

NPN PRE-BIASED SMALL SIGNAL DUAL SURFACE MOUNT TRANSISTOR
Features

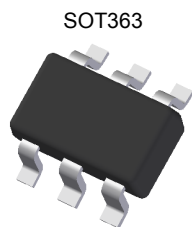
- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDA)
- Built-In Biasing Resistors
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

Part Number	R1 (NOM)	R2 (NOM)
DDC124EU	22K Ω	22K Ω
DDC144EU	47K Ω	47K Ω
DDC114YU	10K Ω	47K Ω
DDC123JU	2.2K Ω	47K Ω
DDC114EU	10K Ω	10K Ω

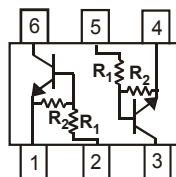
Mechanical Data

- Case: SOT363
- 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: 0.006 grams (approximate)

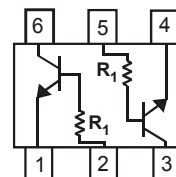
Part Number	R1 Only
DDC113TU	1K Ω
DDC143TU	4.7K Ω
DDC114TU	10K Ω



Top View



R1, R2



R1 Only

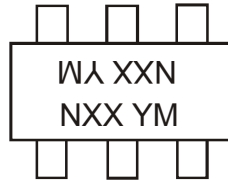
Device Schematic

Ordering Information (Notes 3 & 4)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DDC124EU-7-F	AEC-Q101	N17	7	8	3,000
DDC124EUQ-7-F	Automotive	N17	7	8	3,000
DDC144EU-7-F	AEC-Q101	N20	7	8	3,000
DDC114YU-7-F	AEC-Q101	N14	7	8	3,000
DDC114YUQ-7-F	Automotive	N14	7	8	3,000
DDC114YUQ-13-F	Automotive	N14	13	8	10,000
DDC123JU-7-F	AEC-Q101	N06	7	8	3,000
DDC114EU-7-F	AEC-Q101	N13	7	8	3,000
DDC114EUQ-7-F	Automotive	N13	7	8	3,000
DDC114EUQ-13-F	Automotive	N13	13	8	10,000
DDC113TU-7-F	AEC-Q101	N01	7	8	3,000
DDC143TU-7-F	AEC-Q101	N07	7	8	3,000
DDC114TU-7-F	AEC-Q101	N12	7	8	3,000
DDC114TUQ-7-F	Automotive	N12	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 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. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_compliance_definitions/.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



NXX = Product Type Marking Code
See Page 1 Diagrams
YM = Date Code Marking
Y = Year (ex: T = 2006)
M = Month (ex: 9 = September)

Date Code Key

Year	2010	2011	2012	2013	2014	2015	2016	2017
Code	X	Y	Z	A	B	C	D	E

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_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Supply Voltage	V _{CC}	50	V
Input Voltage	V _{IN}	-10 to +40 -10 to +40 -6 to +40 -5 to +12 -10 to +40 -5V max -5V max -5V max	V
Output Current	I _{C(MAX)}	100	mA

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Notes 6 & 7)	P _D	200	mW
Thermal Resistance, Junction to Ambient Air (Note 6)	R _{θJA}	625	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

Notes: 6. Mounted on FR4 PC Board with minimum recommended pad layout
7. 150mW per element must not be exceeded.

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

For R1 only devices: DDC113TU & DDC143TU & DDC114TU

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	50	—	—	V	I _C = 50μA
Collector-Emitter Breakdown Voltage	BV _{CEO}	50	—	—	V	I _C = 1mA
Emitter-Base Breakdown Voltage	BV _{EBO}	5	—	—	V	I _E = 50μA
Collector Cutoff Current	I _{CBO}	—	—	0.5	μA	V _{CB} = 50V
Emitter Cutoff Current	I _{EBO}	—	—	0.5	μA	V _{EB} = 4V
Collector-Emitter Saturation Voltage	V _{CE(sat)}	—	—	0.3	V	I _C /I _B = 2.5mA / 0.25mA DDC143TU I _C /I _B = 1mA / 0.1mA DDC114TU I _C /I _B = 10mA / 1mA DDC113TU
DC Current Transfer Ratio	h _{FE}	100	250	600	—	I _C = 1mA, V _{CE} = 5V
Input Resistor (R ₁) Tolerance	ΔR ₁	-30	—	+30	%	—
Gain-Bandwidth Product (Note 7)	f _T	—	250	—	MHz	V _{CE} = 10V, I _E = -5mA, f = 100MHz

