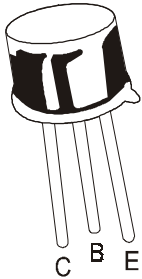


NPN SILICON PLANAR EPITAXIAL TRANSISTORS

2N1613



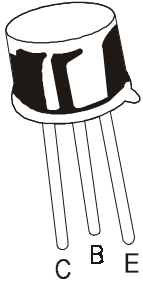
**TO-39
Metal Can Package**

ABSOLUTE MAXIMUM RATINGS (Ta=25°C unless specified otherwise)

| DESCRIPTION | SYMBOL | VALUE | UNITS |
|--|-----------------------------------|-------------|-------|
| Collector Emitter Voltage (RBE≤10Ω) | V _{CER} | 50 | V |
| Collector Base Voltage | V _{CBO} | 75 | V |
| Emitter Base Voltage | V _{EBO} | 7.0 | V |
| Collector Current Continuous | I _C | 500 | mA |
| Power Dissipation @ Ta=25°C | P _D | 800 | mW |
| Derate Above 25°C | | 4.57 | mW/°C |
| Power Dissipation@ Tc=25°C | P _D | 3 | W |
| Derate Above 25°C | | 17.15 | mW/°C |
| Operating And Storage Junction Temperature Range | T _j , T _{stg} | -65 to +200 | °C |
| THERMAL RESISTANCE | | | |
| Junction to Ambient | R _{th(j-a)} | 218.7 | °C/W |
| Junction to Case | R _{th(j-c)} | 58.3 | °C/W |

ELECTRICAL CHARACTERISTICS (Ta=25°C unless specified otherwise)

| DESCRIPTION | SYMBOL | MIN | TYP | MAX | UNITS |
|--------------------------------------|---|-----|------|-----|-------|
| Collector Emitter Breakdown Voltage | V _{CER(sus)} * I _C =100mA, R _{BE} ≤10Ω | 50 | | | V |
| Collector Base Breakdown Voltage | BV _{CBO} I _C =100μA, I _E =0 | 75 | | | V |
| Emitter Base Breakdown Voltage | BV _{EBO} I _E =100μA, I _C =0 | 7 | | | V |
| Collector Leakage Current | I _{CBO} V _{CB} =60V, I _E =0 | | | 10 | nA |
| | V _{CB} =60V, I _E =0, T _A =150°C | | | 10 | μA |
| Emitter Leakage Current | I _{EBO} V _{EB} =5V, I _C =0 | | | 10 | nA |
| Collector Emitter Saturation Voltage | V _{CE(Sat)} * I _C =150mA, I _B =15mA | | 0.3 | 1.5 | V |
| Base Emitter Saturation Voltage | V _{BE(Sat)} * I _C =150mA, I _B =15mA | | 0.78 | 1.3 | V |
| DC Current Gain | h _{FE} * I _C =0.1mA, V _{CE} =10V | 20 | 35 | | |
| | I _C =10mA, V _{CE} =10V | 35 | 50 | | |
| | I _C =150mA, V _{CE} =10V | 40 | 80 | 120 | |
| | I _C =500mA, V _{CE} =10V | 20 | 30 | | |
| | I _C =10mA, V _{CE} =10V | 20 | | | |
| | T _a =-55°C | | | | |

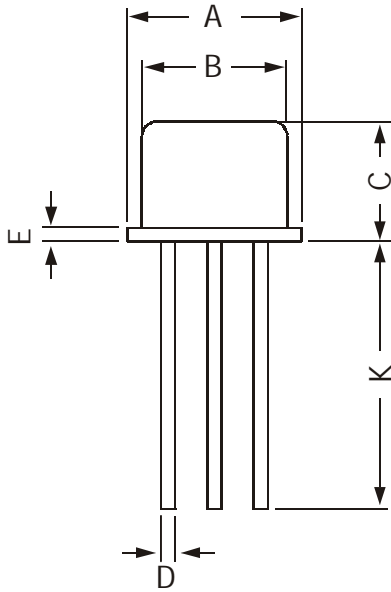


ELECTRICAL CHARACTERISTICS (Ta=25°C unless specified otherwise)

| DESCRIPTION | SYMBOL | TEST CONDITION | MIN | TYP | MAX | UNITS |
|--|------------------|---|------|-----|-----|-------------------|
| <u>SMALL SIGNAL CHARACTERISTICS</u> | | | | | | |
| Small Signal Current Gain | h _{fe} | I _C =1mA, V _{CE} =5V, f=1kHz | 30 | | 100 | |
| | | I _C =5mA, V _{CE} =10V, f=1kHz | 35 | | 150 | |
| Input Impedance | h _{ib} | I _C =1mA, V _{CB} =5V, f=1kHz | 24 | | 34 | Ω |
| | | I _C =5mA, V _{CE} =10V, f=1kHz | 4.0 | | 8.0 | Ω |
| Voltage Feedback Ratio | h _{rb} | I _C =1mA, V _{CE} =5V, f=1.0kHz | | | 3.0 | X10 ⁻⁴ |
| | | I _C =5mA, V _{CE} =10V, f=1kHz | | | 3.0 | X10 ⁻⁴ |
| Output Admittance | h _{ob} | I _C =1mA, V _{CE} =5V, f=1kHz | 0.05 | | 0.5 | μmho |
| | | I _C =5mA, V _{CE} =10V, f=1kHz | 0.05 | | 0.5 | μmho |
| Current Gain Bandwidth Product | f _T * | I _C =50mA, V _{CE} =10V, f=20MHz | 60 | | | MHz |
| Output Capacitance | C _{ob} | V _{CB} =10V, I _E =0, f=100kHz | | 10 | 25 | pF |
| Input Capacitance | C _{ib} | V _{EB} =0.5V, I _C =0, f=100kHz | | 50 | 80 | pF |
| Noise Figure | NF | I _C =300μA, V _{CE} =10V, R _S =510Ω f=1kHz | | | 12 | dB |

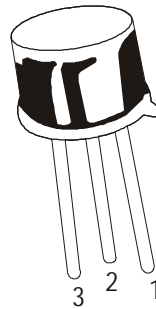
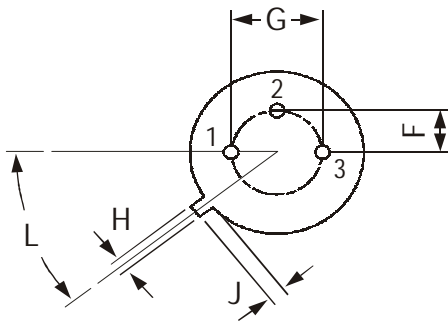
*Pulse Test: Pulse Length ≤300μs, Duty Cycle ≤1.0%

TO-39 Metal Can Package



All dimensions are in mm

| DIM | MIN | MAX |
|-----|--------|--------|
| A | 8.50 | 9.39 |
| B | 7.74 | 8.50 |
| C | 6.09 | 6.60 |
| D | 0.40 | 0.53 |
| E | — | 0.88 |
| F | 2.41 | 2.66 |
| G | 4.82 | 5.33 |
| H | 0.71 | 0.86 |
| J | 0.73 | 1.02 |
| K | 12.70 | — |
| L | 42 DEG | 48 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-39 | 500 pcs/polybag | 540 gm/500 pcs | 3" x 7.5" x 7.5" | 20K | 17" x 15" x 13.5" | 32K | 40 kgs |

Disclaimer

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