PNP PRE-BIASED SMALL-SIGNAL SURFACE-MOUNT TRANSISTOR

Features

- Epitaxial Planar Die Construction
- Built-In Biasing Resistors
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The ADTA144WCAQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**
  https://www.diodes.com/quality/product-definitions/

R1 (NOM)	R2 (NOM)
47kΩ	22kΩ

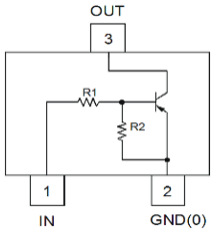
Mechanical Data

- Package: SOT23
- Package 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 e3
- Weight: 0.008 grams (Approximate)

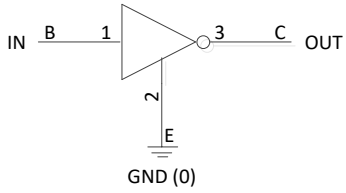
SOT23



Top View



Device Schematic



Equivalent Inverter Circuit

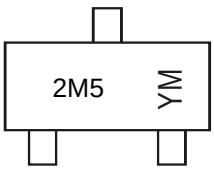
Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
ADTA144WCAQ-7	SOT23	2M5	7	8	3,000	Reel
ADTA144WCAQ-13	SOT23	2M5	13	8	10,000	Reel

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. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information

SOT23



2M5 = Product Type Marking Code
YM = Date Code Marking
Y or $\overline{Y}$ or $\underline{Y}$ = Year (ex: M = 2025)
M = Month (ex: 9 = September)

Date Code Key

Year	2020	-	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Code	H	-	M	N	P	R	S	T	U	V	W	X

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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Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Supply Voltage <Pin: (3) to (2)>	V_{CC}	-50	V
Input Voltage <Pin: (1) to (2)>	V_{IN}	+10 to -40	V
Output Current	I_O	-30	mA
Output Current	I_C (Max)	-100	mA

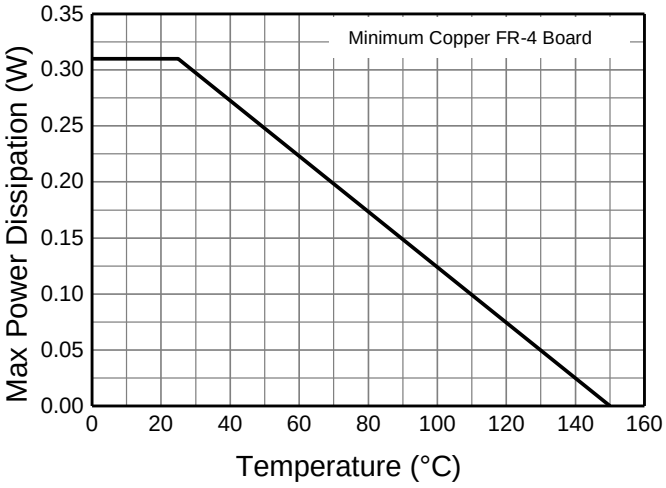
Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	310	mW
Thermal Resistance, Junction to Ambient Air (Note 5)	$R_{\theta JA}$	403	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

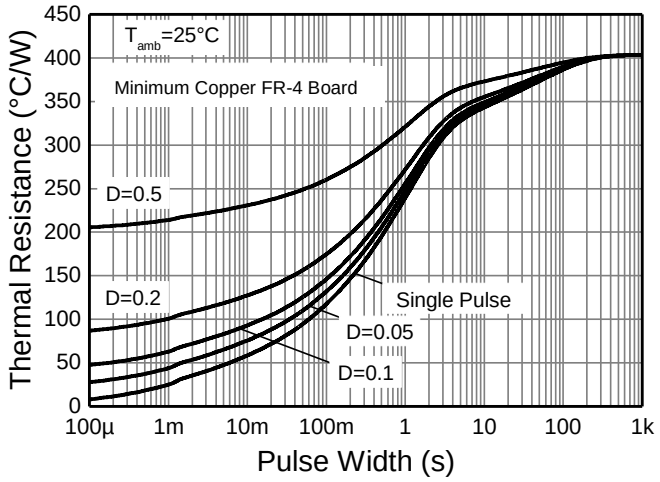
Note: 5. Mounted on FR-4 PC Board with minimum recommended pad layout.

