# NPN PRE-BIASED SMALL SIGNAL DUAL SURFACE MOUNT TRANSISTOR

## Features

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

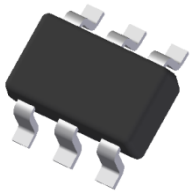
## Mechanical Data

- Package: SOT363
- 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: 0.006 grams (Approximate)

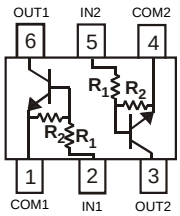
| Part Number | R1 (NOM) | R2 (NOM) |
|---|---|---|
| DDC124EU | 22kΩ | 22kΩ |
| DDC144EU | 47kΩ | 47kΩ |
| DDC114YU | 10kΩ | 47kΩ |
| DDC123JU | 2.2kΩ | 47kΩ |
| DDC114EU | 10kΩ | 10kΩ |
| DDC143XU | 4.7kΩ | 10kΩ |
| DDC143ZU | 4.7kΩ | 47kΩ |
| DDC115EU | 100kΩ | 100kΩ |

| Part Number | R1 Only |
|---|---|
| DDC113TU | 1kΩ |
| DDC143TU | 4.7kΩ |
| DDC114TU | 10kΩ |

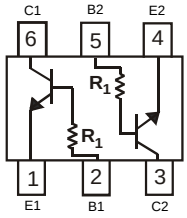
**SOT363**



Top View




R1, R2




R1 Only

Device Schematic

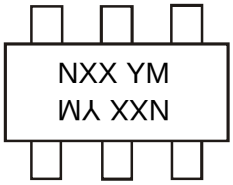
## Ordering Information (Notes 4, 5)

| Part Number | Status | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|---|---|---|---|---|---|
| DDC124EU-7-F | Active | N17 | 7 | 8 | 3,000 |
| DDC124EUQ-7-F | NRND (Use ADC124EUQ) | N17 | 7 | 8 | 3,000 |
| DDC144EU-7-F | Active | N20 | 7 | 8 | 3,000 |
| DDC114YU-7-F | Active | N14 | 7 | 8 | 3,000 |
| DDC114YUQ-7-F | NRND (Use ADC114YUQ) | N14 | 7 | 8 | 3,000 |
| DDC114YUQ-13-F | NRND (Use ADC114YUQ) | N14 | 13 | 8 | 10,000 |
| DDC123JU-7-F | Active | N06 | 7 | 8 | 3,000 |
| DDC114EU-7-F | Active | N13 | 7 | 8 | 3,000 |
| DDC114EUQ-7-F | NRND (Use ADC114EUQ) | N13 | 7 | 8 | 3,000 |
| DDC114EUQ-13-F | NRND (Use ADC114EUQ) | N13 | 13 | 8 | 10,000 |
| DDC113TU-7-F | Active | N01 | 7 | 8 | 3,000 |
| DDC143TU-7-F | Active | N07 | 7 | 8 | 3,000 |
| DDC114TU-7-F | Active | N12 | 7 | 8 | 3,000 |
| DDC114TUQ-7-F | Active | N12 | 7 | 8 | 3,000 |
| DDC143XU-7 | Active | N04 | 7 | 8 | 3,000 |
| DDC143XU-13 | Active | N04 | 13 | 8 | 10,000 |
| DDC143ZU-7-F | Active | N03 | 7 | 8 | 3,000 |
| DDC115EU-7-F | Active | N02 | 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/.
5. NRND = Not Recommended for New Design.

## Marking Information

**SOT363**




NXX = Product Type Marking Code (See Ordering Information)
YM = Date Code Marking
Y or $\overline{Y}$ = Year (ex: J = 2022)
M = Month (ex: 9 = September)

