Description

This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirement of Automotive Applications.

Features

- BV_{CEO} > 100V
- I_C = 2A High Continuous Collector Current
- I_{CM} = 6A Peak Collector Current
- P_D up to 3.2W
- 43% Smaller Than SOT223; 60% Smaller Than TO252
- Maximum Height just 1.1mm
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

Mechanical Data

- Case: PowerDI®5
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.093 grams (Approximate)

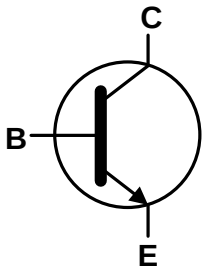
Applications

- Voltage Regulator using Emitter-Follower
- DC-DC Converter
- Telecoms
- Power Management

PowerDI5

Top View

Bottom View



Device Schematic

Top View
Pin-Out

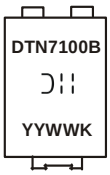
Ordering Information (Notes 4 and 5)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
DXTN07100BP5Q-13	Automotive	DTN7100B	13	16	5,000

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com/quality/lead_free.html 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to http://www.diodes.com/product_compliance_definitions.html.
5. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

Marking Information

PowerDI5



DTN7100B = Product Type Marking Code
= Manufacturers' Code Marking
K = Factory Designator
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 16 for 2016)
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}	120	V
Collector-Emitter Voltage	V_{CEO}	100	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	2	A
Peak Pulse Current	I_{CM}	6	A

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

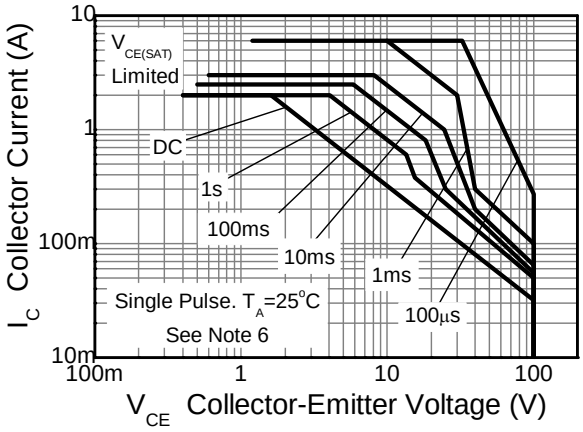
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 6)	P_D	3.2	W
	(Note 7)		1.7	
	(Note 8)		0.74	
Thermal Resistance, Junction to Ambient Air	(Note 6)	$R_{\theta JA}$	39	°C/W
	(Note 7)		75	
	(Note 8)		169	
Thermal Resistance, Junction to Leads	(Note 9)	$R_{\theta JL}$	9	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 10)

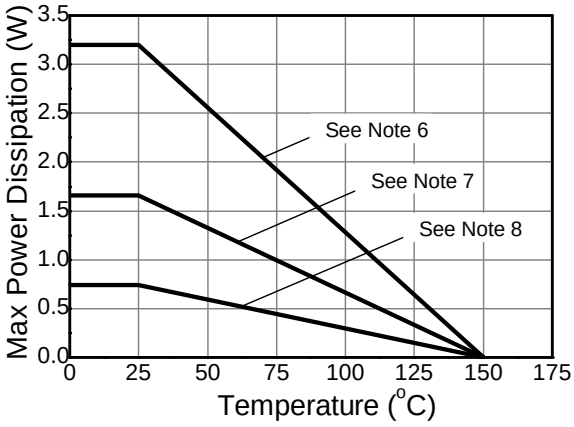
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Notes:
6. For a device mounted with the exposed collector pad on 50mm x 50mm 2oz copper that is on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
7. Same as note (6), except mounted on 25mm x 25mm 1oz copper.
8. Same as note (6), except mounted on minimum recommended pad (MRP) layout.
9. Thermal resistance from junction to solder-point (on the exposed collector pad).
10. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

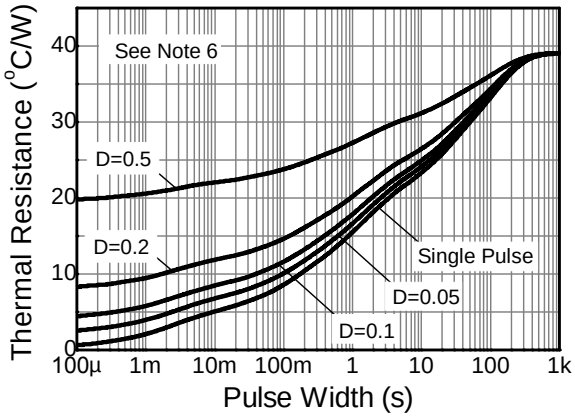
Thermal Characteristics and Derating Information



