

**12V PNP LOW SATURATION SWITCHING TRANSISTOR IN SOT26**

**Features**

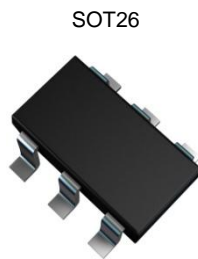
- $BV_{CEO} > -12V$
- $I_C = -4A$  Continuous Collector Current
- $I_{CM} = -15A$  Peak Pulse Current
- $R_{CE(sat)} = 37m\Omega$  for a Low Equivalent On-Resistance
- Low Saturation Voltage of  $<-90mV$  max @  $-1A$
- $h_{FE}$  Characterized up to  $-15A$  for High Current Gain Hold-Up
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

**Mechanical Data**

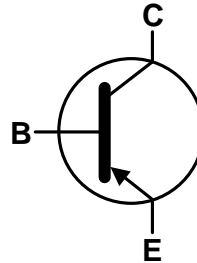
- Case: SOT26
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.015 grams (Approximate)

**Applications**

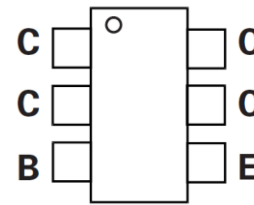
- DC-DC Converters
- Power Management Functions
- Power Switches
- Motor Control



Top View



Device Symbol



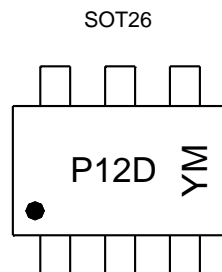
Pin-Out Top

**Ordering Information** (Notes 4)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXT13P12DE6TA	P12D	7	8	3,000

- 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](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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**



P12D = Product Type Marking Code  
 YM = Date Code Marking  
 Y or  $\bar{Y}$  = Year (ex: C = 2015)  
 M or  $\bar{M}$  = Month (ex: 9 = September)

Date Code Key

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Code	C	D	E	F	G	H	I	J	K	L	M

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	-20	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-12	V
Emitter-Base Voltage	V <sub>EBO</sub>	-7.5	V
Base Current	I <sub>B</sub>	-500	mA
Continuous Collector Current	I <sub>C</sub>	-4	A
Peak Pulse Collector Current	I <sub>CM</sub>	-15	A

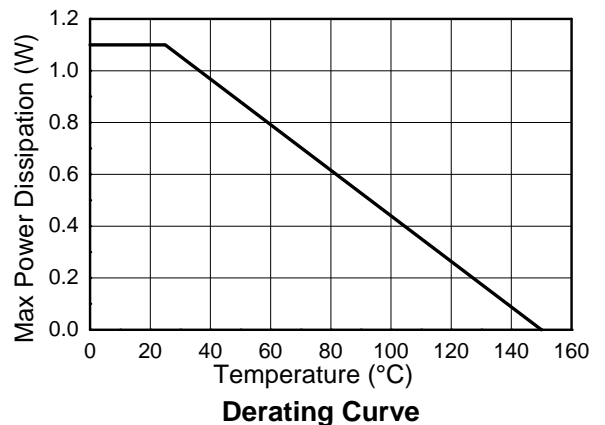
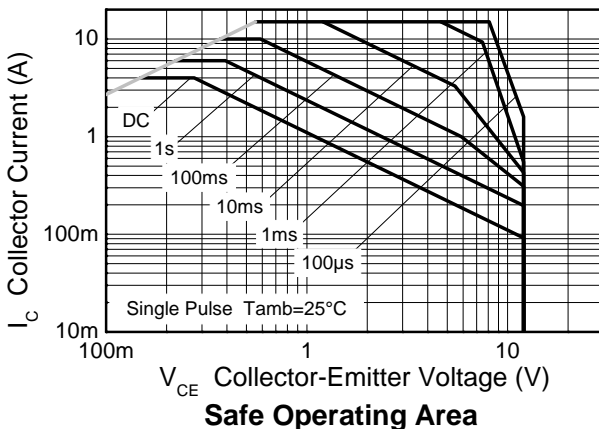
**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

