DDC (xxxx) U

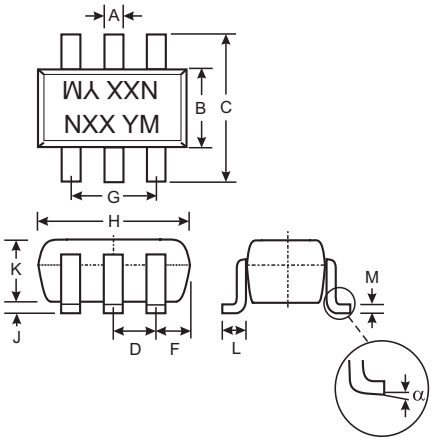
NPN PRE-BIASED SMALL SIGNAL SOT-363 DUAL SURFACE MOUNT TRANSISTOR

Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDA)
- Built-In Biasing Resistors
- **Lead Free/RoHS Compliant (Note 3)**

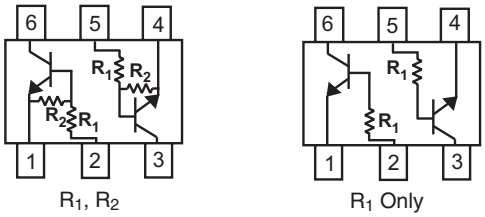
Mechanical Data

- Case: SOT-363
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Terminal Connections: See Diagram
- Marking: Date Code and Marking Code (See Diagrams & Page 3)
- Ordering Information (See Page 3)
- Weight: 0.006 grams (approximate)



SOT-363		
Dim	**Min**	**Max**
A	0.10	0.30
B	1.15	1.35
C	2.00	2.20
D	0.65 Nominal	
F	0.30	0.40
H	1.80	2.20
J	—	0.10
K	0.90	1.00
L	0.25	0.40
M	0.10	0.25
α	0°	8°
All Dimensions in mm		

P/N	R1	R2	MARKING
DDC124EU	22KΩ	22KΩ	N17
DDC144EU	47KΩ	47KΩ	N20
DDC114YU	10KΩ	47KΩ	N14
DDC123JU	2.2KΩ	47KΩ	N06
DDC114EU	10KΩ	10KΩ	N13
DDC113TU	1KΩ	—	N01
DDC143TU	4.7KΩ	—	N07
DDC114TU	10KΩ	—	N12



SCHEMATIC DIAGRAM

Maximum Ratings @ T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Supply Voltage, (6) to (1) and (3) to (4)		V_{CC}	50	V
Input Voltage, (2) to (1) and (5) to (4)	DDC124EU DDC144EU DDC114YU DDC123JU DDC114EU DDC113TU DDC143TU DDC114TU	V_{IN}	-10 to +40 -10 to +40 -6 to +40 -5 to +12 -10 to +40 -5 Vmax -5 Vmax -5 Vmax	V
Output Current	DDC124EU DDC144EU DDC114YU DDC123JU DDC114EU DDC113TU DDC143TU DDC114TU	I_O	30 30 70 100 50 100 100 100	mA
Output Current	All	I_C (Max)	100	mA
Power Dissipation (Total)		P_d	200	mW
Thermal Resistance, Junction to Ambient Air (Note 1)		$R_{\theta JA}$	625	°C/W
Operating and Storage and Temperature Range		T_j, T_{STG}	-55 to +150	°C

Note: 1. Mounted on FR4 PC Board with recommended pad layout at http://www.diodes.com/datasheets/ap02001.pdf.
2. 150mW per element must not be exceeded.
3. No purposefully added lead.

