

Features

- $BV_{CEO} = -12V$
- $I_C = -3A$ Continuous Current
- $I_{CM} = -20A$ Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)} < -50mV$ @ $-0.1A$
- $R_{sat} = 53m\Omega$ for a Low Equivalent On-Resistance
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](#) or your local Diodes representative.**

<https://www.diodes.com/quality/product-definitions/>

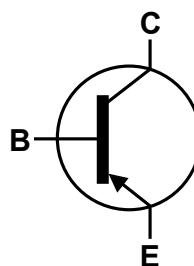
Mechanical Data

- Case: SOT89
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability 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: 0.05 grams (Approximate)

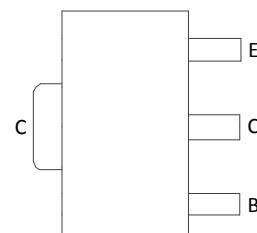
SOT89



Top View



Device Symbol



Top View
Pin Out

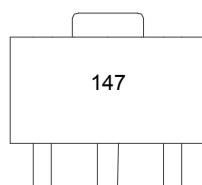
Ordering Information (Note 4)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
FCX1147ATA	Standard	147	7	12	1,000

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



147 = Product Type Marking Code

Absolute Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

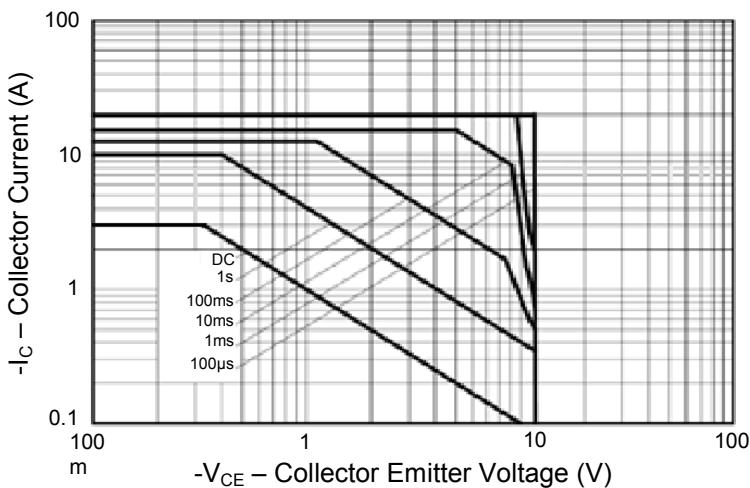
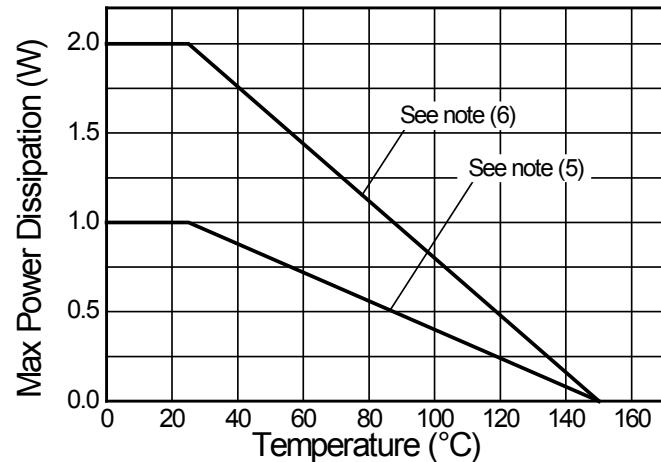
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-15	V
Collector-Emitter Voltage	V_{CEO}	-12	V
Emitter-Base Voltage	V_{EBO}	-5	V
Continuous Collector Current	I_C	-3	A
Peak Pulse Collector Current (single pulse)	I_{CM}	-20	A
Base Current	I_B	-500	mA

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	1	W
Power Dissipation (Note 6)	P_D	2	W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Notes:

- 5. For a device surface mounted on 15mm x 15mm x 0.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; device measured when operating in steady state condition.
- 6. Same as note (5), except the device is mounted on 40mm x 40mm x 0.6mm single sided 1oz weight copper.

