

COMPLEMENTARY 20V LOW SATURATION TRANSISTORS

Features

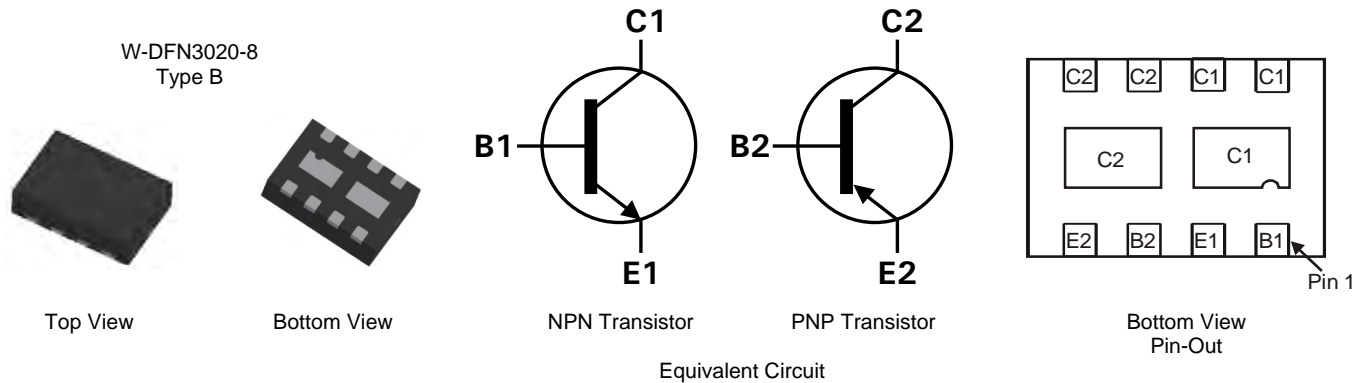
- NPN Transistor
- $BV_{CEO} > 20V$
 - $I_C = 4.5A$ Continuous Collector Current
 - Low Saturation Voltage (150mV max @ 1A)
 - $R_{SAT} = 47m\Omega$ for a low equivalent On-Resistance
- PNP Transistor
- $BV_{CEO} > -20V$
 - $I_C = -3.5A$ Continuous Collector Current
 - Low Saturation Voltage (-220mV max @ -1A)
 - $R_{SAT} = 64m\Omega$ for a low equivalent On-Resistance
- h_{FE} characterized up to 6A for high current gain hold up
 - Low profile 0.8mm high package for thin applications
 - $R_{\theta JA}$ efficient, 40% lower than SOT26
 - 6mm² footprint, 50% smaller than TSOP6 and SOT26
 - **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
 - **Halogen and Antimony Free. "Green" Device (Note 3)**
 - **Qualified to AEC-Q101 Standards for High Reliability**
 - **PPAP capable (Note 4)**

Mechanical Data

- Case: W-DFN3020-8 Type B
- Nominal package height: 0.8mm
- Case material: molded plastic. "Green" molding compound.
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - NiPdAu, Solderable per MIL-STD-202, Method 208 (e4)
- Weight: 0.013 grams (approximate)

Applications

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



Ordering Information (Note 4 & 5)

| Product | Compliance | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|---------------|------------|---------|--------------------|-----------------|-------------------|
| ZXTC6718MCTA | AEC-Q101 | DB2 | 7 | 8 | 3,000 |
| ZXTC6718MCQTA | Automotive | DB2 | 7 | 8 | 3,000 |

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
 2. See <http://www.diodes.com> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified.
 5. For packaging details, go to our website at <http://www.diodes.com>

