

## 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: [DXTP78060DFGQ](#)
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DXTN78060DFGQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.**  
<https://www.diodes.com/quality/product-definitions/>

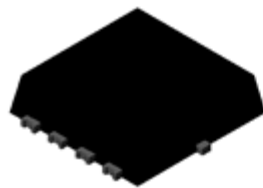
## Mechanical Data

- Package: PowerDI<sup>®</sup>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)

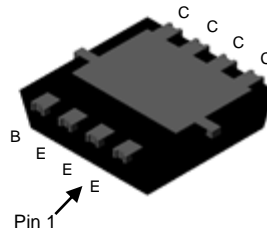
## Applications

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

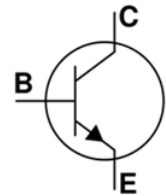
PowerDI3333-8/SWP (Type UX)



Top View



Bottom View



Device Symbol

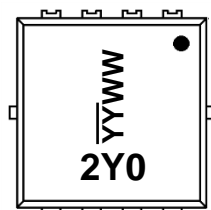
## Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
DXTN78060DFGQ-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)

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

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CB0</sub>	100	V
Collector-Emitter Voltage	V <sub>CEO</sub>	60	V
Emitter-Base Voltage	V <sub>EBO</sub>	8	V
Continuous Collector Current (Note 5)	I <sub>C</sub>	3	A
Continuous Collector Current (Note 7)	I <sub>C</sub>	6	A
Peak Pulse Current	I <sub>CM</sub>	12	A