Electrical Characteristics @ $T_A = 25°C$ unless otherwise specified

Characteristic (DDC113TU & DDC143TU & DDC114TU only)	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	50	—	—	V	$I_C = 50\mu A$
Collector-Emitter Breakdown Voltage	BV_{CEO}	50	—	—	V	$I_C = 1mA$
Emitter-Base Breakdown Voltage	BV_{EBO}	5	—	—	V	$I_E = 50\mu A$
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*	f_T	—	250	—	MHz	$V_{CE} = 10V, I_E = -5mA, f = 100MHz$

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	DDC124EU DDC144EU DDC114YU DDC123JU DDC114EU	$V_{I(off)}$	0.5 0.5 0.3 0.5 0.5	1.1 1.1 — — 1.1	—	V	$V_{CC} = 5V, I_O = 100\mu A$
	DDC124EU DDC144EU DDC114YU DDC123JU DDC114EU	$V_{I(on)}$	—	1.9 1.9 — — 1.9	3.0 3.0 1.4 1.1 3.0		$V_O = 0.3, I_O = 5mA$ $V_O = 0.3, I_O = 2mA$ $V_O = 0.3, I_O = 1mA$ $V_O = 0.3, I_O = 5mA$ $V_O = 0.3, I_O = 10mA$
Output Voltage	DDC124EU DDC144EU DDC114YU DDC123JU DDC114EU	$V_{O(on)}$	—	0.1	0.3	V	$I_O/I_I = 10mA / 0.5mA$ $I_O/I_I = 10mA / 0.5mA$ $I_O/I_I = 5mA / 0.25mA$ $I_O/I_I = 5mA / 0.25mA$ $I_O/I_I = 10mA / 0.5mA$
Input Current	DDC124EU DDC144EU DDC114YU DDC123JU DDC114EU	I_I	—	—	0.36 0.18 0.88 3.6 0.88	mA	$V_I = 5V$
Output Current		$I_{O(off)}$	—	—	0.5	μA	$V_{CC} = 50V, V_I = 0V$
DC Current Gain	DDC124EU DDC144EU DDC114YU DDC123JU DDC114EU	G_I	56 68 68 80 30	—	—	—	$V_O = 5V, I_O = 5mA$ $V_O = 5V, I_O = 5mA$ $V_O = 5V, I_O = 10mA$ $V_O = 5V, I_O = 10mA$ $V_O = 5V, I_O = 5mA$
Input Resistor (R_1) Tolerance		ΔR_1	-30	—	+30	%	—
Resistance Ratio Tolerance		R_2/R_1	-20	—	+20	%	—
Gain-Bandwidth Product*		f_T	—	250	—	MHz	$V_{CE} = 10V, I_E = 5mA,$ $f = 100MHz$

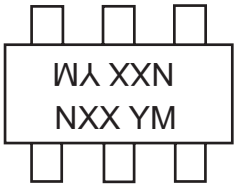
* Transistor - For Reference Only

Ordering Information (Note 4)

Device	Packaging	Shipping
DDC124EU-7-F	SOT-363	3000/Tape & Reel
DDC144EU-7-F	SOT-363	3000/Tape & Reel
DDC114YU-7-F	SOT-363	3000/Tape & Reel
DDC123JU-7-F	SOT-363	3000/Tape & Reel
DDC114EU-7-F	SOT-363	3000/Tape & Reel
DDC113TU-7-F	SOT-363	3000/Tape & Reel
DDC143TU-7-F	SOT-363	3000/Tape & Reel
DDC114TU-7-F	SOT-363	3000/Tape & Reel

Notes: 4. For Packaging Details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

