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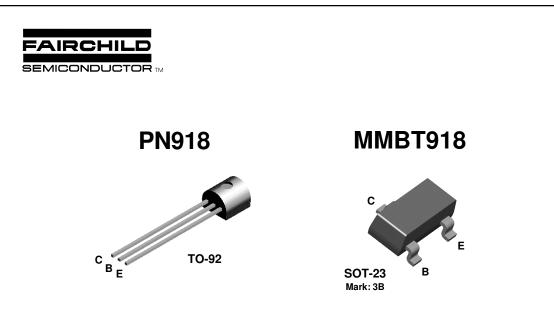
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NPN RF Transistor

This device is designed for use as RF amplifiers, oscillators and multipliers with collector currents in the 1.0 mA to 30 mA range. Sourced from Process 43.

Absolute Maximum Ratings* TA = 25°C unless otherwise noted

| Symbol | Parameter | Value | Units |
|-----------------------------------|--|-------------|-------|
| V _{CEO} | Collector-Emitter Voltage | 15 | V |
| V _{CBO} | Collector-Base Voltage | 30 | V |
| V _{EBO} | Emitter-Base Voltage | 3.0 | V |
| Ic | Collector Current - Continuous | 50 | mA |
| T _J , T _{stg} | Operating and Storage Junction Temperature Range | -55 to +150 | °C |

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:

1) These ratings are based on a maximum junction temperature of 150 degrees C.
2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Thermal Characteristics TA = 25°C unless otherwise noted

| Symbol | Characteristic | Max Unit | | Units |
|-----------------|---|----------|----------|-------|
| | | PN918 | *MMBT918 | |
| P _D | Total Device Dissipation | 350 | 225 | mW |
| | Derate above 25°C | 2.8 | 1.8 | mW/°C |
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | 125 | | °C/W |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 357 | 556 | °C/W |

*Device mounted on FR-4 PCB 1.6" X 1.6" X 0.06."

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NPN RF Transistor

(continued)

| Electrical | Characteristics |
|------------|-----------------|
| | |

|--|

 $TA = 25^{\circ}C$ unless otherwise noted

OFF CHARACTERISTICS

-

| V _{CEO(sus)} | Collector-Emitter Sustaining Voltage* | $I_{\rm C} = 3.0 \text{ mA}, I_{\rm B} = 0$ | 15 | | V |
|-----------------------|---------------------------------------|---|-----|------|----|
| V _{(BR)CBO} | Collector-Base Breakdown Voltage | $I_{C} = 1.0 \ \mu A, \ I_{E} = 0$ | 30 | | V |
| V _{(BR)EBO} | Emitter-Base Breakdown Voltage | $I_{\rm E} = 10 \ \mu {\rm A}, \ I_{\rm C} = 0$ | 3.0 | | V |
| I _{CBO} | Collector Cutoff Current | $V_{CB} = 15 \text{ V}, \text{ I}_{E} = 0$ | | 0.01 | μA |
| | | V _{CB} = 15 V, T _A = 150°C | | 1.0 | μA |

ON CHARACTERISTICS

| h _{FE} | DC Current Gain | $I_{C} = 3.0 \text{ mA}, V_{CE} = 1.0 \text{ V}$ | 20 | | |
|----------------------|--------------------------------------|--|----|-----|---|
| V _{CE(sat)} | Collector-Emitter Saturation Voltage | $I_{\rm C} = 10$ mA, $I_{\rm B} = 1.0$ mA | | 0.4 | V |
| V _{BE(sat)} | Base-Emitter Saturation Voltage | $I_{\rm C} = 10$ mA, $I_{\rm B} = 1.0$ mA | | 1.0 | V |