Date Code Key

| Year | 2002 | …. | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | O | …. | J | K | L | M | N | O | P | R | S | T |

| 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 | | $V_O$ | 50 | V |
| Input Voltage | DDC124EU | $V_I$ | -10 to +40 | V |
| | DDC144EU | | -10 to +40 | |
| | DDC114YU | | -6 to +40 | |
| | DDC123JU | | -5 to +12 | |
| | DDC114EU | | -10 to +40 | |
| | DDC113TU | | -5V max | |
| | DDC143TU | | -5V max | |
| | DDC114TU | | -5V max | |
| | DDC143XU | | -7 to +20 | |
| | DDC143ZU | | -5 to +30 | |
| | DDC115EU | | -10 to +40 | |
| Output Current | DDC124EU | $I_O$ | 30 | mA |
| | DDC144EU | | 30 | |
| | DDC114YU | | 70 | |
| | DDC123JU | | 100 | |
| | DDC114EU | | 50 | |
| | DDC113TU | | 100 | |
| | DDC143TU | | 100 | |
| | DDC114TU | | 100 | |
| | DDC143XU | | 100 | |
| | DDC143ZU | | 100 | |
| | DDC115EU | | 20 | |
| Peak Output Current | | $I_{CM}$ | 100 | mA |

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

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Power Dissipation (Notes 6 & 7) | $P_D$ | 200 | mW |
| Thermal Resistance, Junction to Ambient Air (Note 6) | $R_{\theta JA}$ | 625 | °C/W |
| Operating and Storage Temperature Range | $T_J$, $T_{STG}$ | -55 to +150 | °C |

Notes: 6. Mounted on FR-4 PC Board with minimum recommended pad layout.
7. 150mW per element must not be exceeded.

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

**For R1 Only Devices: DDC113TU & DDC143TU & DDC114TU**

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage | $BV_{CBO}$ | 50 | — | — | V | $I_C$ = 50µA |
| Collector-Emitter Breakdown Voltage | $BV_{CEO}$ | 50 | — | — | V | $I_C$ = 1mA |
| Emitter-Base Breakdown Voltage | $BV_{EBO}$ | 5 | — | — | V | $I_E$ = 50µA |
| Collector Cutoff Current | $I_{CBO}$ | — | — | 0.5 | µA | $V_{CB}$ = 50V |
| Emitter Cutoff Current | $I_{EBO}$ | — | — | 0.5 | µA | $V_{EB}$ = 4V |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | — | — | 0.3 | V | $I_C/I_B$ = 2.5mA / 0.25mA DDC143TU<br>$I_C/I_B$ = 1mA / 0.1mA DDC114TU<br>$I_C/I_B$ = 10mA / 1mA DDC113TU |
| DC Current Transfer Ratio | $h_{FE}$ | 100 | 250 | 600 | — | $I_C$ = 1mA, $V_{CE}$ = 5V |
| Input Resistor ($R_1$) Tolerance | $\Delta R_1$ | -30 | — | +30 | % | — |
| Transition frequency (Note 8) | $f_T$ | — | 250 | — | MHz | $V_{CE}$ = 10V, $I_E$ = -5mA, f = 100MHz |

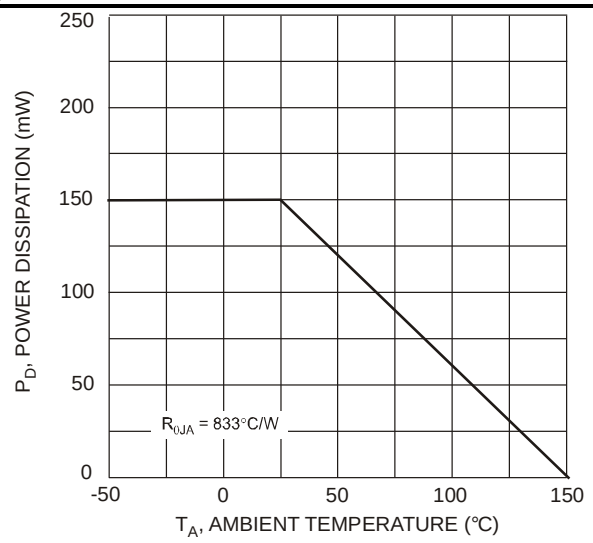
## Electrical Characteristics (@ $T_A$ = +25°C, unless otherwise specified.)

