

Features

- $BV_{CEO} > -100V$
- $BV_{EBO} > -8V$
- Continuous Current I_C to $-2.5A$
- Peak Pulse Current I_{CM} to $-8A$
- Ultra-Low Saturation Voltage $V_{CE(sat)} < -85mV @ -1A$
- High Current $R_{CE(sat)} = 60m\Omega$ Typical
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- Wettable Flank for Improved Optical Inspection
- Rated to $+175^\circ C$ – Ideal for High-Temperature Environments
- Complementary NPN Type: [DXTN78100CFG](#)
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **An automotive-compliant part is available under a separate datasheet ([DXTP78100CFGQ](#))**

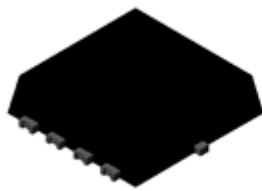
Mechanical Data

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

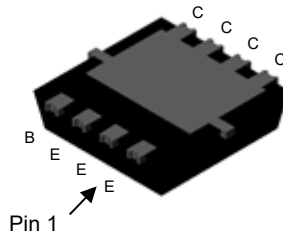
Applications

- MOSFET & IGBT gate drivers
- Load switches
- Low-voltage regulation
- DC to DC converters
- Motors, solenoids, relays and actuator drivers control

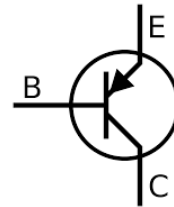
PowerDI3333-8/SWP (Type UX)



Top View



Bottom View



Device Symbol

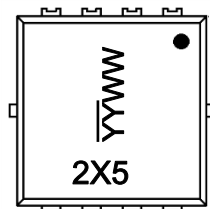
Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
DXTP78100CFG-7	PowerDI3333-8/SWP (Type UX)	2X5	7	12	2,000	Reel

- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
 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)



2X5 = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 25 = 2025)
 WW = Week Code (01 to 53)

PowerDI is a registered trademark of Diodes Incorporated in the United States and other countries.

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	-110	V
Collector-Emitter Voltage	V _{CEO}	-100	V
Emitter-Base Voltage	V _{EBO}	-8	V
Continuous Collector Current (Note 5)	I _C	-1.5	A
Continuous Collector Current (Note 7)	I _C	-2.5	A
Peak Pulse Current	I _{CM}	-8	A

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

Characteristic	Symbol	Value	Unit	
Power Dissipation	P _D	(Note 5)	900	mW
		(Note 6)	1.6	W
		(Note 7)	2.4	W
Thermal Resistance, Junction to Ambient	R _{θJA}	(Note 5)	140	°C/W
		(Note 6)	92	°C/W
		(Note 7)	62.5	°C/W
Thermal Resistance, Junction to Case (Note 7)	R _{θJC}	8	°C/W	
Thermal Resistance, Junction to Lead (Note 8)	R _{θJL}	6.5	°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	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C
Electrostatic Discharge - Charged Device Model	ESD CDM	1,000	V	IV

- 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 15mm x 15mm 2oz copper.
 7. Same as Note 5, except the device is mounted on 25mm x 25mm 2oz copper.
 8. Thermal resistance from junction to solder-point (at the collector tab).
 9. Refer to JEDEC specifications JESD22-A114, JESD22-A115 and JESD22-C101.

