DDTC (R1≠R2 SERIES) KA

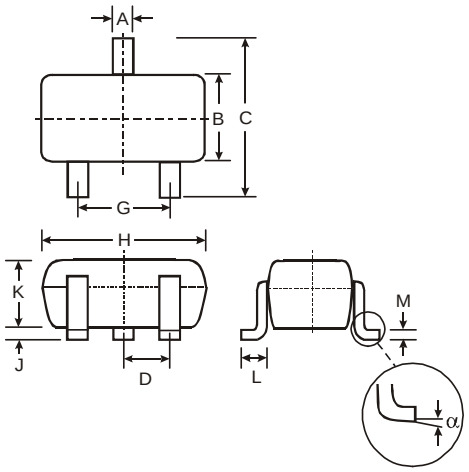
NPN PRE-BIASED SMALL SIGNAL SURFACE MOUNT TRANSISTOR

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**

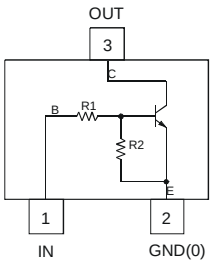
Mechanical Data

- 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 Information: See Table Below & Page 5
- Ordering Information: See Page 5
- Weight: 0.006 grams (approximate)

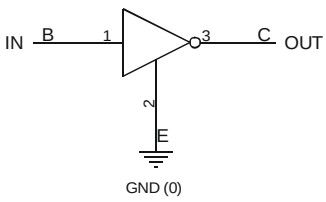


SC-59		
Dim	**Min**	**Max**
A	0.35	0.50
B	1.50	1.70
C	2.70	3.00
D	0.95	
G	1.90	
H	2.90	3.10
J	0.013	0.10
K	1.00	1.30
L	0.35	0.55
M	0.10	0.20
α	0°	8°
All Dimensions in mm		

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

Notes:
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.
3. Product manufactured with Date Code 0627 (week 27, 2006) and newer are built with Green Molding Compound. Product manufactured prior to Date Code 0627 are built with Non-Green Molding Compound and may contain Halogens or Sb2O3 Fire Retardants.

Maximum Ratings @T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Supply Voltage, (3) to (2)		V_{CC}	50	V
Input Voltage, (1) to (2)	DDTC113ZKA	V_{IN}	-5 to +10	V
	DDTC123YKA		-5 to +12	
	DDTC123JKA		-5 to +12	
	DDTC143XKA		-7 to +20	
	DDTC143FKA		-6 to +30	
	DDTC143ZKA		-5 to +30	
	DDTC114YKA		-6 to +40	
	DDTC114WKA		-10 to +30	
	DDTC124XKA		-10 to +40	
	DDTC144VKA		-15 to +40	
	DDTC144WKA		-10 to +40	
Output Current	DDTC113ZKA	I_O	100	mA
	DDTC123YKA		100	
	DDTC123JKA		100	
	DDTC143XKA		100	
	DDTC143FKA		100	
	DDTC143ZKA		100	
	DDTC114YKA		70	
	DDTC114WKA		100	
	DDTC124XKA		50	
	DDTC144VKA		30	
	DDTC144WKA		30	
Output Current	All	I_C (Max)	100	mA
Power Dissipation		P_d	200	mW
Thermal Resistance, Junction to Ambient Air	(Note 4)	$R_{\theta JA}$	625	°C/W
Operating and Storage Temperature Range		T_j, T_{STG}	-55 to +150	°C