**For R1, R2 Devices: DDC124EU& DDC144EU& DDC114YU& DDC123JU& DDC114EU& DDC143ZU& DDC115EU**

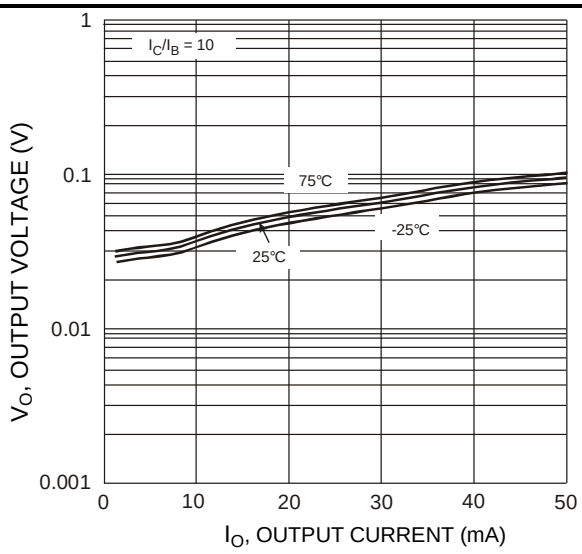
| Characteristic | | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|---|
| Input Voltage | DDC124EU | $V_{I(off)}$ | 0.5 | 1.1 | — | V | $V_{CC}$ = 5V, $I_O$ = 100µA |
| | DDC144EU | | 0.5 | 1.1 | | | |
| | DDC114YU | | 0.3 | — | | | |
| | DDC123JU | | 0.5 | — | | | |
| | DDC114EU | | 0.5 | 1.1 | | | |
| | DDC143XU | | 0.3 | — | | | |
| | DDC143ZU | | 0.5 | — | | | |
| | DDC115EU | | 0.5 | — | | | |
| | DDC124EU | $V_{I(on)}$ | — | 1.9 | 3.0 | | $V_O$ = 0.3V, $I_O$ = 5mA |
| | DDC144EU | | | 1.9 | 3.0 | | $V_O$ = 0.3V, $I_O$ = 2mA |
| | DDC114YU | | | — | 1.4 | | $V_O$ = 0.3V, $I_O$ = 1mA |
| | DDC123JU | | | — | 1.1 | | $V_O$ = 0.3V, $I_O$ = 5mA |
| | DDC114EU | | | 1.9 | 3.0 | | $V_O$ = 0.3V, $I_O$ = 10mA |
| | DDC143XU | | | — | 2.5 | | $V_O$ = 0.3V, $I_O$ = 20mA |
| | DDC143ZU | | | — | 1.3 | | $V_O$ = 0.3V, $I_O$ = 5mA |
| | DDC115EU | | | — | 3 | | $V_O$ = 0.3V, $I_O$ = 1mA |
| Output Voltage | DDC124EU | $V_{O(on)}$ | — | 0.1 | 0.3 | V | $I_O/I_I$ = 10mA / 0.5mA |
| | DDC144EU | | | | | | $I_O/I_I$ = 10mA / 0.5mA |
| | DDC114YU | | | | | | $I_O/I_I$ = 5mA / 0.25mA |
| | DDC123JU | | | | | | $I_O/I_I$ = 5mA / 0.25mA |
| | DDC114EU | | | | | | $I_O/I_I$ = 10mA / 0.5mA |
| | DDC143XU | | | | | | $I_O/I_I$ = 10mA / 0.5mA |
| | DDC143ZU | | | | | | $I_O/I_I$ = 5mA / 0.25mA |
| | DDC115EU | | | | | | $I_O/I_I$ = 10mA / 0.5mA |
| Input Current | DDC124EU | $I_I$ | — | — | 0.36 | mA | $V_I$ = 5V |
| | DDC144EU | | | | 0.18 | | |
| | DDC114YU | | | | 0.88 | | |
| | DDC123JU | | | | 3.6 | | |
| | DDC114EU | | | | 0.88 | | |
| | DDC143XU | | | | 1.8 | | |
| | DDC143ZU | | | | 1.8 | | |
| | DDC115EU | | | | 0.15 | | |
| Output Current | | $I_{O(off)}$ | — | — | 0.5 | µA | $V_{CC}$ = 50V, $V_I$ = 0V |
| DC Current Gain | DDC124EU | $G_I$ | 56 | — | — | — | $V_O$ = 5V, $I_O$ = 5mA |
| | DDC144EU | | 68 | | | | $V_O$ = 5V, $I_O$ = 5mA |
| | DDC114YU | | 68 | | | | $V_O$ = 5V, $I_O$ = 10mA |
| | DDC114YUQ | | 80 | | | | $V_O$ = 5V, $I_O$ = 5mA |
| | DDC123JU | | 80 | | | | $V_O$ = 5V, $I_O$ = 10mA |
| | DDC114EU | | 30 | | | | $V_O$ = 5V, $I_O$ = 5mA |
| | DDC143XU | | 30 | | | | $V_O$ = 5V, $I_O$ = 10mA |
| | DDC143ZU | | 80 | | | | $V_O$ = 5V, $I_O$ = 10mA |
| | DDC115EU | | 82 | | | | $V_O$ = 5V, $I_O$ = 5mA |
| Input Resistor ($R_1$) Tolerance | | $\Delta R_1$ | -30 | — | +30 | % | — |
| Resistance Ratio Tolerance | | $\Delta(R_2/R_1)$ | -20 | — | +20 | % | — |
| Transition frequency (Note 8) | | $f_T$ | — | 250 | — | MHz | $V_{CE}$ = 10V, $I_E$ = 5mA, f = 100MHz |

