

# DDTC (R1≠R2 SERIES) KA

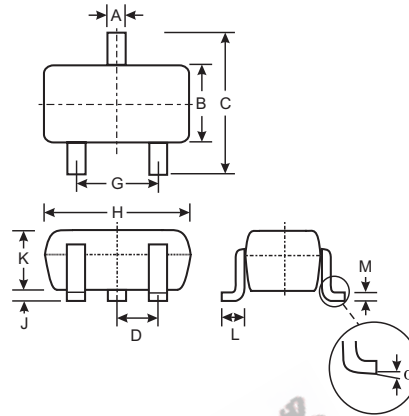
## NPN PRE-BIASED SMALL SIGNAL SC-59 SURFACE MOUNT TRANSISTOR

### 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**

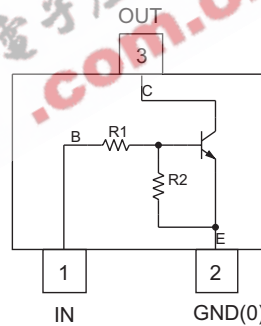
### Mechanical Data

- 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)

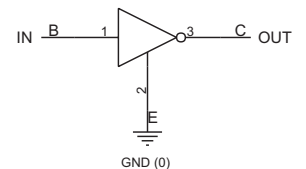


SC-59		
Dim	Min	Max
A	0.35	0.50
B	1.50	1.70
C	2.70	3.00
D	0.95	
G	1.90	
H	2.90	3.10
J	0.013	0.10
K	1.00	1.30
L	0.35	0.55
M	0.10	0.20
α	0°	8°
<b>All Dimensions in mm</b>		

P/N	R1 (NOM)	R2 (NOM)	Type Code
DDTC113ZKA	1KΩ	10KΩ	N02
DDTC123YKA	2.2KΩ	10KΩ	N05
DDTC123JKA	2.2KΩ	47KΩ	N06
DDTC143XKA	4.7KΩ	10KΩ	N09
DDTC143FKA	4.7KΩ	22KΩ	N10
DDTC143ZKA	4.7KΩ	47KΩ	N11
DDTC114YKA	10KΩ	47KΩ	N14
DDTC114WKA	10KΩ	4.7KΩ	N15
DDTC124XKA	22KΩ	47KΩ	N18
DDTC144VKA	47KΩ	10KΩ	N21
DDTC144WKA	47KΩ	22KΩ	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)	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	I <sub>O</sub>	100 100 100 100 100 100 70 100 50 30 30	mA
Output Current	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	V <sub>I(off)</sub>	0.3			V	V <sub>CC</sub> = 5V, I <sub>O</sub> = 100μA
		0.3				
Input Voltage	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				
		0.3				
		0.5				
		0.3				
		0.3				
		0.5				
		0.3				
		0.8				
		0.4				
		1.0				
		0.8				
		3.0				
		3.0				
1.1						
2.5						
1.3						
1.3						
1.4						
3.0						
2.5						
5.0						
4.0						
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 V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA
	DDTC123YKA				33		
	DDTC123JKA				80		
	DDTC143XKA				30		
	DDTC143FKA				68		
	DDTC143ZKA				80		
	DDTC114YKA				68		
	DDTC114WKA				24		
	DDTC124XKA				68		
	DDTC144VKA				33		
	DDTC144WKA				56		
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