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

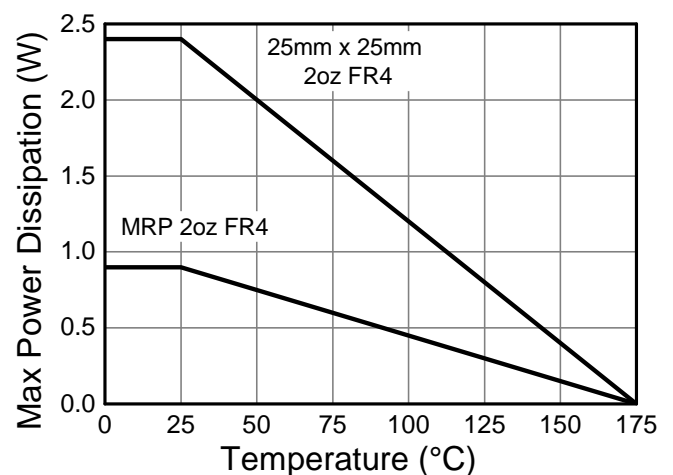
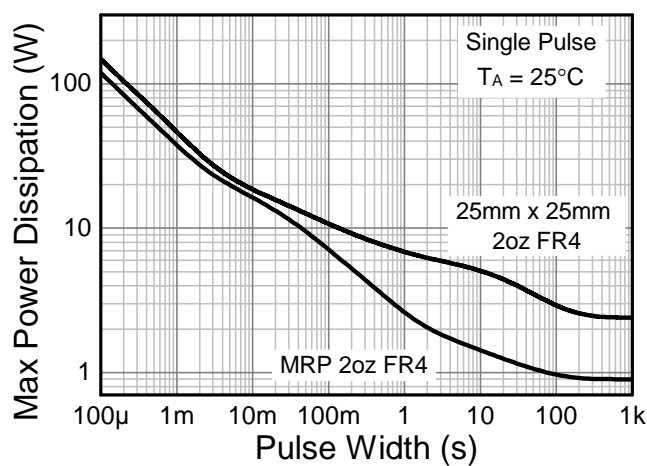
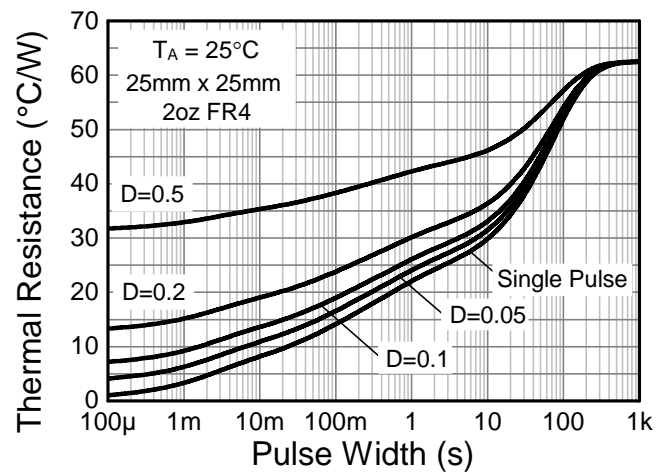
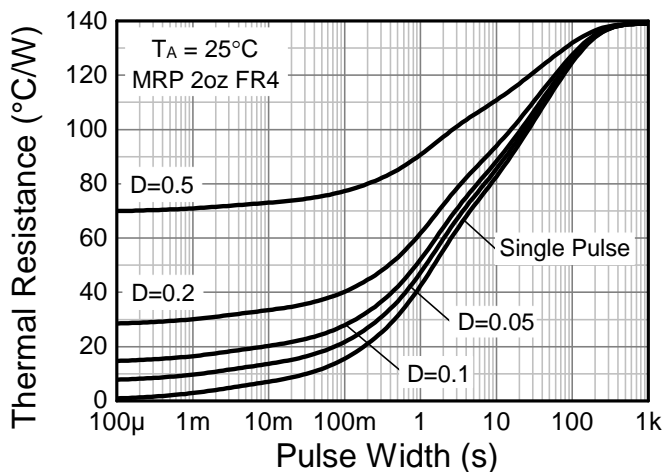
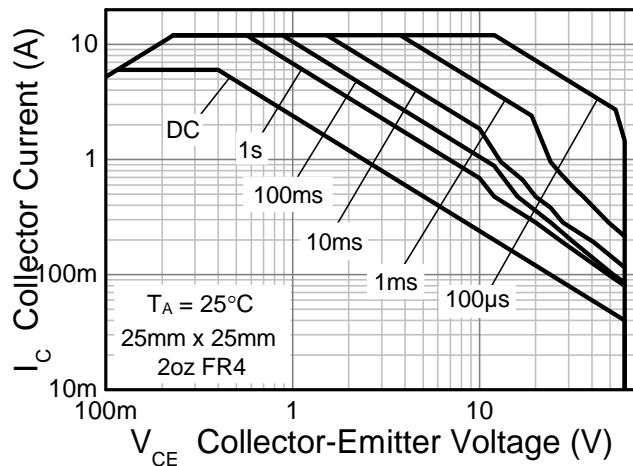
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	900	mW
		1.6	W
		2.4	W
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	140	°C/W
		92	°C/W
		62.5	°C/W
Thermal Resistance, Junction to Case (Note 7)	R <sub>θJC</sub>	8	°C/W
Thermal Resistance, Junction to Leads (Note 8)	R <sub>θJL</sub>	6.5	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-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 25mm × 25mm 2oz copper.
  - Same as Note 5, except the device is mounted on 50mm × 50mm 2oz copper.
  - Thermal resistance from junction to solder-point (at the collector tab).
  - Refer to JEDEC specification JESD22-A114, JESD22-A115 and JESD22-C101.

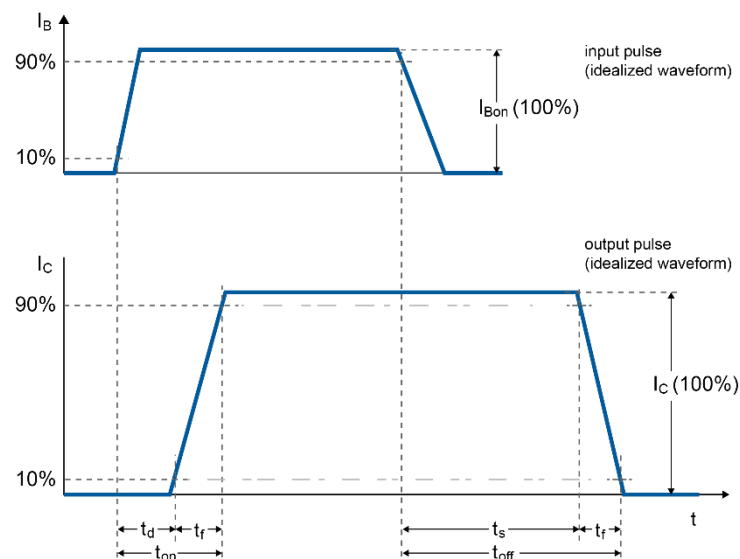
## Thermal Characteristics and Derating Information



