DDTC (R1 = R2 SERIES) EE

NPN PRE-BIASED TRANSISTOR IN SOT523

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 or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

Mechanical Data

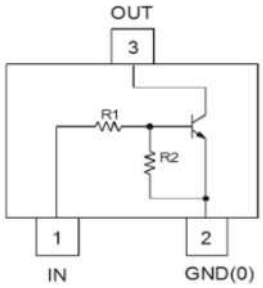
- Case: SOT523
- Case Material: Molded Plastic, "Green" Molding Compound UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.002 grams (Approximate)

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

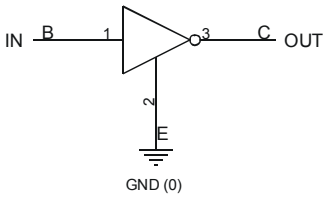
SOT523



Top View



Device Schematic



Equivalent Inverter Circuit

Ordering Information (Note 4)

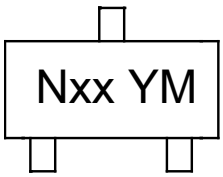
Product	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
DDTC123EE-7-F	Standard	N04	7	8	3000
DDTC143EE-7-F	Standard	N08	7	8	3000
DDTC114EE-7-F	Standard	N13	7	8	3000
DDTC124EE-7-F	Standard	N17	7	8	3000
DDTC144EE-7-F	Standard	N20	7	8	3000
DDTC115EE-7-F	Standard	N24	7	8	3000

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/.

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Marking Information

SOT523



NXX = Product Type Marking Code (See Ordering Information)
YM = Date Code Marking
Y or $\overline{Y}$ = Year (ex: I = 2021)
M or $\overline{M}$ = 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°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Supply Voltage <Pin: (3) to (2)>		V_{CC}	50	V
Input Voltage <Pin: (1) to (2)>	DDTC123EE DDTC143EE DDTC114EE DDTC124EE DDTC144EE DDTC115EE	V_I	-10 to +12 -10 to +30 -10 to +40 -10 to +40 -10 to +40 -10 to +40	V
Output Current	DDTC123EE DDTC143EE DDTC114EE DDTC124EE DDTC144EE DDTC115EE	I_O	100 100 50 30 100 20	mA
Output Current		I_C (Max)	100	mA

Thermal Characteristics (@ T_A = +25°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	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

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

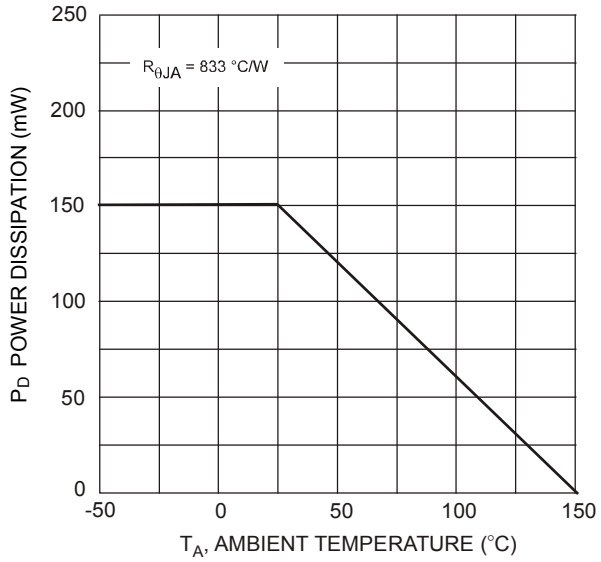
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Electrical Characteristics (@ T_A = +25°C, unless otherwise specified.)

