

## Features

- $BV_{CEO} > -140V$
- Small Form Factor Thermally Efficient Package. Enables Higher Density End Products
- $I_C = -4A$  Continuous Collector Current
- $I_{CM} = -10A$  Peak Pulse Current
- Low Saturation Voltage  $V_{CE(sat)} < -120mV @ I_C = -1A$
- $R_{SAT} = 72m\Omega$  for a Low Equivalent On-Resistance
- $h_{FE}$  Specified up to  $-10A$  for a High Gain Hold-Up
- 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)**

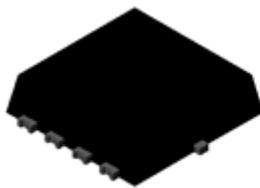
## Mechanical Data

- Case: PowerDI<sup>®</sup>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)

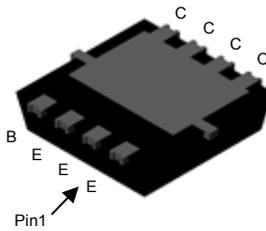
## Applications

- Motor Driving
- Line Switching
- High-Side Switches

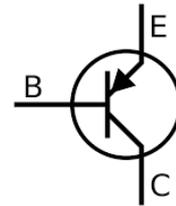
PowerDI3333-8 (SWP) (Type UX)



Top View



Bottom View



Device Symbol

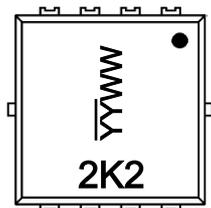
## Ordering Information (Note 4)

Part Number	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
DXTP03140BFG-7	2K2	7	12	2000

- 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/products/packages.html>.

## Marking Information

PowerDI3333-8 (SWP) (Type UX)



2K2= Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 19 = 2019)  
 WW = Week Code (01 to 53)

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	-180	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-140	V
Emitter-Base Voltage	V <sub>EBO</sub>	-7	V
Continuous Collector Current	I <sub>C</sub>	-4	A
Peak Pulse Current	I <sub>CM</sub>	-10	A

