45V NPN MEDIUM-POWER TRANSISTOR IN PowerDI3333-8

Features

- BV_{CEO} > 45V
- Small Form Factor Thermally Efficient Package – Enables Higher Density End Products
- I_C = 3A High Continuous Current
- High Gain h_{FE} > 400 @ 1A
- Low Saturation Voltage $V_{CE(sat)}$ < 300mV @ 1A
- 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 DXTN07045DFGQ 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/

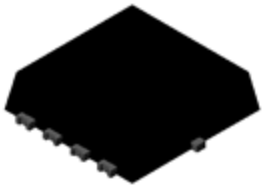
Mechanical Data

- 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)

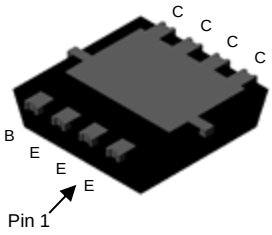
Applications

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

PowerDI3333-8/SWP (Type UX)

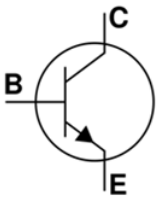


Top View



Bottom View

Equivalent Circuit



Device Symbol

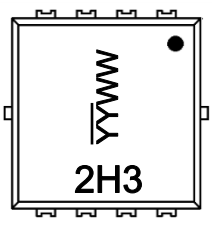
Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
DXTN07045DFGQ-7	PowerDI3333-8/SWP (Type UX)	2H3	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)



2H3 = 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}	45	V
Collector-Emitter Voltage	V_{CEO}	45	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 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 and JESD22-A115.

