

Features and Benefits

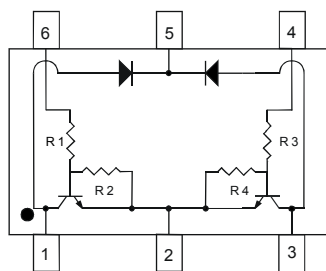
- Epitaxial Planar Die Construction
- Two Pre-Biased Transistors and Two Switching Diodes, Internally Connected in One Package
- Ideally Suited for Automated Assembly Processes
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen- and Antimony-Free. "Green" Device (Note 3)**
- **For 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

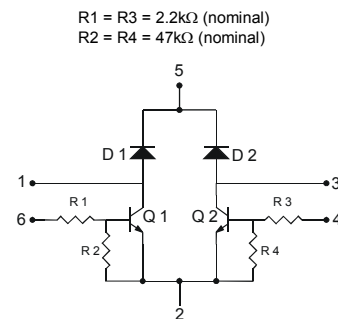
- Case: SOT-363
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish - Matte Tin annealed over Alloy 42 lead-frame. Solderable per MIL-STD-202, Method 208 @3
- Weight: 0.0062 grams (approximate)



Top View



Top View



Device Circuit

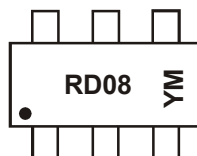
R1 = R3 = 2.2kΩ (nominal)
R2 = R4 = 47kΩ (nominal)

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. 1 = 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

Maximum Ratings, Total Device @ $T_A = 25^\circ\text{C}$ 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	$^\circ\text{C/W}$
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

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

Characteristic	Symbol	Value	Unit
Non-Repetitive Peak Reverse Voltage	V_{RM}	100	V
Peak Repetitive Reverse Voltage	V_{RRM}	75	V
Working Peak Reverse Voltage	V_{RWM}		
DC Blocking Voltage	V_R		
RMS Reverse Voltage	$V_{R(RMS)}$	53	V
Average Rectified Output Current (Note 5)	I_O	250	mA
Non-Repetitive Peak Forward Surge Current @ $t = 1.0\mu\text{s}$ @ $t = 1.0\text{ms}$	I_{FSM}	4.0	A
		1.0	

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	$V_{I(off)}$	0.5	—	—	V	$V_{CC} = 5V, I_O = 100\mu\text{A}$
	$V_{I(on)}$	—	—	1.1	V	$V_O = 0.3V, I_O = 5\text{mA}$
Output Voltage	$V_{O(on)}$	—	—	0.3	V	$I_O/I_I = 50\text{mA}/0.25\text{mA}$
Input Current	I_I	—	—	3.6	mA	$V_I = 5V$
Output Current	$I_{O(off)}$	—	—	0.5	μA	$V_{CC} = 50V, V_I = 0V$
DC Current Gain	G_I	80	—	—	—	$V_O = 5V, I_O = 10\text{mA}$
Input Resistor Tolerance (Note 6)	$\Delta R1$	-30	—	+30	%	—
Resistance Ratio Tolerance (Note 6)	$\Delta R2/R1$	-20	—	+20	%	—
Gain-Bandwidth Product (Note 6)	f_T	—	250	—	MHz	$V_{CE} = 10V, I_E = 5\text{mA}, f = 100\text{MHz}$

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

Characteristic	Symbol	Min	Max	Unit	Test Condition
Reverse Breakdown Voltage (Note 7)	$V_{(BR)R}$	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 7)	I_R	—	2.5	μA	$V_R = 75V$
			50	μA	$V_R = 75V, T_J = 150^\circ\text{C}$
			30	μA	$V_R = 25V, T_J = 150^\circ\text{C}$
			25	nA	$V_R = 20V$
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: 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.

