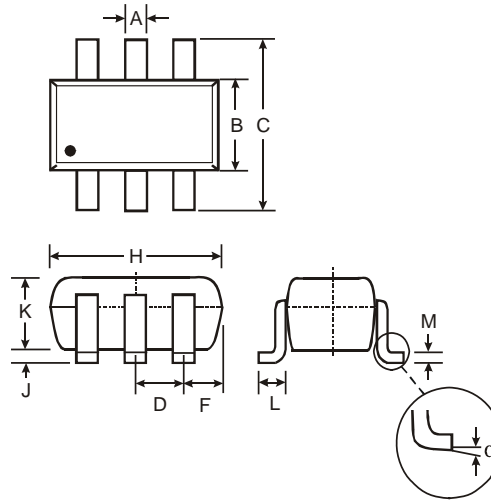


Features

- Epitaxial Planar Die Construction
- One Transistor and One Switching Diode in One Package
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**

Mechanical Data

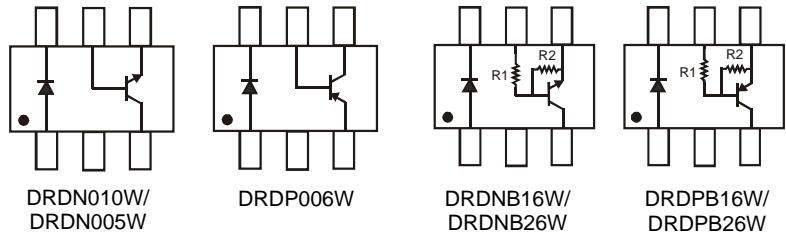
- Case: SOT-363
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminal Connections: See Diagram
- Terminals: Finish - Matte Tin annealed over Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 8
- Ordering Information: See Page 8
- Weight: 0.008 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 |
| α | 0° | 8° |

All Dimensions in mm

| P/N | R1 (NOM) | R2 (NOM) |
|----------|----------|----------|
| DRDNB16W | 1K | 10K |
| DRDPB16W | 1K | 10K |
| DRDNB26W | 220 | 4.7K |
| DRDPB26W | 220 | 4.7K |



Maximum Ratings, Total Device @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 3) | P _D | 200 | mW |
| Thermal Resistance, Junction to Ambient Air (Note 3) | R _{θJA} | 625 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

Maximum Ratings, DRDN010W NPN Transistor @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|----------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CBO} | 45 | V |
| Collector-Emitter Voltage | V _{CEO} | 18 | V |
| Emitter-Base Voltage | V _{EBO} | 5 | V |
| Collector Current (Note 3) | I _C | 1000 | mA |

Maximum Ratings, DRDN005W NPN Transistor @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|---|------------------|-------|------|
| Collector-Base Voltage | V _{CBO} | 80 | V |
| Collector-Emitter Voltage | V _{CEO} | 80 | V |
| Emitter-Base Voltage | V _{EBO} | 4.0 | V |
| Collector Current – Continuous (Note 3) | I _C | 500 | mA |

- Notes:
1. No purposefully added lead.
 2. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.
 3. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on page 9 or our website at <http://www.diodes.com/datasheets/ap02001.pdf>.

Maximum Ratings, DRDP006W PNP Transistor @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|----------------------------|-----------|-------|------|
| Collector-Base Voltage | V_{CBO} | -60 | V |
| Collector-Emitter Voltage | V_{CEO} | -60 | V |
| Emitter-Base Voltage | V_{EBO} | -5.0 | V |
| Collector Current (Note 3) | I_C | -600 | mA |

Maximum Ratings, DRDNB16W Pre-Biased NPN Transistor @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|----------------|----------|-----------|------|
| Supply Voltage | V_{CC} | 50 | V |
| Input Voltage | V_{IN} | -5 to +10 | V |
| Output Current | I_C | 600 | mA |

Maximum Ratings, DRDNB26W Pre-Biased NPN Transistor @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|----------------|----------|----------|------|
| Supply Voltage | V_{CC} | 50 | V |
| Input Voltage | V_{IN} | -5 to +5 | V |
| Output Current | I_C | 600 | mA |

Maximum Ratings, DRDPB16W Pre-Biased PNP Transistor @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|----------------|----------|-----------|------|
| Supply Voltage | V_{CC} | -50 | V |
| Input Voltage | V_{IN} | +5 to -10 | V |
| Output Current | I_C | 600 | mA |

Maximum Ratings, DRDPB26W Pre-Biased PNP Transistor @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|----------------|----------|----------|------|
| Supply Voltage | V_{CC} | -50 | V |
| Input Voltage | V_{IN} | +5 to -5 | V |
| Output Current | I_C | -600 | mA |

Maximum Ratings, Switching Diode @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|---|--------------|------------------------|------|
| Non-Repetitive Peak Reverse Voltage | V_{RM} | 100 | V |
| Peak Repetitive Reverse Voltage | V_{RRM} | 75 | V |
| Working Peak Reverse Voltage | V_{RWM} | | |
| DC Blocking Voltage | V_R | | |
| RMS Reverse Voltage | $V_{R(RMS)}$ | 53 | V |
| Forward Continuous Current (Note 3) | I_{FM} | 500 | mA |
| Average Rectified Output Current (Note 3) | I_O | 250 | mA |
| Non-Repetitive Peak Forward Surge Current | I_{FSM} | @ $t = 1.0\mu\text{s}$ | 4.0 |
| | | @ $t = 1.0\text{s}$ | 2.0 |