Marking Information



DB2 = Product type marking code
Top view, dot denotes pin 1

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

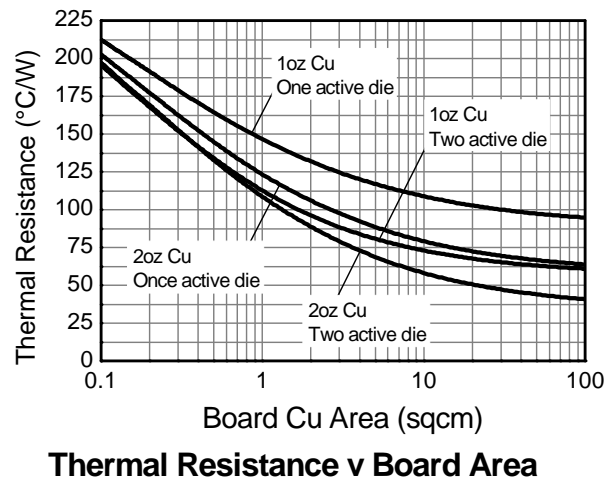
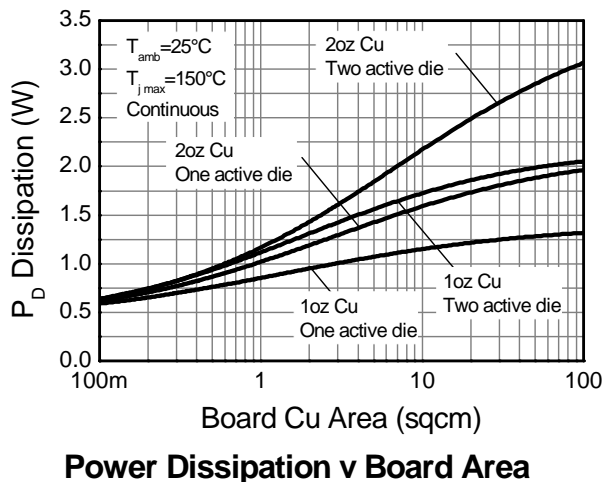
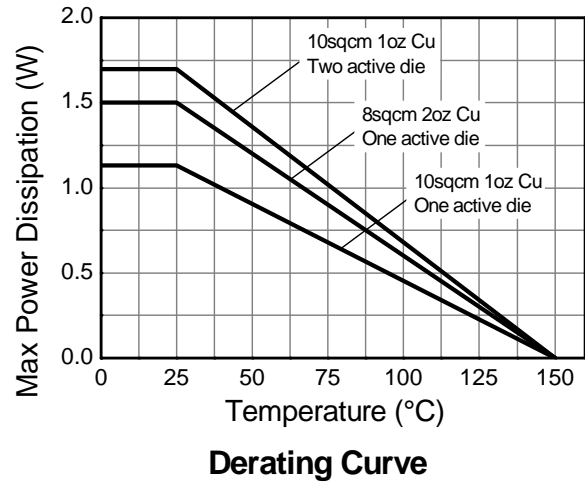
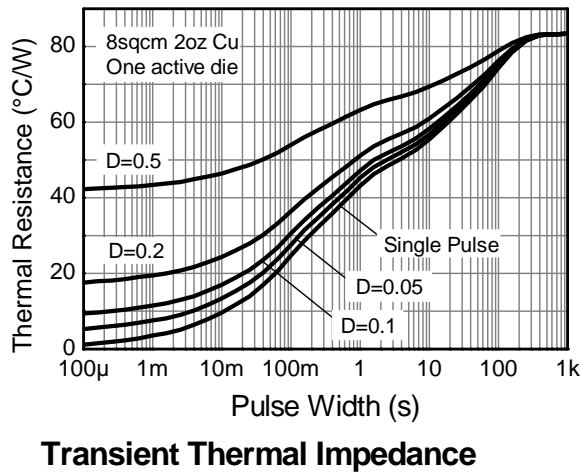
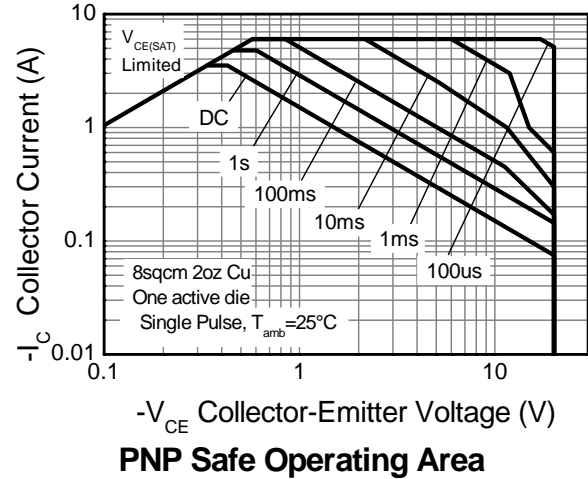
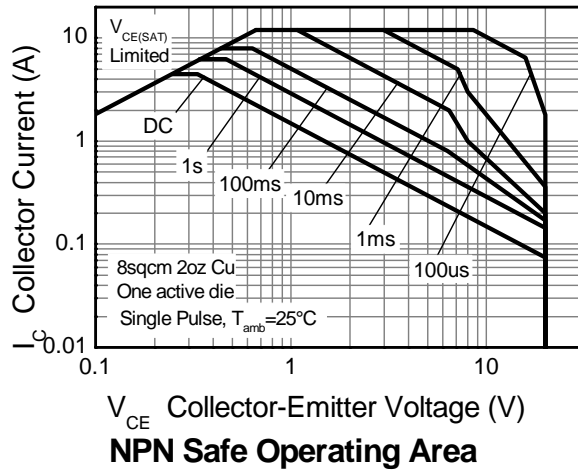
| Characteristic | Symbol | NPN | PNP | Unit |
|------------------------------|------------------|-----|------|------|
| Collector-Base Voltage | V _{CB0} | 40 | -25 | V |
| Collector-Emitter Voltage | V _{CEO} | 20 | -20 | V |
| Emitter-Base Voltage | V _{EBO} | 7 | -7 | V |
| Peak Pulse Current | I _{CM} | 12 | -6 | A |
| Continuous Collector Current | I _C | 4.5 | -3.5 | A |
| Continuous Collector Current | | 5 | -3.8 | |
| Base Current | I _B | 1 | | A |

