


ZXTD720MC
DUAL 40V PNP LOW SATURATION SWITCHING TRANSISTOR
Features and Benefits

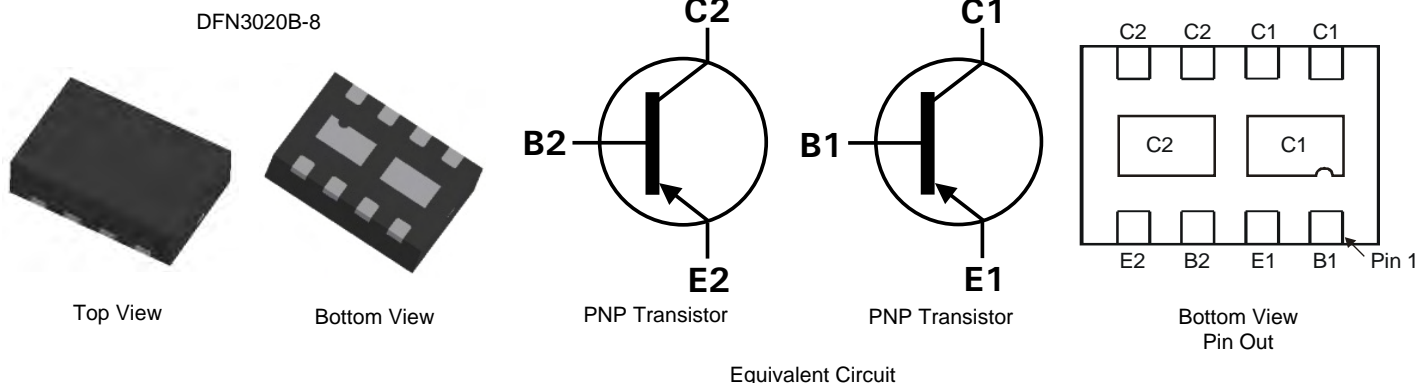
- $BV_{CEO} > -40V$
- $I_C = -3A$ Continuous Collector Current
- Low Saturation Voltage ($-220mV @ -1A$)
- $R_{SAT} = 104 m\Omega$ for Low Equivalent On Resistance
- hFE specified up to $-3A$ for high gain holds up
- Dual NPN saving footprint and component count
- Low profile 0.8mm high package for thin applications
- $R_{\theta JA}$ efficient, 40% lower than SOT26
- $6mm^2$ footprint, 50% smaller than TSOP6 and SOT26
- **Lead-Free, RoHS Compliant (Note 1)**
- **Halogen and Antimony Free. "Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

- Case: DFN3020B-8
- Case material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Terminals: Pre-Plated NiPdAu leadframe.
- Nominal package height: 0.8mm
- Moisture Sensitivity: Level 1 per J-STD-020
- Solderable per MIL-STD-202, Method 208
- Weight: 0.013 grams (approximate)

Applications

- DC-DC Converters
- Charging circuits
- Power switches
- Motor control
- CCFL Backlighting
- Portable applications


Ordering Information (Note 3)

| Product | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-------------|---------|--------------------|-----------------|-------------------|
| ZXTD720MCTA | D33 | 7 | 8 | 3,000 |

- Notes:
1. No purposefully added lead.
 2. Diodes Inc's "Green" Policy can be found on our website at <http://www.diodes.com>
 3. For Packaging Details, go to our website at <http://www.diodes.com>.

Marking Information


D33 = Product type Marking Code
Top View, Dot Denotes Pin 1

Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

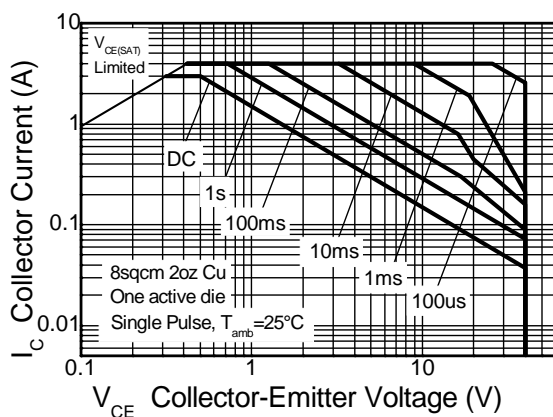
| Parameter | Symbol | Limit | Unit |
|--|-----------|-------|------|
| Collector-Base Voltage | V_{CBO} | -50 | V |
| Collector-Emitter Voltage | V_{CEO} | -40 | |
| Emitter-Base Voltage | V_{EBO} | -7 | |
| Peak Pulse Current | I_{CM} | -4 | A |
| Continuous Collector Current (Notes 4 and 7) | I_C | -3 | |
| Base Current | I_B | -1 | |

