

## Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistors, R1 = R2
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](https://www.diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

## Mechanical Data

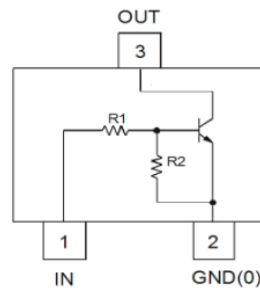
- Case: SOT523
- Case Material: Molded Plastic, "Green" Molding Compound  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208
- Weight: 0.002 grams (Approximate)

Part Number	R1, R2 (NOM)
DDTC123EE	2.2k $\Omega$
DDTC143EE	4.7k $\Omega$
DDTC114EE	10k $\Omega$
DDTC124EE	22k $\Omega$
DDTC144EE	47k $\Omega$
DDTC115EE	100k $\Omega$

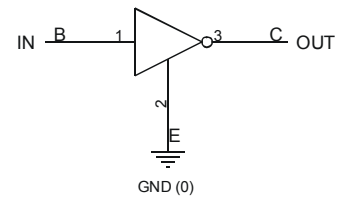
SOT523



Top View



Device Schematic



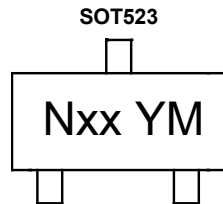
Equivalent Inverter Circuit

## Ordering Information (Note 4)

Product	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
DDTC123EE-7-F	Standard	N04	7	8	3000
DDTC143EE-7-F	Standard	N08	7	8	3000
DDTC114EE-7-F	Standard	N13	7	8	3000
DDTC124EE-7-F	Standard	N17	7	8	3000
DDTC144EE-7-F	Standard	N20	7	8	3000
DDTC115EE-7-F	Standard	N24	7	8	3000

- 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



NXX = Product Type Marking Code (See Ordering Information)  
 YM = Date Code Marking  
 Y or  $\bar{Y}$  = Year (ex: I = 2021)  
 M or  $\bar{M}$  = Month (ex: 9 = September)

### Date Code Key

Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Code	I	J	K	L	M	N	O	P	R	S	T	U

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

## Absolute Maximum Ratings (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Supply Voltage <Pin: (3) to (2)>	$V_{CC}$	50	V
Input Voltage <Pin: (1) to (2)>	$V_i$	-10 to +12 -10 to +30 -10 to +40 -10 to +40 -10 to +40 -10 to +40	V
Output Current	$I_o$	100 100 50 30 100 20	mA
Output Current	$I_C$ (Max)	100	mA

## Thermal Characteristics (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Notes 5 & 6)	$P_D$	150	mW
Thermal Resistance, Junction to Ambient Air (Note 5)	$R_{\theta JA}$	833	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

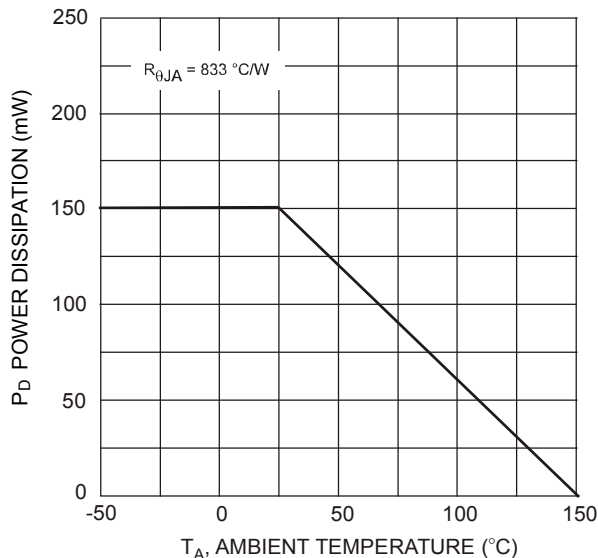
Notes: 5. Mounted on FR-4 PC Board with minimum recommended pad layout.  
 6. 150mW per element must not be exceeded.