SMALL SIGNAL CHARACTERISTICS

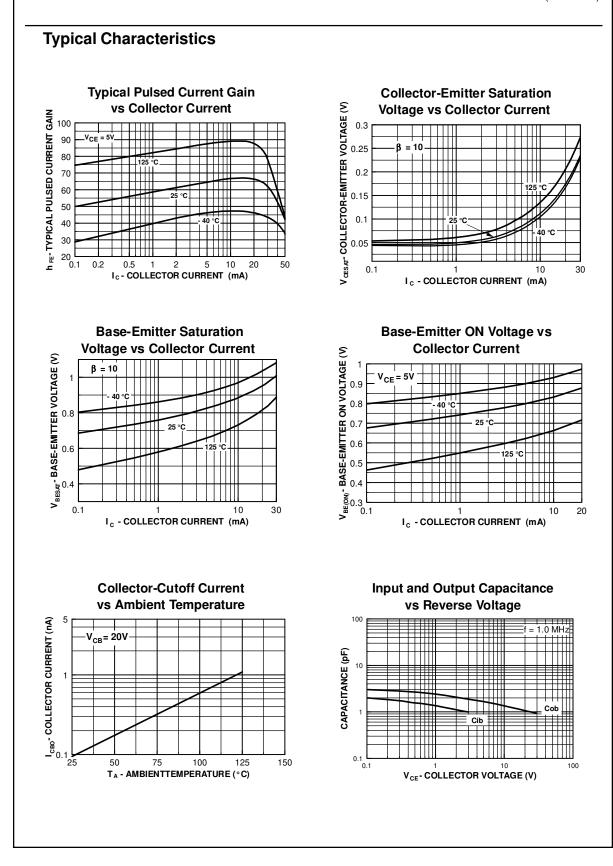
| f _T | Current Gain - Bandwidth Product | $I_{C} = 4.0 \text{ mA}, V_{CE} = 10 \text{ V},$ f = 100 MHz | 600 | | MHz |
|------------------|----------------------------------|---|-----|------------|----------|
| C _{obo} | Output Capacitance | $V_{CB} = 10 \text{ V}, I_E = 0, f = 1.0 \text{ MHz}$ $V_{CB} = 0, I_E = 0, f = 1.0 \text{ MHz}$ | | 1.7 3.0 | pF pF |
| C _{ibo} | Input Capacitance | $V_{BE} = 0.5 \text{ V}, I_{C} = 0, f = 1.0 \text{ MHz}$ | | 2.0 | pF |
| NF | Noise Figure | $I_{C} = 1.0 \text{ mA}, V_{CE} = 6.0 \text{ V}, R_{G} = 400\Omega, f = 60 \text{ MHz}$ | | 6.0 | dB |

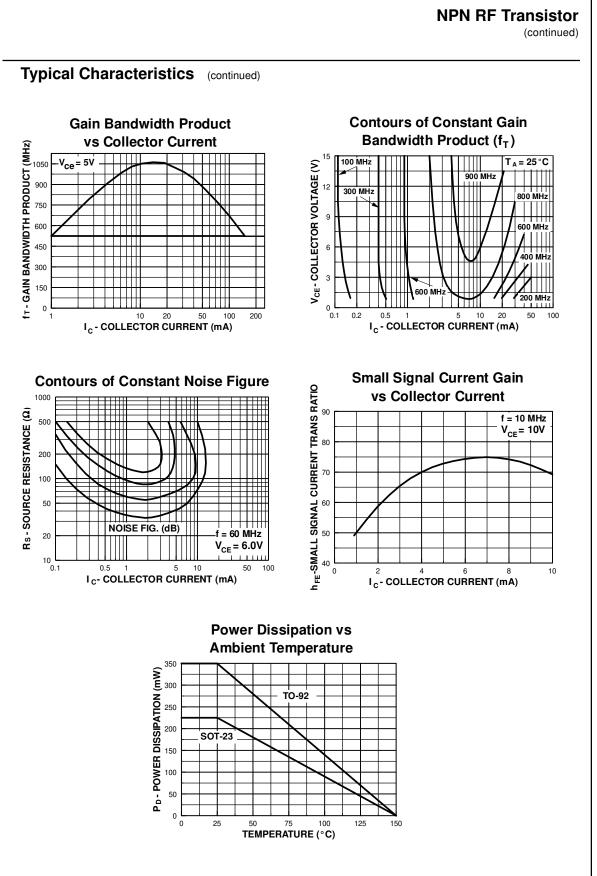
FUNCTIONAL TEST

| G _{pe} | Amplifier Power Gain | $V_{CB} = 12 \text{ V}, \text{ I}_{C} = 6.0 \text{ mA},$ f = 200 MHz | 15 | dB |
|-----------------|----------------------|---|----|----|
| Po | Power Output | $V_{CB} = 15 \text{ V}, I_{C} = 8.0 \text{ mA},$ f = 500 MHz | 30 | mW |
| η | Collector Efficiency | $V_{CB} = 15 \text{ V}, \text{ I}_{C} = 8.0 \text{ mA},$ f = 500 MHz | 25 | % |