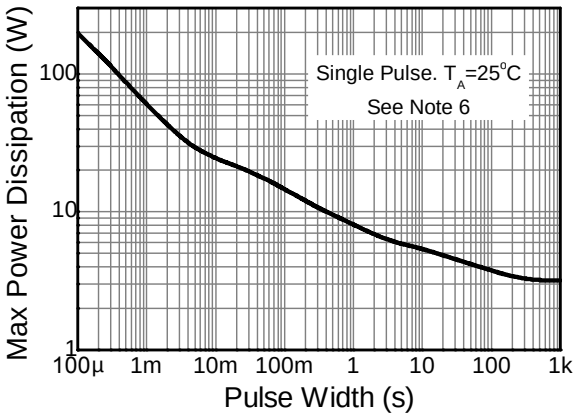
Safe Operating Area



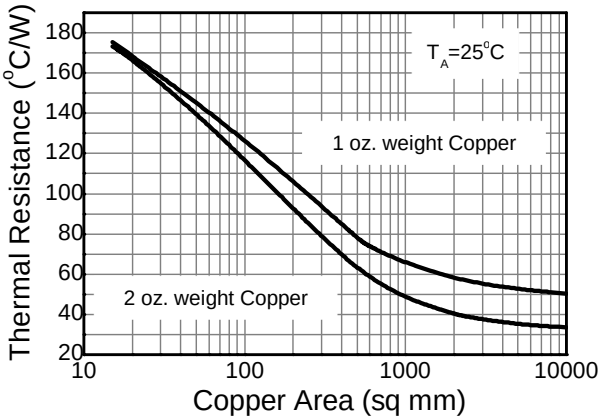
Derating Curve



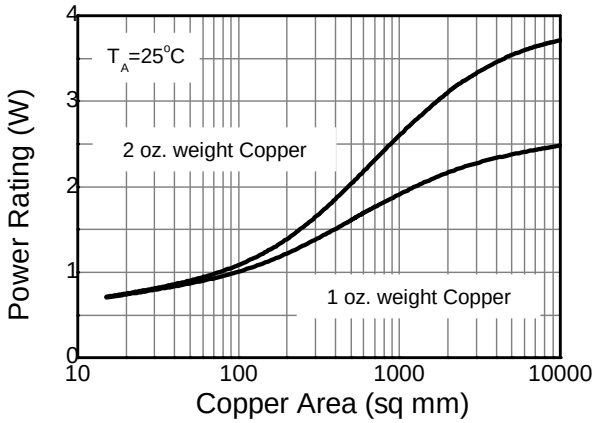
Transient Thermal Impedance



Pulse Power Dissipation



Thermal Resistance vs. Cu Area



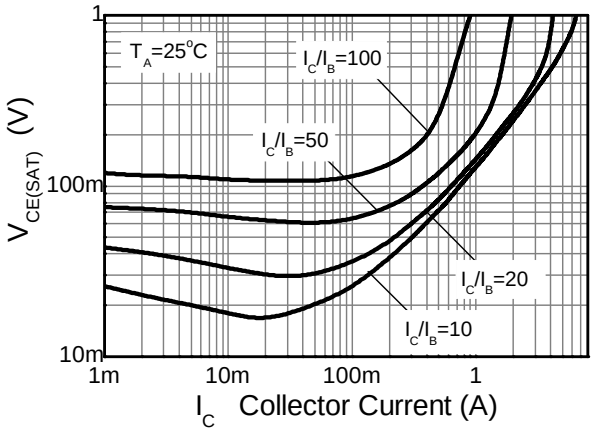
Power Rating vs. Cu Area

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

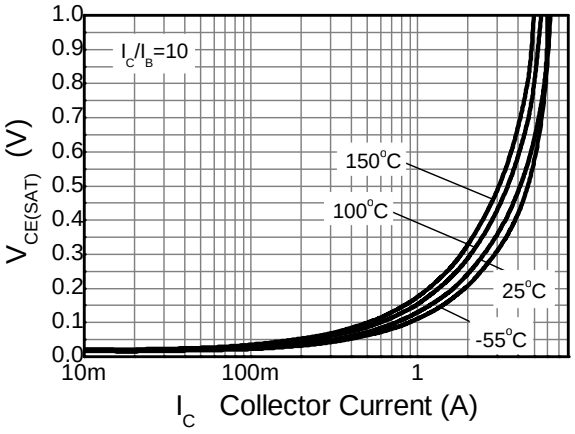
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	120	—	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Note 11)	BV_{CEO}	100	—	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	5	—	—	V	I_E = 100µA
Collector Cutoff Current	I_{CBO}	—	—	0.1 10	µA	V_{CB} = 100V V_{CB} = 100V, T_A = +100°C
Emitter Cutoff Current	I_{EBO}	—	—	0.1	µA	V_{EB} = 4V
