

SMALL SIGNAL COMPLEMENTARY PRE-BIASED DUAL TRANSISTOR

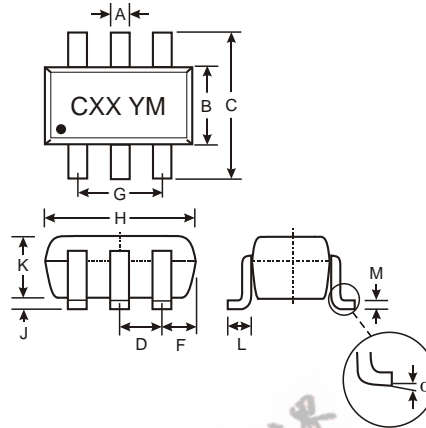
NEW PRODUCT

Features

- Epitaxial Planar Die Construction
- Built-In Biasing Resistors
- **Lead Free/RoHS Compliant (Note 3)**
- Surface Mount Package Suited for Automated Assembly

Mechanical Data

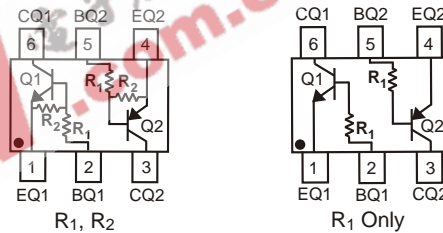
- Case: SOT-363
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Terminal Connections: See Diagram
- Marking: Date Code and Marking Code (See Page 4)
- Ordering Information (See Page 4)
- Weight: 0.006 grams (approximate)



| SOT-363 | | |
|---------|--------------|------|
| Dim | Min | Max |
| A | 0.10 | 0.30 |
| B | 1.15 | 1.35 |
| C | 2.00 | 2.20 |
| D | 0.65 Nominal | |
| F | 0.30 | 0.40 |
| H | 1.80 | 2.20 |
| J | | 0.10 |
| K | 0.90 | 1.00 |
| L | 0.25 | 0.40 |
| M | 0.10 | 0.25 |
| | 0° | 8° |

All Dimensions in mm

| P/N | R1 | R2 | MARKING |
|----------|------|------|---------|
| DCX124EU | 22K | 22K | C17 |
| DCX144EU | 47K | 47K | C20 |
| DCX114YU | 10K | 47K | C14 |
| DCX123JU | 2.2K | 47K | C06 |
| DCX114EU | 10K | 10K | C13 |
| DCX143TU | 4.7K | - | C07 |
| DCX143EU | 4.7K | 4.7K | C08 |
| DCX114TU | 10K | - | C12 |



Q1: NPN Transistor
Q2: PNP Transistor

SCHMATIC DIAGRAM

Maximum Ratings NPN Section @ T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------|------|
| Supply Voltage, (6) to (1) and (4) to (3) | V _{CC} | 50 | V |
| Input Voltage, (2) to (1) and (4) to (5) | V _{IN} | -10 to +40 -10 to +40 -6 to +40 -5 to +12 -10 to +40 -5 V _{max} -10 to +30 -5 V _{max} | V |
| Output Current | I _O | 30 30 70 100 50 100 100 100 | mA |
| Output Current | I _C (Max) | 100 | mA |
| Power Dissipation (Total) | P _d | 200 | mW |
| Thermal Resistance, Junction to Ambient Air (Note 1) | R _{JA} | 625 | °C/W |
| Operating and Storage and Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

- Note:
1. Mounted on FR4 PC Board with recommended pad layout at <http://www.diodes.com/datasheets/ap02001.pdf>.
 2. 150mW per element must not be exceeded.
 3. No purposefully added lead.

Maximum Ratings PNP Section @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|---------------------------------------------------------------------------------------------------------------------------|----------------|----------------------------------------------------------------------------------------------------------------|---------------------------|
| Supply Voltage, (3) to (1) | V_{CC} | 50 | V |
| Input Voltage, (2) to (1) DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143TU DCX143EU DCX114TU | V_{IN} | +10 to -40 +10 to -40 +6 to -40 +5 to -12 +10 to -40 +5 V_{max} +10 to -30 +5 V_{max} | V |
| Output Current DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143TU DCX143EU DCX114TU | I_O | -30 -30 -70 -100 -50 -100 -100 -100 | mA |
| Output Current All | I_C (Max) | -100 | mA |
| Power Dissipation (Total) (Page 1: Note 2) | P_d | 200 | mW |
| Thermal Resistance, Junction to Ambient Air (Page 1: Note 1) | R_{JA} | 625 | $^\circ\text{C}/\text{W}$ |
| Operating and Storage and Temperature Range | T_j, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

Electrical Characteristics NPN Section @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic (DCX143TU & DCX114TU only) | Symbol | Min | Typ | Max | Unit | Test Condition |
|-------------------------------------------|---------------|-----|-----|-----|---------------|-----------------------------------------------------------------------------------------------------|
| Collector-Base Breakdown Voltage | BV_{CBO} | 50 | | | V | $I_C = 50\mu\text{A}$ |
| Collector-Emitter Breakdown Voltage | BV_{CEO} | 50 | | | V | $I_C = 1\text{mA}$ |
| Emitter-Base Breakdown Voltage | BV_{EBO} | 5 | | | V | $I_E = 50\mu\text{A}$ |
| Collector Cutoff Current | I_{CBO} | | | 0.5 | μA | $V_{CB} = 50\text{V}$ |
| Emitter Cutoff Current | I_{EBO} | | | 0.5 | μA | $V_{EB} = 4\text{V}$ |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | | | 0.3 | V | $I_C/I_B = 2.5\text{mA} / 0.25\text{mA}$ DCX143TU $I_C/I_B = 1\text{mA} / 0.1\text{mA}$ DCX114TU |
| DC Current Transfer Ratio | h_{FE} | 100 | 250 | 600 | | $I_C = 1\text{mA}, V_{CE} = 5\text{V}$ |
| Input Resistor (R_1) Tolerance | R_1 | -30 | | +30 | % | |
| Gain-Bandwidth Product | f_T | | 250 | | MHz | $V_{CE} = 10\text{V}, I_E = -5\text{mA}, f = 100\text{MHz}$ |

