

Features

- $BV_{CEO} > 60V$
- $BV_{EBO} > 8V$
- Continuous Current I_C to 6A
- Peak Pulse Current I_{CM} to 12A
- Ultra-Low Saturation Voltage $V_{CE(sat)} < 45mV$ @ 1A
- High Current $R_{CE(sat)} = 23m\Omega$ 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 PNP Type: [DXTN78060DFG](#)
- **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 ([DXTN78060DFGQ](#))**

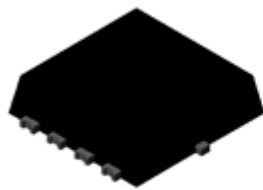
Mechanical Data

- 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 @3
- Weight: 0.03 grams (Approximate)

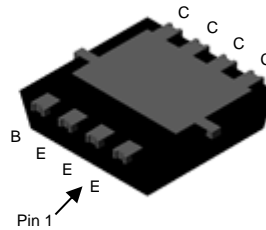
Applications

- MOSFET & IGBT gate drivers
- Load switches
- Low-voltage regulation
- DC to DC converters
- Motor, solenoid, relay and actuator drivers control

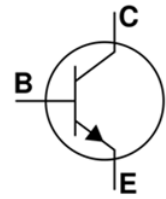
PowerDI3333-8/SWP (Type UX)



Top View



Bottom View



Device Symbol

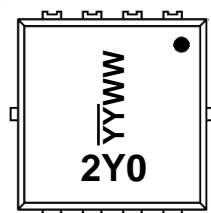
Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
DXTN78060DFG-7	PowerDI3333-8/SWP (Type UX)	2Y0	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)



2Y0 = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 25 = 2025)
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}	100	V
Collector-Emitter Voltage	V _{CEO}	60	V
Emitter-Base Voltage	V _{EBO}	8	V
Continuous Collector Current (Note 5)	I _C	3	A
Continuous Collector Current (Note 7)	I _C	6	A
Peak Pulse Current	I _{CM}	12	A