Collector-Emitter Saturation Voltage (Note 11)	$V_{CE(SAT)}$	—	0.13 0.23	0.3 0.5	V	I_C = 1A, I_B = 100mA I_C = 2A, I_B = 200mA
Base-Emitter Saturation Voltage (Note 11)	$V_{BE(SAT)}$	—	0.9	1.25	V	I_C = 1A, I_B = 100mA
Base-Emitter Turn-On Voltage (Note 11)	$V_{BE(ON)}$	—	0.8	1.00	V	I_C = 1A, V_{CE} = 2V
DC Current Gain (Note 11)	h_{FE}	70 100 55 25	200 200 110 55	— 300 — —	—	I_C = 50mA, V_{CE} = 2V I_C = 500mA, V_{CE} = 2V I_C = 1A, V_{CE} = 2V I_C = 2A, V_{CE} = 2V
Transition Frequency	f_T	140	175	—	MHz	I_C = 100mA, V_{CE} = 5V f = 100MHz
Output Capacitance	C_{OBO}	—	—	30	pF	V_{CB} = 10V, f = 1MHz
Switching Time	t_{ON} t_{OFF}	—	80 1200	—	ns ns	I_C = 500mA, V_{CC} = 10V, I_{B1} = -I_{B2} = 50mA

Note: 11. Pulse Test: Pulse width ≤ 300µs. Duty cycle ≤ 2.0%.

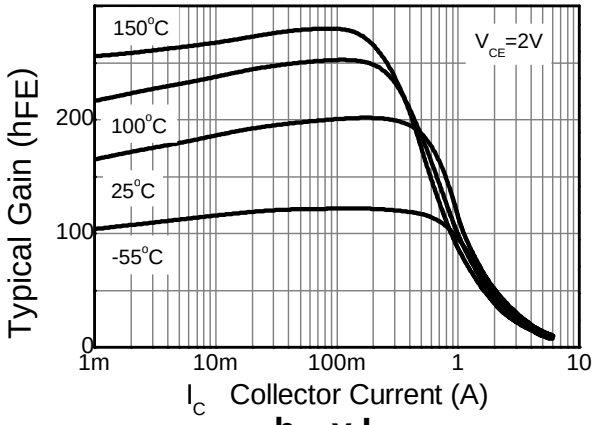
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



