

Features

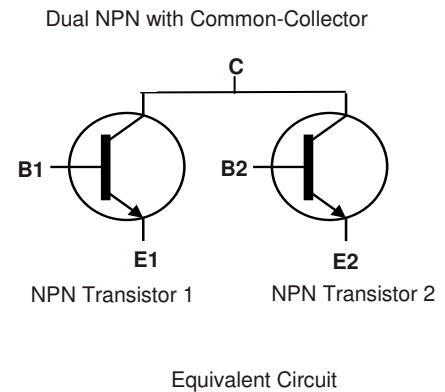
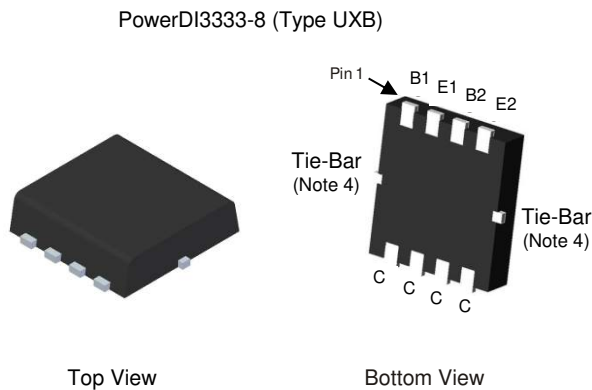
- Dual NPN with Common-Collector
- $BV_{CEO} > 400V$
- $I_C = 0.5A$ Continuous Collector Current
- Configurable as NPN Darlington Pair
- Low Saturation Voltage $V_{CE(SAT)} < 175mV @ 500mA$
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

- Case: PowerDI[®] 3333-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification 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: 0.072 grams (Approximate)

Applications

- Power Management
- High Voltage Start-Up Switch
- DC-DC Converters

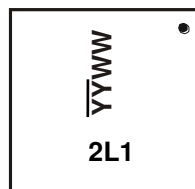


Ordering Information (Note 5)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
ZXTN08400BNS-7	Standard	2L1	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. Tie-bars are internally connected to the Common-Collector. They do not need to be externally connected.
 5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



2L1 = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 19 for 2019)
 WW = Week Code (01 to 53)

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	450	V
Collector-Emitter Voltage (Forward Blocking)	V _{CEX}	450	V
Collector-Emitter Voltage	V _{CEO}	400	V
Emitter-Collector Voltage (Reverse Blocking)	V _{ECO}	6	V
Emitter-Base Voltage	V _{EBO}	7	V
Continuous Collector Current	I _C	0.5	A
Peak Pulse Current	I _{CM}	1	A
Base Current	I _B	0.2	A

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

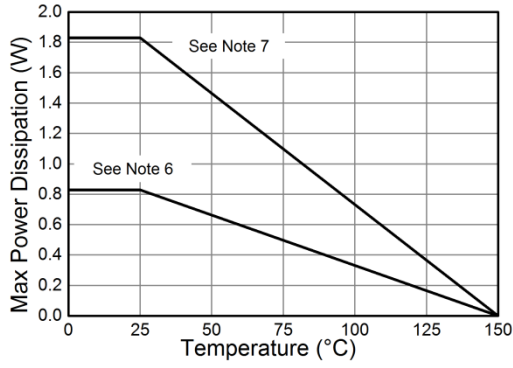
Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 6)	P _D	0.83	W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	150	°C/W
Total Power Dissipation (Note 7)	P _D	1.83	W
Thermal Resistance, Junction to Ambient (Note 7)	R _{θJA}	68	°C/W
Thermal Resistance, Junction to Lead (Note 8)	R _{θJL}	19	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

ESD Ratings (Note 9)