Electrical Characteristics NPN Section (Continued) @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | | Symbol | Min | Typ | Max | Unit | Test Condition |
|------------------------------------|----------------------------------------------------------------------|--------------|----------------------------------------|-------------------------------|---------------------------------------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Voltage | DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143EU | $V_{I(off)}$ | 0.5 0.5 0.3 0.5 0.5 0.5 | 1.1 1.1 1.1 1.16 | | V | $V_{CC} = 5V, I_O = 100\mu A$ |
| | DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143EU | | $V_{I(on)}$ | | 1.9 1.9 1.9 1.99 | | |
| Output Voltage | DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143EU | $V_{O(on)}$ | | | 0.1 | 0.3 | V |
| Input Current | DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143EU | I_I | | | 0.36 0.18 0.88 3.6 0.88 0.88 | mA | $V_I = 5V$ |
| Output Current | | $I_{O(off)}$ | | | 0.5 | μA | $V_{CC} = 50V, V_I = 0V$ |
| DC Current Gain | DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143EU | G_I | 56 68 68 80 30 50 | | | | $V_O = 5V, I_O = 5mA$ $V_O = 5V, I_O = 5mA$ $V_O = 5V, I_O = 10mA$ $V_O = 5V, I_O = 10mA$ $V_O = 5V, I_O = 5mA$ $V_O = 5V, I_O = 10mA$ |
| Input Resistor (R_1) Tolerance | | R_1 | -30 | | +30 | % | |
| Resistance Ratio Tolerance | | R_2/R_1 | -20 | | +20 | % | |
| Gain-Bandwidth Product | | f_T | | 250 | | MHz | $V_{CE} = 10V, I_E = 5mA, f = 100MHz$ |

Electrical Characteristics PNP Section @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic (DCX143TU & DCX114TU only) | Symbol | Min | Typ | Max | Unit | Test Condition |
|-------------------------------------------|---------------|-----|-----|------|---------|-------------------------------------------------------------------------|
| Collector-Base Breakdown Voltage | BV_{CBO} | -50 | | | V | $I_C = -50\mu A$ |
| Collector-Emitter Breakdown Voltage | BV_{CEO} | -50 | | | V | $I_C = -1mA$ |
| Emitter-Base Breakdown Voltage | BV_{EBO} | -5 | | | V | $I_E = -50\mu A$ |
| 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 | $I_C/I_B = 2.5mA / 0.25mA$ DCX143TU $I_C/I_B = 1mA / 0.1mA$ DCX114TU |
| DC Current Transfer Ratio | h_{FE} | 100 | 250 | 600 | | $I_C = -1mA, V_{CE} = -5V$ |
| Input Resistor (R_1) Tolerance | R_1 | -30 | | +30 | % | |
| Gain-Bandwidth Product | f_T | | 250 | | MHz | $V_{CE} = -10V, I_E = 5mA, f = 100MHz$ |

Electrical Characteristics PNP Section (Continued) @ T_A = 25°C unless otherwise specified

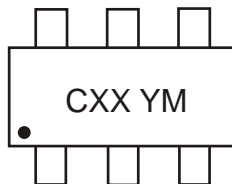
| Characteristic | | Symbol | Min | Typ | Max | Unit | Test Condition |
|--------------------------------------------|----------------------------------------------------------------------|--------------------------------|----------------------------------------------|--------------|---------------------------------------------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Voltage | DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143EU | V _{I(off)} | -0.5 -0.5 -0.3 -0.5 -0.5 -0.5 | -1.1 -1.1 | | V | V _{CC} = -5V, I _O = -100μA |
| | DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143EU | | V _{I(on)} | | -1.9 -1.9 -1.1 -1.1 -1.9 -2.5 | | |
| Output Voltage | DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143EU | V _{O(on)} | | | -0.1 | -0.3 | V |
| Input Current | DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143EU | I _I | | | -0.36 -0.18 -0.88 -3.6 -0.88 -0.88 | mA | V _I = -5V |
| Output Current | | I _{O(off)} | | | -0.5 | μA | V _{CC} = 50V, V _I = 0V |
| DC Current Gain | DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143EU | G _I | 56 68 68 80 30 40 | | | | V _O = -5V, I _O = -5mA V _O = -5V, I _O = -5mA V _O = -5V, I _O = -10mA V _O = -5V, I _O = -10mA V _O = -5V, I _O = -5mA V _O = -5V, I _O = -10mA |
| Input Resistor (R ₁) Tolerance | | R ₁ | -30 | | +30 | % | |
| Resistance Ratio Tolerance | | R ₂ /R ₁ | -20 | | +20 | % | |
| Gain-Bandwidth Product | | f _T | | 250 | | MHz | V _{CE} = -10V, I _E = -5mA, f = 100MHz |

Ordering Information (Note 4)

| Device | Packaging | Shipping |
|--------------|-----------|------------------|
| DCX124EU-7-F | SOT-363 | 3000/Tape & Reel |
| DCX144EU-7-F | SOT-363 | 3000/Tape & Reel |
| DCX114YU-7-F | SOT-363 | 3000/Tape & Reel |
| DCX123JU-7-F | SOT-363 | 3000/Tape & Reel |
| DCX114EU-7-F | SOT-363 | 3000/Tape & Reel |
| DCX143TU-7-F | SOT-363 | 3000/Tape & Reel |
| DCX143EU-7-F | SOT-363 | 3000/Tape & Reel |
| DCX114TU-7-F | SOT-363 | 3000/Tape & Reel |

Notes: 4. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

Marking Information



CXX = Product Type Marking Code
YM = Date Code Marking
Y = Year ex: T = 2006
M = Month ex: 9 = September

Date Code Key

| Year | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------|------|------|------|------|------|------|------|
| Code | T | U | V | W | X | Y | Z |

