

COMPLEX ARRAY FOR VOLTAGE REGULATORS

Features

- Epitaxial Planar Die Construction
- Selectively Paired NPN Transistors & Zener Diodes for Series Pass Voltage Regulator Circuits
- Ideally Suited for Automated Assembly Processes
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

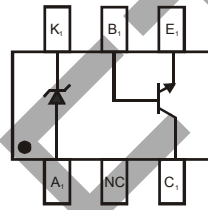
Mechanical Data

- Case: SOT363
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Annealed over Alloy 42 Leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Weight: 0.006 grams (Approximate)

SOT363



Top View



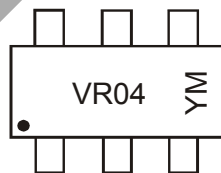
Top View
Pin Configuration

Ordering Information (Note 4)

Device	Packaging	Shipping
DVR5V0W-7	SOT363	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 <http://www.diodes.com/datasheets/ap02007.pdf>.

Marking Information



VR04 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year ex: G = 2019
 M = Month ex: 9 = September

Date Code Key

Year	2004	2005	2006	2007	2008	...	2018	2019	2020	2021	2022	2023
Code	R	S	T	U	V	...	F	G	H	I	J	K

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 @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_d	200	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	625	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_j, T_{STG}	-55 to +150	$^\circ\text{C}$

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	45	V
Collector-Emitter Voltage	V_{CEO}	18	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current (with Forced Air Cooling) (Note 5)	I_C	1	A

Maximum Ratings, Zener Element @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Value	Unit
Forward Voltage @ $I_F = 10\text{mA}$	V_F	0.9	V

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

Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)					
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	45	—	V	$I_C = 100\mu\text{A}, I_E = 0$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	18	—	V	$I_C = 1\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	5	—	V	$I_E = 100\mu\text{A}, I_C = 0$
Collector Cutoff Current	I_{CBO}	—	1	μA	$V_{CB} = 40\text{V}, I_E = 0$
Emitter Cutoff Current	I_{EBO}	—	1	μA	$V_{EB} = 4\text{V}, I_C = 0$
ON CHARACTERISTICS (Note 6)					
DC Current Gain	h_{FE}	150	800	—	$I_C = 100\text{mA}, V_{CE} = 1\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	0.5	V	$I_C = 300\text{mA}, I_B = 30\text{mA}$
SMALL SIGNAL CHARACTERISTICS					
Output Capacitance	C_{obo}	—	8	pF	$V_{CB} = 10\text{V}, f = 1.0\text{MHz}, I_E = 0$
Current Gain-Bandwidth Product	f_T	100	—	MHz	$V_{CB} = 10\text{V}, I_E = 50\text{mA}, f = 100\text{MHz}$

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

Zener Voltage Range (Note 7)				Maximum Reverse Leakage Current (Note 6)	
$V_Z @ I_{ZT}$			I_{ZT}	$I_R @ V_R$	
Nom (V)	Min (V)	Max (V)	mA	μA	V
5.1	4.85	5.36	0.05	5	3

- Notes:
- Part mounted on FR-4 substrate PC board, with 1 inch square, 2oz copper pad layout.
 - Short duration pulse test used to minimize self-heating effect.
 - Nominal Zener voltage is measured with the device junction in thermal equilibrium at $T_T = 30^\circ\text{C} \pm 1^\circ\text{C}$.

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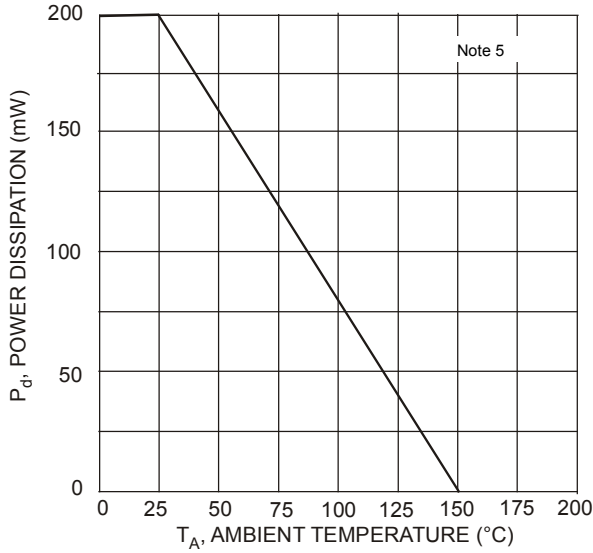


