

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°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/>

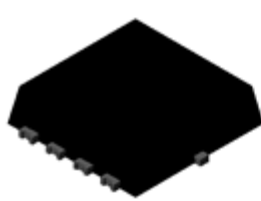
Mechanical Data

- Package: PowerDI[®]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)

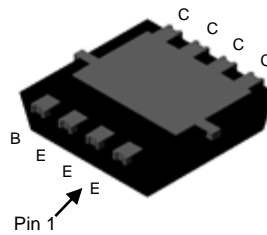
Applications

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

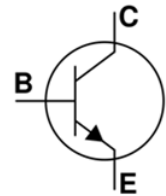
PowerDI3333-8/SWP (Type UX)



Top View



Bottom View



Device Symbol

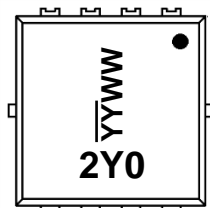
Ordering Information (Note 4)

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)

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	(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 Leads (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 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, JESD22-A115 and JESD22-C101.

Thermal Characteristics and Derating Information

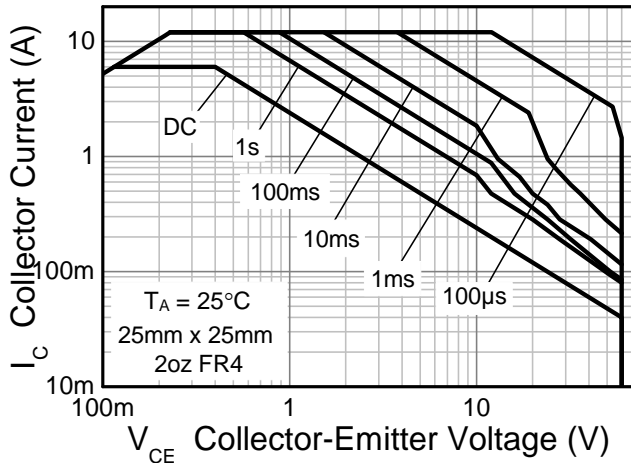


Fig 1. Safe Operating Area

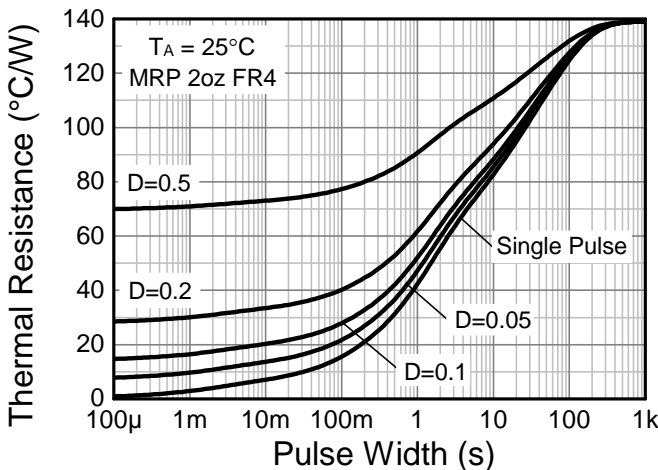


Fig 2. Transient Thermal Impedance

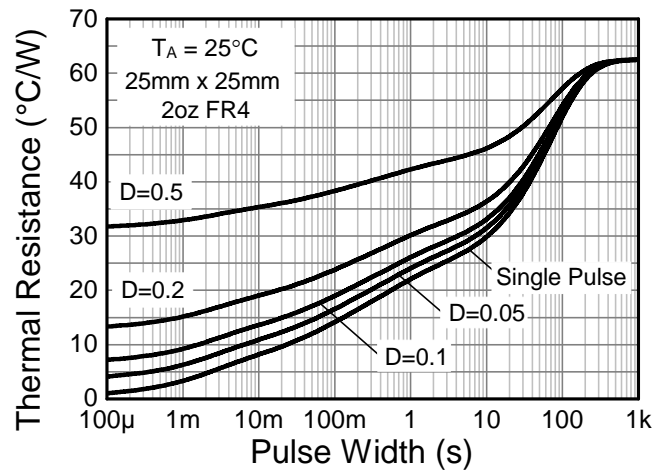


Fig 3. Transient Thermal Impedance

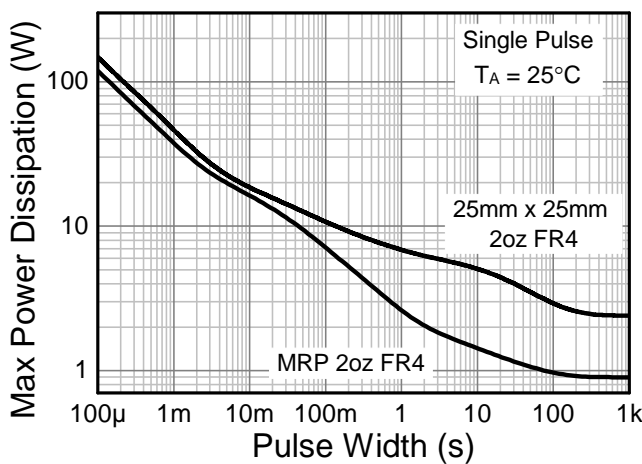


Fig 4. Pulse Power Dissipation

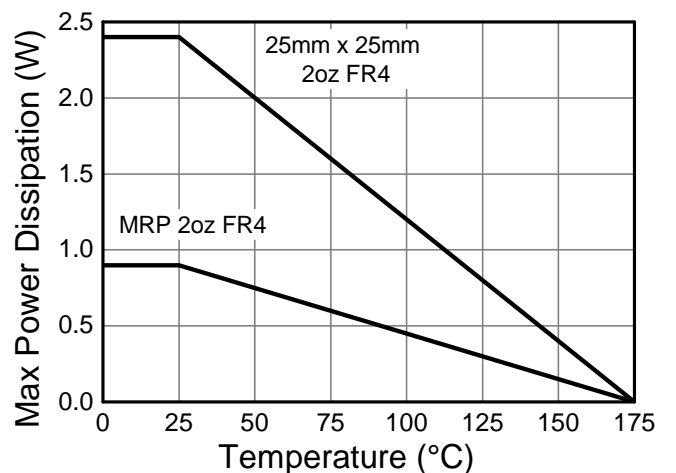


Fig 5. Derating Curve

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CB0}	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} = V, T _A = +125°C
Collector Cut-off Current	I _{CES}	—	—	300	nA	V _{CB} = 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%.