For R1, R2 devices: DDC124EU & DDC144EU & DDC114YU & DDC123JU & DDC114EU

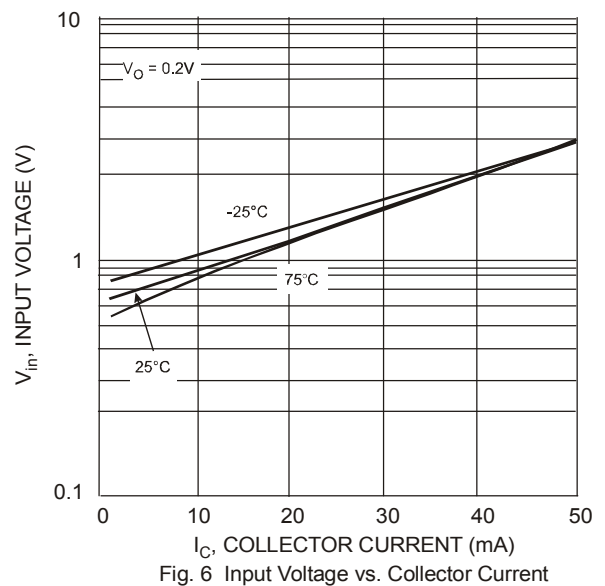
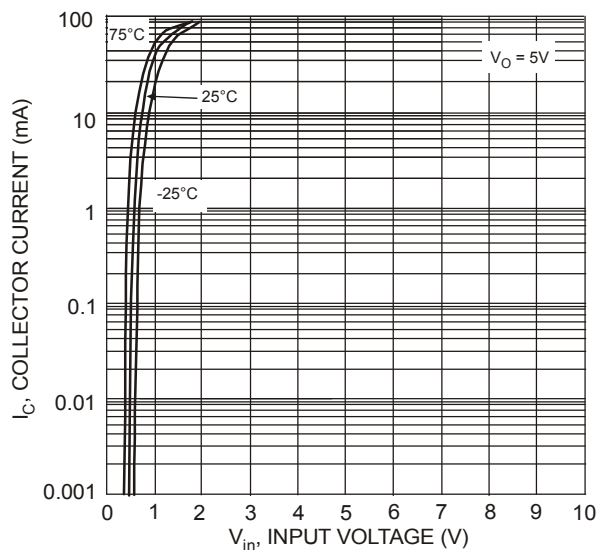
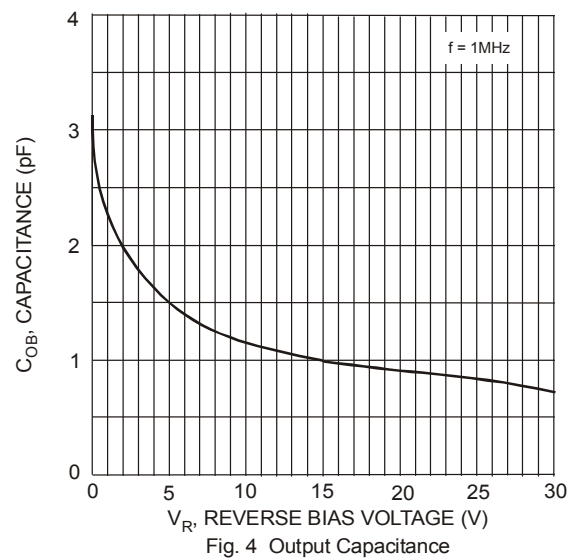
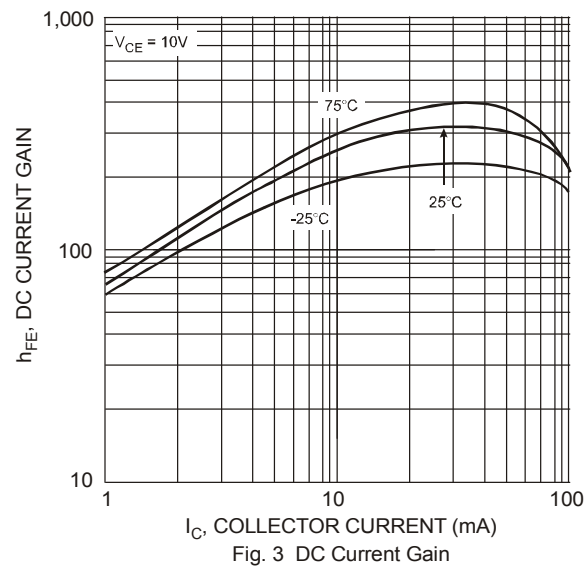
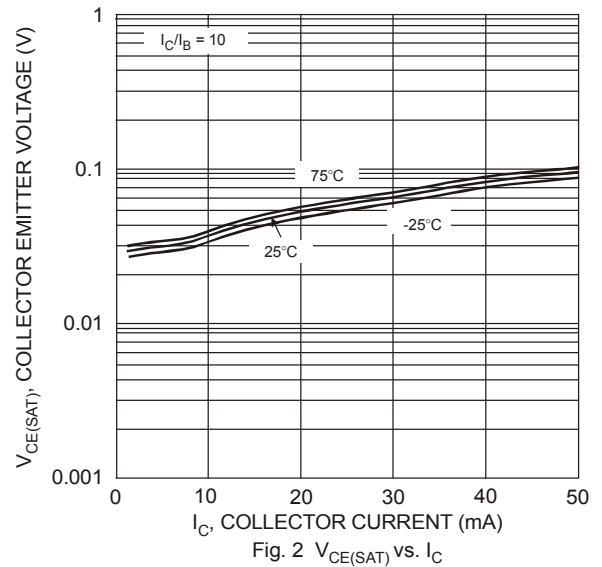
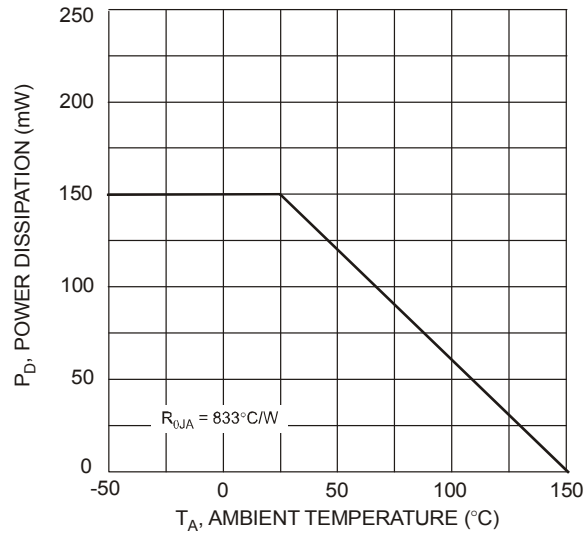
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	DDC124EU	0.5	1.1	—	V	V _{CC} = 5V, I _O = 100μA
	DDC144EU	0.5	1.1	—		
	DDC114YU	0.3	—	—		
	DDC123JU	0.5	—	—		
	DDC114EU	0.5	1.1	—		
	DDC124EU	—	1.9	3.0		V _O = 0.3, I _O = 5mA
Output Voltage	DDC144EU	—	1.9	3.0	V	V _O = 0.3, I _O = 2mA
	DDC114YU	—	—	1.4		V _O = 0.3, I _O = 1mA
	DDC123JU	—	—	1.1		V _O = 0.3, I _O = 5mA
	DDC114EU	—	1.9	3.0		V _O = 0.3, I _O = 10mA