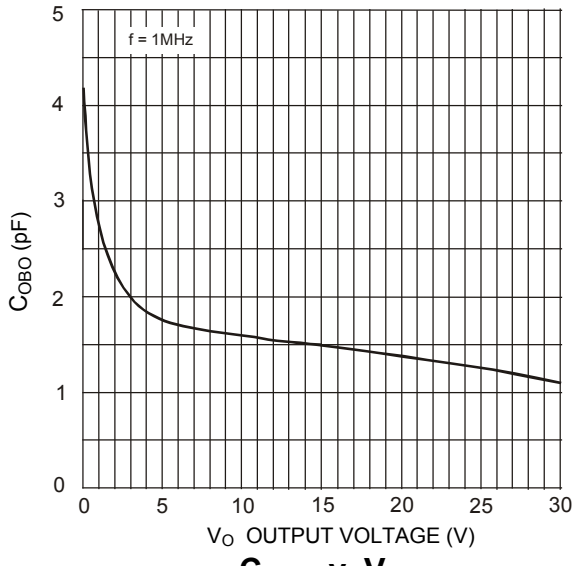
Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage		$V_{I(off)}$ (Note 7)	0.5	1.1	—	V	V_{CC} = 5V, I_O = 100µA
		$V_{I(on)}$ (Note 8)	—	1.9	3		V_O = 0.3V, I_O = 20mA, DDTC123EE V_O = 0.3V, I_O = 20mA, DDTC143EE V_O = 0.3V, I_O = 10mA, DDTC114EE V_O = 0.3V, I_O = 5mA, DDTC124EE V_O = 0.3V, I_O = 2mA, DDTC144EE V_O = 0.3V, I_O = 1mA, DDTC115EE
Output Voltage		$V_{O(on)}$	—	0.1	0.3	V	I_O/I_I = 10mA/0.5mA, DDTC123EE I_O/I_I = 10mA/0.5mA, DDTC143EE I_O/I_I = 10mA/0.5mA, DDTC114EE I_O/I_I = 10mA/0.5mA, DDTC124EE I_O/I_I = 10mA/0.5mA, DDTC144EE I_O/I_I = 5mA/0.25mA, DDTC115EE
Input Current	DDTC123EE DDTC143EE DDTC114EE DDTC124EE DDTC144EE DDTC115EE	I_I	—	—	3.8 1.8 0.88 0.36 0.18 0.15	mA	V_I = 5V
Output Current		$I_{O(off)}$	—	—	0.5	µA	V_{CC} = 50V, V_I = 0V
DC Current Gain	DDTC123EE DDTC143EE DDTC114EE DDTC124EE DDTC144EE DDTC115EE	G_I	20 20 30 56 68 82	—	—	—	V_O = 5V, I_O = 20mA V_O = 5V, I_O = 10mA V_O = 5V, I_O = 5mA V_O = 5V, I_O = 5mA V_O = 5V, I_O = 5mA V_O = 5V, I_O = 5mA
Input Resistor Tolerance		ΔR_1	-30	—	+30	%	—
Resistance Ratio Tolerance		$\Delta R_2/R_1$	0.8	1	1.2	%	—
Transition frequency (Note 9)		f_T	—	250	—	MHz	V_{CE} = -10V, I_E = 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



