

TIP131, TIP132 (NPN), TIP137 (PNP)

Preferred Devices

Darlington Complementary Silicon Power Transistors

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

Features

- High DC Current Gain –
 $h_{FE} = 2500$ (Typ) @ I_C
= 4.0 Adc
- Collector–Emitter Sustaining Voltage – @ 30 mAdc
 $V_{CE(sus)} = 80$ Vdc (Min) – TIP131
= 100 Vdc (Min) – TIP132, TIP137
- Low Collector–Emitter Saturation Voltage –
 $V_{CE(sat)} = 2.0$ Vdc (Max) @ $I_C = 4.0$ Adc
= 3.0 Vdc (Max) @ $I_C = 6.0$ Adc
- Monolithic Construction with Built–In Base–Emitter Shunt Resistors
- Pb–Free Packages are Available*

MAXIMUM RATINGS

| Rating | Symbol | TIP131 | TIP132 TIP137 | Unit |
|--|----------------|-------------|------------------|------------------|
| Collector–Emitter Voltage | V_{CEO} | 80 | 100 | Vdc |
| Collector–Base Voltage | V_{CB} | 80 | 100 | Vdc |
| Emitter–Base Voltage | V_{EB} | 5.0 | | Vdc |
| Collector Current – Continuous Peak | I_C | 8.0 12 | | Adc |
| Base Current | I_B | 300 | | mAdc |
| Total Power Dissipation @ $T_C = 25^\circ\text{C}$ | P_D | 70 | | W |
| Total Power Dissipation @ $T_A = 25^\circ\text{C}$ | P_D | 2.0 | | W |
| Operating and Storage Junction, Temperature Range | T_J, T_{stg} | –65 to +150 | | $^\circ\text{C}$ |

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|--|-----------------|------|--------------------|
| Thermal Resistance, Junction–to–Case | $R_{\theta JC}$ | 1.78 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction–to–Ambient | $R_{\theta JA}$ | 63.5 | $^\circ\text{C/W}$ |

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

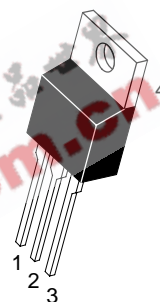
*For additional information on our Pb–Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



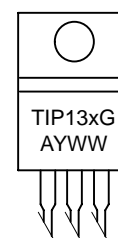
ON Semiconductor®

<http://onsemi.com>

DARLINGTON 8 AMPERE COMPLEMENTARY SILICON POWER TRANSISTORS 80–100 VOLTS, 70 WATTS



MARKING DIAGRAM



TO–220AB
CASE 221A
STYLE 1

TIP13x = Device Code
x = 1, 2, or 7
A = Assembly Location
Y = Year
WW = Work Week
G = Pb–Free Package

ORDERING INFORMATION

| Device | Package | Shipping |
|---------|---------------------|---------------|
| TIP131 | TO–220 | 50 Units/Rail |
| TIP131G | TO–220 (Pb–Free) | 50 Units/Rail |
| TIP132 | TO–220 | 50 Units/Rail |
| TIP132G | TO–220 (Pb–Free) | 50 Units/Rail |
| TIP137 | TO–220 | 50 Units/Rail |
| TIP137G | TO–220 (Pb–Free) | 50 Units/Rail |

Preferred devices are recommended choices for future use and best overall value.

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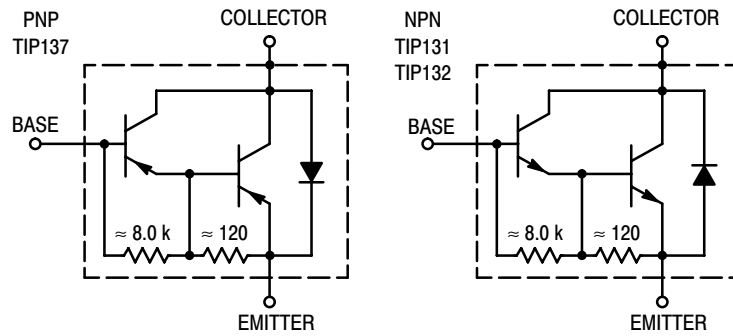


