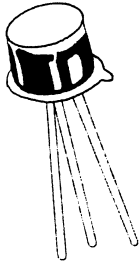


NPN SILICON PLANAR SWITCHING TRANSISTORS

**2N2221A
 2N2222A
 TO-18**



Switching And Linear Application DC And VHF Amplifier Applications

ABSOLUTE MAXIMUM RATINGS

| DESCRIPTION | SYMBOL | 2N2221A,22A | UNIT |
|--------------------------------------------------|----------|-------------|----------|
| Collector -Emitter Voltage | VCEO | 40 | V |
| Collector -Base Voltage | VCBO | 75 | V |
| Emitter -Base Voltage | VEBO | 6.0 | V |
| Collector Current Continuous | IC | 800 | mA |
| Power Dissipation @Ta=25 degC | PD | 500 | mW |
| Derate Above 25deg C | | 2.28 | mW/deg C |
| @ Tc=25 degC | PD | 1.2 | W |
| Derate Above 25deg C | | 6.85 | mW/deg C |
| Operating And Storage Junction Temperature Range | Tj, Tstg | -65 to +200 | deg C |

ELECTRICAL CHARACTERISTICS (Ta=25 deg C Unless Otherwise Specified)

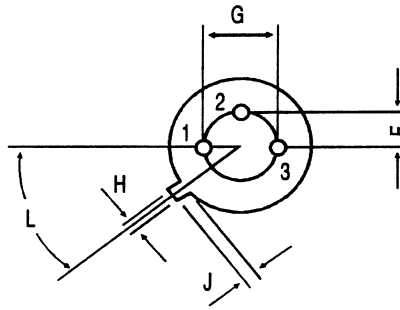
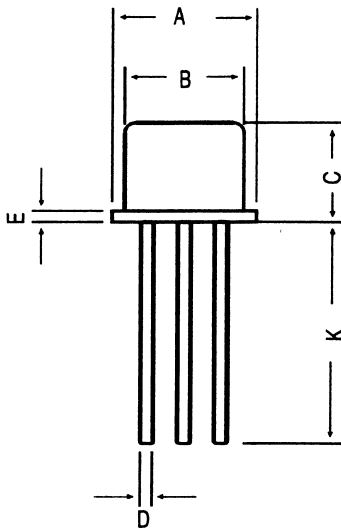
| DESCRIPTION | SYMBOL | TEST CONDITION | VALUE | | UNIT |
|--------------------------------------|------------|------------------|-------|---------|------|
| | | | MIN | MAX | |
| Collector -Emitter Voltage | VCEO | IC=10mA,IB=0 | 40 | - | V |
| Collector -Base Voltage | VCBO | IC=10uA,IE=0 | 75 | - | V |
| Emitter-Base Voltage | VEBO | IE=10uA, IC=0 | 6.0 | - | V |
| Collector-Cut off Current | ICBO | VCB=60V, IE=0 | - | 10 | nA |
| | | Ta=150 deg C | | | |
| | | VCB=60V, IE=0 | - | 10 | uA |
| | ICEX | VCE=60V, VEB=3V | - | 10 | nA |
| Emitter-Cut off Current | IEBO | VEB=3V, IC=0 | - | 10 | nA |
| Base-Cut off Current | IBL | VCE=60V, VEB=3V | - | 20 | nA |
| Collector Emitter Saturation Voltage | VCE(Sat)* | IC=150mA,IB=15mA | - | 0.3 | V |
| | | IC=500mA,IB=50mA | | 1.0 | V |
| Base Emitter Saturation Voltage | VBE(Sat) * | IC=150mA,IB=15mA | - | 0.6-1.2 | V |
| | | IC=500mA,IB=50mA | - | 2.0 | V |

