NPN PRE-BIASED 100mA SURFACE MOUNT TRANSISTOR

Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistors
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

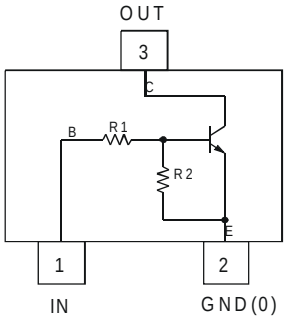
Part Number	R1 (NOM)	R2 (NOM)	Marking
DDTC122LE	0.22kΩ	10kΩ	N81
DDTC142JE	0.47kΩ	10kΩ	N82
DDTC122TE	0.22kΩ	OPEN	N83
DDTC142TE	0.47kΩ	OPEN	N84

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: Matte Tin Finish. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.002 grams (Approximate)

SOT523

Top View



Schematic and Pin Diagram

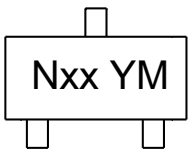
Ordering Information (Note 4)

Part Number	Compliance	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
DDTC122LE-7-F	AEC-Q101	7	8	3,000
DDTC142JE-7-F	AEC-Q101	7	8	3,000
DDTC122TE-7-F	AEC-Q101	7	8	3,000
DDTC142TE-7-F	AEC-Q101	7	8	3,000

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

SOT523



Nxx = Product Type Marking Code
(See Table in Features)
YM = Date Code Marking
Y or $\overline{Y}$ = Year (ex: F = 2018)
M or $\overline{M}$ = Month (ex: 9 = September)

Date Code Key

Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Code	F	G	H	I	J	K	L	M	N	O

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, (3) to (2)		V_{CC}	50	V
Input Voltage, (1) to (2)	DDTC122LE DDTC142JE	V_{IN}	-5 to +6 -5 to +6	V
Input Voltage, (2) to (1)	DDTC122TE DDTC142TE	$V_{EBO\ (MAX)}$	5	V
Output Current	All	I_C	100	mA

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

Characteristic	Symbol	Value	Unit
Power Dissipation	P_D	150	mW
Thermal Resistance, Junction to Ambient Air (Note 5)	$R_{\theta JA}$	625	°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.

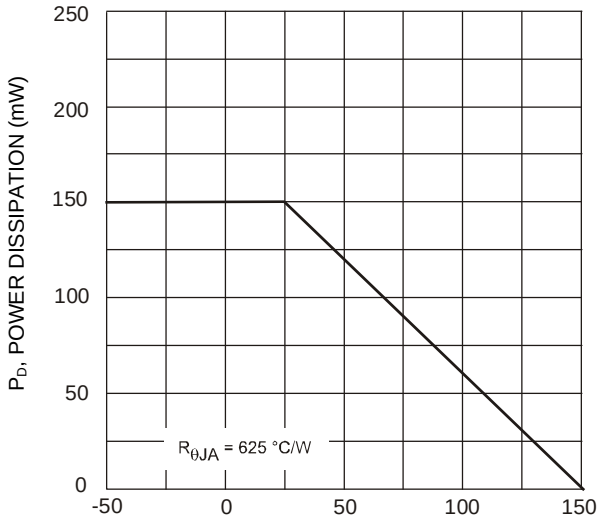


Fig. 1 Power Derating Curve

Electrical Characteristics R1, R2 Types (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	DDTC122LE DDTC142JE	$V_{I(OFF)}$	0.3 0.3	—	—	V	V_{CC} = 5V, I_O = 100µA
	DDTC122LE DDTC142JE	$V_{I(ON)}$	—	—	2.0 2.0	V	V_O = 0.3V, I_O = 20mA V_O = 0.3V, I_O = 20mA
Output Voltage		$V_{O(ON)}$	—	—	0.3	V	I_O/I_I = 5mA/0.25mA
Input Current	DDTC122LE DDTC142JE	I_I	—	—	28 13	mA	V_I = 5V
Output Current		$I_{O(OFF)}$	—	—	0.5	µA	V_{CC} = 50V, V_I = 0V
DC Current Gain	DDTC122LE DDTC142JE	G_I	56 56	—	—	—	V_O = 5V, I_O = 10mA
Gain-Bandwidth Product (Note 6)		f_T	—	200	—	MHz	V_{CE} = 10V, I_E = 5mA, f = 100MHz