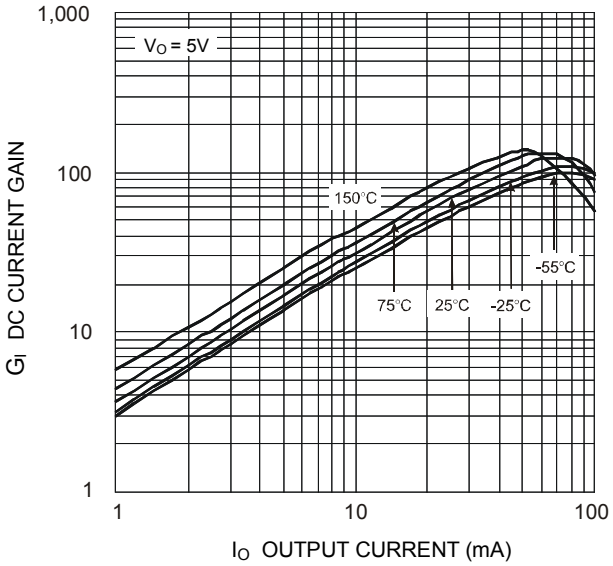
Derating Curve



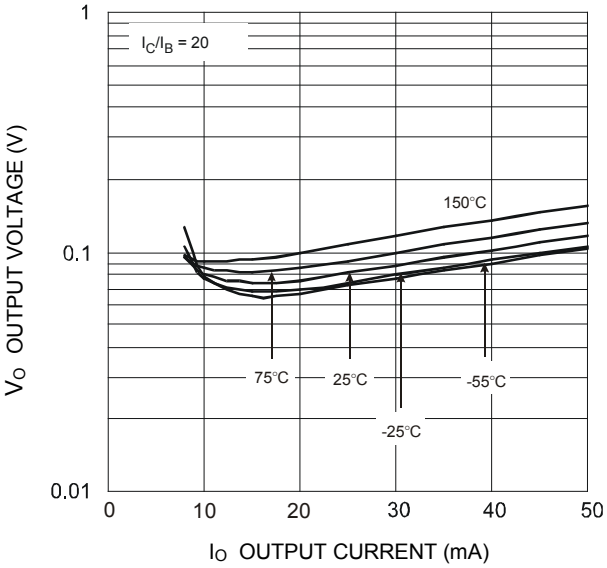
C_{OBO} v V_O

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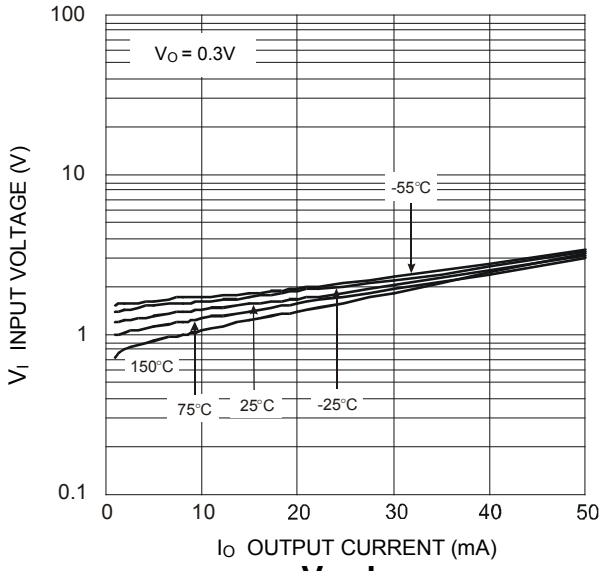
Typical Electrical Characteristics – DDTC123EE



