THE DATASHEET OF

DRDNB21D-7

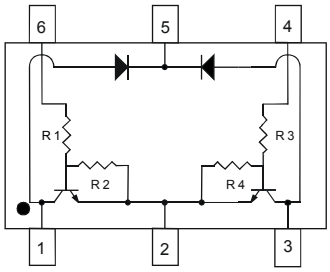
Features and Benefits

- Epitaxial Planar Die Construction
- Two Pre-Biased Transistors and Two Switching Diodes, Internally Connected in One Package
- Ideally Suited for Automated Assembly Processes
- **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 refer to the related automotive grade (Q-suffix) part. A listing can be found at https://www.diodes.com/products/automotive/automotive-products/.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. https://www.diodes.com/quality/product-definitions/**

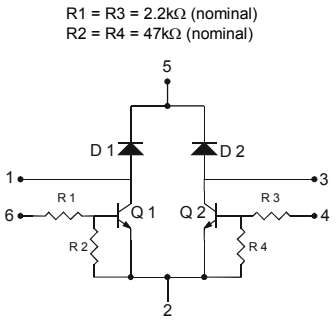
Mechanical Data

- 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 e3
- Weight: 0.0062 grams (approximate)

Top View



Top View



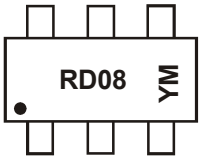
Device Circuit

Ordering Information (Note 4)

Device	Packaging	Shipping
DRDNB21D-7	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



RD08 = Product Type Marking Code
YM = Date Code Marking
Y = Year (e.g. I = 2021)
M = Month (e.g. 1 = January)

Date Code Key

Year	2005	2006	…..	2018	2019	2020	2021	2022	2023	2024	2025	2026
Code	S	T	…..	F	G	H	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

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Maximum Ratings, Total Device @ T_A = 25°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	°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

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
Average Rectified Output Current (Note 5)	I_O	250	mA
Non-Repetitive Peak Forward Surge Current @ t = 1.0μs @ t = 1.0ms	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 (Note 6)	ΔR1	-30	—	+30	%	-
Resistance Ratio Tolerance (Note 6)	ΔR2/R1	-20	—	+20	%	-
Gain-Bandwidth Product (Note 6)	f_T	—	250	—	MHz	V_{CE} = 10V, I_E = 5mA, f = 100MHz

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

Characteristic	Symbol	Min	Max	Unit	Test Condition
Reverse Breakdown Voltage (Note 7)	$V_{(BR)R}$	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 7)	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: 5. Device mounted on FR-4 PCB, 2oz 1inch squared copper pad PC board.
6. Transistor: for reference only.
7. Short duration pulse test used to minimize self-heating effect.

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Device Characteristics

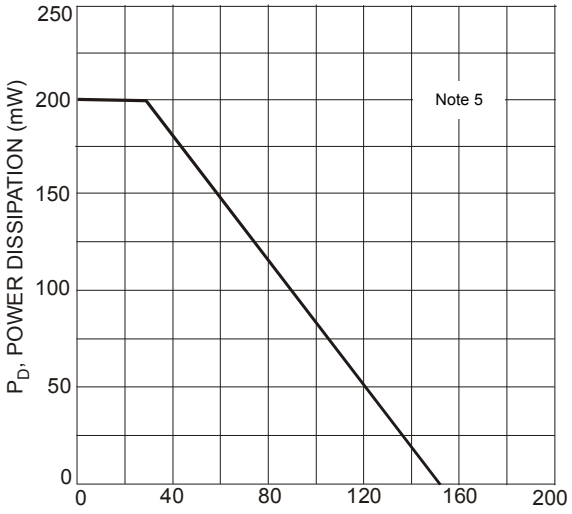

Fig. 1 Power Derating Curve (Total Device)

