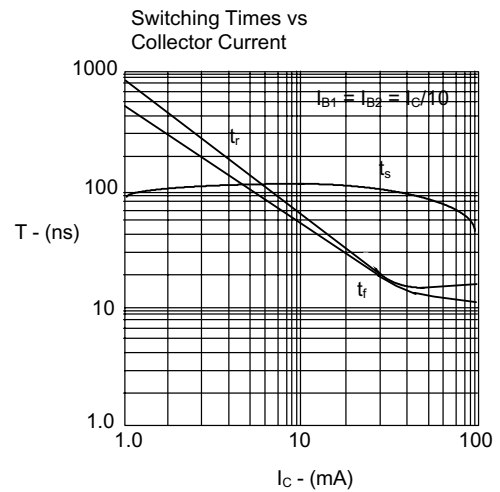
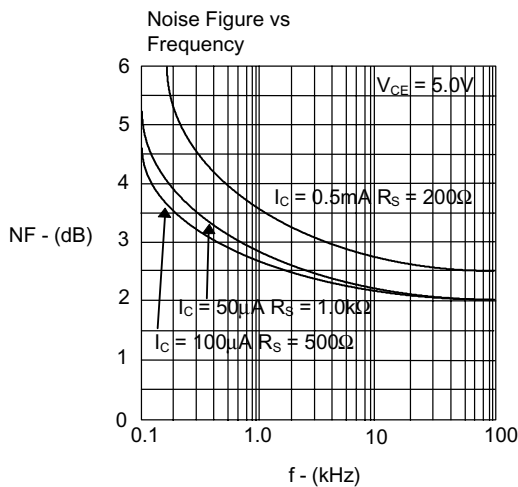
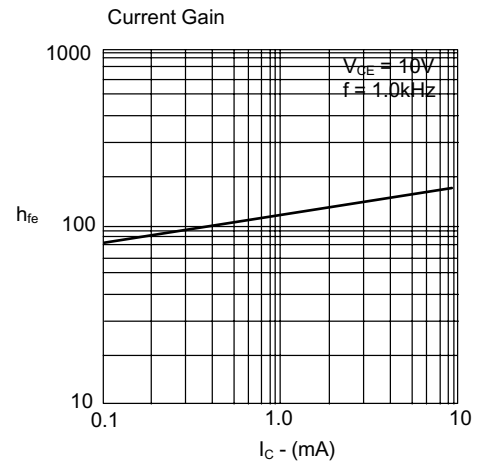
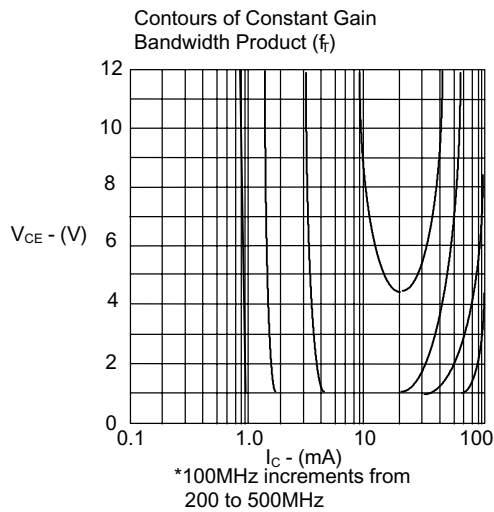
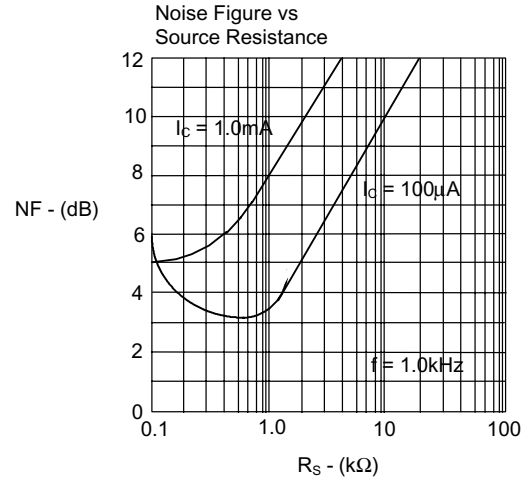
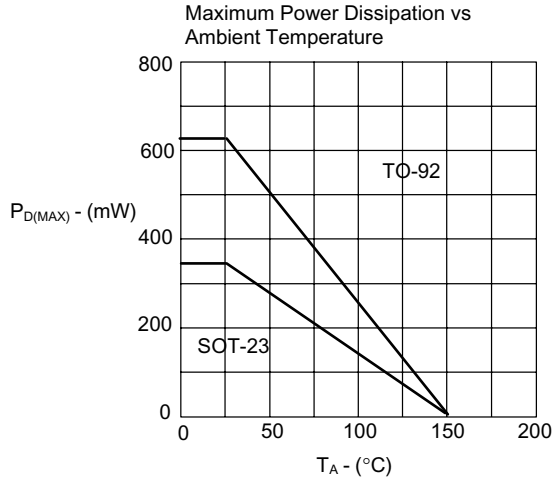
DIMENSIONS