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | NPN | PNP | Unit |
|---|-----------------------------------|-------------|-----|------|
| Power Dissipation Linear Derating Factor | P _D | 1.5 | | W |
| | | 12 | | |
| | | 2.45 | | |
| | | 19.6 | | |
| | | 1.13 | | |
| Thermal Resistance, Junction to Ambient | R _{θJA} | 8 | | °C/W |
| | | 1.7 | | |
| | | 13.6 | | |
| Thermal Resistance, Junction to Ambient | R _{θJA} | 83.3 | | °C/W |
| | | 51.0 | | |
| | | 111 | | |
| | | 73.5 | | |
| Thermal Resistance, Junction to Lead | R _{θJL} | 17.1 | | °C |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | | °C |

- Notes:
- 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.
 - Same as note (6), except the device is measured at t < 5 sec.
 - Same as note (6), except the device is surface mounted on 31mm x 31mm (10cm²) FR4 PCB with high coverage of single sided 1oz copper.
 - For a dual device with one active die.
 - For dual device with 2 active die running at equal power.
 - Thermal resistance from junction to solder-point (on the exposed collector pads).

Thermal Characteristics and Derating Information

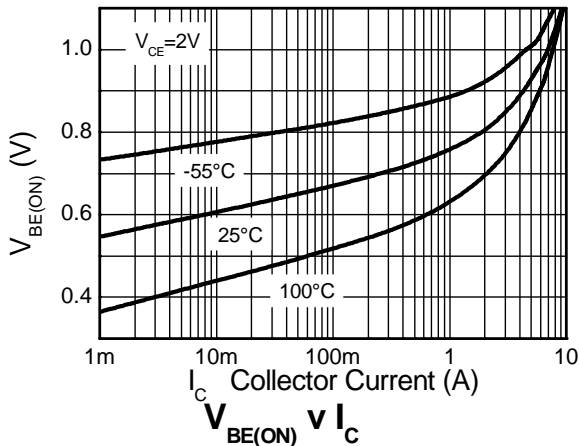
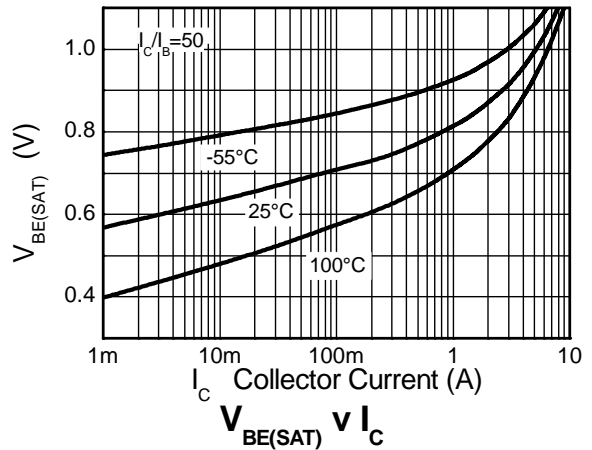
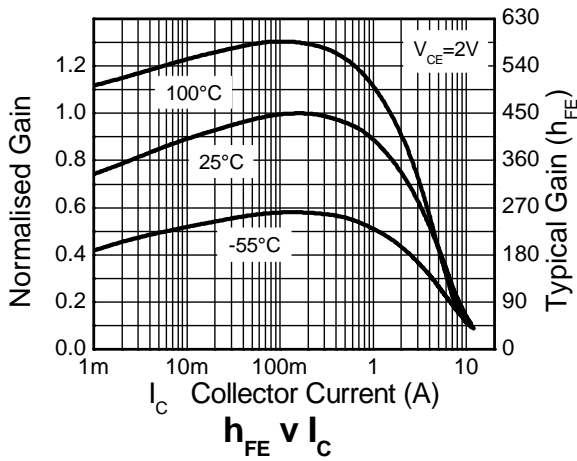
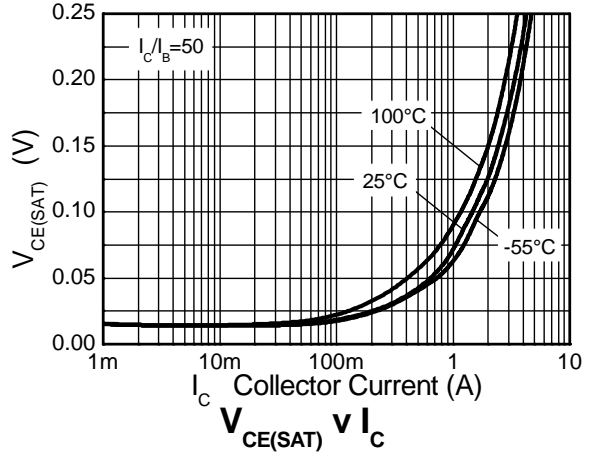
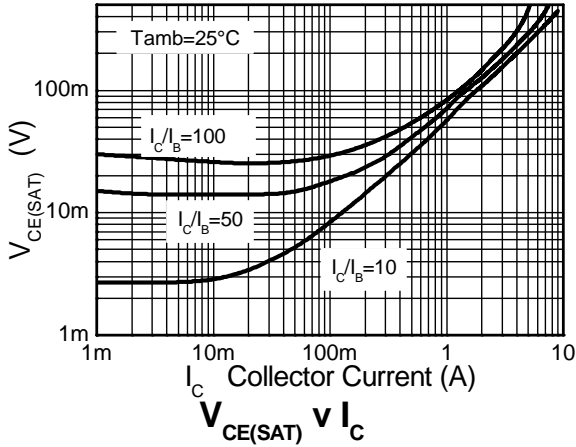


NPN - Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|----------------------|-----|------|------|------|--|
| Collector-Base Breakdown Voltage | BV _{CBO} | 40 | 100 | - | V | I _C = 100μA |