Thermal Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

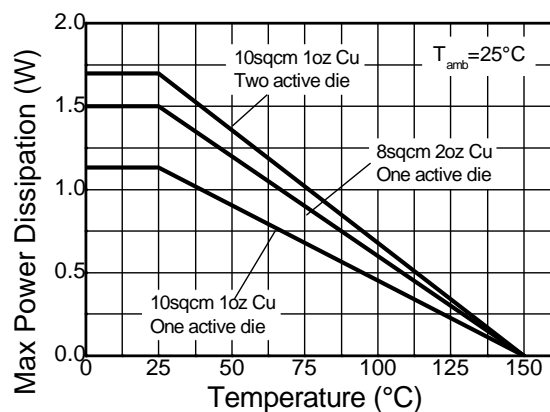
| Characteristic | Symbol | Value | Unit |
|---|-----------------|-------------|--------------------|
| Power Dissipation Linear Derating Factor | P_D | 1.5 | W |
| | | 12 | |
| | | 2.45 | |
| | | 19.6 | |
| | | 1.13 | |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 8 | $^\circ\text{C/W}$ |
| | | 1.7 | |
| | | 13.6 | |
| | | 83.3 | |
| | | 51.0 | |
| Thermal Resistance, Junction to Lead | $R_{\theta JL}$ | 111 | $^\circ\text{C/W}$ |
| | | 73.5 | |
| | | 17.1 | |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

- Notes:
4. For a dual device surface mounted on 28mm x 28mm (8cm²) FR4 PCB with high coverage of single sided 2 oz copper, in still air conditions; the device is measured when operating in a steady-state condition. The heatsink is split in half with the exposed collector pads connected to each half.
 5. Same as note (4), except the device is measured at $t < 5$ sec.
 6. Same as note (4), except the device is surface mounted on 31mm x 31mm (10cm²) FR4 PCB with high coverage of single sided 1oz copper.
 7. For a dual device with one active die.
 8. For dual device with 2 active die running at equal power.
 9. Thermal resistance from junction to solder-point (at the end of the collector lead).

