



DXTP22040DFG

#### 40V PNP LOW VCESAT TRANSISTOR IN PowerDI3333-8

#### **Features**

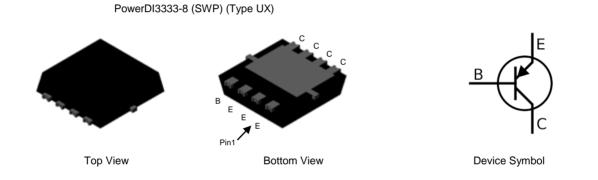
- $BV_{CEO} > -40V$
- Small Form Factor Thermally Efficient Package. Enables Higher Density End Products
- I<sub>C</sub> = -2A Continuous Collector Current
- I<sub>CM</sub> = -3A Peak Pulse Current
- Low Saturation Voltage V<sub>CE(sat)</sub> < -320mV @ -1A
- Complementary NPN Type: DXTN22040DFG
- Rated to +175°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 @3
- Weight: 0.03 grams (Approximate)

#### Applications

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



## Ordering Information (Note 4)

Pa	art Number	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
DXTP22040DFG-7		2K4	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.					

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)



<u>2K</u>4 = Product Type Marking Code YYWW = Date Code Marking YY = Last Two Digits of Year (ex: 19 = 2019) WW = Week Code (01 to 53)

PowerDI is a registered trademark of Diodes Incorporated. DXTP22040DFG Datasheet number: DS41061 Rev. 1 - 2

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## Absolute Maximum Ratings (@TA = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit	
Collector-Base Voltage	V <sub>CBO</sub>	-50	V	
Collector-Emitter Voltage	V <sub>CEO</sub>	-40	V	
Emitter-Base Voltage	V <sub>EBO</sub>	-7	V	
Continuous Collector Current	Ι <sub>C</sub>	-2	٨	
Peak Pulse Collector Current	I <sub>CM</sub>	-3	A	
Continuous Base Current	IB	-100		
Peak Pulse Base Current	I <sub>BM</sub>	-200	mA	

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

Characteristic		Symbol	Value	Unit
	(Note 5)		1.07	W
Power Dissipation	(Note 6)	PD	2.3	W
	(Note 7)		3.4	W
	(Note 5)		140	°C/W
Thermal Resistance, Junction to Ambient	(Note 6)	R <sub>0JA</sub>	65	°C/W
	(Note 7)		44	°C/W
Thermal Resistance, Junction to Leads (Note 8	R <sub>θJL</sub>	11	°C/W	
Operating and Storage Temperature Range	TJ, TSTG	-55 to +175	°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	С	
Notes: 5. For a device mounted with the collector tab on MRP FR4-PC	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.				

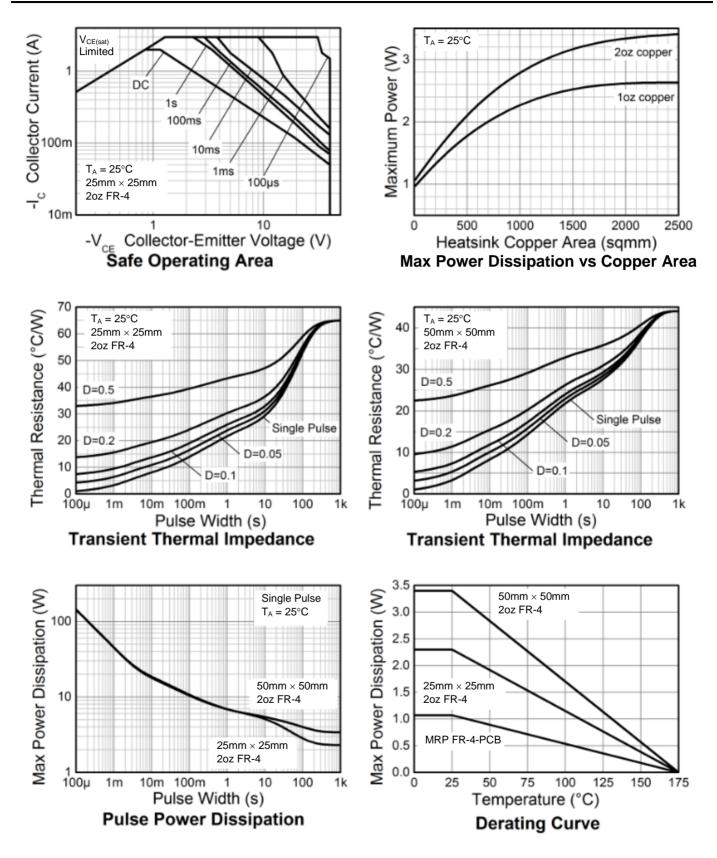
5. For a device mounted with the collector tab on MRP FR4-PCB; device is measured under still air conditions whilst operating in a steady-state.

