

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)**

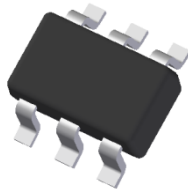
Part Number	R1 (NOM)	R2 (NOM)
DDC124EU	22kΩ	22kΩ
DDC144EU	47kΩ	47kΩ
DDC114YU	10kΩ	47kΩ
DDC123JU	2.2kΩ	47kΩ
DDC114EU	10kΩ	10kΩ
DDC143ZU	4.7kΩ	47kΩ
DDC115EU	100kΩ	100kΩ

Mechanical Data

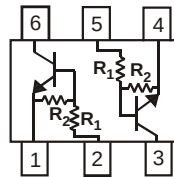
- Case: SOT363
- Case Material: Molded Plastic, "Green" Molding Compound.
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per
MIL-STD-202, Method 208 
- Weight: 0.006 grams (Approximate)

Part Number	R1 Only
DDC113TU	1kΩ
DDC143TU	4.7kΩ
DDC114TU	10kΩ

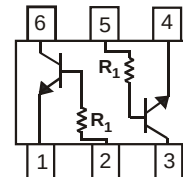
SOT363



Top View



R1, R2



R1 Only

Device Schematic

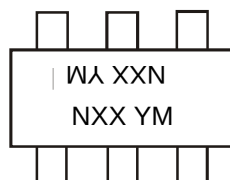
Ordering Information (Notes 4, 5 & 6)

Product	Status	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
DDC124EU-7-F	Active	AEC-Q101	N17	7	8	3,000
DDC124EUQ-7-F	NRND (Use ADC124EUQ)	Automotive	N17	7	8	3,000
DDC144EU-7-F	Active	AEC-Q101	N20	7	8	3,000
DDC114YU-7-F	Active	AEC-Q101	N14	7	8	3,000
DDC114YUQ-7-F	NRND (Use ADC114YUQ)	Automotive	N14	7	8	3,000
DDC114YUQ-13-F	NRND (Use ADC114YUQ)	Automotive	N14	13	8	10,000
DDC123JU-7-F	Active	AEC-Q101	N06	7	8	3,000
DDC114EU-7-F	Active	AEC-Q101	N13	7	8	3,000
DDC114EUQ-7-F	NRND (Use ADC114EUQ)	Automotive	N13	7	8	3,000
DDC114EUQ-13-F	NRND (Use ADC114EUQ)	Automotive	N13	13	8	10,000
DDC113TU-7-F	Active	AEC-Q101	N01	7	8	3,000
DDC143TU-7-F	Active	AEC-Q101	N07	7	8	3,000
DDC114TU-7-F	Active	AEC-Q101	N12	7	8	3,000
DDC114TUQ-7-F	Active	Automotive	N12	7	8	3,000
DDC143ZU-7-F	Active	AEC-Q101	N03	7	8	3,000
DDC115EU-7-F	Active	AEC-Q101	N02	7	8	3,000

- 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. 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/>.
 5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.
 6. NRND = Not Recommended for New Design.

Marking Information

SOT363



NXX = Product Type Marking Code (See Ordering Information)
 YM = Date Code Marking
 Y = Year (ex: F = 2018)
 M = Month (ex: 9 = September)

Date Code Key

Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Code	F	G	H	I	J	K	L	M	N	O	P

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, <Pin: (6) to (1) and (3) to (4)>	V _{CC}	50	V
Input Voltage, <Pin: (2) to (1) and (5) to (4)>	V _{IN}	-10 to +40 -10 to +40 -6 to +40 -5 to +12 -10 to +40 -5V max -5V max -5V max -5 to +30 -10 to +40	V
Output Current	I _O	30 30 70 100 100 50 100 100 100 100 20	mA
Output Current	I _{C(MAX)}	100	mA

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Notes 7 & 8)	P _D	200	mW
Thermal Resistance, Junction to Ambient Air (Note 7)	R _{θJA}	625	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

Notes: 7. Mounted on FR-4 PC Board with minimum recommended pad layout.
 8. 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 9)	f _T	—	250	—	MHz	V _{CE} = 10V, I _E = -5mA, f = 100MHz