Electrical Characteristics, DRDN010W NPN Transistor @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Min | Max | Unit | Test Condition |
|--------------------------------------|---------------|-----|-----|---------------|---|
| DC Current Gain | h_{FE} | 150 | 800 | — | $I_C = 100\text{mA}$, $V_{CE} = 1\text{V}$ |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | — | 0.5 | V | $I_C = 300\text{mA}$, $I_B = 30\text{mA}$ |
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | 45 | — | V | $I_C = 100\mu\text{A}$, $I_E = 0$ |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | 18 | — | V | $I_C = 1\text{mA}$, $I_B = 0$ |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | 5 | — | V | $I_E = 100\mu\text{A}$, $I_C = 0$ |
| Collector Cutoff Current | I_{CBO} | — | 1 | μA | $V_{CB} = 40\text{V}$, $I_E = 0$ |
| Emitter Cutoff Current | I_{EBO} | — | 1 | μA | $V_{EB} = 4\text{V}$, $I_C = 0$ |
| Current Gain-Bandwidth Product | f_T | 100 | — | MHz | $V_{CE} = 10\text{V}$, $I_C = 50\text{mA}$, $f = 100\text{MHz}$ |
| Capacitance | C_{obo} | — | 8 | pF | $V_{CB} = 10\text{V}$, $I_E = 0$, $f = 1\text{MHz}$ |

Electrical Characteristics, DRDN005W NPN Transistor @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Min | Max | Unit | Test Condition |
|--------------------------------------|---------------|-----|------|------|---|
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | 80 | — | V | $I_C = 100\mu\text{A}$, $I_E = 0$ |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | 80 | — | V | $I_C = 1.0\text{mA}$, $I_B = 0$ |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | 4.0 | — | V | $I_E = 100\mu\text{A}$, $I_C = 0$ |
| Collector Cutoff Current | I_{CBO} | — | 100 | nA | $V_{CB} = 60\text{V}$, $I_E = 0$ $V_{CB} = 80\text{V}$, $I_E = 0$ |
| Collector Cutoff Current | I_{CES} | — | 100 | nA | $V_{CE} = 60\text{V}$, $I_{BO} = 0\text{V}$ $V_{CE} = 80\text{V}$, $I_{BO} = 0\text{V}$ |
| DC Current Gain | h_{FE} | 100 | — | — | $I_C = 10\text{mA}$, $V_{CE} = 1.0\text{V}$ $I_C = 100\text{mA}$, $V_{CE} = 1.0\text{V}$ |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | — | 0.25 | V | $I_C = 100\text{mA}$, $I_B = 10\text{mA}$ |
| Base-Emitter Saturation Voltage | $V_{BE(SAT)}$ | — | 1.2 | V | $I_C = 100\text{mA}$, $V_{CE} = 1.0\text{V}$ |
| Current Gain-Bandwidth Product | f_T | 100 | — | MHz | $V_{CE} = 2.0\text{V}$, $I_C = 10\text{mA}$, $f = 100\text{MHz}$ |

Electrical Characteristics, DRDP006W PNP Transistor @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Min | Max | Unit | Test Condition |
|--------------------------------------|---------------|-----|------|------|---|
| DC Current Gain | h_{FE} | 100 | 300 | — | $I_C = -150\text{mA}$, $V_{CE} = -10\text{V}$ |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | — | -0.4 | V | $I_C = -150\text{mA}$, $I_B = -15\text{mA}$ |
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | -60 | — | V | $I_C = -10\mu\text{A}$, $I_E = 0$ |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | -60 | — | V | $I_C = -10\text{mA}$, $I_B = 0$ |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | -5 | — | V | $I_E = -10\mu\text{A}$, $I_C = 0$ |
| Collector Cutoff Current | I_{CBO} | — | -10 | nA | $V_{CB} = -50\text{V}$, $I_E = 0$ |
| Current Gain-Bandwidth Product | f_T | 200 | — | MHz | $V_{CE} = -20\text{V}$, $I_C = -50\text{mA}$, $f = 100\text{MHz}$ |
| Capacitance | C_{obo} | — | 8 | pF | $V_{CB} = -10\text{V}$, $I_E = 0$, $f = 1\text{MHz}$ |

Electrical Characteristics, DRDNB16W Pre-Biased NPN Transistor @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|------------------------|--------------|-----|-----|------|---------------|--|
| Input Voltage | $V_{I(off)}$ | 0.3 | — | — | V | $V_{CC} = 5\text{V}$, $I_O = 100\mu\text{A}$ |
| | $V_{I(on)}$ | — | — | 2.0 | V | $V_O = 0.3\text{V}$, $I_O = 20\text{mA}$ |
| Output Voltage | $V_{O(on)}$ | — | — | 0.3V | V | $I_O/I_I = 50\text{mA}/2.5\text{mA}$ |
| Input Current | I_I | — | — | 7.2 | mA | $V_I = 5\text{V}$ |
| Output Current | $I_{O(off)}$ | — | — | 0.5 | μA | $V_{CC} = 50\text{V}$, $V_I = 0\text{V}$ |
| DC Current Gain | G_I | 56 | — | — | — | $V_O = 5\text{V}$, $I_O = 50\text{mA}$ |
| Gain-Bandwidth Product | f_T | — | 200 | — | MHz | $V_{CE} = 10\text{V}$, $I_E = 5\text{mA}$, $f = 100\text{MHz}$ |

