



# DRDNB21D

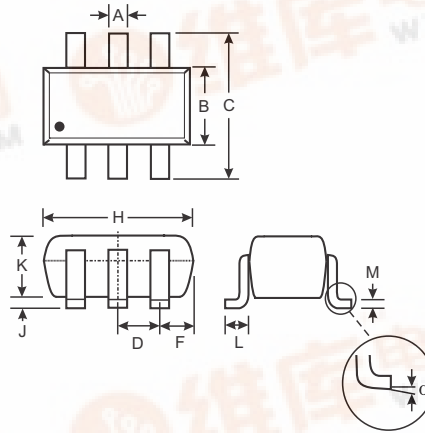
## COMPLEX ARRAY FOR DUAL RELAY DRIVER

### 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

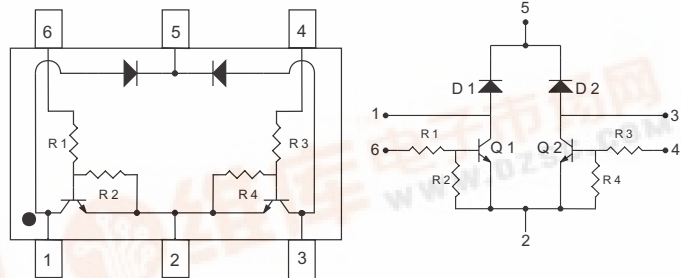
- Case: SOT-363
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture sensitivity: Level 1 per J-STD-020C
- Terminal Connections: See Diagram
- Terminals: Finish - Matte Tin annealed over Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208
- Marking & Type Code Information: See Last Page
- Ordering Information: See Last Page
- 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
$\alpha$	0°	8°
All Dimensions in mm		

R1 = R3 = 2.2k $\Omega$  (nominal)

R2 = R4 = 47k $\Omega$  (nominal)



### Maximum Ratings, Total Device @ T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 3)	P <sub>d</sub>	200	mW
Thermal Resistance, Junction to Ambient Air (Note 3)	R <sub>θJA</sub>	625	°C/W
Operating and Storage Junction Temperature Range	T <sub>j</sub> , T <sub>STG</sub>	-55 to +150	°C

### Maximum Ratings, Pre-Biased NPN Transistor @ T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CC</sub>	50	V
Collector-Emitter Voltage	V <sub>in</sub>	-5 to +12	V
Emitter-Base Voltage	I <sub>O</sub>	100	mA
Output Current - Continuous (Note 3)	I <sub>c</sub>	200	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](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>.

NEW PRODUCT



**Maximum Ratings, Switching Diode** @ T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Non-Repetitive Peak Reverse Voltage	V <sub>RM</sub>	100	V
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V <sub>RRM</sub> V <sub>RWM</sub> V <sub>R</sub>	75	V
RMS Reverse Voltage	V <sub>R(RMS)</sub>	53	V
Forward Continuous Current (Note 3)	I <sub>FM</sub>	500	mA
Average Rectified Output Current (Note 3)	I <sub>O</sub>	250	mA
Non-Repetitive Peak Forward Surge Current @ t = 1.0μs @ t = 1.0s	I <sub>FSM</sub>	4.0 2.0	A

**Electrical Characteristics, Pre-Biased NPN Transistor** @ T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	V <sub>I(off)</sub>	0.5	—	—	V	V <sub>CC</sub> = 5V, I <sub>O</sub> = 100μA
	V <sub>I(on)</sub>	—	—	1.1	V	V <sub>O</sub> = 0.3V, I <sub>O</sub> = 5mA
Output Voltage	V <sub>O(on)</sub>	—	—	0.3	V	I <sub>O</sub> /I <sub>I</sub> = 50mA/0.25mA
Input Current	I <sub>I</sub>	—	—	3.6	mA	V <sub>I</sub> = 5V
Output Current	I <sub>O(off)</sub>	—	—	0.5	uA	V <sub>CC</sub> = 50V, V <sub>I</sub> = 0V
DC Current Gain	G <sub>I</sub>	80	—	—	—	V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA
Input Resistor Tolerance	ΔR1	-30	—	+30	%	
Resistance Ratio Tolerance	ΔR2/R1	-20	—	+20	%	
Gain-Bandwidth Product*	f <sub>T</sub>	—	250	—	MHz	V <sub>CE</sub> = 10V, I <sub>E</sub> = 5mA, f = 100MHz

