

TO-92 Plastic-Encapsulate Transistors

3DD13002N46 TRANSISTOR (NPN)

FEATURE

- Lower Switching Applications

MAXIMUM RATINGS (T_a=25°C unless otherwise noted)

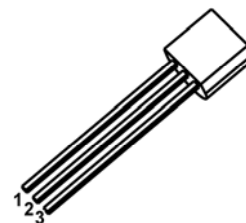
| Symbol | Parameter | Value | Unit |
|------------------|---|---------|------|
| V _{CB0} | Collector-Base Voltage | 600 | V |
| V _{CEO} | Collector-Emitter Voltage | 100 | V |
| V _{EBO} | Emitter-Base Voltage | 6 | V |
| I _C | Collector Current -Continuous | 0.8 | A |
| P _C | Collector Power Dissipation | 0.8 | W |
| R _{θJA} | Thermal Resistance from Junction to Ambient | 156 | °C/W |
| T _J | Junction Temperature | 150 | °C |
| T _{stg} | Storage Temperature | -55~150 | °C |

TO-92

1.EMITTER

2. COLLECTOR

3. BASE



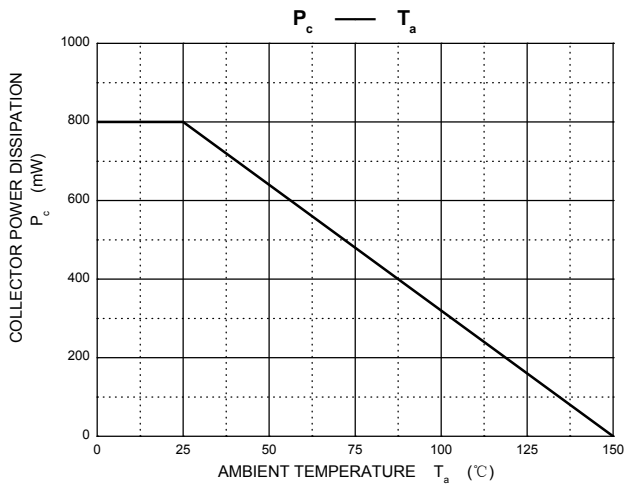
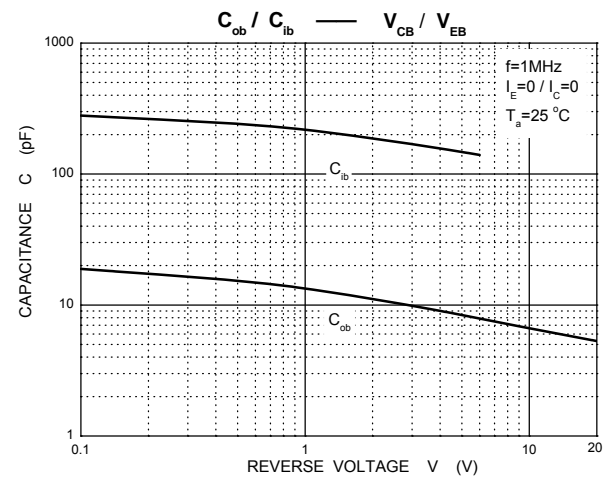
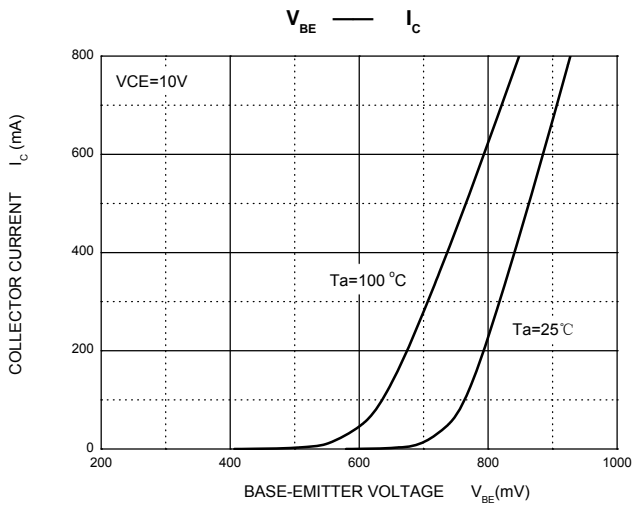
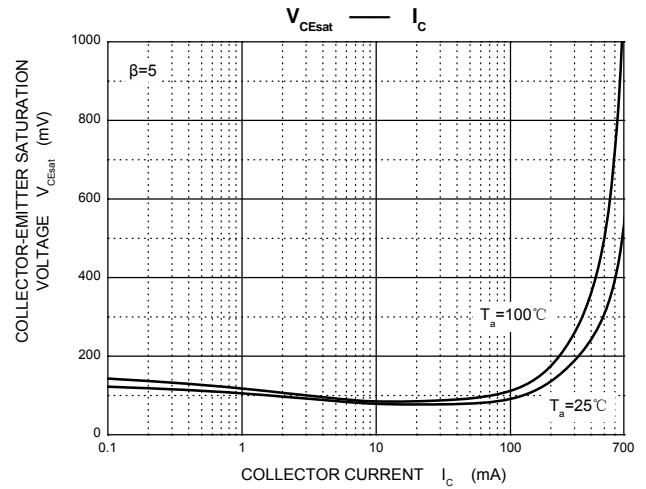
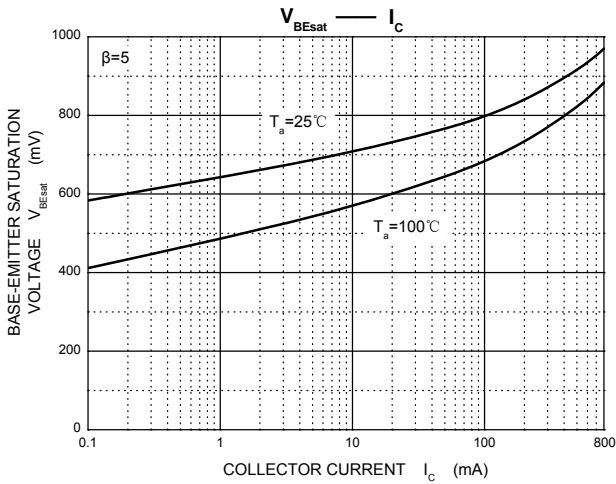
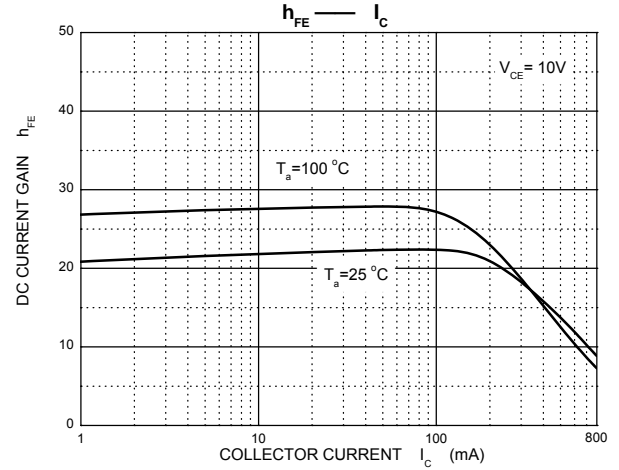
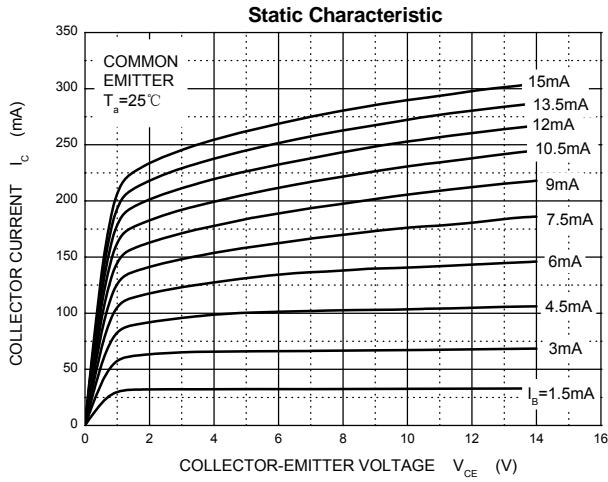
ELECTRICAL CHARACTERISTICS (T_a=25°C unless otherwise specified)