| 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 |

PNP SECTION

NEW PRODUCT

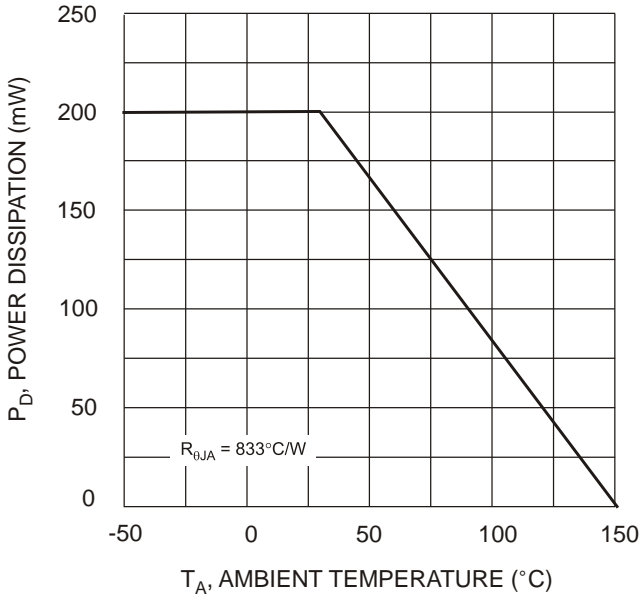


Fig. 1 Derating Curve

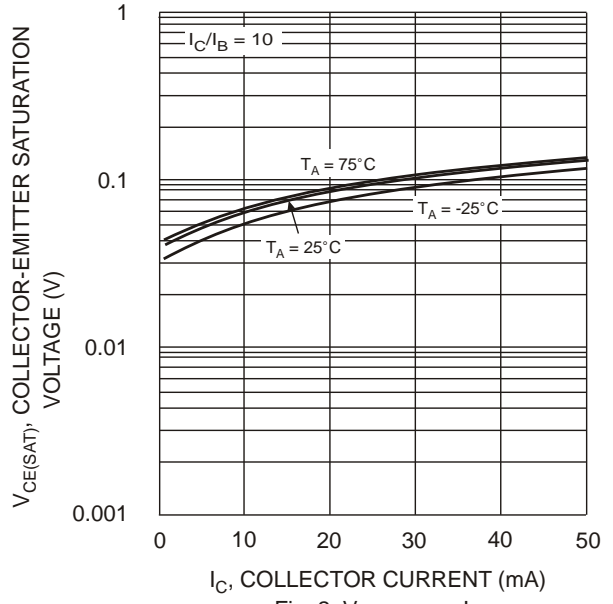


Fig. 2 $V_{CE(SAT)}$ vs. I_C

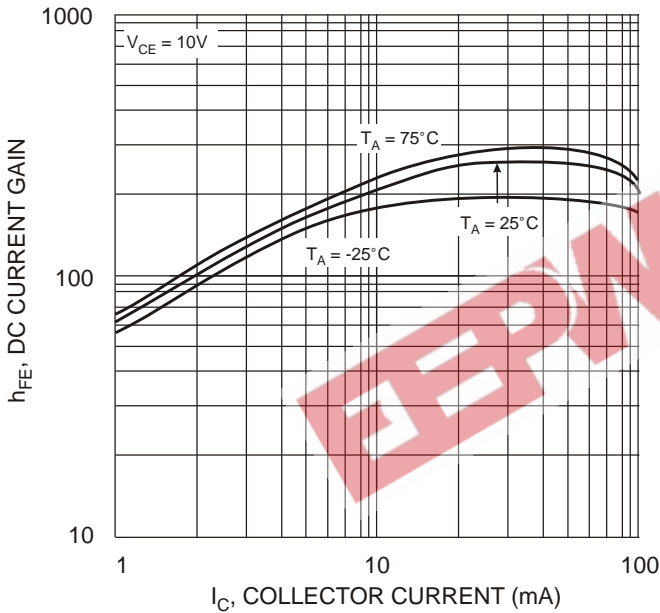


Fig. 3 DC Current Gain

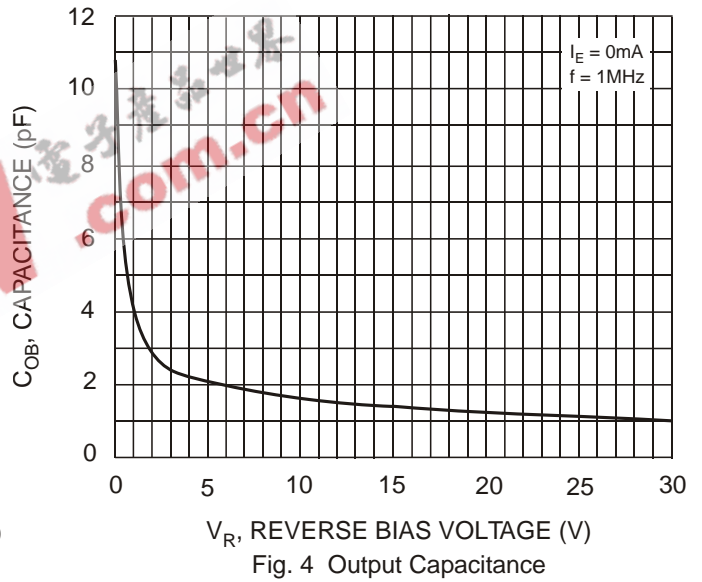


Fig. 4 Output Capacitance

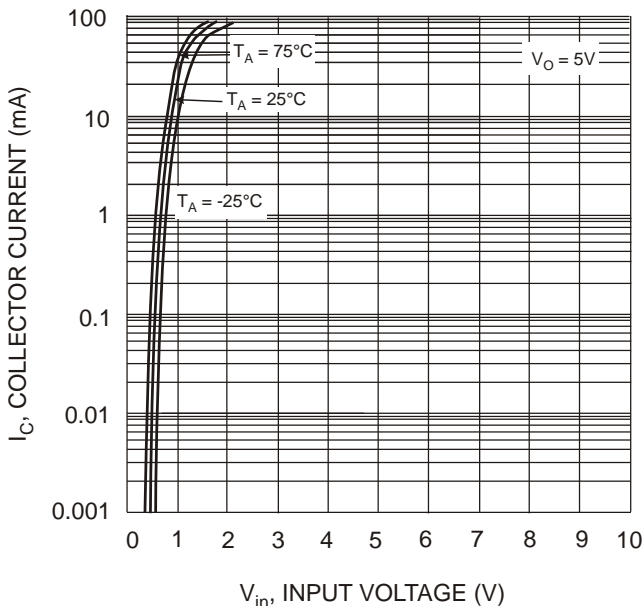


Fig. 5 Collector Current Vs. Input Voltage

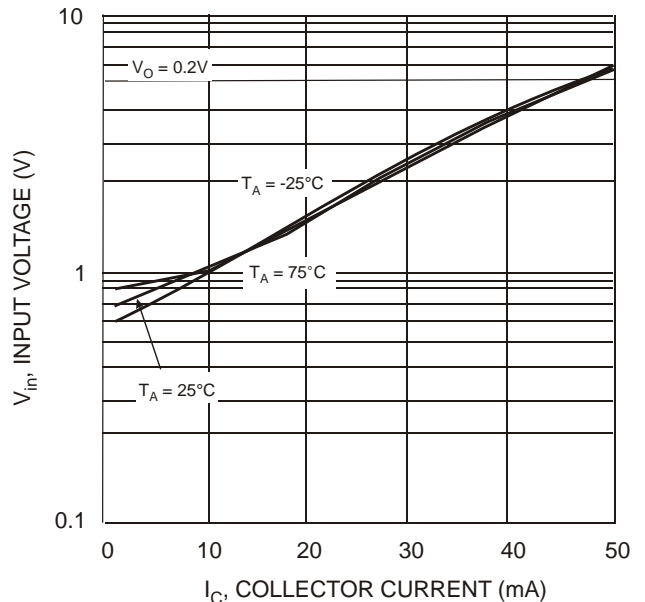


Fig. 6 Input Voltage vs. Collector Current

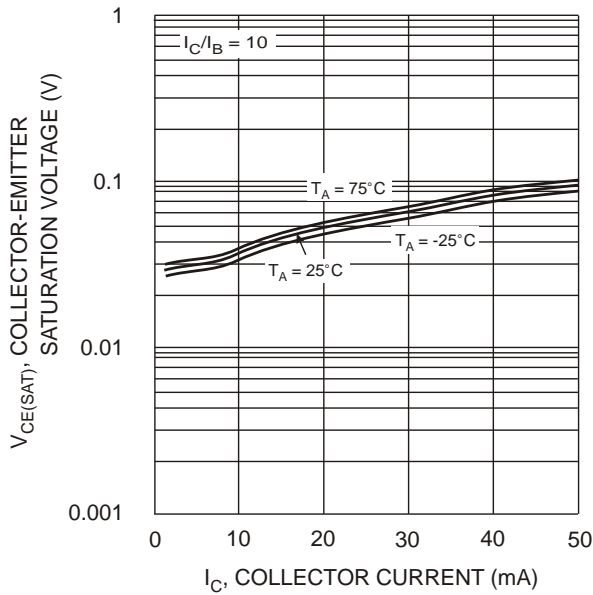