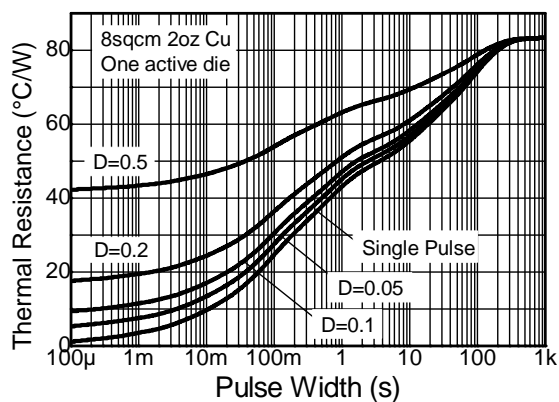
Thermal Characteristics



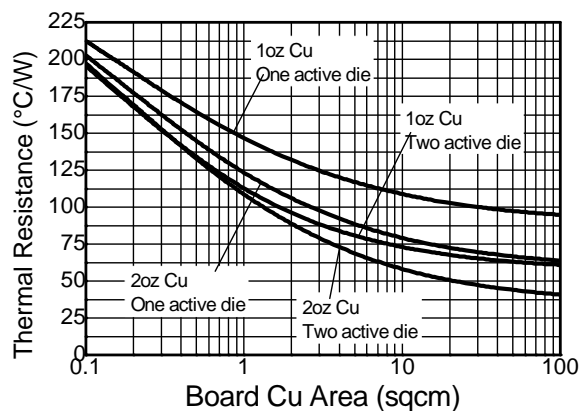
Safe Operating Area



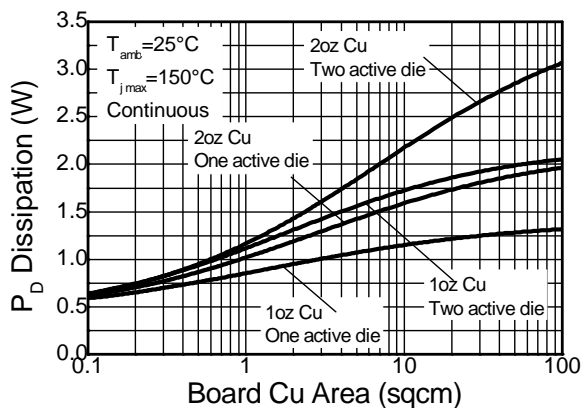
Derating Curve



Transient Thermal Impedance



Thermal Resistance v Board Area



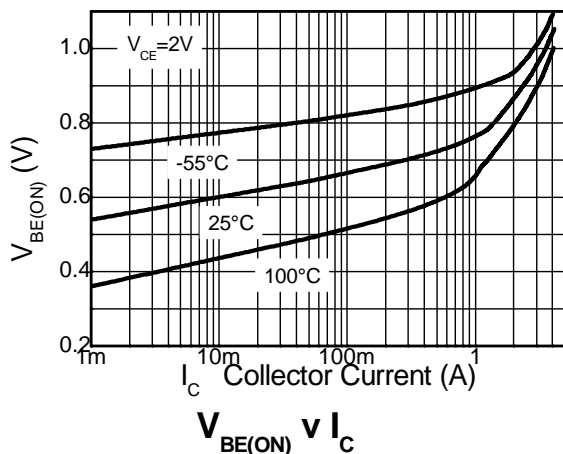
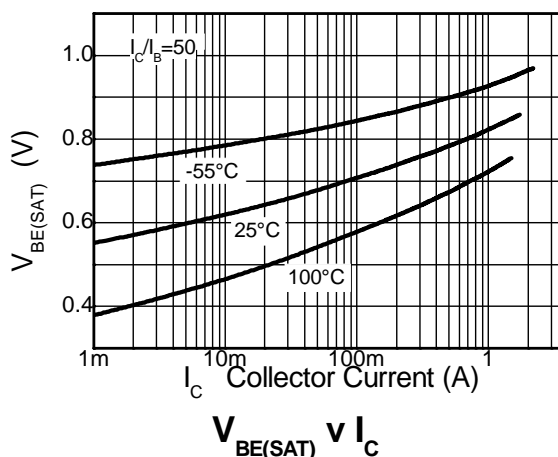
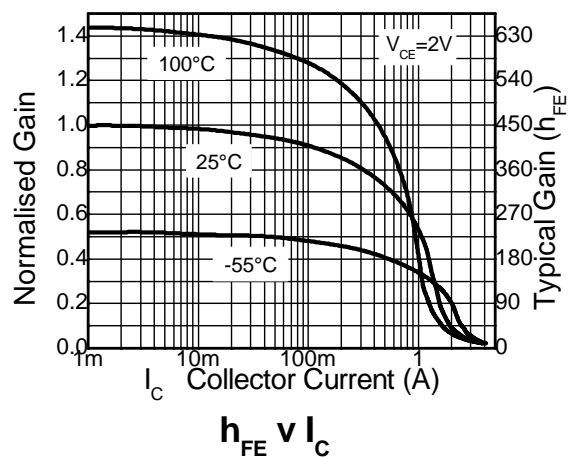
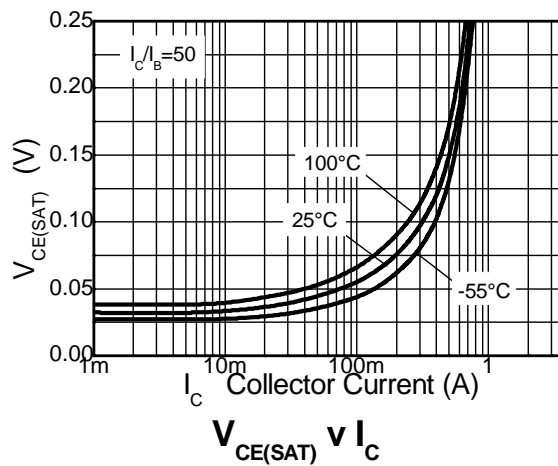
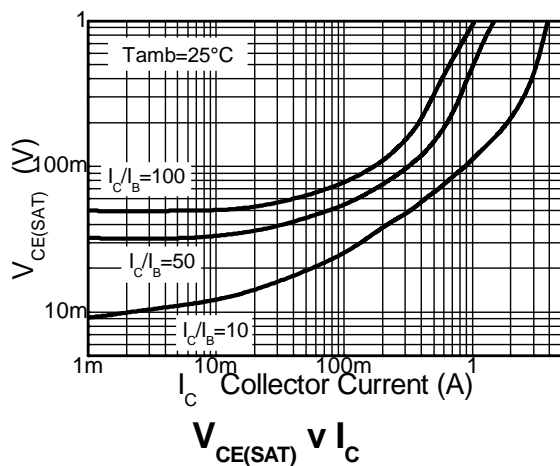
Power Dissipation v Board Area