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

Electrical Characteristics @T_A = 25°C unless otherwise specified

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
	DDTC113ZKA	$V_{I(off)}$	0.3	—	—		V_{CC} = 5V, I_O = 100μA
	DDTC123YKA		0.3				
	DDTC123JKA		0.5				
	DDTC143XKA		0.3				
	DDTC143FKA		0.3				
	DDTC143ZKA		0.5				
	DDTC114YKA		0.3				
	DDTC114WKA		0.8				
	DDTC124XKA		0.4				
	DDTC144VKA		1.0				
	DDTC144WKA		0.8				
Input Voltage	DDTC113ZKA	$V_{I(on)}$	—	—	3.0	V	V_O = 0.3V, I_O = 20mA
	DDTC123YKA				3.0		V_O = 0.3V, I_O = 20mA
	DDTC123JKA				1.1		V_O = 0.3V, I_O = 5mA
	DDTC143XKA				2.5		V_O = 0.3V, I_O = 20mA
	DDTC143FKA				1.3		V_O = 0.3V, I_O = 3mA
	DDTC143ZKA				1.3		V_O = 0.3V, I_O = 5mA
	DDTC114YKA				1.4		V_O = 0.3V, I_O = 1mA
	DDTC114WKA				3.0		V_O = 0.3V, I_O = 2mA
	DDTC124XKA				2.5		V_O = 0.3V, I_O = 2mA
	DDTC144VKA				5.0		V_O = 0.3V, I_O = 2mA
	DDTC144WKA				4.0		V_O = 0.3V, I_O = 2mA
Output Voltage		$V_{O(on)}$	—	0.1	0.3	V	I_O/I_I = 5mA/0.25mA DDTC123JKA I_O/I_I = 5mA/0.25mA DDTC143ZKA I_O/I_I = 5mA/0.25mA DDTC114YKA I_O/I_I = 10mA/0.5mA All Others
Input Current	DDTC113ZKA	I_I	—	—	7.2	mA	V_I = 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		$I_{O(off)}$	—	—	0.5	μA	V_{CC} = 50V, V_I = 0V
DC Current Gain	DDTC113ZKA	G_I	33	—	—	—	V_O = 5V, I_O = 5mA
	DDTC123YKA		33				V_O = 5V, I_O = 10mA
	DDTC123JKA		80				V_O = 5V, I_O = 10mA
	DDTC143XKA		30				V_O = 5V, I_O = 10mA
	DDTC143FKA		68				V_O = 5V, I_O = 10mA
	DDTC143ZKA		80				V_O = 5V, I_O = 10mA
	DDTC114YKA		68				V_O = 5V, I_O = 5mA
	DDTC114WKA		24				V_O = 5V, I_O = 10mA
	DDTC124XKA		68				V_O = 5V, I_O = 5mA
	DDTC144VKA		33				V_O = 5V, I_O = 5mA
	DDTC144WKA		56				V_O = 5V, I_O = 5mA
Input Resistor Tolerance		ΔR_1	-30	—	+30	%	—
Resistance Ratio Tolerance		$\Delta R_2/R_1$	-20	—	+20	%	—
Gain-Bandwidth Product*		f_T	—	250	—	MHz	V_{CE} = 10V, I_E = 5mA, f = 100MHz

