

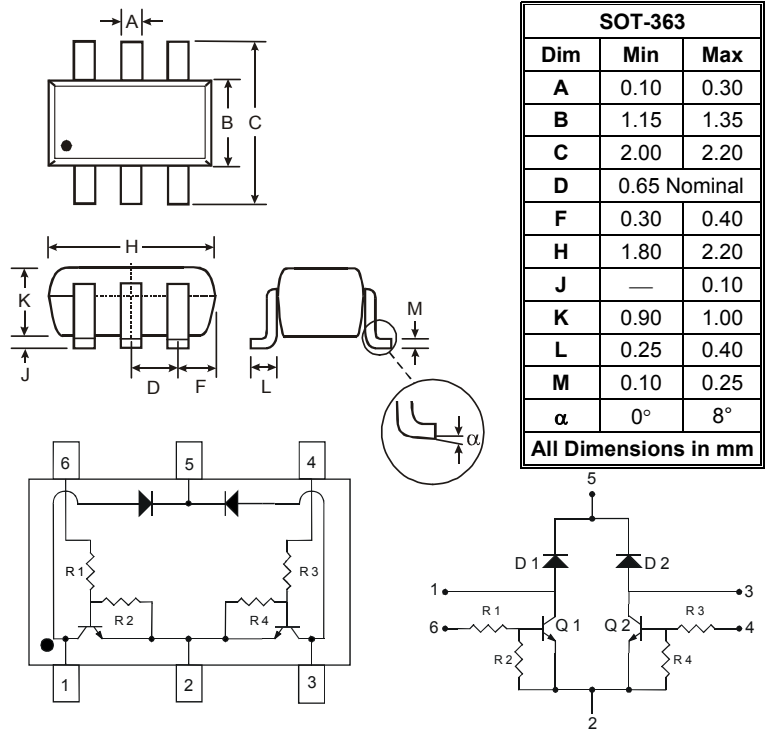
Features

- Epitaxial Planar Die Construction
- Two Pre-Biased Transistors and Two Switching Diodes, Internally Connected in One Package
- Ideally Suited for Automated Assembly Processes
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**
- **Qualified to AEC-Q101 standards for High Reliability**

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-020C
- Terminal Connections: See Diagram
- Terminals: Finish - Matte Tin annealed over Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208
- Marking & Type Code Information: See Page 5
- Ordering Information: See Page 5
- Weight: 0.0062 grams (approximate)

R1 = R3 = 2.2kΩ (nominal)
R2 = R4 = 47kΩ (nominal)



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 Junction Temperature Range	T _j , T _{STG}	-55 to +150	°C

Maximum Ratings, Pre-Biased NPN Transistor @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CC}	50	V
Collector-Emitter Voltage	V _{in}	-5 to +12	V
Output Current	I _o	100	mA
Peak Collector Current	I _{CM}	100	mA

Maximum Ratings, Switching Diode @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Non-Repetitive Peak Reverse Voltage	V _{RM}	100	V
Peak Repetitive Reverse Voltage	V _{RPM}	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 = 1.0μs	4.0
		@ t = 1.0s	2.0

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 our website at <http://www.diodes.com/datasheets/ap02001.pdf>.

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	$V_{I(\text{off})}$	0.5	—	—	V	$V_{CC} = 5\text{V}$, $I_O = 100\mu\text{A}$
	$V_{I(\text{on})}$	—	—	1.1	V	$V_O = 0.3\text{V}$, $I_O = 5\text{mA}$
Output Voltage	$V_{O(\text{on})}$	—	—	0.3	V	$I_O/I_I = 50\text{mA}/0.25\text{mA}$
Input Current	I_I	—	—	3.6	mA	$V_I = 5\text{V}$
Output Current	$I_{O(\text{off})}$	—	—	0.5	μA	$V_{CC} = 50\text{V}$, $V_I = 0\text{V}$
DC Current Gain	G_I	80	—	—	—	$V_O = 5\text{V}$, $I_O = 10\text{mA}$
Input Resistor Tolerance	ΔR_1	-30	—	+30	%	
Resistance Ratio Tolerance	$\Delta R_2/R_1$	-20	—	+20	%	
Gain-Bandwidth Product*	f_T	—	250	—	MHz	$V_{CE} = 10\text{V}$, $I_E = 5\text{mA}$, $f = 100\text{MHz}$