Note: 8. Transistor - for reference only.

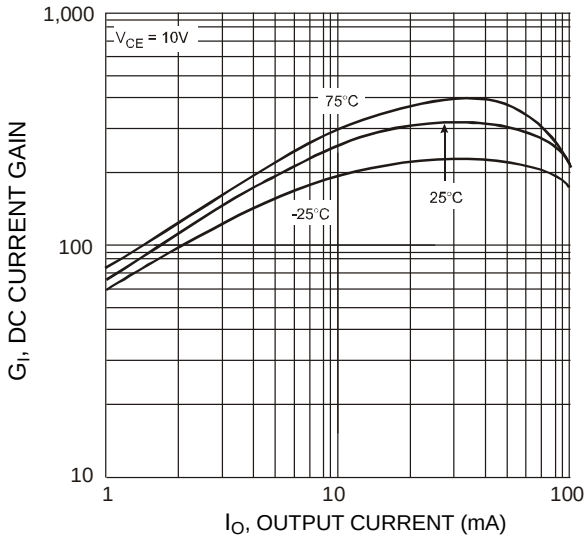
## Typical Curves – DDC123JU (@ $T_A$ = +25°C, unless otherwise specified.)



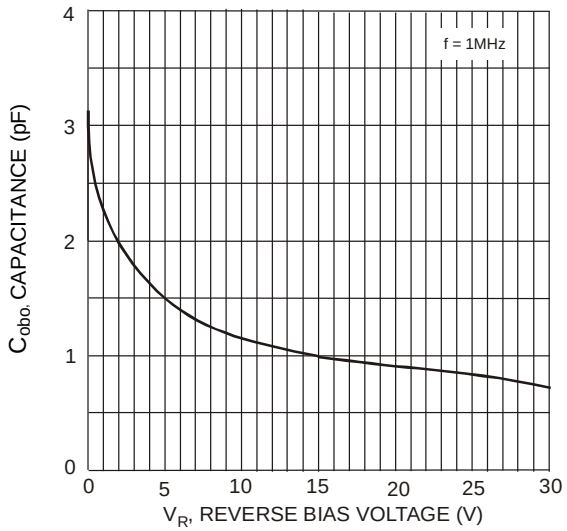

**$P_D$ v $T_A$**



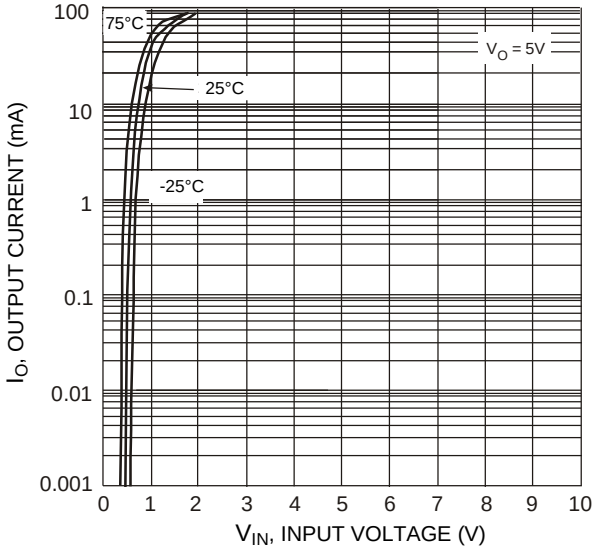

**$V_O$ v $I_O$**



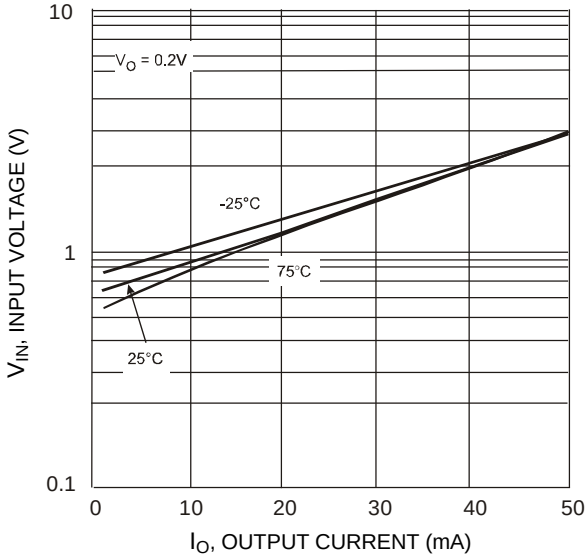