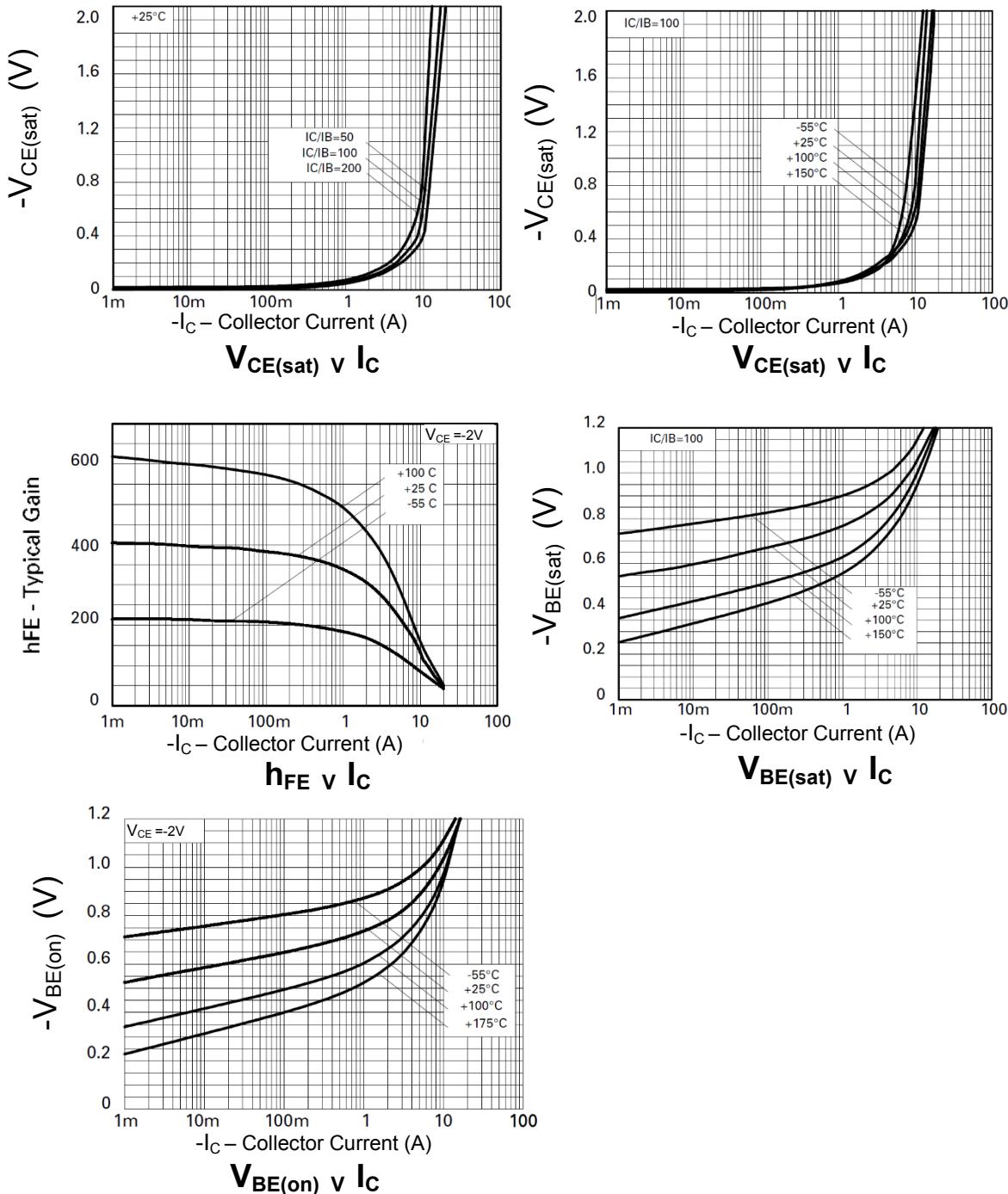
Thermal Characteristics and Derating

Safe Operating Area

Derating Curve

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-15	—	—	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage	BV_{CES}	-12	—	—	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 7)	BV_{CEO}	-12	—	—	V	$I_C = -10\text{mA}$
Collector-Emitter Breakdown Voltage	BV_{CEV}	-12	—	—	V	$I_C = -100\mu\text{A}, V_{\text{BE}} = +1\text{V}$
Emitter-Base Breakdown Voltage	BV_{EBO}	-5	—	—	V	$I_E = -100\mu\text{A}$
Collector Cut-Off Current	I_{CBO}	—	-0.3	-10	nA	$V_{\text{CB}} = -12\text{V}$
Emitter Cut-Off Current	I_{EBO}	—	-0.3	-10	nA	$V_{\text{EB}} = -4\text{V}$
Collector Emitter Cut-Off Current	I_{CES}	—	-0.3	-10	nA	$V_{\text{CES}} = -10\text{V}$
Collector-Emitter Saturation Voltage (Note 7)	$V_{\text{CE}(\text{sat})}$	—	-25	-50	mV	$I_C = -0.1\text{A}, I_B = -1\text{mA}$
			-70	-110		$I_C = -0.5\text{A}, I_B = -2.5\text{mA}$
			-90	-130		$I_C = -1\text{A}, I_B = -6\text{mA}$
			-115	-170		$I_C = -2\text{A}, I_B = -20\text{mA}$
			-160	-250		$I_C = -3\text{A}, I_B = -30\text{mA}$
			-250	-400		$I_C = -5\text{A}, I_B = -50\text{mA}$
			—	—		—
Base-Emitter Saturation Voltage (Note 7)	$V_{\text{BE}(\text{sat})}$	—	-820	-1000	mV	$I_C = -3\text{A}, I_B = -30\text{mA}$
Base-Emitter Turn-On Voltage (Note 7)	$V_{\text{BE}(\text{on})}$	—	-770	-950	mV	$I_C = -3\text{A}, V_{\text{CE}} = -2\text{V}$
