

Features and Benefits

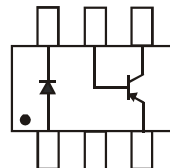
- Epitaxial Planar Die Construction
- One Transistor and One Switching Diode in One Package
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

Mechanical Data

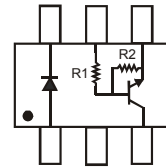
- Case: SOT-363
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish - Matte Tin annealed over Alloy 42 lead-frame. Solderable per MIL-STD-202, Method 208
- Weight: 0.008 grams (approximate)



Top View



DRDP006W



DRDNB16W

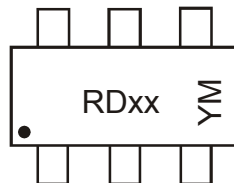
 R1 = 1K Ω
 R2 = 10K Ω

Ordering Information (Note 4)

Device	Compliance	Packaging	Shipping
DRDP006W-7	Commercial	SOT-363	3000/Tape & Reel
DRDNB16W-7	Commercial	SOT-363	3000/Tape & Reel

- 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



RDxx = Product Type Marking Code:
 RD02 = DRDP006W
 RD03 = DRDNB16W
 YM = Date Code Marking
 Y = Year (ex: 1 = 2021)
 M = Month (ex: 9 = September)

Date Code Key

Year	2005	2021	2022	2023	2024	2025	2026
Code	S	I	J	K	L	M	N

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

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	200	mW
Thermal Resistance, Junction to Ambient Air (Note 5)	$R_{\theta JA}$	625	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CB0}	-60	V
Collector-Emitter Voltage	V_{CEO}	-60	V
Emitter-Base Voltage	V_{EB0}	-5.0	V
Collector Current (Note 5)	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, 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 5)	I_{FM}	500	mA	
Average Rectified Output Current (Note 5)	I_O	250	mA	
Non-Repetitive Peak Forward Surge Current	I_{FSM}	@ $t = 1.0\mu\text{s}$	4.0	A
		@ $t = 1.0\text{s}$	1.0	

Note: 5. Device mounted on FR-4 PCB, 1 inch square 2oz copper pad area.

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

Characteristic (Note 6)	Symbol	Min	Typ	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 (Note 6)	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	$V_{O(on)}$	—	—	0.3	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, Switching Diode @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
Reverse Breakdown Voltage (Note 6)	$V_{(BR)R}$	75	—	—	$I_R = 10\mu\text{A}$
Forward Voltage	V_F	0.62	0.72	V	$I_F = 5.0\text{mA}$
		—	0.855		$I_F = 10\text{mA}$
		—	1.0		$I_F = 100\text{mA}$
		—	1.25		$I_F = 150\text{mA}$
Reverse Current (Note 6)	I_R	—	2.5	μA	$V_R = 75\text{V}$
		—	50	μA	$V_R = 75\text{V}$, $T_J = 150^\circ\text{C}$
		—	30	μA	$V_R = 25\text{V}$, $T_J = 150^\circ\text{C}$
		—	25	nA	$V_R = 20\text{V}$
Total Capacitance	C_T	—	4.0	pF	$V_R = 0$, $f = 1.0\text{MHz}$
Reverse Recovery Time	t_{rr}	—	4.0	ns	$I_F = I_R = 10\text{mA}$, $t_{rr} = 0.1 \times I_R$, $R_L = 100\Omega$

Note: 6. Short duration pulse test used to minimize self-heating effect.

