

#### **COMPLEX ARRAY FOR DUAL RELAY DRIVER**

#### **Features and Benefits**

- 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

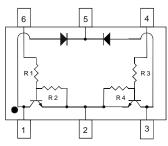
$R1 = R3 = 2.2k\Omega$	
$R2 = R4 = 47k\Omega$ (1	(nominal)

#### **Mechanical Data**

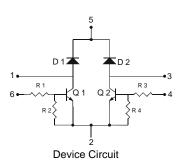
- Case: SOT-363
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish Matte Tin annealed over Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.0062 grams (approximate)







Top View



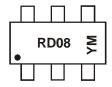
## **Ordering Information** (Note 3)

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

Notes:

- es: 1. No purposefully added lead.
  - 2. Diodes Inc.'s "Green" Policy can be found on our website at http://www.diodes.com
  - 3. For packaging details, visit our website at http://www.diodes.com.

## **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	2013	2014	2015	2016
Code	S	Т	U	V	W	Χ	Υ	Z	Α	В	С	D
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	0	N	D



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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 4)	P <sub>D</sub>	200	mW
Thermal Resistance, Junction to Ambient Air (Note 4)	$R_{ hetaJA}$	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 @TA = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Emitter Voltage	Vcc	50	V
Base-Emitter Voltage	V <sub>in</sub>	-5 to +12	V
Output Current	Io	100	mA
Peak Collector Current	I <sub>CM</sub>	100	mA

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

Characteristic	Symbol	Value	Unit
Non-Repetitive Peak Reverse Voltage	$V_{RM}$	100	V
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V <sub>RRM</sub> V <sub>R</sub> WM V <sub>R</sub>	75	٧
RMS Reverse Voltage	$V_{R(RMS)}$	53	V
Forward Continuous Current (Note 4)	I <sub>FM</sub>	500	mA
Average Rectified Output Current (Note 4)	Io	250	mA
Non-Repetitive Peak Forward Surge Current @ t = 1.0μs @ t = 1.0s	I <sub>FSM</sub>	4.0 1.0	А

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

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition
Innut Voltage	$V_{I(off)}$	0.5	_	_	V	$V_{CC} = 5V, I_{O} = 100 \mu A$
Input Voltage	$V_{I(on)}$	_	_	1.1	V	$V_O = 0.3V$ , $I_O = 5mA$
Output Voltage	V <sub>O(on)</sub>	_	_	0.3	V	$I_0/I_1 = 50 \text{mA}/0.25 \text{mA}$
Input Current	=	_	_	3.6	mA	V <sub>I</sub> = 5V
Output Current	I <sub>O(off)</sub>	_	_	0.5	uA	$V_{CC} = 50V, V_{I} = 0V$
DC Current Gain	G <sub>l</sub>	80	_	_	_	$V_0 = 5V, I_0 = 10mA$
Input Resistor Tolerance	ΔR1	-30	_	+30	%	-
Resistance Ratio Tolerance	ΔR2/R1	-20	_	+20	%	-
Gain-Bandwidth Product*	f⊤	_	250	_	MHz	V <sub>CE</sub> = 10V, I <sub>E</sub> = 5mA, f = 100MHz

<sup>\*</sup> Transistor - For Reference Only

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

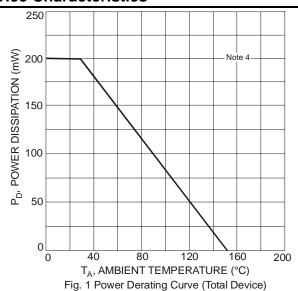
Characteristic	Symbol	Min	Max	Unit	Test Condition
Reverse Breakdown Voltage (Note 5)	V <sub>(BR)R</sub>	75	_	V	$I_R = 10\mu A$
Forward Voltage	V <sub>F</sub>	0.62 — — —	0.72 0.855 1.0 1.25	V	I <sub>F</sub> = 5.0mA I <sub>F</sub> = 10mA I <sub>F</sub> = 100mA I <sub>F</sub> = 150mA
Reverse Current (Note 5)	I <sub>R</sub>		2.5 50 30 25	μΑ μΑ μΑ nA	$V_R = 75V$ $V_R = 75V$ , $T_J = 150^{\circ}C$ $V_R = 25V$ , $T_J = 150^{\circ}C$ $V_R = 20V$
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	$I_F = I_R = 10 \text{mA}, I_{rr} = 0.1 \text{ x } I_R, R_L = 100 \Omega$

