140V PNP LOW VCESAT TRANSISTOR IN PowerDI3333-8

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} = 72mΩ for a Low Equivalent On-Resistance
- h_{FE} Specified up to -10A for a High Gain Hold-Up
- 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)**

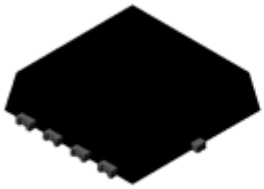
Mechanical Data

- Case: PowerDI®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)

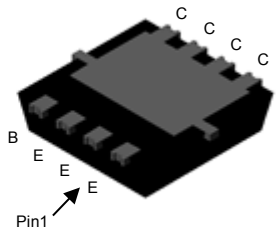
Applications

- Motor Driving
- Line Switching
- High-Side Switches

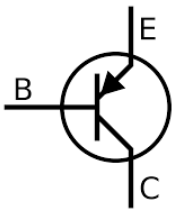
PowerDI3333-8 (SWP) (Type UX)



Top View



Bottom View



Device Symbol

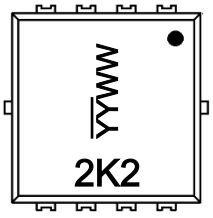
Ordering Information (Note 4)

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)

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-180	V
Collector-Emitter Voltage	V_{CEO}	-140	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current	I_C	-4	A
Peak Pulse Current	I_{CM}	-10	A

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

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	1.07	W
	(Note 6)		2.3	W
	(Note 7)		3.4	W
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\Theta JA}$	140	°C/W
	(Note 6)		65	°C/W
	(Note 7)		44	°C/W
Thermal Resistance, Junction to Leads (Note 8)		$R_{\Theta JL}$	6	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +175	°C

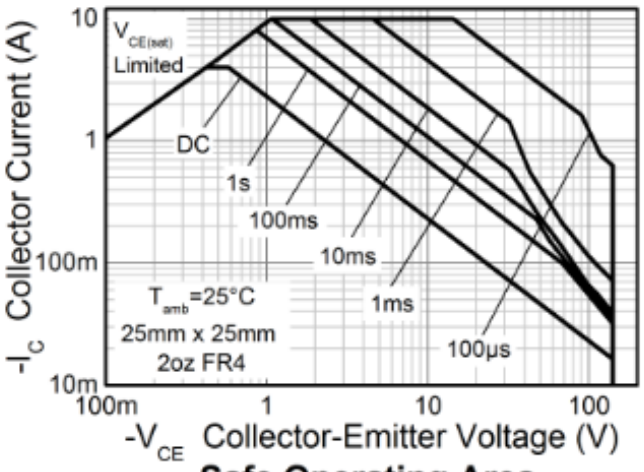
ESD Ratings (Note 9)

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

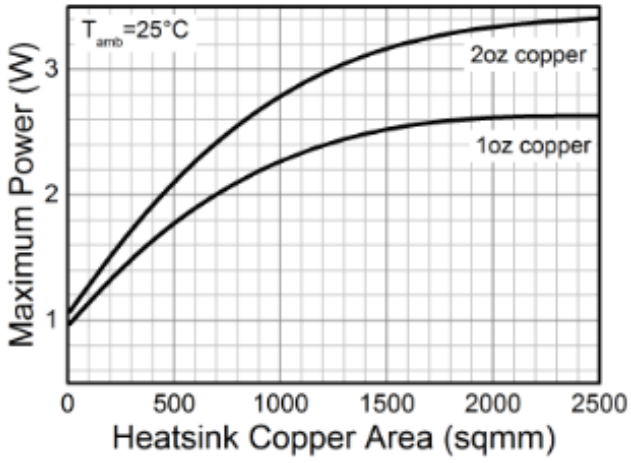
Notes:
5. For a device mounted with the collector tab on MRP FR4-PCB; device is measured under still air conditions whilst operating in a steady-state.
6. Same as Note 5, except the device is mounted on 25mm × 25mm 2oz copper.
7. Same as Note 5, except the device is mounted on 50mm × 50mm 2oz copper.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