Electrical Characteristics R1- Only Type (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage		BV_{CBO}	50	—	—	V	I_C = 50µA
Collector-Emitter Breakdown Voltage		BV_{CEO}	40	—	—	V	I_C = 1mA
Emitter-Base Breakdown Voltage	DDTC122TE DDTC142TE	BV_{EBO}	5	—	—	V	I_E = 50µA I_E = 50µA
Collector Cutoff Current		I_{CBO}	—	—	0.5	µA	V_{CB} = 50V
Emitter Cutoff Current	DDTC122TE DDTC142TE	I_{EBO}	— —	—	0.5 0.5	µA	V_{EB} = 4V
Collector-Emitter Saturation Voltage		$V_{CE(SAT)}$	—	—	0.3	V	I_C = 5mA, I_B = 0.25mA
DC Current Transfer Ratio	DDTC122TE DDTC142TE	h_{FE}	100 100	250 250	600 600	—	I_C = 1mA, V_{CE} = 5V
Gain-Bandwidth Product (Note 6)		f_T	—	200	—	MHz	V_{CE} = 10V, I_E = -5mA, f = 100MHz

Note 6: Transistor – For Reference only.

Package Outline Dimensions

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

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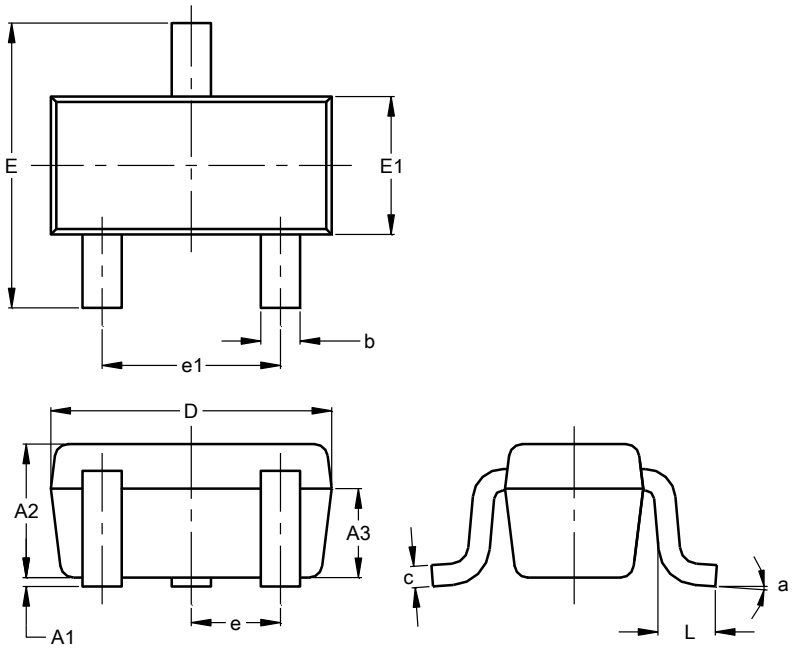
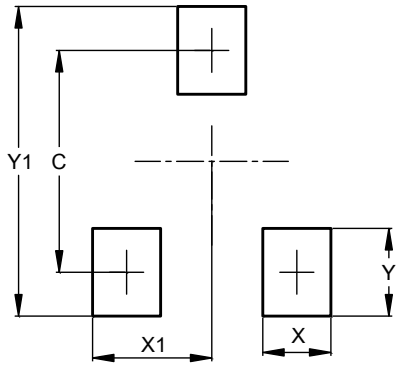


SOT523			
Dim	**Min**	**Max**	**Typ**
A1	0.00	0.10	0.05
A2	0.60	0.80	0.75
A3	0.45	0.65	0.50
b	0.15	0.30	0.22
c	0.10	0.20	0.12
D	1.50	1.70	1.60
E	1.45	1.75	1.60
E1	0.75	0.85	0.80
e	0.50 BSC		
e1	0.90	1.10	1.00
L	0.20	0.40	0.33
a	0°	--	8°
All Dimensions in mm			

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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