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

For R1, R2 Devices: DDC124EU & DDC144EU & DDC114YU & DDC123JU & DDC114EU & DDC143ZU & DDC115EU

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	DDC124EU DDC144EU DDC114YU DDC123JU DDC114EU DDC143ZU DDC115EU	0.5 0.5 0.3 0.5 0.5 0.5 0.5	1.1 1.1 — — 1.1 — —	—	V	V _{CC} = 5V, I _O = 100μA
	DDC124EU DDC144EU DDC114YU DDC123JU DDC114EU DDC143ZU DDC115EU	— — — — — — —	1.9 1.9 — 1.1 1.9 — —	3.0 3.0 1.4 1.1 3.0 1.3 3		V _O = 0.3V, I _O = 5mA V _O = 0.3V, I _O = 2mA V _O = 0.3V, I _O = 1mA V _O = 0.3V, I _O = 5mA V _O = 0.3V, I _O = 10mA V _O = 0.3V, I _O = 5mA V _O = 0.3V, I _O = 1mA
Output Voltage	DDC124EU DDC144EU DDC114YU DDC123JU DDC114EU DDC143ZU DDC115EU	—	0.1	0.3	V	I _O /I _L = 10mA / 0.5mA I _O /I _L = 10mA / 0.5mA I _O /I _L = 5mA / 0.25mA I _O /I _L = 5mA / 0.25mA I _O /I _L = 10mA / 0.5mA I _O /I _L = 5mA / 0.25mA I _O /I _L = 10mA / 0.5mA
Input Current	DDC124EU DDC144EU DDC114YU DDC123JU DDC114EU DDC143ZU DDC115EU	—	—	0.36 0.18 0.88 3.6 0.88 1.8 0.15	mA	V _I = 5V
Output Current	I _{O(OFF)}	—	—	0.5	μA	V _{CC} = 50V, V _I = 0V
DC Current Gain	DDC124EU DDC144EU DDC114YU DDC114YUQ DDC123JU DDC114EU DDC143ZU DDC115EU	56 68 68 80 80 30 80 82	—	—	—	V _O = 5V, I _O = 5mA V _O = 5V, I _O = 5mA V _O = 5V, I _O = 10mA V _O = 5V, I _O = 5mA V _O = 5V, I _O = 10mA V _O = 5V, I _O = 5mA V _O = 5V, I _O = 10mA V _O = 5V, I _O = 5mA
Input Resistor (R ₁) Tolerance	ΔR ₁	-30	—	+30	%	—
Resistance Ratio Tolerance	Δ(R ₂ /R ₁)	-20	—	+20	%	—
Gain-Bandwidth Product (Note 9)	f _T	—	250	—	MHz	V _{CE} = 10V, I _E = 5mA, f = 100MHz

Note: 9. Transistor - For Reference Only.

