60V NPN MEDIUM POWER TRANSISTOR IN PowerDI3333-8

Features

- BV_{CEO} > 60V
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- I_C = 3A High Continuous Current
- I_{CM} = 6A Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)}$ < 250mV @ 1A
- Complementary PNP Type: DXTP07060BFGQ
- Rated to +175°C – Ideal for High Temperature Environment
- Wettable Flank for Improved Optical Inspection
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DXTN07060BFGQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**
  https://www.diodes.com/quality/product-definitions/

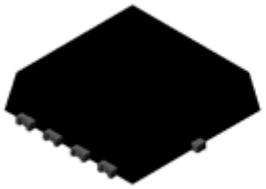
Mechanical Data

- 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)

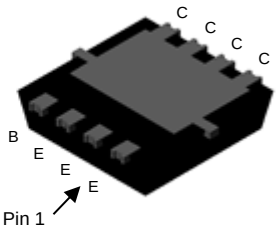
Applications

- Load switches
- Linear regulators
- MOSFET or IGBT gate driving
- Battery charging

PowerDI3333-8/SWP (Type UX)

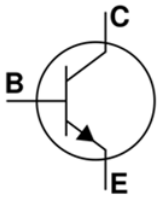


Top View



Bottom View

Equivalent Circuit



Device Symbol

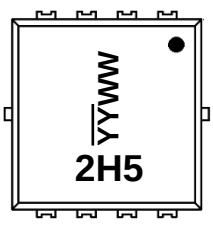
Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
DXTN07060BFGQ-7	PowerDI3333-8/SWP (Type UX)	2H5	7	12	2000	Reel

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. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information

PowerDI3333-8/SWP (Type UX)



2H5 = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 25 = 2025)
WW = Week Code (01 to 53)

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	80	V
Collector-Emitter Voltage	V_{CEO}	60	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	3	A
Peak Pulse Current	I_{CM}	6	A

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

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	1	W
	(Note 6)		2.3	W
	(Note 7)		3.4	W
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	140	°C/W
	(Note 6)		65	°C/W
	(Note 7)		44	°C/W
Thermal Resistance, Junction to Leads (Note 8)		$R_{\theta JL}$	8.5	°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	4000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Notes:
5. For a device mounted with the collector tab on MRP FR-4 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 and JESD22-A115.

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Thermal Characteristics and Derating Information