* Transistor - For Reference Only

Typical Curves – DDTC123JKA

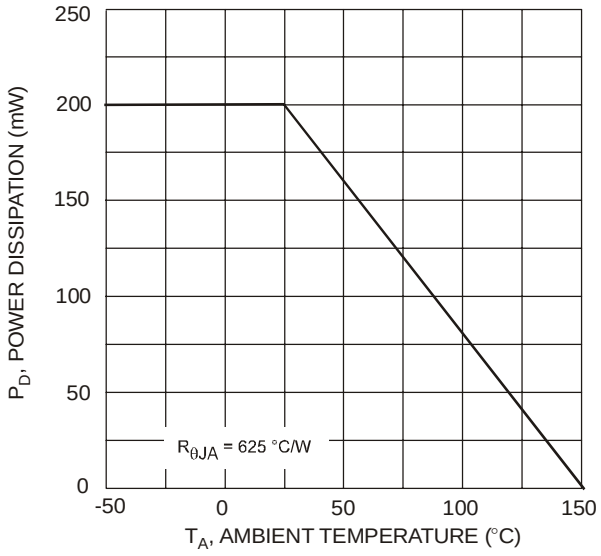


Fig. 1 Derating Curve

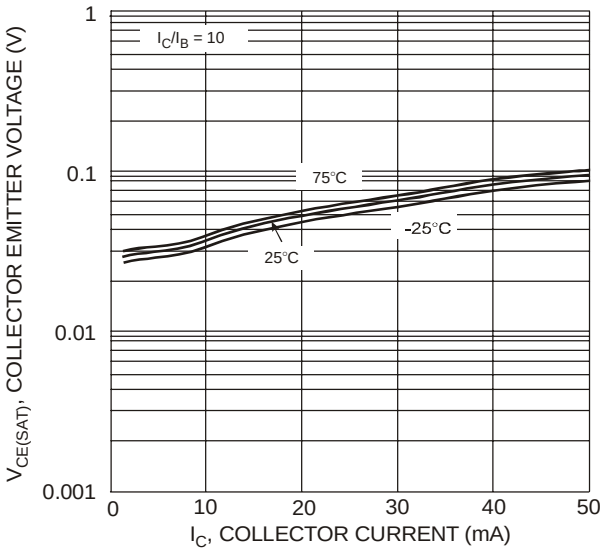


Fig. 2 $V_{CE(SAT)}$ vs. I_C

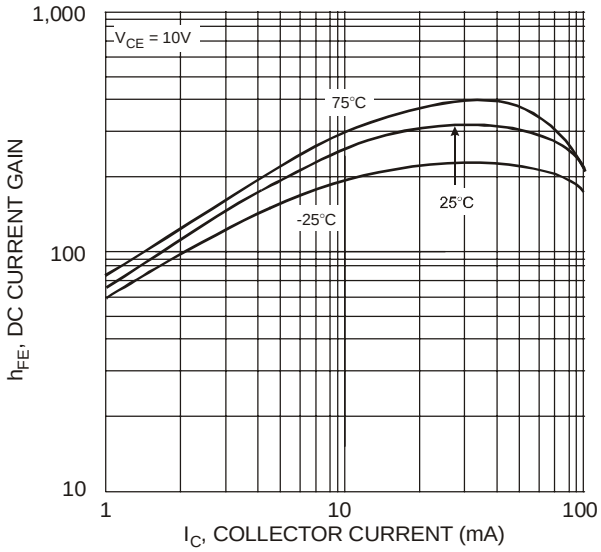


Fig. 3 DC Current Gain

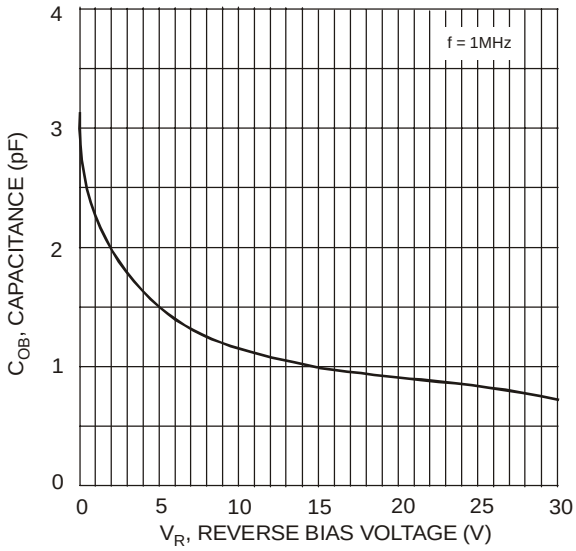


Fig. 4 Output Capacitance

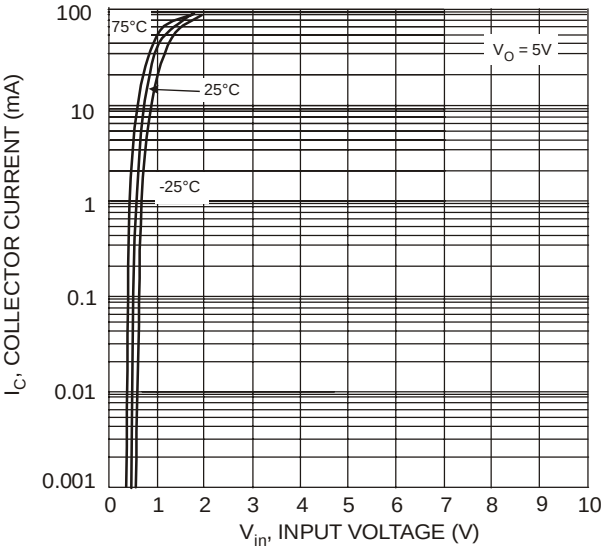


Fig. 5 Collector Current vs. Input Voltage

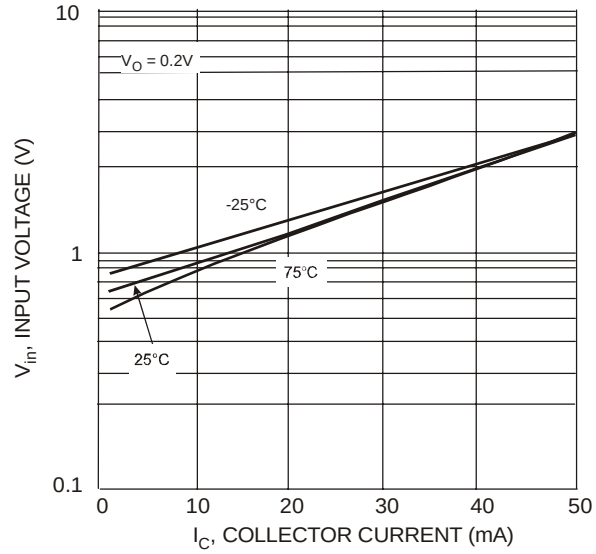


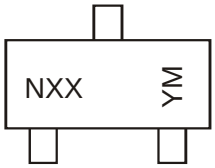
Fig. 6 Input Voltage vs. Collector Current

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: 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

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