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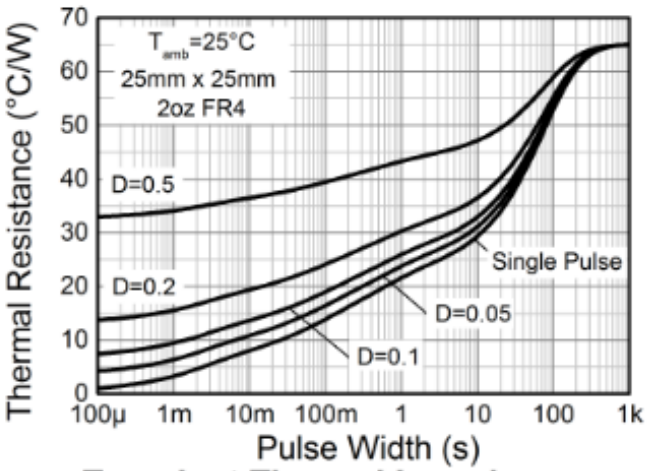
Thermal Characteristics and Derating Information



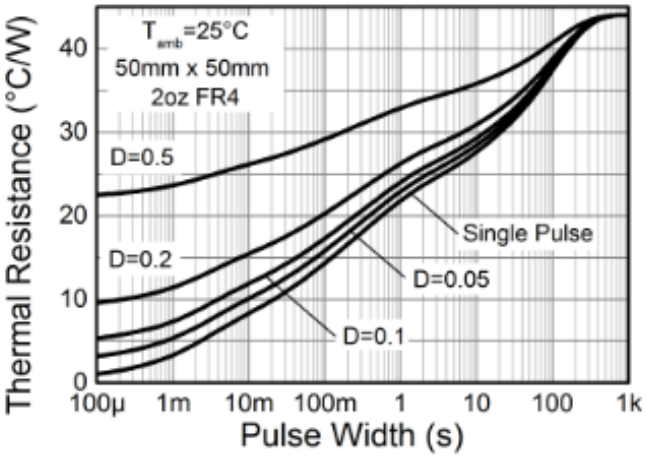
Safe Operating Area



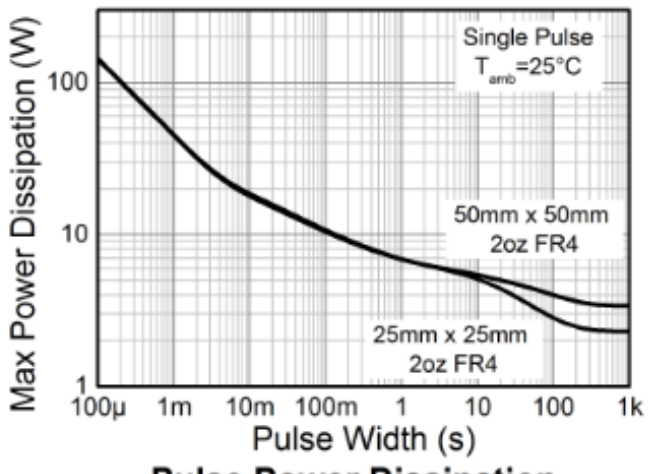
Max Power Dissipation vs. Copper Area



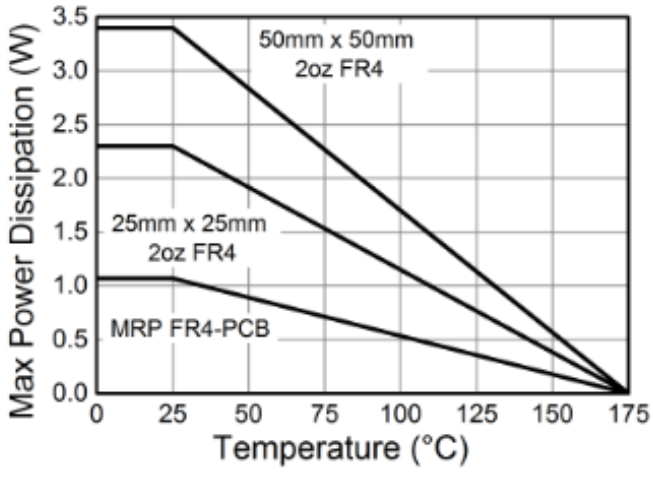
Transient Thermal Impedance



Transient Thermal Impedance



Pulse Power Dissipation



Derating Curve