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

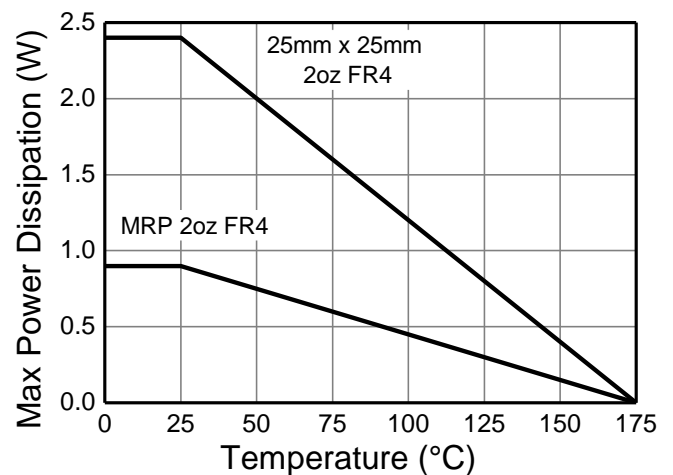
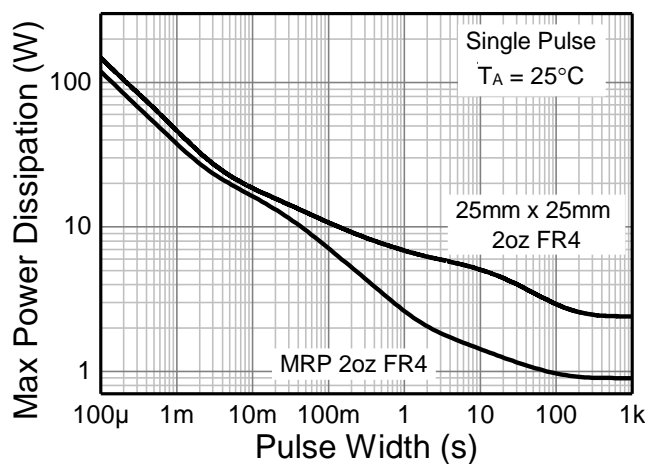
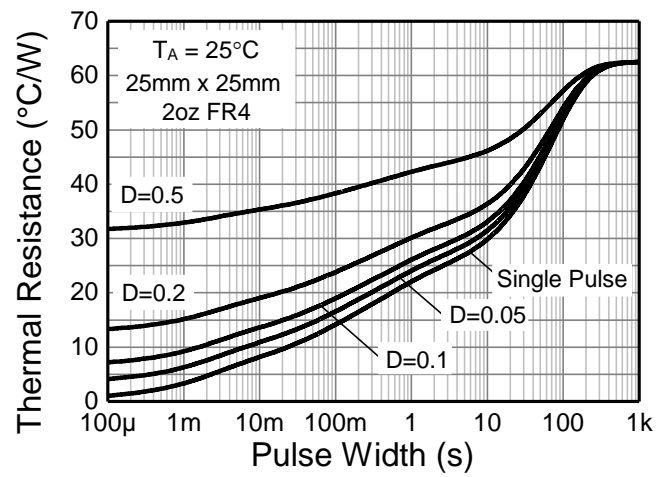
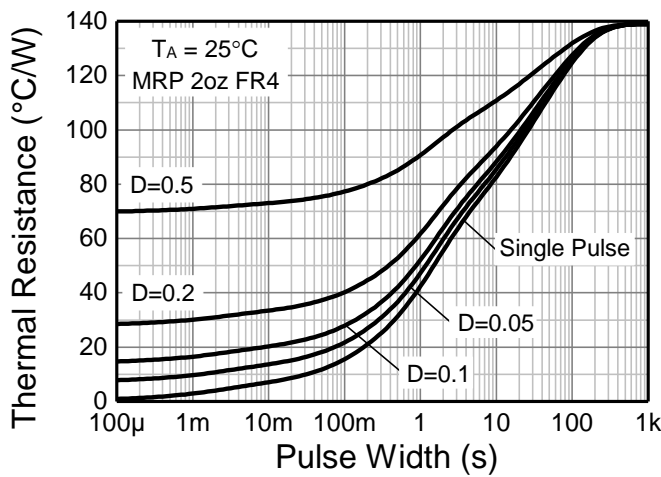
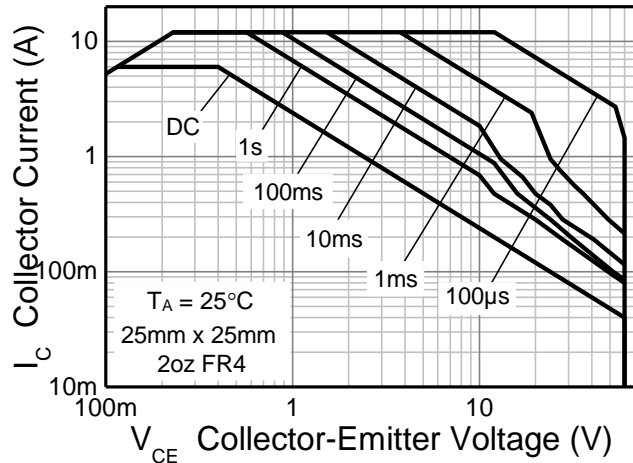
Characteristic	Symbol	Value	Unit
Power Dissipation	P _D	900	mW
		1.6	W
		2.4	W
Thermal Resistance, Junction to Ambient	R _{θJA}	140	°C/W
		92	°C/W
		62.5	°C/W
Thermal Resistance, Junction to Case (Note 7)	R _{θJC}	8	°C/W
Thermal Resistance, Junction to Lead (Note 8)	R _{θJL}	6.5	°C/W
Operating and Storage 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:
- 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.
 - Same as Note 5, except the device is mounted on 15mm x 15mm 2oz copper.
 - Same as Note 5, except the device is mounted on 25mm x 25mm 2oz copper.
 - Thermal resistance from junction to solder-point (at the collector tab).
 - Refer to JEDEC specification JESD22-A114, JESD22-A115 and JESD22-C101.