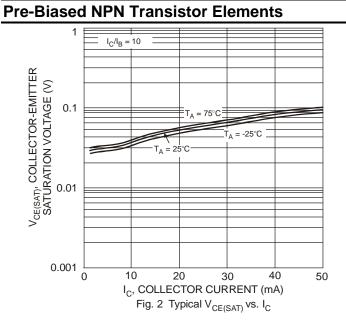
Notes: 4. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at http://www.diodes.com

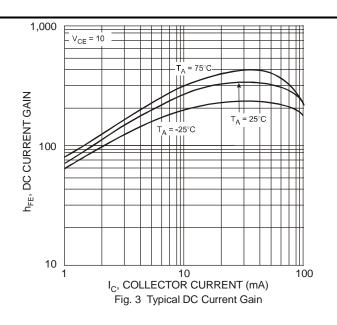
Short duration pulse test used to minimize self-heating effect.



### **Device Characteristics**









### **Pre-Biased NPN Transistor Elements - continued**

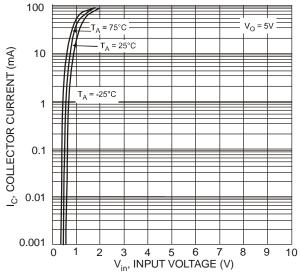
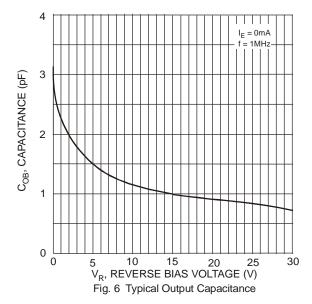


Fig. 4 Typical Collector Current vs. Input Voltage



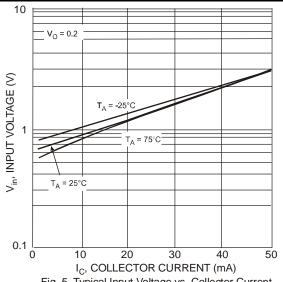
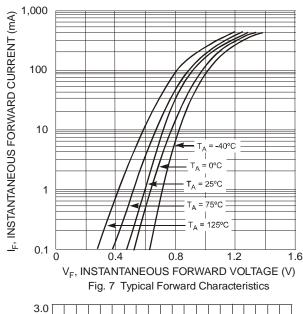
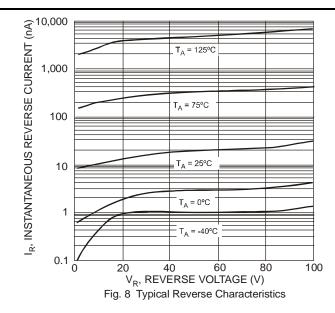


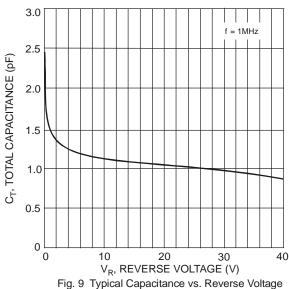
Fig. 5 Typical Input Voltage vs. Collector Current



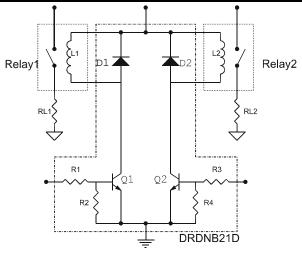
#### **Switching Diode Elements**







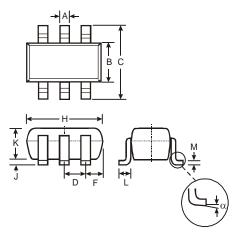
## **Typical Application Circuit**



Typical Application Circuit DRDNB21D with two independent relays.

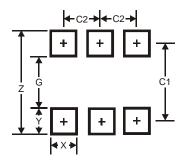


# **Package Outline Dimensions**



	SOT-363							
Dim	Min	Max						
Α	0.10	0.30						
В	1.15	1.35						
C	2.00 2.20							
D	0.65 Typ							
F	0.40	0.45						
Н	1.80	2.20						
7	0	0.10						
K	0.90	1.00						
L	0.25	0.40						
M	0.10	0.22						
α	0°	8°						
All Di	All Dimensions in mm							

# **Suggested Pad Layout**



Dimensions	Value (in mm)
Z	2.5
G	1.3
Х	0.42
Υ	0.6
C1	1.9
C2	0.65



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