	DDC124EU	—	0.1	0.3		I _O /I _I = 10mA / 0.5mA
	DDC144EU	—	0.1	0.3		I _O /I _I = 10mA / 0.5mA
Input Current	DDC114YU	—	—	0.36	mA	V _I = 5V
	DDC123JU	—	—	0.18		
	DDC114EU	—	—	0.88		
	DDC124EU	—	—	0.88		
	DDC144EU	—	—	3.6		
	DDC114EU	—	—	0.88		
Output Current	I _{O(off)}	—	—	0.5	μA	V _{CC} = 50V, V _I = 0V
DC Current Gain	DDC124EU	56	—	—	—	V _O = 5V, I _O = 5mA
	DDC144EU	68	—	—		V _O = 5V, I _O = 5mA
	DDC114YU	68	—	—		V _O = 5V, I _O = 10mA
	DDC114YUQ	80	—	—		V _O = 5V, I _O = 5mA
	DDC123JU	80	—	—		V _O = 5V, I _O = 10mA
	DDC114EU	30	—	—		V _O = 5V, I _O = 5mA
Input Resistor (R ₁) Tolerance	ΔR ₁	-30	—	+30	%	—
Resistance Ratio Tolerance	R ₂ /R ₁	-20	—	+20	%	—
Gain-Bandwidth Product (Note 7)	f _T	—	250	—	MHz	V _{CE} = 10V, I _E = 5mA, f = 100MHz

