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Diodes Incorporated
DRDNB21D-7

For any questions, you can email us directly:
sales@integrated-circuit.com

Lead-free Green

DRDNB21D

COMPLEX ARRAY FOR DUAL RELAY DRIVER

Features and Benefits

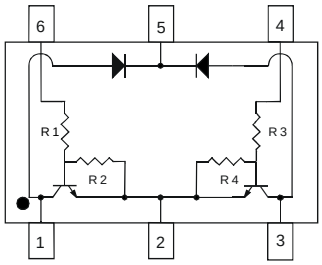
- Epitaxial Planar Die Construction
- Two Pre-Biased Transistors and Two Switching Diodes, Internally Connected in One Package
- Ideally Suited for Automated Assembly Processes
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**
- **Qualified to AEC-Q101 standards for High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

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

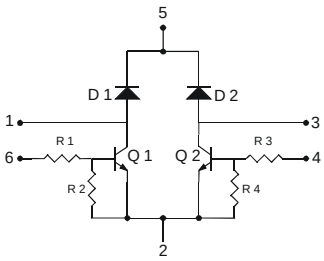
Mechanical Data

- 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



Top View



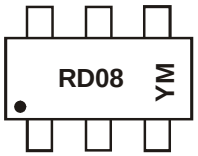
Device Circuit

Ordering Information (Note 3)

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

Notes: 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	T	U	V	W	X	Y	Z	A	B	C	D

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°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 4)	P_D	200	mW
Thermal Resistance, Junction to Ambient Air (Note 4)	$R_{\theta JA}$	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-Emitter Voltage	V_{CC}	50	V
Base-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 Working Peak Reverse Voltage DC Blocking Voltage	V_{RRM} V_{RWM} V_R	75	V
RMS Reverse Voltage	$V_{R(RMS)}$	53	V
Forward Continuous Current (Note 4)	I_{FM}	500	mA
Average Rectified Output Current (Note 4)	I_O	250	mA
Non-Repetitive Peak Forward Surge Current @ t = 1.0µs @ t = 1.0s	I_{FSM}	4.0 1.0	A

Electrical Characteristics, 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
	$V_{I(on)}$	—	—	1.1	V	V_O = 0.3V, I_O = 5mA
Output Voltage	$V_{O(on)}$	—	—	0.3	V	I_O/I_I = 50mA/0.25mA
Input Current	I_I	—	—	3.6	mA	V_I = 5V
Output Current	$I_{O(off)}$	—	—	0.5	uA	V_{CC} = 50V, V_I = 0V
DC Current Gain	G_I	80	—	—	—	V_O = 5V, I_O = 10mA
Input Resistor Tolerance	ΔR1	-30	—	+30	%	-
Resistance Ratio Tolerance	ΔR2/R1	-20	—	+20	%	-
Gain-Bandwidth Product*	f_T	—	250	—	MHz	V_{CE} = 10V, I_E = 5mA, f = 100MHz

* Transistor - For Reference Only

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

Characteristic	Symbol	Min	Max	Unit	Test Condition
Reverse Breakdown Voltage (Note 5)	$V_{(BR)R}$	75	—	V	I_R = 10µA
Forward Voltage	V_F	0.62 — — —	0.72 0.855 1.0 1.25	V	I_F = 5.0mA I_F = 10mA I_F = 100mA I_F = 150mA
Reverse Current (Note 5)	I_R	—	2.5 50 30 25	µA µA µA nA	V_R = 75V V_R = 75V, T_J = 150°C V_R = 25V, T_J = 150°C 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. 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
5. Short duration pulse test used to minimize self-heating effect.