Fig. 7 $V_{CE(SAT)}$ vs. I_C

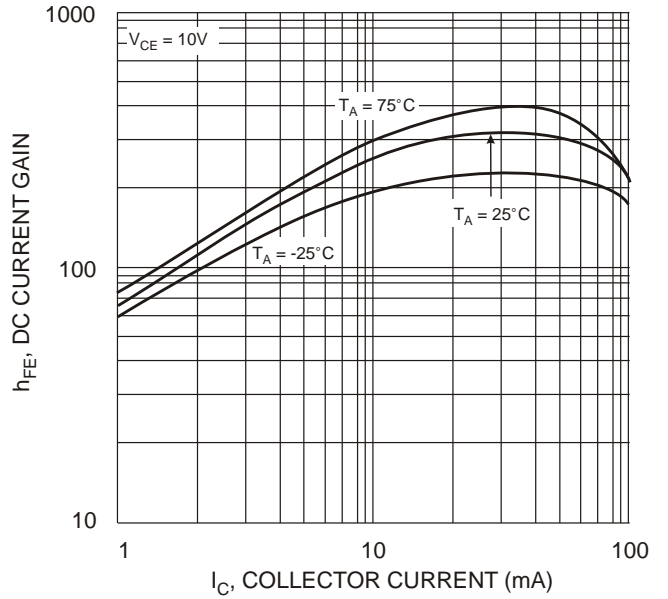


Fig. 8 DC Current Gain

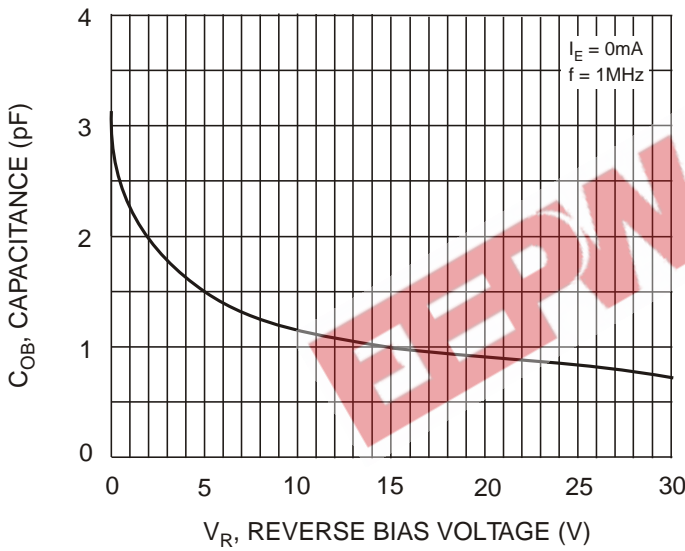


Fig. 9 Output Capacitance

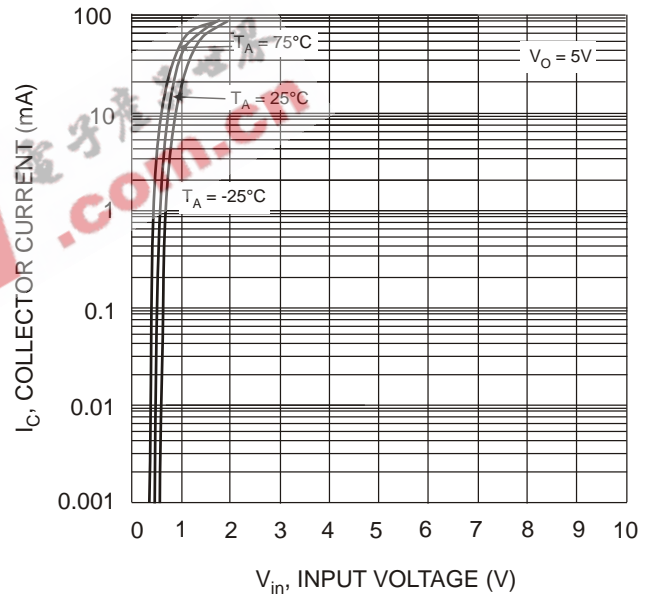


Fig. 10 Collector Current Vs. Input Voltage

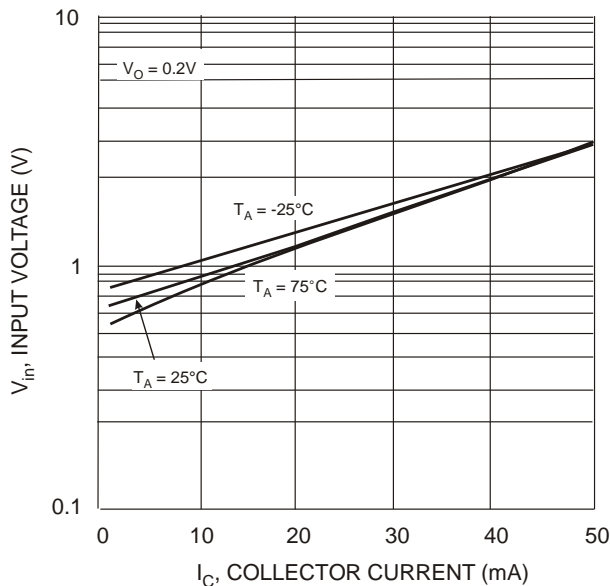


Fig. 11 Input Voltage vs. Collector Current

PNP SECTION

NEW PRODUCT

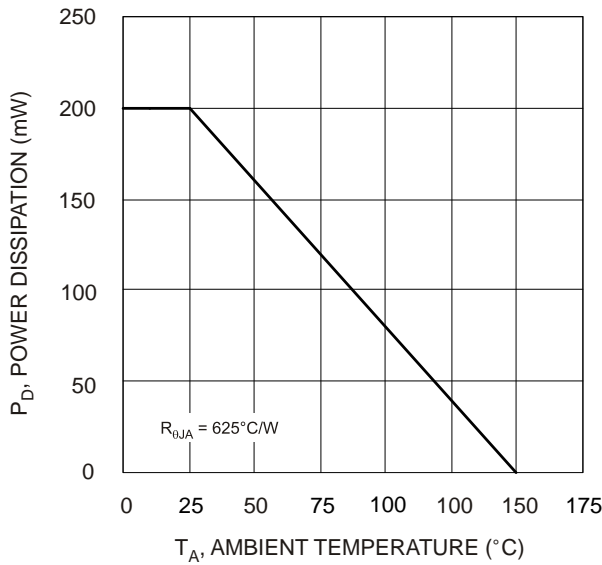


Fig. 12 Power Derating Curve

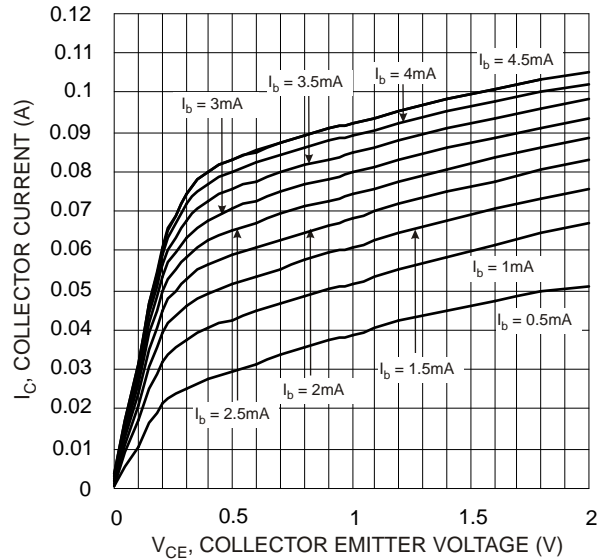


Fig. 13 V_{CE} vs I_C

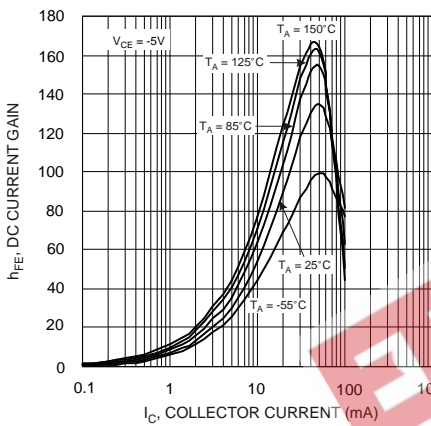


