

Transistor, PNP TO-3

multicomp PRO



Description:

Complementary silicon power transistors.

The 2N6609 powerbase™ power transistors designed for high power audio, disk head positioners and other linear applications. These devices can also be used in power switching circuits such as relay or solenoid drivers, DC-DC converters or inverters.

Features:

- Pb-free packages
- High safe operating area (100% tested) 150W at 100V
- Completely characterized for linear operation
- High DC current gain and low saturation voltage
- $h_{FE} = 15$ (min.) at 8A, 4V
- $V_{CE}(\text{sat}) = 1.4\text{V}$ (max.) at $I_C = 8\text{A}$, $I_B = 0.8\text{A}$
- For low distortion complementary designs

Maximum Ratings

| Rating | Symbol | Value | Unit |
|--|----------------|--------------|--------------------------|
| Collector-Emitter Voltage | V_{CEO} | 140 | V DC |
| Collector-Emitter Voltage | V_{CEX} | 160 | |
| Collector-Base Voltage | V_{CBO} | | |
| Emitter-Base Voltage | V_{EBO} | 7 | |
| Collector Current - Continuous - Peak (Note 2) | I_C | 16 30 | A DC |
| Base Current - Continuous - Peak (Note 2) | I_B | 4 15 | |
| Total Power Dissipation at $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 150 0.855 | W W/ $^\circ\text{C}$ |
| Operating and Storage Junction Temperature Range | T_J, T_{Stg} | -65 to +200 | $^\circ\text{C}$ |

Thermal Characteristics

| Characteristic | Symbol | Max. | Unit |
|-------------------------------------|-----------------|------|---------------------------|
| Thermal Resistance Junction to Case | $R_{\theta JC}$ | 1.17 | $^\circ\text{C}/\text{W}$ |

Max. 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.

1. Indicates JEDEC Registered Data.
2. Pulse Test: Pulse Width = 5ms, Duty Cycle $\leq 10\%$.

Transistor, PNP TO-3

multicomp **PRO**

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

| Characteristic | Symbol | Min. | Max. | Unit |
|----------------|--------|------|------|------|
|----------------|--------|------|------|------|

Off Characteristics (Note 3)

| | | | | |
|--|----------------|-----|---------|-------|
| Collector-Emitter Breakdown Voltage (Note 4) ($I_C = 0.2\text{A DC}$, $I_B = 0$) | $V_{EO(sus)}$ | 140 | - | V DC |
| Collector-Emitter Sustaining Voltage (Note 4) ($I_C = 0.1\text{A DC}$, $V_{BE(off)} = 1.5\text{V DC}$, $R_{BE} = 100\Omega$) | $V_{CEX(sus)}$ | 160 | - | |
| Collector-Emitter Sustaining Voltage ($I_C = 0.2\text{A DC}$, $R_{BE} = 100\Omega$) | $V_{CER(sus)}$ | 150 | - | |
| Collector Cut off Current (Note 4) ($V_{CE} = 120\text{V DC}$, $I_B = 0$) | I_{CEO} | - | 10 | mA DC |
| Collector Cut off Current (Note 4) ($V_{CE} = 140\text{V DC}$, $V_{BE(off)} = 1.5\text{V dc}$) ($V_{CE} = 140\text{V DC}$, $V_{BE(off)} = 1.5\text{V DC}$, $T_C = 150^\circ\text{C}$) | I_{CEX} | - | 2 10 | |
| Collector Cut off Current ($V_{CB} = 140\text{V DC}$, $I_E = 0$) | I_{CBO} | - | 2 | |
| Emitter Cut off Current (Note 4) ($V_{BE} = 7\text{V DC}$, $I_C = 0$) | I_{EBO} | - | 5 | |

On Characteristic (Note 3)

| | | | | |
|---|---------------|---------|----------|------|
| DC Current Gain ($I_C = 8\text{A DC}$, $V_{CE} = 4\text{V DC}$) (Note 4) ($I_C = 16\text{A DC}$, $V_{CE} = 4\text{V DC}$) | h_{FE} | 15 5 | 60 - | - |
| Collector-Emitter Saturation Voltage ($I_C = 8\text{A DC}$, $I_B = 800\text{mA DC}$) (Note 4) ($I_C = 16\text{A DC}$, $I_B = 3.2\text{A DC}$) | $V_{CE(sat)}$ | - | 1.4 4 | V DC |
| Base-Emitter On Voltage (Note 4) ($I_C = 8\text{A DC}$, $V_{CE} = 4\text{V DC}$) | $V_{BE(on)}$ | - | 2.2 | |