G_I v I_O



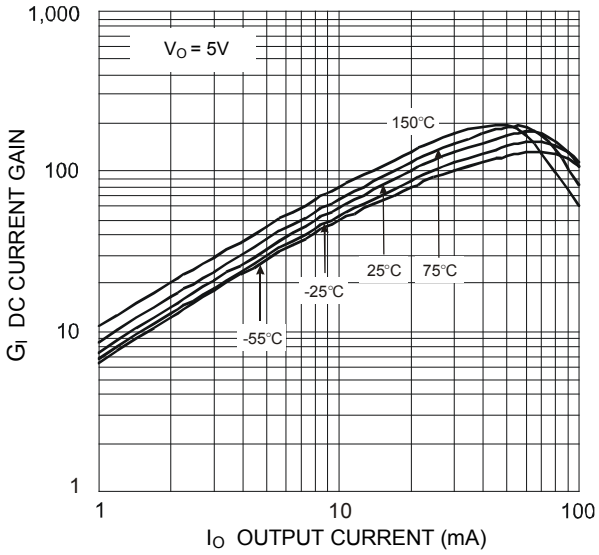
V_O v I_O



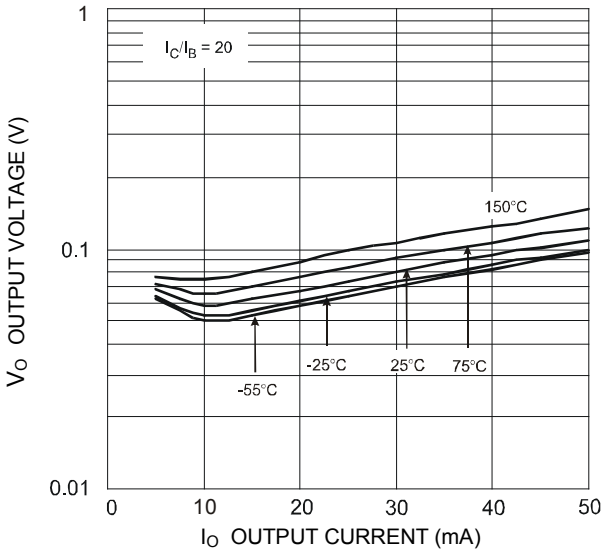
V_I v I_O

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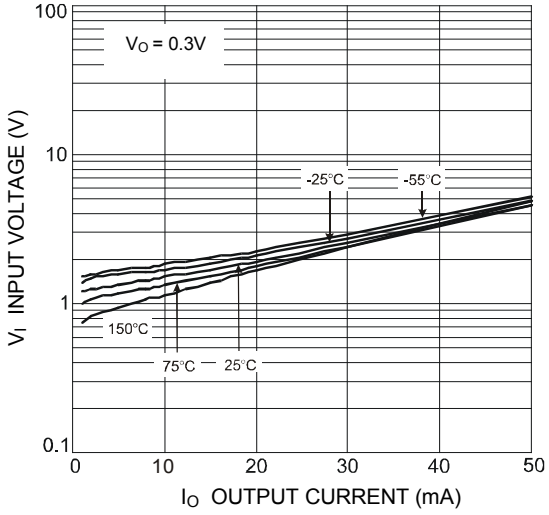
Typical Electrical Characteristics – DDTC143EE