| Collector-Emitter Breakdown Voltage (Note 12) | BV _{CEO} | 20 | 27 | - | V | I _C = 10mA |
| Emitter-Base Breakdown Voltage | BV _{EBO} | 7 | 8.2 | - | V | I _E = 100μA |
| Collector Cutoff Current | I _{CBO} | - | - | 100 | nA | V _{CB} = 30V |
| Emitter Cutoff Current | I _{EBO} | - | - | 100 | nA | V _{EB} = 6V |
| Collector Emitter Cutoff Current | I _{CES} | - | - | 100 | nA | V _{CE} = 16V |
| Static Forward Current Transfer Ratio (Note 12) | h _{FE} | 200 | 400 | - | - | I _C = 10mA, V _{CE} = 2V |
| | | 300 | 450 | - | - | I _C = 200mA, V _{CE} = 2V |
| | | 200 | 360 | - | - | I _C = 2A, V _{CE} = 2V |
| | | 100 | 180 | - | - | I _C = 6A, V _{CE} = 2V |
| Collector-Emitter Saturation Voltage (Note 12) | V _{CE(sat)} | - | 8 | 15 | mV | I _C = 0.1A, I _B = 10mA |
| | | - | 90 | 150 | | I _C = 1A, I _B = 10mA |
| | | - | 115 | 135 | | I _C = 2A, I _B = 50mA |
| | | - | 190 | 250 | | I _C = 3A, I _B = 100mA |
| | | - | 210 | 300 | | I _C = 4.5A, I _B = 125mA |
| Base-Emitter Turn-On Voltage (Note 12) | V _{BE(on)} | - | 0.88 | 0.97 | V | I _C = 4.5A, V _{CE} = 2V |
| Base-Emitter Saturation Voltage (Note 12) | V _{BE(sat)} | - | 0.98 | 1.07 | V | I _C = 4.5A, I _B = 125mA |
| Output Capacitance | C _{obo} | - | 23 | 30 | pF | V _{CB} = 10V, f = 1MHz |
| Transition Frequency | f _T | 100 | 140 | - | MHz | V _{CE} = 10V, I _C = 50mA, f = 100MHz |
| Turn-on Time | t _{on} | - | 170 | - | ns | V _{CC} = 10V, I _C = 3A |
| Turn-off Time | t _{off} | - | 400 | - | ns | I _{B1} = I _{B2} = 10mA |