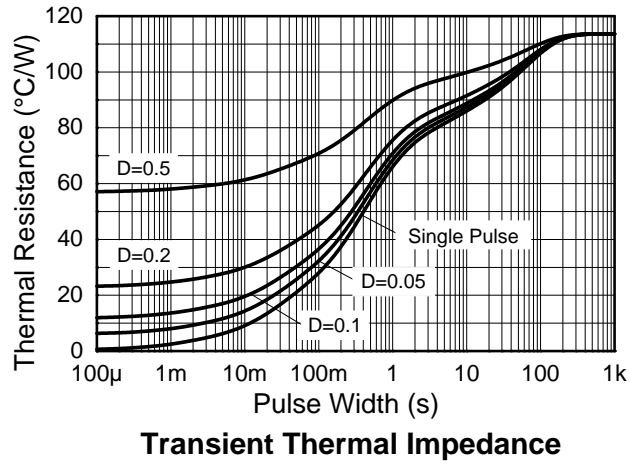
Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	P <sub>D</sub>	1.1	W
		8.8	
		1.7	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	13.6	°C/W
		113	
Thermal Resistance, Junction to Lead	R <sub>θJL</sub>	73	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**ESD Ratings** (Note 8)

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:
- For a device mounted with collector leads on 25mm x 25mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  - Same as Note 5, except the device is measured at t ≤ 5 seconds.
  - Thermal resistance from junction to solder-point (at the end of the collector leads).
  - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