Typical Curves – DDC123JU (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

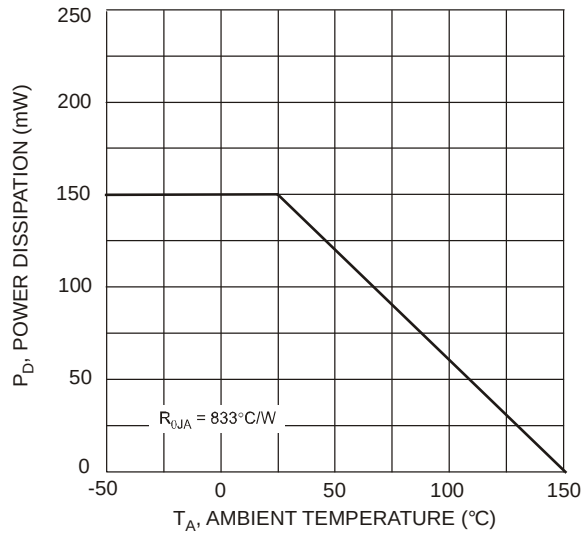


Fig. 1 Derating Curve

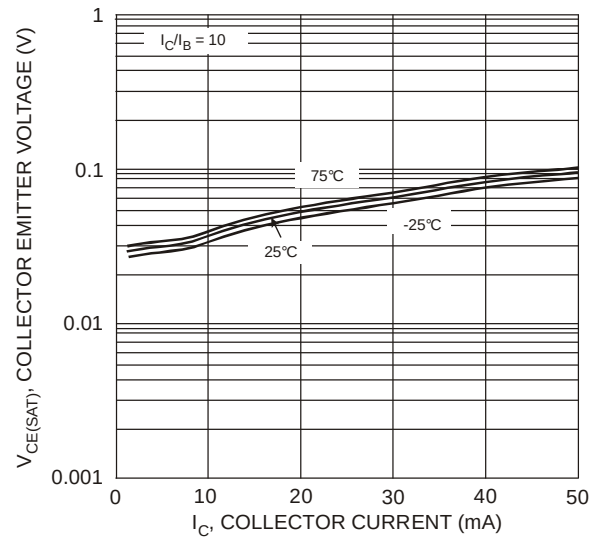


Fig. 2 $V_{CE(SAT)}$ vs. I_C

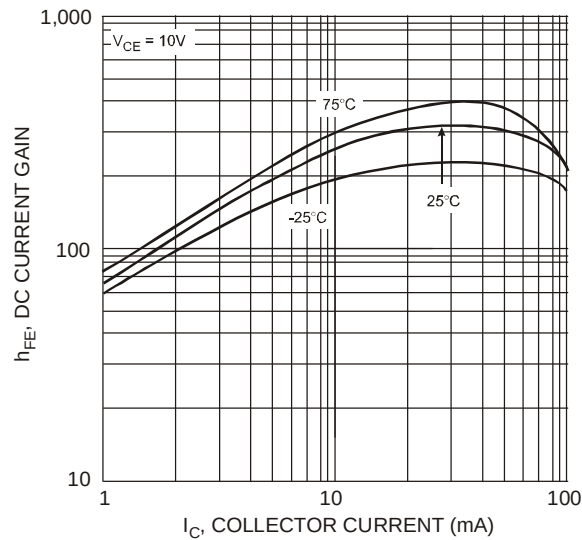


Fig. 3 DC Current Gain

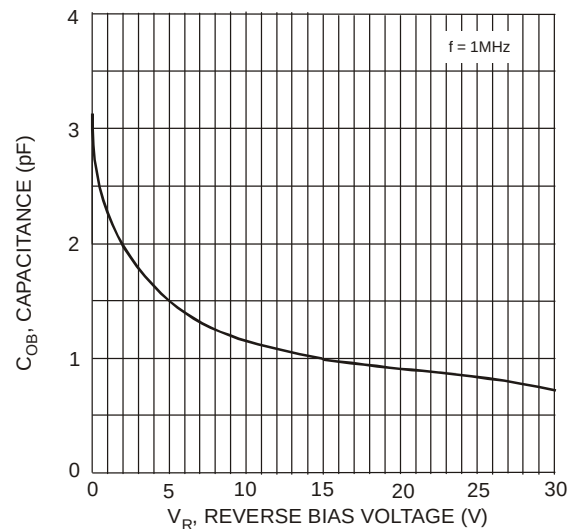


Fig. 4 Output Capacitance

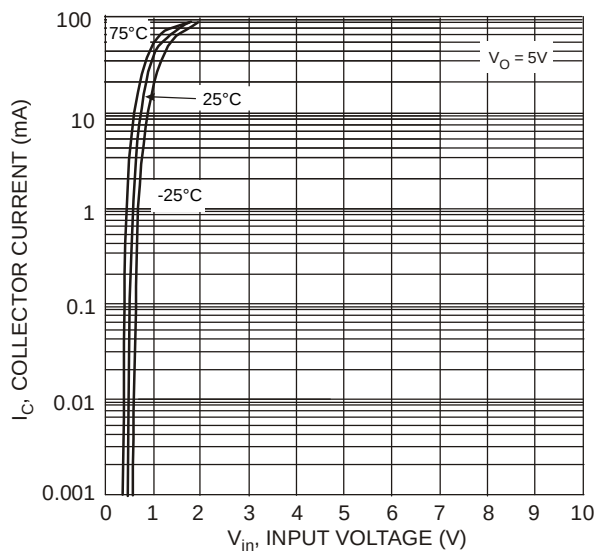