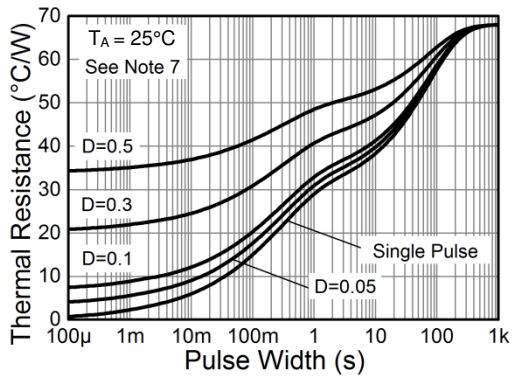
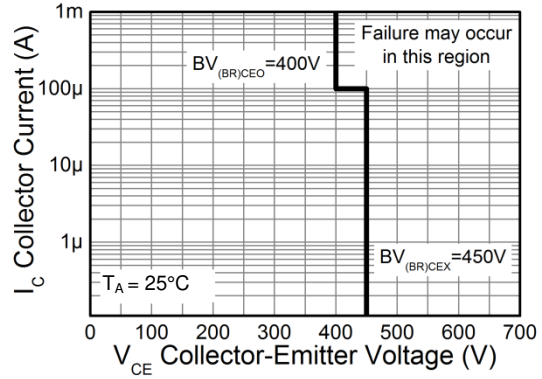
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
6. Device mounted on FR-4 PCB board, with minimum recommended pad layout, single sided.
 7. Device mounted on FR-4 substrate PCB board, 2oz copper, with thermal bias to bottom layer 1-inch square copper plate.
 8. Thermal resistance from junction to soldering point (on the collector pads).
 9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

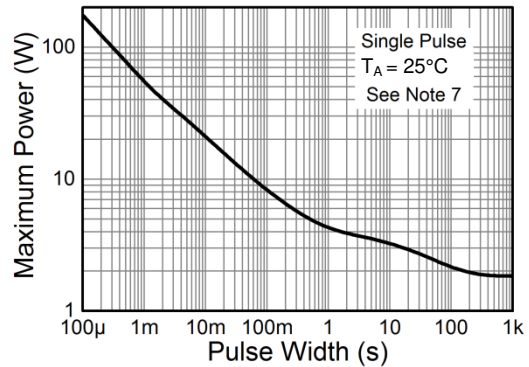
Thermal Characteristics and Derating Information