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

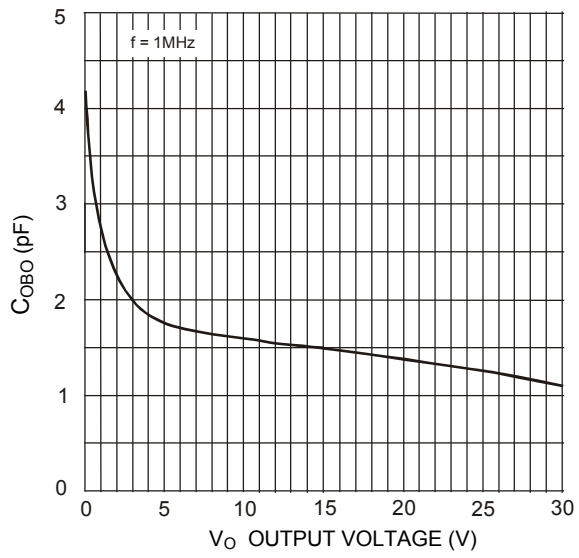
Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage		V <sub>I(off)</sub> (Note 7)	0.5	1.1	—	V	V <sub>CC</sub> = 5V, I <sub>O</sub> = 100µA
		V <sub>I(on)</sub> (Note 8)	—	1.9	3		V <sub>O</sub> = 0.3V, I <sub>O</sub> = 20mA, DDTC123EE V <sub>O</sub> = 0.3V, I <sub>O</sub> = 20mA, DDTC143EE V <sub>O</sub> = 0.3V, I <sub>O</sub> = 10mA, DDTC114EE V <sub>O</sub> = 0.3V, I <sub>O</sub> = 5mA, DDTC124EE V <sub>O</sub> = 0.3V, I <sub>O</sub> = 2mA, DDTC144EE V <sub>O</sub> = 0.3V, I <sub>O</sub> = 1mA, DDTC115EE
Output Voltage		V <sub>O(on)</sub>	—	0.1	0.3	V	I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5mA, DDTC123EE I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5mA, DDTC143EE I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5mA, DDTC114EE I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5mA, DDTC124EE I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5mA, DDTC144EE I <sub>O</sub> /I <sub>I</sub> = 5mA/0.25mA, DDTC115EE
Input Current	DDTC123EE DDTC143EE DDTC114EE DDTC124EE DDTC144EE DDTC115EE	I <sub>I</sub>	—	—	3.8 1.8 0.88 0.36 0.18 0.15	mA	V <sub>I</sub> = 5V
Output Current		I <sub>O(off)</sub>	—	—	0.5	µA	V <sub>CC</sub> = 50V, V <sub>I</sub> = 0V
DC Current Gain	DDTC123EE DDTC143EE DDTC114EE DDTC124EE DDTC144EE DDTC115EE	G <sub>I</sub>	20 20 30 56 68 82	—	—	—	V <sub>O</sub> = 5V, I <sub>O</sub> = 20mA 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
Input Resistor Tolerance		ΔR <sub>1</sub>	-30	—	+30	%	—
Resistance Ratio Tolerance		ΔR <sub>2</sub> /R <sub>1</sub>	0.8	1	1.2	%	—
Transition frequency (Note 9)		f <sub>T</sub>	—	250	—	MHz	V <sub>CE</sub> = -10V, I <sub>E</sub> = 5mA, f = 100MHz

Notes: 7. Guarantees that the device will be switched OFF if the Input Voltage is less than 0.5V.  
8. Guarantees that the device will be switched ON if the Input Voltage is more than 3V.  
9. Transistor only.