ELECTRICAL CHARACTERISTICS (Ta=25 deg C Unless Otherwise Specified) 2N2221A to 2N2222A

| DESCRIPTION | SYMBOL | TEST CONDITION | 2221A | 2222A | UNIT | |
|---------------------------------------------------------|---------|----------------------------------------|---------|-----------|-------|--|
| DC Current Gain | hFE | IC=0.1mA, VCE=10V | >20 | >35 | | |
| | | IC=1mA, VCE=10V | >25 | >50 | | |
| | | IC=10mA, VCE=10V | >35 | >75 | | |
| | | Ta=55 deg C | | | | |
| | | IC=10mA, VCE=10V | >15 | >35 | | |
| | | IC=150mA, VCE=10V | 40-120 | 100-300 | | |
| | | IC=150mA, VCE=1V | >20 | >50 | | |
| | | IC=500mA, VCE=10V | >25 | >40 | | |
| <u>DYNAMIC CHARACTERISTICS</u> | | | | | | |
| ALL f=1kHz | | | | | | |
| Small Signal Current Gain | hfe | IC=1mA, VCE=10V | 30-150 | 50-300 | | |
| | | IC=10mA, VCE=10V | 50-300 | 75-375 | | |
| Input Impedance | hie | IC=1mA, VCE=10V | 1.0-3.5 | 2.0-8.0 | kohms | |
| | | IC=10mA, VCE=10V | 0.2-1.0 | 0.25-1.25 | | |
| Voltage Feedback Ratio | hre | IC=1mA, VCE=10V | <5.0 | <8.0 | x10-4 | |
| | | IC=10mA, VCE=10V | <2.5 | <4.0 | | |
| Out put Admittance | hoe | IC=1mA, VCE=10V | 3.0-15 | 5.0-35 | umhos | |
| | | IC=10mA, VCE=10V | 10-100 | 25-200 | | |
| Collector Base Time Constant | rb'Cc | IE=20mA, VCB=20V f=31.8MHz | <150 | <150 | ps | |
| Real Part Common-Emitter High Frequency Input Impedance | Re(hie) | IC=20mA, VCE=20V f=300MHz | <60 | <60 | ohms | |
| Noise Figure | NF | IC=100uA, VCE=10V Rs=1kohms, f=1kHz | - | <4.0 | dB | |
| <u>DYNAMIC CHARACTERISTICS</u> | | | | | | |
| Transistors Frequency | ft | IC=20mA, VCE=20V f=100MHz | >250 | >300 | MHz | |
| Out-Put Capacitance | Cob | VCB=10V, IE=0 f=100kHz | <8.0 | <8.0 | pF | |
| Input Capacitance | Cib | VEB=0.5V, IC=0 f=100kHz | <25 | <25 | pF | |
| <u>SWITCHING Time</u> | | | | | | |
| Delay time | td | IC=150mA, IB1=15mA | | <10 | ns | |
| Rise time | tr | VCC=30V, VBE=0.5V - | | <25 | ns | |
| Storage time | ts | IC=150mA, IB1= | | <225 | ns | |
| Fall time | tf | IB2=15mA, VCC=30V - | | <60 | ns | |

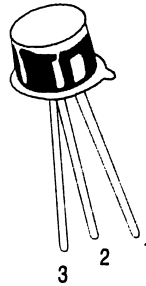
***Pulse Condition: Pulse Width=300us, Duty Cycle=2%**

TO-18 Metal Can Package



All dimensions in mm.

| DIM | MIN | MAX |
|-----|--------|------|
| A | 5.24 | 5.84 |
| B | 4.52 | 4.97 |
| C | 4.31 | 5.33 |
| D | 0.40 | 0.53 |
| E | — | 0.76 |
| F | — | 1.27 |
| G | — | 2.97 |
| H | 0.91 | 1.17 |
| J | 0.71 | 1.21 |
| K | 12.70 | — |
| L | 45 DEG | |



PIN CONFIGURATION

1. EMITTER
2. BASE
3. COLLECTOR

Packing Detail

| PACKAGE | STANDARD PACK | | INNER CARTON BOX | | OUTER CARTON BOX | | |
|---------|---------------|----------------|------------------|------|-------------------|-------|--------|
| | Details | Net Weight/Qty | Size | Qty | Size | Qty | Gr Wt |
| TO-18 | 1K/polybag | 350 gm/1K pcs | 3" x 7.5" x 7.5" | 5.0K | 17" x 15" x 13.5" | 80.0K | 34 kgs |