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

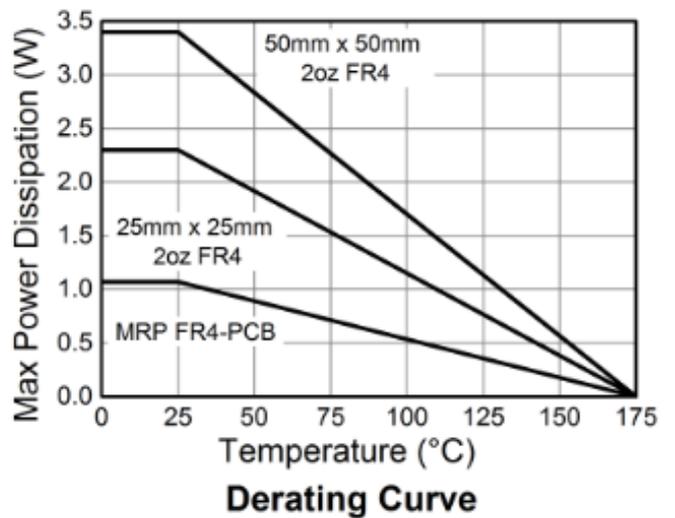
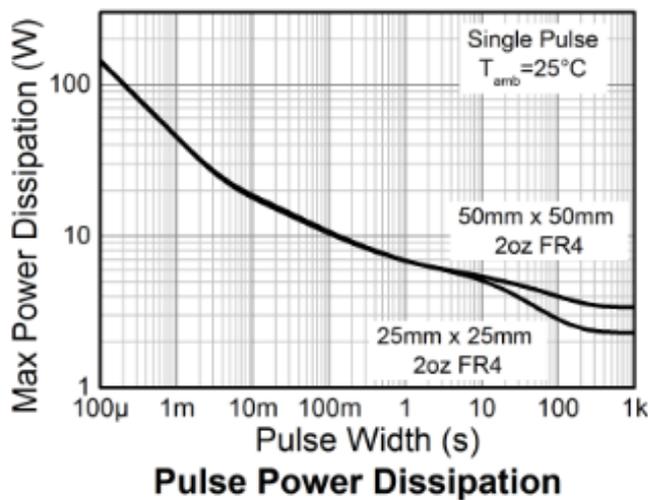
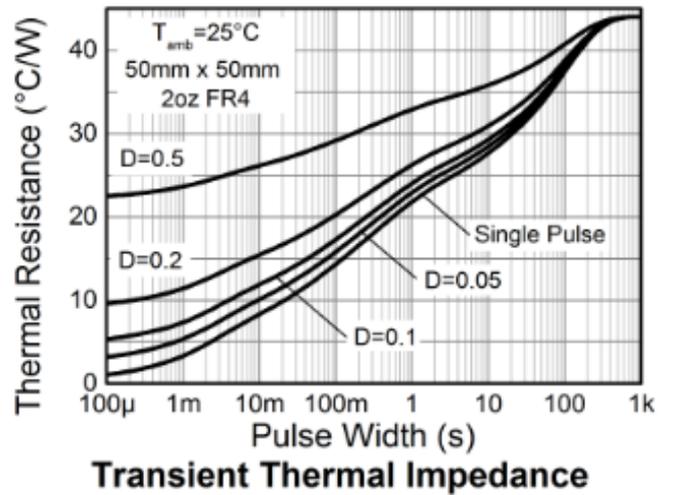
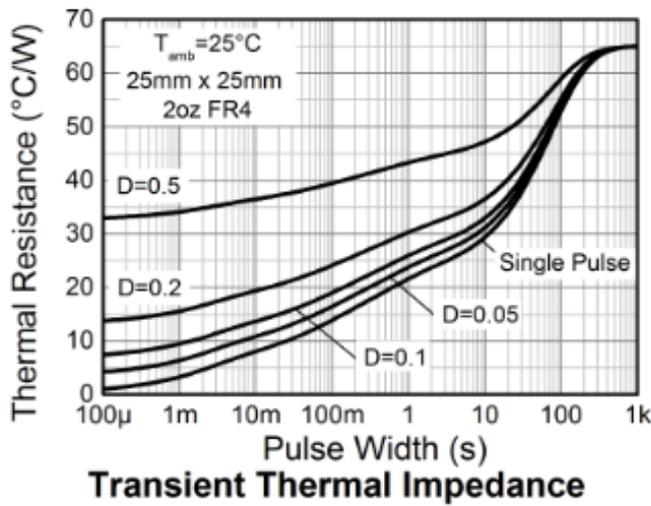
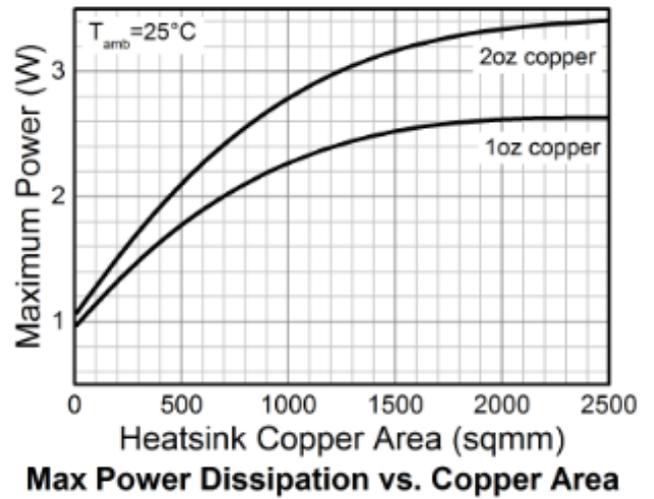
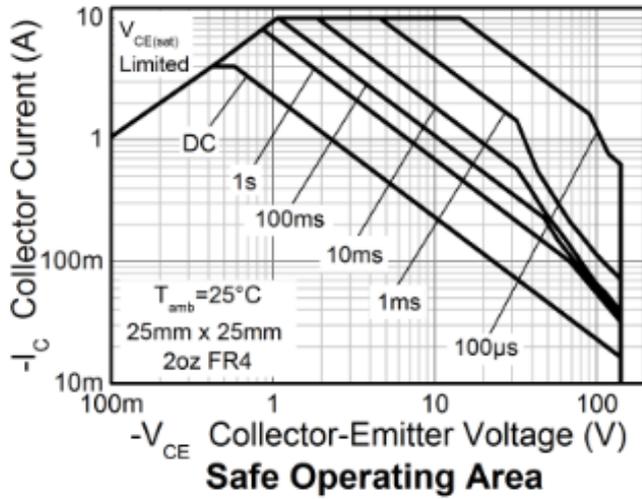
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	1.07	W
		2.3	W
		3.4	W
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	140	°C/W
		65	°C/W
		44	°C/W
Thermal Resistance, Junction to Leads (Note 8)	R <sub>θJL</sub>	6	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +175	°C