* Transistor - For Reference Only

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

Characteristic	Symbol	Min	Max	Unit	Test Condition
Reverse Breakdown Voltage (Note 4)	$V_{(BR)R}$	75	—	V	$I_R = 10\mu\text{A}$
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 4)	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	$I_F = I_R = 10\text{mA}$, $I_{rr} = 0.1 \times I_R$, $R_L = 100\Omega$

- Notes:
- 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 our website at <http://www.diodes.com/datasheets/ap02001.pdf>.
 - Short duration pulse test used to minimize self-heating effect.

Device Characteristics

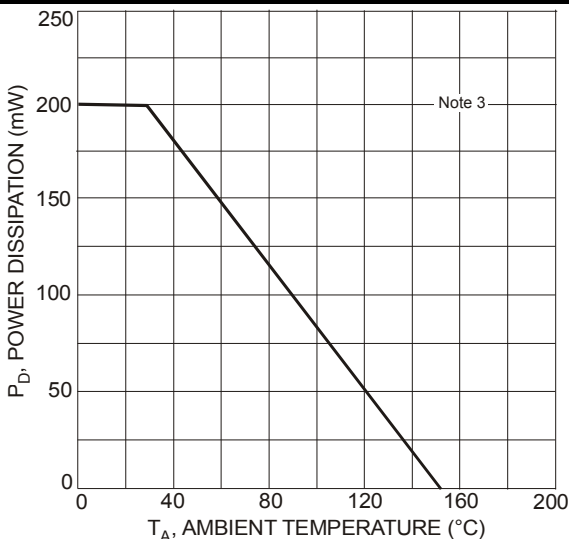
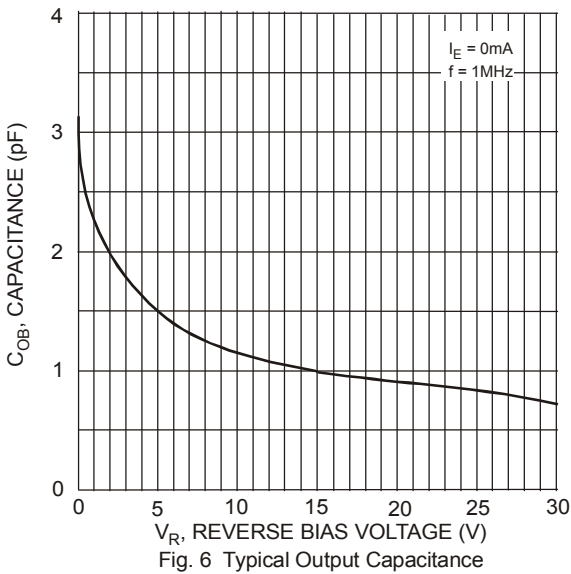
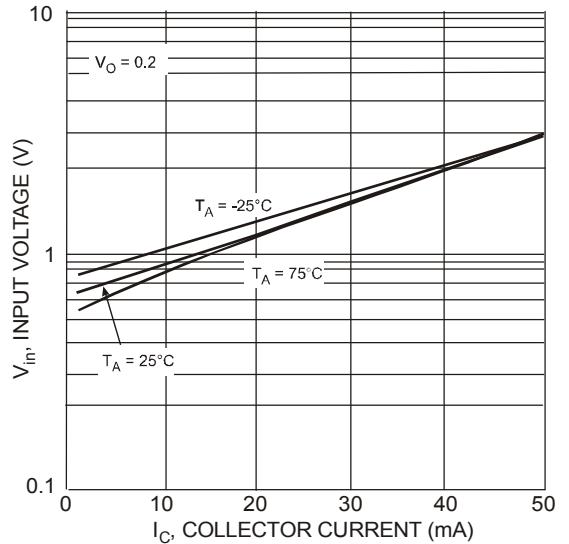
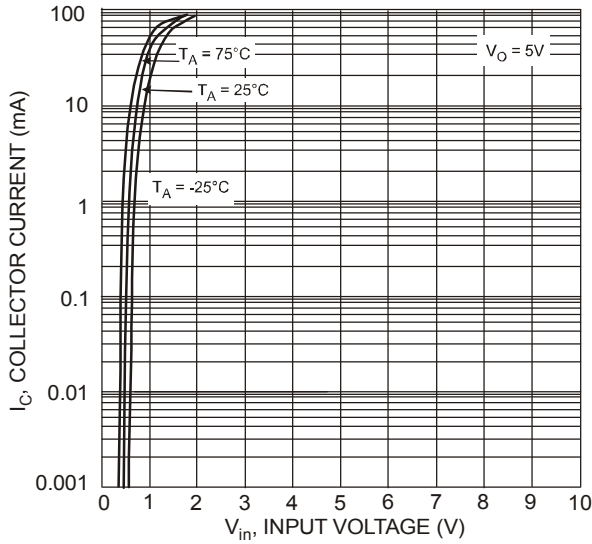
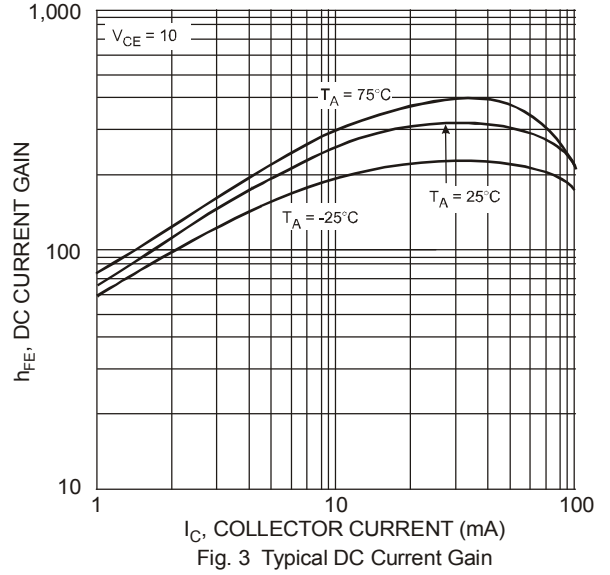
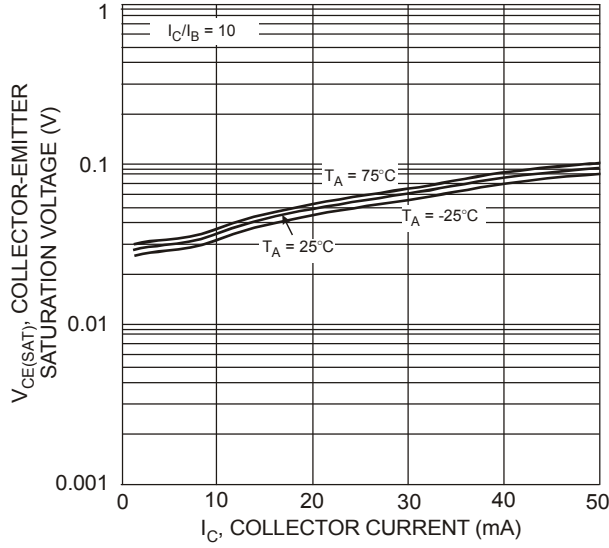