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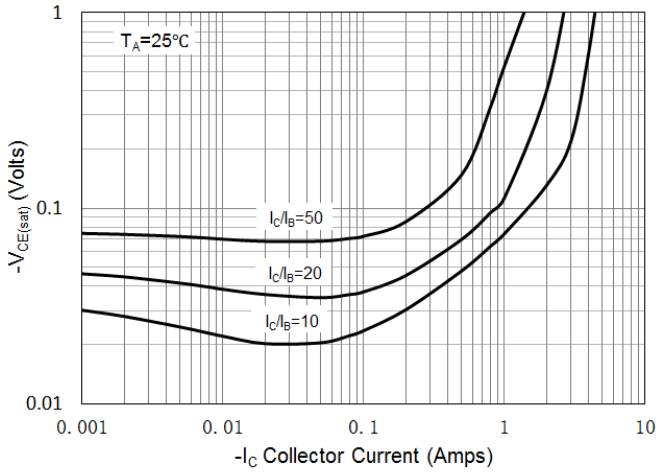
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

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

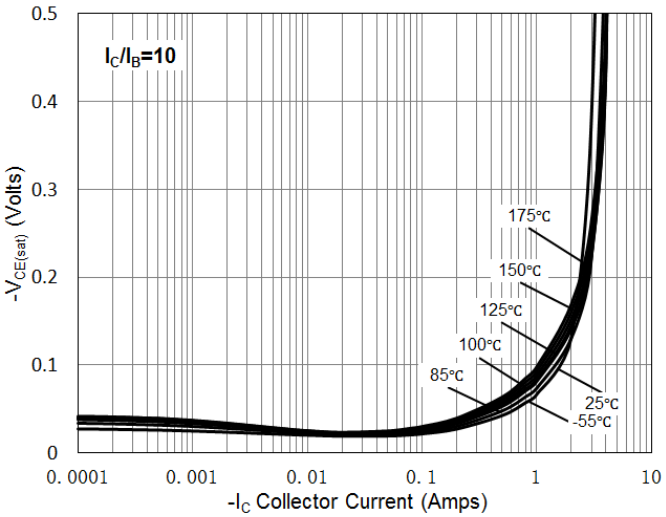
Note: 10. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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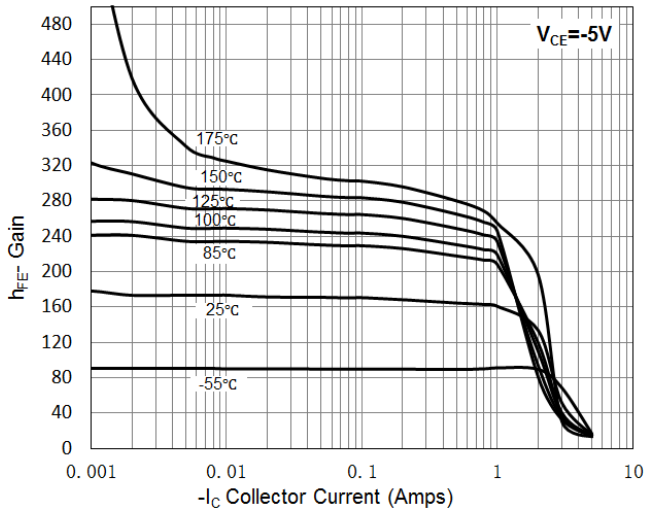
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