**ESD Ratings** (Note 9)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4000	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 × 25mm 2oz copper.
  7. Same as Note 5, except the device is mounted on 50mm × 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**

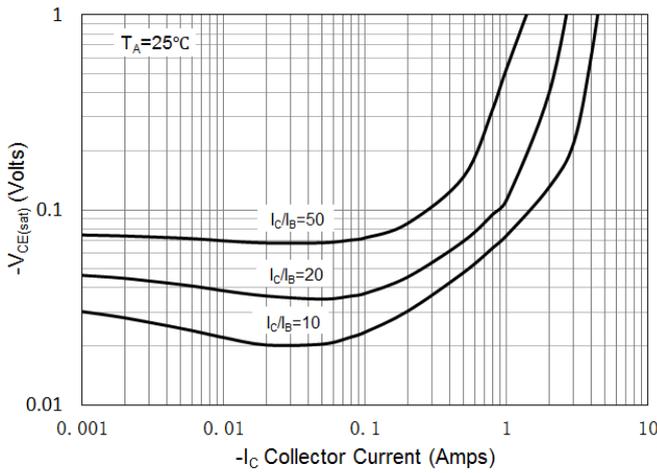


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

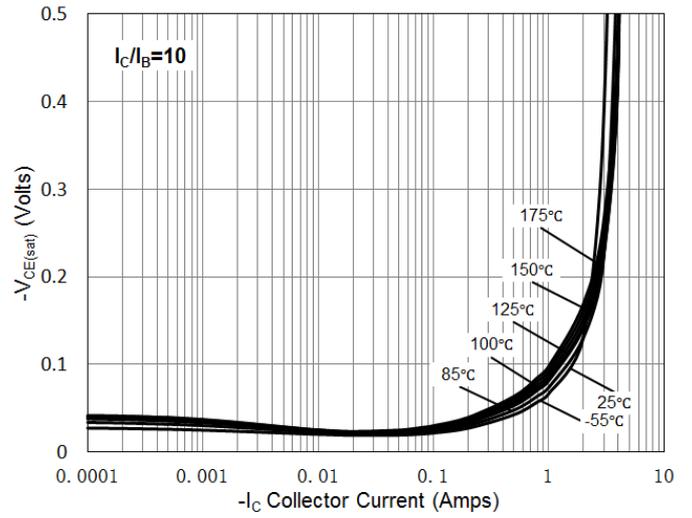
Characteristic	Symbol	Min	Typ.	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-180	-216	—	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage (Note 10)	BV <sub>CER</sub>	-180	—	—	V	I <sub>C</sub> = -1μA, R <sub>B</sub> ≤ 1kΩ
Collector-Emitter Breakdown Voltage (Note 10)	BV <sub>CEO</sub>	-140	-164	—	V	I <sub>C</sub> = -1mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-7	-8.3	—	V	I <sub>E</sub> = -100μA
Collector Cut-Off Current	I <sub>CBO</sub>	—	-1	-20	nA	V <sub>CB</sub> = -150V
		—	-0.1	-10	μA	V <sub>CB</sub> = -150V, T <sub>A</sub> = +125°C
Collector Cut-Off Current	I <sub>CER</sub> R ≤ 1kΩ	—	-2	-20	nA	V <sub>CB</sub> = -150V
		—	-0.3	-10	μA	V <sub>CB</sub> = -150V, T <sub>A</sub> = +125°C
Emitter Cut-Off Current	I <sub>EBO</sub>	—	-1	-10	nA	V <sub>EB</sub> = -6V
DC Current Transfer Static Ratio (Note 10)	h <sub>FE</sub>	100	165	—	—	I <sub>C</sub> = -10mA, V <sub>CE</sub> = -5V
		100	154	300	—	I <sub>C</sub> = -1A, V <sub>CE</sub> = -5V
		45	65	—	—	I <sub>C</sub> = -3A, V <sub>CE</sub> = -5V
		—	5	—	—	I <sub>C</sub> = -10A, V <sub>CE</sub> = -5V
Collector-Emitter Saturation Voltage (Note 10)	V <sub>CE(sat)</sub>	—	-37	-60	mV	I <sub>C</sub> = -100mA, I <sub>B</sub> = -5mA
		—	-47	-80	mV	I <sub>C</sub> = -0.5A, I <sub>B</sub> = -50mA
		—	-72	-120	mV	I <sub>C</sub> = -1A, I <sub>B</sub> = -100mA
		—	-200	-360	mV	I <sub>C</sub> = -3A, I <sub>B</sub> = -300mA
Base-Emitter Saturation Voltage (Note 10)	V <sub>BE(sat)</sub>	—	-918	-1040	mV	I <sub>C</sub> = -3A, I <sub>B</sub> = -300mA
Base-Emitter Turn-On Voltage (Note 10)	V <sub>BE(on)</sub>	—	-802	-930	mV	I <sub>C</sub> = -3A, V <sub>CE</sub> = -5V
Transitional Frequency	f <sub>T</sub>	—	120	—	MHz	I <sub>C</sub> = -100mA, V <sub>CE</sub> = -10V, f = 50MHz
Output Capacitance	C <sub>obo</sub>	—	33	—	pF	V <sub>CB</sub> = -10V, f = 1MHz
Switching Characteristics	t <sub>delay</sub>	—	9.7	—	ns	V <sub>CC</sub> = -50V, I <sub>C</sub> = -1A, I <sub>B1</sub> = -I <sub>B2</sub> = -100mA
	t <sub>rise</sub>	—	200	—	ns	
	t <sub>storage</sub>	—	1500	—	ns	
	t <sub>fall</sub>	—	137	—	ns	