Fig. 5 Collector Current vs. Input Voltage

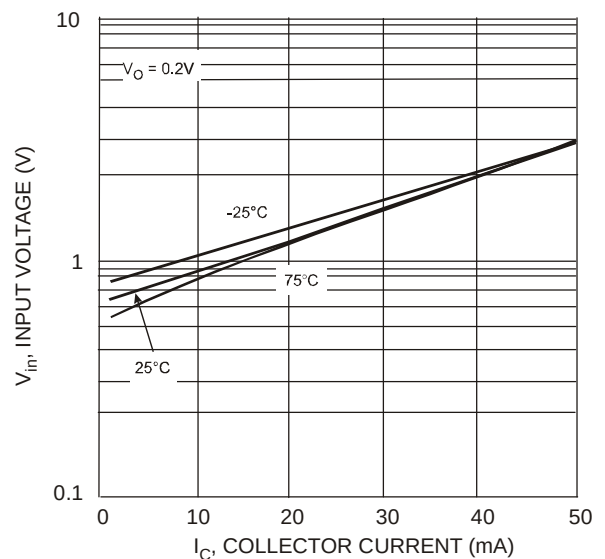


Fig. 6 Input Voltage vs. Collector Current

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

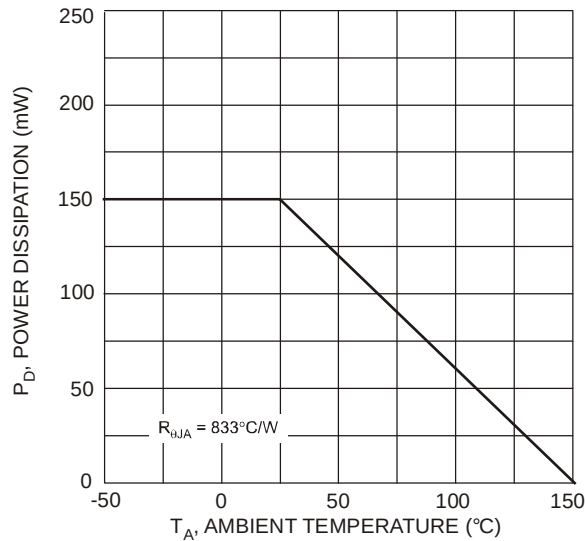


Fig.7 Derating Curve

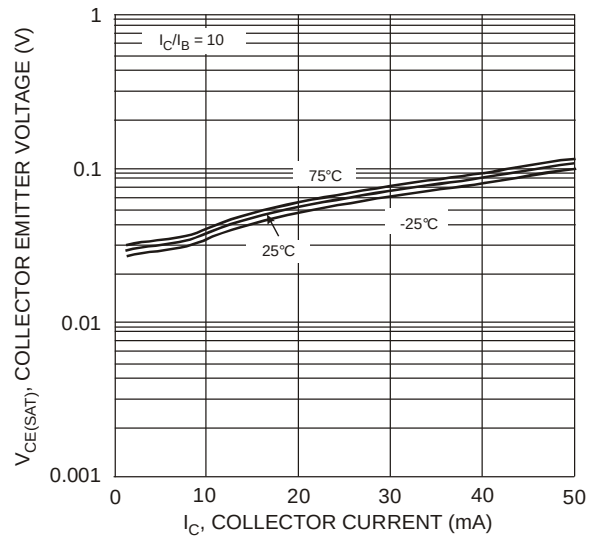


Fig.8 $V_{CE(SAT)}$ vs. I_C

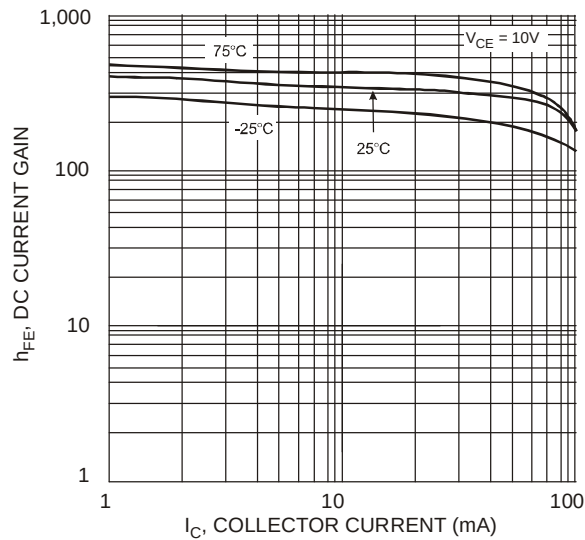