6. Same as Note 5, except the device is mounted on  $25mm \times 25mm 2oz$  copper. 7. Same as Note 5, except the device is mounted on  $50mm \times 50mm 2oz$  copper.

Thermal resistance from junction to solder-point (at the collector tab).
 Refer to JEDEC specification JESD22-A114 and JESD22-A115.



# **Thermal Characteristics and Derating Information**





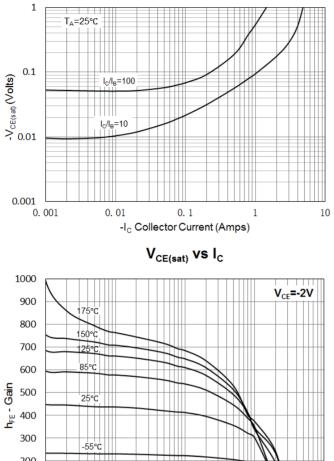
# Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

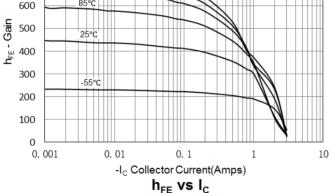
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition
Collector-Base Breakdown Voltage		-50	-71	_	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage (Note 10)		-40	-58	_	V	$I_{C} = -10 \text{mA}$
Emitter-Base Breakdown Voltage		-7	-8.5	_	V	I <sub>E</sub> = -100μA
Collector-Base Cut-Off Current	BV <sub>EBO</sub>	_	-1 -0.1	-0.1 -20	μA	V <sub>CB</sub> = -50V V <sub>CB</sub> = -50V, T <sub>A</sub> = +150°C
Emitter-Base Cut-Off Current	I <sub>EBO</sub>	_	-1	-20	nA	$V_{EB} = -6V$
Collector-Emitter Cut-Off Current	ICES	_	-1	-20	nA	$V_{CE} = -40V, V_{BE} = 0V$
Static Forward Current Transfer Ratio (Note 10)	h <sub>FE</sub>	340 300 200 120	410 354 303 203	900 —	_	$I_{C} = -100 \text{mA}, V_{CE} = -2V$ $I_{C} = -500 \text{mA}, V_{CE} = -2V$ $I_{C} = -1A, V_{CE} = -2V$ $I_{C} = -2A, V_{CE} = -2V$
Collector-Emitter Saturation Voltage (Note 10)	V <sub>CE(sat)</sub>	_	-56 -48 -81 -146 -218	-140 -170 -320 -400 -600	mV	I <sub>C</sub> = -100mA, I <sub>B</sub> = -1mA I <sub>C</sub> = -500mA, I <sub>B</sub> = -50mA I <sub>C</sub> = -1A, I <sub>B</sub> = -100mA I <sub>C</sub> = -2A, I <sub>B</sub> = -200mA I <sub>C</sub> = -3A, I <sub>B</sub> = -300mA
Collector-Emitter Saturation Resistance (Note 10)	R <sub>CE(sat)</sub>		_	320	mΩ	$I_{C} = -1A, I_{B} = -100mA$
Base-Emitter Saturation Voltage (Note 10)	V <sub>BE(sat)</sub>	_	-0.88	-1	V	$I_{C} = -1A, I_{B} = -100mA$
Base-Emitter Turn-On Voltage (Note 10)	V <sub>BE(on)</sub>		-0.76	-0.9	V	$I_{C} = -1A, V_{CE} = -2V$
Transition Frequency	f⊤		120	-	MHz	I <sub>C</sub> = -50mA, V <sub>CE</sub> = -10V f = 100MHz
Output Capacitance	C <sub>obo</sub>		12		pF	V <sub>CB</sub> = -10V, f = 1MHz
	t <sub>delay</sub>	_	10		ns	
Switching Characteristics	t <sub>rise</sub>	_	144	_	ns	$V_{CC} = -10V, I_{C} = -500mA$
Switching Characteristics	t <sub>storage</sub>	—	704		ns	$I_{B1} = -I_{B2} = -50 \text{mA}$
	t <sub>fall</sub>	_	48.5		ns	