**$G_I$ v $I_O$**




**$C_{obo}$ v $V_R$**

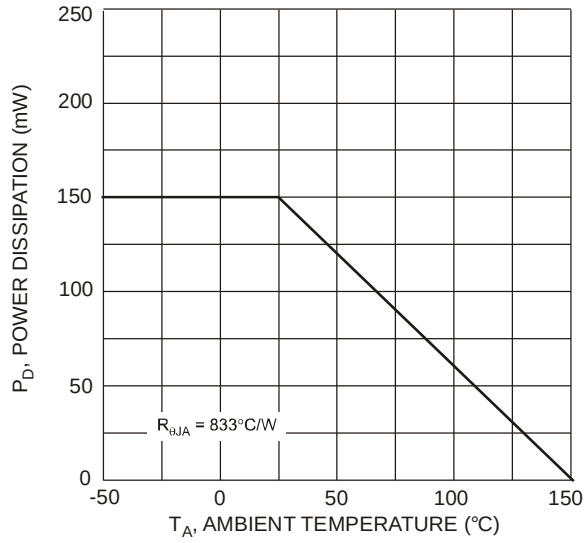



**$I_O$ v $V_{IN}$**

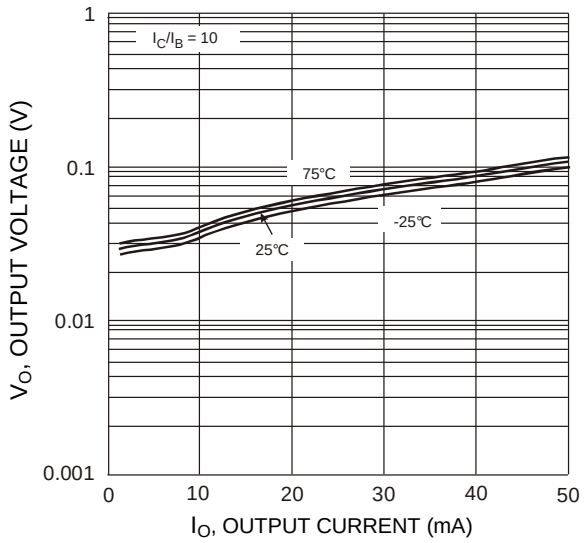



**$V_{IN}$ v $I_O$**

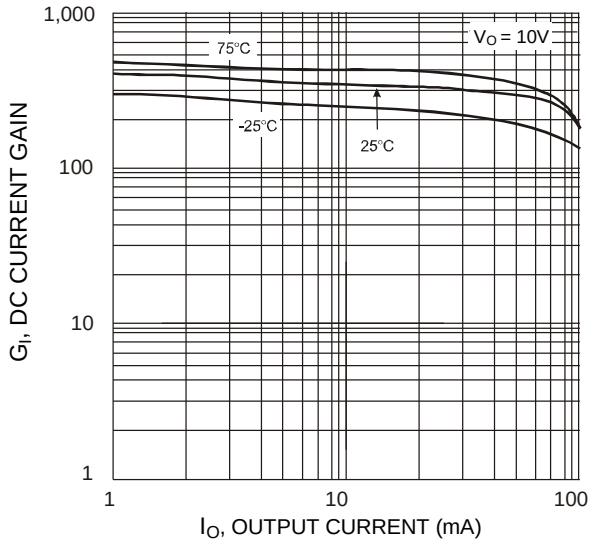
## Typical Curves – DDC114YU (@ $T_A$ = +25°C, unless otherwise specified.)