Device Characteristics

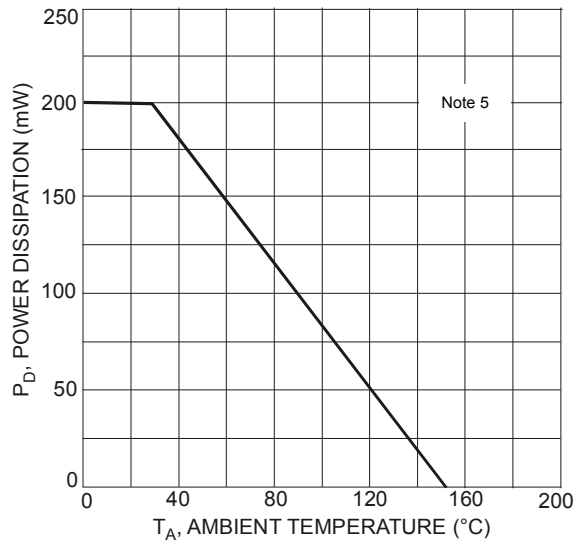


Fig. 1 Power Derating Curve (Total Device)

Pre-Biased NPN Transistor Elements

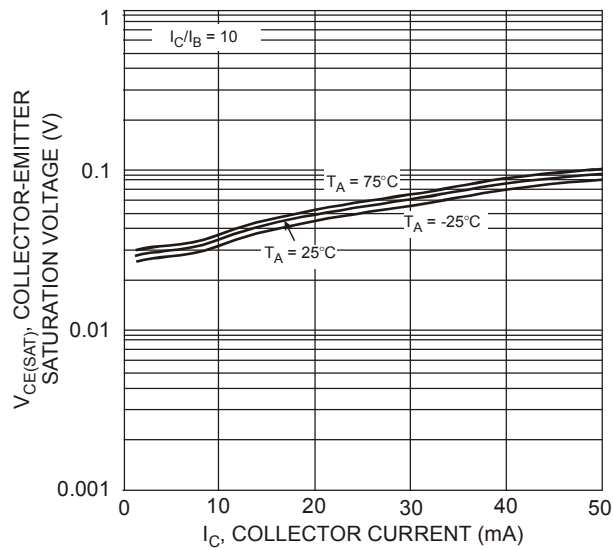


Fig. 2 Typical $V_{CE(SAT)}$ vs. I_C

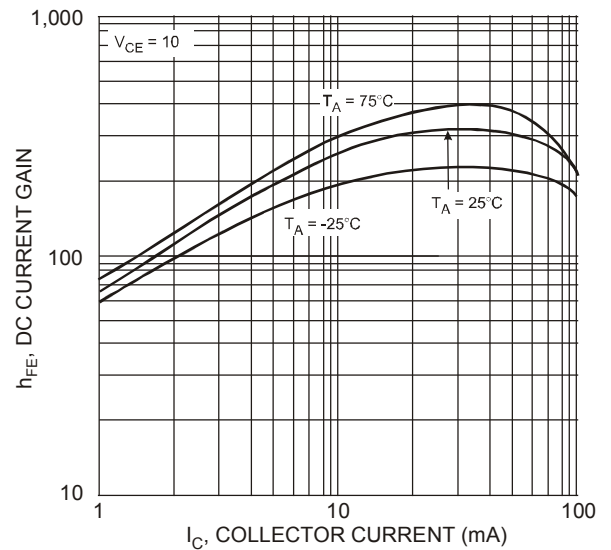
