

35V NPN SURFACE MOUNT TRANSISTOR

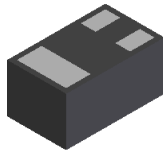
Features

- Ultra-Small Leadless Surface Mount Package
- ESD: HBM 8kV, MM 400V
- 3.0A Maximum Peak Collector Current
- **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**

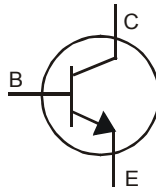
Mechanical Data

- Case: X1-DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.0009 grams (Approximate)

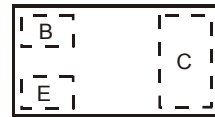
X1-DFN1006-3



Bottom View



Device Symbol



Top View
Device Schematic

Ordering Information (Note 4)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN3035CLP-7B	4S	7	8	10,000

- 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. For packaging details, go to our website at <http://www.diodes.com>.

Marking Information



Top View

4S = Product Type Marking Code
Bar Denotes Base and Emitter Side

Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	35	V
Collector-Emitter Voltage	V_{CEO}	35	V
Emitter-Base Voltage	V_{EBO}	7	V
Emitter-Collector Voltage	V_{ECO}	6	V
Collector Current - Continuous	I_C	500	mA
Peak Pulse Collector Current (Note 5)	I_{CM}	3.0	A
Peak Pulse Base Current (Note 5)	I_{BM}	1.0	A
Emitter-Base Repetitive Avalanche Energy (Note 6)	$E_{EB(AR)}$	50	μJ

Thermal Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 7)	P_D	460	mW
Power Dissipation (Note 8)	P_D	1	W
Thermal Resistance, Junction to Ambient (Note 7)	$R_{\theta JA}$	272	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient (Note 8)	$R_{\theta JA}$	120	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Lead (Note 9)	$R_{\theta JL}$	110	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

- Notes:
5. Under pulsed conditions with $> 1\text{s}$ between pulses. Pulse width $< 10\mu\text{s}$. Duty cycle $\leq 0.001\%$.
 6. Same as note 5, with no measurable degradation in high-current gain at 2.5A after 100×10^3 cycles of $< 50\mu\text{J}$ of energy per pulse. Low-current gain will be degraded.
 7. For a device surface mounted on minimum recommended pad layout FR-4 PCB with single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition. The entire exposed collector pad is attached to the heatsink.
 8. Same as note 7, except device is surface mounted on 25mm X 25mm collector pad heatsink with 1oz copper.
 9. Thermal resistance from junction to solder-point (at the end of the collector lead).