Notes: 12. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

NPN - Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

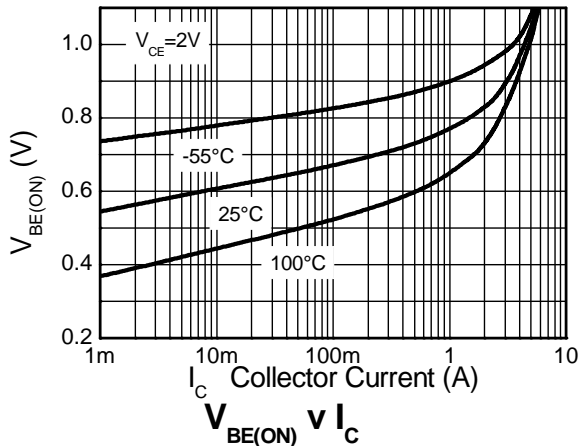
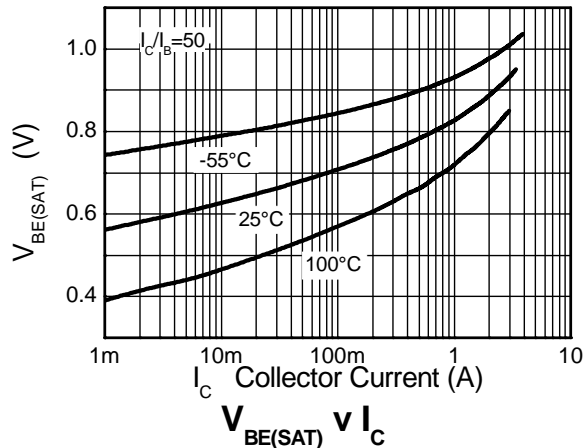
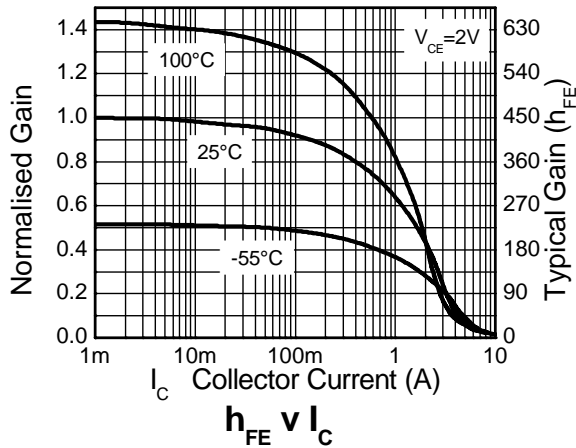
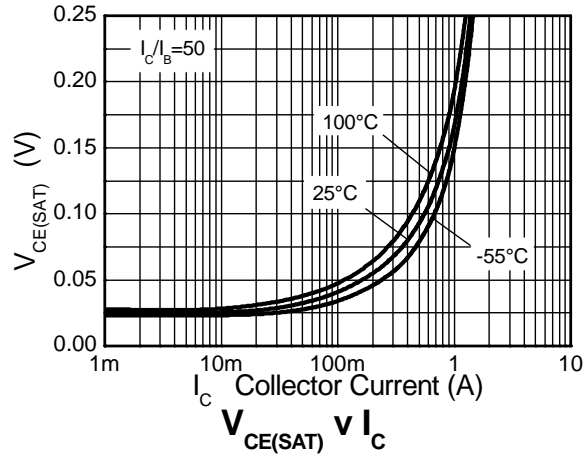
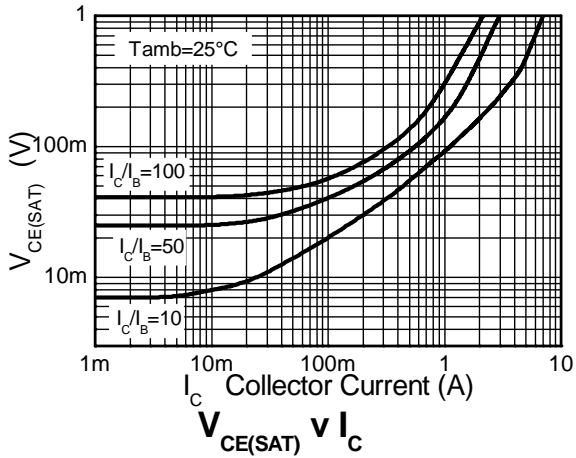