**Typical Electrical Characteristics**

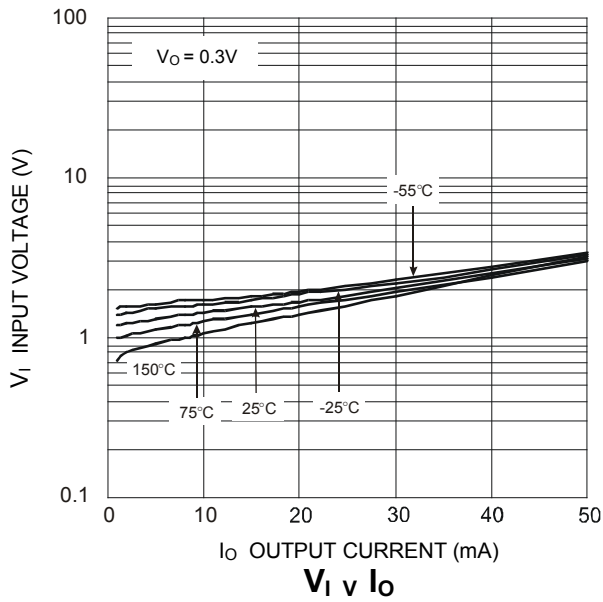
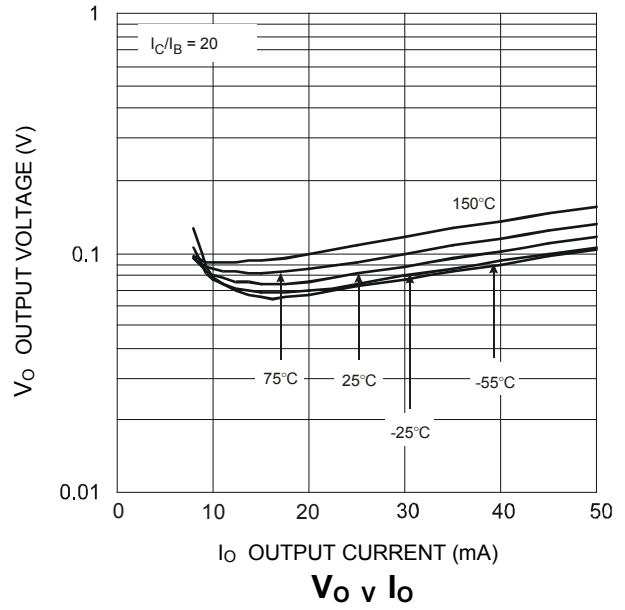
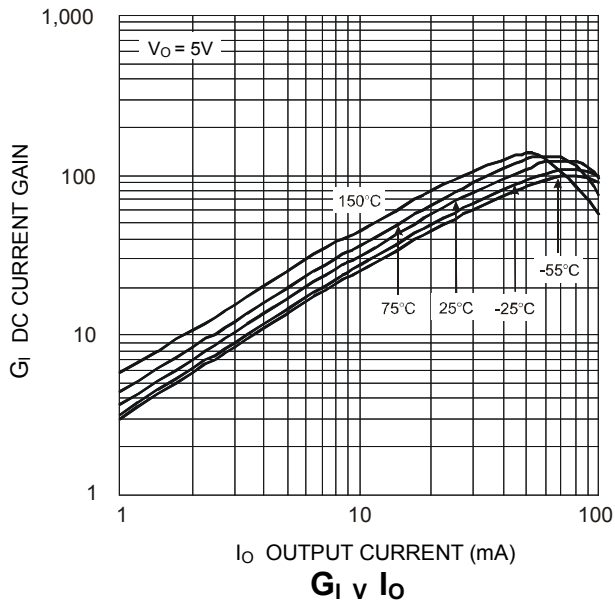