Device Characteristics

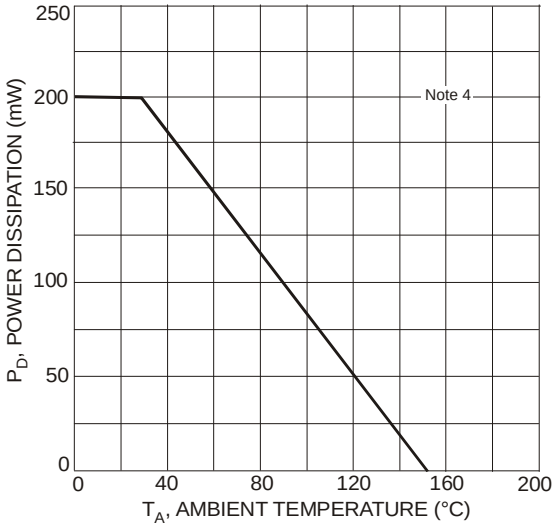


Fig. 1 Power Derating Curve (Total Device)

Pre-Biased NPN Transistor Elements

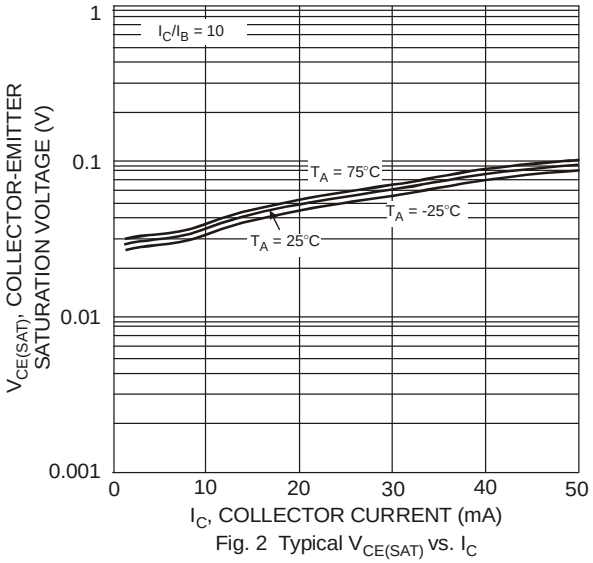


Fig. 2 Typical $V_{CE(SAT)}$ vs. I_C

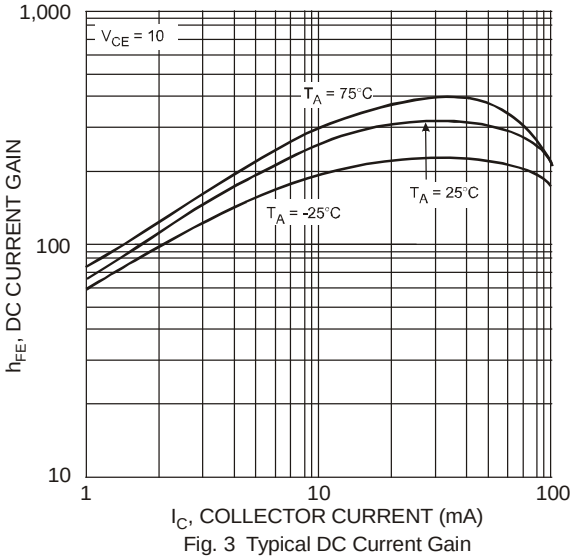


Fig. 3 Typical DC Current Gain

Pre-Biased NPN Transistor Elements - continued

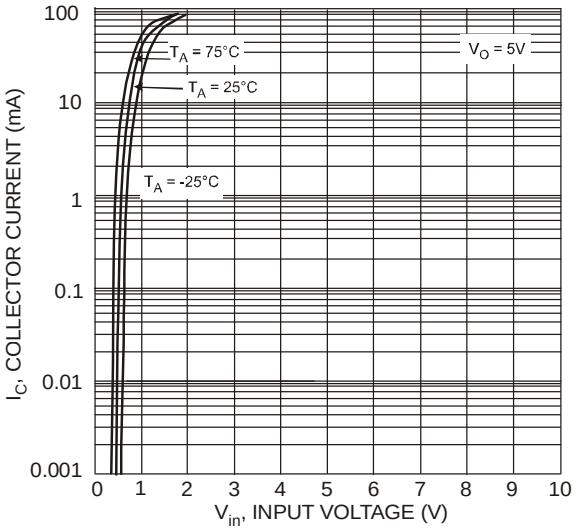


Fig. 4 Typical Collector Current vs. Input Voltage

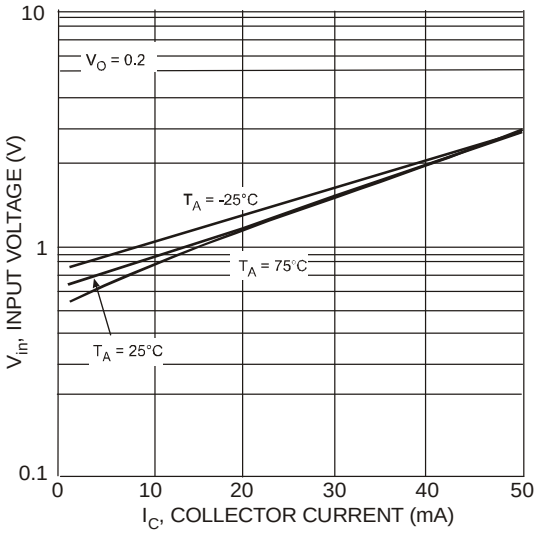