Thermal Characteristics and Derating Information

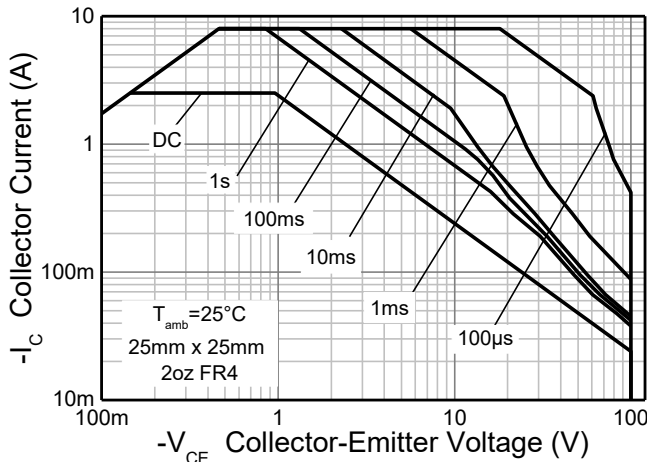


Fig 1. Safe Operating Area

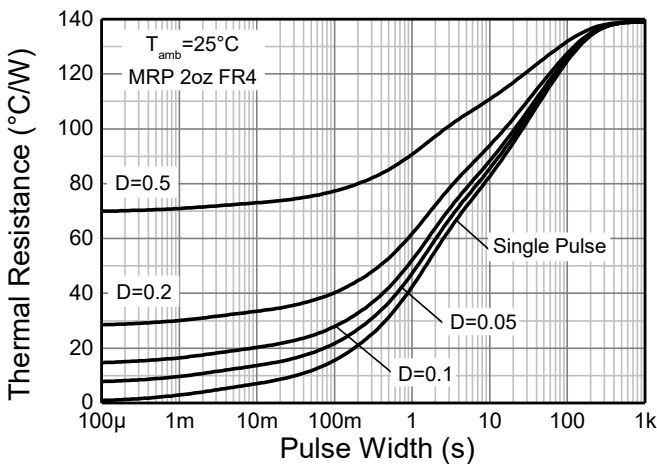


Fig 2. Transient Thermal Impedance

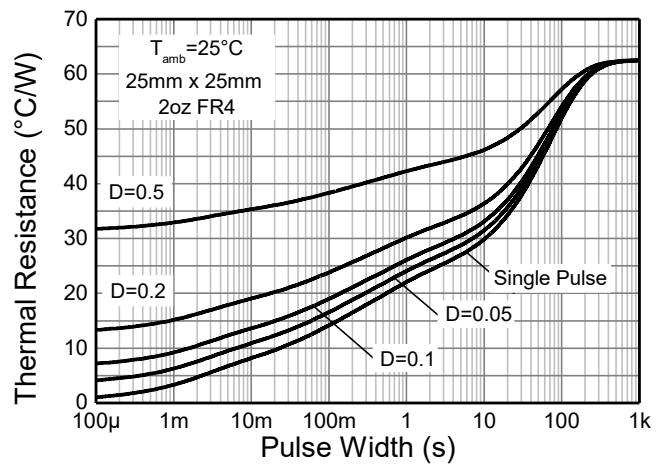


Fig 3. Transient Thermal Impedance

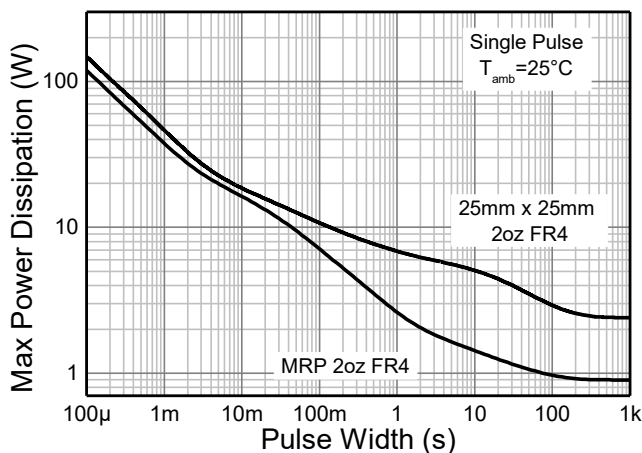


Fig 4. Pulse Power Dissipation

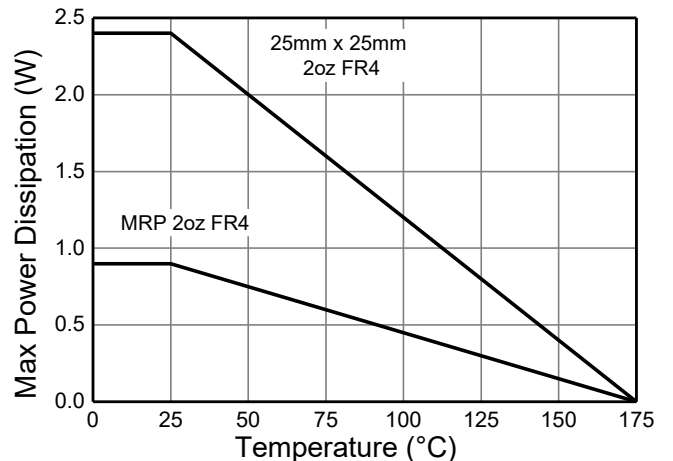


Fig 5. Derating Curve

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	-110	—	—	V	I _C = -100μA
Collector-Emitter Breakdown Voltage (Note 10)	BV _{CEO}	-100	—	—	V	I _C = -10mA
Emitter-Collector Breakdown Voltage	BV _{ECO}	-5	—	—	V	I _E = -100μA
Emitter-Base Breakdown Voltage	BV _{EBO}	-8	—	—	V	I _E = -100μA
Collector Cutoff Current	I _{CBO}	—	—	-100	nA	V _{CB} = -110V
		—	—	1	μA	V _{CB} = -110V, T _A = +125°C
Collector Cutoff Current	I _{CES}	—	—	-300	nA	V _{CE} = -80V
Emitter Cutoff Current	I _{EBO}	—	—	-50	nA	V _{EB} = -7V
Collector-Emitter Saturation Voltage (Note 10)	V _{CE(sat)}	—	-90	—	mV	I _C = -100mA, I _B = -1mA
		—	-110	-160	mV	I _C = -1A, I _B = -50mA