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

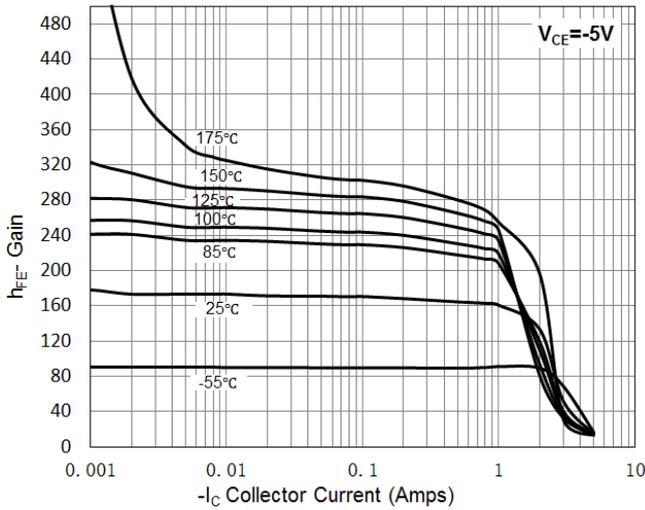
**Typical Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)



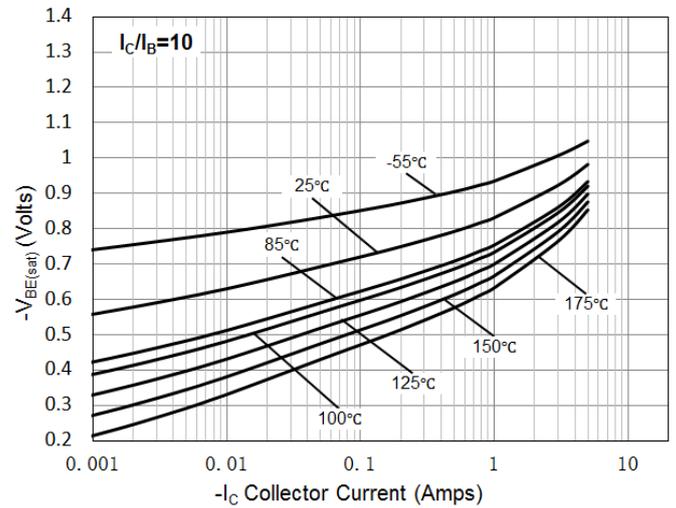
**$V_{CE(sat)}$  vs  $I_C$**



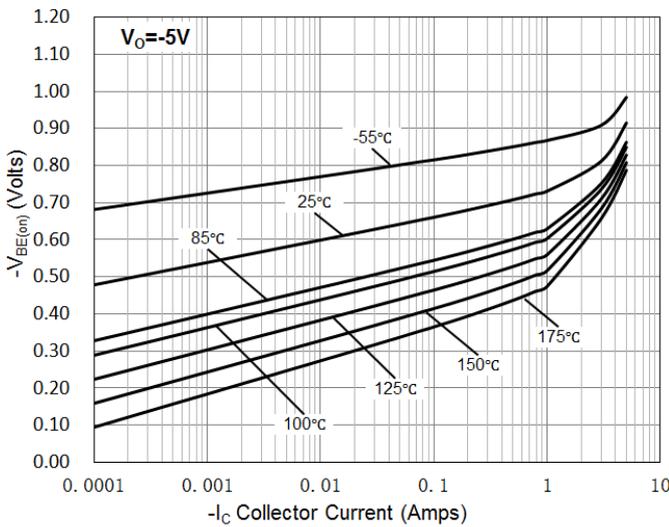
**$V_{CE(sat)}$  vs  $I_C$**



**$h_{FE}$  vs  $I_C$**



**$V_{BE(sat)}$  vs  $I_C$**

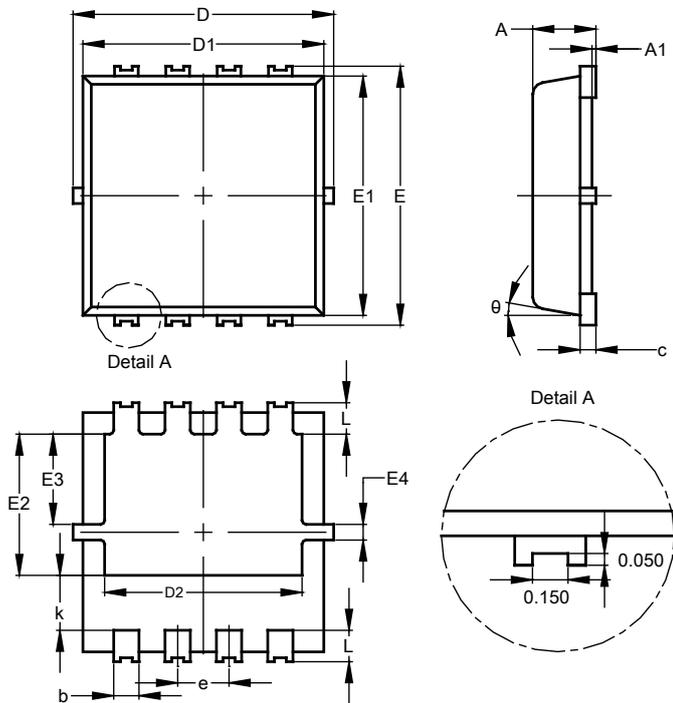


**$V_{BE(on)}$  vs  $I_C$**

**Package Outline Dimensions**

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

**PowerDI3333-8 (SWP) (Type UX)**

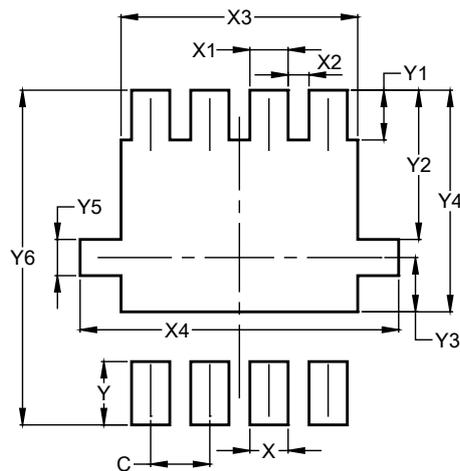


PowerDI3333-8 (SWP) (Type UX)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	2.30	2.70	2.50
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E3	0.95	1.35	1.15
E4	0.10	0.30	0.20
e	--	--	0.65
k	0.50	0.90	0.70
L	0.30	0.50	0.40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

**Suggested Pad Layout**

Please see <https://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

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device terminals and PCB tracking.

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