\* Transistor - For Reference Only

**Electrical Characteristics, Switching Diode** @ T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
Reverse Breakdown Voltage (Note 4)	V <sub>(BR)R</sub>	75	—	V	I <sub>R</sub> = 10μA
Forward Voltage (Note 4)	V <sub>F</sub>	0.62	0.72	V	I <sub>F</sub> = 5.0mA
		—	0.855		I <sub>F</sub> = 10mA
		—	1.0		I <sub>F</sub> = 100mA
		—	1.25		I <sub>F</sub> = 150mA
Reverse Current (Note 4)	I <sub>R</sub>	—	2.5	μA	V <sub>R</sub> = 75V
		—	50	μA	V <sub>R</sub> = 75V, T <sub>J</sub> = 150°C
		—	30	μA	V <sub>R</sub> = 25V, T <sub>J</sub> = 150°C
		—	25	nA	V <sub>R</sub> = 20V
Total Capacitance	C <sub>T</sub>	—	4.0	pF	V <sub>R</sub> = 0, f = 1.0MHz
Reverse Recovery Time	t <sub>rr</sub>	—	4.0	ns	I <sub>F</sub> = I <sub>R</sub> = 10mA, I <sub>rr</sub> = 0.1 x I <sub>R</sub> , R <sub>L</sub> = 100Ω

- 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

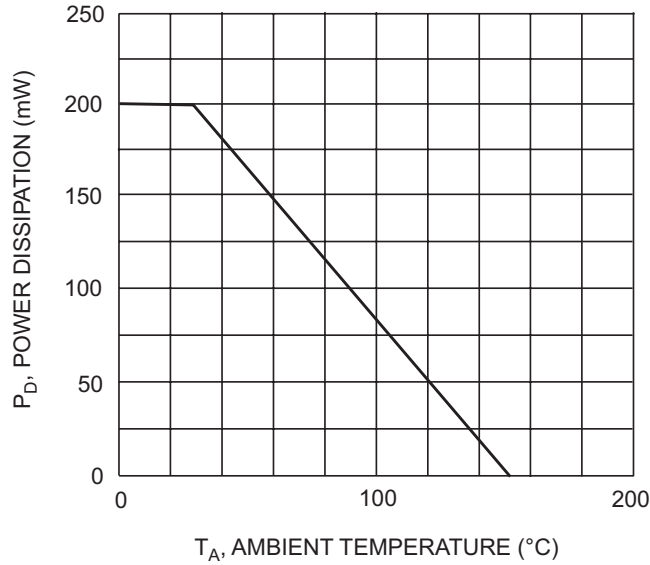


Fig. 1, Power Derating Curve (Total Device)