Fig. 14 DC Current Gain

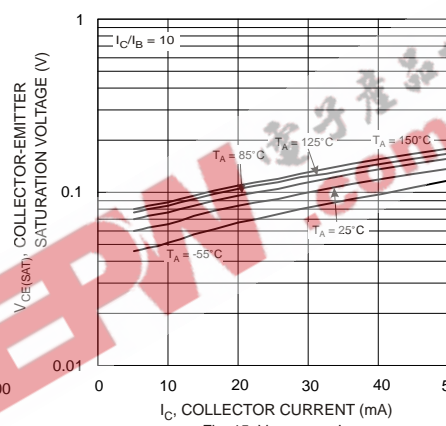


Fig. 15 $V_{CE(SAT)}$ vs I_C

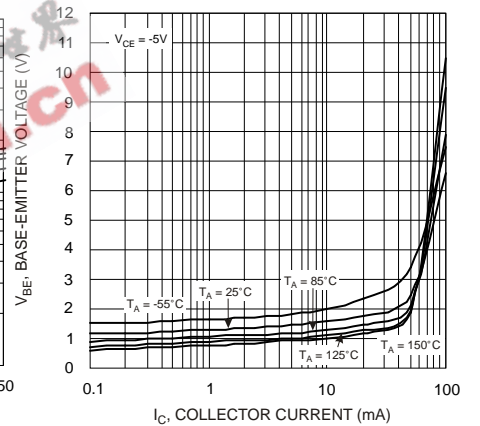


Fig. 16 V_{BE} vs I_C

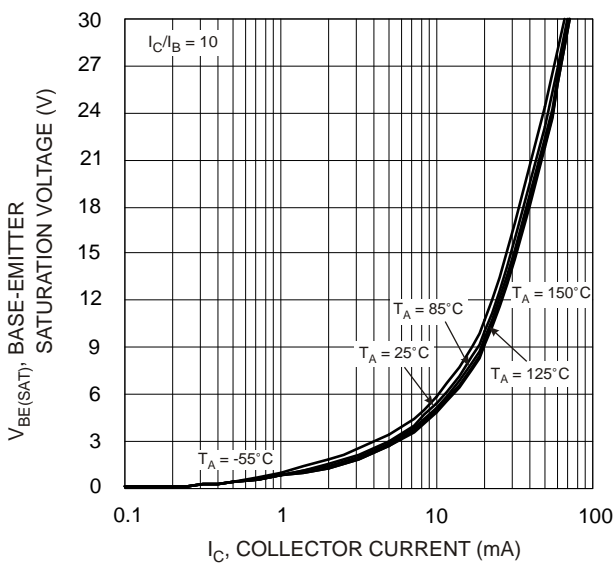


Fig. 17 $V_{BE(SAT)}$ vs I_C

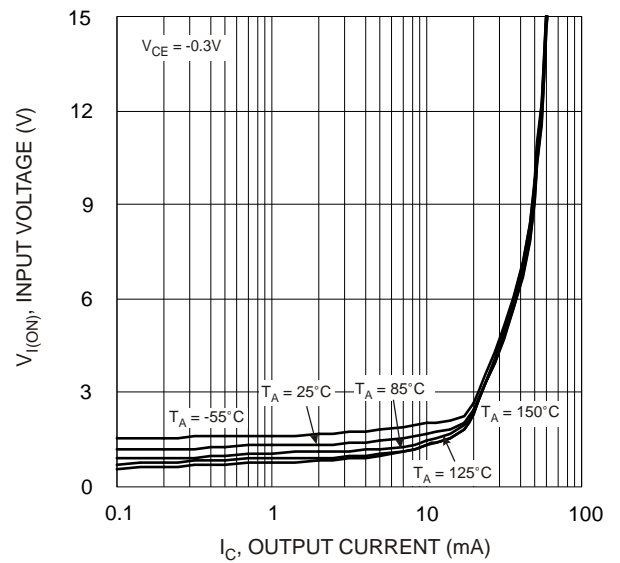


Fig. 18 $V_{I(ON)}$ vs I_C

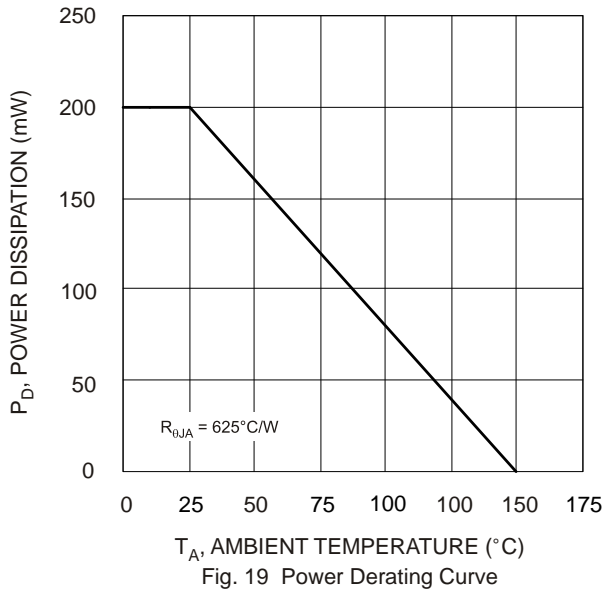


Fig. 19 Power Derating Curve

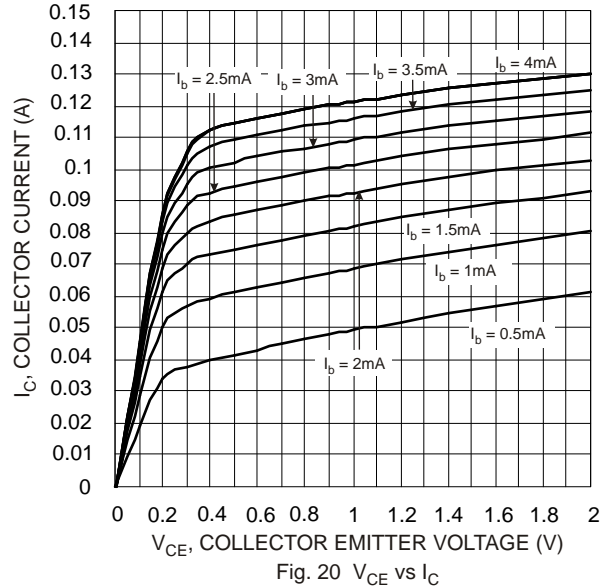


Fig. 20 V_{CE} vs I_C

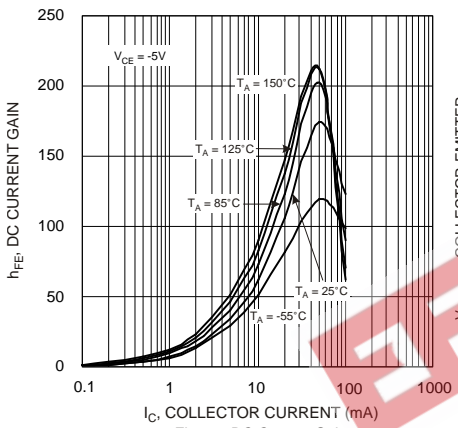


Fig. 21 DC Current Gain

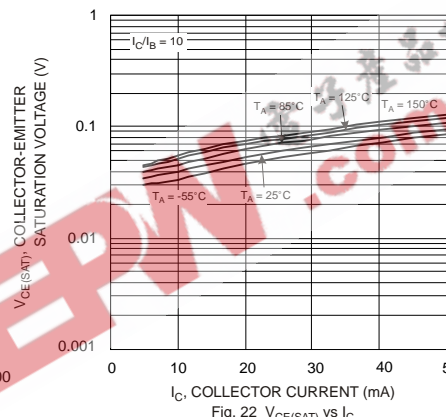