Device Characteristics

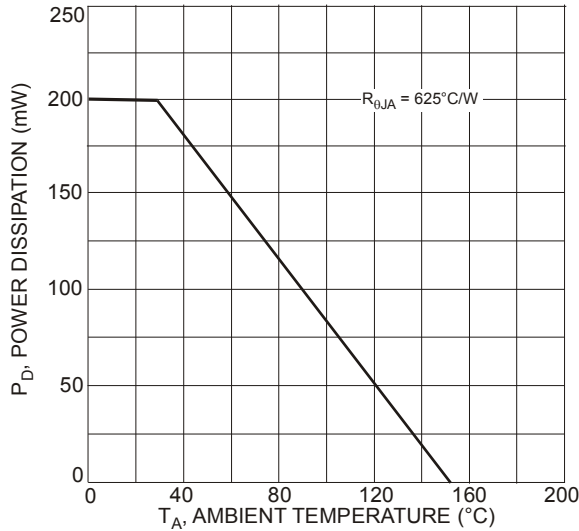


Fig. 1, Power Derating Curve (Total Device)

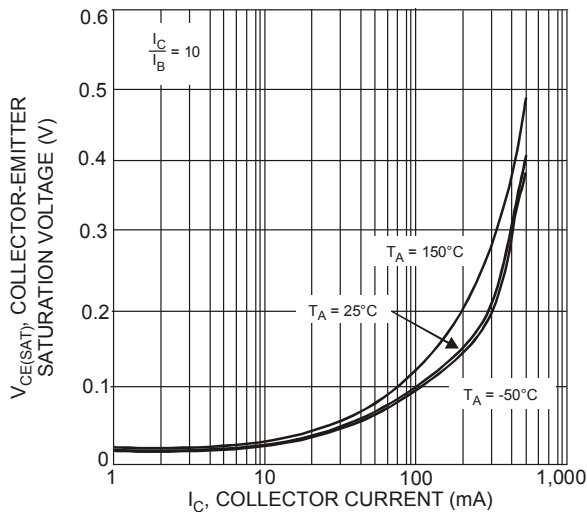


Fig. 2, Typical Collector-Emitter Saturation Voltage vs. Collector Current (DRDP006W)

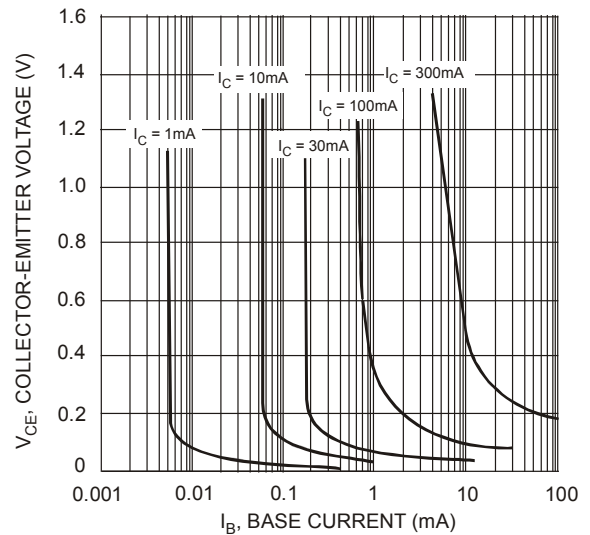


Fig. 3, Typical Collector Saturation Region (DRDP006W)

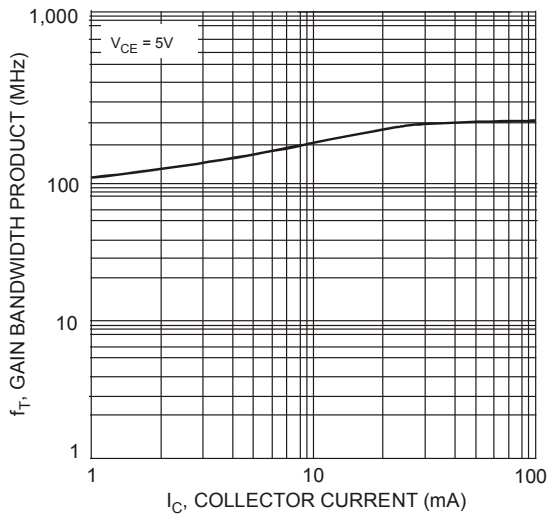


Fig. 4, Typical Gain Bandwidth Product vs. Collector Current (DRDP006W)

