



BUX77ESY BUX77HR

Hi-Rel NPN bipolar transistor 80 V - 5 A

Features

| | |
|-----------------------------|-----------------|
| BV_{CEO} | 80 V |
| I_C (max) | 5 A |
| H_{FE} at 10 V - 150 mA | > 70 |
| Operating temperature range | -65°C to +200°C |

- Hi-Rel NPN bipolar transistor
- Linear gain characteristics
- ESCC qualified
- European preferred part list - EPPL
- Radiation level: lot specific total dose contact marketing for specified level

Description

The BUX77HR is a silicon planar epitaxial NPN transistor in TO-257 package. It is specifically designed for aerospace Hi-Rel applications and ESCC qualified according to the 5203-016 specification. In case of conflict between this datasheet and ESCC detailed specification, the latter prevails.

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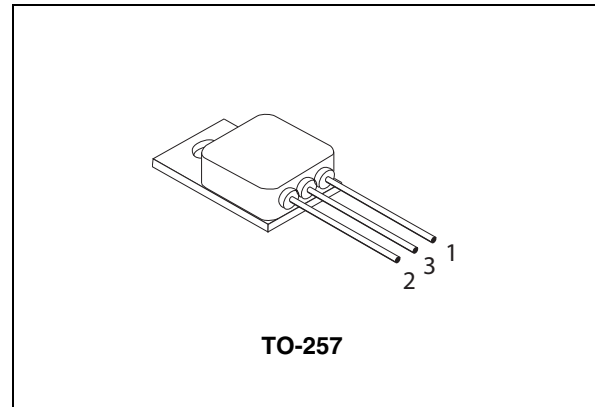


Figure 1. Internal schematic diagram

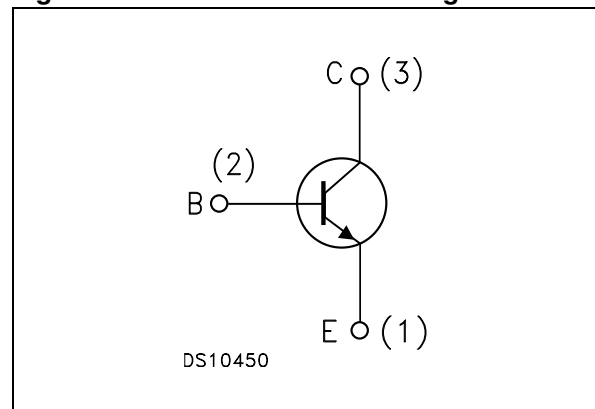


Table 1. Device summary

| Order codes | Package | Lead finish | Marking | Type | EPPL | Packaging |
|-------------|---------|--------------------|------------------------|-------------------|------|------------|
| BUX77ESYHRB | TO-257 | Gold Solder Dip | 520301606 520301607 | ESCC Flight | Yes | Strip pack |
| BUX77ESY | TO-257 | Gold | BUX77ESY | Engineering model | | Strip pack |

1 Electrical ratings

Table 2. Absolute maximum ratings

| Symbol | Parameter | Value | Unit |
|-----------|----------------------------------------------|------------|------|
| V_{CBO} | Collector-base voltage ($I_E = 0$) | 100 | V |
| V_{CEO} | Collector-emitter voltage ($I_B = 0$) | 80 | V |
| V_{EBO} | Emitter-base voltage ($I_C = 0$) | 6 | V |
| I_C | Collector current | 5 | A |
| P_{tot} | Total dissipation at $T_C \leq 25\text{ °C}$ | 35 | W |
| T_{stg} | Storage temperature | -65 to 200 | °C |
| T_J | Max. operating junction temperature | 200 | °C |

Figure 2. Thermal data

| Symbol | Parameter | Value | Unit |
|------------|--------------------------------------|-------|------|
| R_{thJC} | Thermal resistance junction-case max | 5 | °C/W |

2 Electrical characteristics

$T_{\text{case}} = 25\text{ °C}$ unless otherwise specified.