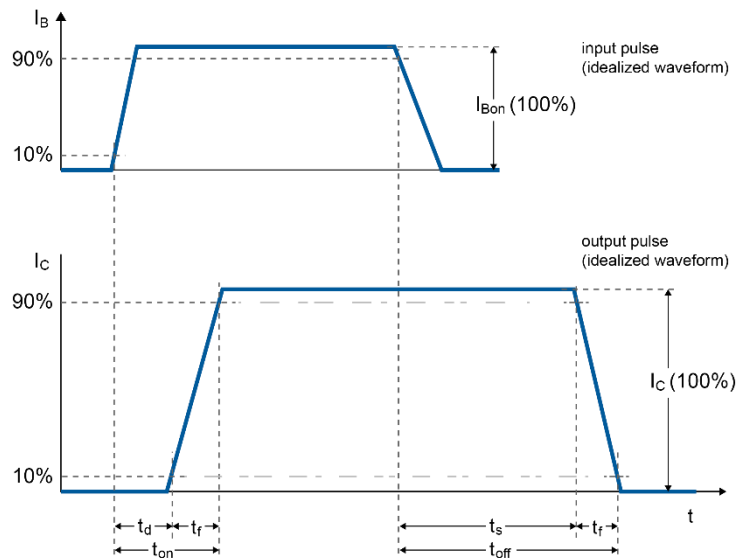


Fig 6. Timing Waveform

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

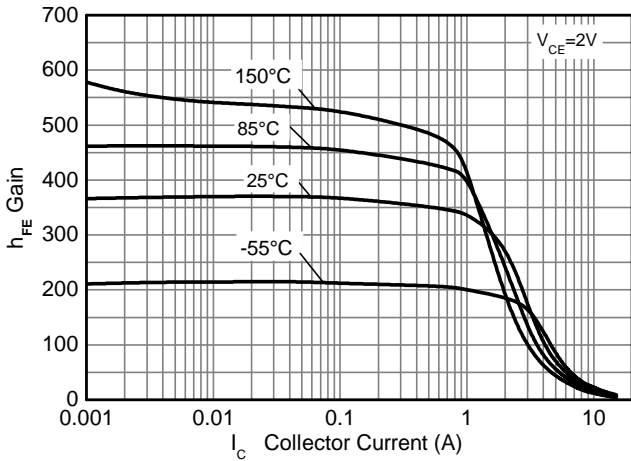


Fig. 7 $h_{FE} \ v \ I_C$

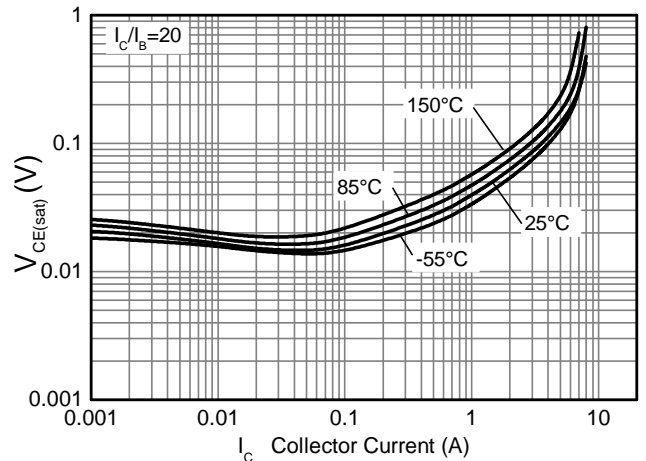


Fig. 8 $V_{CE(sat)} \ v \ I_C$

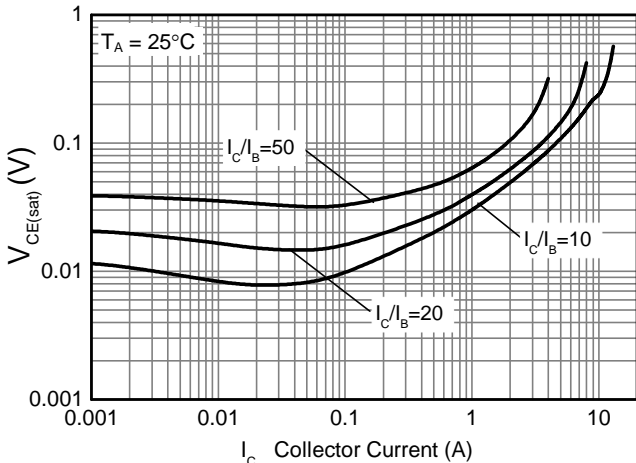


