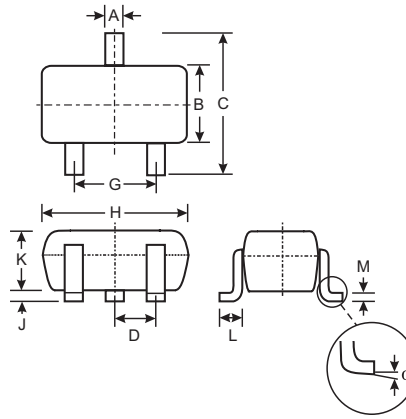


### Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistors, R1≠R2
- **Lead Free/RoHS Compliant (Note 1)**
- **"Green" Device, Note 2 and 3**

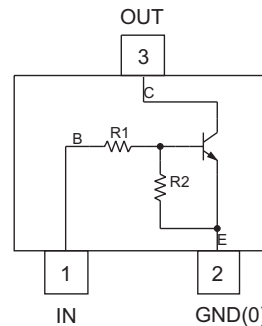
### Mechanical Data

- Case: SC-59
- Case Material: Molded Plastic, "Green" Molding Compound, Note 3. 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 Copper leadframe).
- Terminal Connections: See Diagram
- Marking: Date Code and Type Code (See Table Below & Page 3)
- Ordering Information (See Page 3)
- Weight: 0.006 grams (approximate)

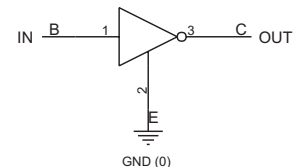


SC-59		
Dim	Min	Max
A	0.35	0.50
B	1.50	1.70
C	2.70	3.00
D	0.95	
G	1.90	
H	2.90	3.10
J	0.013	0.10
K	1.00	1.30
L	0.35	0.55
M	0.10	0.20
$\alpha$	0°	8°
<b>All Dimensions in mm</b>		

P/N	R1 (NOM)	R2 (NOM)	Type Code
DDTC113ZKA	1K $\Omega$	10K $\Omega$	N02
DDTC123YKA	2.2K $\Omega$	10K $\Omega$	N05
DDTC123JKA	2.2K $\Omega$	47K $\Omega$	N06
DDTC143XKA	4.7K $\Omega$	10K $\Omega$	N09
DDTC143FKA	4.7K $\Omega$	22K $\Omega$	N10
DDTC143ZKA	4.7K $\Omega$	47K $\Omega$	N11
DDTC114YKA	10K $\Omega$	47K $\Omega$	N14
DDTC114WKA	10K $\Omega$	4.7K $\Omega$	N15
DDTC124XKA	22K $\Omega$	47K $\Omega$	N18
DDTC144VKA	47K $\Omega$	10K $\Omega$	N21
DDTC144WKA	47K $\Omega$	22K $\Omega$	N22



Schematic and Pin Configuration



Equivalent Inverter Circuit

- Note: 1. No purposefully added Lead.  
 2. Diodes Inc.'s "Green" policy can be found on our website at [http://www.diodes.com/products/lead\\_free/index.php](http://www.diodes.com/products/lead_free/index.php).  
 3. Product manufactured with Date Code 0609 (week 9, 2006) and newer are built with Green Molding Compound. Product manufactured prior to Date Code 0609 are built with Non-Green Molding Compound and may contain Halogens or Sb2O3 Fire Retardants.

## Maximum Ratings @ T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Supply Voltage, (3) to (2)	V <sub>CC</sub>	50	V
Input Voltage, (1) to (2) DDTC113ZKA DDTC123YKA DDTC123JKA DDTC143XKA DDTC143FKA DDTC143ZKA DDTC114YKA DDTC114WKA DDTC124XKA DDTC144VKA DDTC144WKA	V <sub>IN</sub>	-5 to +10 -5 to +12 -5 to +12 -7 to +20 -6 to +30 -5 to +30 -6 to +40 -10 to +30 -10 to +40 -15 to +40 -10 to +40	V
Output Current DDTC113ZKA DDTC123YKA DDTC123JKA DDTC143XKA DDTC143FKA DDTC143ZKA DDTC114YKA DDTC114WKA DDTC124XKA DDTC144VKA DDTC144WKA	I <sub>O</sub>	100 100 100 100 100 100 70 100 50 30 30	mA
Output Current All	I <sub>C</sub> (Max)	100	mA
Power Dissipation	P <sub>d</sub>	200	mW
Thermal Resistance, Junction to Ambient Air (Note 4)	R <sub>θJA</sub>	625	°C/W
Operating and Storage and Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

Note: 4. Mounted on FR4 PC Board with recommended pad layout at <http://www.diodes.com/datasheets/ap02001.pdf>.