Note: 7. Transistor - For Reference Only

Typical Curves – DDC123JU

One Section

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



Typical Curves – DDC114YU One Section (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

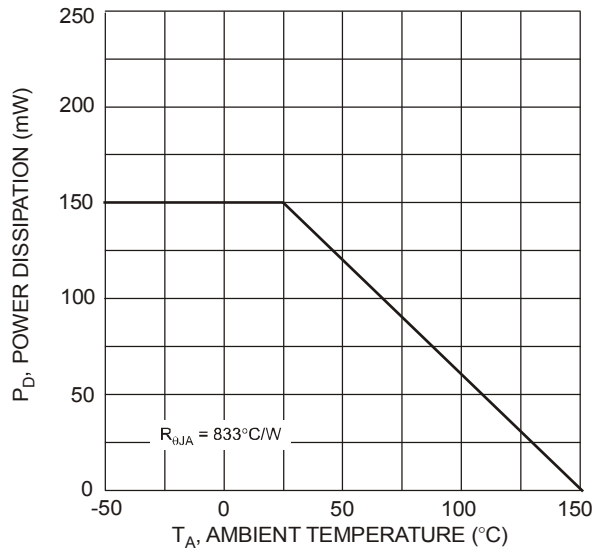


Fig. 1 Derating Curve

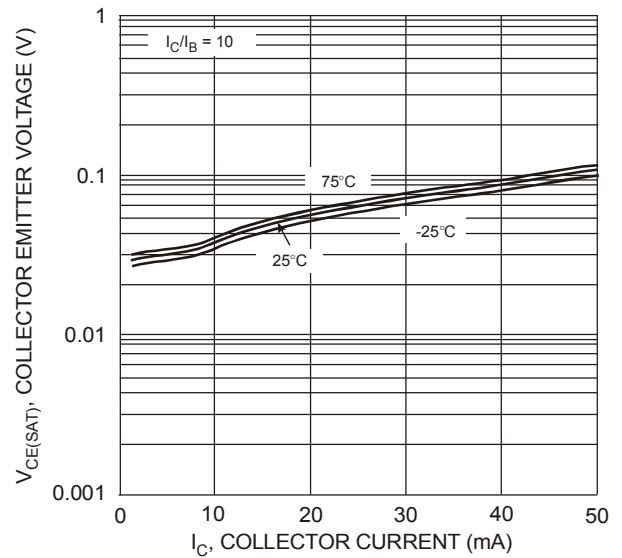


Fig. 2 $V_{CE(SAT)}$ vs. I_C