Thermal Characteristics

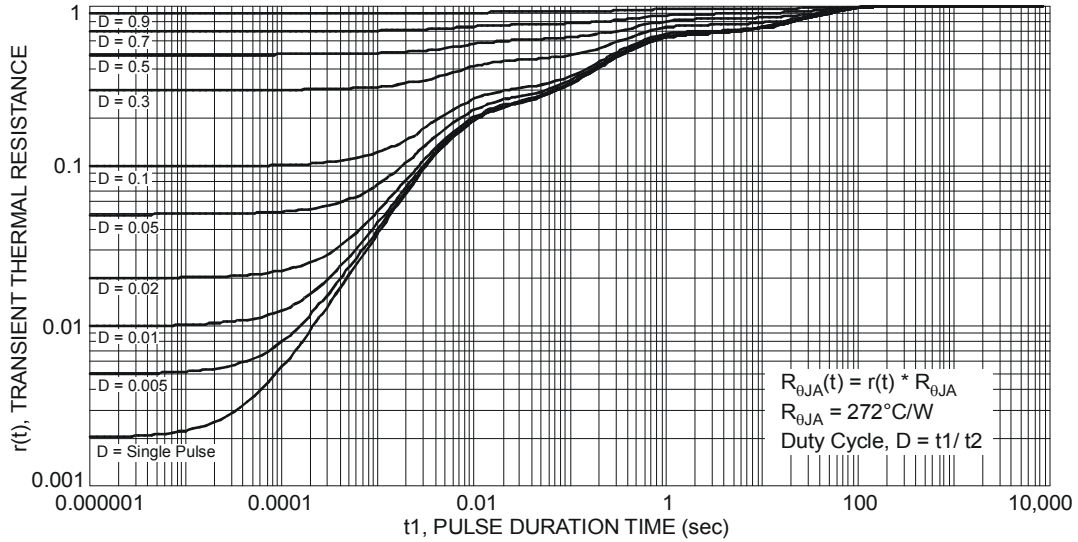


Fig. 1 Transient Thermal Resistance

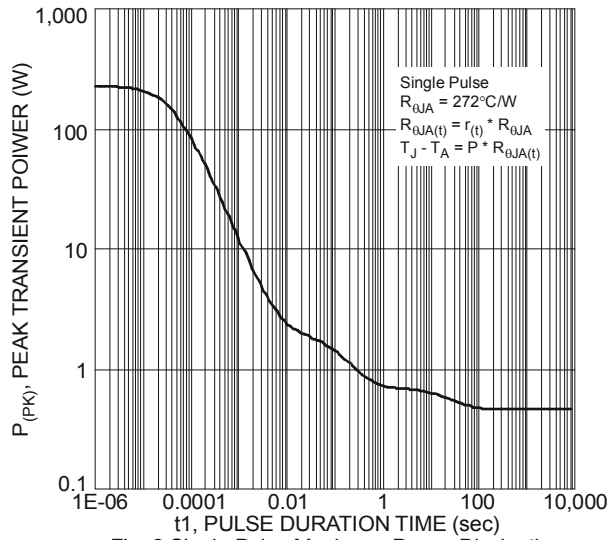


Fig. 2 Single Pulse Maximum Power Dissipation

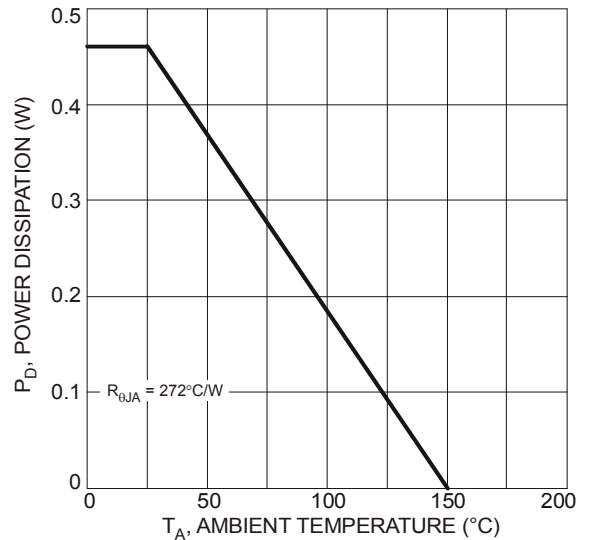


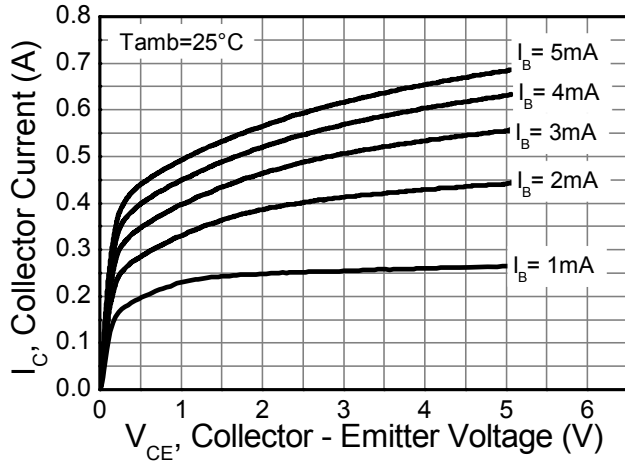
Fig. 3 Power Dissipation vs. Ambient Temperature

Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

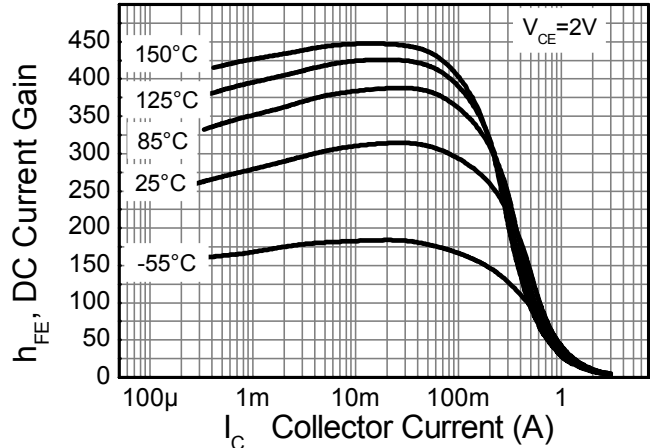
Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS					
Collector-Base Breakdown Voltage	BV_{CBO}	35	—	V	$I_C = 100\mu\text{A}, I_E = 0$
Collector-Emitter Breakdown Voltage (Note 8)	BV_{CEO}	35	—	V	$I_C = 10\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	BV_{EBO}	7	—	V	$I_E = 100\mu\text{A}, I_C = 0$
Emitter-Collector Breakdown Voltage	BV_{ECO}	6	—	V	$I_E = 100\mu\text{A}, I_B = 0$
Collector Cutoff Current	I_{CBO}	—	100 50	nA μA	$V_{CB} = 30\text{V}, I_E = 0$ $V_{CB} = 30\text{V}, I_E = 0, T_A = 150^\circ\text{C}$
Emitter Cutoff Current	I_{EBO}	—	100	nA	$V_{EB} = 5\text{V}, I_C = 0$
ON CHARACTERISTICS (Note 8)					
DC Current Gain	h_{FE}	150 150 50 3	— — — —	—	$V_{CE} = 2\text{V}, I_C = 10\text{mA}$ $V_{CE} = 2\text{V}, I_C = 100\text{mA}$ $V_{CE} = 2\text{V}, I_C = 500\text{mA}$ $V_{CE} = 5\text{V}, I_C = 2.5\text{A}$ (Note 9)
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	500	mV	$I_C = 500\text{mA}, I_B = 50\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	—	1.5	V	$I_C = 500\text{mA}, I_B = 50\text{mA}$
Base-Emitter Turn On Voltage	$V_{BE(on)}$	—	1.1	V	$V_{CE} = 2\text{V}, I_C = 100\text{mA}$
SMALL SIGNAL CHARACTERISTICS					
Output Capacitance	C_{obo}	—	6	pF	$V_{CB} = 10\text{V}, f = 1.0\text{MHz}$
Current Gain-Bandwidth Product	f_T	250	—	MHz	$V_{CE} = 5\text{V}, I_C = 100\text{mA}, f = 100\text{MHz}$

Notes: 8. Measured under pulsed conditions. Pulse width = 300 μs . Duty cycle $\leq 2\%$.
9. Measured under pulsed conditions. Pulse width = 50 μs . Duty cycle $\leq 0.005\%$.

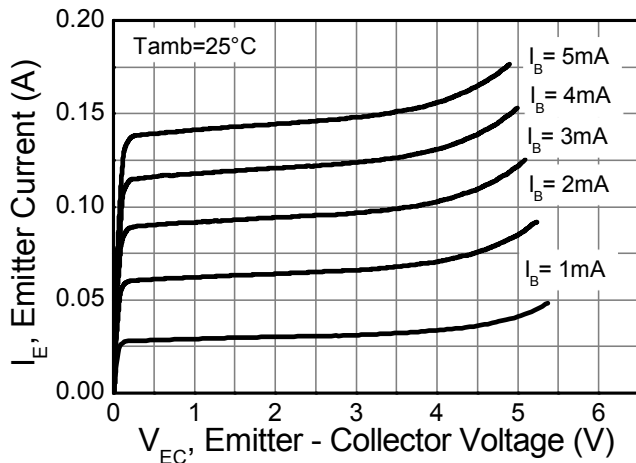
Typical Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified



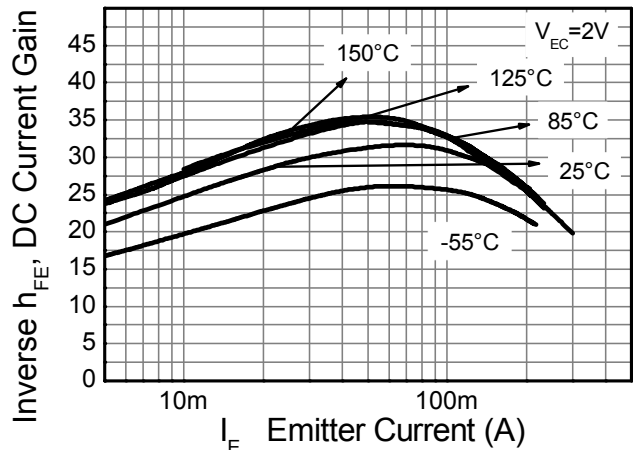
$I_C \text{ v } V_{CE}$



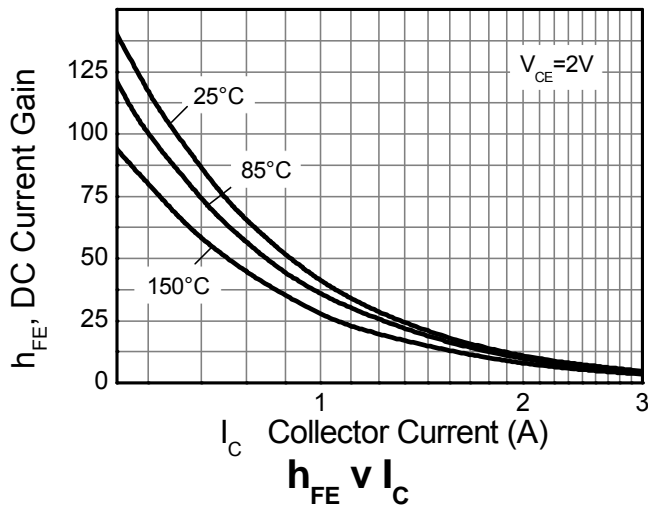
$h_{FE} \text{ v } I_C$



$I_E \text{ v } V_{EC}$

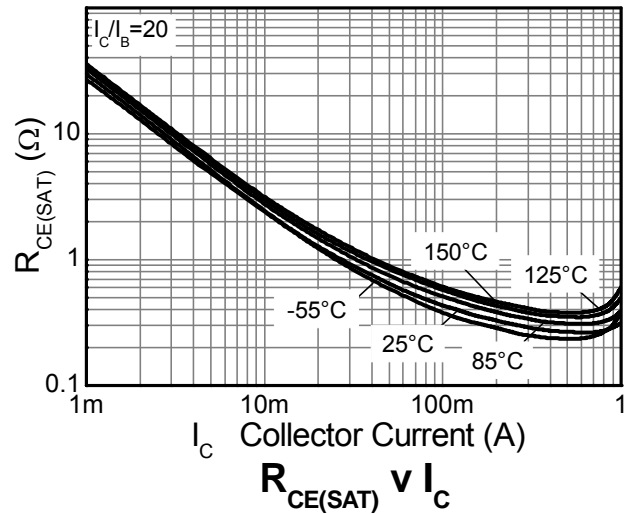
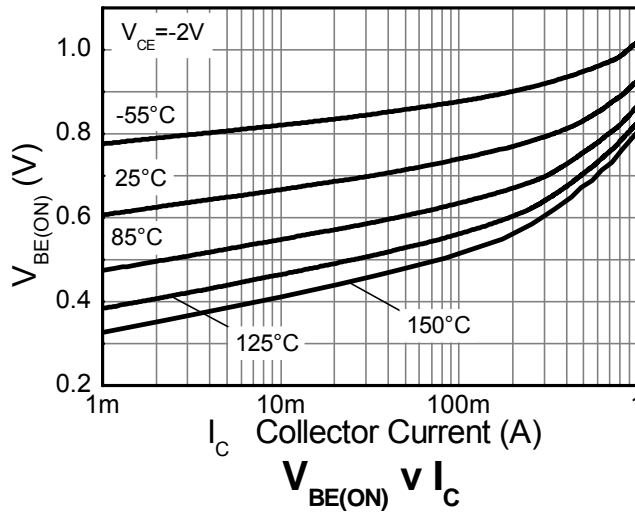
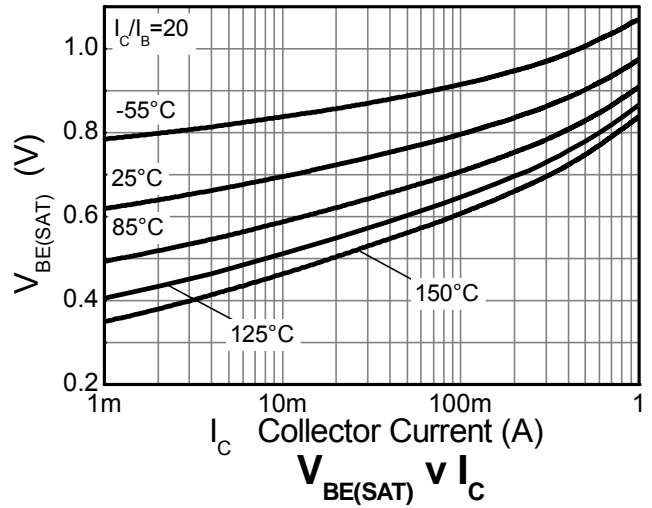
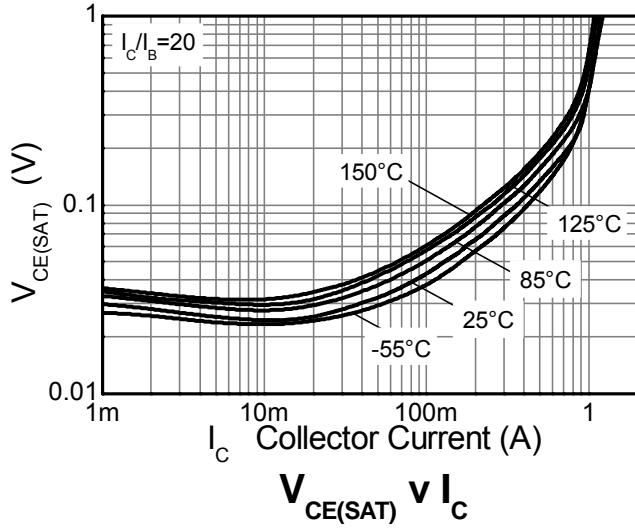


Inverse $h_{FE} \text{ v } I_E$

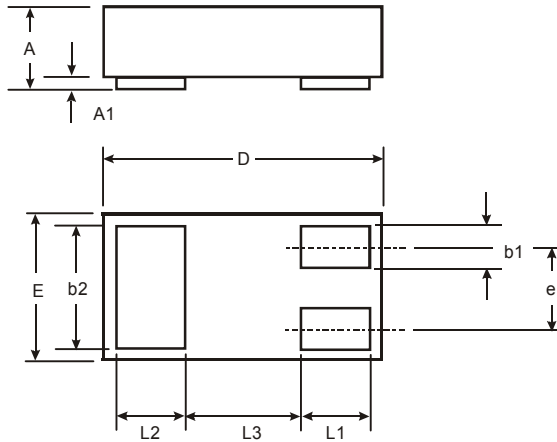


$h_{FE} \text{ v } I_C$

Typical Electrical Characteristics - Continued

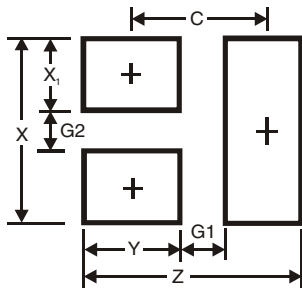


Package Outline Dimensions



X1-DFN1006-3			
Dim	Min	Max	Typ
A	0.47	0.53	0.50
A1	0	0.05	0.03
b1	0.10	0.20	0.15
b2	0.45	0.55	0.50
D	0.95	1.075	1.00
E	0.55	0.675	0.60
e	—	—	0.35
L1	0.20	0.30	0.25
L2	0.20	0.30	0.25
L3	—	—	0.40
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
Z	1.1
G1	0.3
G2	0.2
X	0.7
X1	0.25
Y	0.4
C	0.7

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