G_I v I_O



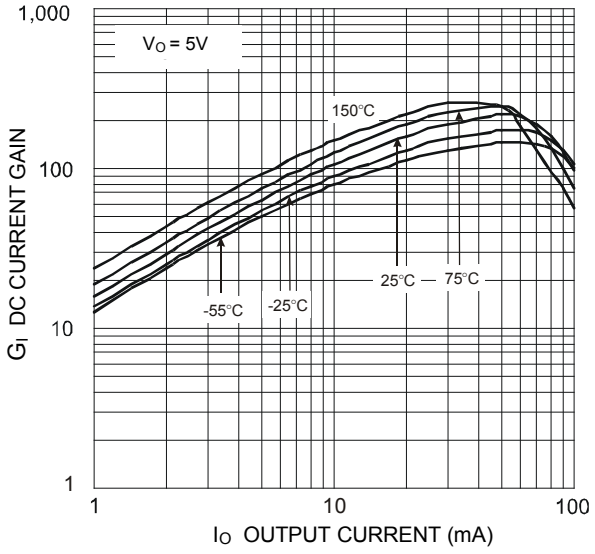
V_O v I_O



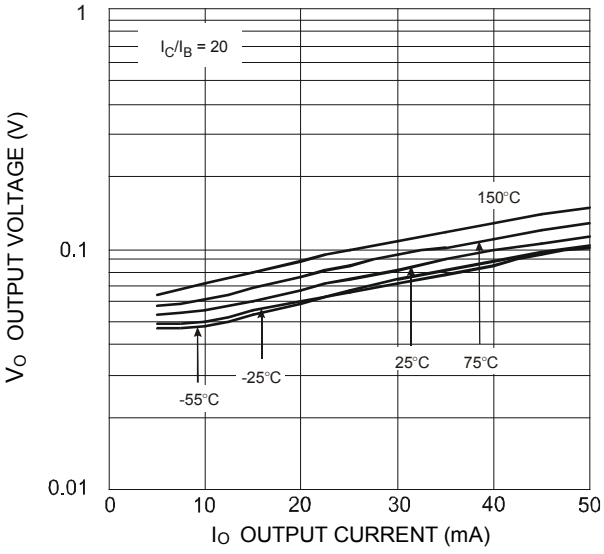
V_I v I_O

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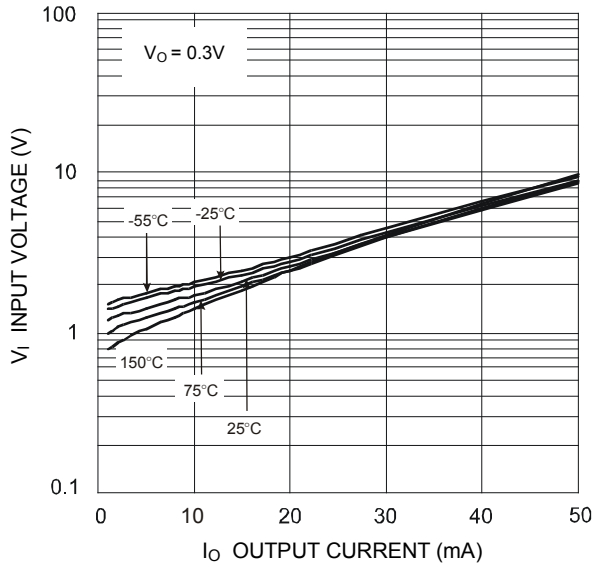
Typical Electrical Characteristics – DDTC114EE