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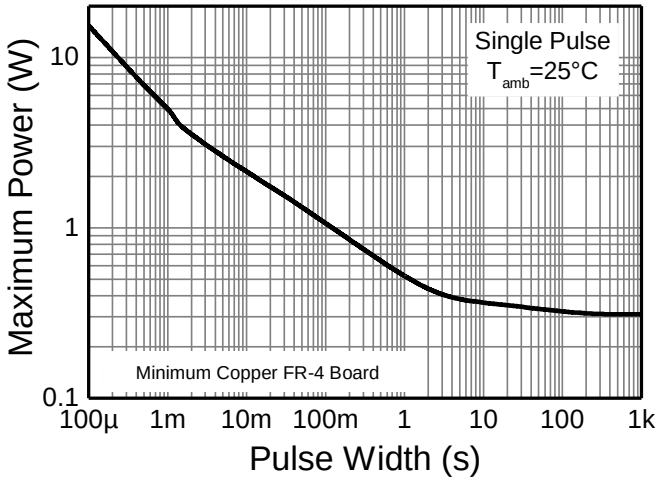
Thermal Characteristics and Derating Information



Derating Curve



Transient Thermal Impedance



Pulse Power Dissipation

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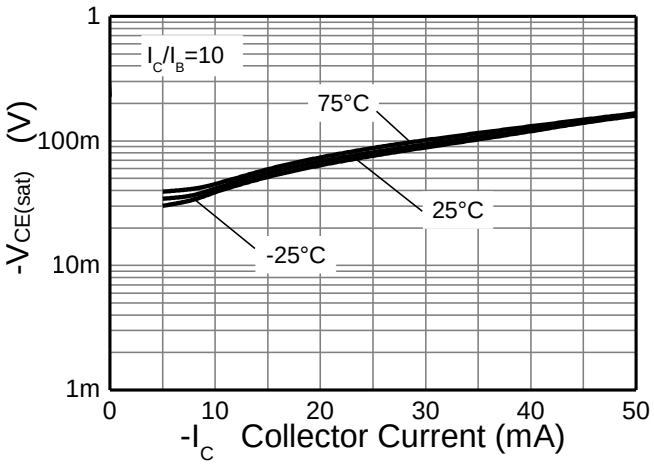
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	$V_{I(off)}$ (Note 6)	-0.8	—	—	V	V_{CC} = -5V, I_O = -100µA
	$V_{I(on)}$ (Note 7)	—	—	-4.0		V_O = -0.3V, I_O = -2mA
Output Voltage	$V_{O(on)}$	—	-0.1	-0.3	V	I_O/I_I = -10mA/-0.5mA
Input Current	I_I	—	—	-0.16	mA	V_I = -5V
Output Current	$I_{O(off)}$	—	—	-0.5	µA	V_{CC} = -50V, V_I = 0
DC Current Gain	G_I	56	—	—	—	V_O = -5V, I_O = -10mA
Input Resistor Tolerance	ΔR_1	-30	—	+30	%	—
Resistance Ratio Tolerance	$\Delta R_2/R_1$	-20	—	+20	%	—
Gain-Bandwidth Product (Note 8)	f_T	—	250	—	MHz	V_{CE} = -10V, I_E = -5mA, f = 100MHz

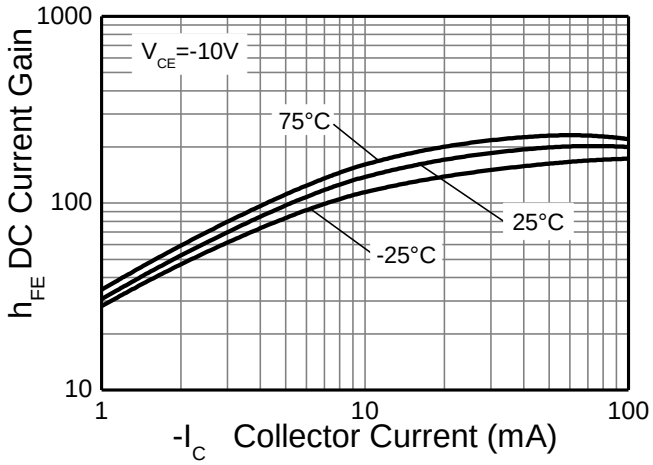
Notes: 6. Guarantees that the device will be switched OFF if the Input Voltage is less than -0.8V.
7. Guarantees that the device will be switched ON if the Input Voltage is more than -4V.
8. Transistor - For Reference Only.