Dynamic Characteristics

| | | | | |
|--|------------|----|---|---|
| Magnitude of Common-Emitter Small-Signal, Short-Circuit, Forward Current Transfer Ratio ($I_C = 1\text{A}$, $f = 50\text{kHz}$) | $ h_{fe} $ | 4 | - | - |
| Small-Signal Current Gain (Note 4) ($I_C = 1\text{A DC}$, $V_{CE} = 4\text{V DC}$, $f = 1\text{kHz}$) | h_{fe} | 40 | - | - |

Second Breakdown Characteristics

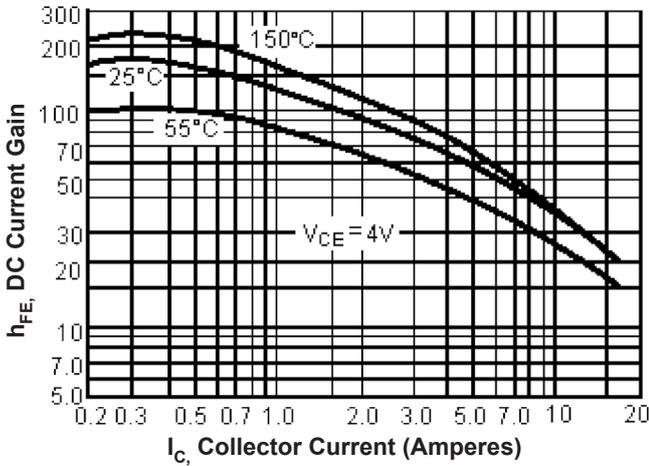
| | | | | |
|---|-----------|-----|---|------|
| Second Breakdown Collector Current with Base Forward Biased $t = 1\text{s}$ (non-repetitive), $V_{CE} = 100\text{V}$ | $I_{S/b}$ | 1.5 | - | A DC |
|---|-----------|-----|---|------|

Note:

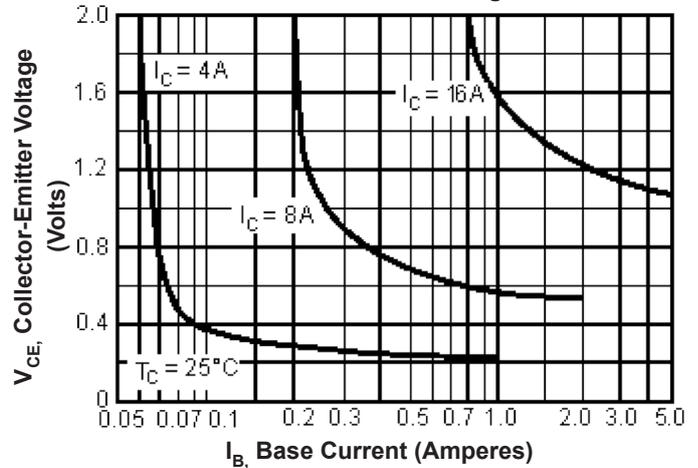
- Pulse Test : Pulse Width = $300\mu\text{s}$, Duty Cycle $\leq 2\%$.
- Indicates JEDEC Registered Data.

