

Silicon NPN Darlington Power Transistors

TIP140/141/142

DESCRIPTION

- With TO-3PN package
- DARLINGTON
- High DC current gain
- Complement to type TIP145/146/147

APPLICATIONS

- Designed for general-purpose amplifier and low frequency switching applications.

PINNING

| PIN | DESCRIPTION |
|-----|--------------------------------------|
| 1 | Base |
| 2 | Collector;connected to mounting base |
| 3 | Emitter |

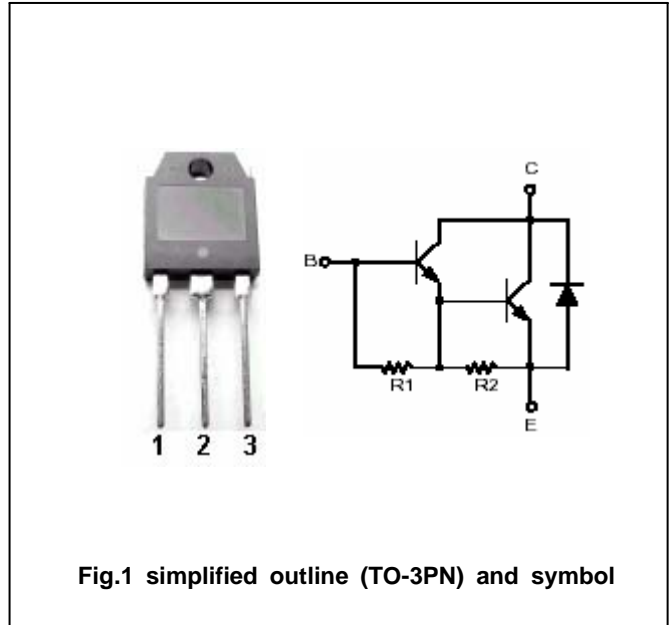


Fig.1 simplified outline (TO-3PN) and symbol

Absolute maximum ratings(Tc=25)

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|------------------|-----------------------------|--------------------|---------|------|
| V _{CBO} | Collector-base voltage | TIP140 | 60 | V |
| | | TIP141 | 80 | |
| | | TIP142 | 100 | |
| V _{CEO} | Collector-emitter voltage | TIP140 | 60 | V |
| | | TIP141 | 80 | |
| | | TIP142 | 100 | |
| V _{EBO} | Emitter-base voltage | Open collector | 5 | V |
| I _C | Collector current-DC | | 10 | A |
| I _{CM} | Collector current-Pulse | | 15 | A |
| I _B | Base current-DC | | 0.5 | A |
| P _C | Collector power dissipation | T _C =25 | 125 | W |
| T _j | Junction temperature | | 150 | |
| T _{stg} | Storage temperature | | -65~150 | |

THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | MAX | UNIT |
|---------------------|-------------------------------------|------|------|
| R _{th j-c} | Thermal resistance junction to case | 1.0 | /W |
| R _{th j-A} | Thermal resistance case to ambient | 35.7 | /W |

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CHARACTERISTICS

T_j=25 unless otherwise specified

| SYMBOL | PARAMETER | CONDITIONS | MIN | TYP. | MAX | UNIT | |
|-----------------------|--------------------------------------|-------------------------------------------|-----------------------------------------|------|-----|------|------------------------------------------|
| V _{CEO(SUS)} | Collector-emitter sustaining voltage | TIP140 | I _C =30mA, I _B =0 | 60 | | V | |
| | | TIP141 | | 80 | | | |
| | | TIP142 | | 100 | | | |
| V _{CEsat-1} | Collector-emitter saturation voltage | I _C =5A, I _B =10mA | | | 2.0 | V | |
| V _{CEsat-2} | Collector-emitter saturation voltage | I _C =10A, I _B =40mA | | | 3.0 | V | |
| V _{BEsat} | Base-emitter saturation voltage | I _C =10A, I _B =40mA | | | 3.5 | V | |
| V _{BE} | Base-emitter on voltage | I _C =10A; V _{CE} =4V | | | 3.0 | V | |
| I _{CBO} | Collector cut-off current | TIP140 | | | 1 | mA | |
| | | TIP141 | | | | | V _{CB} =80V, I _E =0 |
| | | TIP142 | | | | | V _{CB} =100V, I _E =0 |
| I _{CEO} | Collector cut-off current | TIP140 | | | 2 | mA | |
| | | TIP141 | | | | | V _{CE} =40V, I _B =0 |
| | | TIP142 | | | | | V _{CE} =50V, I _B =0 |
| I _{EBO} | Emitter cut-off current | V _{EB} =5V; I _C =0 | | | 2 | mA | |
| h _{FE-1} | DC current gain | I _C =5A; V _{CE} =4V | 1000 | | | | |
| h _{FE-2} | DC current gain | I _C =10A; V _{CE} =4V | 500 | | | | |