Fig. 22 $V_{CE(SAT)}$ vs I_C

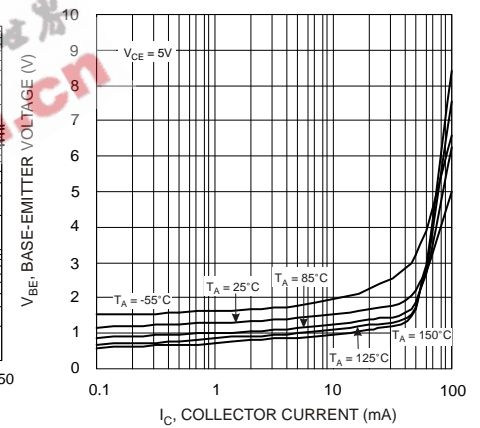


Fig. 23 V_{BE} vs I_C

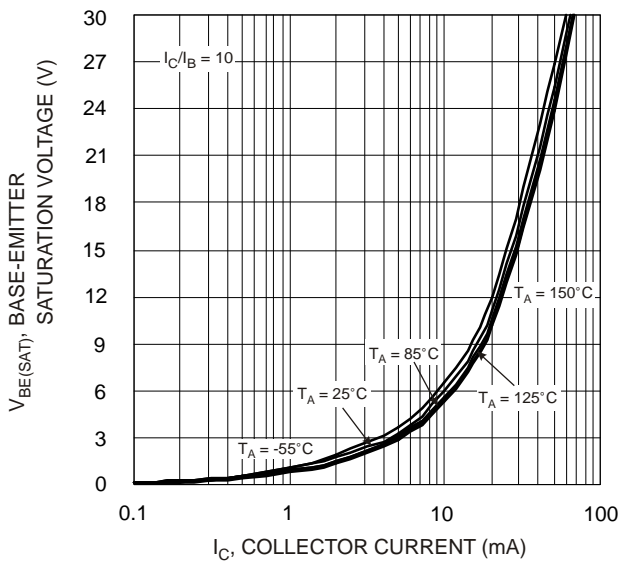


Fig. 24 $V_{BE(SAT)}$ vs I_C

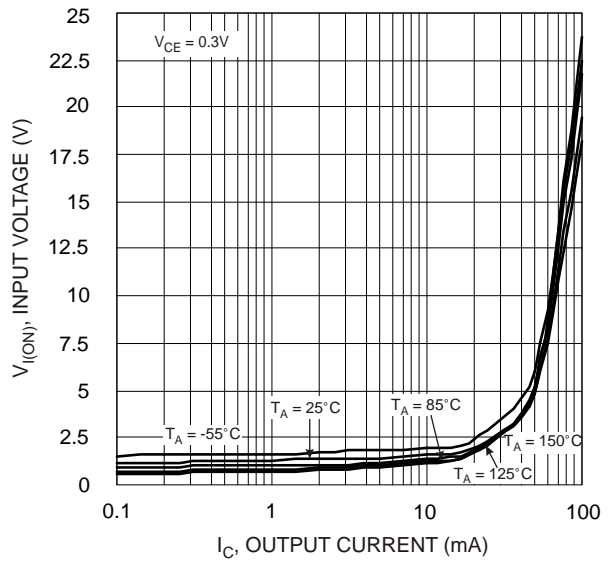


Fig. 25 $V_{(ON)}$ vs I_C

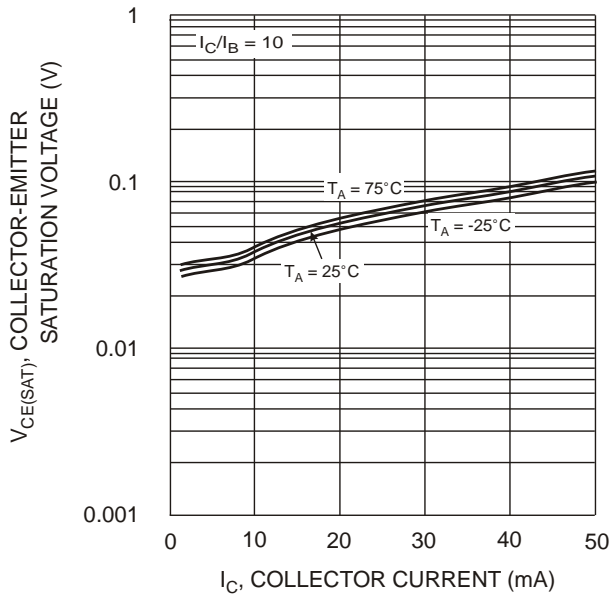


Fig. 26 $V_{CE(SAT)}$ vs. I_C

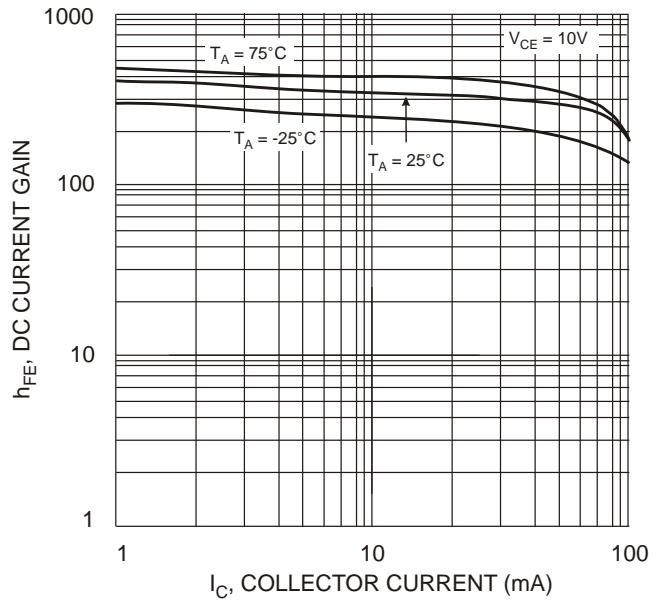


Fig. 27 DC Current Gain

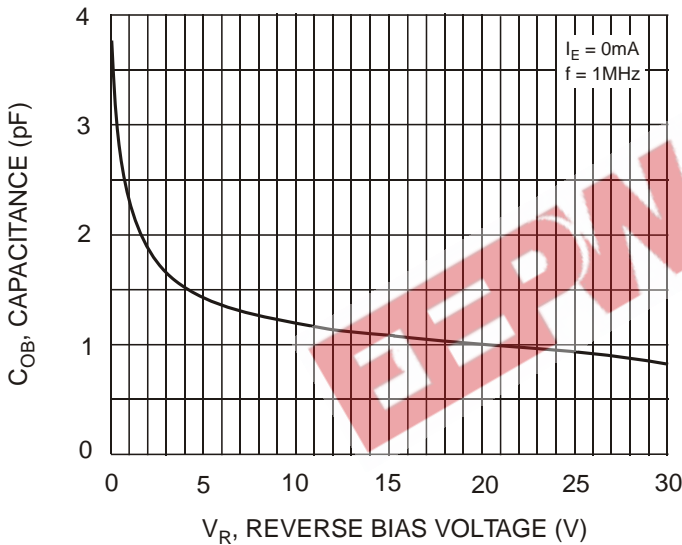


Fig. 28 Output Capacitance

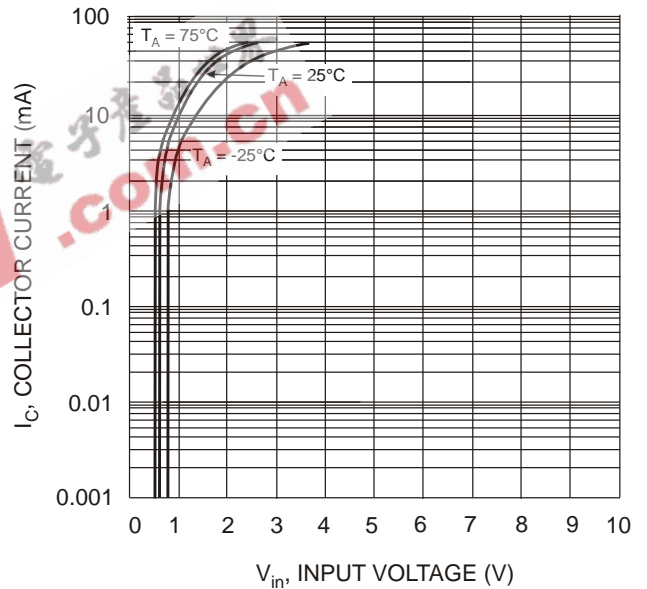


Fig. 29 Collector Current Vs. Input Voltage

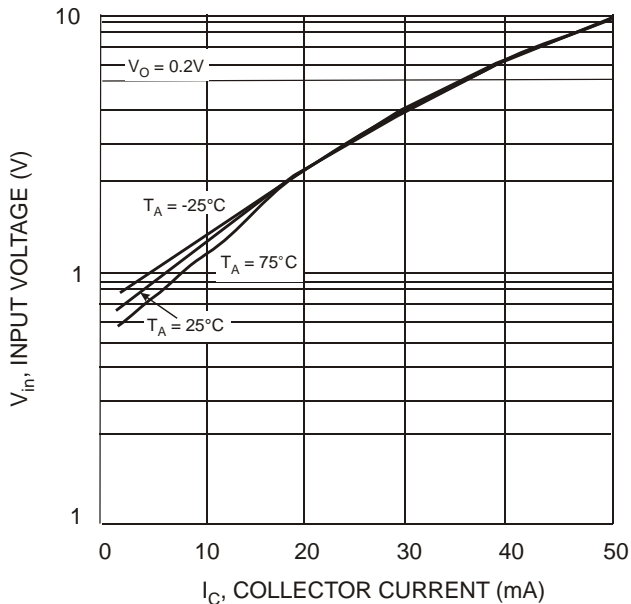


