

Features

- $BV_{CEO} > -40V$
- Small Form Factor Thermally Efficient Package. Enables Higher Density End Products
- $I_C = -2A$ Continuous Collector Current
- $I_{CM} = -3A$ Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)} < -225mV @ -1A$
- Complementary NPN Type: DXTN22040CFGQ
- Rated to $+175^{\circ}C$ – Ideal For High Temperature Environment
- Wettable Flank For Improved Optical Inspection
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DXTP22040CFGQ is suitable for automotive applications requiring specific change control and is AEC-Q101 qualified, is PPAP capable, and is manufactured in IATF16949:2016 certified facilities.**

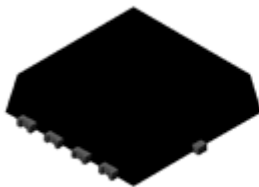
Mechanical Data

- Case: PowerDI[®]3333-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.03 grams (Approximate)

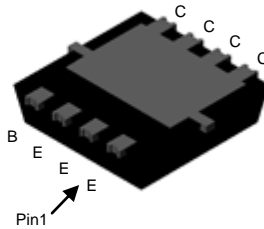
Applications

- High-Side Switch
- Supply Line Switching
- Motor Driving

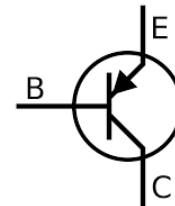
PowerDI3333-8 (SWP) (Type UX)



Top View



Bottom View



Device Symbol

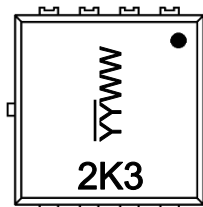
Ordering Information (Note 4)

| Part Number | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity Per Reel |
|-----------------|------------|---------|--------------------|-----------------|-------------------|
| DXTP22040CFGQ-7 | Automotive | 2K3 | 7 | 12 | 2,000 |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> 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. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information

PowerDI3333-8 (SWP) (Type UX)



2K3 = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 19 = 2019)
 WW = Week Code (01 to 53)

Absolute Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|------------------------------|-----------|-------|------|
| Collector-Base Voltage | V_{CBO} | -50 | V |
| Collector-Emitter Voltage | V_{CEO} | -40 | V |
| Emitter-Base Voltage | V_{EBO} | -7 | V |
| Continuous Collector Current | I_C | -2 | A |
| Peak Pulse Collector Current | I_{CM} | -3 | |
| Continuous Base Current | I_B | -100 | mA |
| Peak Pulse Base Current | I_{BM} | -200 | |