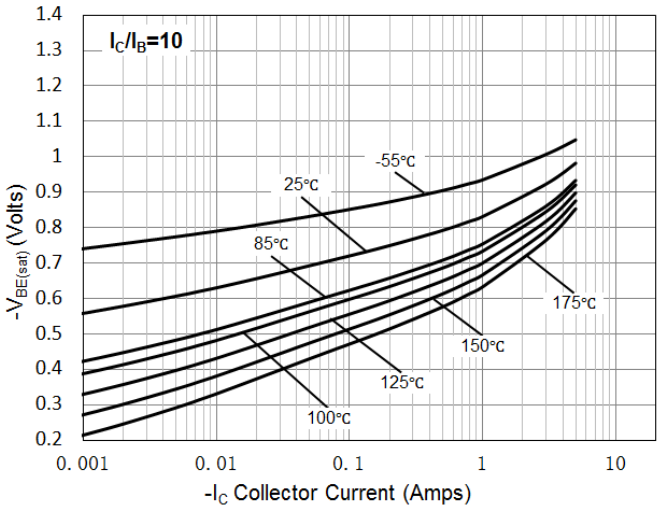
$V_{CE(sat)}$ vs I_C



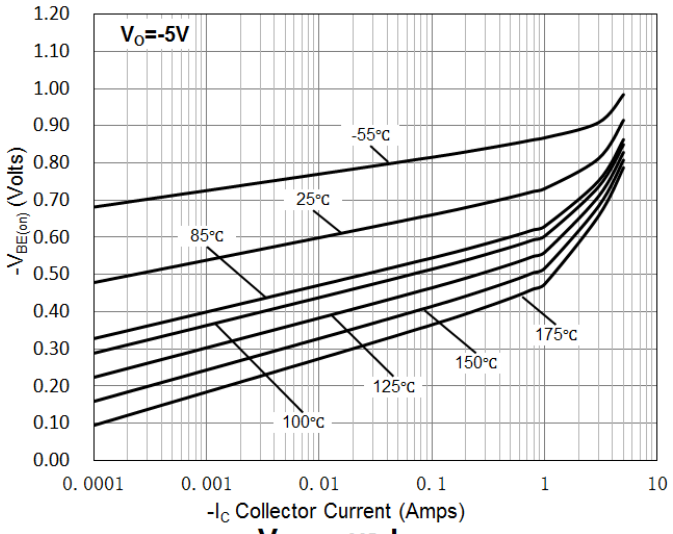
$V_{CE(sat)}$ vs I_C



h_{FE} vs I_C



$V_{BE(sat)}$ vs I_C



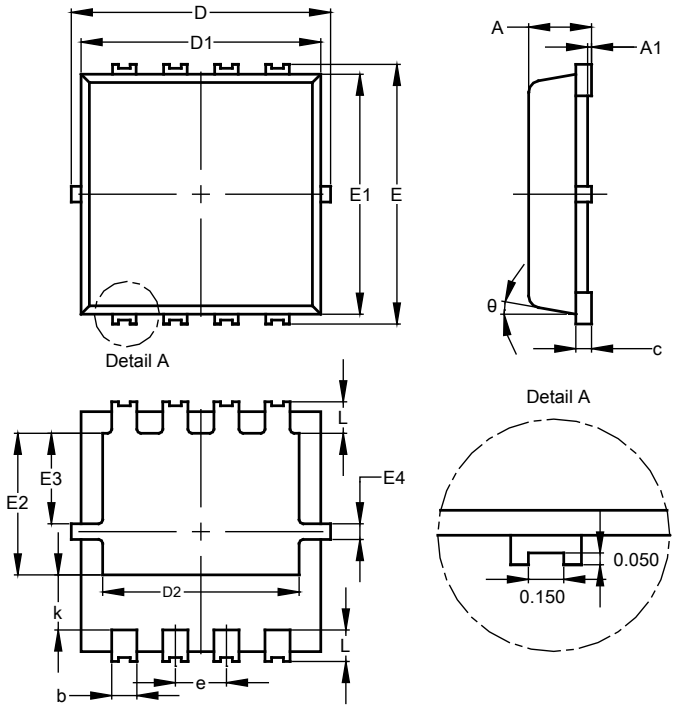
$V_{BE(on)}$ vs I_C

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Package Outline Dimensions

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

PowerDI3333-8 (SWP) (Type UX)

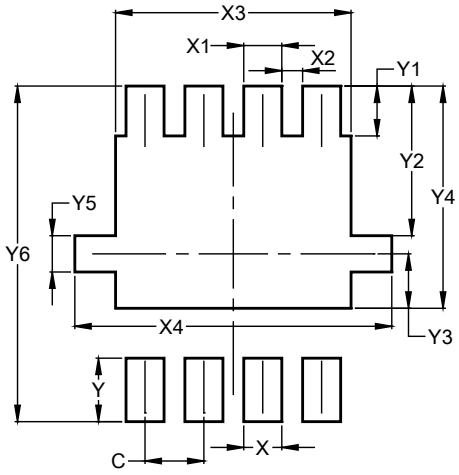


PowerDI3333-8 (SWP) (Type UX)			
Dim	**Min**	**Max**	**Typ**
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	2.30	2.70	2.50
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E3	0.95	1.35	1.15
E4	0.10	0.30	0.20
e	–	–	0.65
k	0.50	0.90	0.70
L	0.30	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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2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

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