NPN PRE-BIASED 100 MA SURFACE MOUNT TRANSISTOR

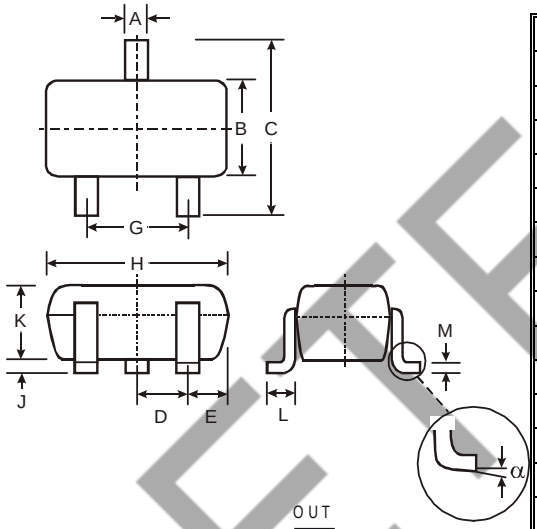
OBSOLETE – PART DISCONTINUED

Features

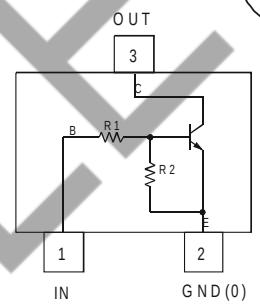
- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistors
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts 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: SOT-323
- Case Material: Molded Plastic, "Green" Molding Compound, Note 4. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Marking Information: See Table Below & Page 3
- Ordering Information: See Page 3
- Weight: 0.006 grams (Approximate)



SOT-323		
Dim	**Min**	**Max**
A	0.25	0.40
B	1.15	1.35
C	2.00	2.20
D	0.65 Nominal	
E	0.30	0.40
G	1.20	1.40
H	1.80	2.20
J	0.0	0.10
K	0.90	1.00
L	0.25	0.40
M	0.10	0.18
α	0°	8°
All Dimensions in mm		



Schematic and Pin Configuration

P/N	R1 (NOM)	R2 (NOM)	Type Code
DDTC122LU	0.22KΩ	10KΩ	N81
DDTC142JU	0.47KΩ	10KΩ	N82
DDTC122TU	0.22KΩ	OPEN	N83
DDTC142TU	0.47KΩ	OPEN	N84

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) DDTC122LU DDTC142JU		V_{IN}	-5 to +6 -5 to +6	V
Input Voltage, (2) to (1)	DDTC122TU DDTC142TU	$V_{EBO\ (MAX)}$	5	V
Output Current	All	I_C	100	mA
Power Dissipation	(Note 5)	P_d	200	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

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. 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.
5. Mounted on FR4 PC Board with recommended pad layout at http://www.diodes.com/package-outlines.html.

Electrical Characteristics @T_A = 25°C unless otherwise specified **R1, R2 Types**

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	DDTC122LU DDTC142JU	$V_{I(off)}$	0.3 0.3	—	—	V	V_{CC} = 5V, I_O = 100μA
	DDTC122LU DDTC142JU	$V_{I(on)}$	—	—	2.0 2.0	V	V_O = 0.3V, I_O = 20mA V_O = 0.3V, I_O = 20mA
Output Voltage		$V_{O(on)}$	—	—	0.3V	V	I_O/I_I = 5mA/0.25mA
Input Current	DDTC122LU DDTC142JU	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	DDTC122LU DDTC142JU	G_I	56 56	—	—	—	V_O = 5V, I_O = 10mA
Gain-Bandwidth Product*		f_T	—	200	—	MHz	V_{CE} = 10V, I_E = 5mA, f = 100MHz

* Transistor - For Reference Only

Electrical Characteristics @T_A = 25°C unless otherwise specified **R1-Only Types**

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	DDTC122TU DDTC142TU	BV_{EBO}	5	—	—	V	I_E = 50μA I_E = 50μA
Collector Cutoff Current		I_{CBO}	—	—	0.5	μA	V_{CB} = 50V
Emitter Cutoff Current	DDTC122TU DDTC142TU	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	DDTC122TU DDTC142TU	h_{FE}	100 100	250 250	600 600	—	I_C = 1mA, V_{CE} = 5V
Gain-Bandwidth Product*		f_T	—	200	—	MHz	V_{CE} = 10V, I_E = -5mA, f = 100MHz