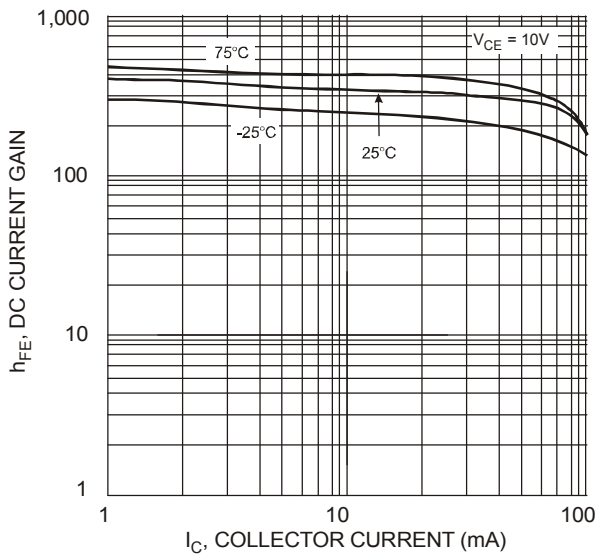


Fig. 3 DC Current Gain

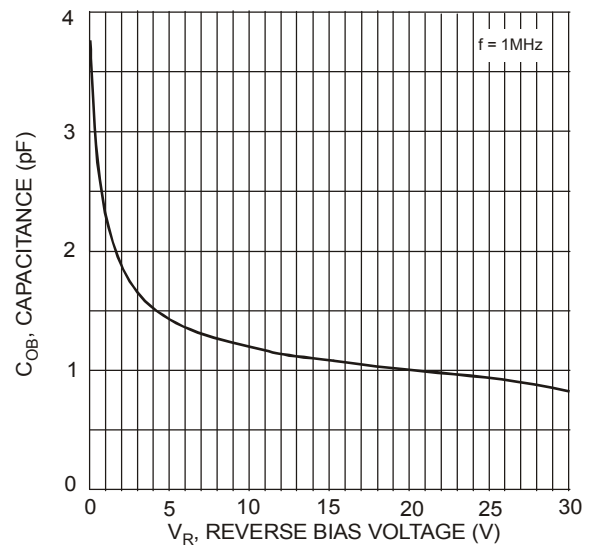


Fig. 4 Output Capacitance

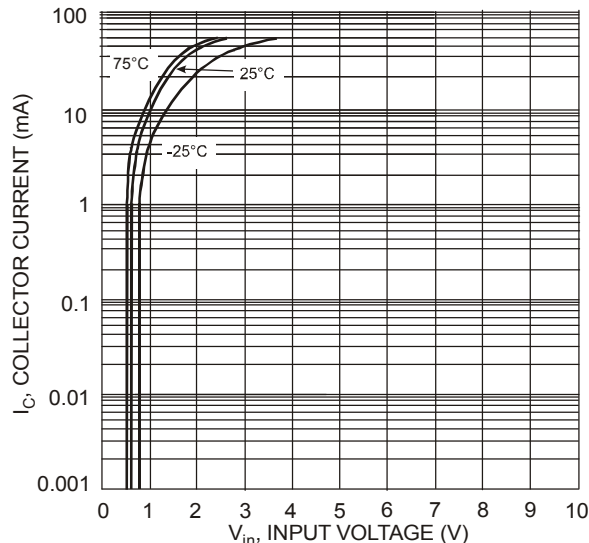


Fig. 5 Collector Current vs. Input Voltage

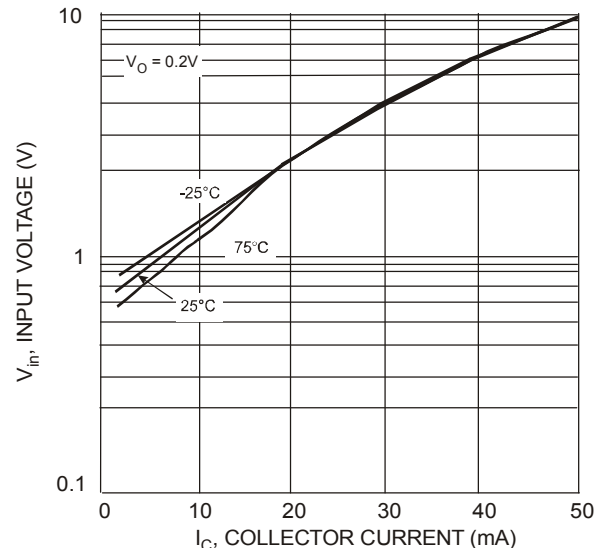


Fig. 6 Input Voltage vs. Collector Current

Typical Curves – DDC124EU One Section (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