Fig. 30 Input Voltage vs. Collector Current

NPN SECTION

NEW PRODUCT

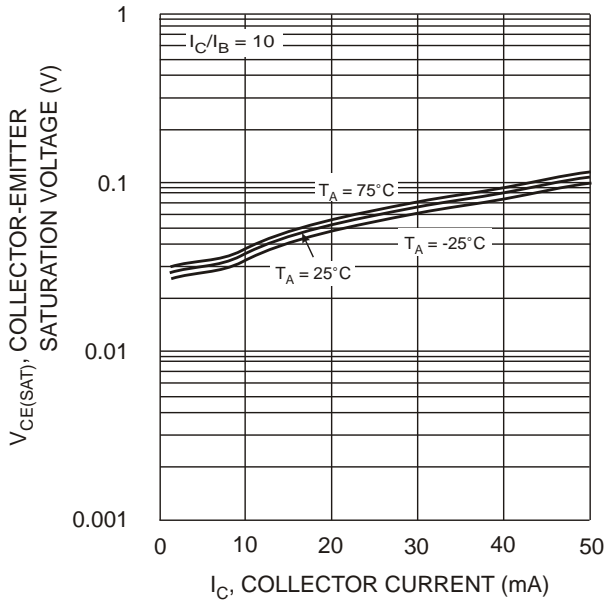


Fig. 31 $V_{CE(SAT)}$ vs. I_C

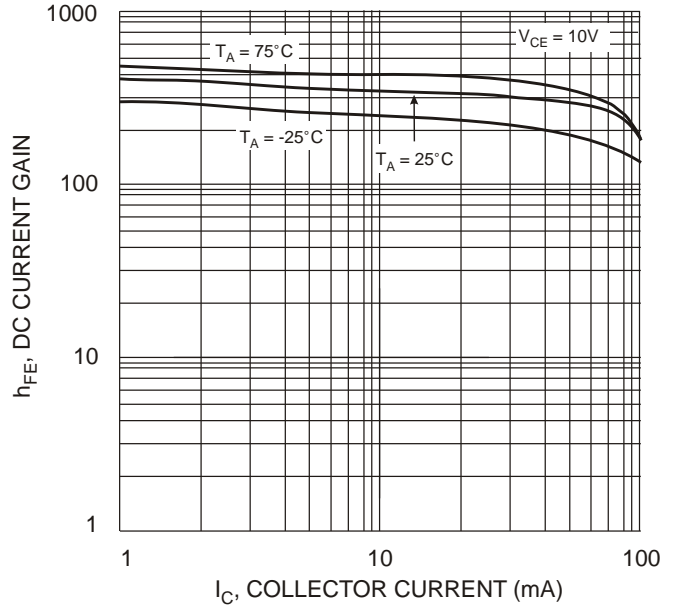


Fig. 32 DC Current Gain

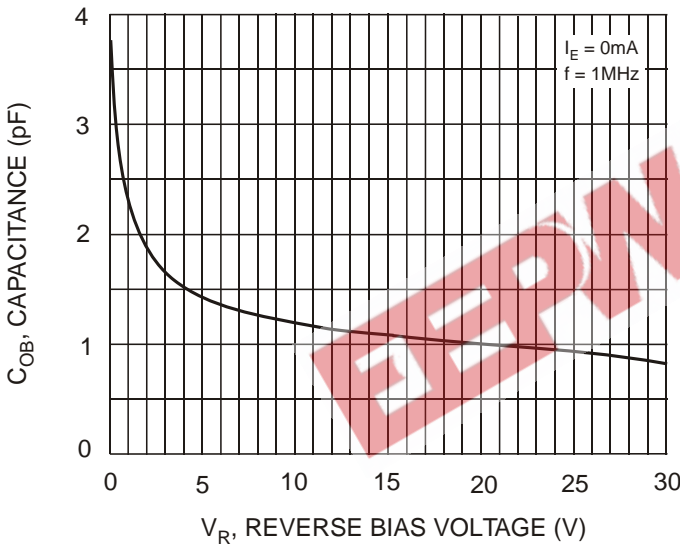


Fig. 33 Output Capacitance

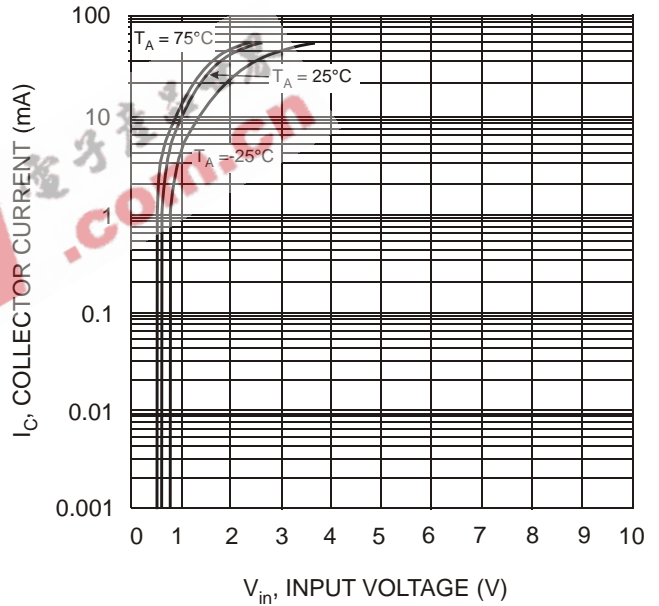


Fig. 34 Collector Current Vs. Input Voltage

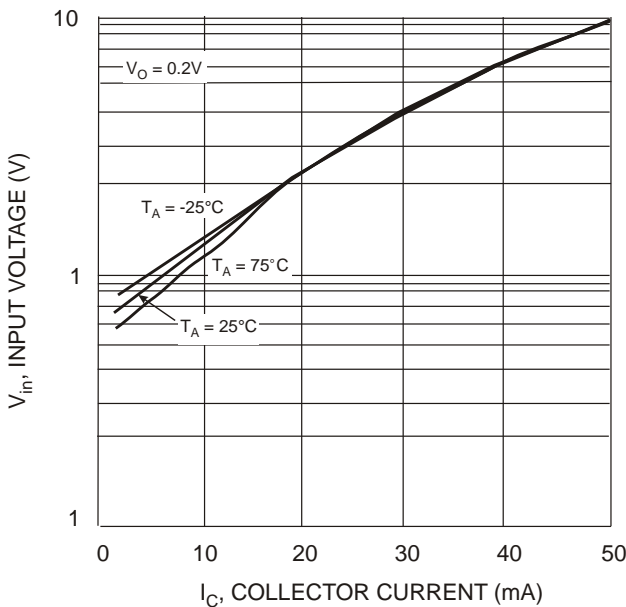


Fig. 35 Input Voltage vs. Collector Current

IMPORTANT NOTICE

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to any product herein. Diodes Incorporated does not assume any liability arising out of the application or use of any product described herein; neither does it convey any license under its patent rights, nor the rights of others. The user of products in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on our website, harmless against all damages.

LIFE SUPPORT

Diodes Incorporated products are not authorized for use as critical components in life support devices or systems without the expressed written approval of the President of Diodes Incorporated.

EEPW 电子產品世界
.com.cn