Pre-Biased NPN Transistor Elements

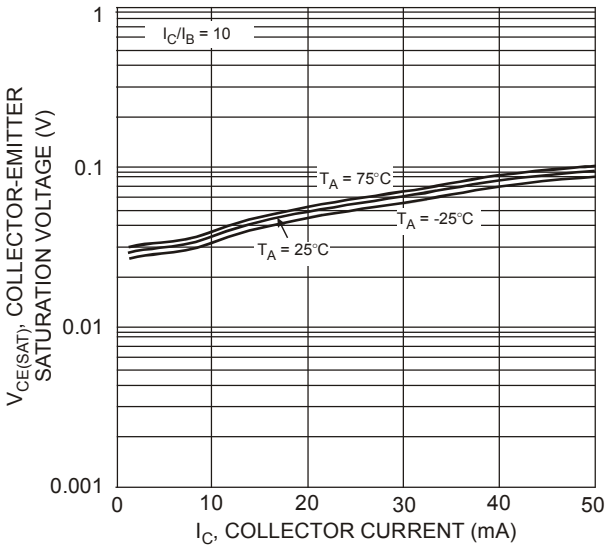

Fig. 2 Typical $V_{CE(SAT)}$ vs. I_C

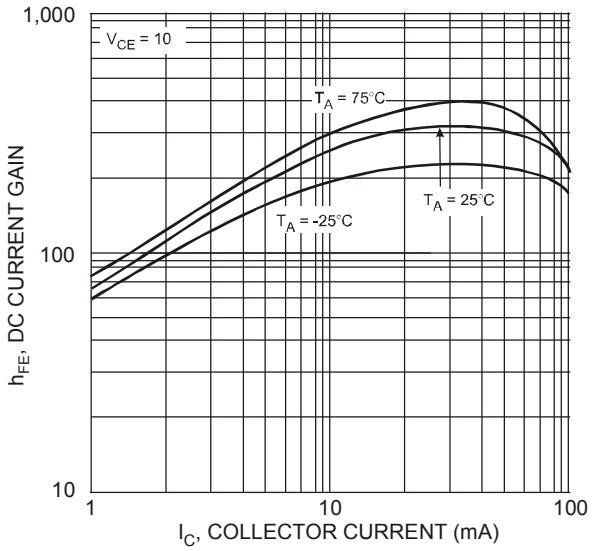

Fig. 3 Typical DC Current Gain

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Pre-Biased NPN Transistor Elements (continued)