*Pulse Test: Pulse Width \leq 300 $\mu s,$ Duty Cycle \leq 2.0%

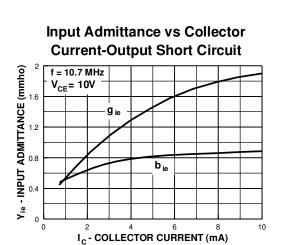
NPN RF Transistor (continued)



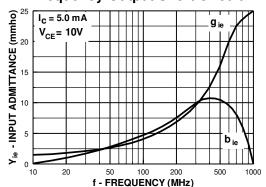


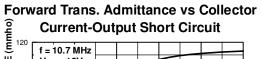


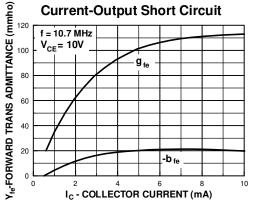
Common Emitter Y Parameters vs. Frequency

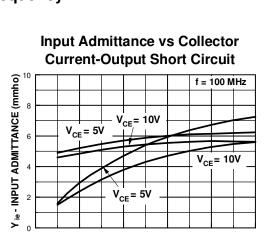


Input Admittance vs Frequency-Output Short Circuit









6

I_C - COLLECTOR CURRENT (mA)

8

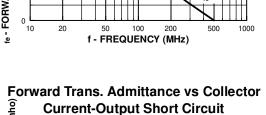
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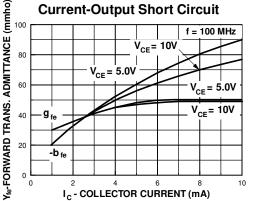
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PN918 / MMBT918

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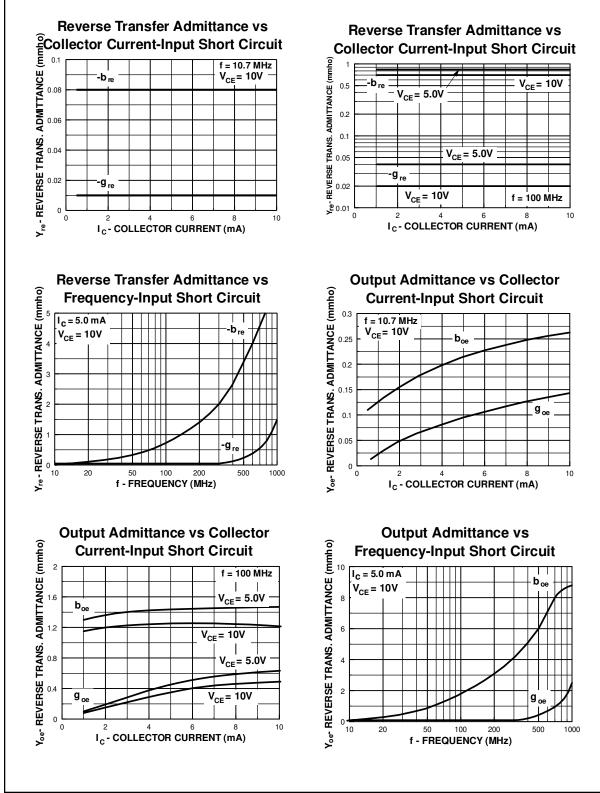
Forward Transfer Admittance vs 16 - FORWARD TRANS. ADMITTANCE (mmho) 09 09 09 00 **Frequency-Output Open Circuit** l_c = 5.0 mA V_{CE} = 10V ۰b g_{fc}