## Electrical Characteristics @ T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage DDTC113ZKA DDTC123YKA DDTC123JKA DDTC143XKA DDTC143FKA DDTC143ZKA DDTC114YKA DDTC114WKA DDTC124XKA DDTC144VKA DDTC144WKA	V <sub>I(off)</sub>	0.3			V	V <sub>CC</sub> = 5V, I <sub>O</sub> = 100μA
		0.3				
Input Voltage DDTC113ZKA DDTC123YKA DDTC123JKA DDTC143XKA DDTC143FKA DDTC143ZKA DDTC114YKA DDTC114WKA DDTC124XKA DDTC144VKA DDTC144WKA	V <sub>I(on)</sub>	0.5	—	—	V	V <sub>O</sub> = 0.3V, I <sub>O</sub> = 20mA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 20mA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 5mA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 20mA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 3mA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 5mA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 1mA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 2mA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 2mA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 2mA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 2mA
		0.3				
Output Voltage	V <sub>O(on)</sub>	—	0.1	0.3	V	I <sub>O</sub> /I <sub>I</sub> = 5mA/0.25mA DDTC123JKA I <sub>O</sub> /I <sub>I</sub> = 5mA/0.25mA DDTC143ZKA I <sub>O</sub> /I <sub>I</sub> = 5mA/0.25mA DDTC114YKA I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5mA All Others

**Electrical Characteristics (continued)** @ T<sub>A</sub> = 25°C unless otherwise specified

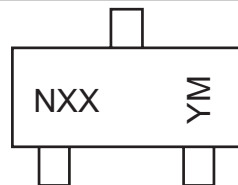
Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Input Current	DDTC113ZKA	I <sub>I</sub>	—	—	7.2	mA	V <sub>I</sub> = 5V
	DDTC123YKA				3.8		
	DDTC123JKA				3.6		
	DDTC143XKA				1.8		
	DDTC143FKA				1.8		
	DDTC143ZKA				1.8		
	DDTC114YKA				0.88		
	DDTC114WKA				0.88		
	DDTC124XKA				0.36		
	DDTC144VKA				0.16		
DDTC144WKA	0.16						
Output Current		I <sub>O(off)</sub>	—	—	0.5	μA	V <sub>CC</sub> = 50V, V <sub>I</sub> = 0V
DC Current Gain	DDTC113ZKA	G <sub>I</sub>	33	—	—	—	V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA
	DDTC123YKA		33				V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA
	DDTC123JKA		80				V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA
	DDTC143XKA		30				V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA
	DDTC143FKA		68				V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA
	DDTC143ZKA		80				V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA
	DDTC114YKA		68				V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA
	DDTC114WKA		24				V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA
	DDTC124XKA		68				V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA
	DDTC144VKA		33				V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA
DDTC144WKA	56	V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA					
Input Resistor Tolerance		ΔR <sub>1</sub>	-30	—	+30	%	—
Resistance Ratio Tolerance		ΔR <sub>2</sub> /R <sub>1</sub>	-20	—	+20	%	—
Gain-Bandwidth Product*		f <sub>T</sub>	—	250	—	MHz	V <sub>CE</sub> = 10V, I <sub>E</sub> = 5mA, f = 100MHz