		—	-70	-85	mV	I _C = -1A, I _B = -100mA
		—	-90	-125	mV	I _C = -1.5A, I _B = -150mA
		—	-165	-300	mV	I _C = -2.5A, I _B = -250mA
Base-Emitter Saturation Voltage (Note 10)	V _{BE(sat)}	—	-860	-950	mV	I _C = -1.5A, I _B = -150mA
		—	-930	-1,050	mV	I _C = -2.5A, I _B = -250mA
Base-Emitter Turn-On Voltage (Note 10)	V _{BE(on)}	—	-750	-850	mV	I _C = -1.5A, V _{CE} = -2V
		—	-815	-900	mV	I _C = -2.5A, V _{CE} = -2V
DC Current Gain (Note 10)	h _{FE}	200	350	—	—	I _C = -10mA, V _{CE} = -2V
		250	340	420	—	I _C = -100mA, V _{CE} = -2V
		220	300	—	—	I _C = -0.5A, V _{CE} = -2V
		160	260	—	—	I _C = -1A, V _{CE} = -2V
		60	130	—	—	I _C = -1.5A, V _{CE} = -2V
		15	35	—	—	I _C = -2.5A, V _{CE} = -2V
Input Capacitance	C _{ibo}	—	300	—	pF	V _{EB} = 0.5V, f = 1MHz
Output Capacitance	C _{obo}	—	21	—	pF	V _{CB} = 10V, f = 1MHz
Current Gain-Bandwidth Product	f _T	150	290	—	MHz	V _{CE} = -10V, I _C = -100mA f = 50MHz
Turn-On Time	t _d	—	13.5	—	ns	V _{CC} = -10V, I _C = -1.5A I _{B1} = -I _{B2} = -150mA
	t _r	—	90	—	ns	
Turn-Off Time	t _s	—	255	—	ns	
	t _f	—	48	—	ns	