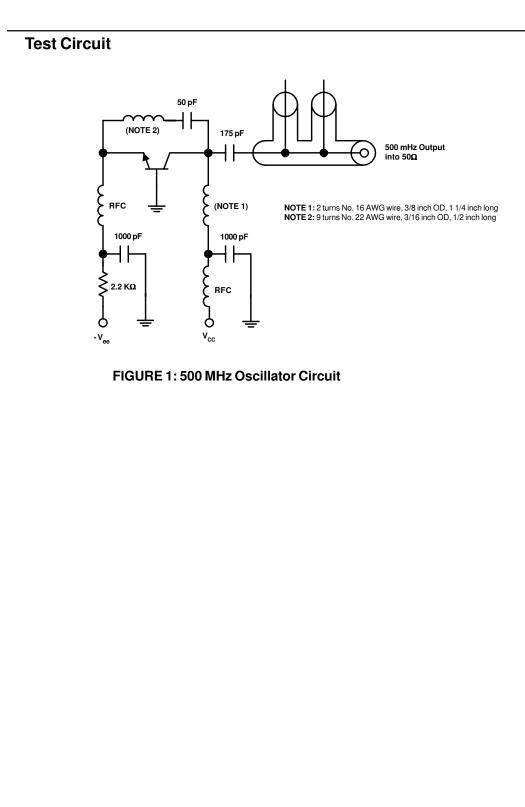
NPN RF Transistor

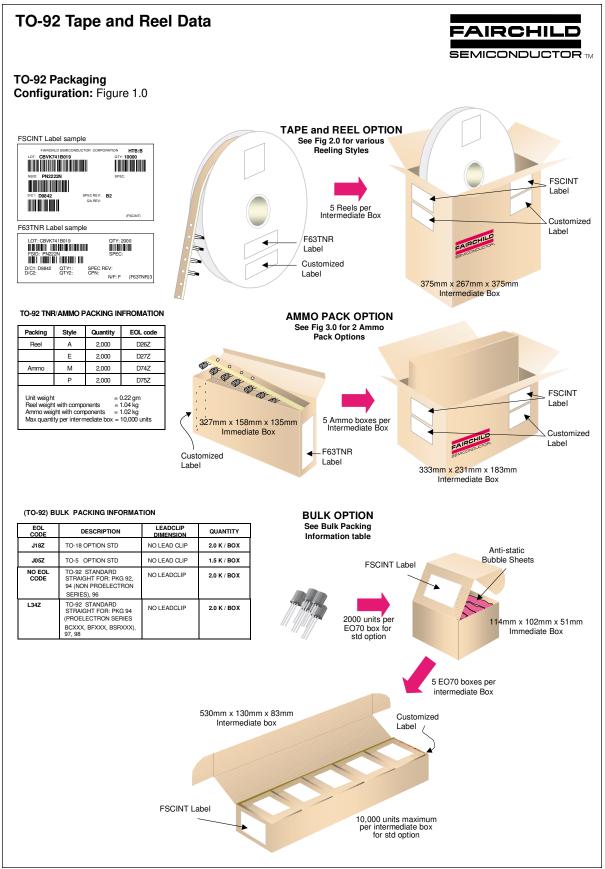
Common Emitter Y Parameters vs. Frequency (continued)