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

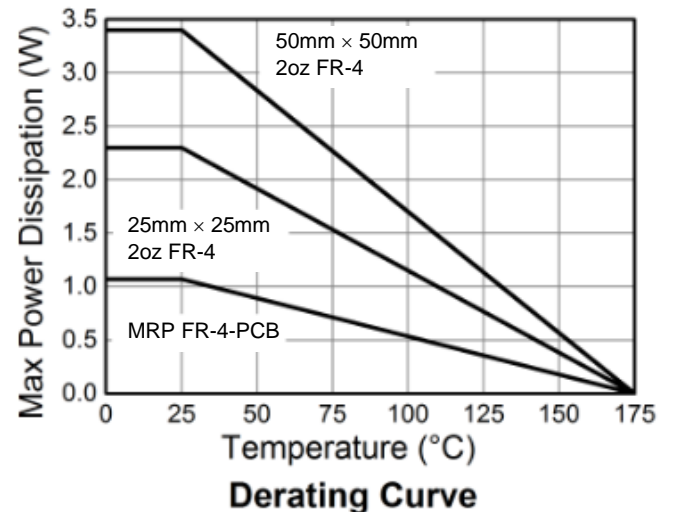
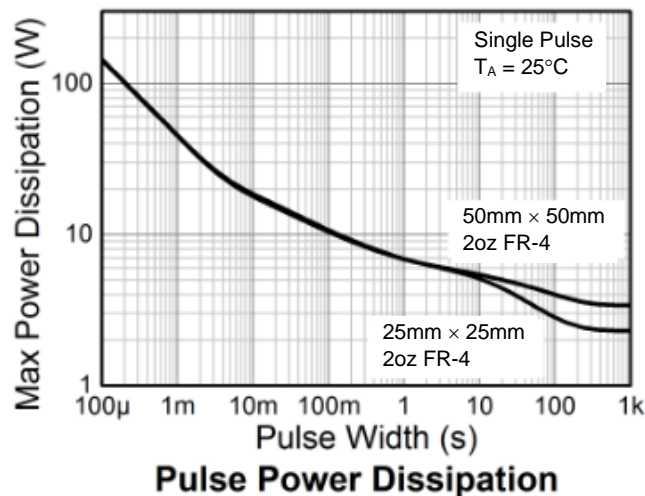
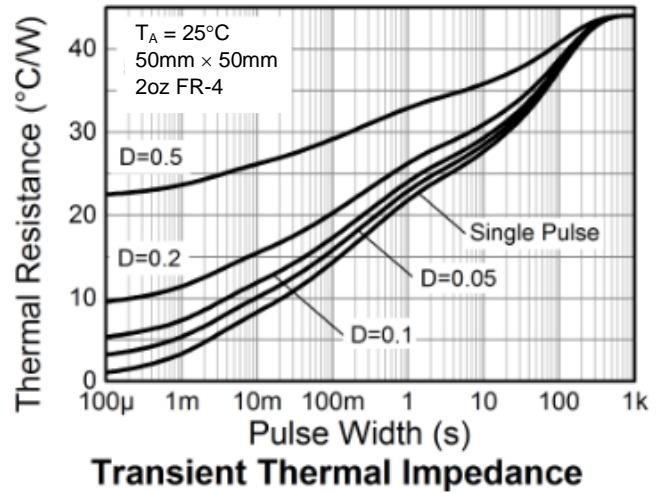
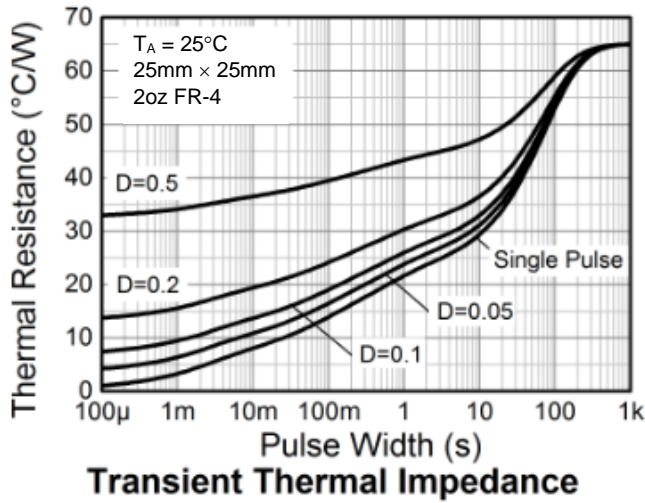
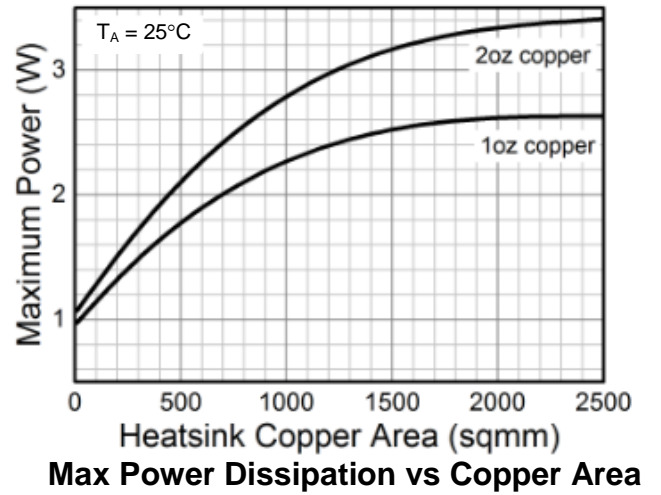
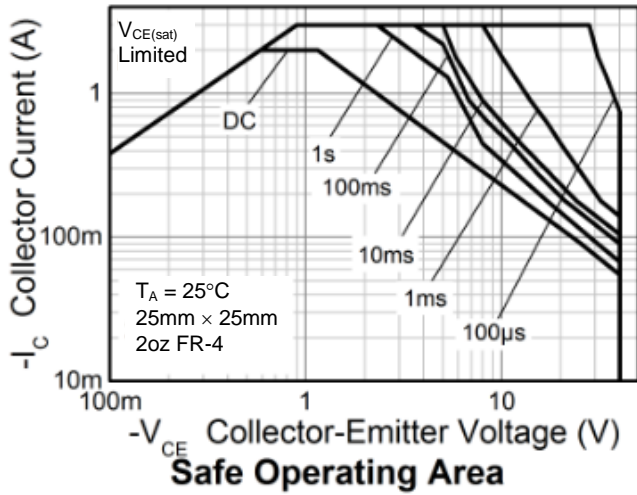
| Characteristic | Symbol | Value | Unit |
|--|-----------------|-------------|--------------------|
| Power Dissipation | P_D | 1.07 | W |
| | | 2.3 | W |
| | | 3.4 | W |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 140 | $^\circ\text{C/W}$ |
| | | 65 | $^\circ\text{C/W}$ |
| | | 44 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Leads (Note 8) | $R_{\theta JL}$ | 11 | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55 to +175 | $^\circ\text{C}$ |