Fig. 1 Max Power Dissipation vs. Ambient Temperature (Total Device)

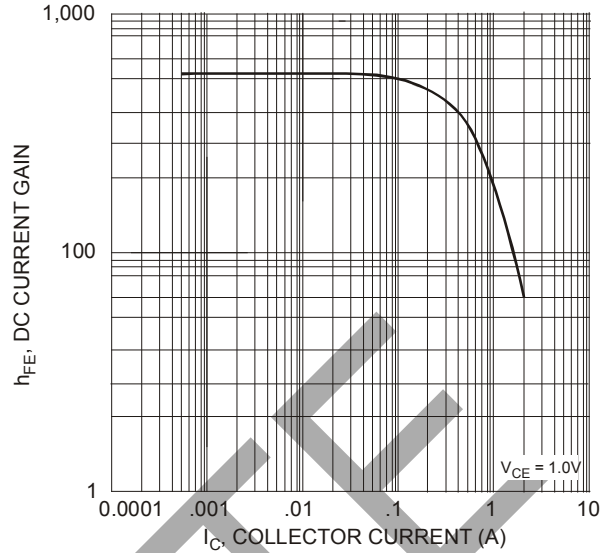


Fig. 2 Typical DC Current Gain vs. Collector Current (NPN Transistor)

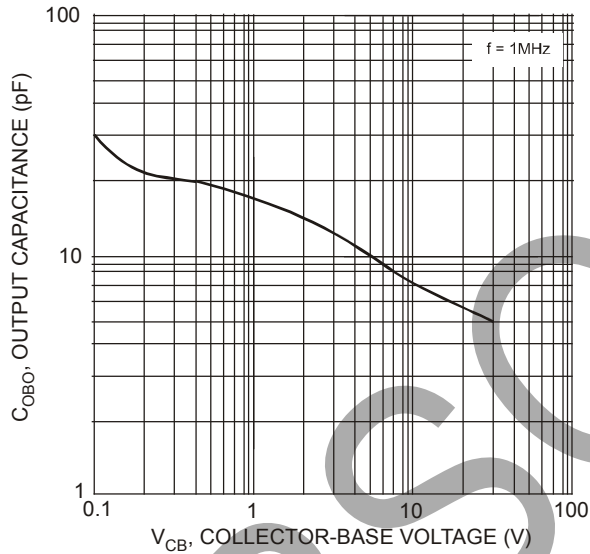


Fig. 3 Typical Output Capacitance vs. Collector-Base Voltage (NPN Transistor)

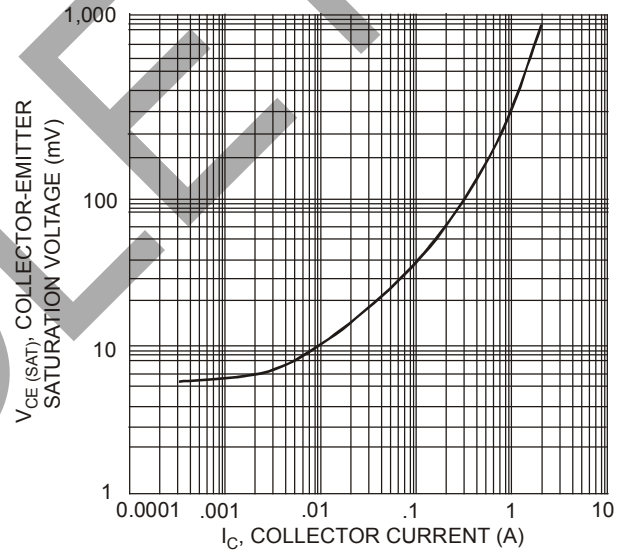


Fig. 4 Typical Collector Saturation Voltage vs. Collector Current (NPN Transistor)