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

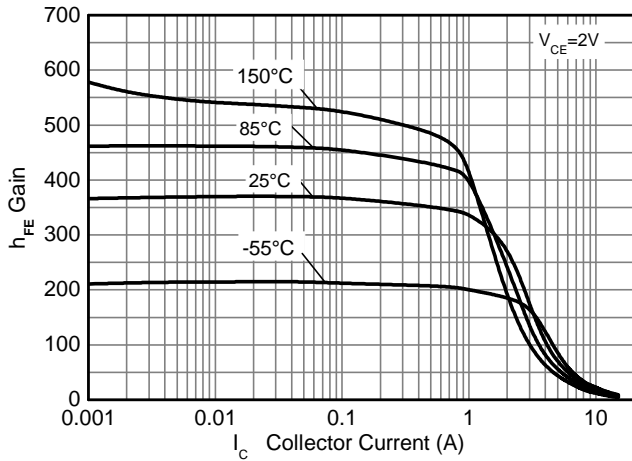
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	100	—	—	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 10)	BV <sub>CEO</sub>	60	—	—	V	I <sub>C</sub> = 10mA
Emitter-Collector Breakdown Voltage	BV <sub>ECO</sub>	5	—	—	V	I <sub>E</sub> = 100μA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	8	—	—	V	I <sub>E</sub> = 100μA
Collector Cut-off Current	I <sub>CBO</sub>	—	—	100	nA	V <sub>CB</sub> = 100V
		—	—	10	μA	V <sub>CB</sub> = V, T <sub>A</sub> = +125°C
Collector Cut-off Current	I <sub>CES</sub>	—	—	300	nA	V <sub>CB</sub> = 48V
Emitter Cut-off Current	I <sub>EBO</sub>	—	—	50	nA	V <sub>EB</sub> = 7V
Collector-Emitter Saturation Voltage (Note 10)	V <sub>CE(sat)</sub>	—	55	—	mV	I <sub>C</sub> = 100mA, I <sub>B</sub> = 1mA
		—	65	100	mV	I <sub>C</sub> = 1A, I <sub>B</sub> = 20mA
		—	30	45	mV	I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA
		—	110	145	mV	I <sub>C</sub> = 2A, I <sub>B</sub> = 40mA
		—	85	125	mV	I <sub>C</sub> = 3A, I <sub>B</sub> = 150mA
		—	135	170	mV	I <sub>C</sub> = 6A, I <sub>B</sub> = 600mA
Base-Emitter Saturation Voltage (Note 10)	V <sub>BE(sat)</sub>	—	870	1,000	mV	I <sub>C</sub> = 3A, I <sub>B</sub> = 150mA
		—	1	1.1	V	I <sub>C</sub> = 6A, I <sub>B</sub> = 600mA
Base-Emitter Turn-On Voltage (Note 10)	V <sub>BE(on)</sub>	—	765	850	mV	I <sub>C</sub> = 3A, V <sub>CE</sub> = 2V
		—	845	950	mV	I <sub>C</sub> = 6A, V <sub>CE</sub> = 2V
DC Current Gain (Note 10)	h <sub>FE</sub>	250	370	—	—	I <sub>C</sub> = 10mA, V <sub>CE</sub> = 2V
		300	370	550	—	I <sub>C</sub> = 100mA, V <sub>CE</sub> = 2V
		240	340	—	—	I <sub>C</sub> = 1A, V <sub>CE</sub> = 2V
		180	290	—	—	I <sub>C</sub> = 2A, V <sub>CE</sub> = 2V
		100	170	—	—	I <sub>C</sub> = 3A, V <sub>CE</sub> = 2V
		25	55	—	—	I <sub>C</sub> = 6A, V <sub>CE</sub> = 2V
Input Capacitance	C <sub>ibo</sub>	—	350	—	pF	V <sub>EB</sub> = 0.5V, f = 1MHz
Output Capacitance	C <sub>obo</sub>	—	18	—	pF	V <sub>CB</sub> = 10V, f = 1MHz
Current Gain-Bandwidth Product	f <sub>T</sub>	150	250	—	MHz	V <sub>CE</sub> = 10V, I <sub>C</sub> = 100mA, f = 50MHz
Turn-On Time	t <sub>d</sub>	—	11.5	—	ns	V <sub>CC</sub> = 10V, I <sub>C</sub> = 3A, I <sub>B1</sub> = -I <sub>B2</sub> = 300mA
	t <sub>r</sub>	—	75	—	ns	
Turn-Off Time	t <sub>s</sub>	—	295	—	ns	
	t <sub>f</sub>	—	30	—	ns	