Fig. 9 $V_{CE(sat)} \ v \ I_C$

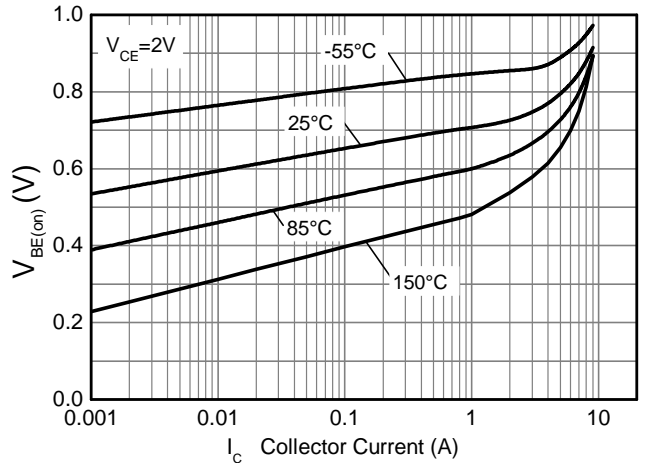


Fig. 10 $V_{BE(on)} \ v \ I_C$

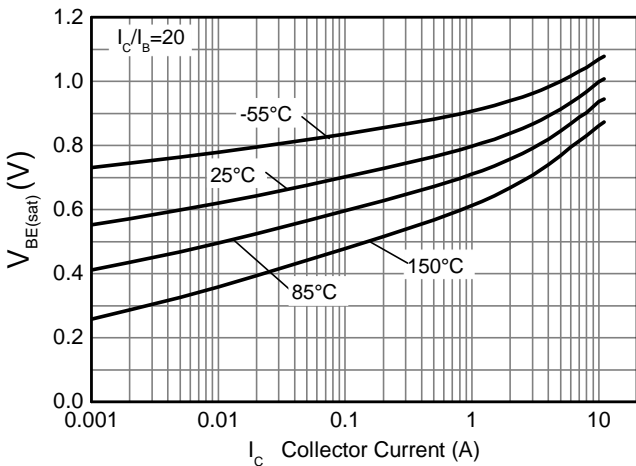


Fig. 11 $V_{BE(sat)} \ v \ I_C$

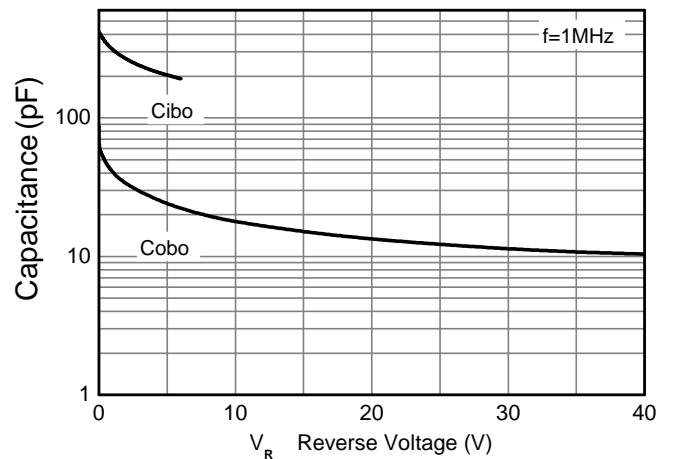


Fig. 12 Typical Junction Capacitance

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