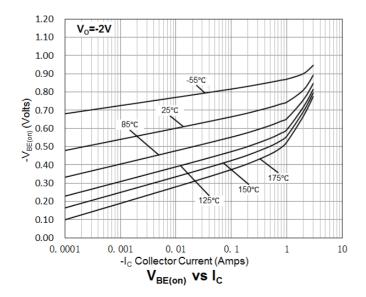
Note: 10. Measured under pulsed conditions. Pulse width  $\leq$  300µs. Duty cycle  $\leq$  2%.

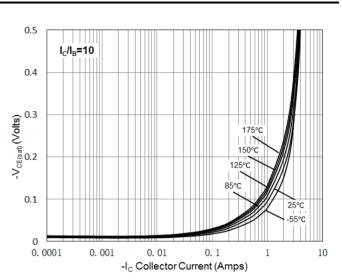


# Typical Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

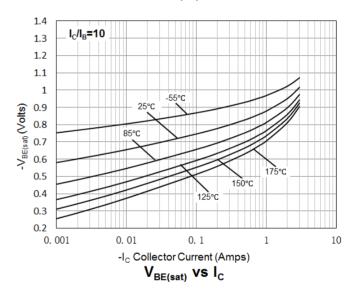








V<sub>CE(sat)</sub> vs I<sub>C</sub>



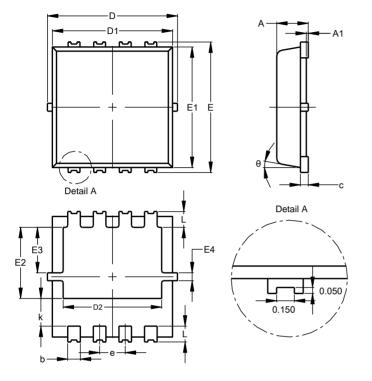
DXTP22040DFG Datasheet number: DS41061 Rev. 1 - 2



## **Package Outline Dimensions**

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

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

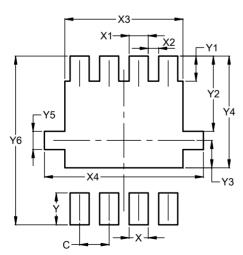


PowerDI3333-8 (SWP)						
(Type UX) Dim Min Max Typ						
A	0.75	0.85				
			0.80			
A1	0.00	0.05				
b	0.25	0.40	0.32			
С	0.10	0.25	0.15			
D	3.20	3.40	3.30			
D1	2.95	3.15	3.05			
D2	2.30	2.70	2.50			
E	3.20	3.40	3.30			
E1	2.95	3.15	3.05			
E2	1.60	2.00	1.80			
E3	0.95	1.35	1.15			
E4	0.10	0.30	0.20			
е	_	_	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)
С	0.650
Х	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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