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

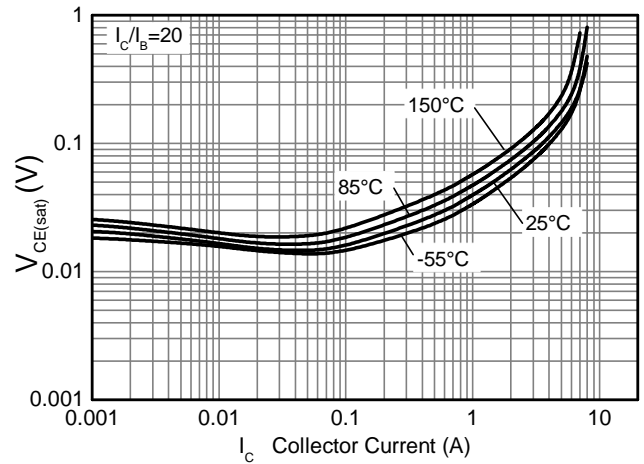


**Fig 6. Timing Waveform**

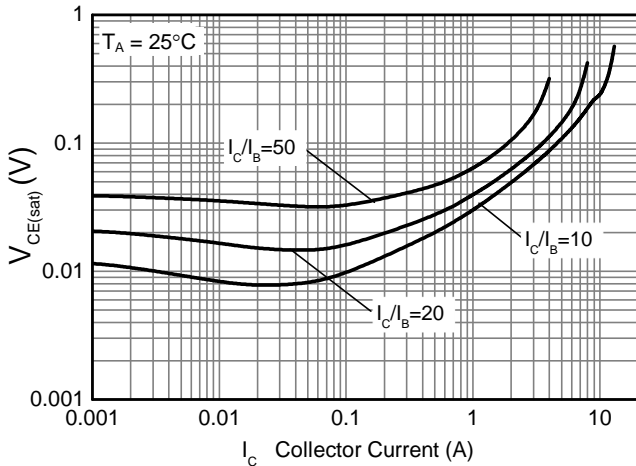
**Typical Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)