Marking Information



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

Date Code Key

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Code	N	P	R	S	T	U	V	W	X	Y	Z

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

TYPICAL CURVES - DDC123JK
ONE SECTION

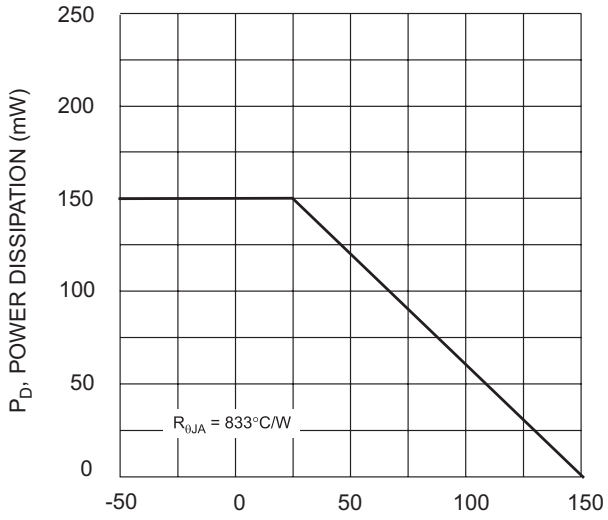


Fig. 1 Derating Curve

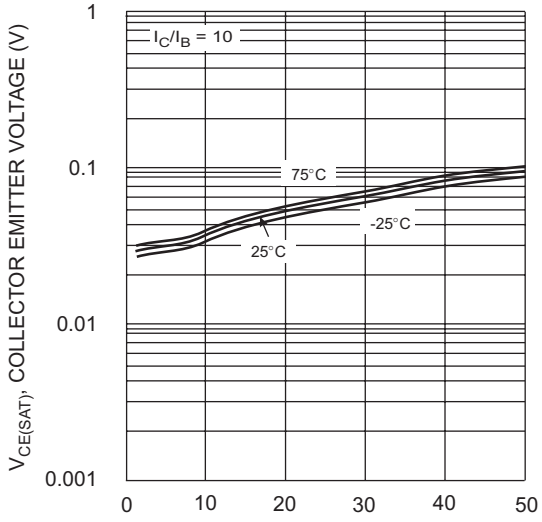


Fig. 2 $V_{CE(SAT)}$ vs. I_C