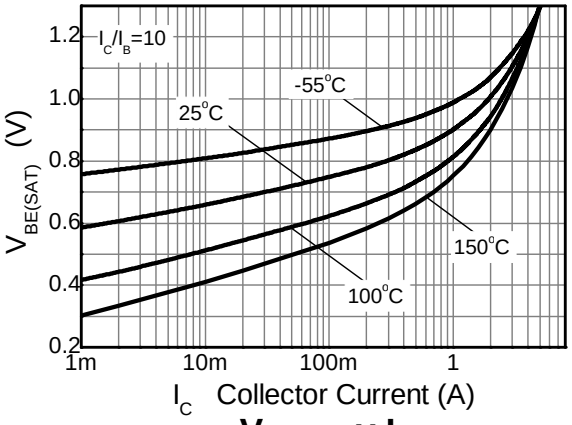
$V_{CE(SAT)}$ v I_C



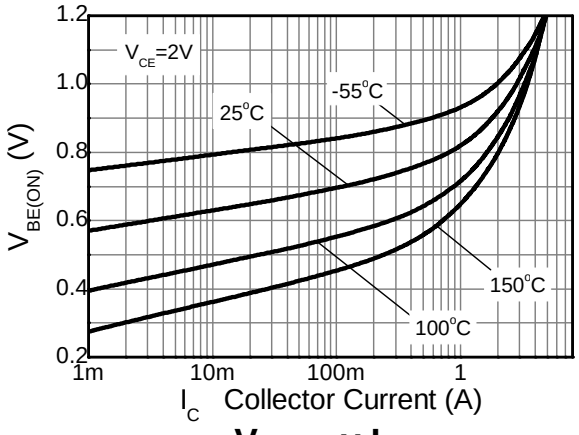
$V_{CE(SAT)}$ v I_C



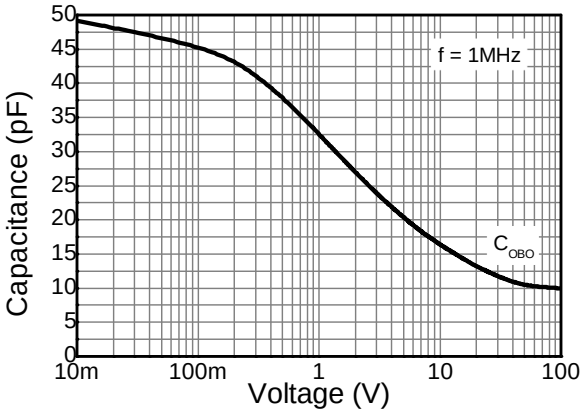
h_{FE} v I_C



$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

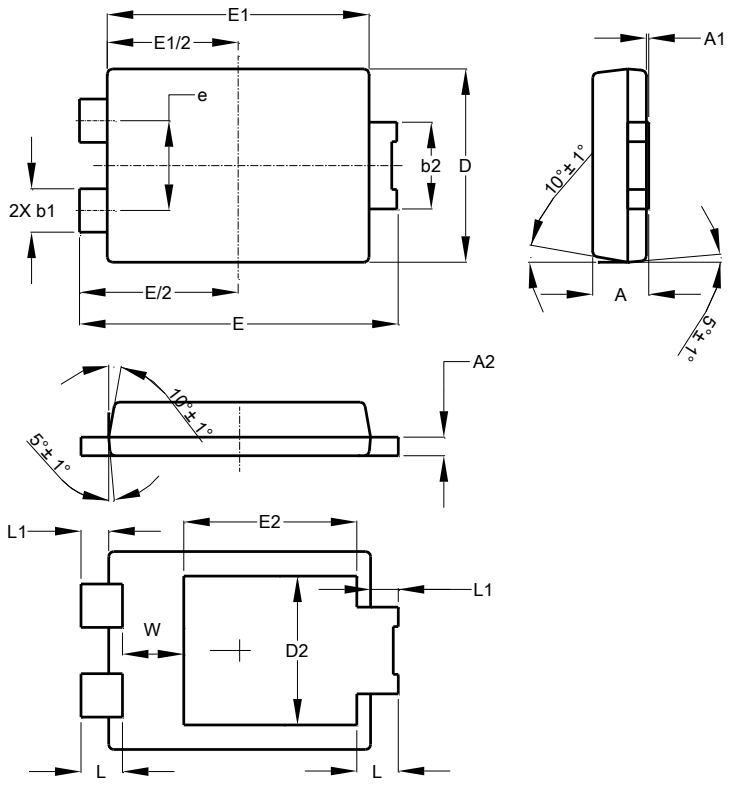


Capacitance v Voltage

Package Outline Dimensions

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

PowerDI5

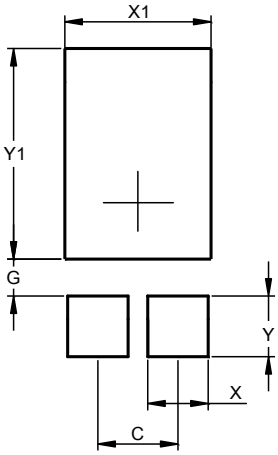


PowerDI5			
Dim	**Min**	**Max**	**Typ**
A	1.05	1.15	1.10
A1	0.00	0.05	--
A2	0.33	0.43	0.381
b1	0.80	0.99	0.89
b2	1.70	1.88	1.78
D	3.90	4.05	3.966
D2	--	--	3.054
E	6.40	6.60	6.504
e	--	--	1.84
E1	5.30	5.45	5.37
E2	--	--	3.549
L	0.75	0.95	0.85
L1	0.50	0.65	0.57
W	1.10	1.41	1.255
All Dimensions in mm			

Suggested Pad Layout

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

PowerDI5



Dimensions	Value (in mm)
C	1.840
G	0.852
X	1.390
X1	3.360
Y	1.400
Y1	4.860

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