ESD Ratings (Note 9)

| Characteristic | Symbol | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge – Human Body Model | ESD HBM | 4,000 | V | 3A |
| Electrostatic Discharge – Machine Model | ESD MM | 400 | V | C |

- Notes:
5. For a device mounted with the collector tab on MRP FR4-PCB; device is measured under still air conditions whilst operating in a steady-state.
 6. Same as Note 5, except the device is mounted on 25mm x 25mm 2oz copper.
 7. Same as Note 5, except the device is mounted on 50mm x 50mm 2oz copper.
 8. Thermal resistance from junction to solder-point (at the collector tab).
 9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

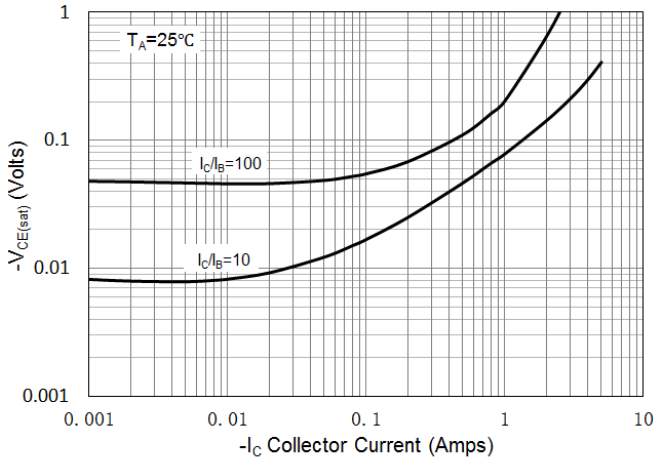


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

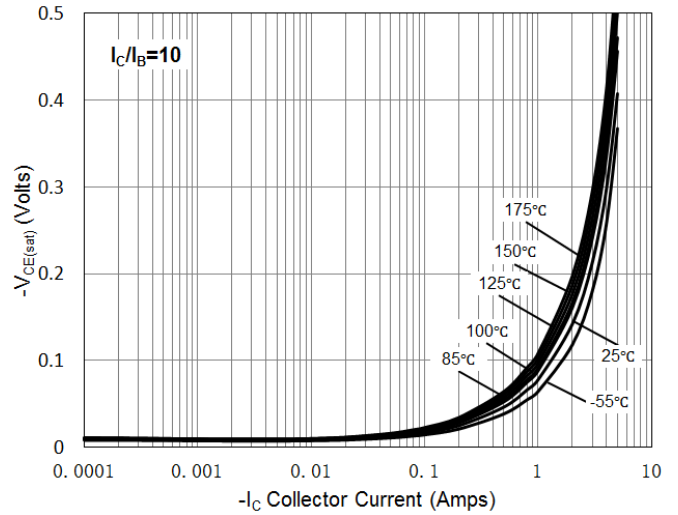
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|----------------------|-------------------------|-----------------------------------|--------------------------------------|----------|--|
| Collector-Base Breakdown Voltage | BV _{CBO} | -50 | -71 | — | V | I _C = -100μA |
| Collector-Emitter Breakdown Voltage (Note 10) | BV _{CEO} | -40 | -50 | — | V | I _C = -10mA |
| Emitter-Base Breakdown Voltage | BV _{EBO} | -7 | -8.6 | — | V | I _E = -100μA |
| Collector-Base Cut-Off Current | I _{CBO} | — | -1 -0.1 | -20 -10 | nA μA | V _{CB} = -50V V _{CB} = -40V, T _A = +150°C |
| Emitter-Base Cut-Off Current | I _{EBO} | — | -1 | -20 | nA | V _{EB} = -6V |
| Collector-Emitter Cut-Off Current | I _{CES} | — | -1 | -20 | nA | V _{CE} = -40V, V _{BE} = 0V |
| Static Forward Current Transfer Ratio (Note 10) | h _{FE} | 200 200 150 80 | 340 299 261 196 | — 600 — — | — | I _C = -100mA, V _{CE} = -2V I _C = -500mA, V _{CE} = -2V I _C = -1A, V _{CE} = -2V I _C = -2A, V _{CE} = -2V |
| Collector-Emitter Saturation Voltage (Note 10) | V _{CE(sat)} | — | -52 -42 -71 -129 -189 | -100 -130 -225 -350 -600 | mV | I _C = -100mA, I _B = -1mA I _C = -500mA, I _B = -50mA I _C = -1A, I _B = -100mA I _C = -2A, I _B = -200mA I _C = -3A, I _B = -300mA |
| Collector-Emitter Saturation Resistance (Note 10) | R _{CE(sat)} | — | — | 225 | mΩ | I _C = -1A, I _B = -100mA |
| Base-Emitter Saturation Voltage (Note 10) | V _{BE(sat)} | — | -0.88 | -1 | V | I _C = -1A, I _B = -100mA |
| Base-Emitter Turn-On Voltage (Note 10) | V _{BE(on)} | — | -0.77 | -0.9 | V | I _C = -1A, V _{CE} = -2V |
| Transition Frequency | f _T | — | 120 | — | MHz | I _C = -50mA, V _{CE} = -10V f = 100MHz |
| Output Capacitance | C _{obo} | — | 12 | — | pF | V _{CB} = -10V, f = 1MHz |
| Switching Characteristics | t _{delay} | — | 11.6 | — | ns | V _{CC} = -10V, I _C = -500mA I _{B1} = -I _{B2} = -50mA |
| | t _{rise} | — | 128 | — | ns | |
| | t _{storage} | — | 524 | — | ns | |
| | t _{fall} | — | 69.4 | — | ns | |