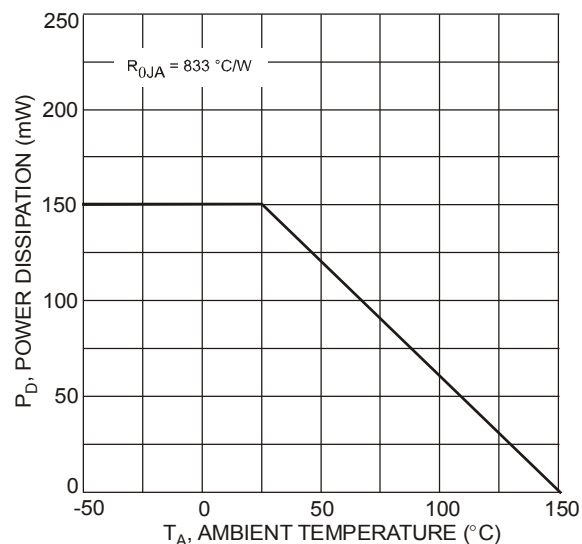


Fig. 1 Power Dissipation vs. Ambient Temperature

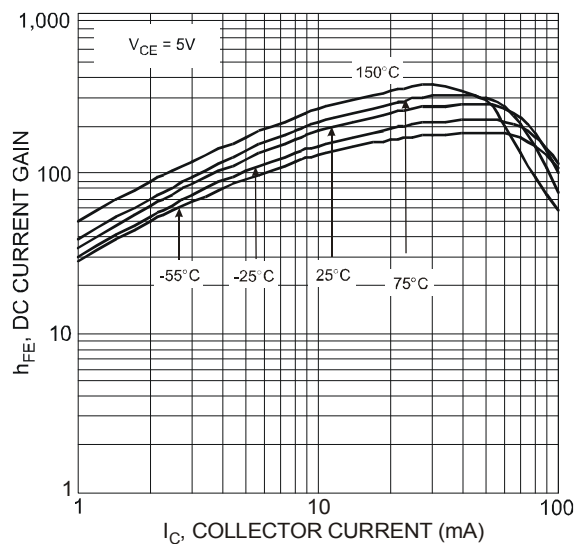


Fig. 2 Typical DC Current Gain vs. Collector Current

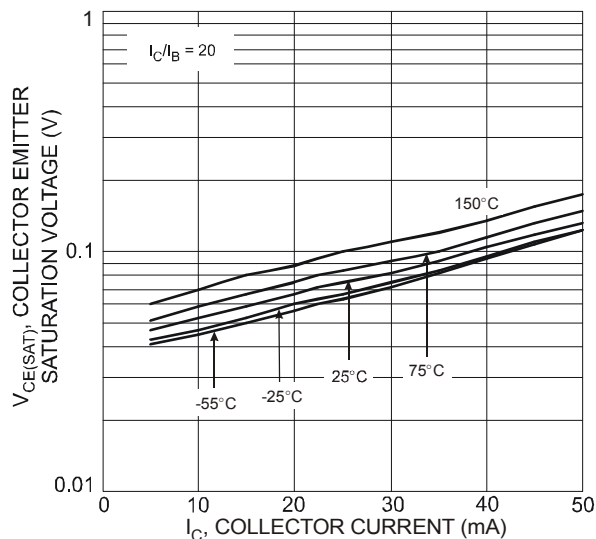


Fig. 3 Collector Emitter Saturation Voltage vs. Collector Current

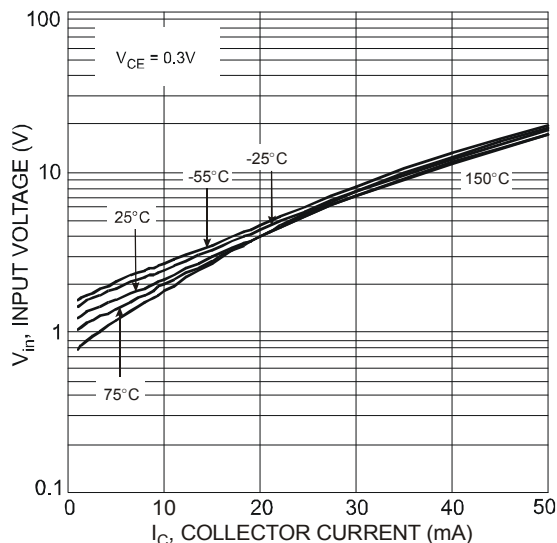
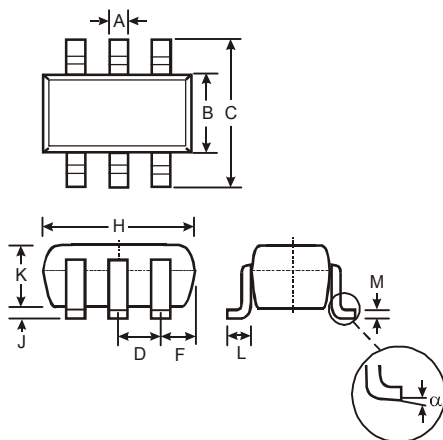


Fig. 4 Input Voltage vs. Collector Current

Package Outline Dimensions

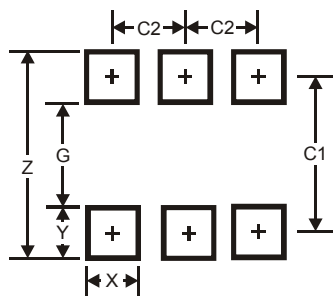
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT363			
Dim	Min	Max	Typ
A	0.10	0.30	0.25
B	1.15	1.35	1.30
C	2.00	2.20	2.10
D	0.65 Typ		
F	0.40	0.45	0.425
H	1.80	2.20	2.15
J	0	0.10	0.05
K	0.90	1.00	1.00
L	0.25	0.40	0.30
M	0.10	0.22	0.11
α	0°	8°	-
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)
Z	2.5
G	1.3
X	0.42
Y	0.6
C1	1.9
C2	0.65

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2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

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