**Derating Curve**

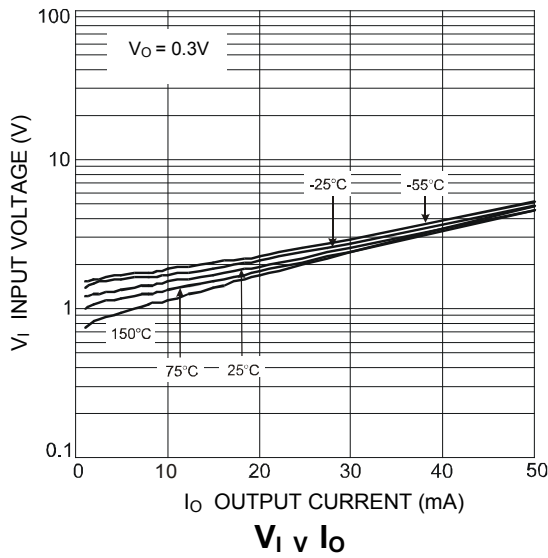
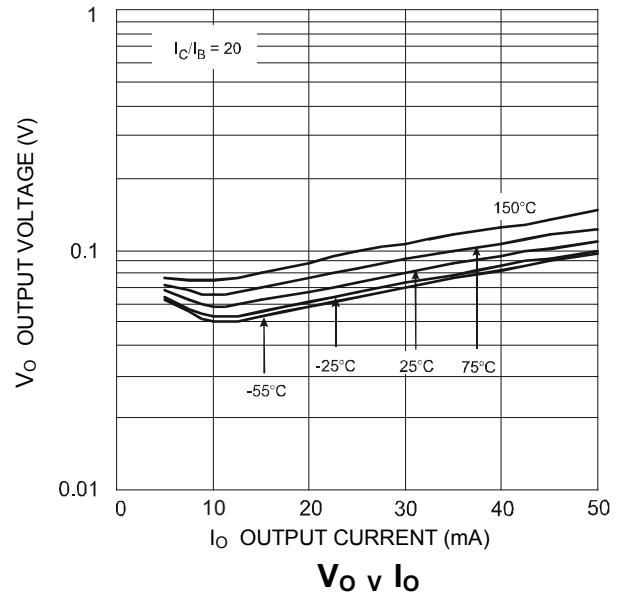
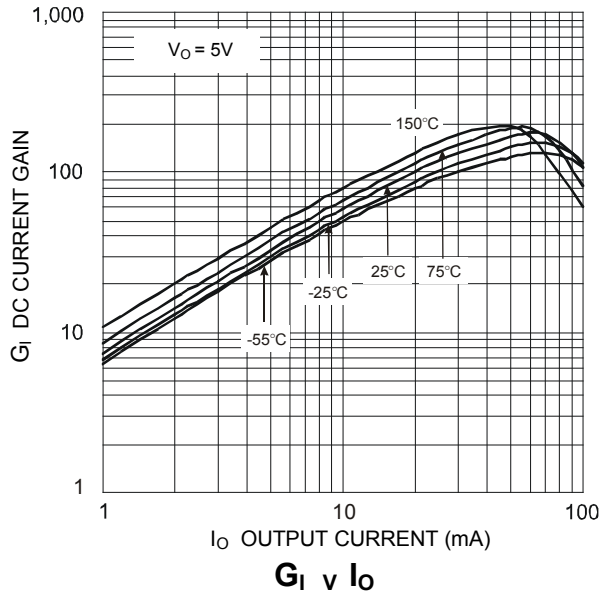