Pre-Biased NPN Transistor Elements

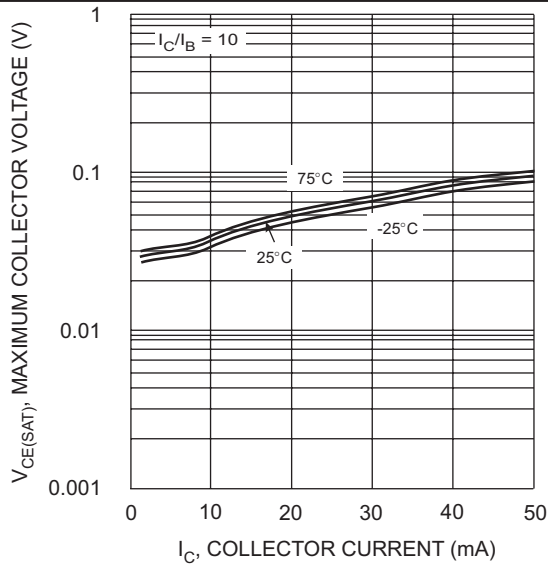


Fig. 2 V<sub>CE(SAT)</sub> vs. I<sub>C</sub>

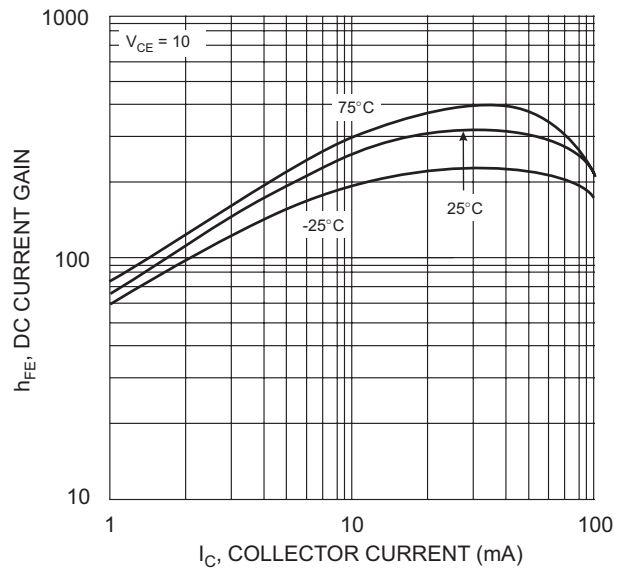


Fig. 3 DC Current Gain

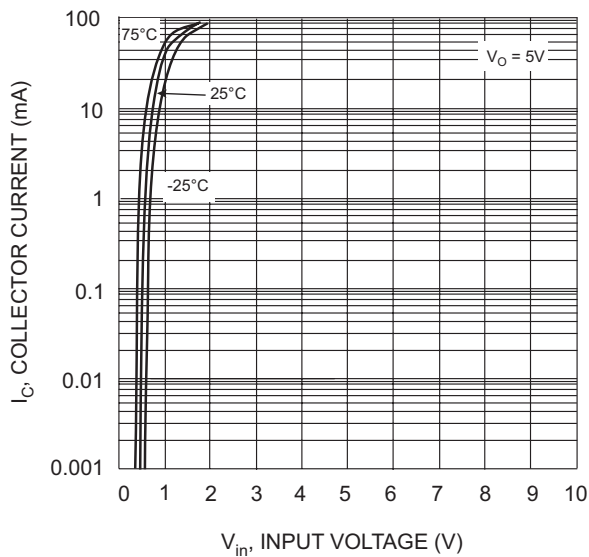


Fig. 4 Collector Current vs. Input Voltage

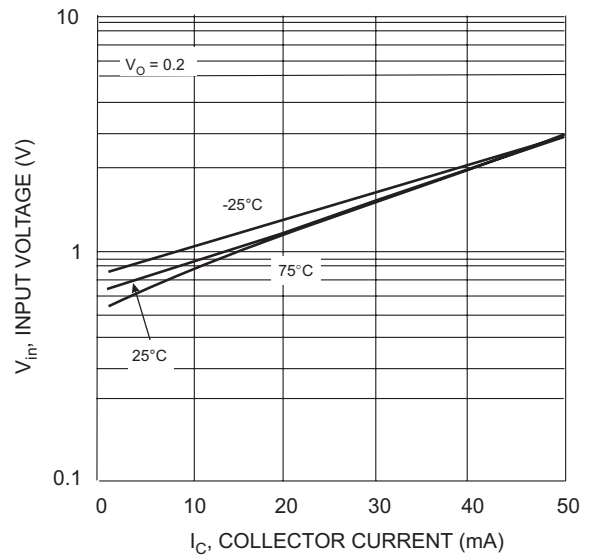


Fig. 5 Input Voltage vs. Collector Current

Pre-Biased NPN Transistor Elements (Continued)