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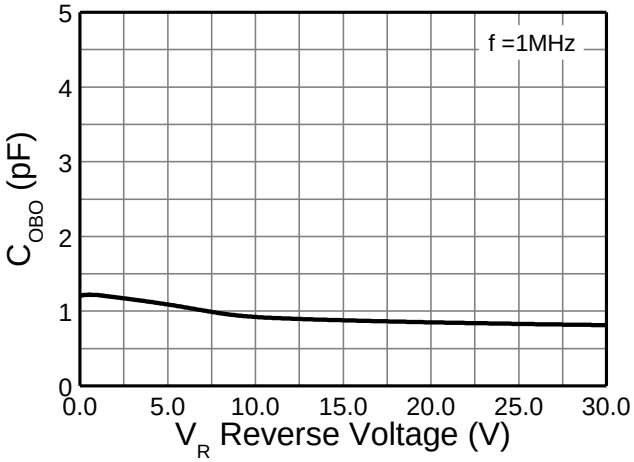
Typical Characteristics (@T_A = +25°C, unless otherwise specified.)



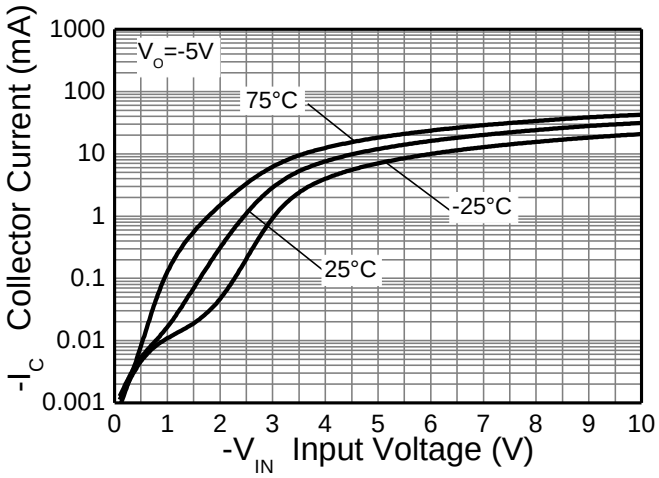
$-V_{CE(sat)}$ v Collector Current



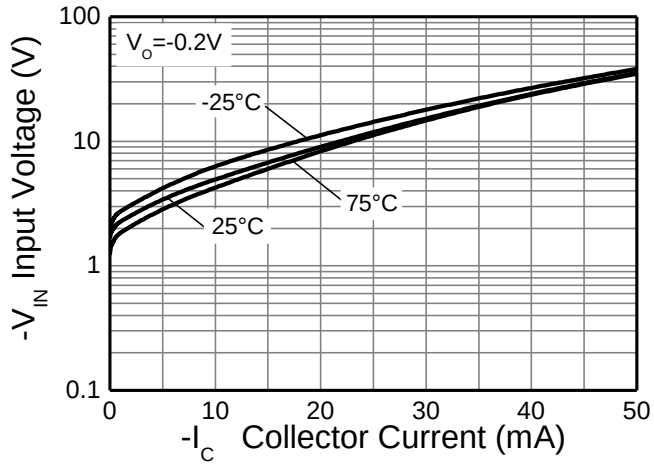
h_{FE} v Collector Current



Output Capacitance



Collector Current v Input Voltage



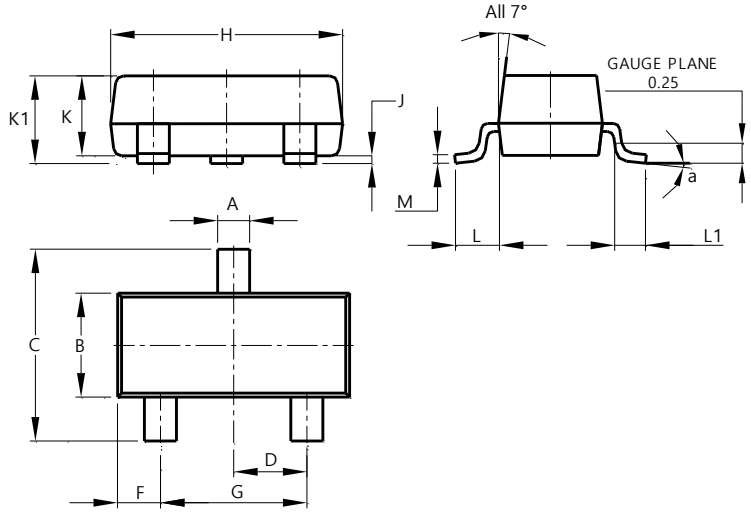
Input Voltage v Collector Current

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Package Outline Dimensions

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

SOT23

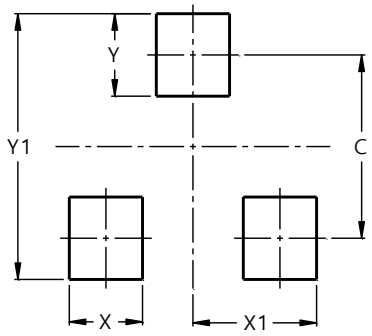


SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT23



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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