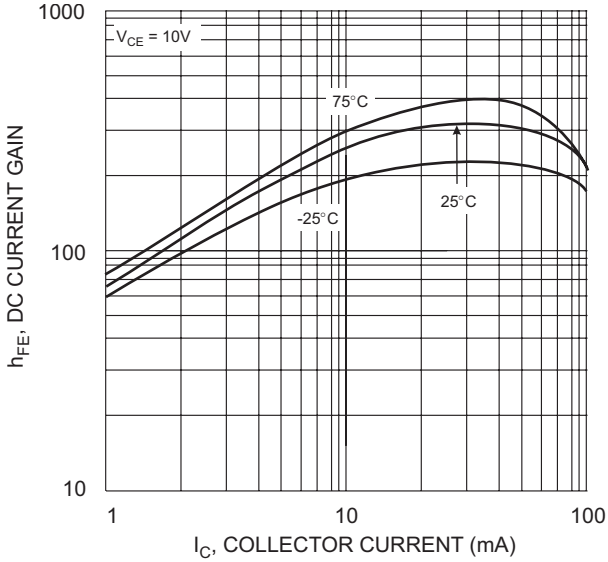


Fig. 3 DC Current Gain

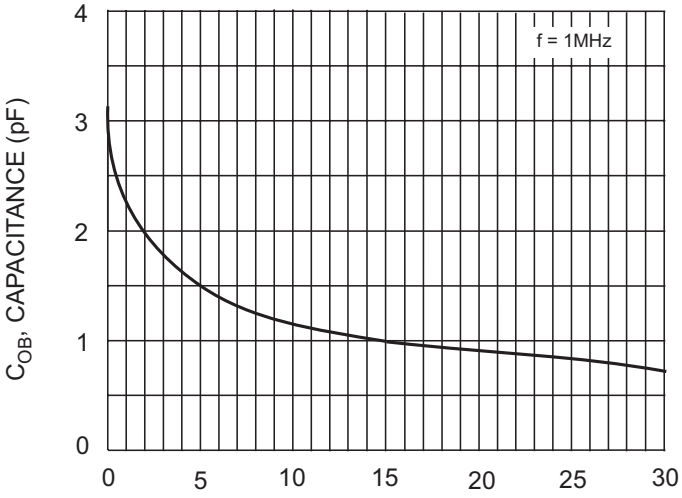


Fig. 4 Output Capacitance

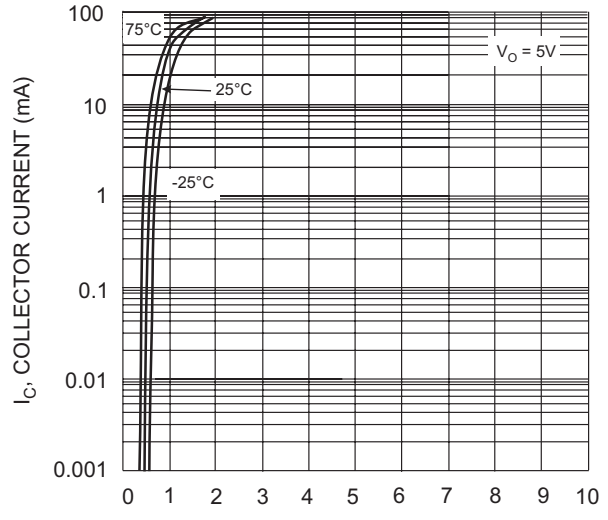


Fig. 5 Collector Current Vs. Input Voltage

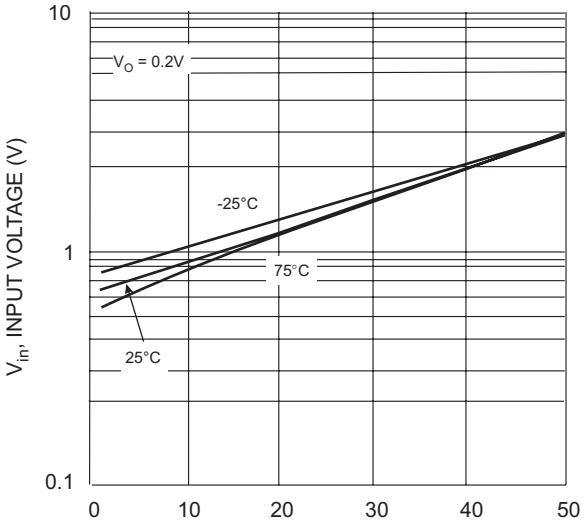


Fig. 6 Input Voltage vs. Collector Current

TYPICAL CURVES - DDC114TK

ONE SECTION

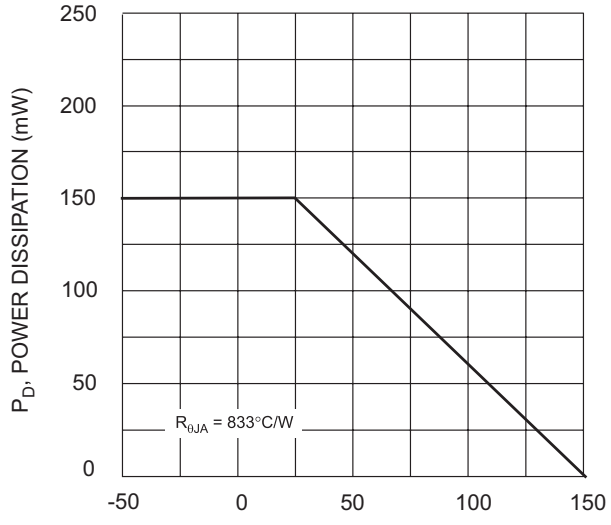


Fig. 1 Derating Curve