Fig. 1 Power Derating Curve (Total Device)

Pre-Biased NPN Transistor Elements



Switching Diode Elements

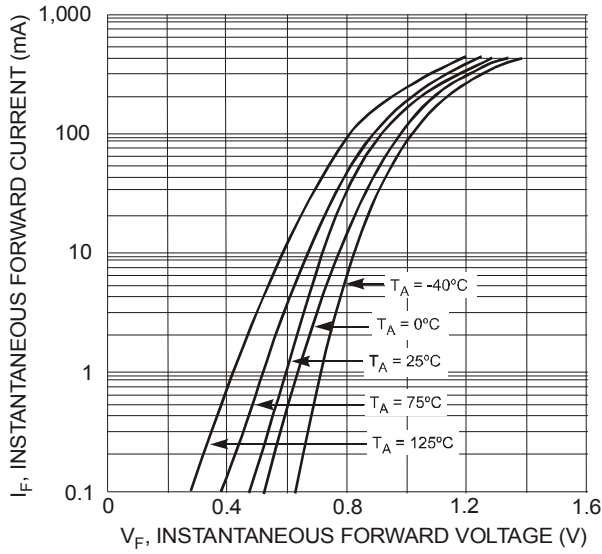


Fig. 7 Typical Forward Characteristics

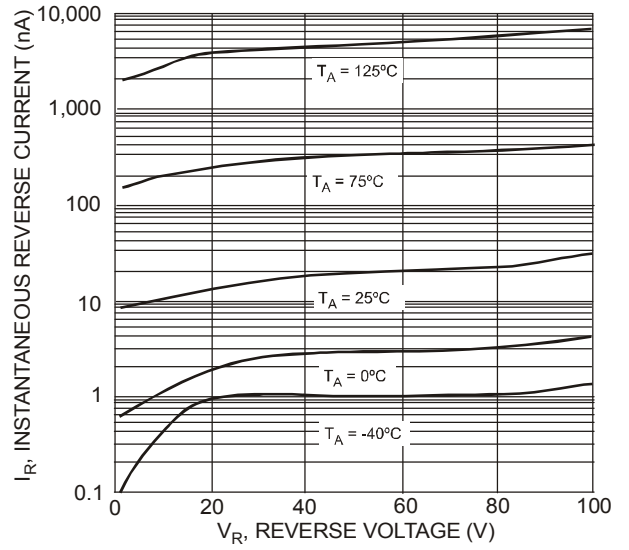


Fig. 8 Typical Reverse Characteristics

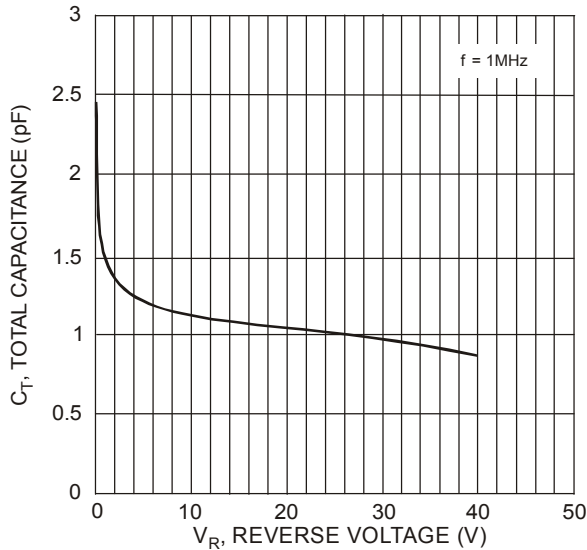
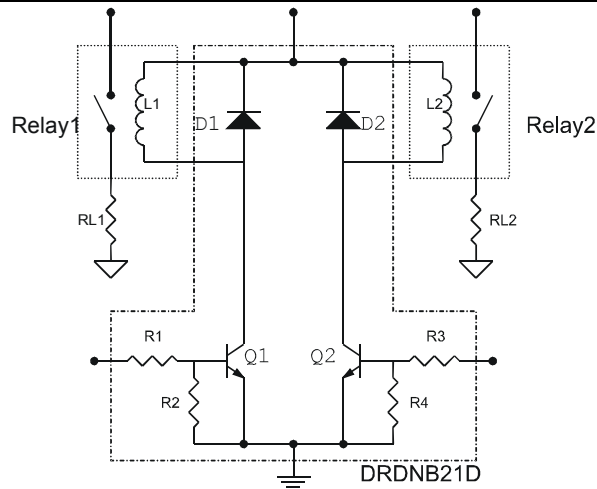


Fig. 9 Typical Capacitance vs. Reverse Voltage

Typical Application Circuit



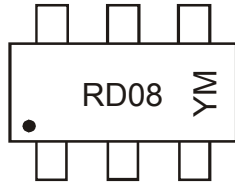
Typical Application Circuit DRDNB21D with two independent relays.

Ordering Information (Note 5)

Device	Packaging	Shipping
DRDNB21D-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



RD08 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year, e.g., T = 2006
 M = Month, e.g., 1 = January

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

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