| DIM | INCHES | | MM | | NOTE |
|-----|--------|------|-------|------|---------------|
| | MIN | MAX | MIN | MAX | |
| A | .175 | .185 | 4.45 | 4.70 | |
| B | .175 | .185 | 4.45 | 4.70 | |
| C | .500 | --- | 12.70 | --- | |
| D | .016 | .020 | 0.41 | 0.63 | |
| E | .135 | .145 | 3.43 | 3.68 | |
| G | .095 | .105 | 2.42 | 2.67 | Straight Lead |
| | .173 | .220 | 4.40 | 5.60 | Bent Lead |

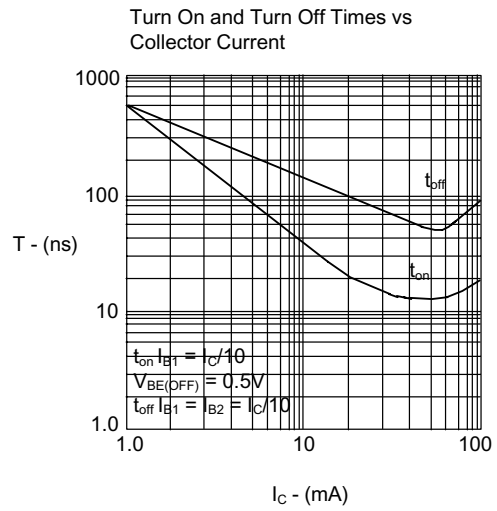
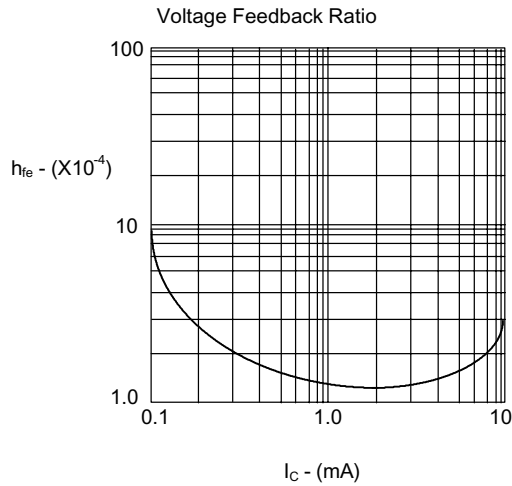
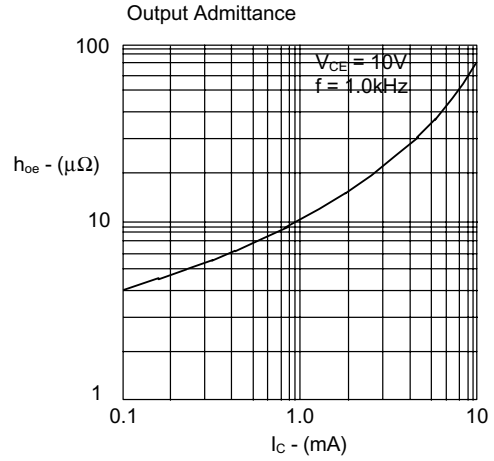
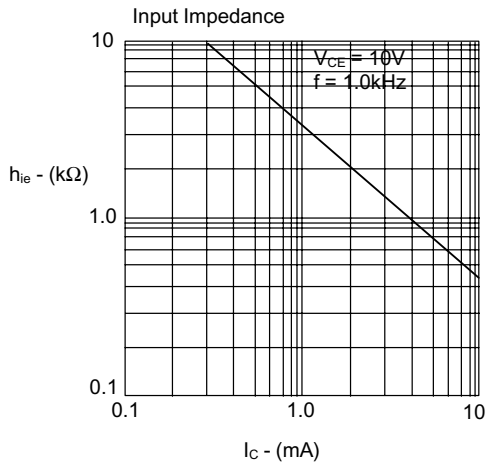
* For ammo packing detailed specification, click here to visit our website of product packaging for details.



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TM

Micro Commercial Components

Ordering Information :

| Device | Packing |
|----------------|-----------------------------|
| Part Number-AP | Ammo Packing: 20Kpcs/Carton |
| Part Number-BP | Bulk: 100Kpcs/Carton |

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

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