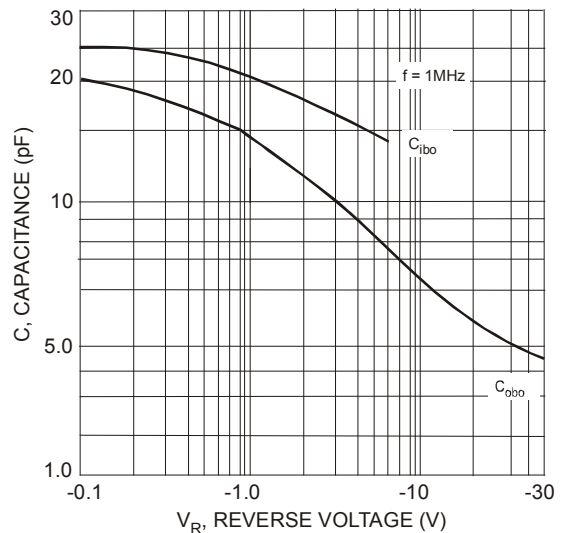


Fig. 5, Typical Capacitance (DRDP006W)

Device Characteristics (continued)

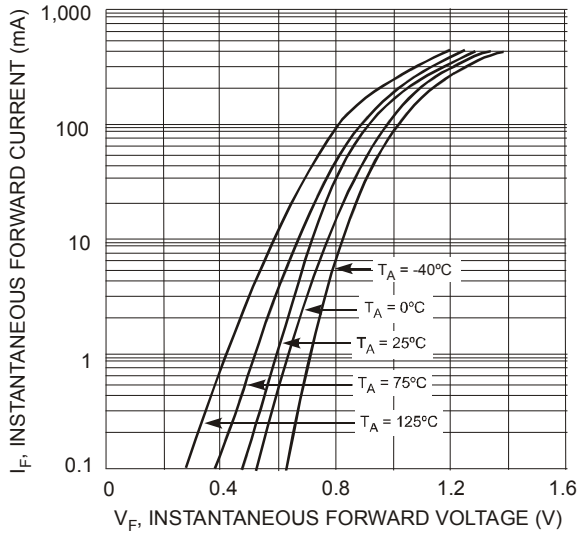


Fig. 6, Typical Forward Characteristics (Switching Diode)

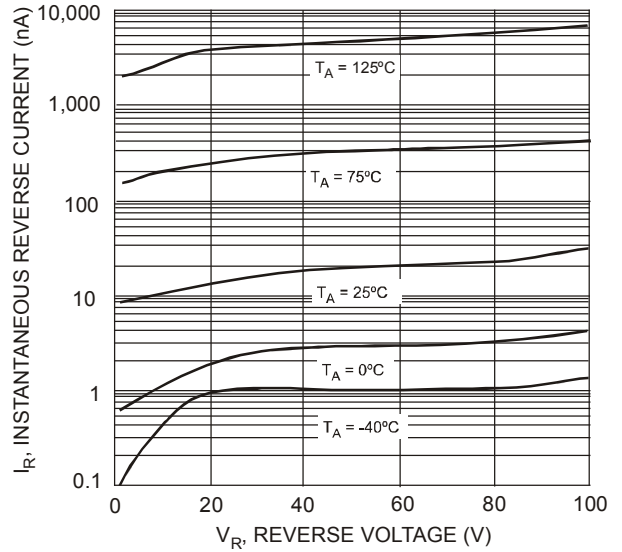


Fig. 7, Typical Reverse Characteristics (Switching Diode)