**Thermal Characteristics and Derating Information**


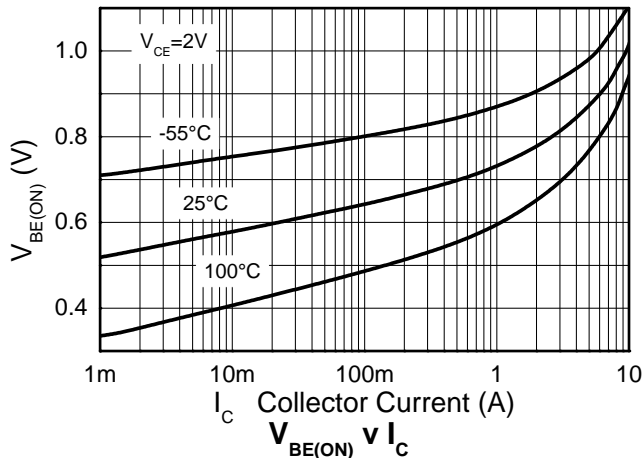
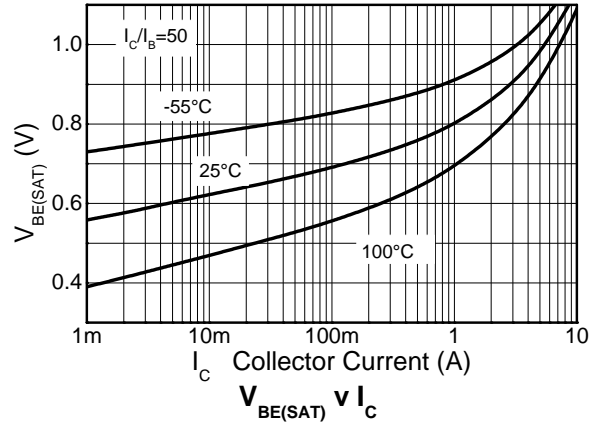
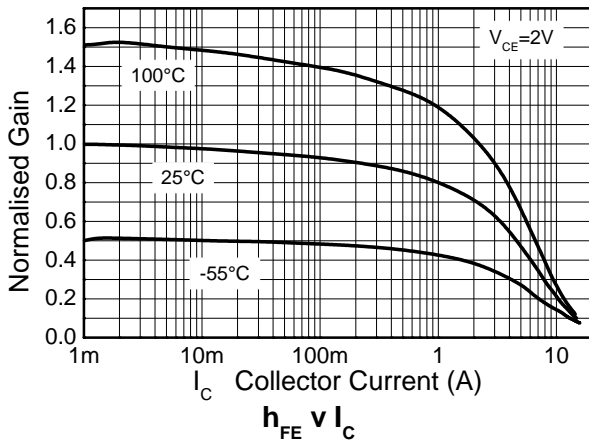
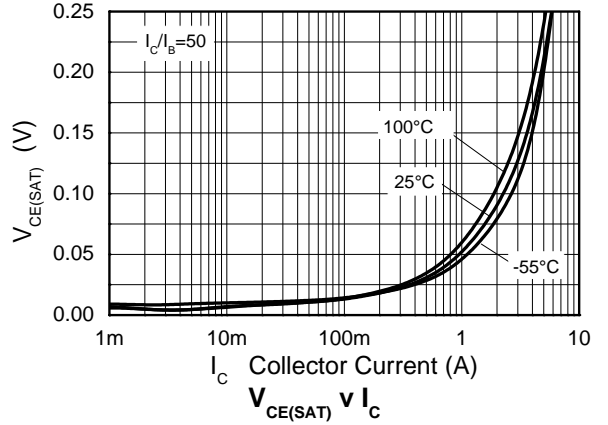
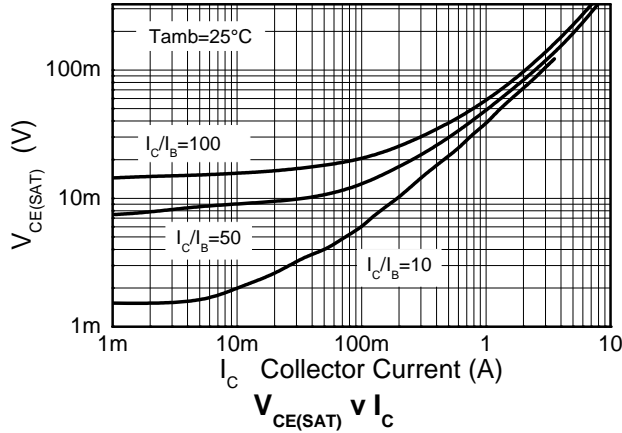


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-20	-33	—	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	-12	-25	—	V	I <sub>C</sub> = -10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-7.5	-8.5	—	V	I <sub>E</sub> = -100μA
Collector-Base Cut-Off Current	I <sub>CBO</sub>	—	—	-100	nA	V <sub>CB</sub> = -16V
Emitter Cut-Off Current	I <sub>EBO</sub>	—	—	-100	nA	V <sub>EB</sub> = -6V
Collector-Emitter Cut-Off Current	I <sub>CES</sub>	—	—	-100	nA	V <sub>CES</sub> = -16V
<b>ON CHARACTERISTICS</b> (Note 9)						
DC Current Gain	h <sub>FE</sub>	300	500	—	—	I <sub>C</sub> = -10mA, V <sub>CE</sub> = -2V
		300	450	900	—	I <sub>C</sub> = -1A, V <sub>CE</sub> = -2V
		200	300	—	—	I <sub>C</sub> = -4A, V <sub>CE</sub> = -2V
		20	30	—	—	I <sub>C</sub> = -15A, V <sub>CE</sub> = -2V
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	—	-7.5	-10	mV	I <sub>C</sub> = -100mA, I <sub>B</sub> = -10mA
		—	-68	-90		I <sub>C</sub> = -1A, I <sub>B</sub> = -10mA
		—	-135	-175		I <sub>C</sub> = -3A, I <sub>B</sub> = -50mA
		—	-200	-250		I <sub>C</sub> = -4A, I <sub>B</sub> = -50mA
		—	-150	-175		I <sub>C</sub> = -4A, I <sub>B</sub> = -400mA
Base-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	—	—	-1.0	V	I <sub>C</sub> = -4A, I <sub>B</sub> = -50mA
Base-Emitter Turn-On Voltage	V <sub>BE(on)</sub>	—	—	-0.9	V	I <sub>C</sub> = -4A, V <sub>CE</sub> = -2V
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Current Gain-Bandwidth Product	f <sub>T</sub>	—	55	—	MHz	V <sub>CE</sub> = -10V, I <sub>C</sub> = -50mA, f = 50MHz
Output Capacitance	C <sub>obo</sub>	—	115	—	pF	V <sub>CB</sub> = -10V, f = 1MHz
Turn-On Time	t <sub>(on)</sub>	—	70	—	ns	V <sub>CC</sub> = -10V, I <sub>C</sub> = -3A
Turn-Off Time	t <sub>(off)</sub>	—	265	—	ns	I <sub>B1</sub> = I <sub>B2</sub> = -60mA