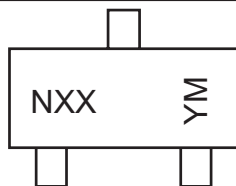
\* Transistor - For Reference Only

**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 - DDTC123JKA**

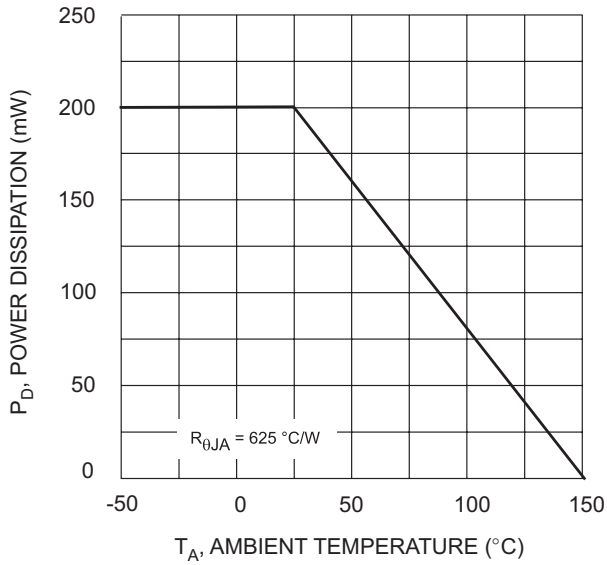


Fig. 1 Derating Curve

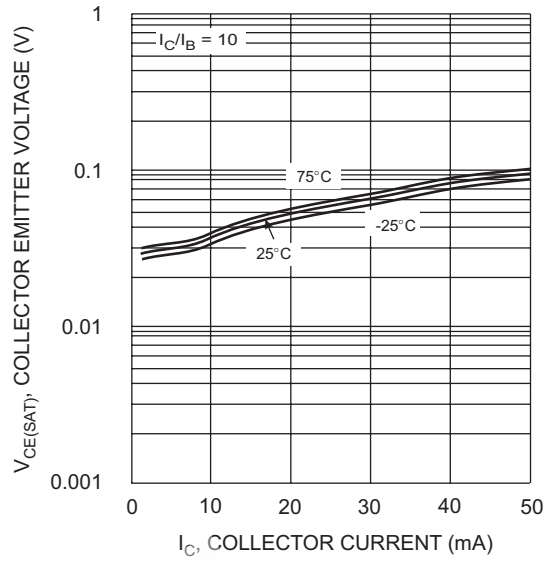


Fig. 2  $V_{CE(SAT)}$  vs.  $I_C$

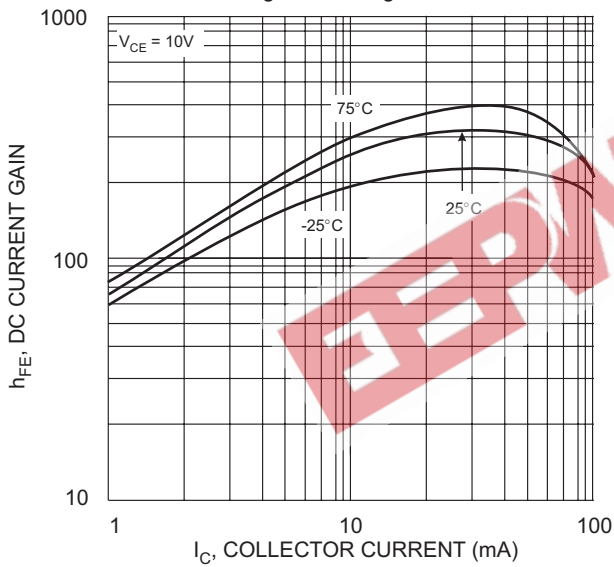


Fig. 3 DC Current Gain

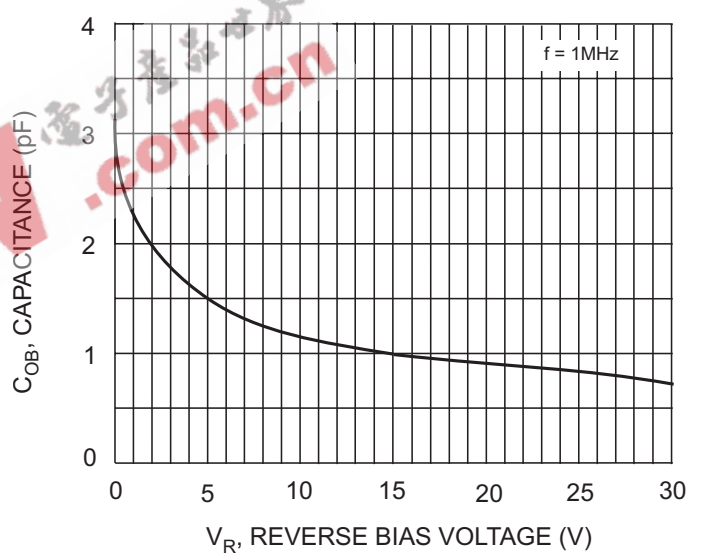


Fig. 4 Output Capacitance

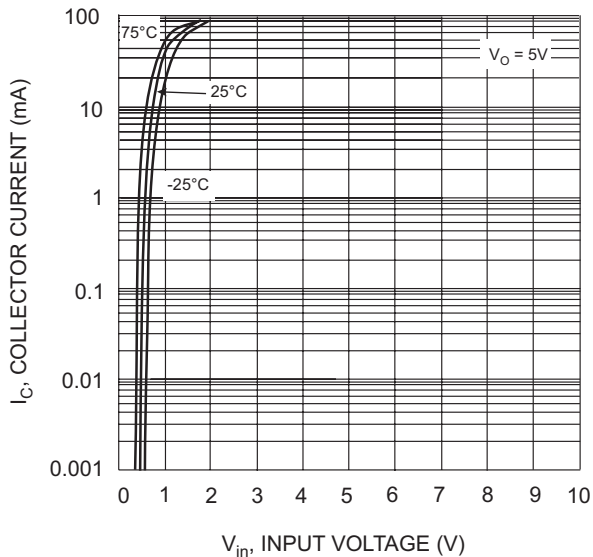


Fig. 5 Collector Current vs. Input Voltage

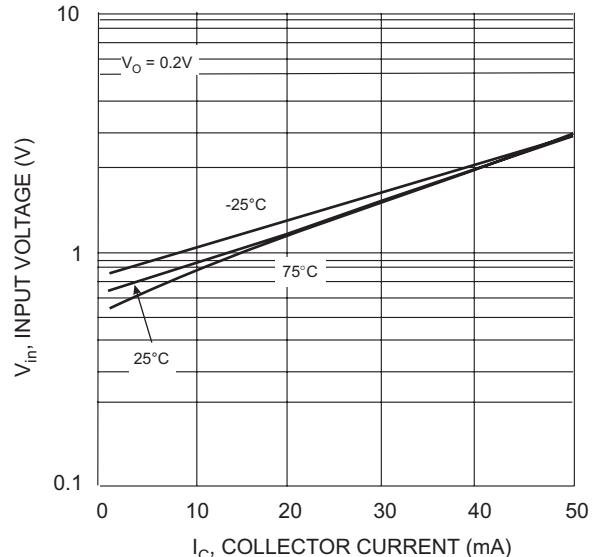


Fig. 6 Input Voltage vs. Collector Current

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