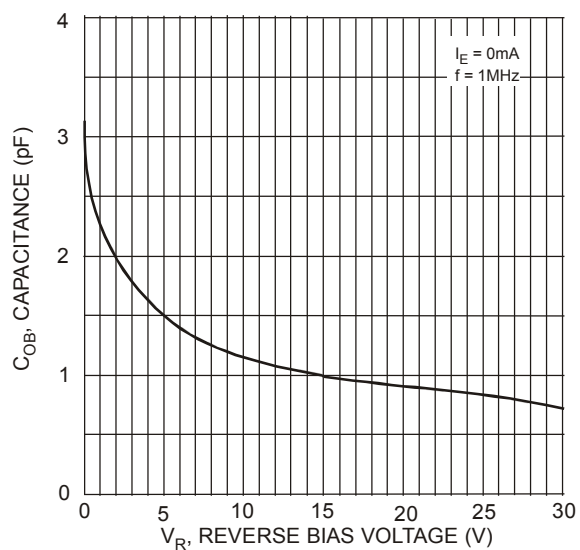
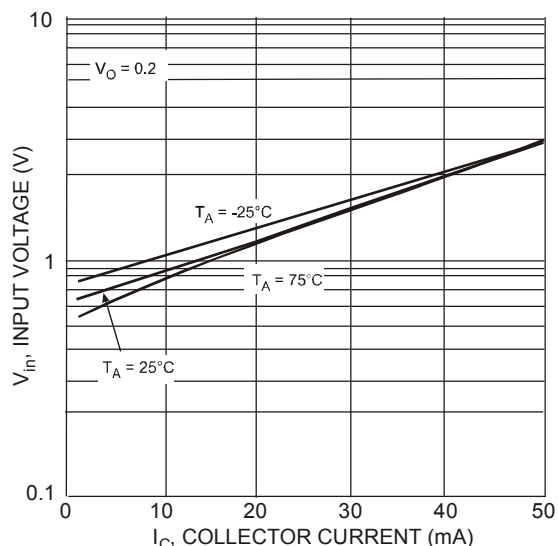
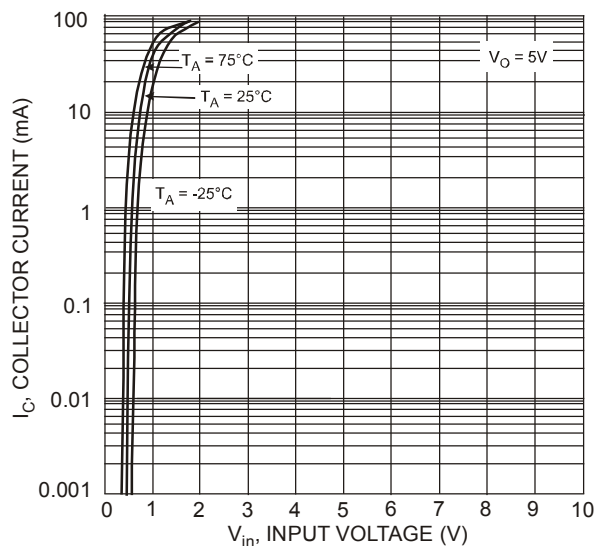
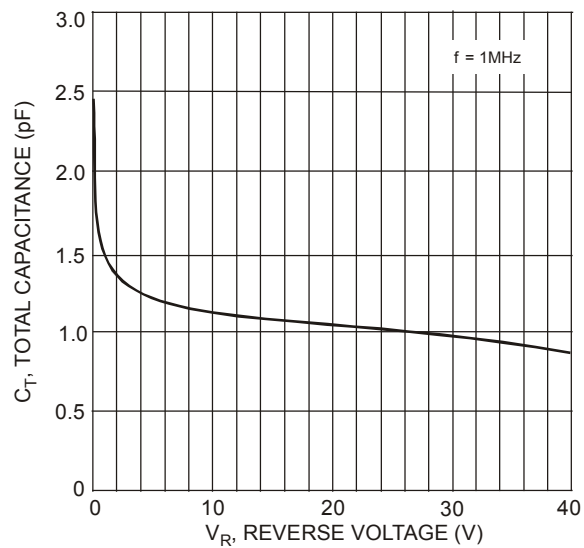
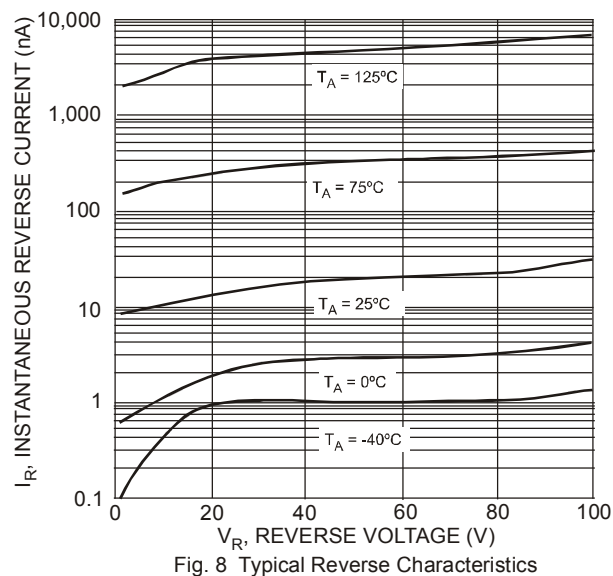
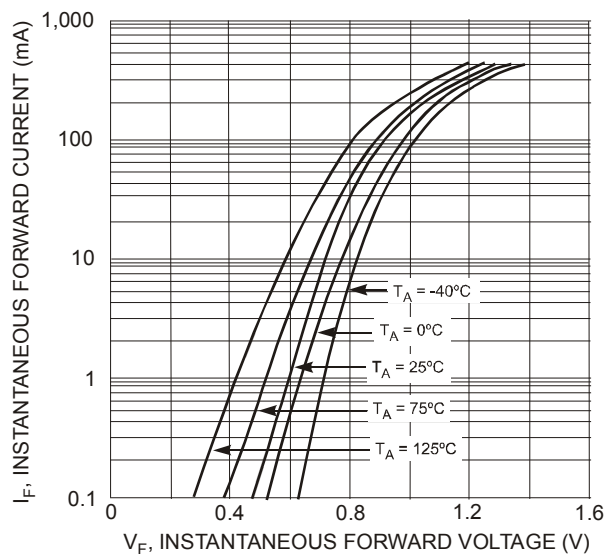