Thermal Characteristics and Derating Information



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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	100	—	—	V	I _C = 100μA
Collector-Emitter Breakdown Voltage (Note 10)	BV _{CEO}	60	—	—	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 Cut-off Current	I _{CBO}	—	—	100	nA	V _{CB} = 100V
		—	—	10	μA	V _{CB} = 100V, T _A = +125°C
Collector Cut-off Current	I _{CES}	—	—	300	nA	V _{CE} = 48V
Emitter Cut-off Current	I _{EBO}	—	—	50	nA	V _{EB} = 7V
Collector-Emitter Saturation Voltage (Note 10)	V _{CE(sat)}	—	55	—	mV	I _C = 100mA, I _B = 1mA
		—	65	100	mV	I _C = 1A, I _B = 20mA
		—	30	45	mV	I _C = 1A, I _B = 100mA
		—	110	145	mV	I _C = 2A, I _B = 40mA
		—	85	125	mV	I _C = 3A, I _B = 150mA
		—	135	170	mV	I _C = 6A, I _B = 600mA
Base-Emitter Saturation Voltage (Note 10)	V _{BE(sat)}	—	870	1,000	mV	I _C = 3A, I _B = 150mA
		—	1	1.1	V	I _C = 6A, I _B = 600mA
Base-Emitter Turn-On Voltage (Note 10)	V _{BE(on)}	—	765	850	mV	I _C = 3A, V _{CE} = 2V
		—	845	950	mV	I _C = 6A, V _{CE} = 2V
DC Current Gain (Note 10)	h _{FE}	250	370	—	—	I _C = 10mA, V _{CE} = 2V
		300	370	550	—	I _C = 100mA, V _{CE} = 2V
		240	340	—	—	I _C = 1A, V _{CE} = 2V
		180	290	—	—	I _C = 2A, V _{CE} = 2V
		100	170	—	—	I _C = 3A, V _{CE} = 2V
		25	55	—	—	I _C = 6A, V _{CE} = 2V
Input Capacitance	C _{ibo}	—	350	—	pF	V _{EB} = 0.5V, f = 1MHz
Output Capacitance	C _{obo}	—	18	—	pF	V _{CB} = 10V, f = 1MHz
Current Gain-Bandwidth Product	f _T	150	250	—	MHz	V _{CE} = 10V, I _C = 100mA, f = 50MHz
Turn-On Time	t _d	—	11.5	—	ns	V _{CC} = 10V, I _C = 3A, I _{B1} = -I _{B2} = 300mA
	t _r	—	75	—	ns	
Turn-Off Time	t _s	—	295	—	ns	
	t _f	—	30	—	ns	