Derating Curve



Transient Thermal Impedance



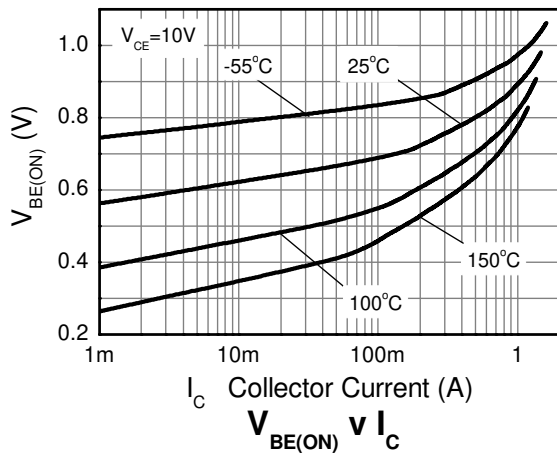
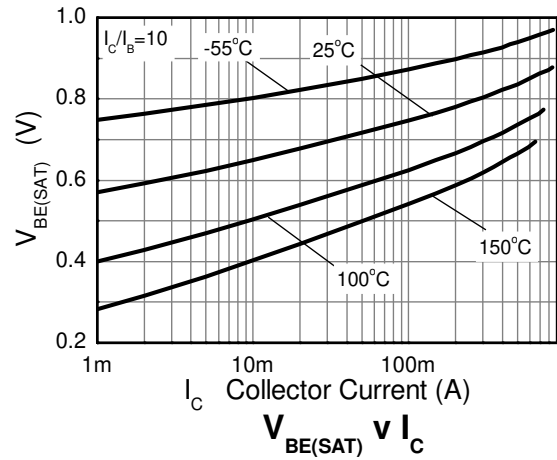
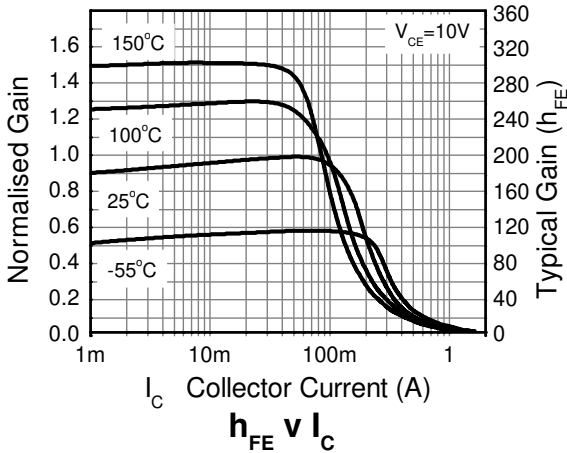
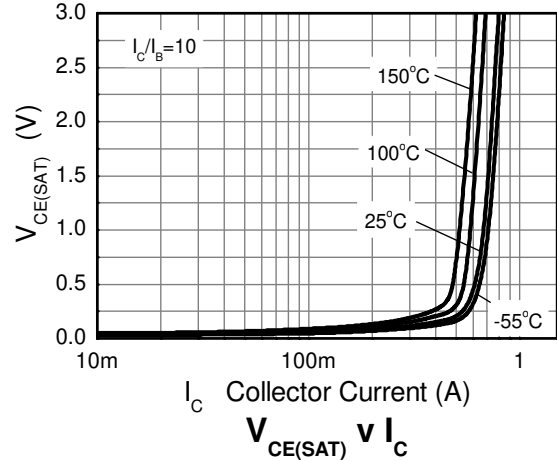
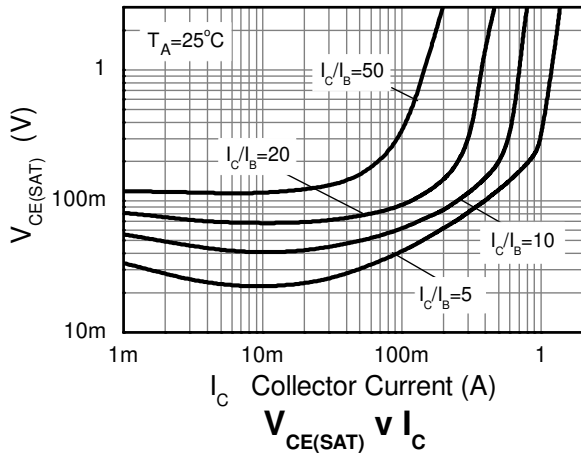
Pulse Power Dissipation