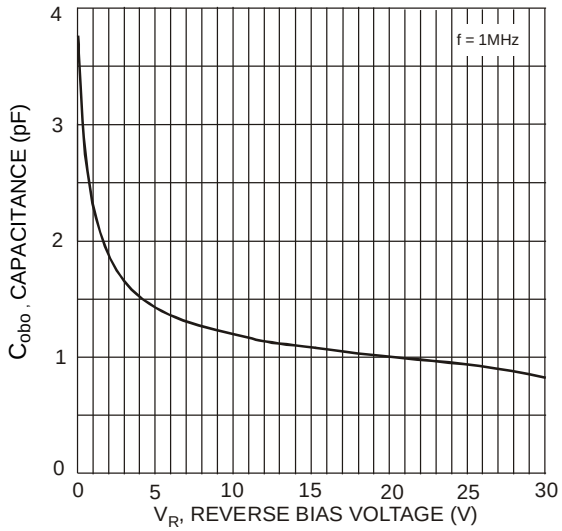

**$P_D$ v $T_A$**



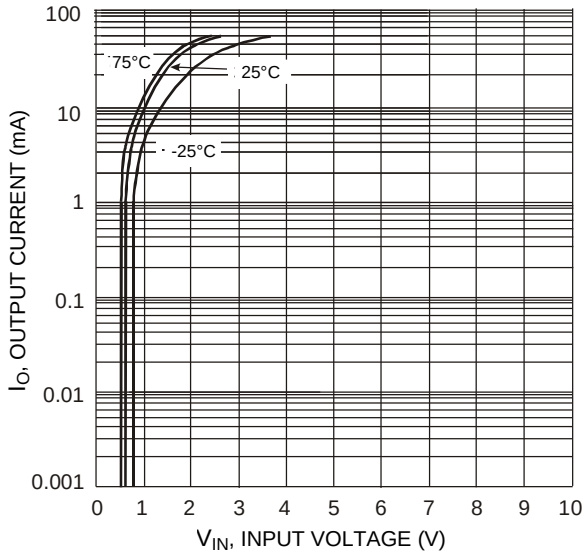

**$V_O$ v $I_O$**



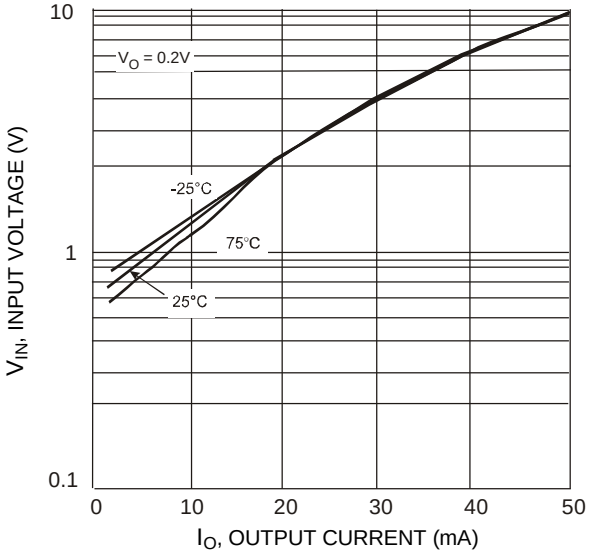

**$G_I$ v $I_O$**




**$C_{obo}$ v $V_R$**

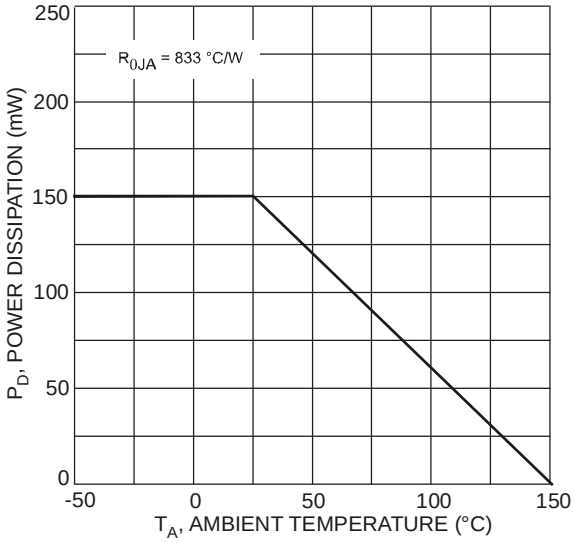