**C<sub>obo</sub> v V<sub>o</sub>**

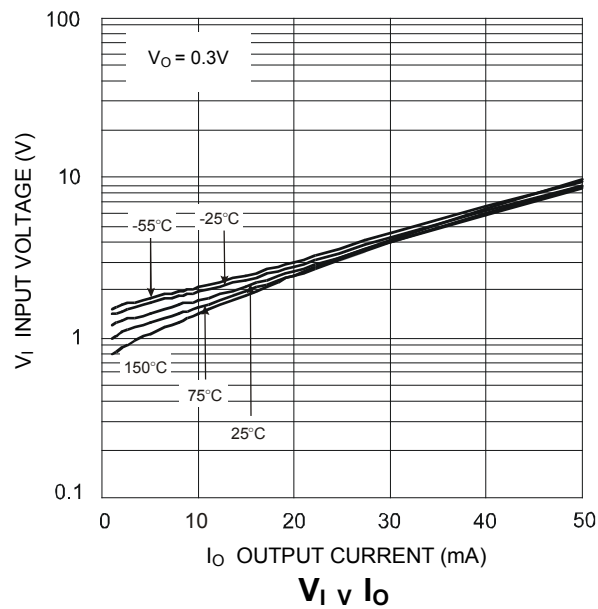
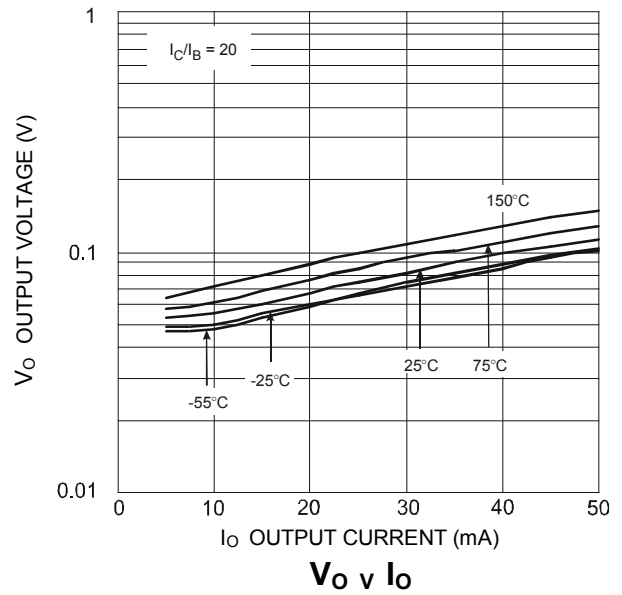
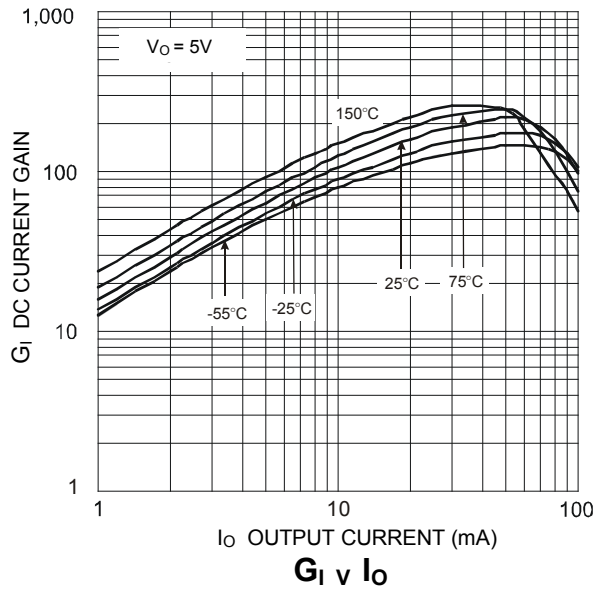
**Typical Electrical Characteristics – DDTC123EE**



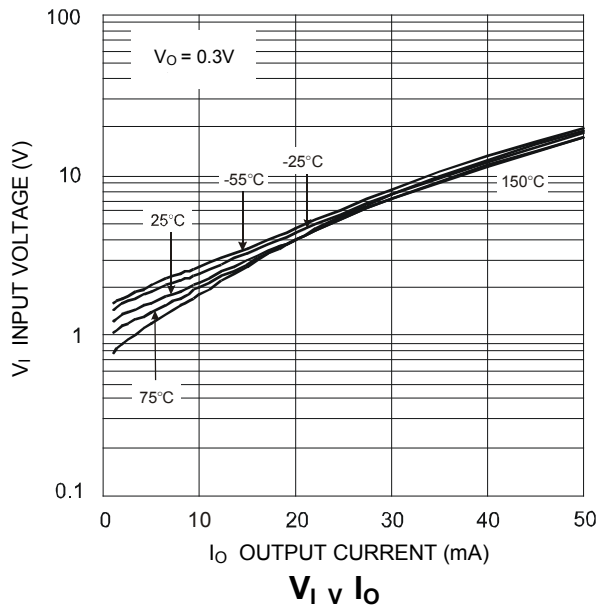
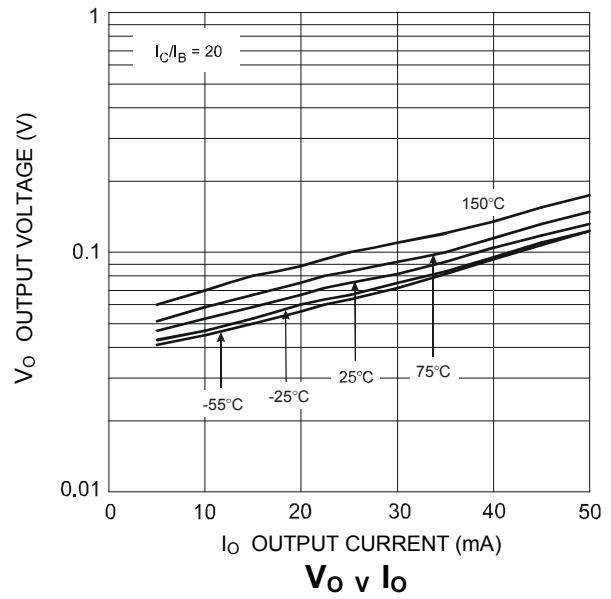
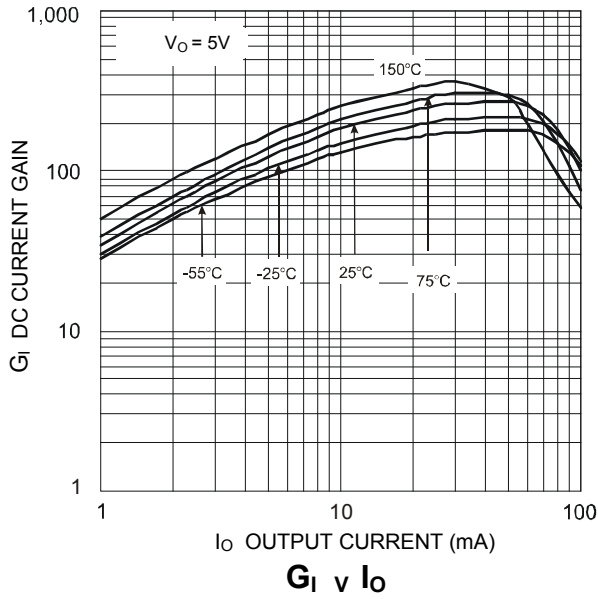
**Typical Electrical Characteristics – DDTC143EE**