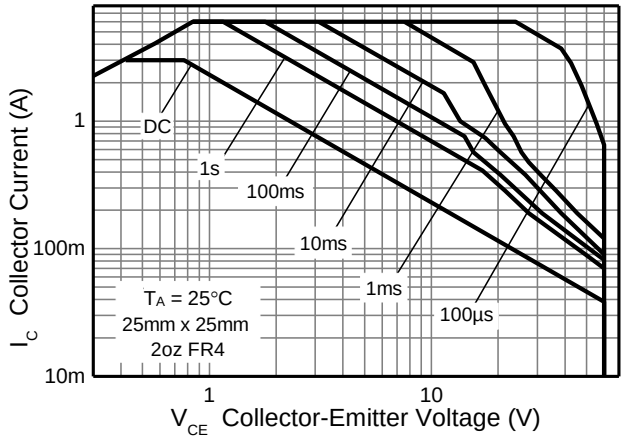


Fig.1 Safe Operating Area

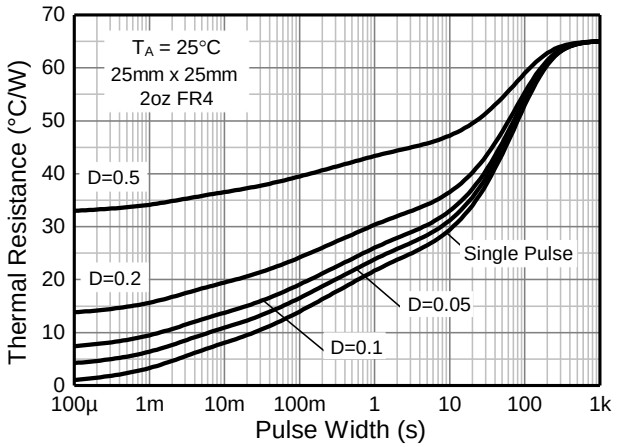


Fig.2 Transient Thermal Impedance

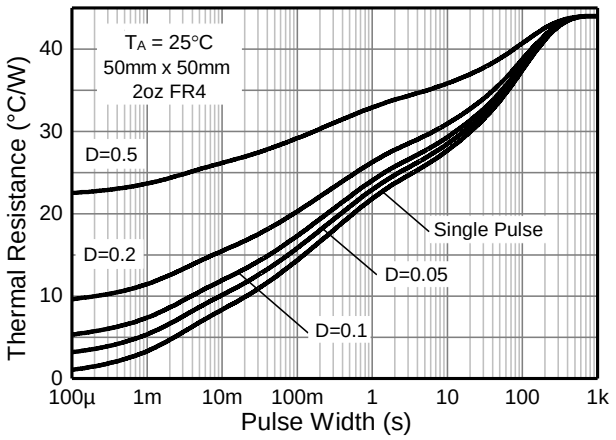


Fig.3 Transient Thermal Impedance

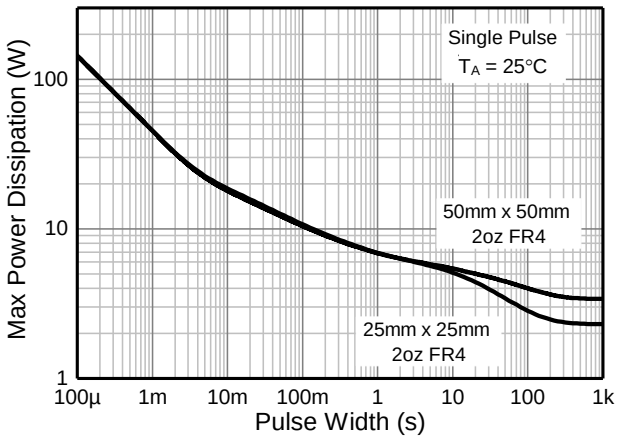


Fig.4 Pulse Power Dissipation

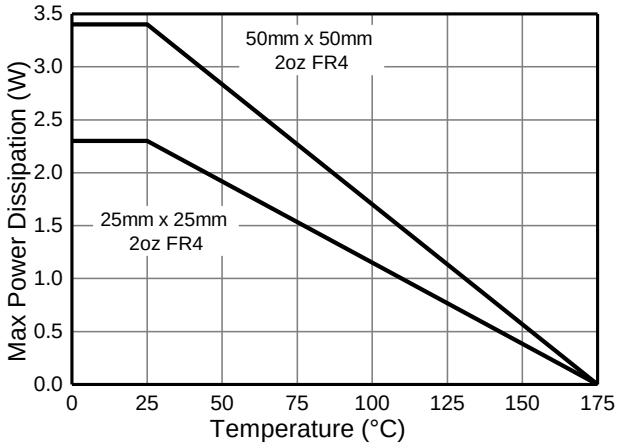


Fig.5 Derating Curve

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	80	195	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Note 10)	BV_{CEO}	60	78	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.2	—	V	I_E = 100µA
Collector Cutoff Current	I_{CBO}	—	1	20	nA	V_{CB} = 60V
		—	0.02	10	µA	V_{CB} = 60V, T_A = +125°C
Emitter Cutoff Current	I_{EBO}	—	1	20	nA	V_{EB} = 6V
DC Current Gain (Note 10)	h_{FE}	70	155	—	—	I_C = 50mA, V_{CE} = 2V
		100	150	300		I_C = 500mA, V_{CE} = 2V
		80	150	—		I_C = 1A, V_{CE} = 2V
		40	115	—		I_C = 2A, V_{CE} = 2V
Collector-Emitter Saturation Voltage (Note 10)	$V_{CE(sat)}$	—	78	250	mV	I_C = 1A, I_B = 100mA
		—	205	500		I_C = 3A, I_B = 300mA
Base-Emitter Saturation Voltage (Note 10)	$V_{BE(sat)}$	—	0.865	1.1	V	I_C = 1A, I_B = 100mA
Base-Emitter Turn-On Voltage (Note 10)	$V_{BE(on)}$	—	0.785	0.95	V	I_C = 1A, V_{CE} = 2V
Input Capacitance	C_{ibo}	—	316	—	pF	V_{EB} = 0.5V, f = 1MHz
Output Capacitance	C_{obo}	—	15	—	pF	V_{CB} = 10V, f = 1MHz
Current Gain-Bandwidth Product	f_T	—	175	—	MHz	V_{CE} = 5V, I_C = 100mA, f = 100MHz
Switching Time	t_{on}	—	45	—	ns	I_C = 500mA, V_{CC} = 10V, I_{B1} = -I_{B2} = 50mA
	t_{off}	—	800	—		