Switching times

| | | | | | | |
|------------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------|--|----|
| t _d | Delay time | V _{CC} = 30 V, I _C = 5.0 A, I _B = 20 mA Duty Cycle 20% I _{B1} = I _{B2} , R _C & R _B Varied, T _J = 25 | | 0.15 | | μs |
| t _r | Rise time | | | 0.55 | | μs |
| t _{stg} | Storage time | | | 2.5 | | μs |
| t _f | Fall time | | | 2.5 | | μs |

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PACKAGE OUTLINE

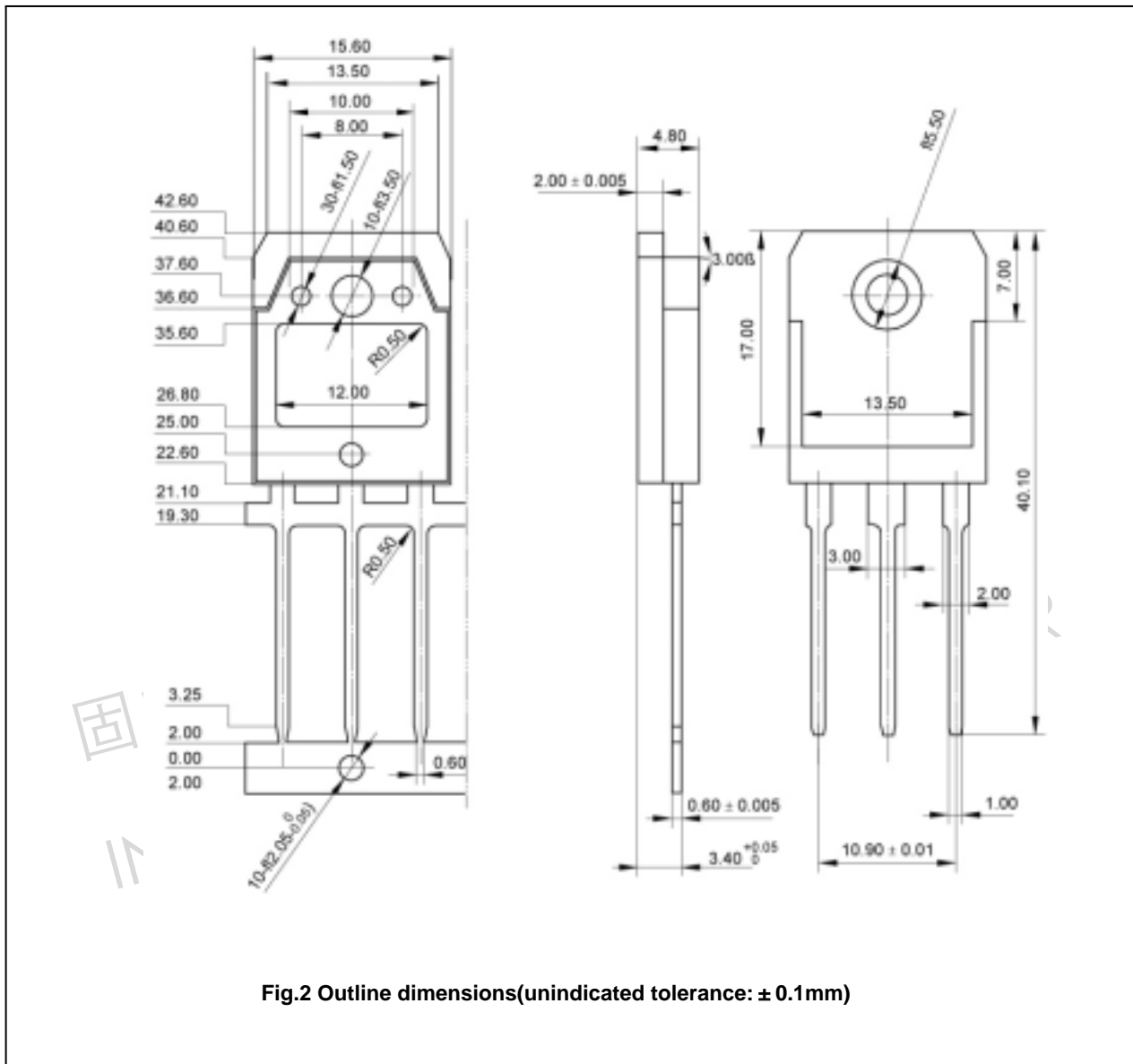


Fig.2 Outline dimensions(unindicated tolerance: ± 0.1mm)

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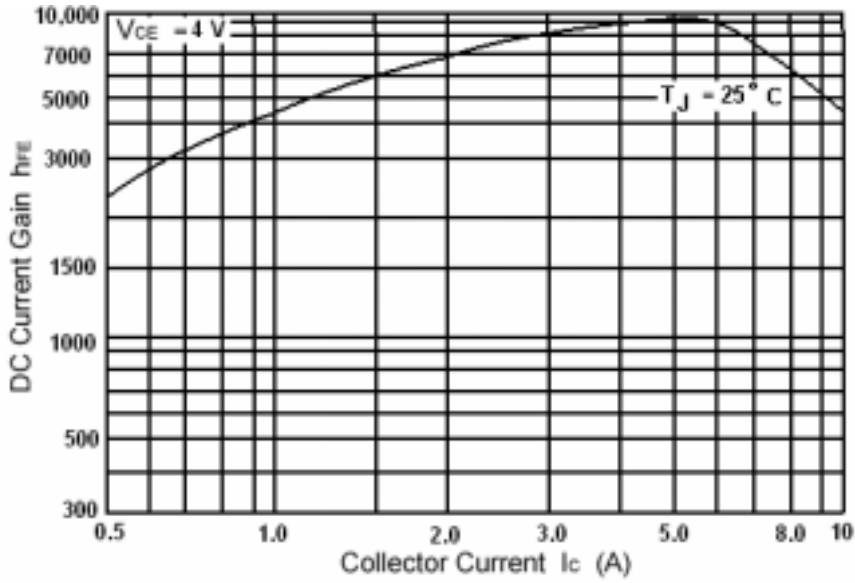


Fig.3 DC current Gain

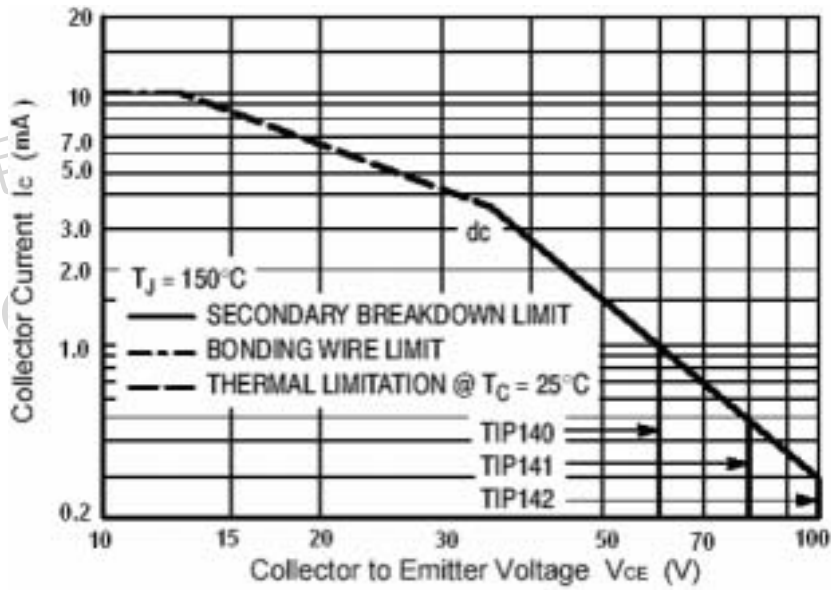


Fig.4 Safe Operating Area