| Parameter | Symbol | Test conditions | Min | Typ | Max | Unit |
|--------------------------------------|----------------------|---|-----|-----|-----|------|
| Collector-base breakdown voltage | V _{(BR)CBO} | I _C =100μA, I _E =0 | 600 | | | V |
| Collector-emitter breakdown voltage | V _{(BR)CEO} | I _C =1mA, I _B =0 | 100 | | | V |
| Emitter-base breakdown voltage | V _{(BR)EBO} | I _E =100μA, I _C =0 | 6 | | | V |
| Collector cut-off current | I _{CBO} | V _{CB} =600V, I _E =0 | | | 100 | μA |
| | I _{CEO} | V _{CE} =500V, I _B =0 | | | 100 | μA |
| Emitter cut-off current | I _{EBO} | V _{EB} =6V, I _C =0 | | | 100 | μA |
| Dc current gain | h _{FE1} | V _{CE} =10V, I _C =200mA | 9 | | 40 | |
| | h _{FE2} | V _{CE} =10V, I _C =0.25mA | 5 | | | |
| Collector-emitter saturation voltage | V _{CE(sat)} | I _C =200mA, I _B =40mA | | | 0.5 | V |
| Base-emitter saturation voltage | V _{BE(sat)} | I _C =200mA, I _B =40mA | | | 1.1 | V |
| Transition frequency | f _T | V _{CE} =10V, I _C =100mA f=1MHz | 5 | | | MHz |
| Fall time | t _f | I _C =1A, I _{B1} =-I _{B2} =0.2A | | | 0.5 | μs |
| Storage time | t _s | V _{CC} =100V | | | 2.5 | μs |

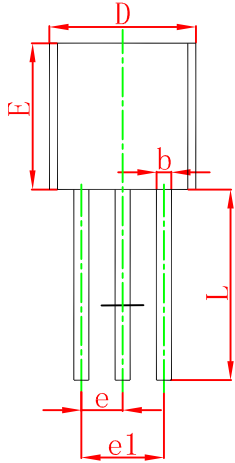
CLASSIFICATION OF h_{FE1}

| Range | 9-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 |
|-------|------|-------|-------|-------|-------|-------|
| | | | | | | |

Typical Characteristics

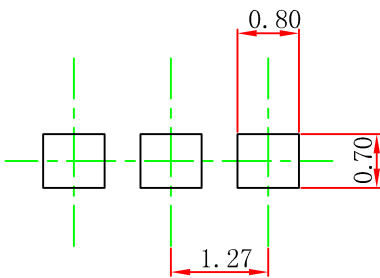


TO-92 Package Outline Dimensions



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|--------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 3.300 | 3.700 | 0.130 | 0.146 |
| A1 | 1.100 | 1.400 | 0.043 | 0.055 |
| b | 0.380 | 0.550 | 0.015 | 0.022 |
| c | 0.360 | 0.510 | 0.014 | 0.020 |
| D | 4.300 | 4.700 | 0.169 | 0.185 |
| D1 | 3.430 | | 0.135 | |
| E | 4.300 | 4.700 | 0.169 | 0.185 |
| e | 1.270 TYP | | 0.050 TYP | |
| e1 | 2.440 | 2.640 | 0.096 | 0.104 |
| L | 14.100 | 14.500 | 0.555 | 0.571 |
| Φ | | 1.600 | | 0.063 |
| h | 0.000 | 0.380 | 0.000 | 0.015 |