* Transistor - For Reference Only

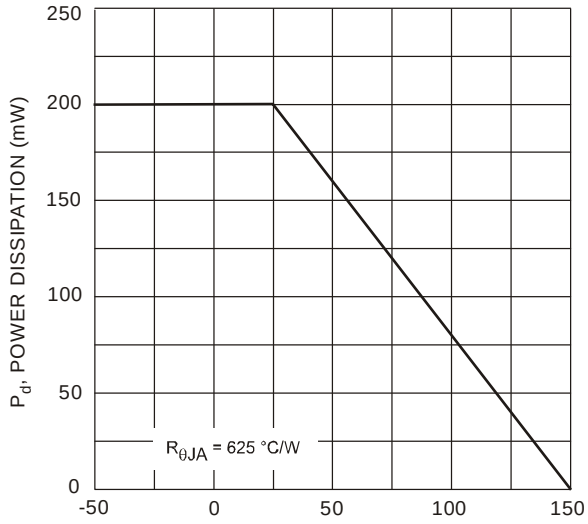


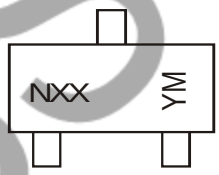
Fig. 1 Power Derating Curve

Ordering Information (Notes 4 & 6)

Device	Packaging	Shipping
DDTC122LU-7-F	SOT-323	3000/Tape & Reel
DDTC142JU-7-F	SOT-323	3000/Tape & Reel
DDTC122TU-7-F	SOT-323	3000/Tape & Reel
DDTC142TU-7-F	SOT-323	3000/Tape & Reel

Notes:
4. 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.
5. Mounted on FR4 PC Board with recommended pad layout at http://www.diodes.com/package-outlines.html.
6. 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 Table on Page 1
YM = Date Code Marking
Y = Year ex: I = 2021
M = Month ex: 9 = September

Date Code Key

Year	2010	…	2021	2022	2023	2024	2025	2026	2027	2028	2029
Code	X	…	I	J	K	L	M	N	O	P	R

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

IMPORTANT NOTICE

1. DIODES INCORPORATED AND ITS SUBSIDIARIES ("DIODES") MAKE NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO ANY INFORMATION CONTAINED IN THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

2. The Information contained herein is for informational purpose only and is provided only to illustrate the operation of Diodes products described herein and application examples. Diodes does not assume any liability arising out of the application or use of this document or any product described herein. This document is intended for skilled and technically trained engineering customers and users who design with Diodes products. Diodes products may be used to facilitate safety-related applications; however, in all instances customers and users are responsible for (a) selecting the appropriate Diodes products for their applications, (b) evaluating the suitability of the Diodes products for their intended applications, (c) ensuring their applications, which incorporate Diodes products, comply the applicable legal and regulatory requirements as well as safety and functional-safety related standards, and (d) ensuring they design with appropriate safeguards (including testing, validation, quality control techniques, redundancy, malfunction prevention, and appropriate treatment for aging degradation) to minimize the risks associated with their applications.

3. Diodes assumes no liability for any application-related information, support, assistance or feedback that may be provided by Diodes from time to time. Any customer or user of this document or products described herein will assume all risks and liabilities associated with such use, and will hold Diodes and all companies whose products are represented herein or on Diodes' websites, harmless against all damages and liabilities.

4. Products described herein may be covered by one or more United States, international or foreign patents and pending patent applications. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks and trademark applications. Diodes does not convey any license under any of its intellectual property rights or the rights of any third parties (including third parties whose products and services may be described in this document or on Diodes' website) under this document.

5. Diodes products are provided subject to Diodes' Standard Terms and Conditions of Sale (https://www.diodes.com/about/company/terms-and-conditions/terms-and-conditions-of-sales/) or other applicable terms. This document does not alter or expand the applicable warranties provided by Diodes. Diodes does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel.

6. Diodes products and technology may not be used for or incorporated into any products or systems whose manufacture, use or sale is prohibited under any applicable laws and regulations. Should customers or users use Diodes products in contravention of any applicable laws or regulations, or for any unintended or unauthorized application, customers and users will (a) be solely responsible for any damages, losses or penalties arising in connection therewith or as a result thereof, and (b) indemnify and hold Diodes and its representatives and agents harmless against any and all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim relating to any noncompliance with the applicable laws and regulations, as well as any unintended or unauthorized application.

7. While efforts have been made to ensure the information contained in this document is accurate, complete and current, it may contain technical inaccuracies, omissions and typographical errors. Diodes does not warrant that information contained in this document is error-free and Diodes is under no obligation to update or otherwise correct this information. Notwithstanding the foregoing, Diodes reserves the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes.

8. Any unauthorized copying, modification, distribution, transmission, display or other use of this document (or any portion hereof) is prohibited. Diodes assumes no responsibility for any losses incurred by the customers or users or any third parties arising from any such unauthorized use.

www.diodes.com