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

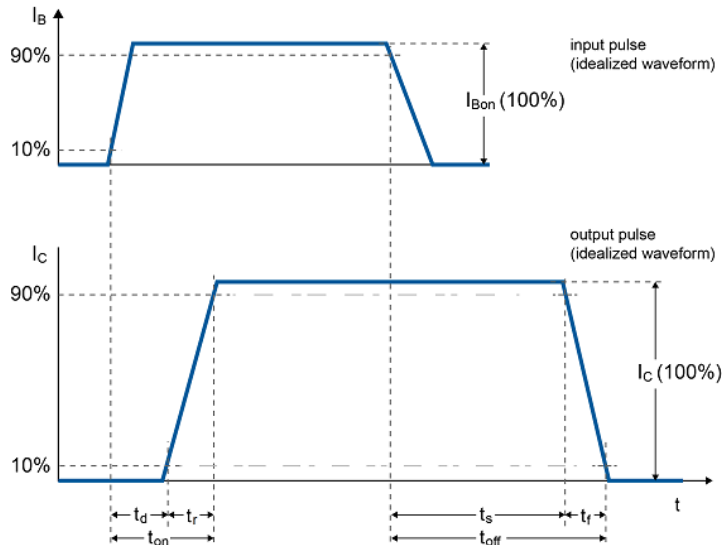


Fig 6. Timing Waveform

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

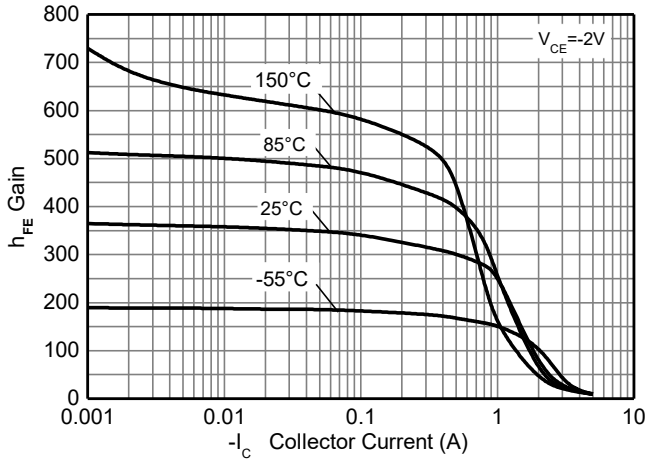


Fig. 7 $h_{FE} \ v \ I_C$

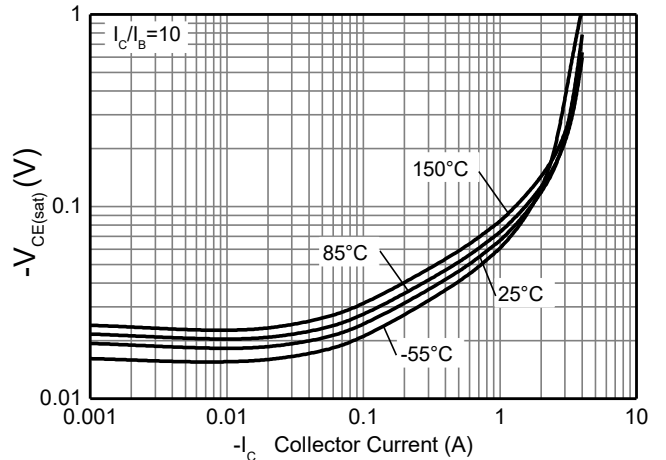


Fig. 8 $V_{CE(sat)} \ v \ I_C$

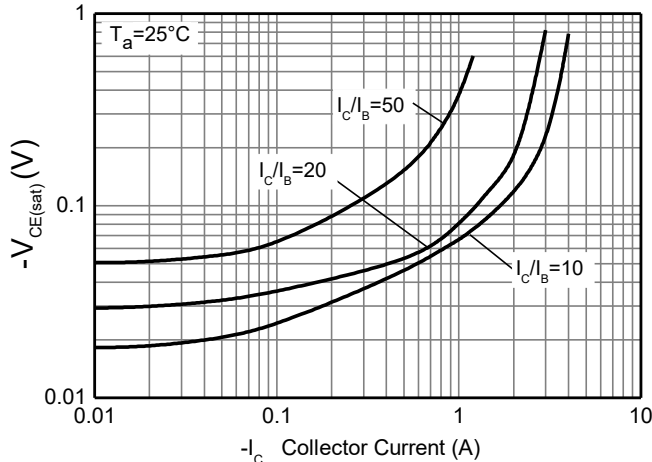


Fig. 9 $V_{CE(sat)} \ v \ I_C$

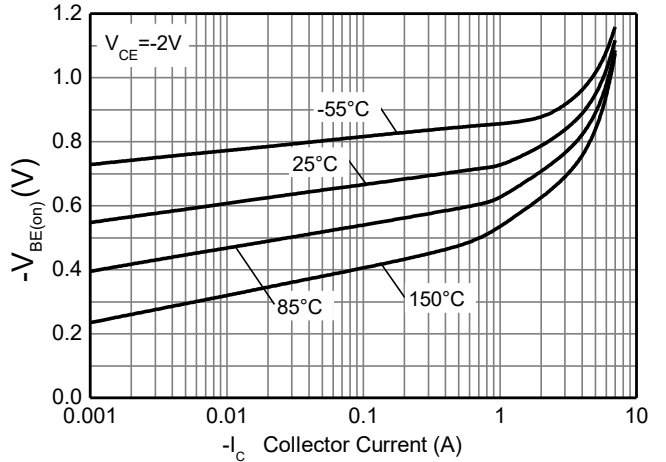


Fig. 10 $V_{BE(on)} \ v \ I_C$

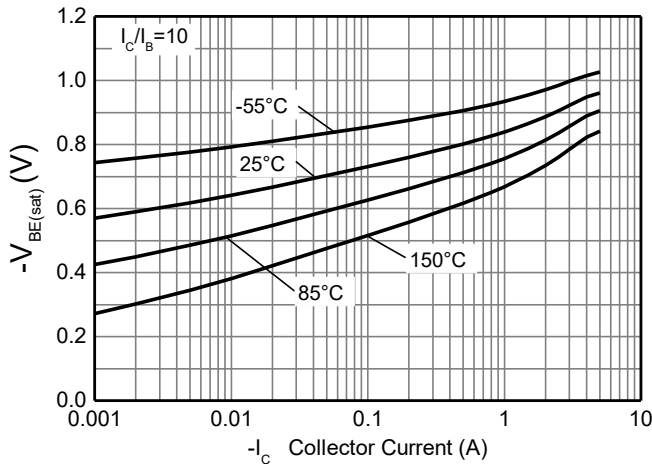