Fig.9 DC Current Gain

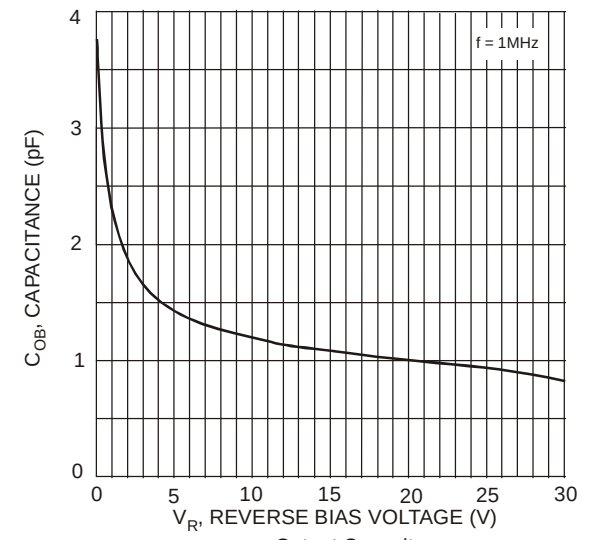


Fig.10 Output Capacitance

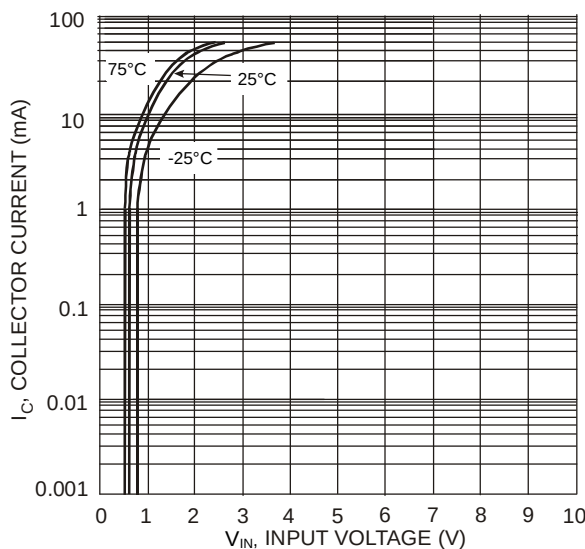


Fig.11 Collector Current vs. Input Voltage

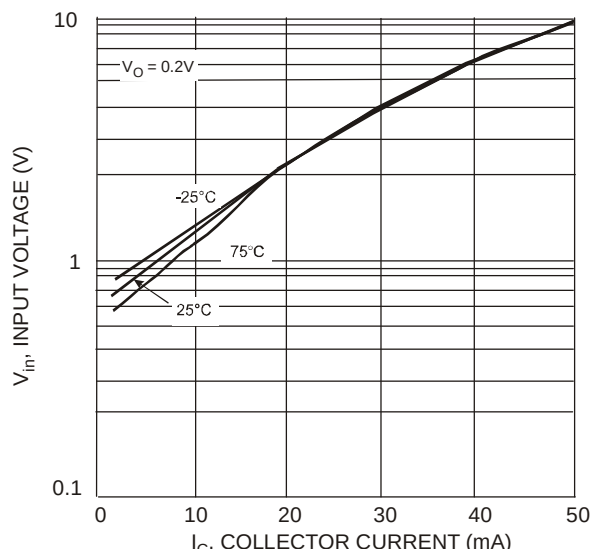
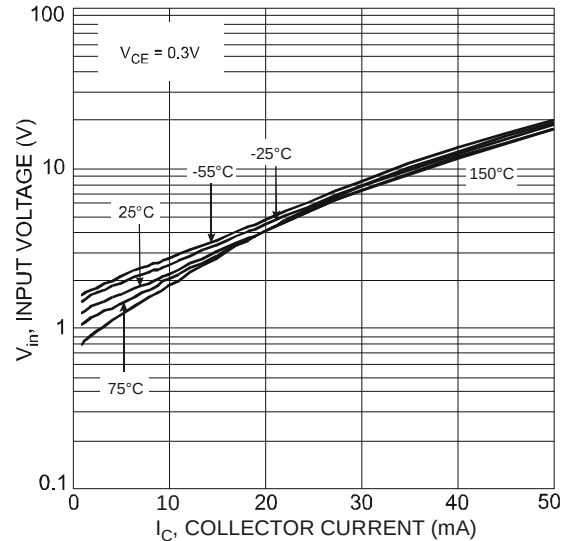
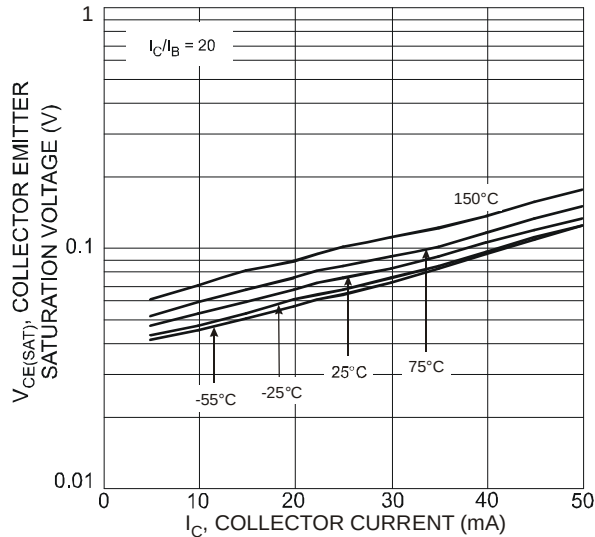
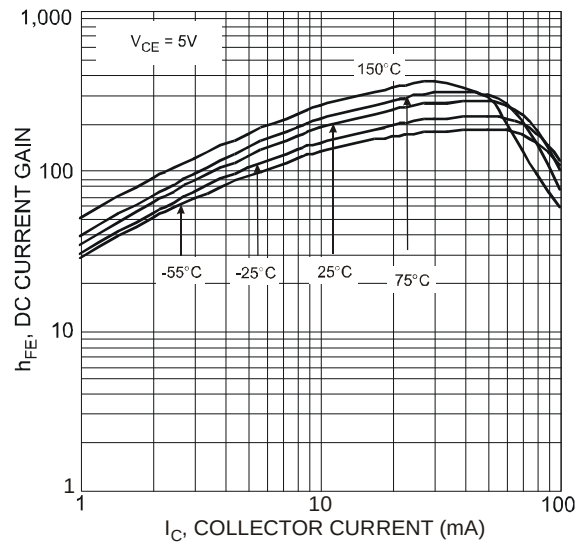
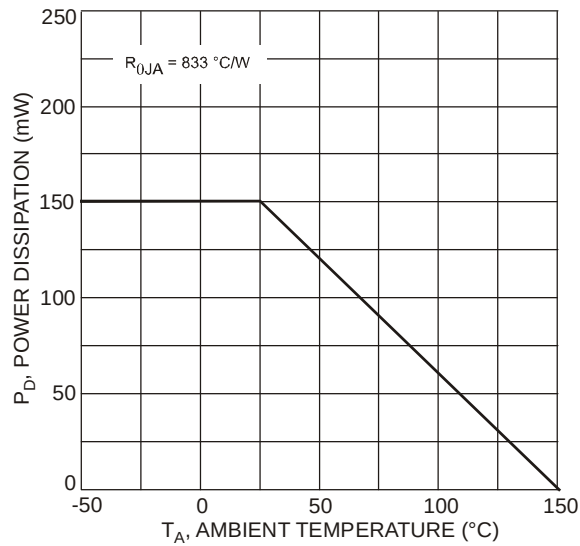