Electrical Characteristics, DRDNB26W Pre-Biased NPN Transistor @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|------------------------|---------------------|-----|-----|------|------|---|
| Input Voltage | V _{I(off)} | 0.5 | — | — | V | V _{CC} = 5V, I _O = 100μA |
| | V _{I(on)} | — | — | 3.0 | V | V _O = 0.3V, I _O = 20mA |
| Output Voltage | V _{O(on)} | — | — | 0.3V | V | I _O /I _I = 50mA/2.5mA |
| Input Current | I _I | — | — | 28 | mA | V _I = 5V |
| Output Current | I _{O(off)} | — | — | 0.5 | μA | V _{CC} = 50V, V _I = 0V |
| DC Current Gain | G _I | 47 | — | — | — | V _O = 5V, I _O = 50mA |
| Gain-Bandwidth Product | f _T | — | 200 | — | MHZ | V _{CE} = 10V, I _E = 5mA, f = 100MHz |

Electrical Characteristics, DRDPB16W Pre-Biased PNP Transistor @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|------------------------|---------------------|------|-----|-------|------|---|
| Input Voltage | V _{I(off)} | -0.3 | — | — | V | V _{CC} = -5V, I _O = -100μA |
| | V _{I(on)} | — | — | -2.0 | V | V _O = -0.3V, I _O = -20mA |
| Output Voltage | V _{O(on)} | — | — | -0.3V | V | I _O /I _I = -50mA/-2.5mA |
| Input Current | I _I | — | — | -7.2 | mA | V _I = -5V |
| Output Current | I _{O(off)} | — | — | -0.5 | μA | V _{CC} = -50V, V _I = 0V |
| DC Current Gain | G _I | 56 | — | — | — | V _O = -5V, I _O = -50mA |
| Gain-Bandwidth Product | f _T | — | 200 | — | MHZ | V _{CE} = -10V, I _E = -5mA, f = 100MHz |

Electrical Characteristics, DRDPB26W Pre-Biased PNP Transistor @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|------------------------|---------------------|------|-----|-------|------|---|
| Input Voltage | V _{I(off)} | -0.5 | — | — | V | V _{CC} = -5V, I _O = -100μA |
| | V _{I(on)} | — | — | -3.0 | V | V _O = -0.3V, I _O = -20mA |
| Output Voltage | V _{O(on)} | — | — | -0.3V | V | I _O /I _I = -50mA/-2.5mA |
| Input Current | I _I | — | — | -28 | mA | V _I = -5V |
| Output Current | I _{O(off)} | — | — | -0.5 | μA | V _{CC} = -50V, V _I = 0V |
| DC Current Gain | G _I | 47 | — | — | — | V _O = -5V, I _O = -50mA |
| Gain-Bandwidth Product | f _T | — | 200 | — | MHZ | V _{CE} = -10V, I _E = -5mA, f = 100MHz |

Electrical Characteristics, Switching Diode @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Max | Unit | Test Condition |
|------------------------------------|--------------------|------|-------|------|---|
| Reverse Breakdown Voltage (Note 4) | V _{(BR)R} | 75 | — | — | I _R = 10μA |
| Forward Voltage | V _F | 0.62 | 0.72 | V | I _F = 5.0mA |
| | | — | 0.855 | | I _F = 10mA |
| | | — | 1.0 | | I _F = 100mA |
| | | — | 1.25 | | I _F = 150mA |
| Reverse Current (Note 4) | I _R | — | 2.5 | μA | V _R = 75V |
| | | | 50 | μA | V _R = 75V, T _J = 150°C |
| | | | 30 | μA | V _R = 25V, T _J = 150°C |
| | | | 25 | nA | V _R = 20V |
| Total Capacitance | C _T | — | 4.0 | pF | V _R = 0, f = 1.0MHz |
| Reverse Recovery Time | t _{rr} | — | 4.0 | ns | I _F = I _R = 10mA, I _{rr} = 0.1 x I _R , R _L = 100Ω |

Notes: 4. Short duration pulse test used to minimize self-heating effect.

Device Characteristics

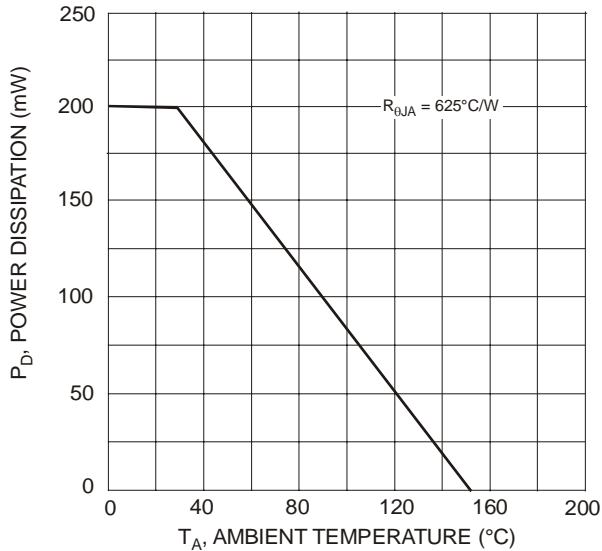


Fig. 1, Power Derating Curve (Total Device)