Fig. 5 Typical Input Voltage vs. Collector Current

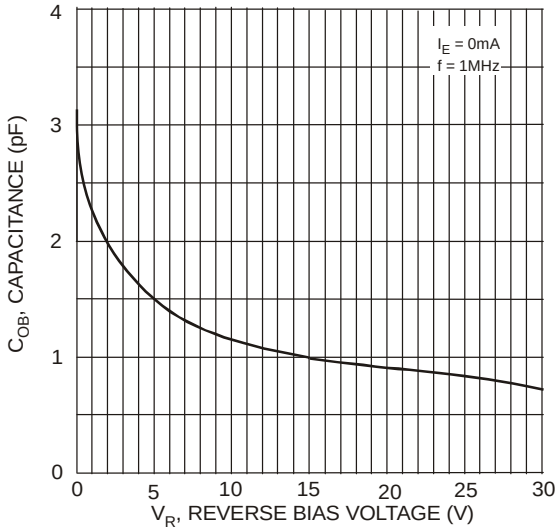


Fig. 6 Typical Output Capacitance

Switching Diode Elements

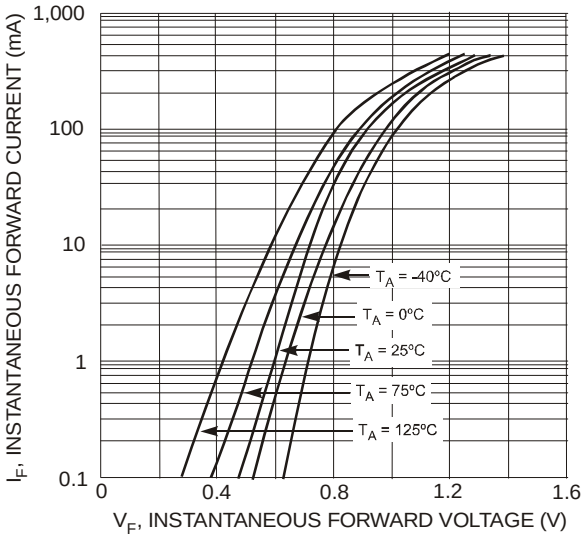


Fig. 7 Typical Forward Characteristics

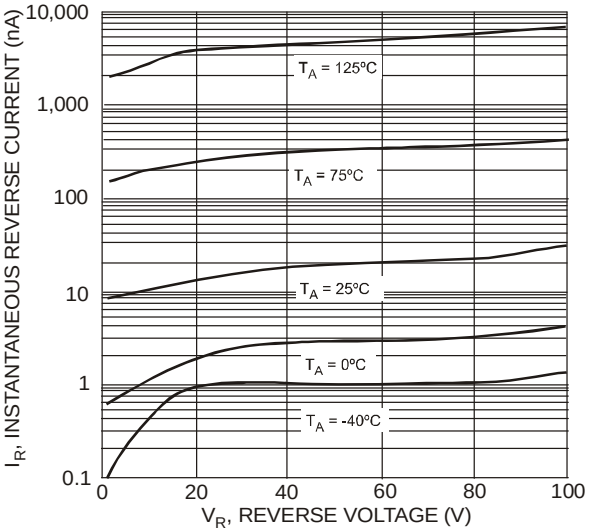


Fig. 8 Typical Reverse Characteristics

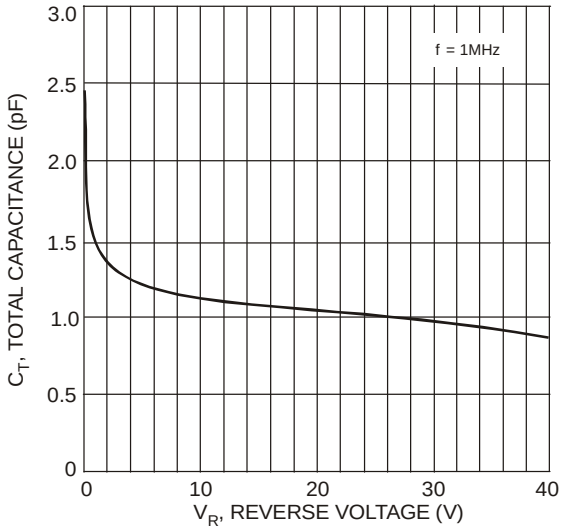
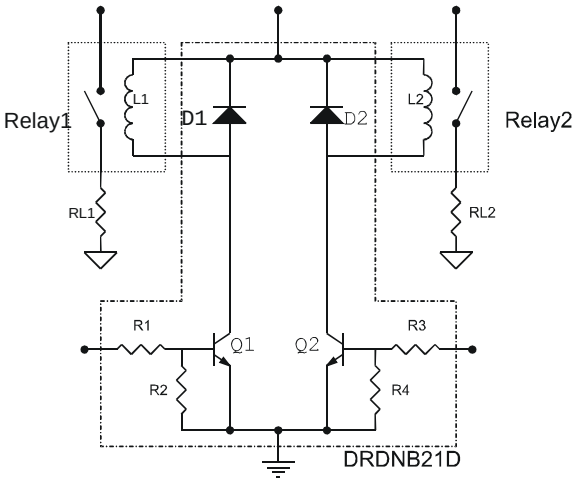


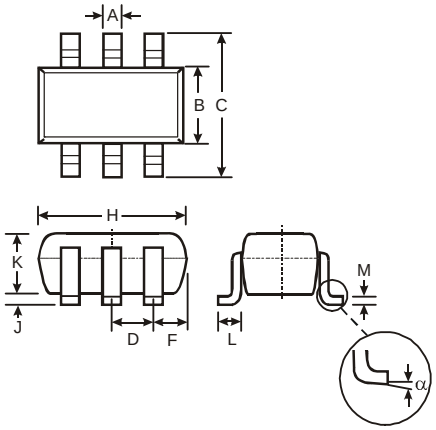
Fig. 9 Typical Capacitance vs. Reverse Voltage

Typical Application Circuit



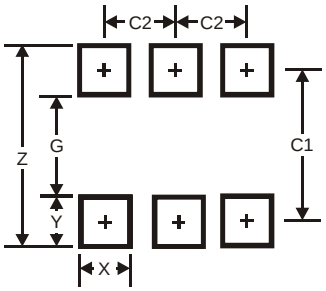
Typical Application Circuit DRDNB21D with two independent relays.

Package Outline Dimensions



SOT-363		
Dim	**Min**	**Max**
A	0.10	0.30
B	1.15	1.35
C	2.00	2.20
D	0.65 Typ	
F	0.40	0.45
H	1.80	2.20
J	0	0.10
K	0.90	1.00
L	0.25	0.40
M	0.10	0.22
α	0°	8°
All Dimensions in mm		

Suggested Pad Layout



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

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