Figure 1. Darlington Circuit Schematic

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

| Characteristic | Symbol | Min | Max | Unit |
|--|----------------|-------------|------------|------|
| OFF CHARACTERISTICS | | | | |
| Collector–Emitter Sustaining Voltage (Note 1) ($I_C = 30 \text{ mAdc}$, $I_B = 0$) | $V_{CEO(sus)}$ | 80 100 | – – | Vdc |
| Collector Cutoff Current ($V_{CE} = 40 \text{ Vdc}$, $I_B = 0$) ($V_{CE} = 50 \text{ Vdc}$, $I_B = 0$) | I_{CEO} | – – | 0.5 0.5 | mAdc |
| Collector Cutoff Current ($V_{CB} = 80 \text{ Vdc}$, $I_E = 0$) ($V_{CB} = 100 \text{ Vdc}$, $I_E = 0$) | I_{CBO} | – – | 0.2 0.2 | mAdc |
| Emitter Cutoff Current ($V_{BE} = 5.0 \text{ Vdc}$, $I_C = 0$) | I_{EBO} | – | 5.0 | mAdc |
| ON CHARACTERISTICS (Note 1) | | | | |
| DC Current Gain ($I_C = 1.0 \text{ Adc}$, $V_{CE} = 4.0 \text{ Vdc}$) ($I_C = 4.0 \text{ Adc}$, $V_{CE} = 4.0 \text{ Vdc}$) | h_{FE} | 500 1000 | – 15000 | – |
| Collector–Emitter Saturation Voltage ($I_C = 4.0 \text{ Adc}$, $I_B = 16 \text{ mAdc}$) ($I_C = 6.0 \text{ Adc}$, $I_B = 30 \text{ mAdc}$) | $V_{CE(sat)}$ | – – | 2.0 3.0 | Vdc |
| Base–Emitter On Voltage ($I_C = 4.0 \text{ Adc}$, $V_{CE} = 4.0 \text{ Vdc}$) | $V_{BE(on)}$ | – | 2.5 | Vdc |

1. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2\%$.

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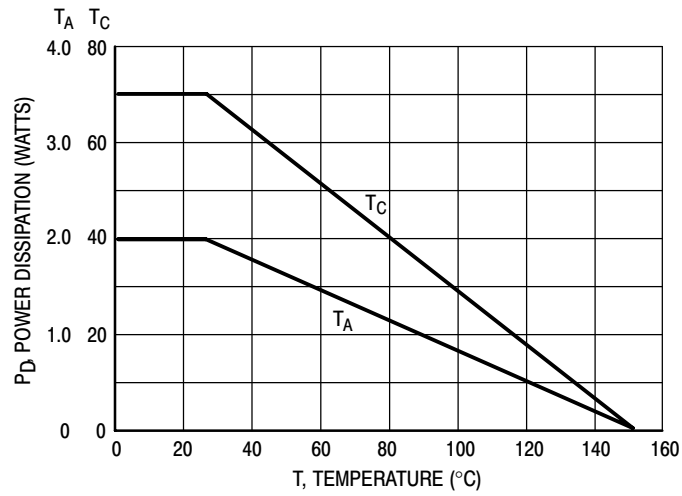