\* Transistor - For Reference Only

**Ordering Information** (Note 3 & 5)

Device	Packaging	Shipping
DDTC113ZKA-7-F	SC-59	3000/Tape & Reel
DDTC123YKA-7-F	SC-59	3000/Tape & Reel
DDTC123JKA-7-F	SC-59	3000/Tape & Reel
DDTC143XKA-7-F	SC-59	3000/Tape & Reel
DDTC143FKA-7-F	SC-59	3000/Tape & Reel
DDTC143ZKA-7-F	SC-59	3000/Tape & Reel
DDTC114YKA-7-F	SC-59	3000/Tape & Reel
DDTC114WKA-7-F	SC-59	3000/Tape & Reel
DDTC124XKA-7-F	SC-59	3000/Tape & Reel
DDTC144VKA-7-F	SC-59	3000/Tape & Reel
DDTC144WKA-7-F	SC-59	3000/Tape & Reel

- Notes: 3. Product manufactured with Date Code 0609 (week 9, 2006) and newer are built with Green Molding Compound. Product manufactured prior to Date Code 0609 are built with Non-Green Molding Compound and may contain Halogens or Sb2O3 Fire Retardants.  
5. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

**Marking Information**


NXX = Product Type Marking Code, See Table on Page 1  
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 - DDT123JKA**