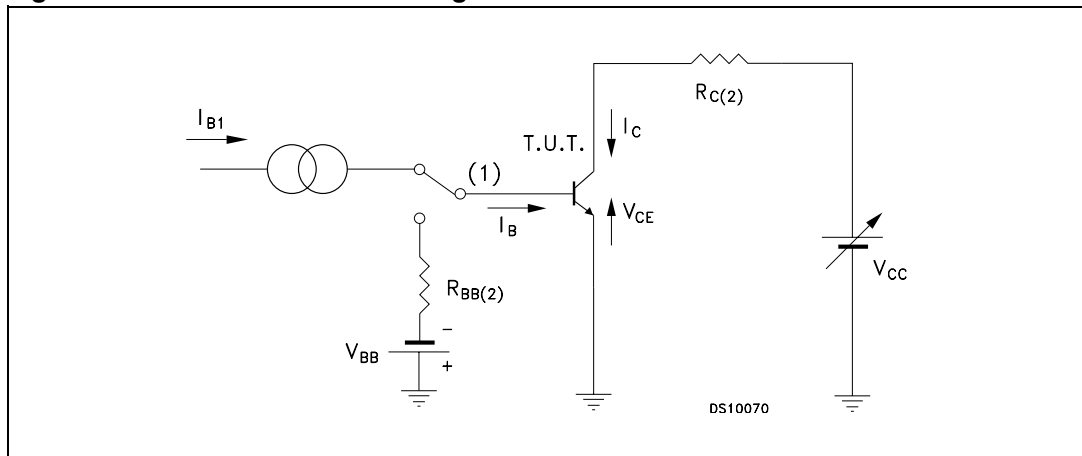
Table 3. Electrical characteristics

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|-----------------------------------|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|---------------|
| I_{CBO} | Collector cut-off current ($I_{\text{E}} = 0$) | $V_{\text{CB}} = 80\text{ V}$ | | - | 0.5 | μA |
| | | $V_{\text{CB}} = 80\text{ V}$ $T_{\text{amb}} = 150\text{ °C}$ | | | 150 | μA |
| I_{CEO} | Collector cut-off current ($I_{\text{B}} = 0$) | $V_{\text{CE}} = 60\text{ V}$ | | - | 10 | μA |
| I_{EBO} | Emitter cut-off current ($I_{\text{C}} = 0$) | $V_{\text{EB}} = 4\text{ V}$ | | - | 0.5 | μA |
| $V_{(\text{BR})\text{CES}}$ | Collector-emitter breakdown voltage ($V_{\text{BE}} = 0$) | $I_{\text{C}} = 2\text{ mA}$ | 100 | - | | V |
| $V_{(\text{BR})\text{CEO}}^{(1)}$ | Collector-emitter breakdown voltage ($I_{\text{B}} = 0$) | $I_{\text{C}} = 50\text{ mA}$ | 80 | - | | V |
| $V_{(\text{BR})\text{EBO}}$ | Emitter-base breakdown voltage ($I_{\text{C}} = 0$) | $I_{\text{E}} = 1\text{ mA}$ | 6 | - | | V |
| $V_{\text{CE}(\text{sat})}^{(1)}$ | Collector-emitter saturation voltage | $I_{\text{C}} = 5\text{ A}$ $I_{\text{B}} = 0.5\text{ A}$ | | - | 1 | V |
| $V_{\text{BE}(\text{sat})}^{(1)}$ | Base-emitter saturation voltage | $I_{\text{C}} = 5\text{ A}$ $I_{\text{B}} = 0.5\text{ A}$ | | - | 1.3 | V |
| $h_{\text{FE}}^{(1)}$ | DC current gain | $I_{\text{C}} = 0.5\text{ A}$ $V_{\text{CE}} = 5\text{ V}$ | 70 | - | 200 | |
| | | $I_{\text{C}} = 2\text{ A}$ $V_{\text{CE}} = 5\text{ V}$ | 50 | | | |
| | | $I_{\text{C}} = 5\text{ A}$ $V_{\text{CE}} = 5\text{ V}$ | 30 | | | |
| | | $I_{\text{C}} = 1\text{ A}$ $V_{\text{CE}} = 5\text{ V}$ $T_{\text{amb}} = -55\text{ °C}$ | 25 | | | |
| h_{fe} | AC forward current transfer ratio | $V_{\text{CE}} = 5\text{ V}$ $I_{\text{C}} = 0.5\text{ A}$ $f = 20\text{ MHz}$ | 2.5 | - | | |
| t_{on} | Turn-on time | $V_{\text{CC}} = 40\text{ V}$ $I_{\text{C}} = 5\text{ A}$ $V_{\text{BB}} = 0.4\text{ V}$ $I_{\text{B1}} = -I_{\text{B2}} = 0.5\text{ A}$ | | - | 0.3 | μs |
| t_{off} | Turn-off time | $V_{\text{CC}} = 40\text{ V}$ $I_{\text{C}} = 5\text{ A}$ $V_{\text{BB}} = 0.4\text{ V}$ $I_{\text{B1}} = -I_{\text{B2}} = 0.5\text{ A}$ | | - | 0.7 | μs |

1. Pulsed duration = 300 μs , duty cycle $\leq 1.5\%$

2.1 Test circuit

Figure 3. Resistive load switching test circuit



1. Fast electronic switch
2. Non-inductive resistor

3 Package mechanical data

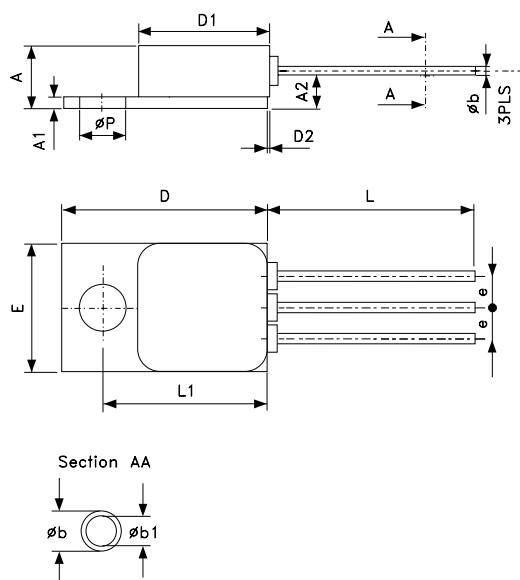
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Package mechanical data

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TO-257 mechanical data

| DIM. | mm. | | |
|------|-------|------|-------|
| | MIN. | TYP | MAX. |
| A | 4.83 | | 5.08 |
| A1 | 0.89 | | 1.14 |
| A2 | | 3.05 | |
| b | 0.64 | | 1.02 |
| b1 | 0.64 | 0.76 | 0.89 |
| D | 16.38 | | 16.89 |
| D1 | 10.41 | | 10.92 |
| D2 | | | 0.97 |
| e | | 2.54 | |
| E | 10.41 | | 10.67 |
| L | 12.70 | | 19.05 |
| L1 | 13.39 | | 13.64 |
| P | 3.56 | | 3.81 |



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4 Revision history

Table 4. Document revision history

| Date | Revision | Changes |
|-------------|----------|-----------------|
| 12-Jan-2010 | 1 | Initial release |

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