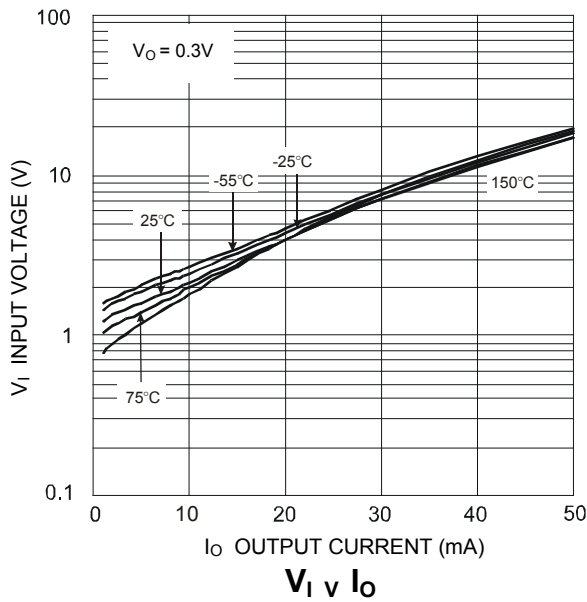
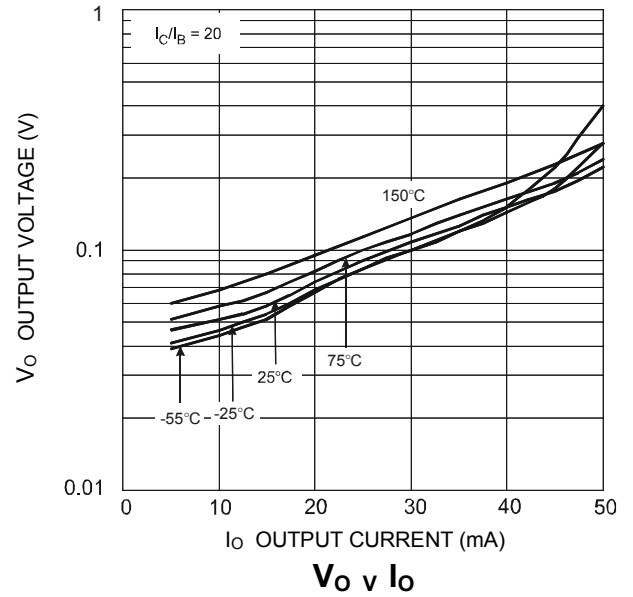
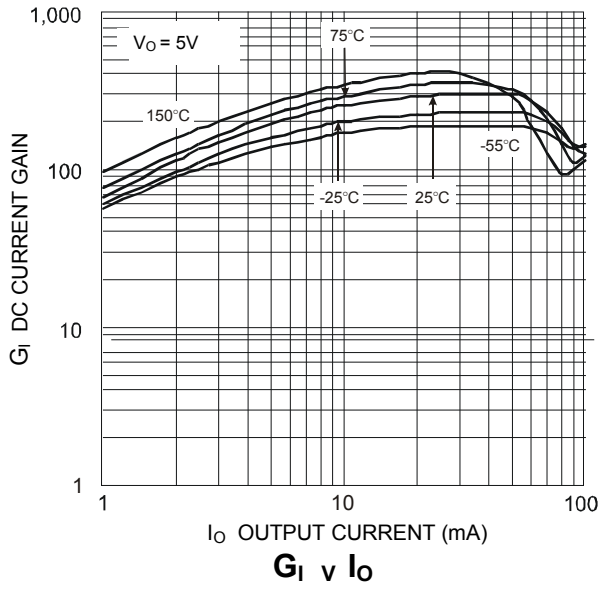
**Typical Electrical Characteristics – DDTC114EE**