DC Current Gain (Note 7)	h_{FE}	—	270	450	—	$I_C = -10\text{mA}, V_{\text{CE}} = -2\text{V}$
			250	400		$I_C = -0.5\text{A}, V_{\text{CE}} = -2\text{V}$
			200	340		$I_C = -2\text{A}, V_{\text{CE}} = -2\text{V}$
			200	300		$I_C = -3\text{A}, V_{\text{CE}} = -2\text{V}$
			150	245		$I_C = -5\text{A}, V_{\text{CE}} = -2\text{V}$
			90	145		$I_C = -10\text{A}, V_{\text{CE}} = -2\text{V}$
			—	50		$I_C = -20\text{A}, V_{\text{CE}} = -2\text{V}$
Transitional frequency	f_T	—	115	—	MHz	$I_C = -50\text{mA}, V_{\text{CE}} = -10\text{V}$ $f = 50\text{MHz}$
Output Capacitance	C_{obo}	—	80	—	pF	$V_{\text{CB}} = -10\text{V}, f = 1\text{MHz}$
Switching Time	t_{on}	—	150	—	ns	$I_C = -4\text{A}, V_{\text{CC}} = -10\text{V},$ $I_{B1} = -I_{B2} = -40\text{mA}$
	t_{off}		220			

 Notes: 7. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

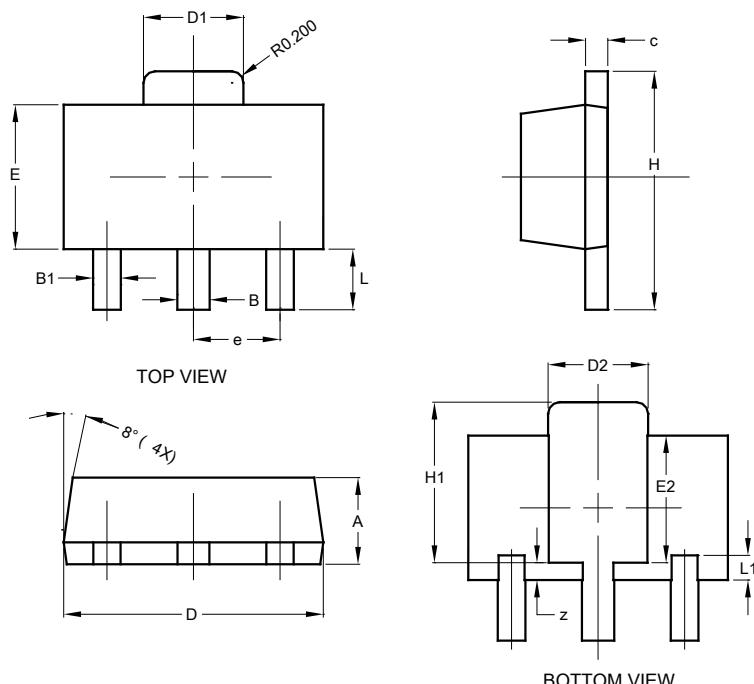
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Package Outline Dimensions

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

SOT89



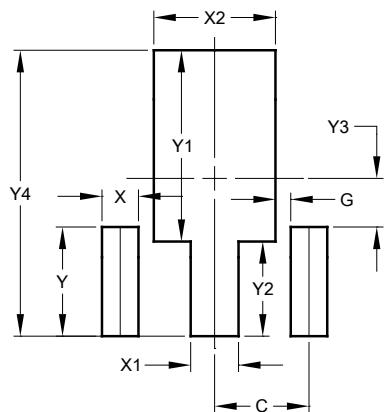
SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30

All Dimensions in mm

Suggested Pad Layout

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

SOT89



Dimensions	Value (in mm)
C	1.500
G	0.244
X	0.580
X1	0.760
X2	1.933
Y	1.730
Y1	3.030
Y2	1.500
Y3	0.770
Y4	4.530

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