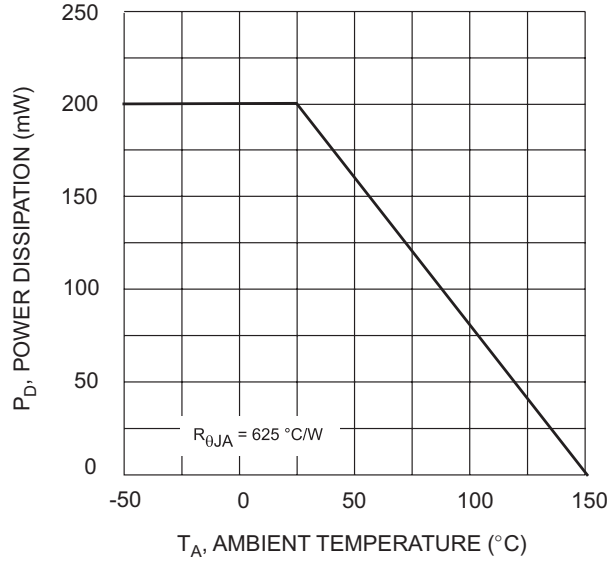


Fig. 1 Derating Curve

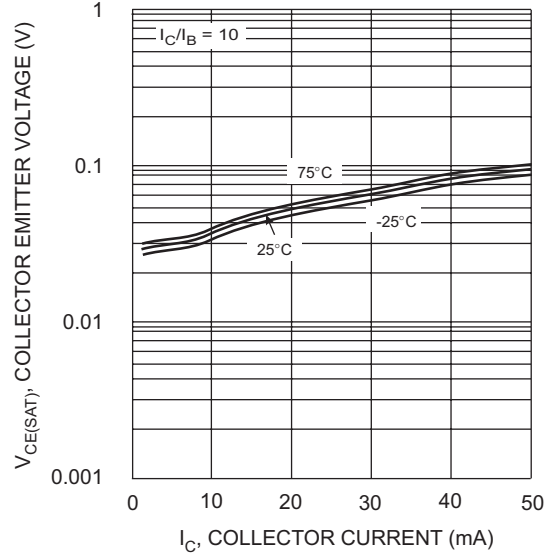


Fig. 2  $V_{CE(SAT)}$  vs.  $I_C$

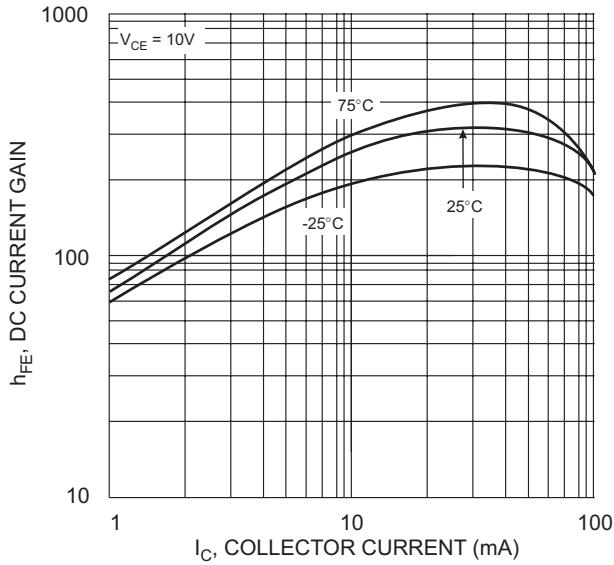


Fig. 3 DC Current Gain

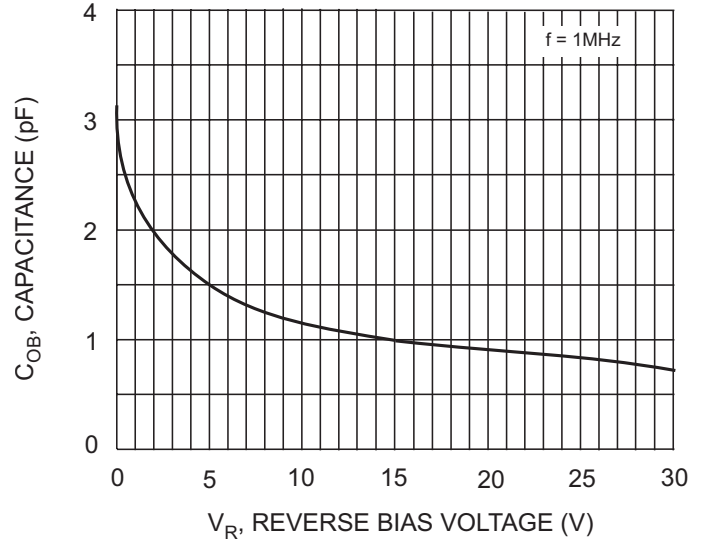


Fig. 4 Output Capacitance

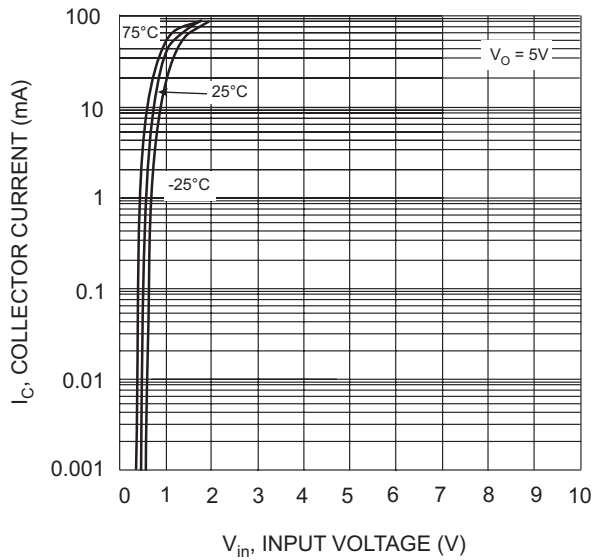


Fig. 5 Collector Current Vs. Input Voltage

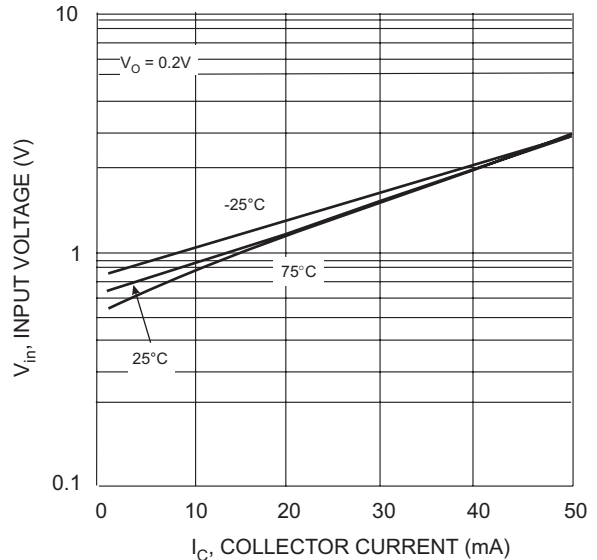


Fig. 6 Input Voltage vs. Collector Current

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