Electrical Characteristics @T_A = 25°C unless otherwise specified

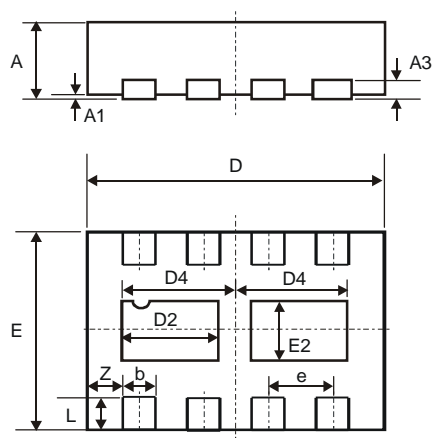
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|----------------------|-----|-------|-------|------|--|
| Collector-Base Breakdown Voltage | V _{(BR)CBO} | -50 | -80 | - | V | I _C = -100μA |
| Collector-Emitter Breakdown Voltage (Note 10) | V _{(BR)CEO} | -40 | -70 | - | V | I _C = -10mA |
| Emitter-Base Breakdown Voltage | V _{(BR)EBO} | -7 | -8.5 | - | V | I _E = -100μA |
| Collector Cutoff Current | I _{CBO} | - | - | -100 | nA | V _{CB} = -40V |
| Emitter Cutoff Current | I _{EBO} | - | - | -100 | nA | V _{EB} = -6V |
| Collector Emitter Cutoff Current | I _{CES} | - | - | -100 | nA | V _{CES} = -32V |
| Static Forward Current Transfer Ratio (Note 10) | h _{FE} | 300 | 480 | - | - | I _C = -10mA, V _{CE} = -2V |
| | | 300 | 450 | - | - | I _C = -100mA, V _{CE} = -2V |
| | | 180 | 290 | - | - | I _C = -1A, V _{CE} = -2V |
| | | 60 | 130 | - | - | I _C = -1.5A, V _{CE} = -2V |
| | | 12 | 22 | - | - | I _C = -3A, V _{CE} = -2V |
| Collector-Emitter Saturation Voltage (Note 10) | V _{CE(sat)} | - | -25 | -40 | mV | I _C = -0.1A, I _B = -10mA |
| | | - | -150 | -220 | | I _C = -1A, I _B = -50mA |
| | | - | -195 | -300 | | I _C = -1.5A, I _B = -100mA |
| | | - | -210 | -300 | | I _C = -2A, I _B = -200mA |
| | | - | -260 | -370 | | I _C = -2.5A, I _B = -250mA |
| Base-Emitter Turn-On Voltage (Note 10) | V _{BE(on)} | - | -0.89 | -0.95 | V | I _C = -2.5A, V _{CE} = -2V |
| Base-Emitter Saturation Voltage (Note 10) | V _{BE(sat)} | - | -0.97 | -1.05 | V | I _C = -2.5A, I _B = -250mA |
| Output Capacitance | C _{obo} | - | 19 | 25 | pF | V _{CB} = -10V, f = 1MHz |
| Transition Frequency | f _T | 150 | 190 | - | MHz | V _{CE} = -10V, I _C = -50mA, f = 100MHz |
| Turn-on Time | t _{on} | - | 40 | - | ns | V _{CC} = -15V, I _C = -0.75A |
| Turn-off Time | t _{off} | - | 435 | - | ns | I _{B1} = I _{B2} = -15mA |

Notes: 10. Measured under pulsed conditions. Pulse width ≤ 300 μs. Duty cycle ≤ 2%

Typical Electrical Characteristics

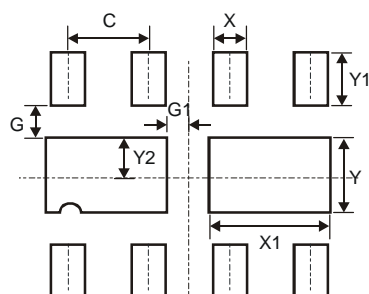


Package Outline Dimensions



| DFN3020B-8 | | | |
|----------------------|------|-------|-------|
| Dim | Min | Max | Typ |
| A | 0.77 | 0.83 | 0.80 |
| A1 | 0 | 0.05 | 0.02 |
| A3 | - | - | 0.15 |
| b | 0.25 | 0.35 | 0.30 |
| D | 2.95 | 3.075 | 3.00 |
| D2 | 0.82 | 1.02 | 0.92 |
| D4 | 1.01 | 1.21 | 1.11 |
| e | - | - | 0.65 |
| E | 1.95 | 2.075 | 2.00 |
| E2 | 0.43 | 0.63 | 0.53 |
| L | 0.25 | 0.35 | 0.30 |
| Z | - | - | 0.375 |
| All Dimensions in mm | | | |

Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 0.650 |
| G | 0.285 |
| G1 | 0.090 |
| X | 0.400 |
| X1 | 1.120 |
| Y | 0.730 |
| Y1 | 0.500 |
| Y2 | 0.365 |

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