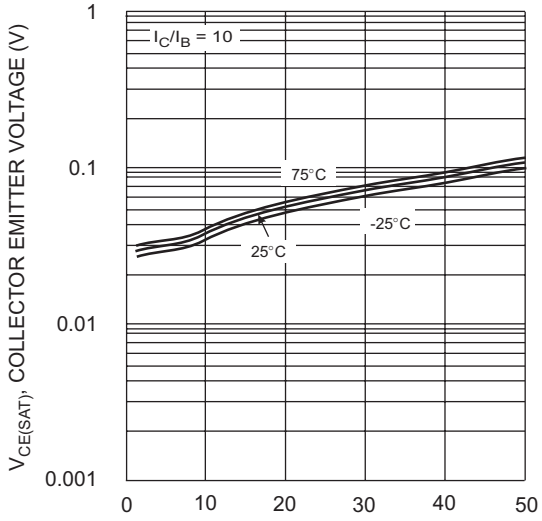


Fig. 2 $V_{CE(SAT)}$ vs. I_C

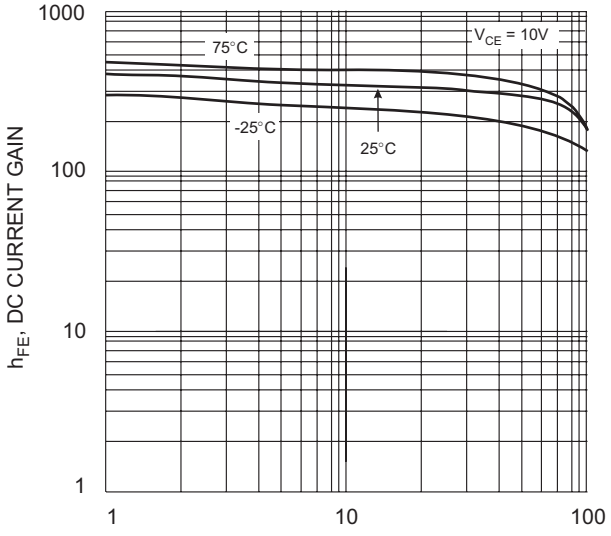


Fig. 3 DC Current Gain

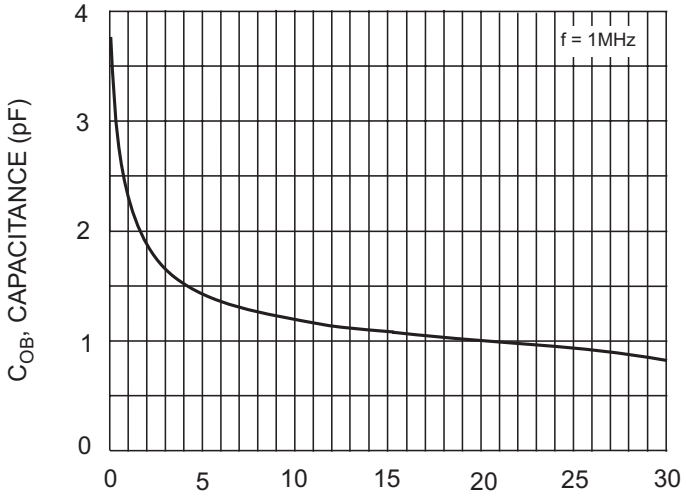


Fig. 4 Output Capacitance

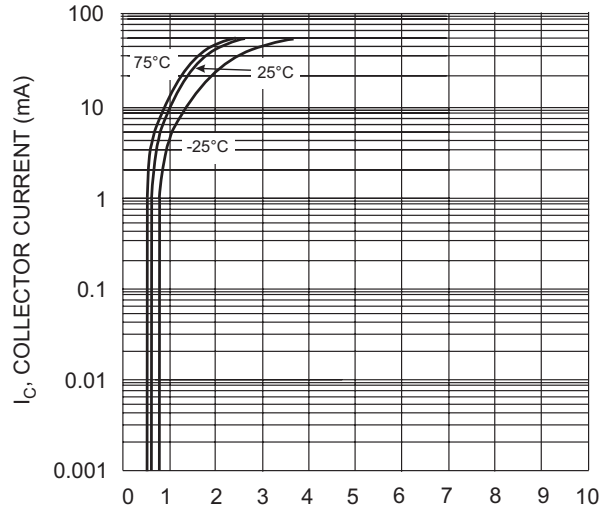


Fig. 7 Collector Current Vs. Input Voltage

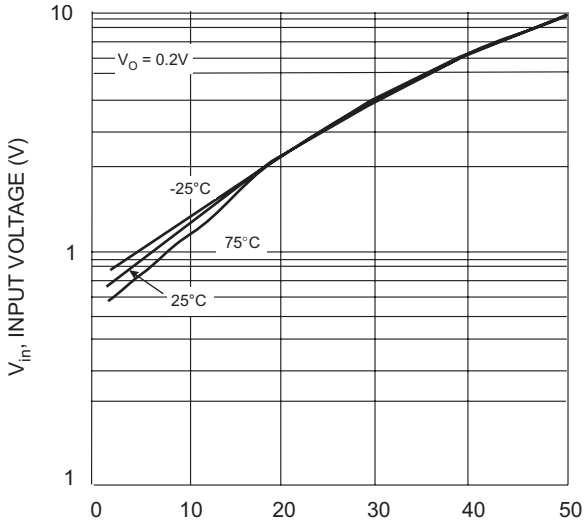


Fig. 6 Input Voltage vs. Collector Current

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