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	450	550	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Forward Blocking)	BV_{CEX}	450	550	—	V	$I_C = 100\mu\text{A}$, $R_{BE} \leq 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$
Collector-Emitter Breakdown Voltage (Base Open) (Note 10)	BV_{CEO}	400	500	—	V	$I_C = 10\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.1	—	V	$I_E = 100\mu\text{A}$
Emitter-Collector Breakdown Voltage (Reverse Blocking)	BV_{ECX}	6	8	—	V	$I_E = 100\mu\text{A}$, $R_{BC} \leq 1\text{k}\Omega$ or $-0.25\text{V} < V_{BC} < 0.25\text{V}$
Emitter-Collector Breakdown Voltage (Base Open)	BV_{ECO}	6	8.5	—	V	$I_E = 100\mu\text{A}$
Collector-Base Cutoff Current	I_{CBO}	—	<1	50	nA	$V_{CB} = 360\text{V}$
			—	20	μA	$V_{CB} = 360\text{V}$, $T_A = +100^\circ\text{C}$
Collector-Emitter Cutoff Current	I_{CEX}	—	<1	100	nA	$V_{CE} = 360\text{V}$, $R_{BE} \leq 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$
Emitter-Base Cutoff Current	I_{EBO}	—	<1	50	nA	$V_{EB} = 5.6\text{V}$
ON CHARACTERISTICS (Note 10)						
Static Forward Current Transfer Ratio	h_{FE}	90	165	300	—	$I_C = 1\text{mA}$, $V_{CE} = 5\text{V}$
			100			$I_C = 50\text{mA}$, $V_{CE} = 5\text{V}$
			10			$I_C = 500\text{mA}$, $V_{CE} = 5\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	70	85	mV	$I_C = 20\text{mA}$, $I_B = 1\text{mA}$
			50	70		$I_C = 50\text{mA}$, $I_B = 5\text{mA}$
			120	170		$I_C = 300\text{mA}$, $I_B = 30\text{mA}$
			125	175		$I_C = 500\text{mA}$, $I_B = 100\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	—	865	950	mV	$I_C = 500\text{mA}$, $I_B = 100\text{mA}$
Base-Emitter On Voltage	$V_{BE(ON)}$	—	800	900	mV	$I_C = 500\text{mA}$, $V_{CE} = 10\text{V}$
SMALL SIGNAL CHARACTERISTICS (Note 10)						
Transition Frequency	f_T	—	40	—	MHz	$I_C = 10\text{mA}$, $V_{CE} = 20\text{V}$, $f = 20\text{MHz}$
Output Capacitance	C_{OBO}	—	8	10	pF	$V_{CB} = 20\text{V}$, $f = 1\text{MHz}$
Delay Time	t_D	—	100	—	ns	$V_{CC} = 100\text{V}$, $I_C = 100\text{mA}$, $I_{B1} = 10\text{mA}$, $I_{B2} = -20\text{mA}$
Rise Time	t_R	—	52	—	ns	
Storage Time	t_S	—	3122	—	ns	
Fall Time	t_F	—	240	—	ns	

Note: 10. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

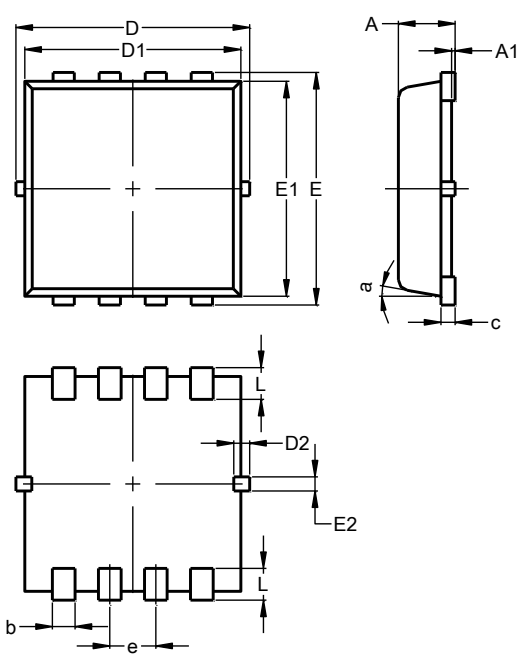
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Package Outline Dimensions

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

PowerDI3333-8 (Type UXB)

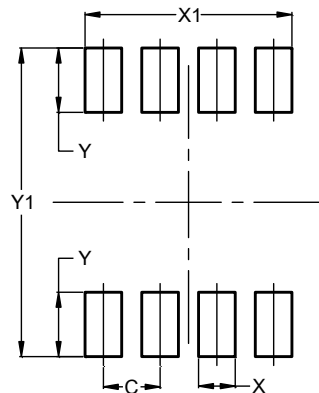


PowerDI3333-8 (Type UXB)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	0.10	0.35	0.23
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	0.10	0.30	0.20
e	—	—	0.65
L	0.35	0.55	0.45
a	0°	12°	10°
All Dimensions in mm			

Suggested Pad Layout

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

PowerDI3333-8 (Type UXB)



Dimensions	Value (in mm)
C	0.650
X	0.420
X1	2.370
Y	0.730
Y1	3.500

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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