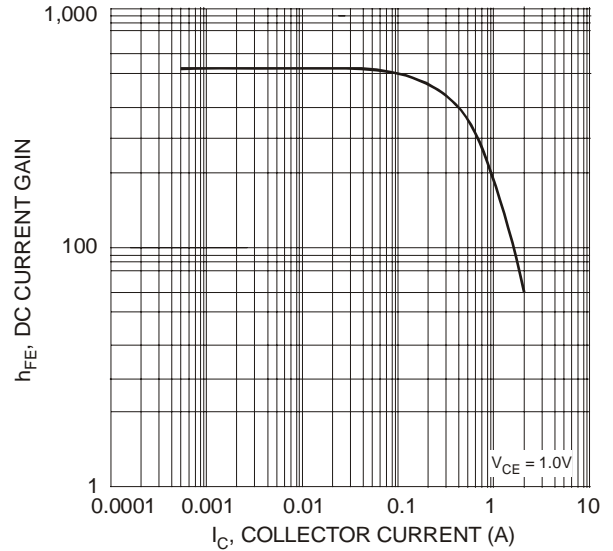


Fig. 2, Typical DC Current Gain vs. Collector Current (DRDN010W)

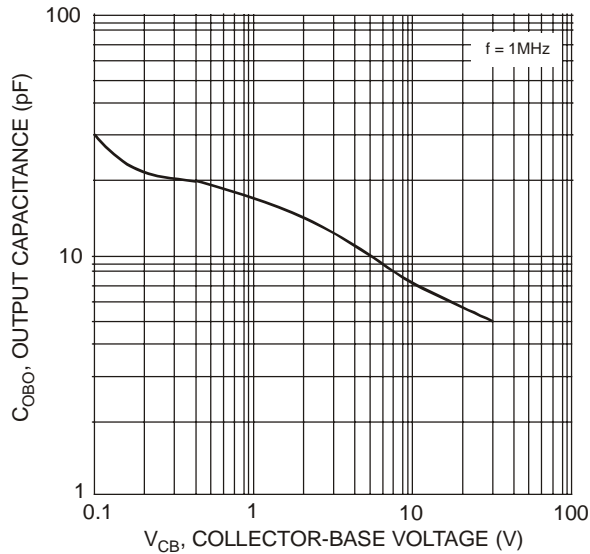


Fig. 3, Typical Output Capacitance vs. Collector-Base Voltage (DRDN010W)

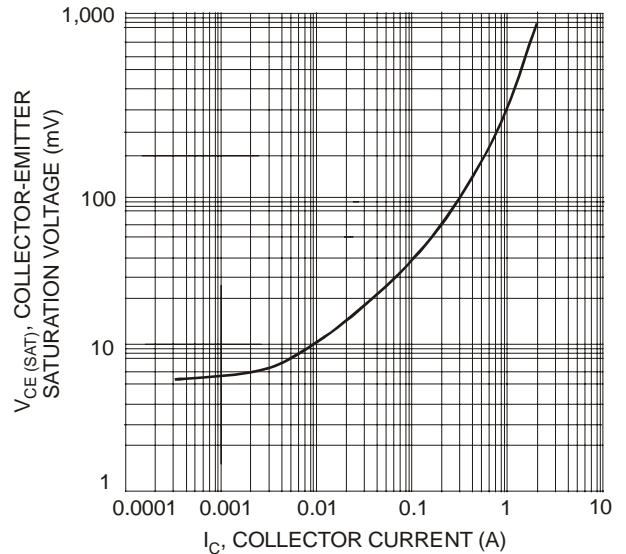


Fig. 4, Typical Collector Saturation Voltage vs. Collector Current (DRDN010W)

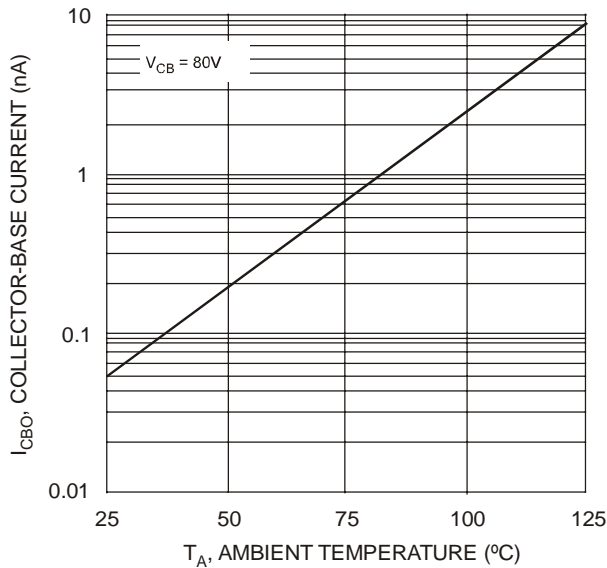


Fig. 5, Typical Collector-Cutoff Current vs. Ambient Temperature (DRDN005W)

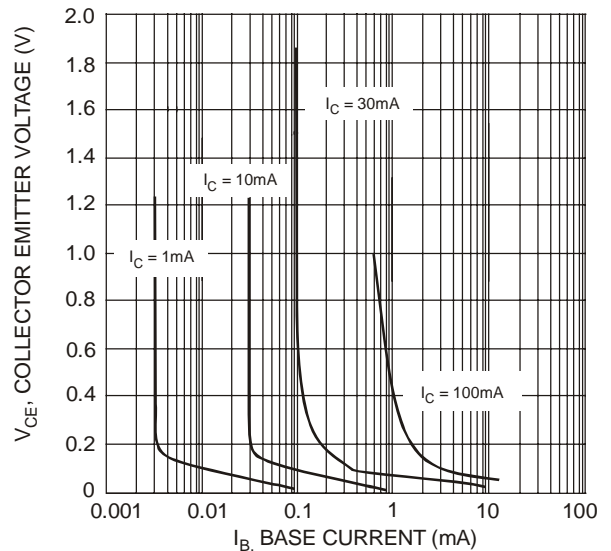


Fig. 6, Typical Collector Saturation Region (DRDN005W)