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

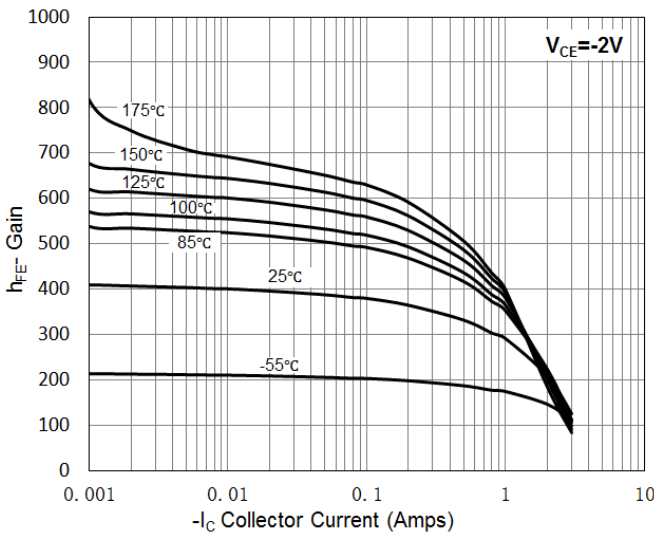
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



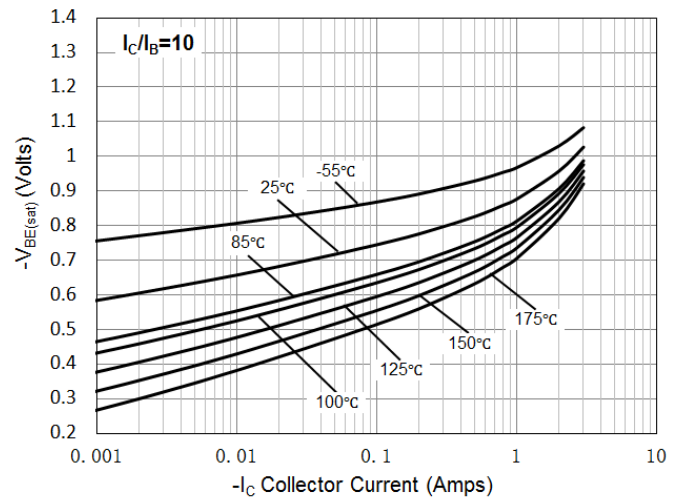
$V_{CE(sat)}$ vs I_C



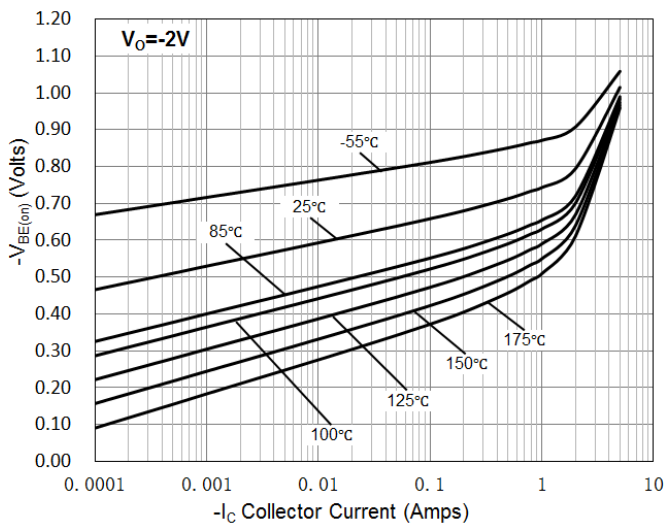
$V_{CE(sat)}$ vs I_C



h_{FE} vs I_C



$V_{BE(sat)}$ vs I_C

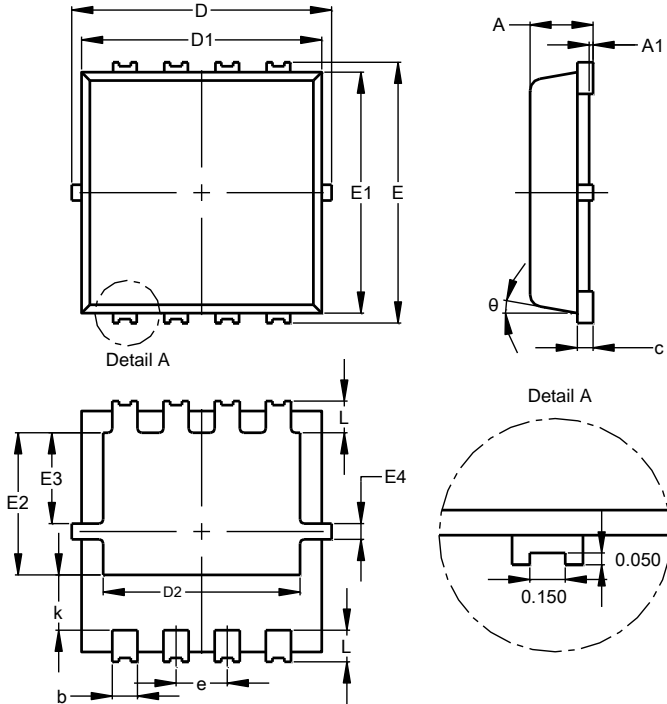


$V_{BE(on)}$ vs I_C

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

PowerDI3333-8 (SWP) (Type UX)

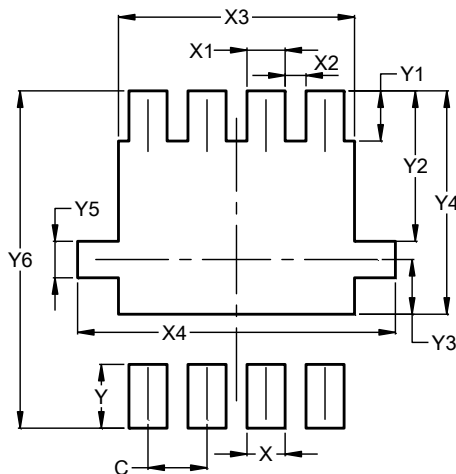


| PowerDI3333-8 (SWP) (Type UX) | | | |
|----------------------------------|------|------|------|
| Dim | Min | Max | Typ |
| A | 0.75 | 0.85 | 0.80 |
| A1 | 0.00 | 0.05 | -- |
| b | 0.25 | 0.40 | 0.32 |
| c | 0.10 | 0.25 | 0.15 |
| D | 3.20 | 3.40 | 3.30 |
| D1 | 2.95 | 3.15 | 3.05 |
| D2 | 2.30 | 2.70 | 2.50 |
| E | 3.20 | 3.40 | 3.30 |
| E1 | 2.95 | 3.15 | 3.05 |
| E2 | 1.60 | 2.00 | 1.80 |
| E3 | 0.95 | 1.35 | 1.15 |
| E4 | 0.10 | 0.30 | 0.20 |
| e | -- | -- | 0.65 |
| k | 0.50 | 0.90 | 0.70 |
| L | 0.30 | 0.50 | 0.40 |
| θ | 0° | 12° | 10° |
| All Dimensions in mm | | | |

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

PowerDI3333-8 (SWP) (Type UX)



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 0.650 |
| X | 0.420 |
| X1 | 0.420 |
| X2 | 0.230 |
| X3 | 2.600 |
| X4 | 3.500 |
| Y | 0.700 |
| Y1 | 0.550 |
| Y2 | 1.650 |
| Y3 | 0.600 |
| Y4 | 2.450 |
| Y5 | 0.400 |
| Y6 | 3.700 |

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