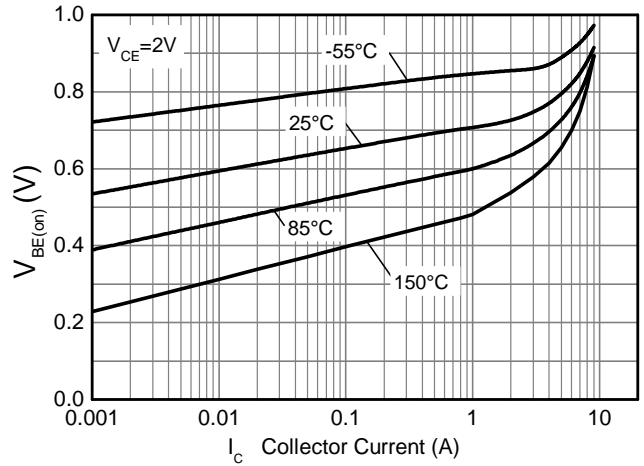
**Fig. 7**  $h_{FE} \text{ v } I_C$



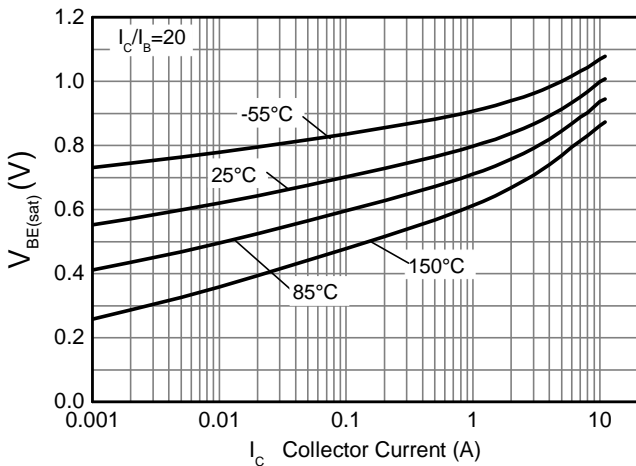
**Fig. 8**  $V_{CE(sat)} \text{ v } I_C$



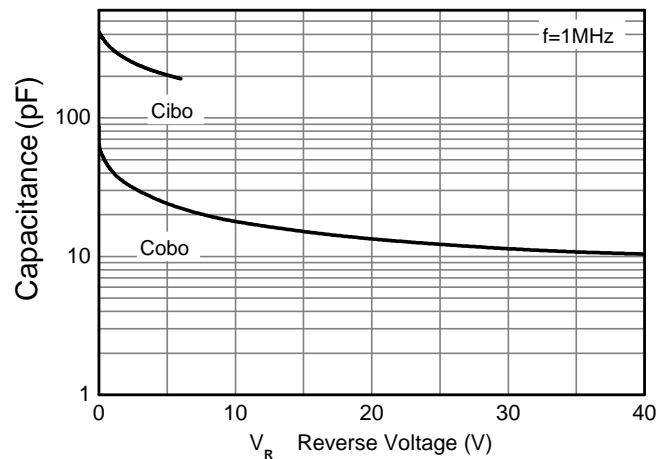
**Fig. 9**  $V_{CE(sat)} \text{ v } I_C$



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

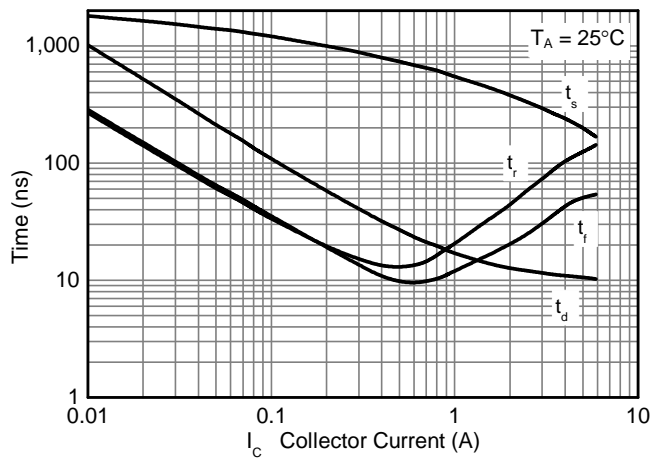
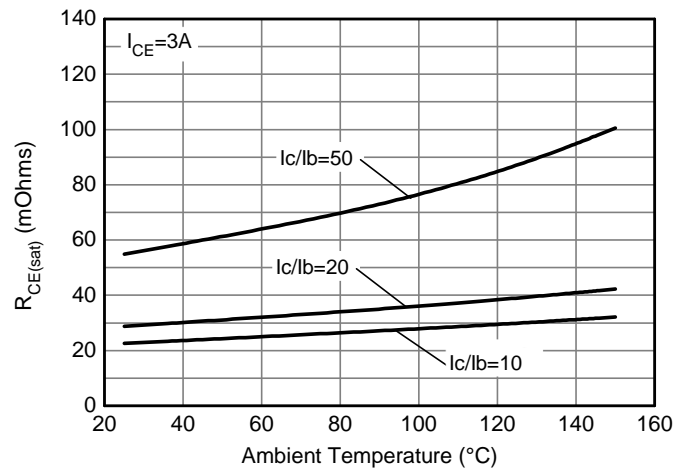
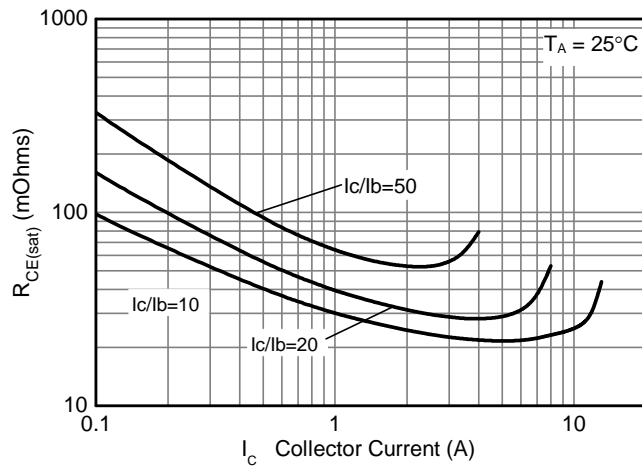