Transistor, PNP TO-3

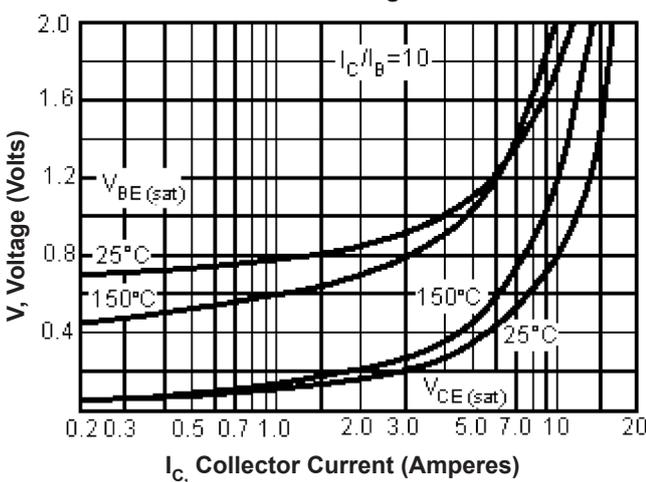
DC Current Gain



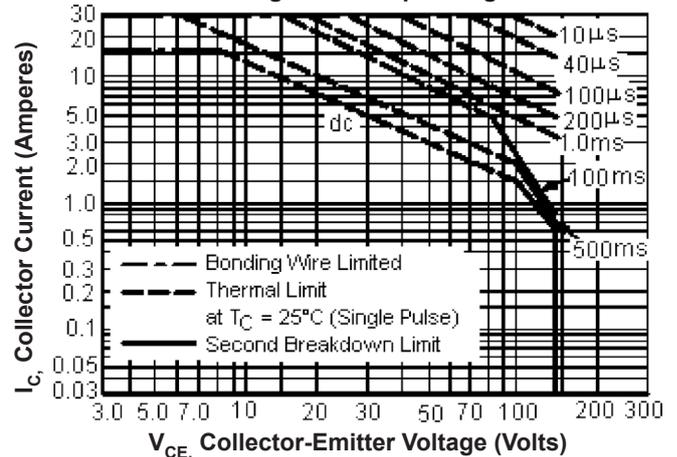
Collector Saturation Region



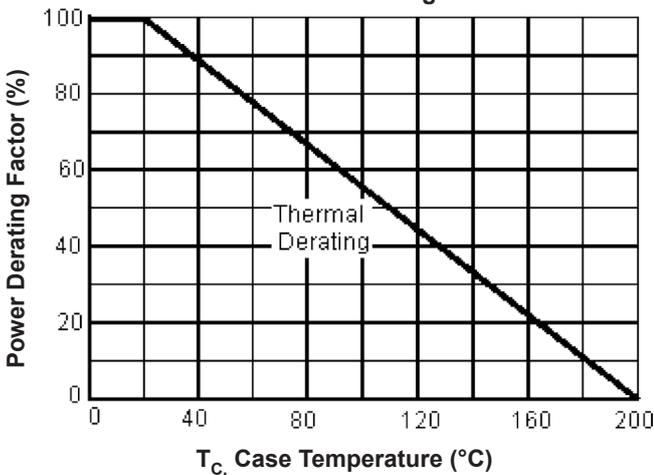
"On" Voltage



Active Region Safe Operating Area



Power Derating

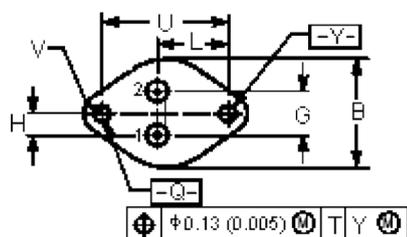
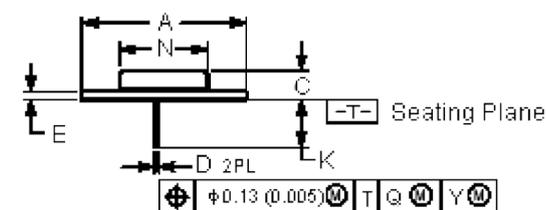


There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate $I_C - V_{CE}$ limits of the transistor that must be observed for reliable operation: i.e., the transistor must not be subjected to greater dissipation than the curves indicate. The data is based on $T_{J(pk)} = 200^\circ C$; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} < 200^\circ C$. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

Transistor, PNP TO-3

multicomp PRO

Dimensions:



| Dimensions | Min. | Max. |
|------------|-------------------|--------------|
| A | 1.55 (39.37) | Reference |
| B | - | 1.05 (26.67) |
| C | 0.25 (6.35) | 0.335 (8.51) |
| D | 0.038 (0.97) | 0.043 (1.09) |
| E | 0.055 (1.4) | 0.07 (1.77) |
| G | 0.43 (10.92) BSC | |
| H | 0.215 (5.46) BSC | |
| K | 0.44 (11.18) | 0.48 (12.19) |
| L | 0.665 (16.89) BSC | |
| N | - | 0.83 (21.08) |
| Q | 0.151 (3.84) | 0.165 (4.19) |
| U | 1.187 (30.15) BSC | |
| V | 0.131 (3.33) | 0.188 (4.77) |

Dimensions : Inches (Millimetres)

Pin Configuration:

- Pin 1. Base
- 2. Emitter
- Collector (Case)

Part Number Table

| Description | Part Number |
|-----------------------|-------------|
| Transistor, PNP, TO-3 | 2N6609 |

Important Notice : This data sheet and its contents (the "Information") belong to the members of the AVNET group of companies (the "Group") or are licensed to it. No licence is granted for the use of it other than for information purposes in connection with the products to which it relates. No licence of any intellectual property rights is granted. The Information is subject to change without notice and replaces all data sheets previously supplied. The Information supplied is believed to be accurate but the Group assumes no responsibility for its accuracy or completeness, any error in or omission from it or for any use made of it. Users of this data sheet should check for themselves the Information and the suitability of the products for their purpose and not make any assumptions based on information included or omitted. Liability for loss or damage resulting from any reliance on the Information or use of it (including liability resulting from negligence or where the Group was aware of the possibility of such loss or damage arising) is excluded. This will not operate to limit or restrict the Group's liability for death or personal injury resulting from its negligence. Multicomp Pro is the registered trademark of Premier Farnell Limited 2019.

Newark.com/multicomp-pro
Farnell.com/multicomp-pro
Element14.com/multicomp-pro

multicomp PRO