

DIGITRON SEMICONDUCTORS

2N5431

PN SILICON ANNULAR UNIJUNCTION TRANSISTOR

MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Rating | Symbol | Value | Unit |
|---|------------|-------------|------------------|
| RMS power dissipation ⁽¹⁾ | P_D | 360 | mW |
| RMS emitter current | I_e | 50 | mA |
| Peak pulse emitter current ⁽²⁾ | I_e | 1.5 | Amp |
| Emitter reverse voltage | V_{B2E} | 30 | Volts |
| Interbase voltage ⁽³⁾ | V_{B2B1} | 35 | Volts |
| Operating junction temperature range | T_J | -65 to +125 | $^\circ\text{C}$ |
| Storage temperature range | T_{stg} | -65 to +200 | $^\circ\text{C}$ |

1. Derate 3 mW/ $^\circ\text{C}$ increase in ambient temperature.
2. Duty cycle $\leq 1\%$, PRR = 10 PPS.
3. Based upon power dissipation at $T_A = 25^\circ\text{C}$.

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic | Symbol | Min | Max | Unit |
|---|-----------------|------|----------|---------------------|
| Intrinsic standoff ratio ⁽¹⁾ ($V_{B2B1} = 10\text{V}$) | η | 0.72 | 0.80 | - |
| Interbase resistance ($V_{B2B1} = 3\text{V}$, $I_E = 0$) | R_{BB} | 6 | 8.5 | k Ω |
| Interbase resistance temperature coefficient ($V_{B2B1} = 3\text{V}$, $I_E = 0$, $T_A = 0$ to 100°C) | αR_{BB} | 0.4 | 0.8 | %/ $^\circ\text{C}$ |
| Emitter saturation voltage ⁽²⁾ ($V_{B2B1} = 10\text{V}$, $I_E = 50\text{mA}$) | $V_{EB1(sat)}$ | - | 3 | Volts |
| Modulated interbase current ($V_{B2B1} = 10\text{V}$, $I_E = 50\text{mA}$) | $I_{B2(mod)}$ | 5 | 30 | mA |
| Emitter reverse current ($V_{B2E} = 30\text{V}$, $I_{B1} = 0$) | I_{EB20} | - | 10 | nA |
| Peak point emitter current ($V_{B2B1} = 25\text{V}$) ($V_{B2B1} = 4\text{V}$) | I_P | - | 0.4 4 | μA |
| Valley point current ⁽²⁾ ($V_{B2B1} = 20\text{V}$, $R_{B2} = 100\text{ohms}$) | I_V | 2 | - | mA |
| Base one peak pulse voltage ($V_{BB} = 4\text{V}$) | V_{OB1} | 1 | - | Volts |

1. η . Intrinsic standoff ratio is defined in terms of the peak point voltage, V_P , by means of the equation: $V_P = \eta V_{B2B1} + V_F$, where V_F is about 0.45V at 25°C @ $I_F = 10\mu\text{A}$ and decreases with temperature at about 2.5 mV/ $^\circ\text{C}$. Components R_1 , C_1 and the UJT form a relaxation oscillator, the remaining circuitry serves as a peak voltage detector. The forward drop of diode D_1 compensates for V_F . To use, the "cal" button is pushed, and R_3 is adjusted to make the current meter, M_1 , read full scale. When the "cal" button is released, the value of η is read directly from the meter, if full scale on the meter reads 1.
2. $PW = 300\mu\text{s}$, duty cycle $\leq 2\%$ to avoid internal heating, which may result erroneous readings.

FIGURE 1 - UNIJUNCTION TRANSISTOR SYMBOL AND NOMENCLATURE

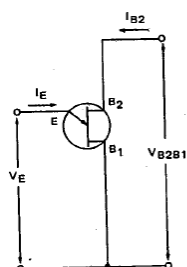
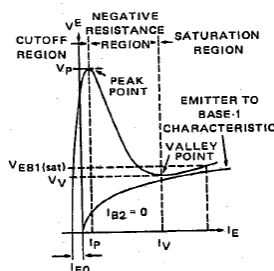


FIGURE 2 - STATIC EMITTER CHARACTERISTICS CURVES



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FIGURE 3 - V_{OB1} TEST CIRCUIT

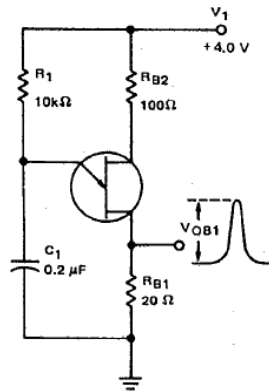


FIGURE 4 - η TEST CIRCUIT

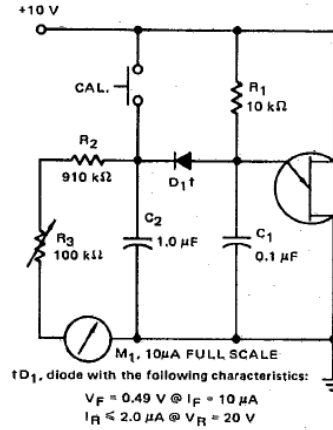
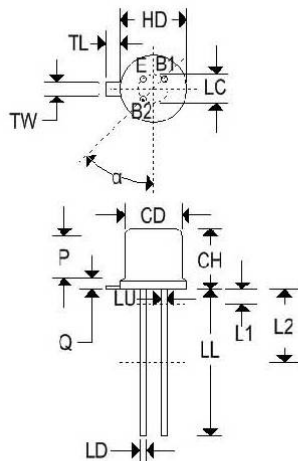
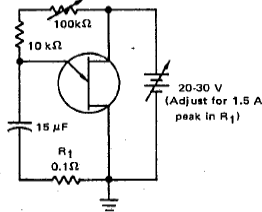
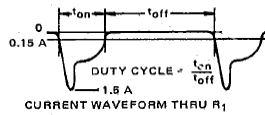


FIGURE 5 - PRR TEST CIRCUIT AND WAVEFORM

DUTY CYCLE $\leq 1.0\%$, PRR ≤ 10 PPS



| Dim | TO-18 | | | |
|----------------|----------|-------|-------------|--------|
| | Inches | | Millimeters | |
| | Min | Max | Min | Max |
| CD | 0.178 | 0.195 | 4.520 | 4.950 |
| CH | 0.170 | 0.210 | 4.320 | 5.330 |
| HD | 0.209 | 0.230 | 5.310 | 5.840 |
| LC | 0.100 TP | | 2.540 TP | |
| LD | 0.016 | 0.021 | 0.410 | 0.530 |
| LL | 0.500 | 0.750 | 12.700 | 19.050 |
| LU | 0.016 | 0.019 | 0.410 | 0.480 |
| L ₁ | - | 0.050 | - | 1.270 |
| L ₂ | 0.250 | - | 6.350 | - |
| P | 0.100 | - | 2.540 | - |
| Q | - | 0.040 | - | 1.020 |
| TL | 0.028 | 0.048 | 0.710 | 1.220 |
| TW | 0.036 | 0.046 | 0.910 | 1.170 |
| α | 45° TP | | 45° TP | |

Available Non-RoHS (standard) or RoHS compliant (add PBF suffix).

Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.

144 Market Street
Kenilworth NJ 07033 USA

phone +1.908.245-7200
fax +1.908.245-0555

sales@digitroncorp.com
www.digitroncorp.com