**Fig. 11**  $V_{BE(sat)} \text{ v } I_C$



**Fig. 12** Typical Junction Capacitance

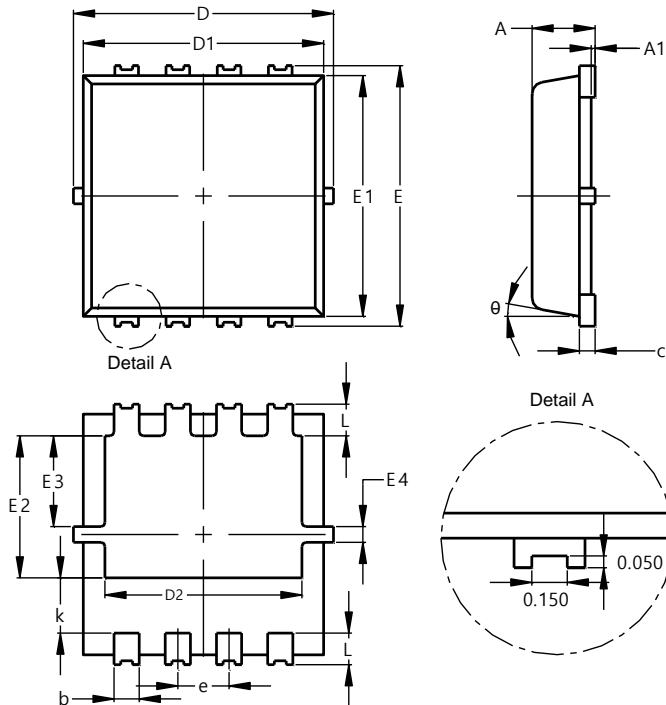
**Typical Electrical Characteristics** (continued) (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



## Package Outline Dimensions

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

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

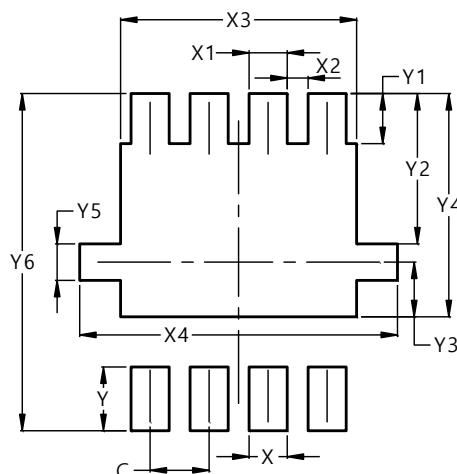


PowerDI3333-8/SWP (Type UX)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	2.30	2.70	2.50
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E3	0.95	1.35	1.15
E4	0.10	0.30	0.20
e	--	--	0.65
k	0.50	0.90	0.70
L	0.30	0.50	0.40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