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

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

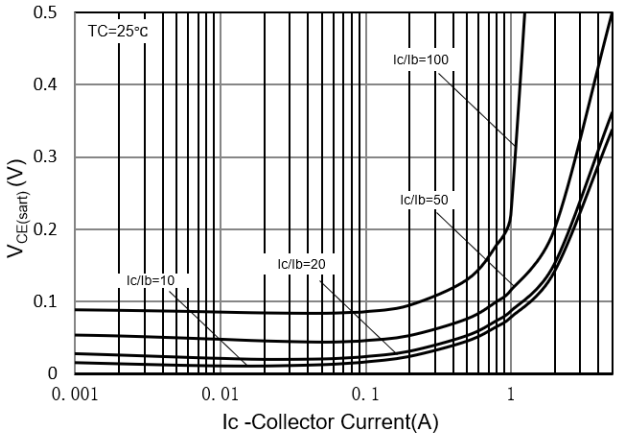


Fig.6 $V_{CE(sat)}$ vs Ic

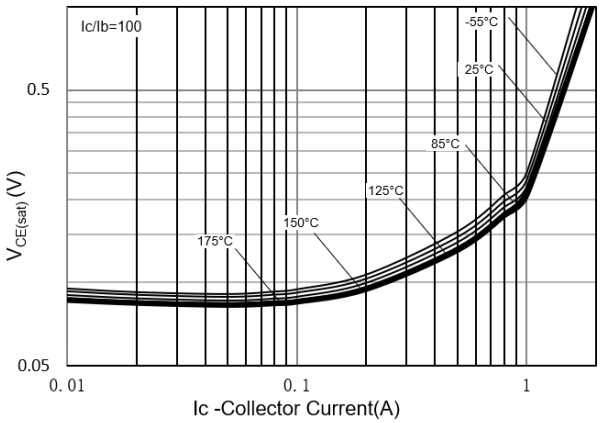


Fig.7 $V_{CE(sat)}$ vs Ic

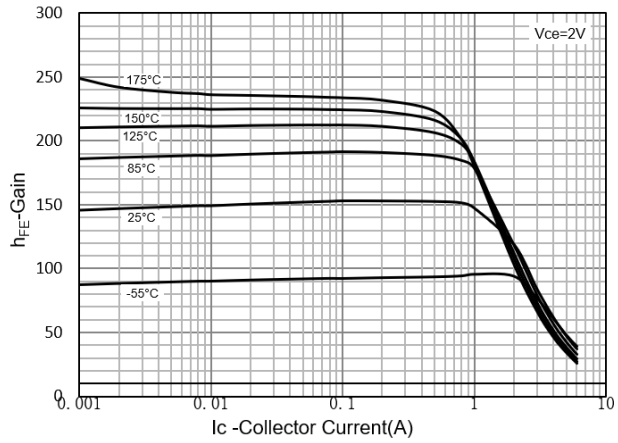


Fig.8 h_{FE} vs Ic

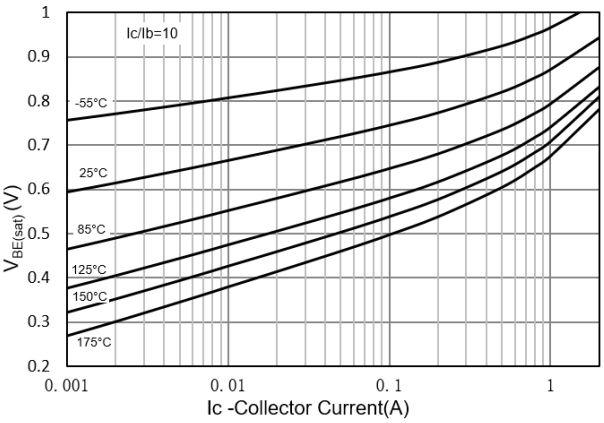


Fig.9 $V_{BE(sat)}$ vs Ic

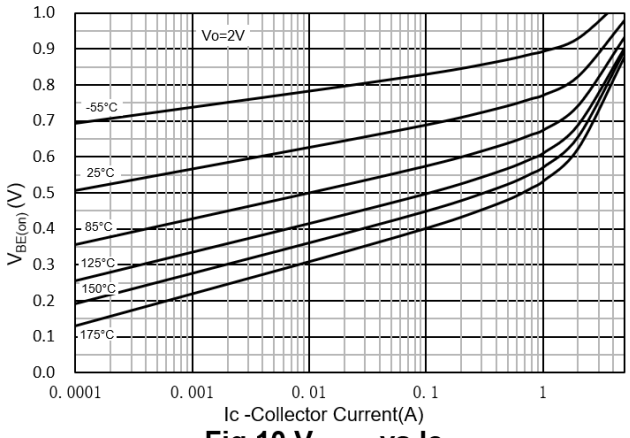


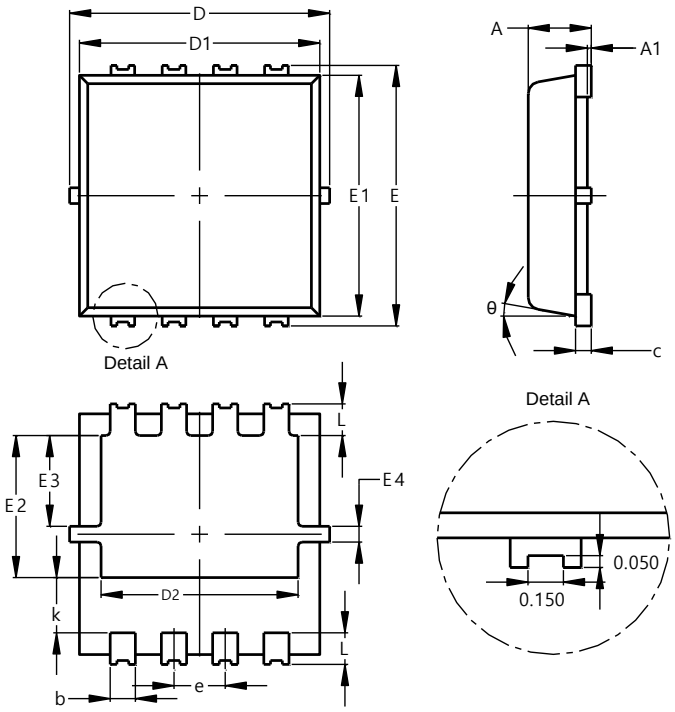
Fig.10 $V_{BE(on)}$ vs Ic

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Package Outline Dimensions

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

PowerDI3333-8/SWP (Type UX)

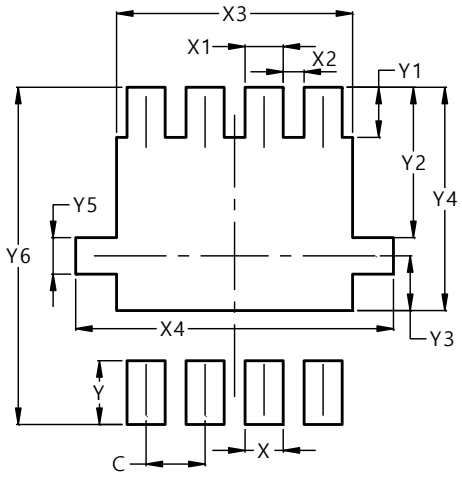


PowerDI3333-8/SWP (Type UX)			
Dim	**Min**	**Max**	**Typ**
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	2.30	2.70	2.50
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E3	0.95	1.35	1.15
E4	0.10	0.30	0.20
e	–	–	0.65
k	0.50	0.90	0.70
L	0.30	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: 11. 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.
12. Side wall tin plated package for wettable flanks in AOI.

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