**Typical Electrical Characteristics – DDTC124EE**



**Typical Electrical Characteristics – DDTC144EE**

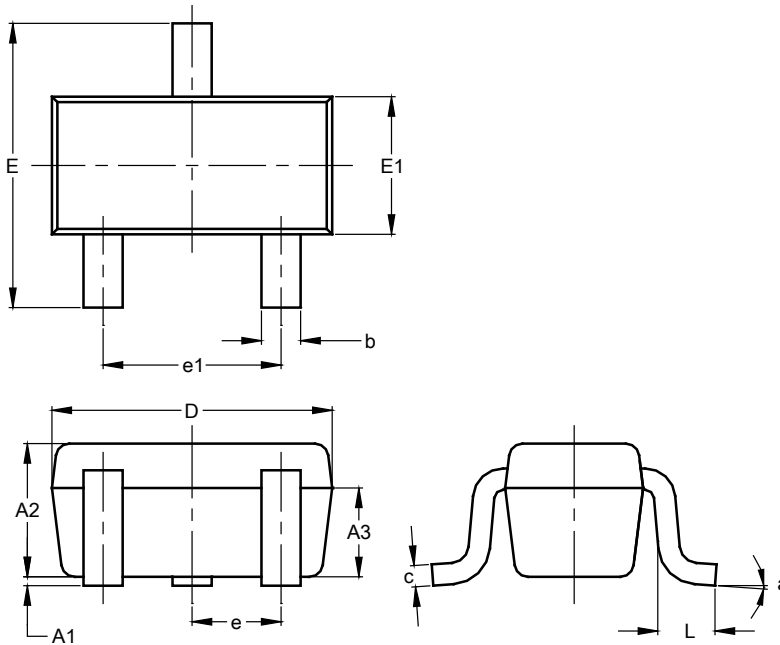




**Package Outline Dimensions**

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

**SOT523**

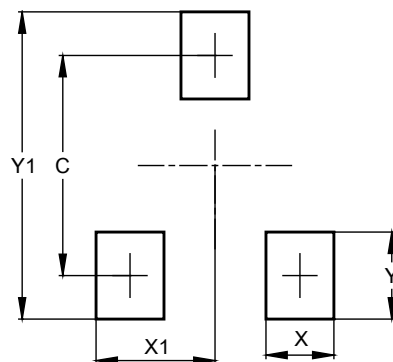


SOT523			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.60	0.80	0.75
A3	0.45	0.65	0.50
b	0.15	0.30	0.22
c	0.10	0.20	0.12
D	1.50	1.70	1.60
E	1.45	1.75	1.60
E1	0.75	0.85	0.80
e	0.50 BSC		
e1	0.90	1.10	1.00
L	0.20	0.40	0.33
a	0°	--	8°
<b>All Dimensions in mm</b>			

**Suggested Pad Layout**

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

**SOT523**



Dimensions	Value (in mm)
C	1.29
X	0.40
X1	0.70
Y	0.51
Y1	1.80

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