TO-92 Suggested Pad Layout



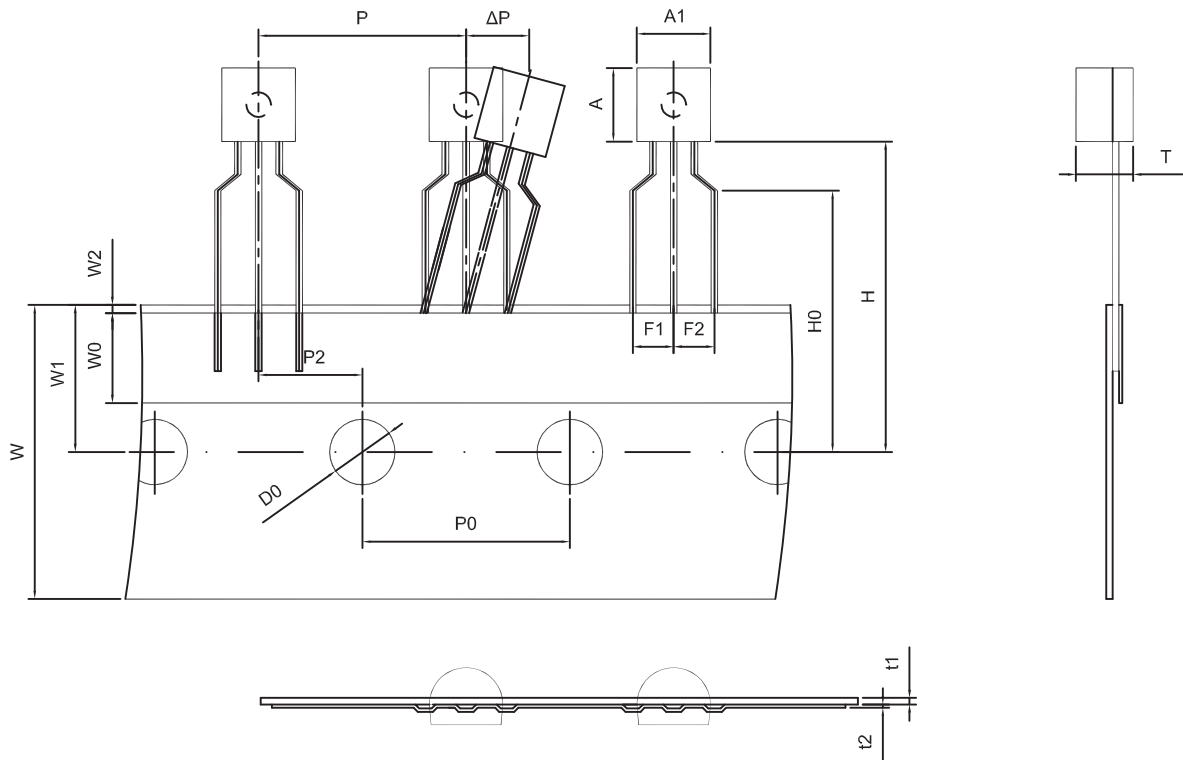
Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.

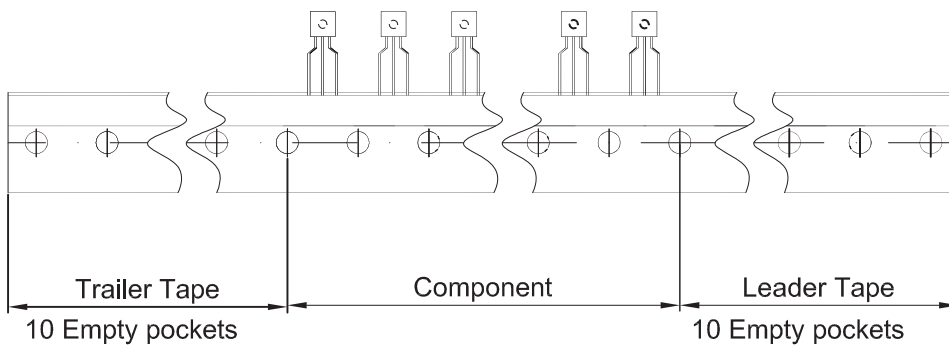
NOTICE

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TO-92 PACKAGE TAPEING DIMENSION



| Dimiensions are in millimeter | | | | | | | | |
|-------------------------------|-----|----------|------|------|------|-----|-----|------|
| A1 | A | T | P | P0 | P2 | F1 | F2 | W |
| 4.5 | 4.5 | 3.5 | 12.7 | 12.7 | 6.35 | 2.5 | 2.5 | 18.0 |
| W0 | W1 | W2 | H | H0 | D0 | t1 | t2 | ΔP |
| 6.0 | 9.0 | 1.0 MAX. | 19.0 | 16.0 | 4.0 | 0.4 | 0.2 | 0 |



| Package | Box | Box Size(mm) | Carton | Carton Size(mm) |
|---------|----------|--------------|------------|-----------------|
| TO-92 | 2000 pcs | 333×162×43 | 20,000 pcs | 350×340×250 |