G_I v I_O



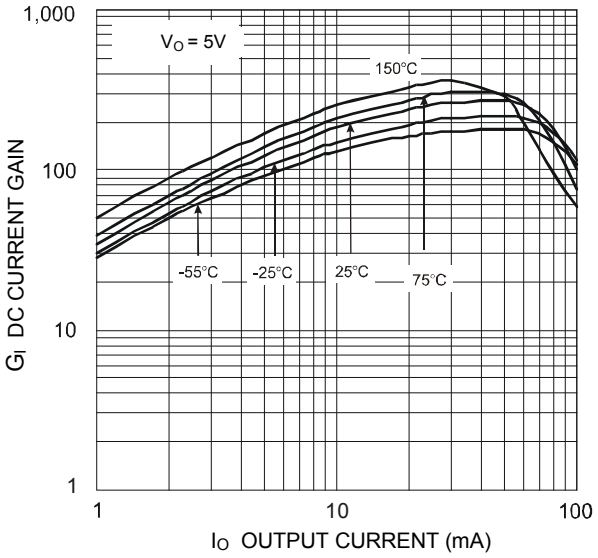
V_O v I_O



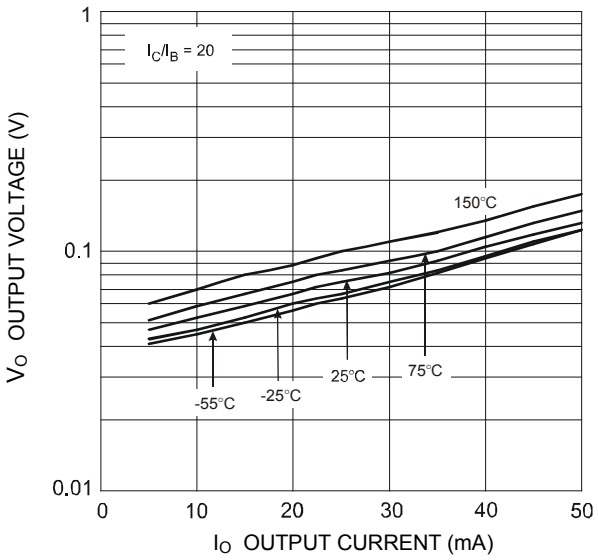
V_I v I_O

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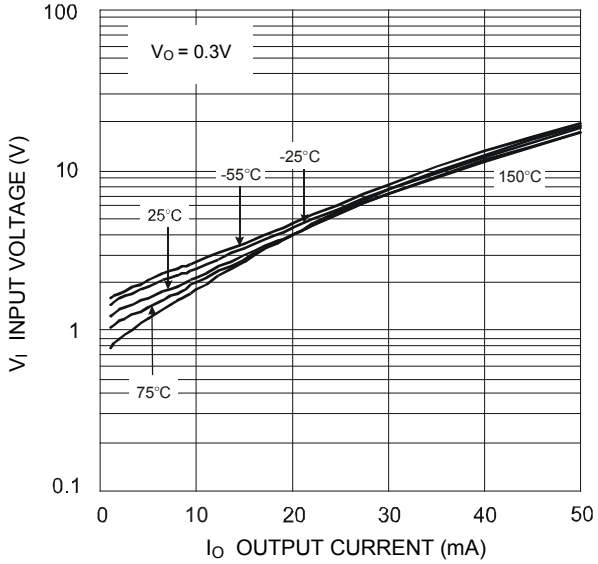
Typical Electrical Characteristics – DDTC124EE