**$I_O$ v $V_{IN}$**

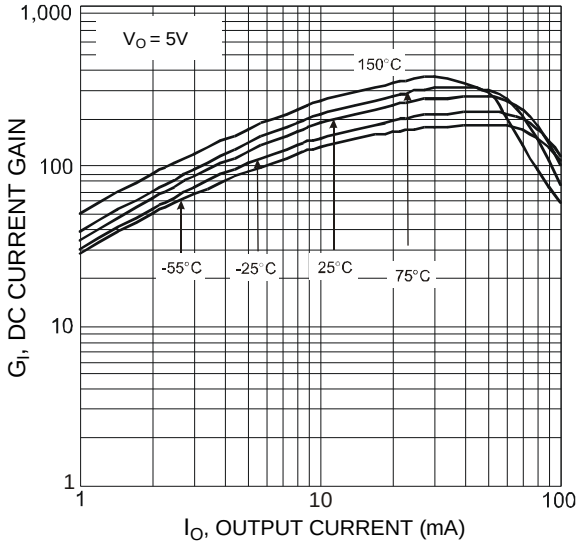



**$V_{IN}$ v $I_O$**

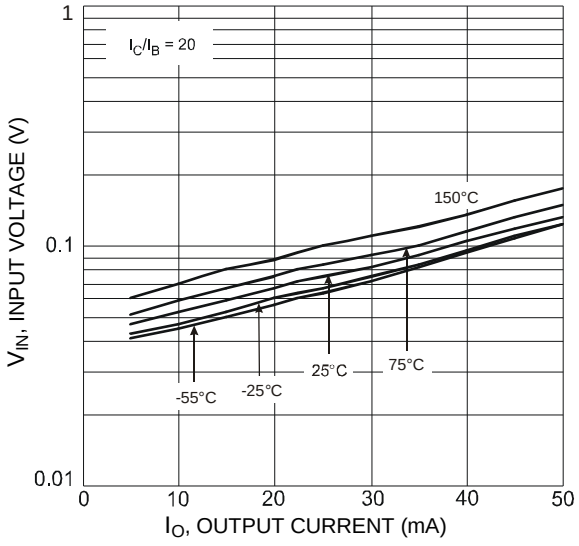
## Typical Curves – DDC124EU (@ $T_A$ = +25°C, unless otherwise specified.)