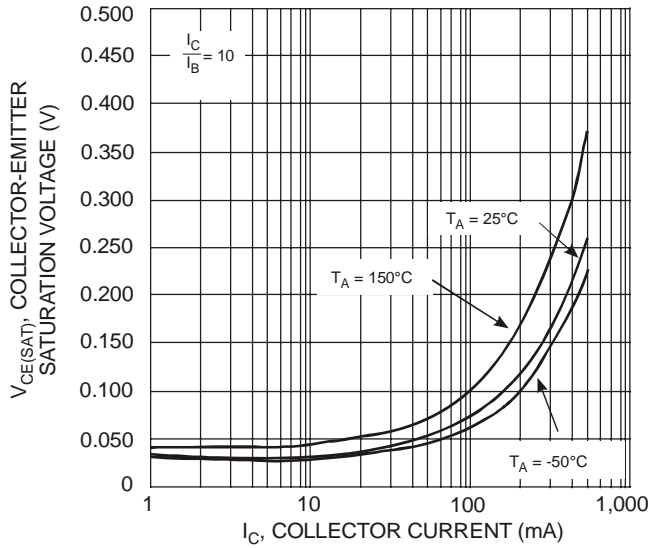


Fig. 7, Typical Collector-Emitter Saturation Voltage vs. Collector Current (DRDN005W)

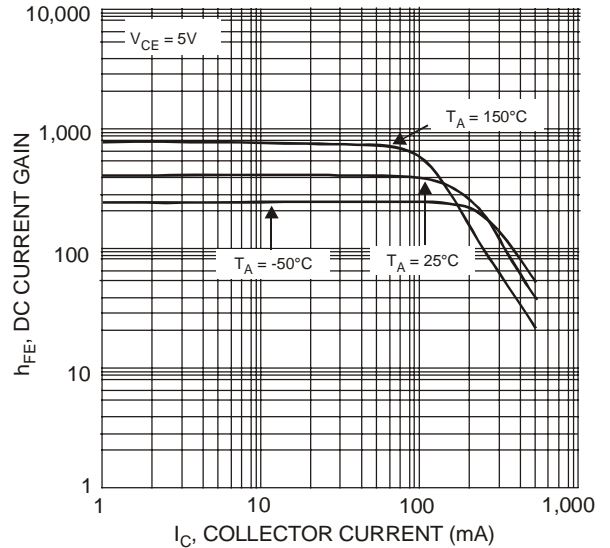


Fig. 8, Typical DC Current Gain vs. Collector Current (DRDN005W)

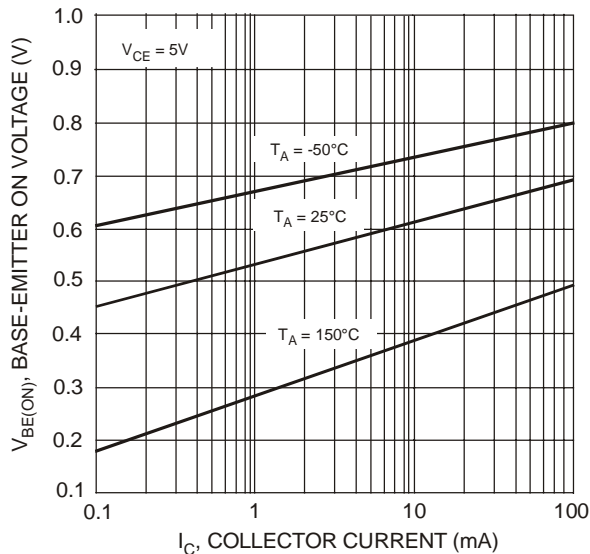


Fig. 9, Typical Base-Emitter On Voltage vs. Collector Current (DRDN005W)

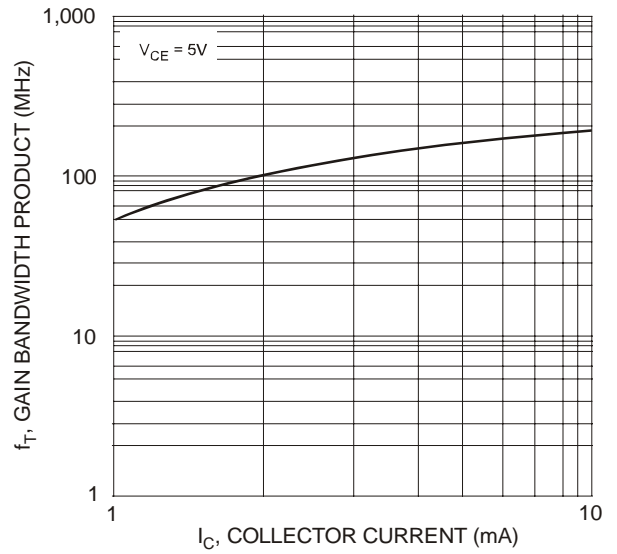


Fig. 10, Typical Gain Bandwidth Product vs. Collector Current (DRDN005W)