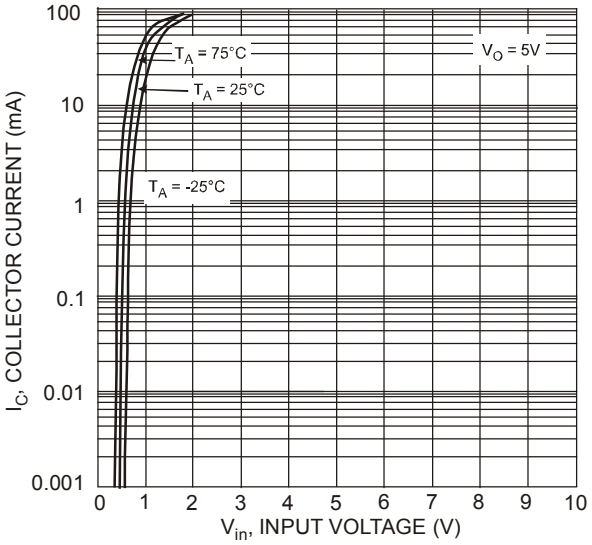

Fig. 4 Typical Collector Current vs. Input Voltage

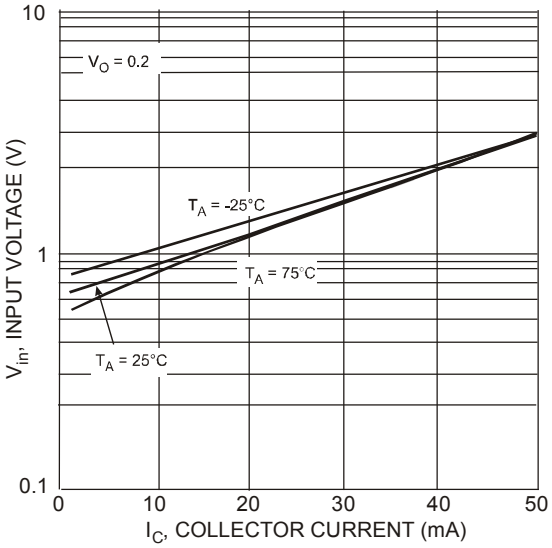

Fig. 5 Typical Input Voltage vs. Collector Current

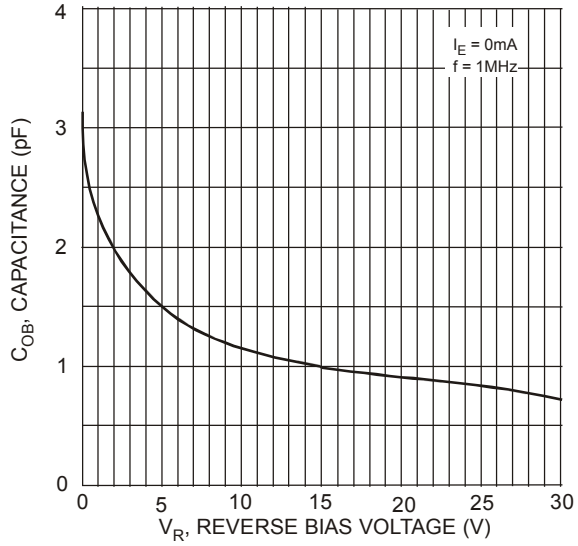

Fig. 6 Typical Output Capacitance

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Switching Diode Elements

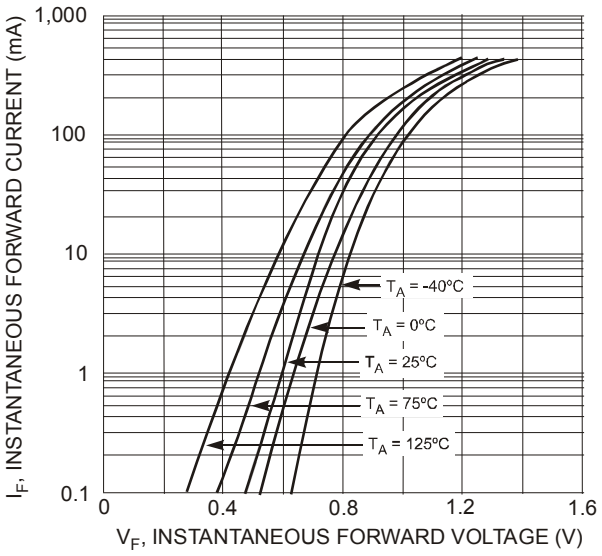

Fig. 7 Typical Forward Characteristics

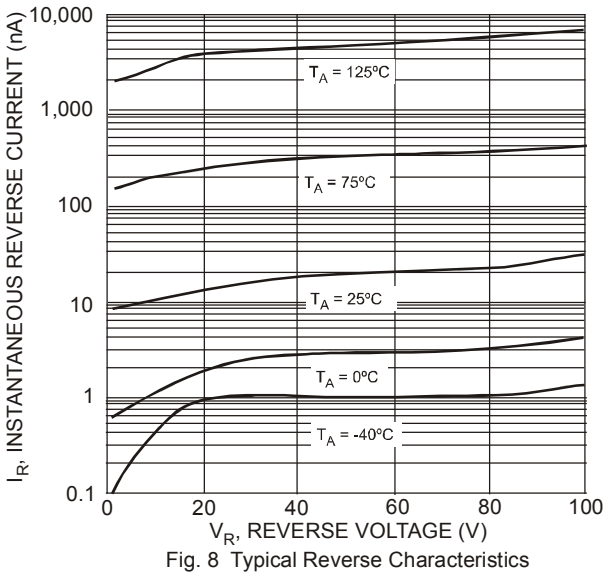

Fig. 8 Typical Reverse Characteristics

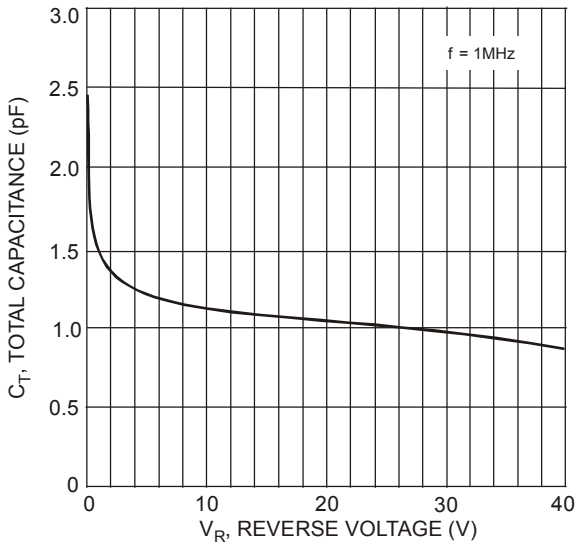

Fig. 9 Typical Capacitance vs. Reverse Voltage