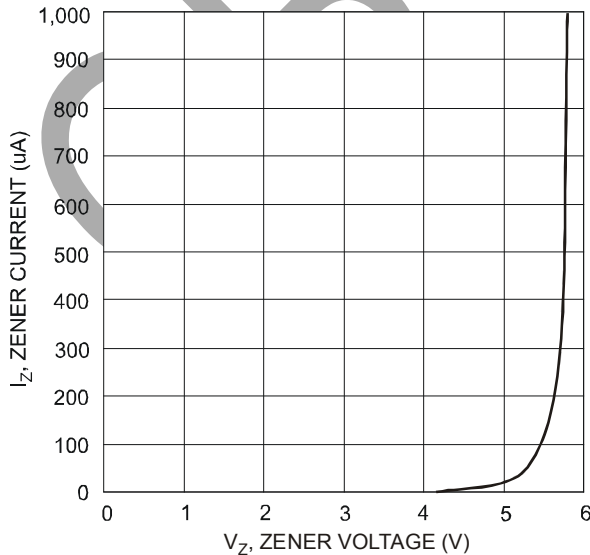
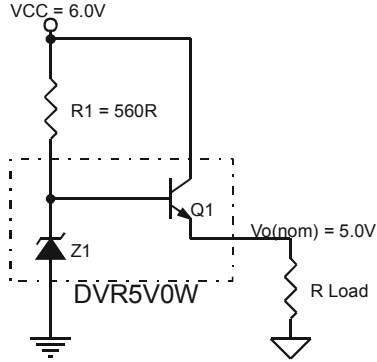


Fig. 5 Typical Zener Breakdown Characteristics

Sample Applications



Sample Application for DVR5V0W:
 $V_{CC} = 6.0V$ $R1 = 560\Omega$
 $V_o(\text{nom}) = 5.0V$ $I_o = 100mA$
 $I_q(\text{typical}) = 0.5mA @ I_o = 0mA$
 Typical $V_{reg}(\text{load}) = 0.2V$ from $I_o = 100mA$ to $0mA$

- Notes:
- 8. Resistor R1 not included.
 - 9. Typical performance shown is under setup and operating conditions specified in the sample applications.
 - 10. Recommended $V_{CC}(\text{min}) \sim V_o(\text{nom}) + 1V$.

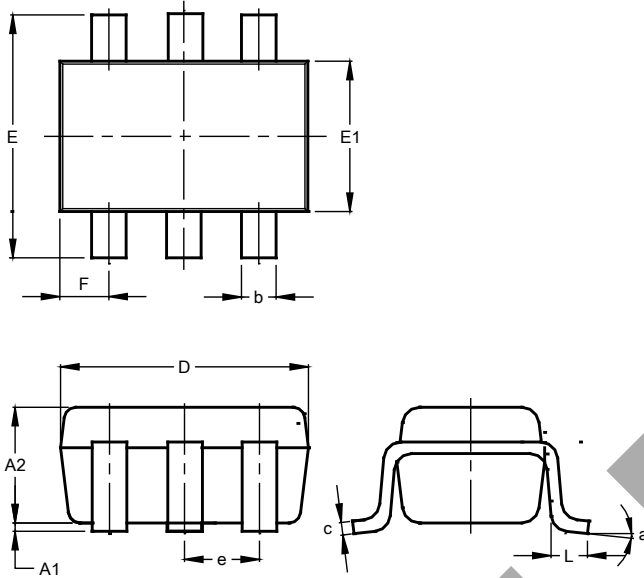
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Package Outline Dimensions

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

SOT363

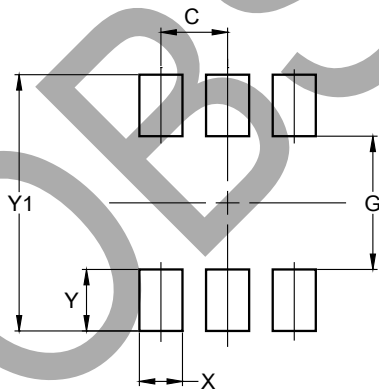


SOT363			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

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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