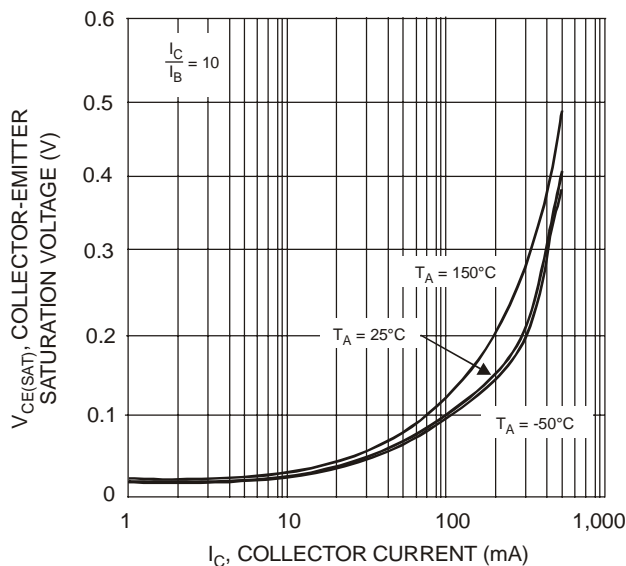


Fig. 11, Typical Collector-Emitter Saturation Voltage vs. Collector Current (DRDP006W)

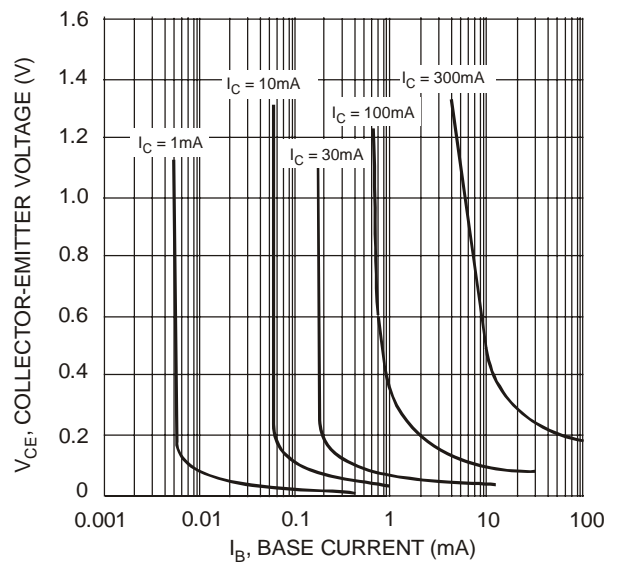


Fig. 12, Typical Collector Saturation Region (DRDP006W)

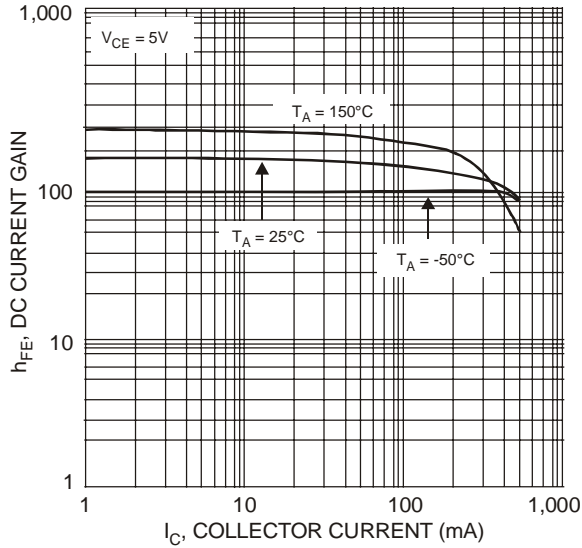


Fig. 13, Typical DC Current Gain vs. Collector Current (DRDP006W)

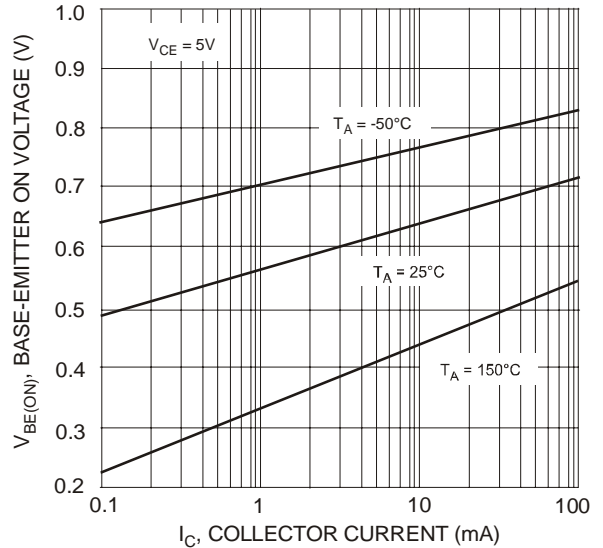


Fig. 14, Typical Base-Emitter On Voltage vs. Collector Current (DRDP006W)

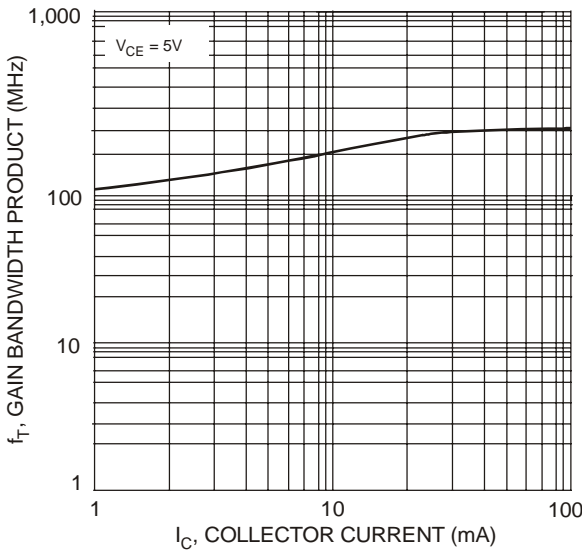


Fig. 15, Typical Gain Bandwidth Product vs. Collector Current (DRDP006W)