G_I v I_O



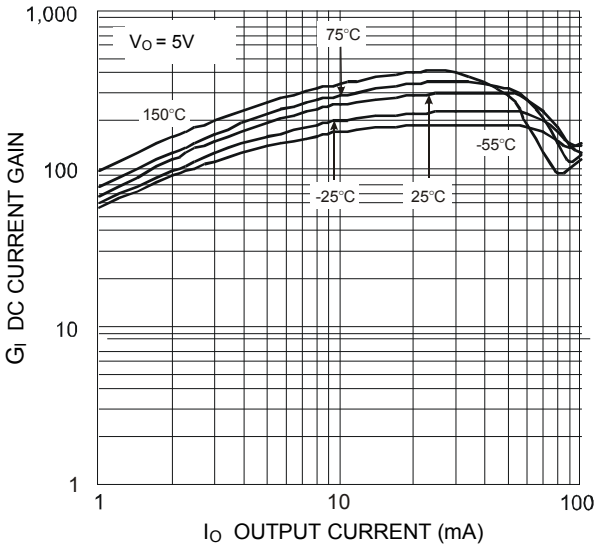
V_O v I_O



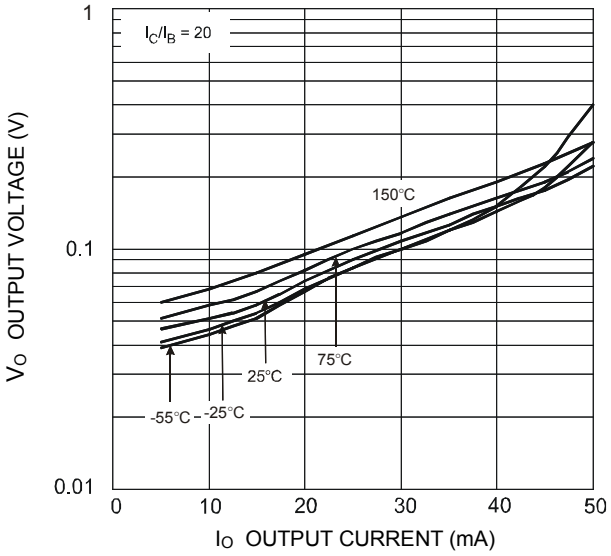
V_I v I_O

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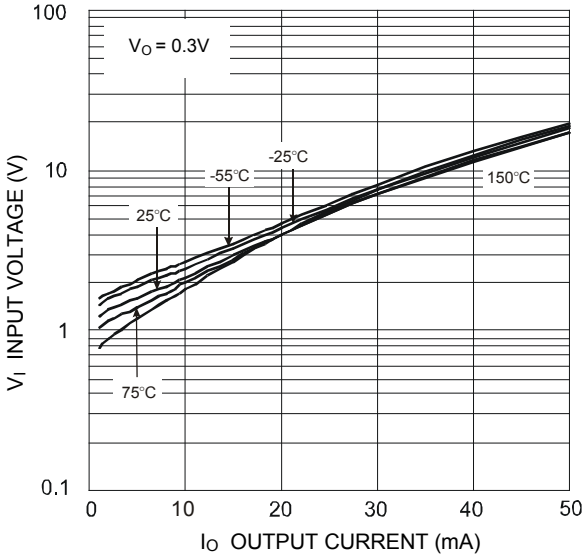
Typical Electrical Characteristics – DDTC144EE



G_I v I_O



V_O v I_O



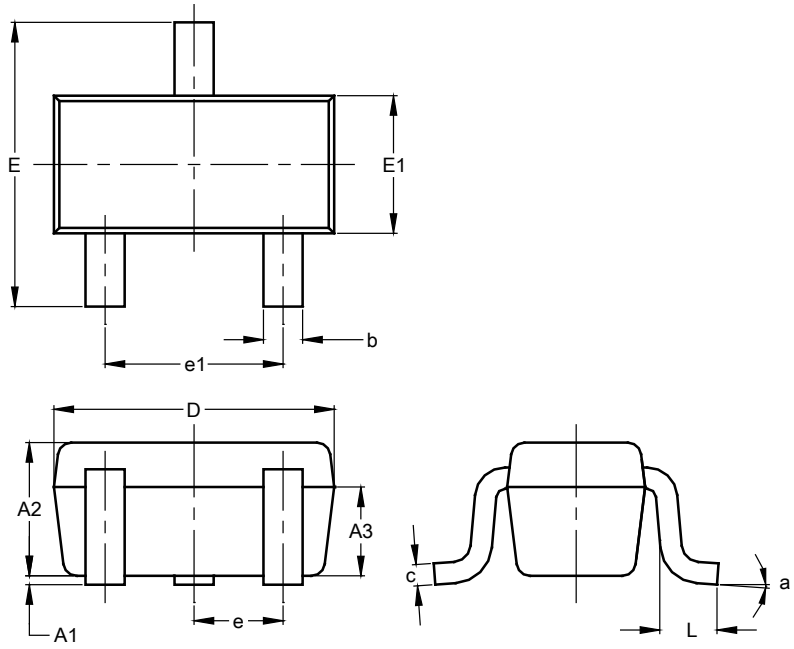
V_I v I_O

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Package Outline Dimensions

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

SOT523

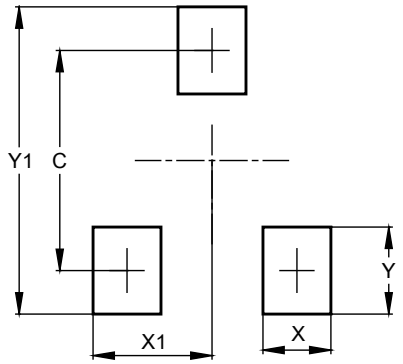


SOT523			
Dim	**Min**	**Max**	**Typ**
A1	0.00	0.10	0.05
A2	0.60	0.80	0.75
A3	0.45	0.65	0.50
b	0.15	0.30	0.22
c	0.10	0.20	0.12
D	1.50	1.70	1.60
E	1.45	1.75	1.60
E1	0.75	0.85	0.80
e	0.50 BSC		
e1	0.90	1.10	1.00
L	0.20	0.40	0.33
a	0°	--	8°
All Dimensions in mm			

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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