PNP - Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|----------------------|-------------------------|-------------------------------------|-------------------------------------|------|--|
| Collector-Base Breakdown Voltage | BV _{CBO} | -25 | -35 | - | V | I _C = -100μA |
| Collector-Emitter Breakdown Voltage (Note 12) | BV _{CEO} | -20 | -25 | - | V | I _C = -10mA |
| Emitter-Base Breakdown Voltage | BV _{EBO} | -7 | -8.5 | - | V | I _E = -100μA |
| Collector Cutoff Current | I _{CBO} | - | - | -100 | nA | V _{CB} = -20V |
| Emitter Cutoff Current | I _{EBO} | - | - | -100 | nA | V _{EB} = -6V |
| Collector Emitter Cutoff Current | I _{CES} | - | - | -100 | nA | V _{CES} = -16V |
| Static Forward Current Transfer Ratio (Note 12) | h _{FE} | 300 300 150 15 | 475 450 230 30 | - - - - | - | I _C = -10mA, V _{CE} = -2V I _C = -100mA, V _{CE} = -2V I _C = -2A, V _{CE} = -2V I _C = -6A, V _{CE} = -2V |
| Collector-Emitter Saturation Voltage (Note 12) | V _{CE(sat)} | - - - - - | -19 -170 -190 -240 -225 | -30 -220 -250 -350 -300 | mV | I _C = -0.1A, I _B = -10mA I _C = -1A, I _B = -20mA I _C = -1.5A, I _B = -50mA I _C = -2.5A, I _B = -150mA I _C = -3.5A, I _B = -350mA |
| Base-Emitter Turn-On Voltage (Note 12) | V _{BE(on)} | - | -0.87 | -0.95 | V | I _C = -3.5A, V _{CE} = -2V |
| Base-Emitter Saturation Voltage (Note 12) | V _{BE(sat)} | - | -1.01 | -1.12 | V | I _C = -3.5A, I _B = -350mA |
| Output Capacitance | C _{obo} | - | 21 | 30 | pF | V _{CB} = -10V, f = 1MHz |
| Transition Frequency | f _T | 150 | 180 | - | MHz | V _{CE} = -10V, I _C = -50mA, f = 100MHz |
| Turn-on Time | t _{on} | - | 40 | - | ns | V _{CC} = -10V, I _C = -1A |
| Turn-off Time | t _{off} | - | 670 | - | ns | I _{B1} = I _{B2} = -10mA |

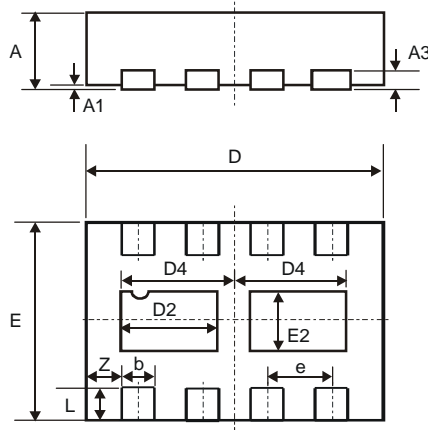
Notes: 12. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

PNP - Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Package Outline Dimensions

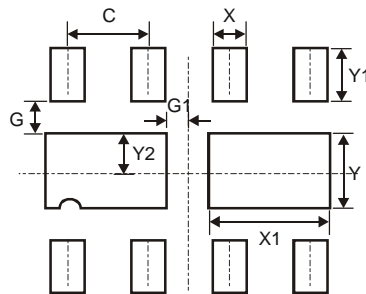
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| W-DFN3020-8 Type B | | | |
|-----------------------|------|-------|-------|
| 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

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



| 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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