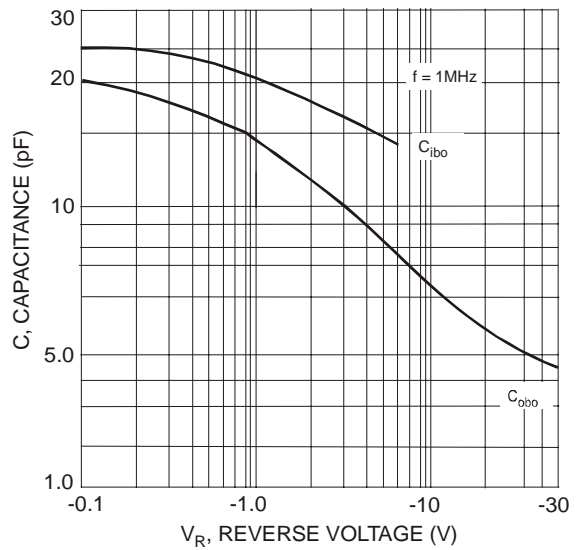


Fig. 16, Typical Capacitance (DRDP006W)

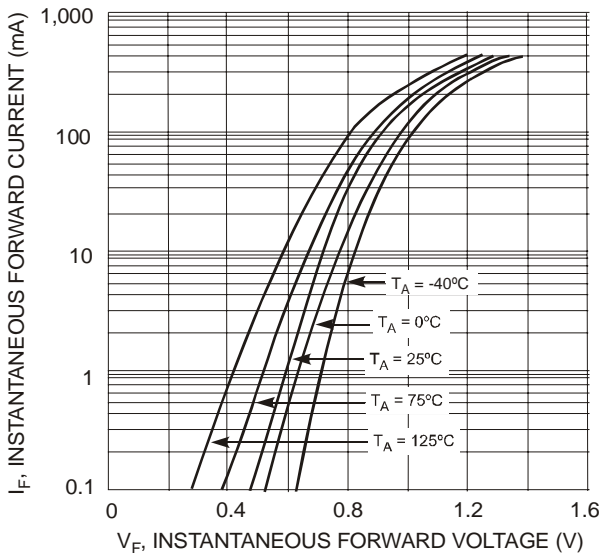


Fig. 17, Typical Forward Characteristics (Switching Diode)

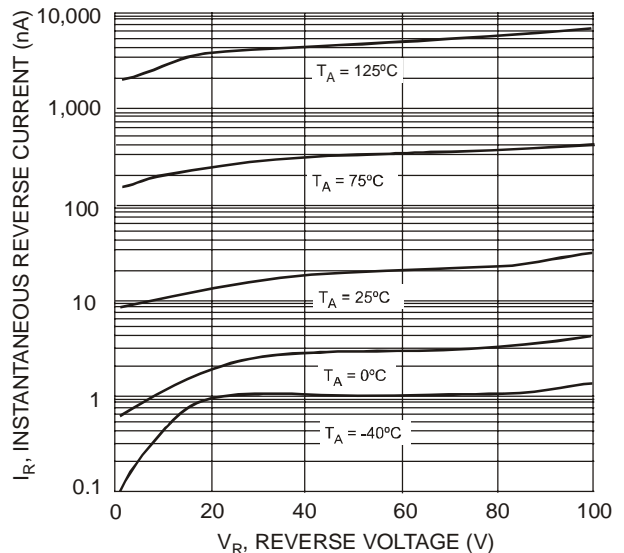


Fig. 18, Typical Reverse Characteristics (Switching Diode)

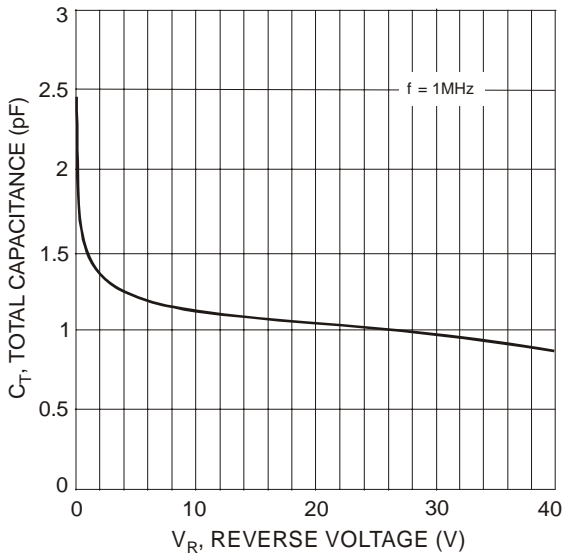


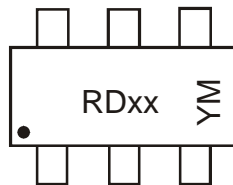
Fig. 19, Typical Capacitance vs. Reverse Voltage (Switching Diode)

Ordering Information (Note 5)

| Device | Packaging | Shipping |
|------------|-----------|------------------|
| DRDN010W-7 | SOT-363 | 3000/Tape & Reel |
| DRDP006W-7 | SOT-363 | 3000/Tape & Reel |
| DRDNB16W-7 | SOT-363 | 3000/Tape & Reel |
| DRDNB26W-7 | SOT-363 | 3000/Tape & Reel |
| DRDPB16W-7 | SOT-363 | 3000/Tape & Reel |
| DRDPB26W-7 | SOT-363 | 3000/Tape & Reel |
| DRDN005W-7 | SOT-363 | 3000/Tape & Reel |