Figure 2. Power Derating

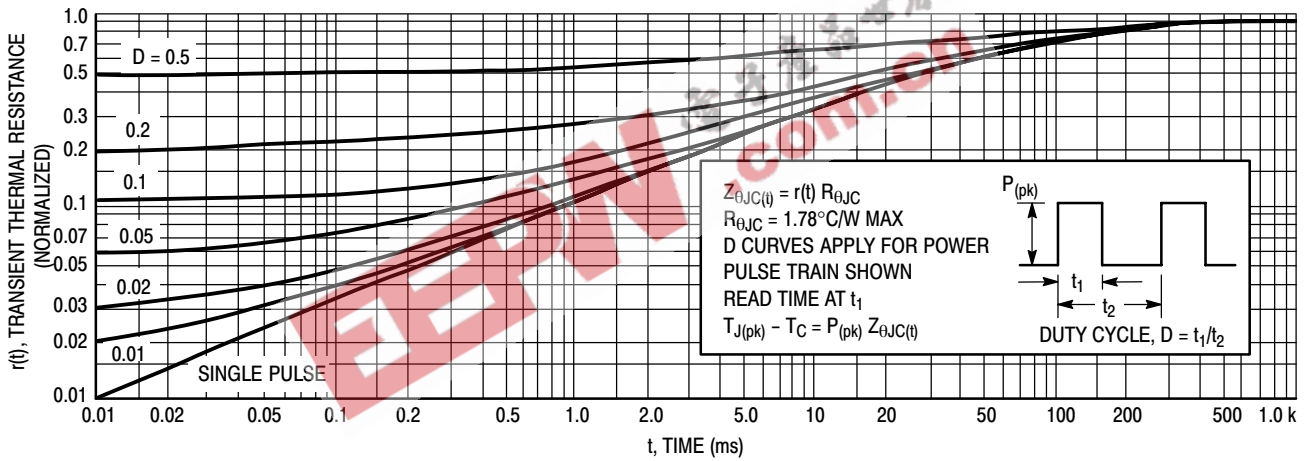
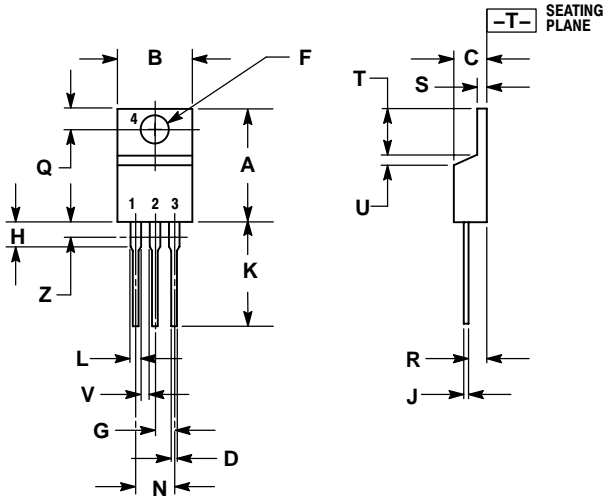


Figure 3. Thermal Response

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PACKAGE DIMENSIONS

TO-220
CASE 221A-09
ISSUE AA




NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

| DIM | INCHES | | MILLIMETERS | |
|-----|--------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.570 | 0.620 | 14.48 | 15.75 |
| B | 0.380 | 0.405 | 9.66 | 10.28 |
| C | 0.160 | 0.190 | 4.07 | 4.82 |
| D | 0.025 | 0.035 | 0.64 | 0.88 |
| F | 0.142 | 0.147 | 3.61 | 3.73 |
| G | 0.095 | 0.105 | 2.42 | 2.66 |
| H | 0.110 | 0.155 | 2.80 | 3.93 |
| J | 0.018 | 0.025 | 0.46 | 0.64 |
| K | 0.500 | 0.562 | 12.70 | 14.27 |
| L | 0.045 | 0.060 | 1.15 | 1.52 |
| N | 0.190 | 0.210 | 4.83 | 5.33 |
| Q | 0.100 | 0.120 | 2.54 | 3.04 |
| R | 0.080 | 0.110 | 2.04 | 2.79 |
| S | 0.045 | 0.055 | 1.15 | 1.39 |
| T | 0.235 | 0.255 | 5.97 | 6.47 |
| U | 0.000 | 0.050 | 0.00 | 1.27 |
| V | 0.045 | --- | 1.15 | --- |
| Z | --- | 0.080 | --- | 2.04 |

STYLE 1:

1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

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