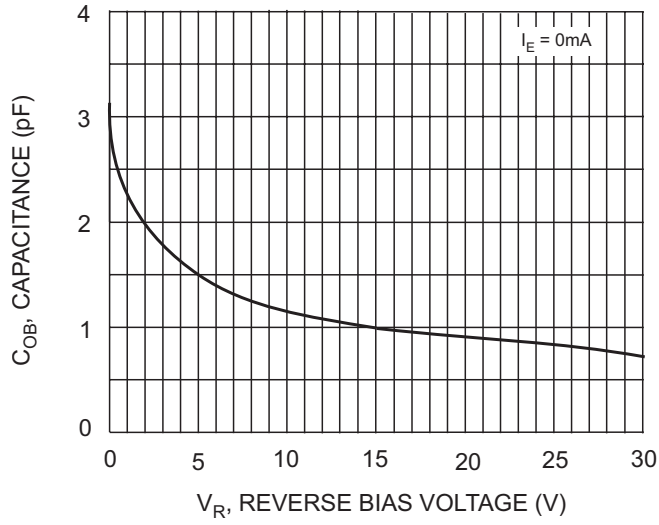


Fig. 6 Output Capacitance

Switching Diode Elements

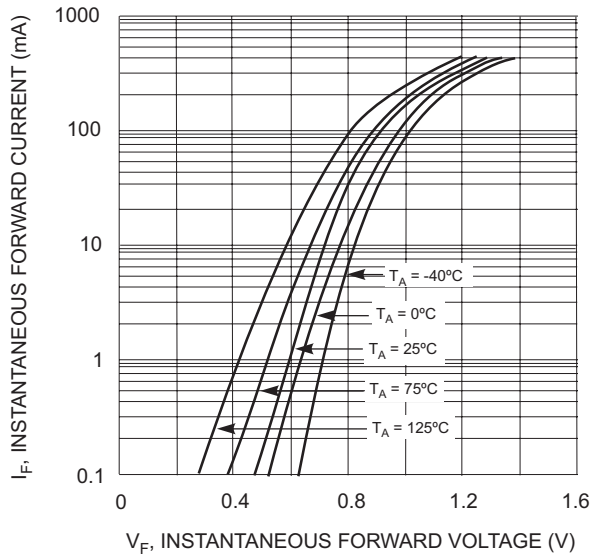


Fig. 7 Typical Forward Characteristics

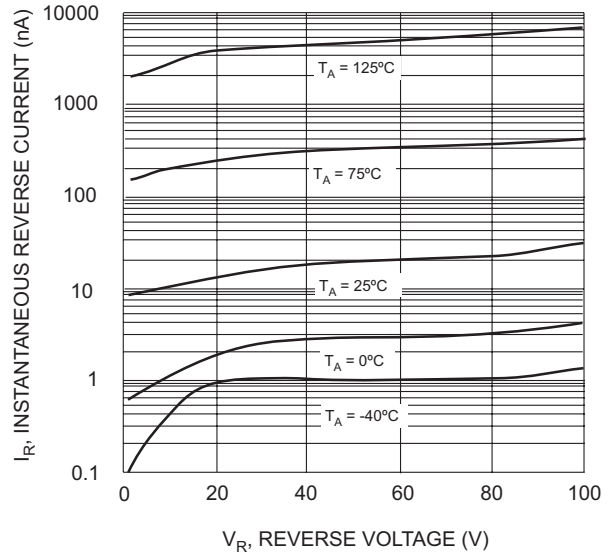


Fig. 8 Typical Reverse Characteristics

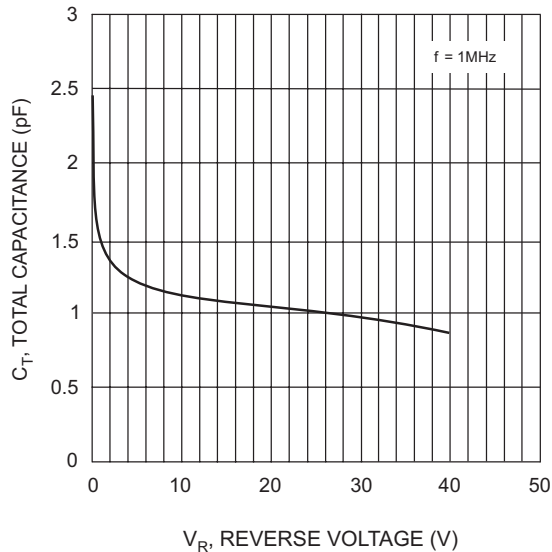
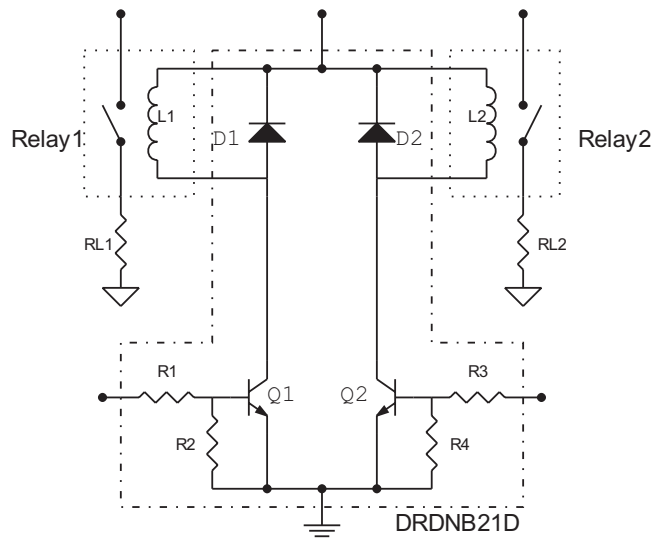


Fig. 9 Typical Capacitance vs. Reverse Voltage

## Typical Application Circuit



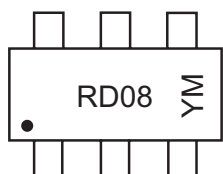
Typical Application Circuit using DRDNB21D with two independent relays.

## Ordering Information (Note 5)

Device	Marking Code	Packaging	Shipping
DRDNB21D-7	RD08	SOT-363	3000/Tape & Reel

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

## Marking Information



XXXX = 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		
Code						S	T	U	V	W		
Month	Jan	Feb	March	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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