Thermal Characteristics and Derating Information

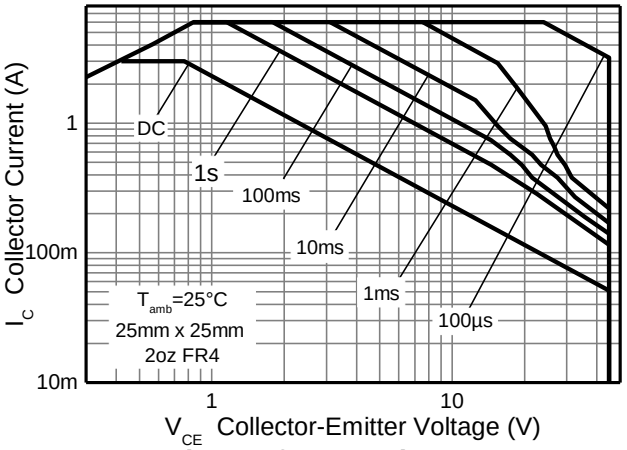


Fig.1 Safe Operating Area

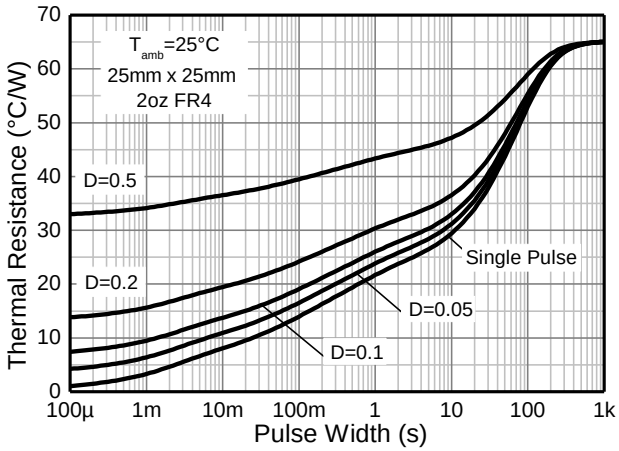


Fig.2 Transient Thermal Impedance

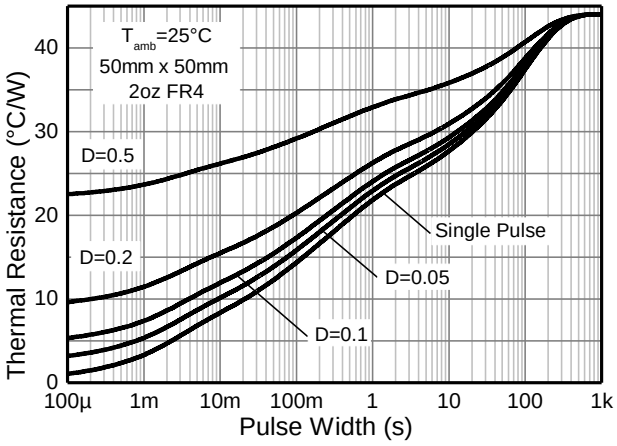


Fig.3 Transient Thermal Impedance

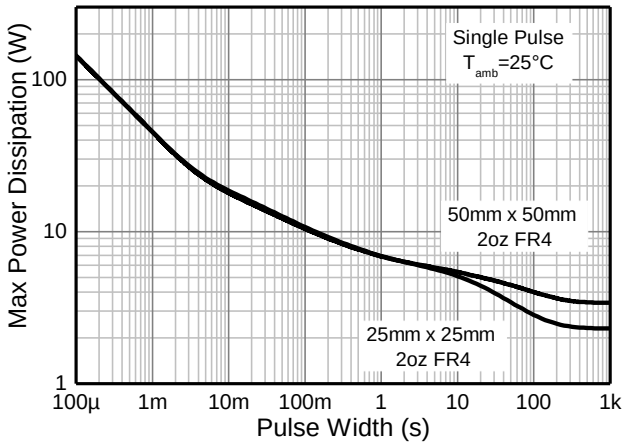


Fig.4 Pulse Power Dissipation

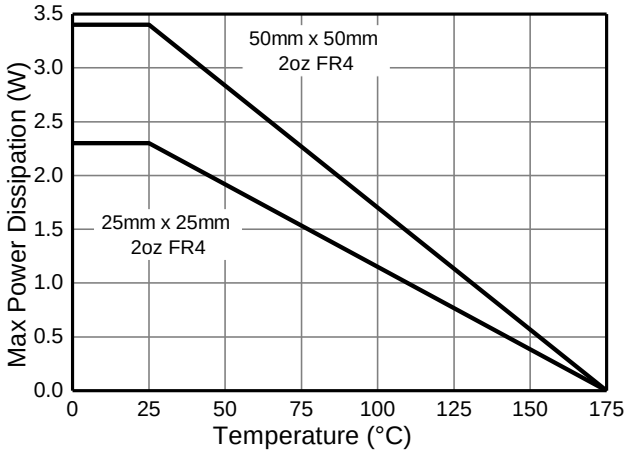


Fig.5 Derating Curve

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	50	150	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Note 10)	BV_{CEO}	45	59	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8	—	V	I_E = 100µA
Collector-Base Cutoff Current	I_{CBO}	—	1	20	nA	V_{CB} = 45V
		—	0.02	10	µA	V_{CB} = 45V, T_A = +125°C
Emitter Cutoff Current	I_{EBO}	—	1	20	nA	V_{EB} = 6V
DC Current Gain (Note 10)	h_{FE}	500	760	—	—	I_C = 0.1A, V_{CE} = 2V
		400	700	—	—	I_C = 1A, V_{CE} = 2V
		150	490	—	—	I_C = 2A, V_{CE} = 2V
		50	220	—	—	I_C = 3A, V_{CE} = 2V
Collector-Emitter Saturation Voltage (Note 10)	$V_{CE(sat)}$	—	59	100	mV	I_C = 0.1A, I_B = 0.5mA
		—	180	300	mV	I_C = 1A, I_B = 5mA
Base-Emitter Saturation Voltage (Note 10)	$V_{BE(sat)}$	—	0.625	1	V	I_C = 1A, I_B = 10mA
Base-Emitter Turn-On Voltage (Note 10)	$V_{BE(on)}$	—	0.560	0.9	V	I_C = 1A, V_{CE} = 2V
Input Capacitance	C_{ibo}	—	200	—	pF	V_{EB} = 0.5V, f = 1MHz
Output Capacitance	C_{obo}	—	16	—	pF	V_{CB} = 10V, f = 1MHz
Current Gain-Bandwidth Product	f_T	150	—	—	MHz	V_{CE} = 5V, I_C = 50mA, f = 50MHz
Turn-On Time	t_{on}	—	33	—	ns	V_{CC} = 10V, I_C = 500mA I_{B1} = -I_{B2} = 50mA
Turn-Off Time	t_{off}	—	1300	—	ns	