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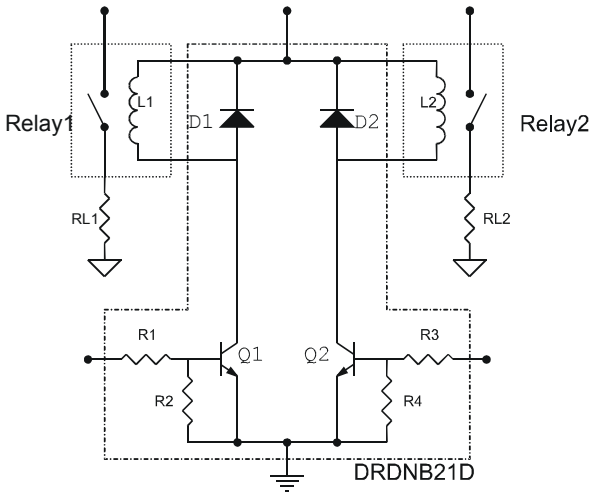
Typical Application Circuit



Typical Application Circuit DRDNB21D with two independent relays.

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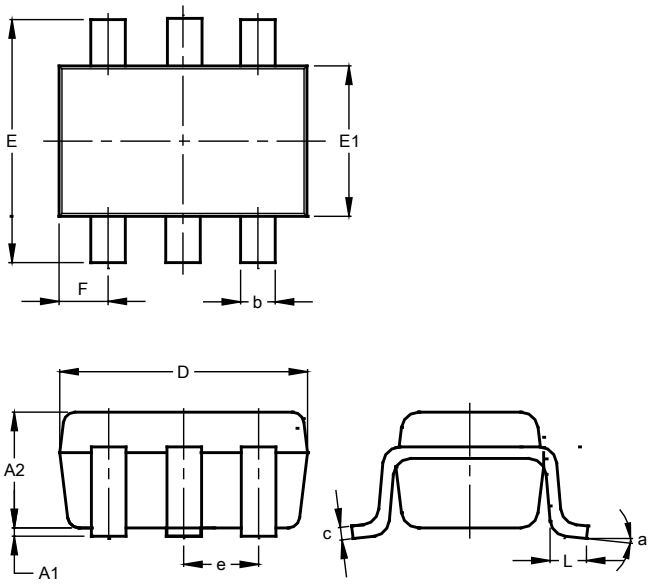
Package Outline Dimensions

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

SOT363

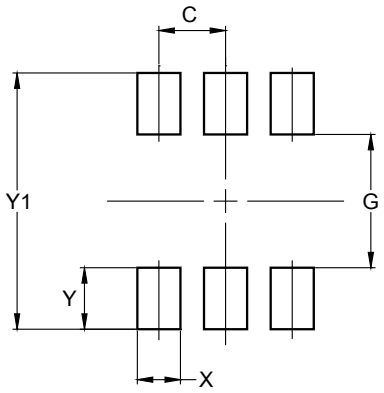


SOT363			
Dim	**Min**	**Max**	**Typ**
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

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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