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

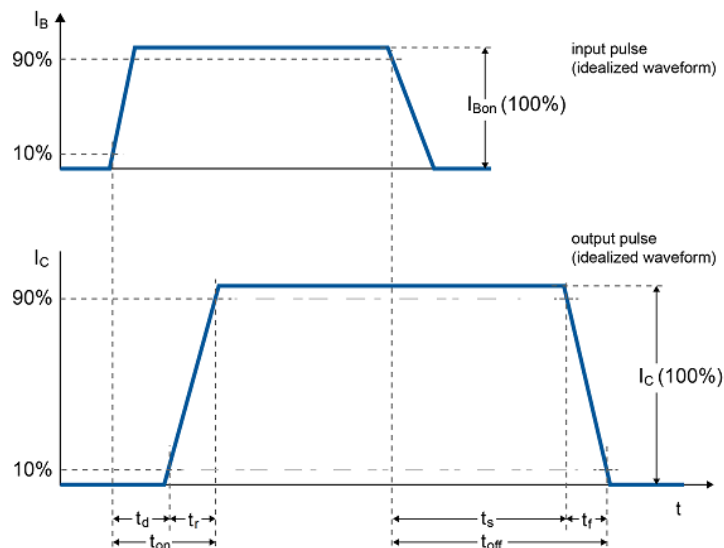


Fig 6. Timing Waveform

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

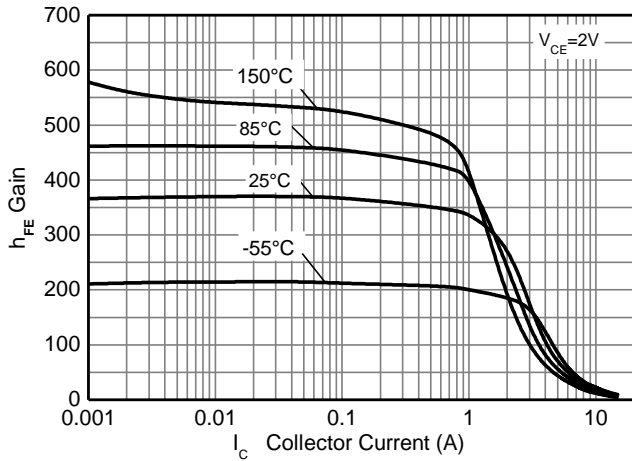


Fig. 7 $h_{FE} \text{ v } I_C$

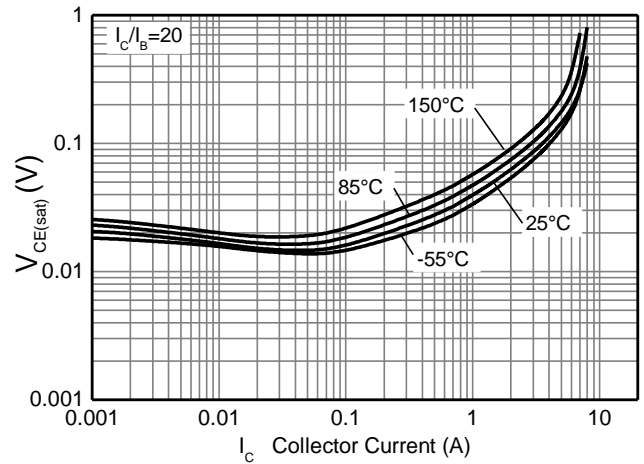


Fig. 8 $V_{CE(sat)} \text{ v } I_C$

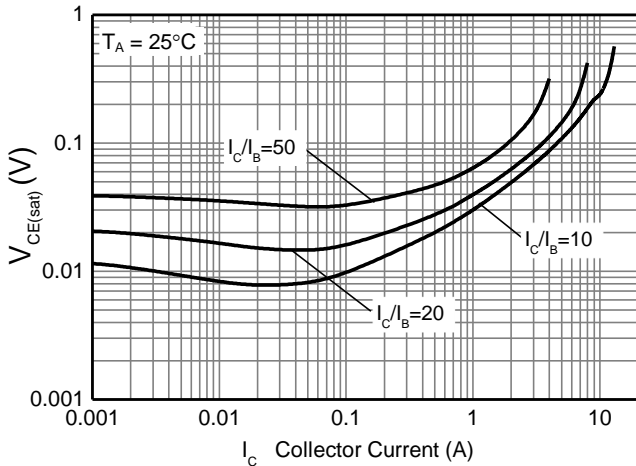


Fig. 9 $V_{CE(sat)} \text{ v } I_C$

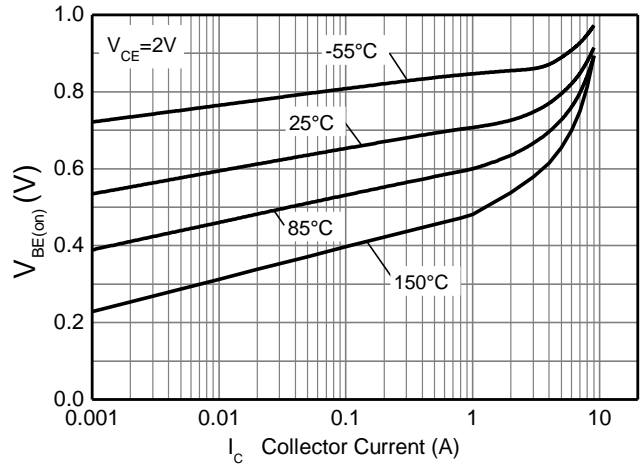


Fig. 10 $V_{BE(on)} \text{ v } I_C$

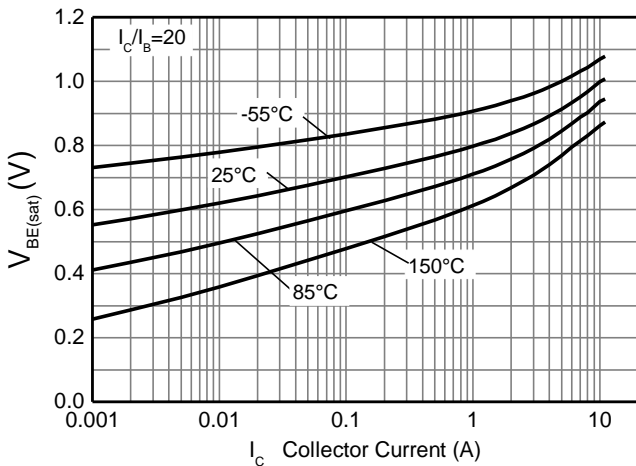