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

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

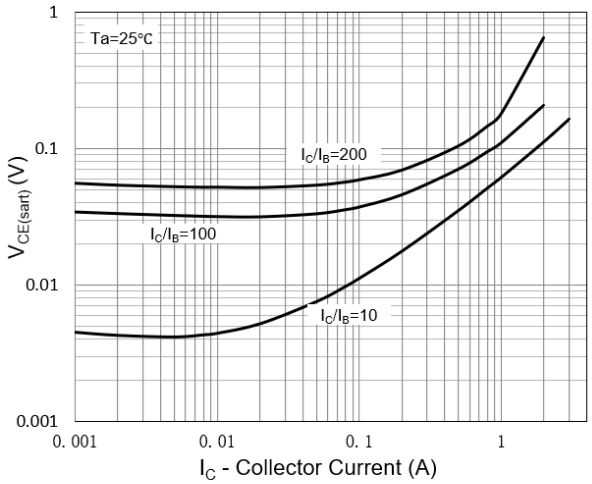


Fig.6 $V_{CE(sat)}$ vs I_C

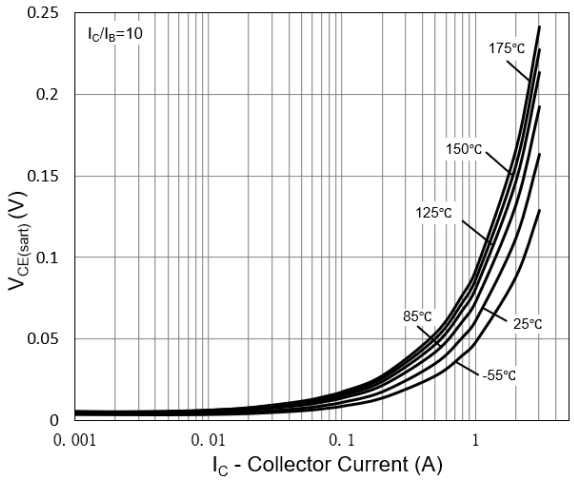


Fig.7 $V_{CE(sat)}$ vs I_C

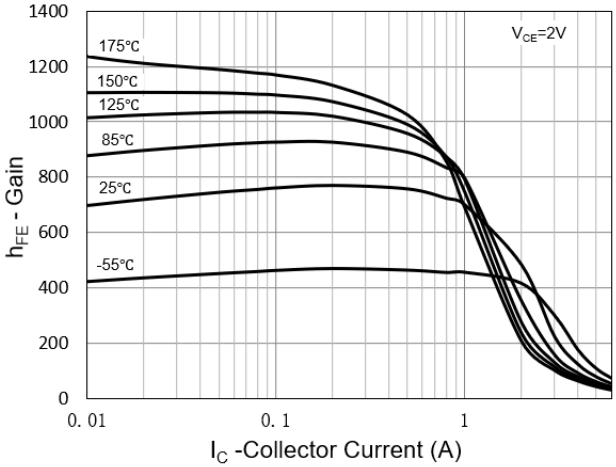


Fig.8 h_{FE} vs I_C

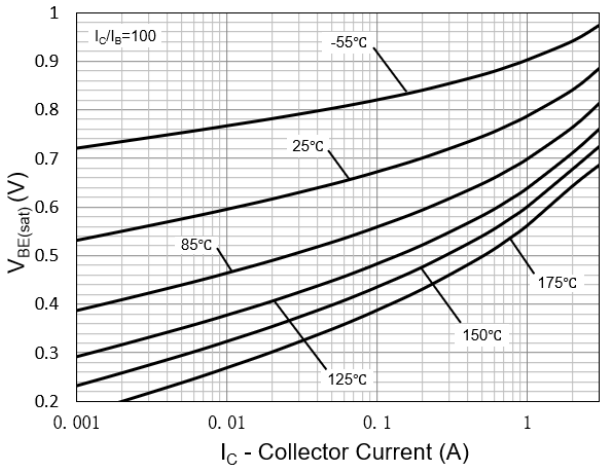


Fig.9 $V_{BE(sat)}$ vs I_C

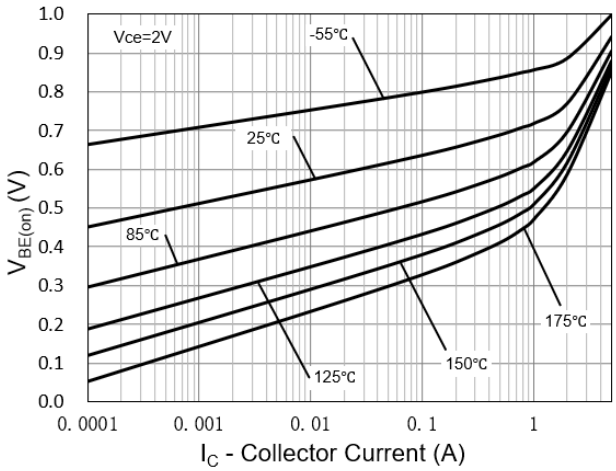
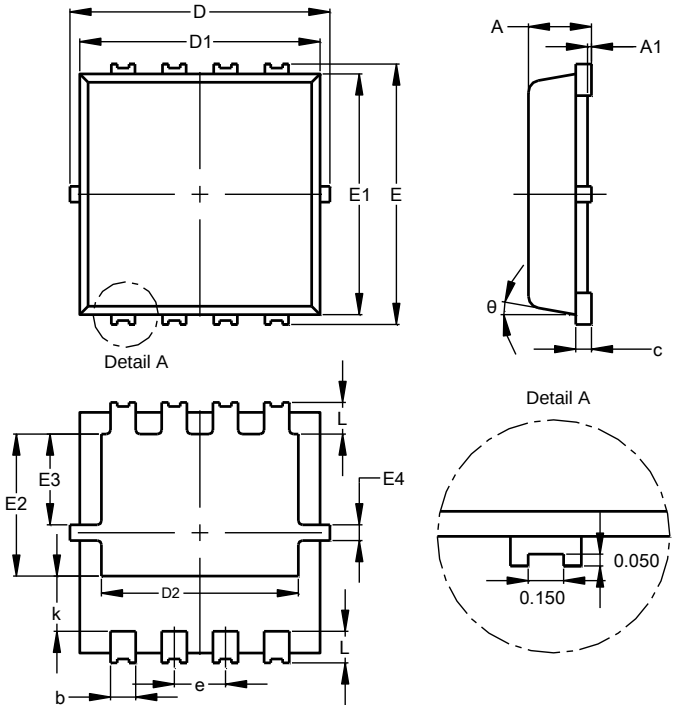


Fig.10 $V_{BE(on)}$ vs I_C

Package Outline Dimensions

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

PowerDI3333-8/SWP (Type UX)

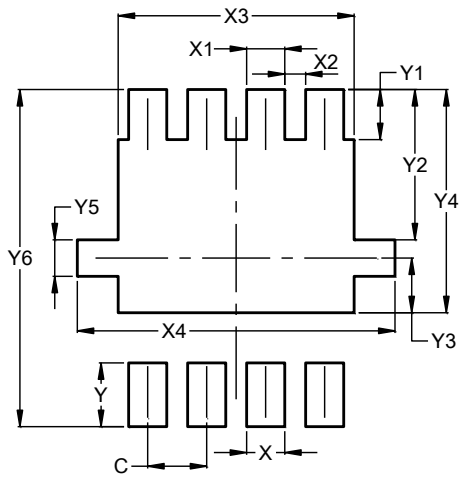


PowerDI3333-8/SWP (Type UX)			
Dim	**Min**	**Max**	**Typ**
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	2.30	2.70	2.50
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E3	0.95	1.35	1.15
E4	0.10	0.30	0.20
e	–	–	0.65
k	0.50	0.90	0.70
L	0.30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