Fig. 3 Typical DC Current Gain

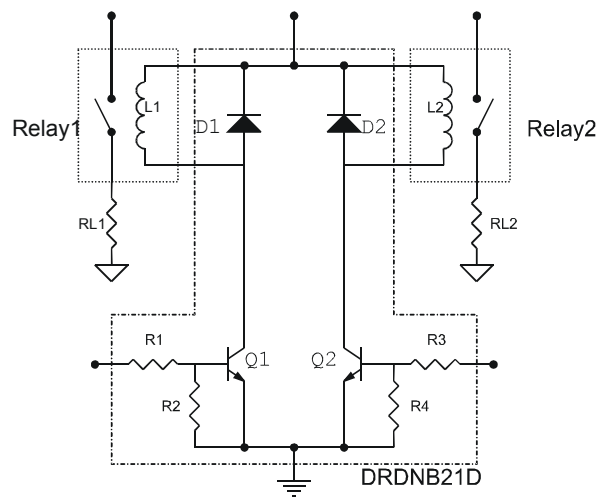
Pre-Biased NPN Transistor Elements (continued)



Switching Diode Elements



Typical Application Circuit

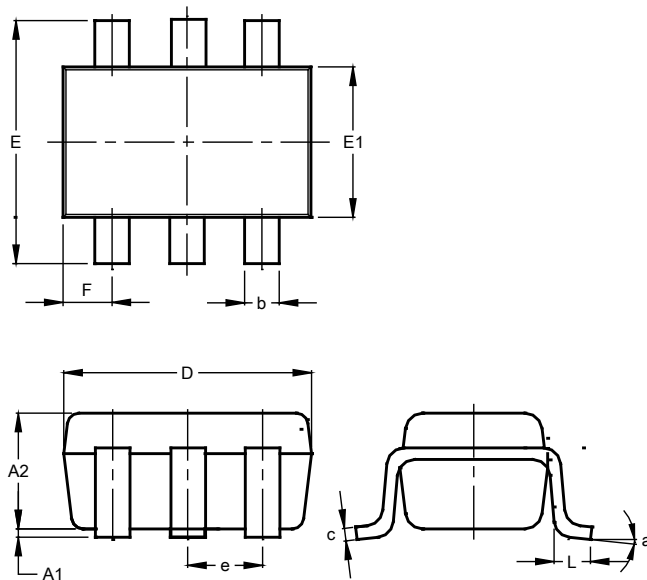


Typical Application Circuit DRDNB21D with two independent relays.

Package Outline Dimensions

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

SOT363

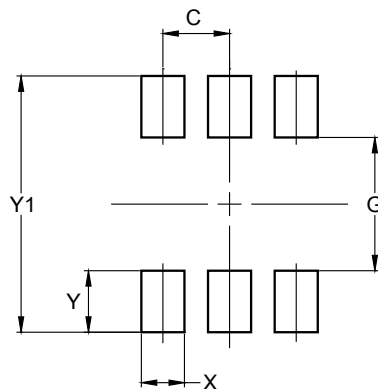


SOT363			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

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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