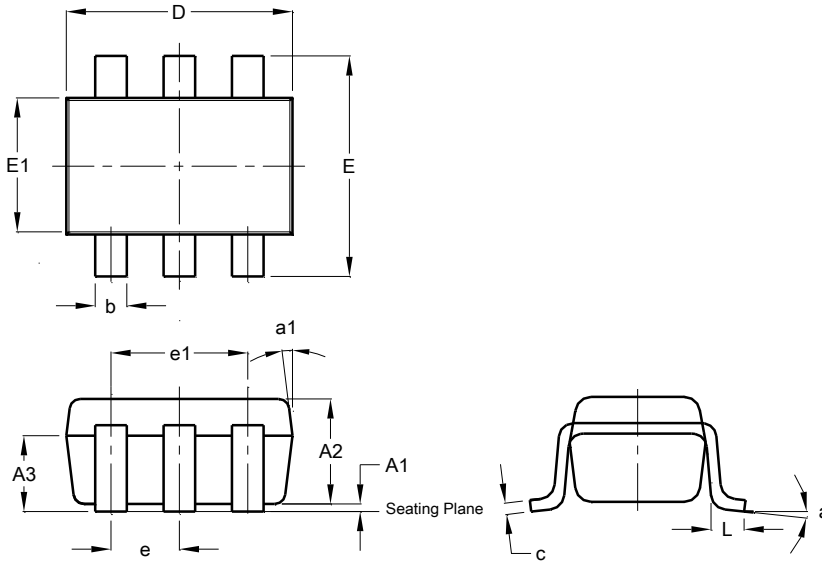
Note: 9. Measured under pulsed conditions; pulse width ≤ 300μs, duty cycle ≤ 2%.

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



**Package Outline**

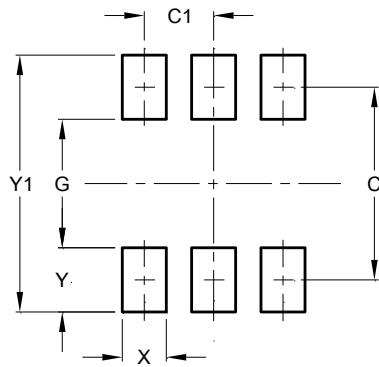
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



SOT26			
Dim	Min	Max	Typ
A1	0.013	0.10	0.05
A2	1.00	1.30	1.10
A3	0.70	0.80	0.75
b	0.35	0.50	0.38
c	0.10	0.20	0.15
D	2.90	3.10	3.00
e	-	-	0.95
e1	-	-	1.90
E	2.70	3.00	2.80
E1	1.50	1.70	1.60
L	0.35	0.55	0.40
a	-	-	8°
a1	-	-	7°
All Dimensions in mm			

**Suggested Pad Layout**

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
C	2.40
C1	0.95
G	1.60
X	0.55
Y	0.80
Y1	3.20

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