Fig.12 Input Voltage vs. Collector Current

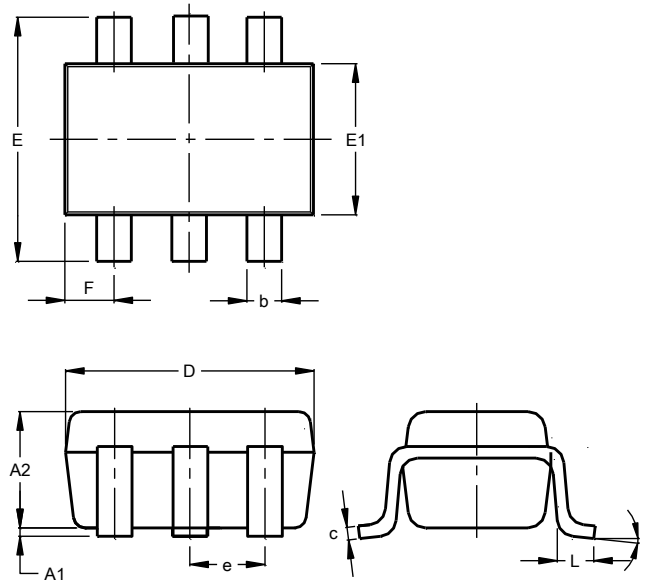
Typical Curves – DDC124EU (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Package Outline Dimensions

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

SOT363

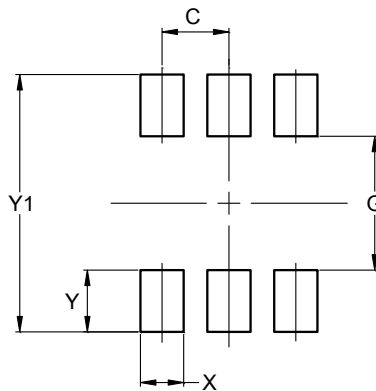


SOT363			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

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Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.420
Y	0.600
Y1	2.500

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