Fig. 11 $V_{BE(sat)} \text{ v } I_C$

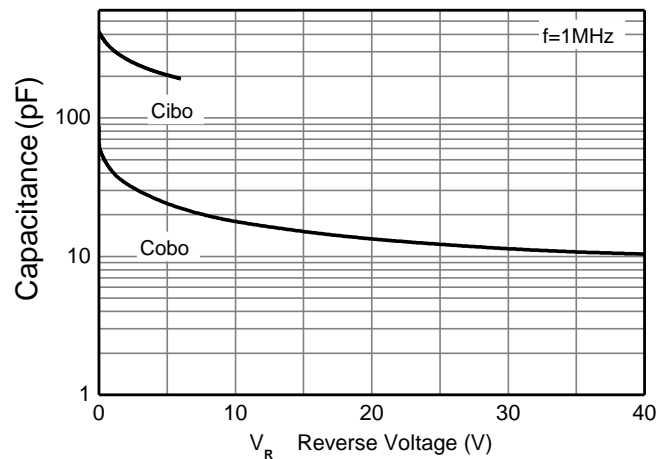


Fig. 12 Typical Junction Capacitance

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

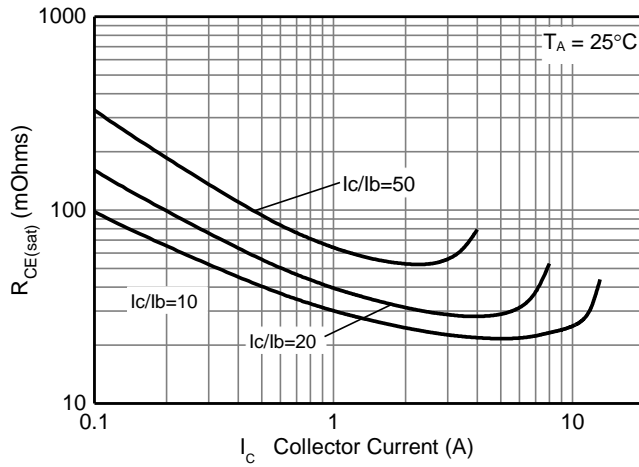


Fig. 13 $R_{CE(sat)} \text{ v } I_C$

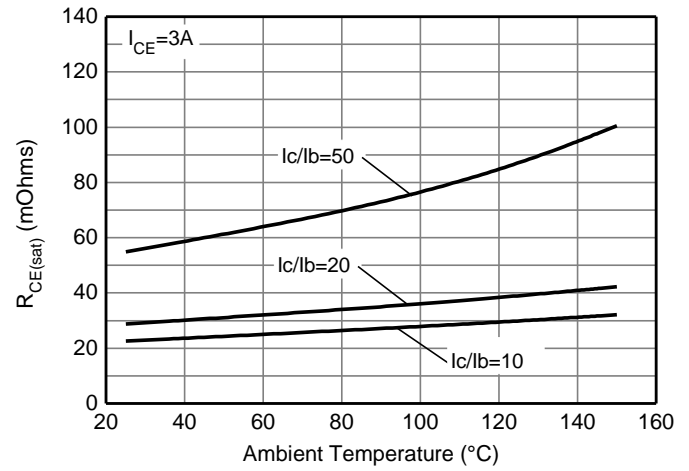


Fig. 14 $R_{CE(sat)} \text{ v } T_A$

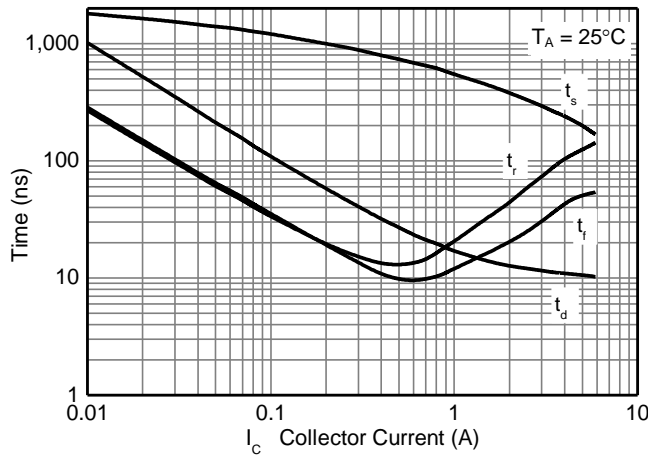
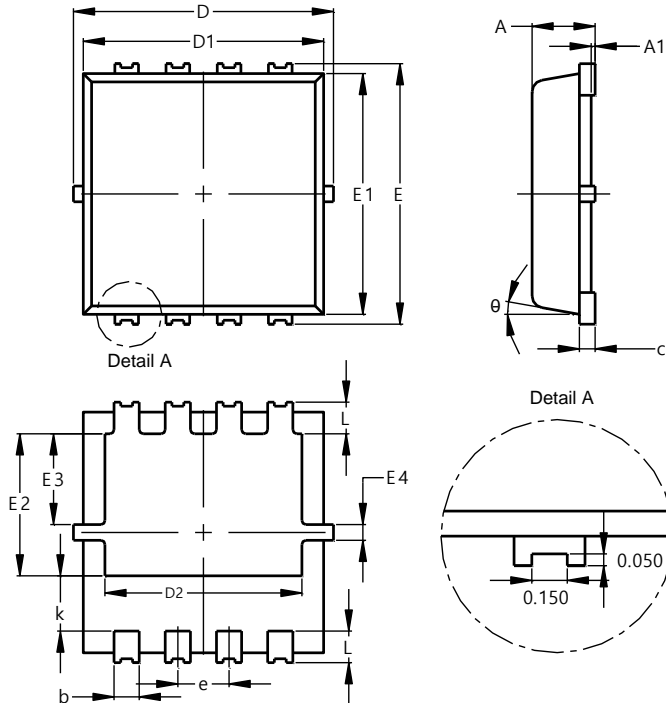


Fig. 15 Switching Performance

Package Outline Dimensions

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

PowerDI3333-8/SWP (Type UX)

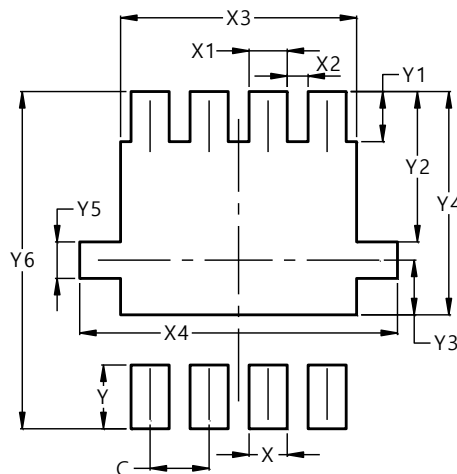


PowerDI3333-8/SWP (Type UX)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	2.30	2.70	2.50
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E3	0.95	1.35	1.15
E4	0.10	0.30	0.20
e	--	--	0.65
k	0.50	0.90	0.70
L	0.30	0.50	0.40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

Note: 11. Side wall tin plated package for wettable flanks in AOI

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