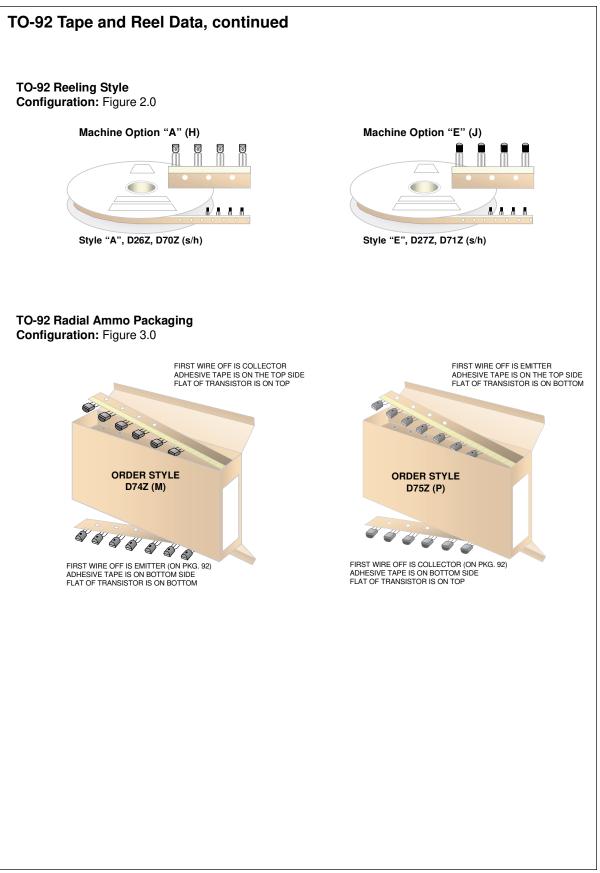


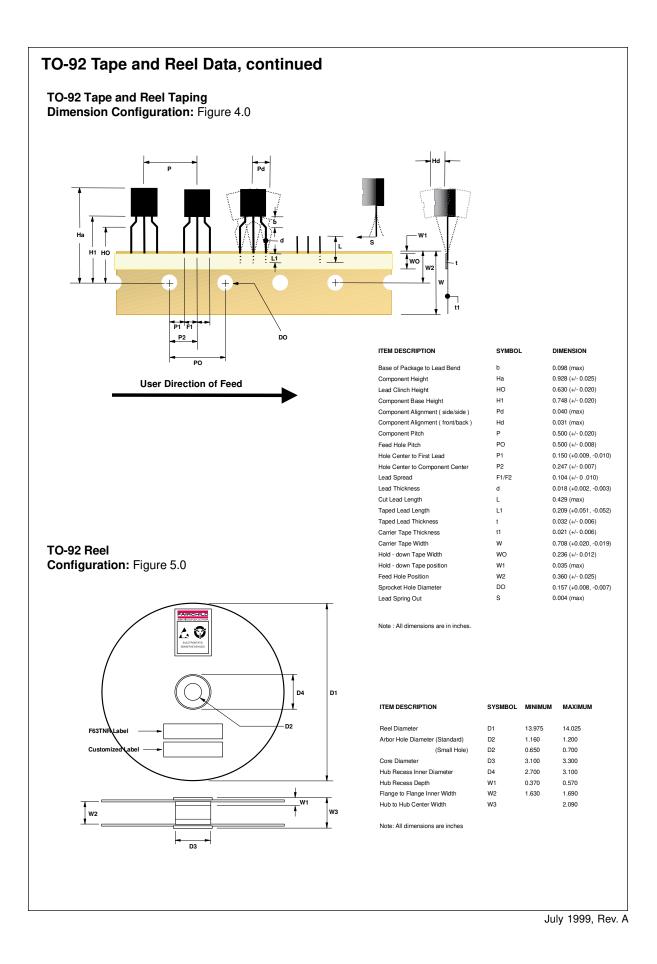


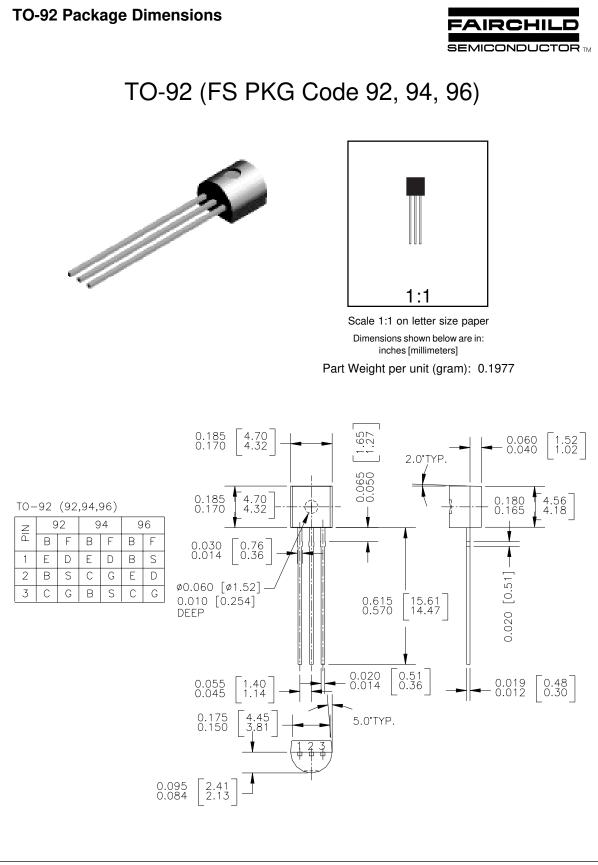


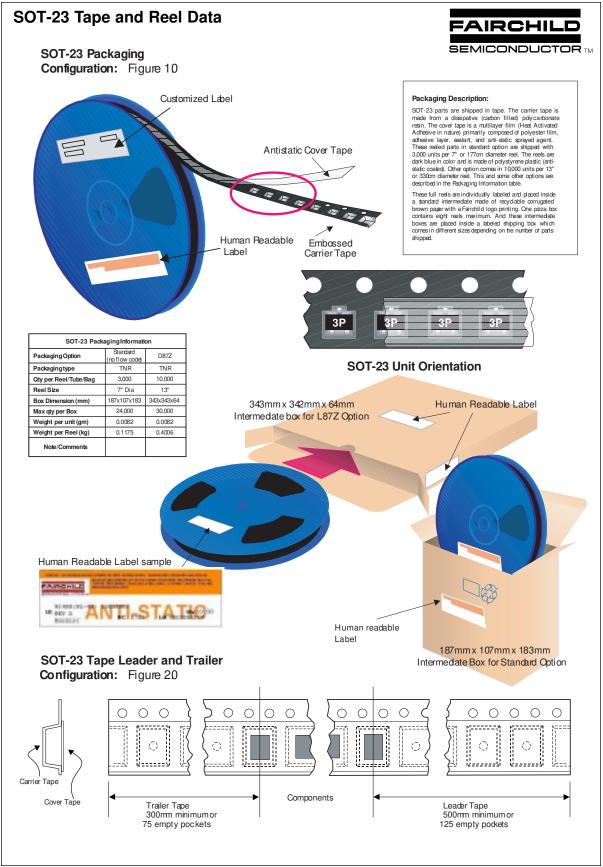