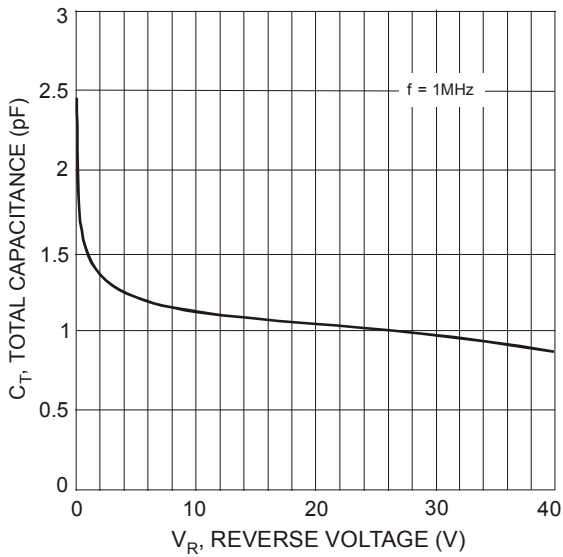
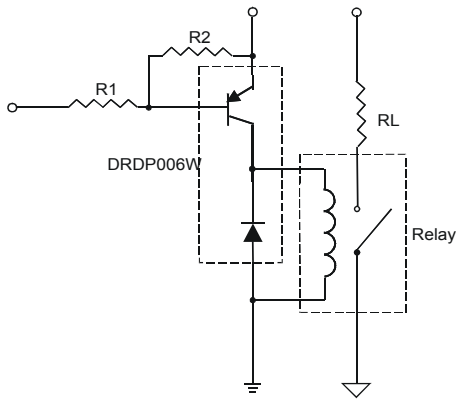
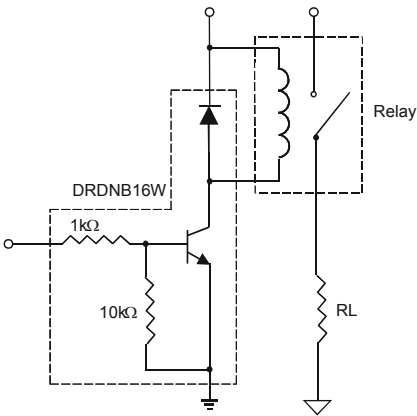


Fig. 8, Typical Capacitance vs. Reverse Voltage (Switching Diode)

Sample Applications



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

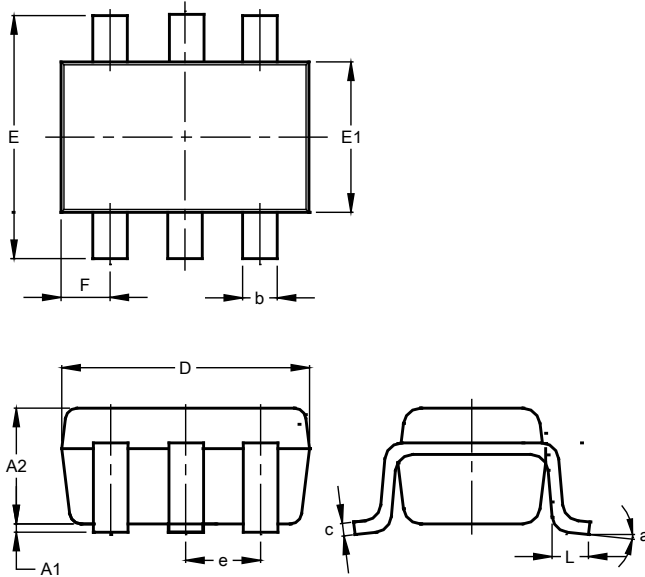


Application Example: DRDNB16W current sink configuration with built-in bias resistors

Package Outline Dimensions

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

SOT363

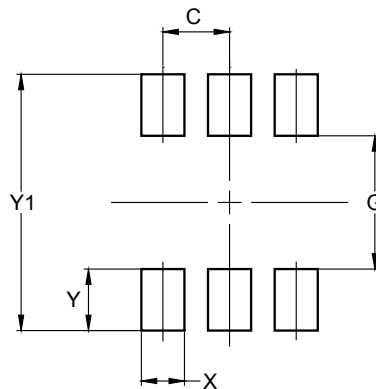


SOT363			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

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

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