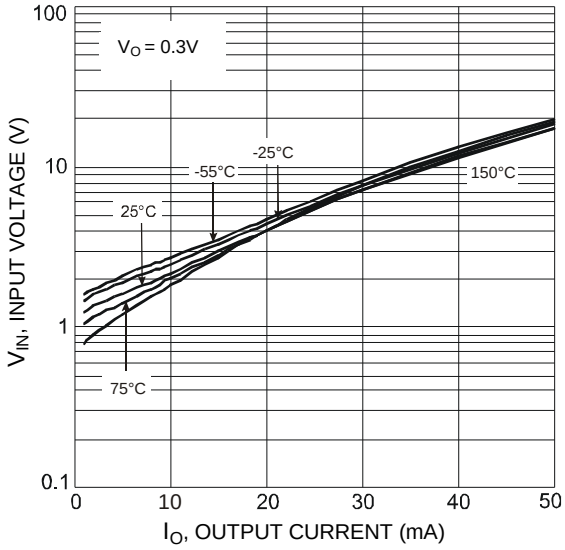

**$P_D$ v $T_A$**




**$G_I$ v $I_O$**




**$V_{IN}$ v $I_O$**

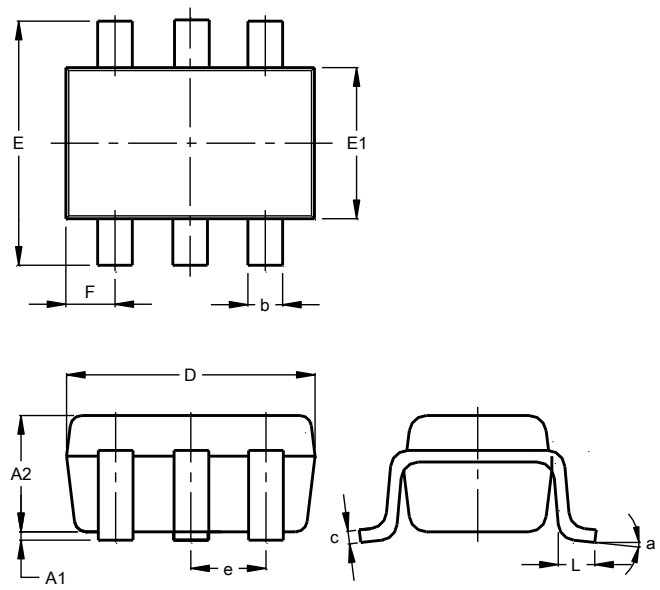



**$V_{IN}$ v $I_O$**

## Package Outline Dimensions

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

**SOT363**

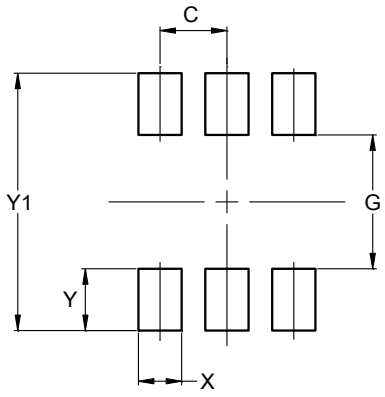



| SOT363 | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A1** | 0.00 | 0.10 | 0.05 |
| **A2** | 0.90 | 1.00 | 0.95 |
| **b** | 0.10 | 0.30 | 0.25 |
| **c** | 0.10 | 0.22 | 0.11 |
| **D** | 1.80 | 2.20 | 2.15 |
| **E** | 2.00 | 2.20 | 2.10 |
| **E1** | 1.15 | 1.35 | 1.30 |
| **e** | 0.650 BSC | | |
| **F** | 0.40 | 0.45 | 0.425 |
| **L** | 0.25 | 0.40 | 0.30 |
| **a** | 0° | 8° | -- |
| **All Dimensions in mm** | | | |

## Suggested Pad Layout

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

**SOT363**




| Dimensions | Value (in mm) |
|---|---|
| **C** | 0.650 |
| **G** | 1.300 |
| **X** | 0.420 |
| **Y** | 0.600 |
| **Y1** | 2.500 |

**IMPORTANT NOTICE**

1. DIODES INCORPORATED (Diodes) AND ITS SUBSIDIARIES 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 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.

9. This Notice may be periodically updated with the most recent version available at https://www.diodes.com/about/company/terms-and-conditions/important-notice



**www.diodes.com**

# X-ON Electronics

Largest Supplier of Electrical and Electronic Components

***Click to view similar products for*** Bipolar Transistors - Pre-Biased ***category:***

***Click to view products by*** Diodes Incorporated ***manufacturer:***

Other Similar products are found below :

DRC9A14E0L DTA124GKAT146 DTA144WETL DTA144WKAT146 DTC113EET1G DTC115TETL DTC115TKAT146 DTC144VUAT106 MUN5241T1G BCR158WH6327XTSA1 SMUN5330DW1T1G RN1306(TE85L,F) EMH15T2R NSBC143ZPDP6T5G DTC114EUA-TP SMUN5237DW1T1G SMUN5213DW1T1G SMUN5114DW1T1G DTC124ECA-TP DTA114ECA-TP DTC113EM3T5G NSVMUN5135DW1T1G NSVMUN2237T1G NSVDTC143ZM3T5G SMUN5335DW1T2G SMUN5216DW1T1G NSVMUN5316DW1T1G NSVMUN5215DW1T1G NSVMUN5213DW1T3G NSVIMD10AMT1G NSVEMC2DXV5T1G NSVDTC144WET1G NSVDTC123JET1G NSVDTA143EM3T5G NSVB1706DMW5T1G NSBC143EDP6T5G NSBA144WDXV6T1G DTA115TET1G NSBC115TDP6T5G NSBA113EF3T5G MUN2235T1G NSBC143ZDXV6T5G NSVDTA114EM3T5G MUN2138T1G DCX124EUQ-7-F MUN2141T1G DTC144TET1G MUN2238T1G SMUN5112DW1T1G NSVMUN5131T1G