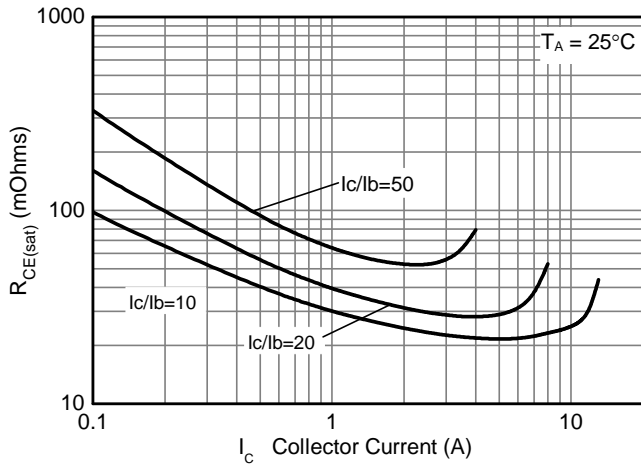


Fig. 13 $R_{CE(sat)} \text{ v } I_C$

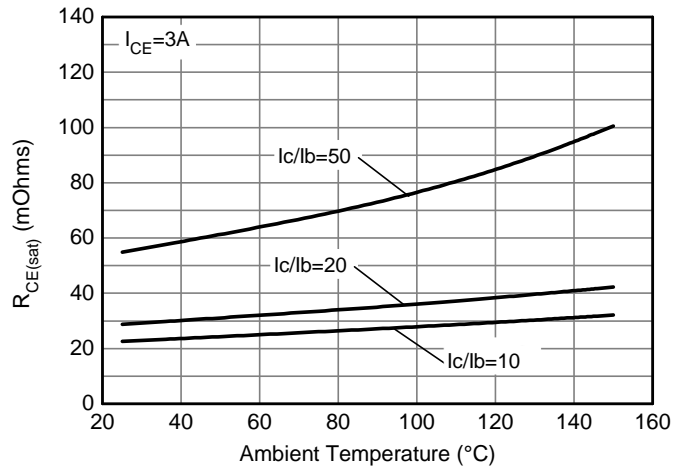


Fig. 14 $R_{CE(sat)} \text{ v } T_A$

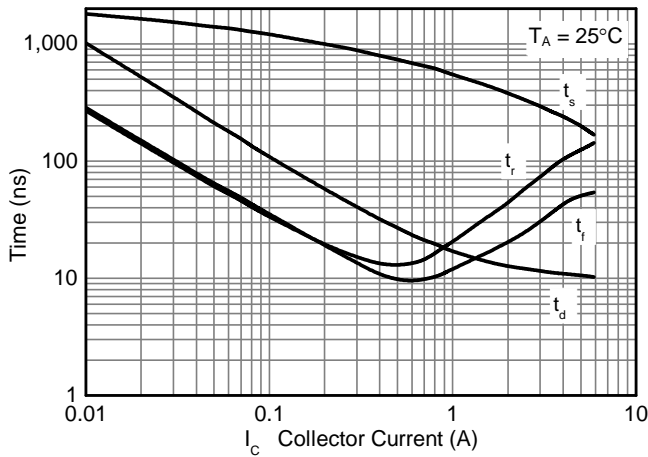


Fig. 15 Switching Performance

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