Fig. 11 $V_{BE(sat)} \ v \ I_C$

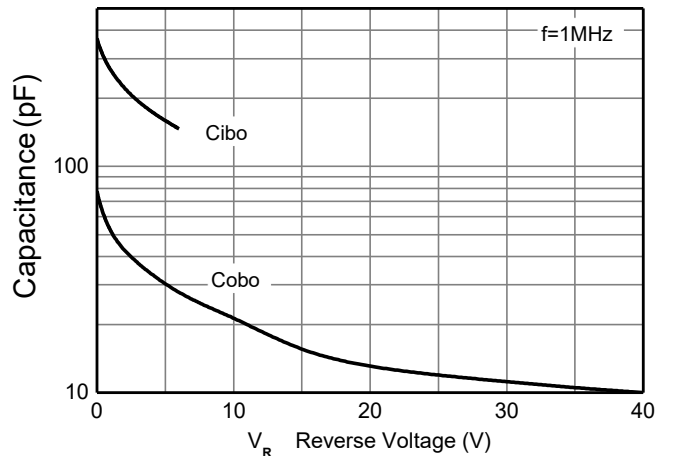


Fig. 12 Typical Junction Capacitance

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

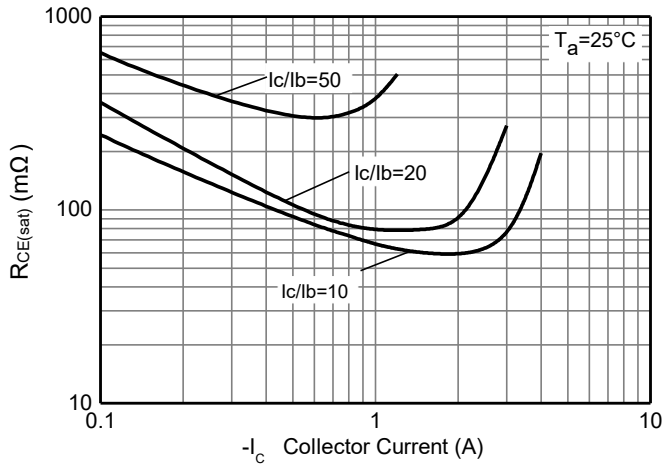


Fig. 13 $R_{CE(sat)} \text{ v } I_C$

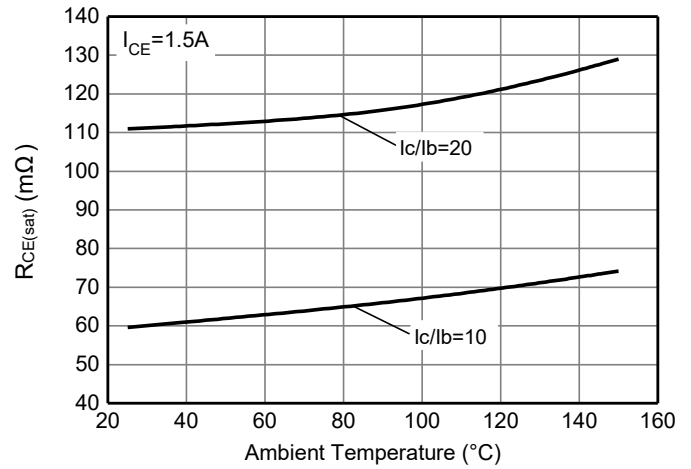


Fig. 14 $R_{CE(sat)} \text{ v } T_{amb}$

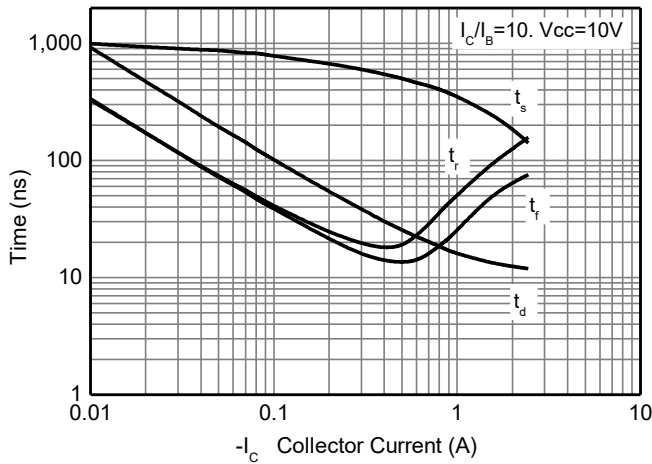
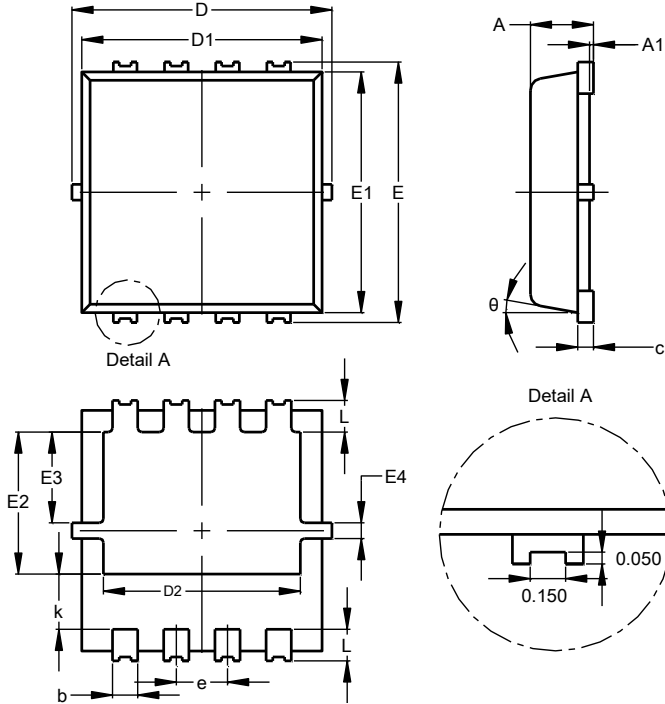


Fig. 15 Switching Performance

Package Outline Dimensions

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

PowerDI3333-8/SWP (Type UX)

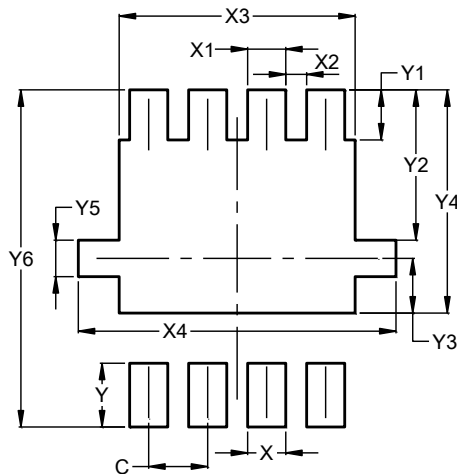


PowerDI3333-8/SWP (Type UX)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	2.30	2.70	2.50
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E3	0.95	1.35	1.15
E4	0.10	0.30	0.20
e	--	--	0.65
k	0.50	0.90	0.70
L	0.30	0.50	0.40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

- Notes:
- 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.
 - Side wall tin plated package for wettable flanks in AOI.

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