Notes: 5. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

Marking Information



RDxx = Product Type Marking Code:

- RD01 = DRDN010W
- RD02 = DRDP006W
- RD03 = DRDNB16W
- RD04 = DRDNB26W
- RD05 = DRDPB16W
- RD06 = DRDPB26W
- RD07 = DRDN005W

YM = Date Code Marking

Y = Year ex: S = 2005

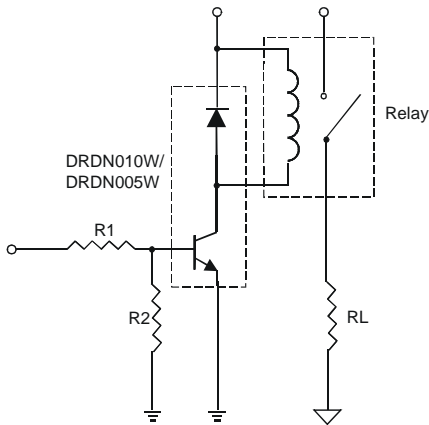
M = Month ex: 9 = September

Date Code Key

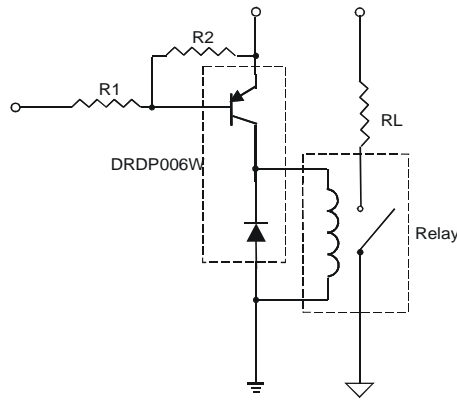
| Year | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------|------|------|------|------|------|------|------|------|
| Code | S | T | U | V | W | X | Y | Z |

| 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 |

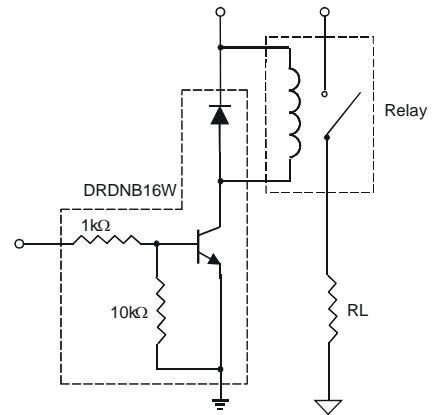
Sample Applications



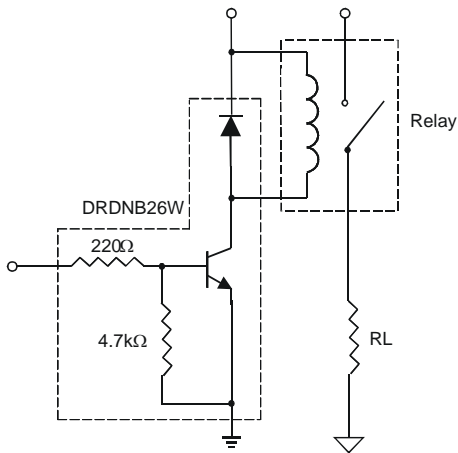
Application Example: DRDN010W/DRDN005W current sink configuration, bias resistors not included



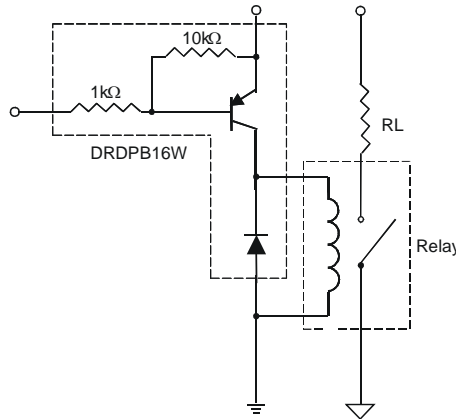
Application Example: DRDP006W current source configuration, bias resistors not included



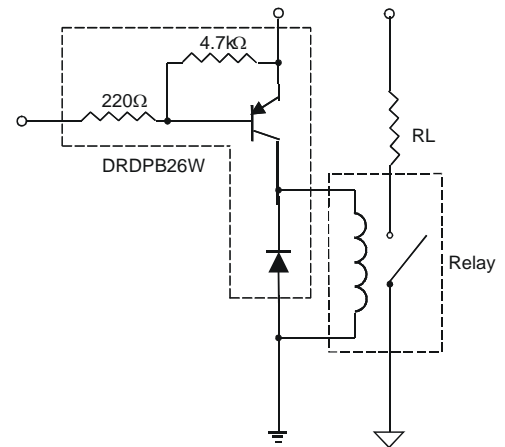
Application Example: DRDNB16W current sink configuration with built-in bias resistors



Application Example: DRDNB26W current sink configuration with built-in bias resistors (low R1)

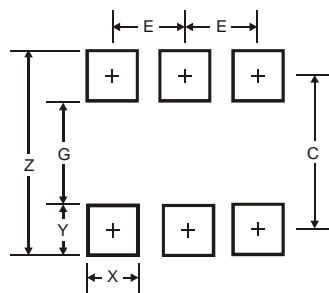


Application Example: DRDPB16W current source configuration with built-in bias resistors



Application Example: DRDPB26W current source configuration with built-in bias resistors (low R1)

Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| Z | 2.5 |
| G | 1.3 |
| X | 0.42 |
| Y | 0.6 |
| C | 1.9 |
| E | 0.65 |

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