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March 2001, Rev. B1



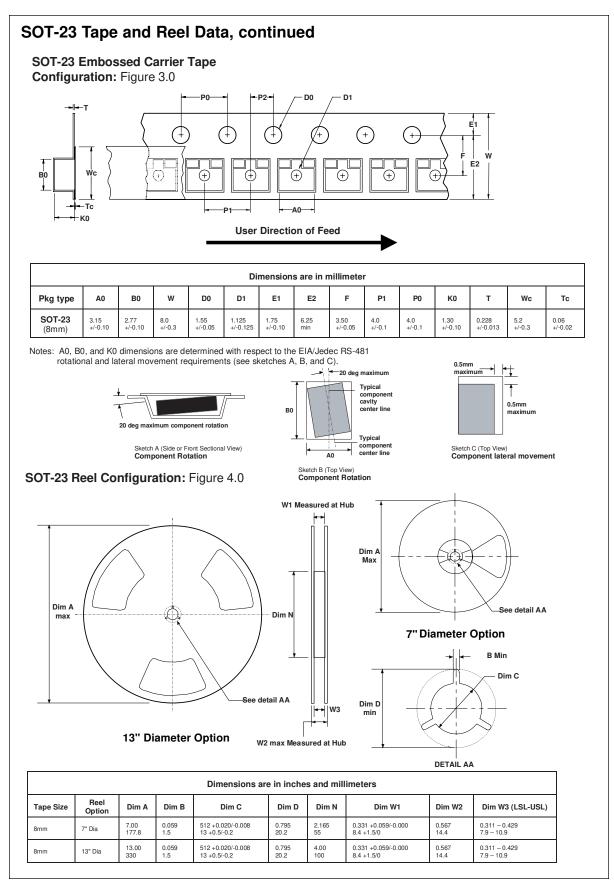




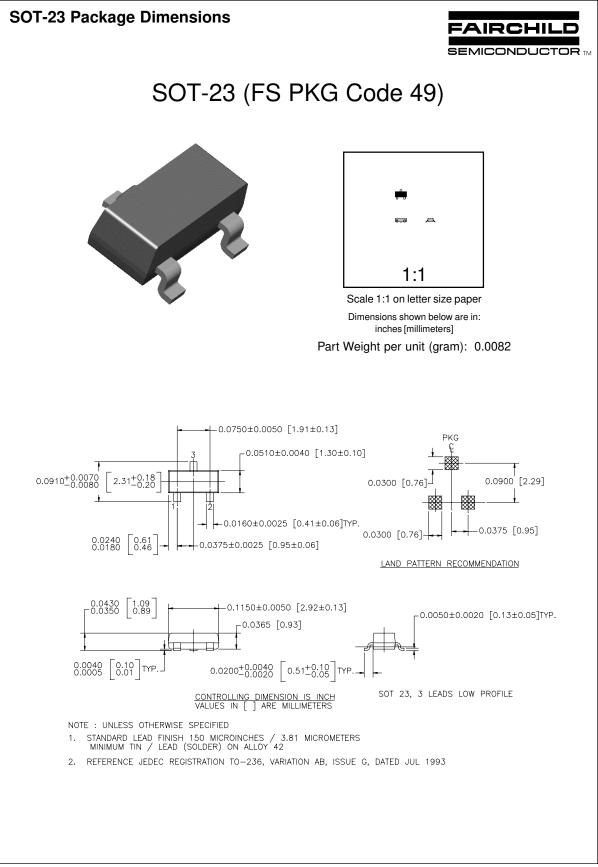


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