

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)**

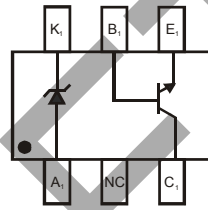
Mechanical Data

- 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



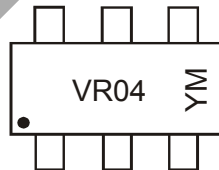
Top View Pin Configuration

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 |

OBSOLETE - PART DISCONTINUED

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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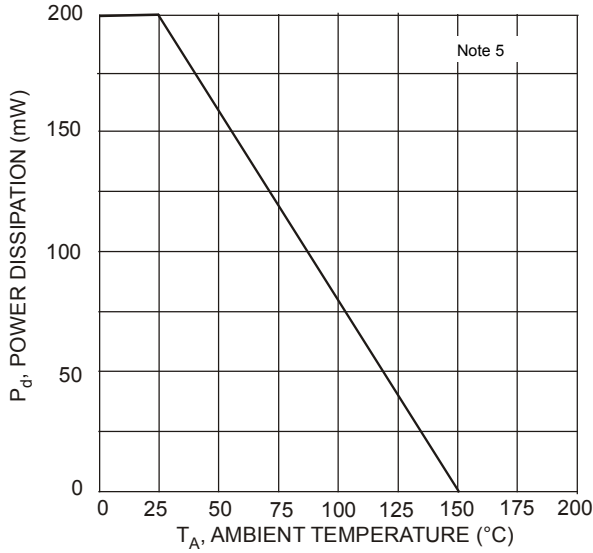


Fig. 1 Max Power Dissipation vs. Ambient Temperature (Total Device)

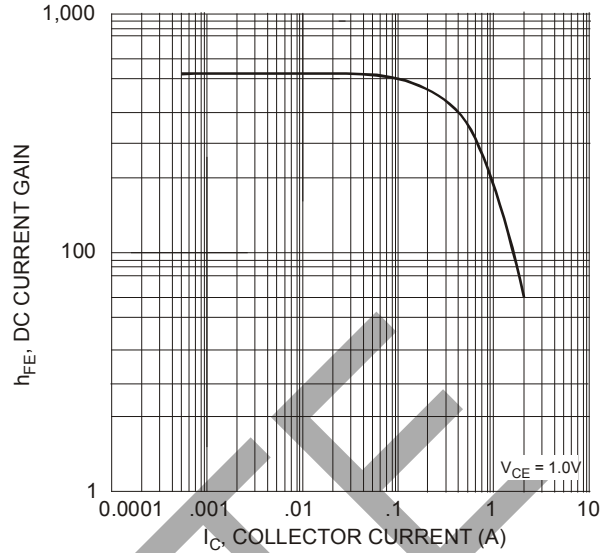


Fig. 2 Typical DC Current Gain vs. Collector Current (NPN Transistor)

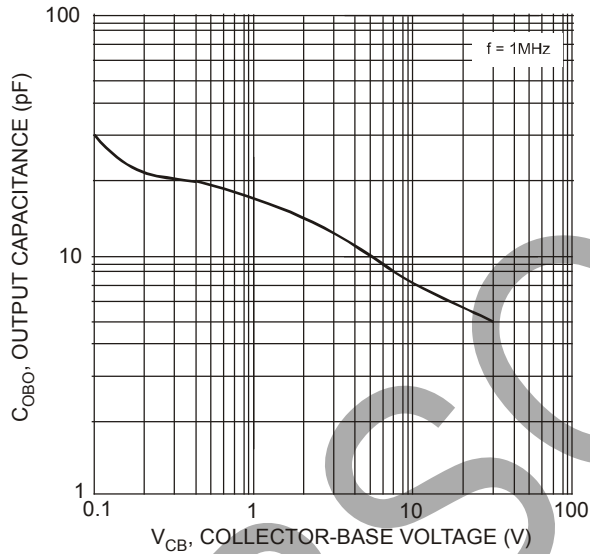


Fig. 3 Typical Output Capacitance vs. Collector-Base Voltage (NPN Transistor)

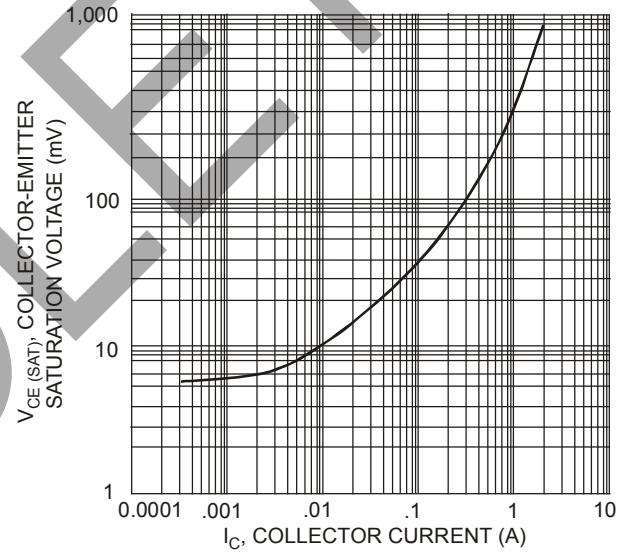


Fig. 4 Typical Collector Saturation Voltage vs. Collector Current (NPN Transistor)

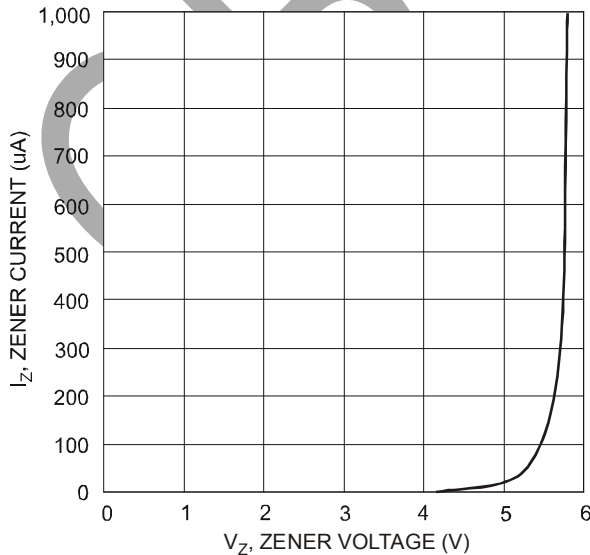
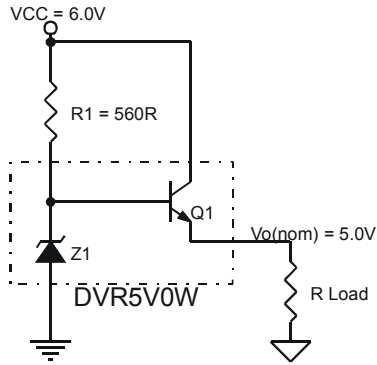


Fig. 5 Typical Zener Breakdown Characteristics

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 $V_{CC}(\text{min}) \sim V_o(\text{nom}) + 1V$.

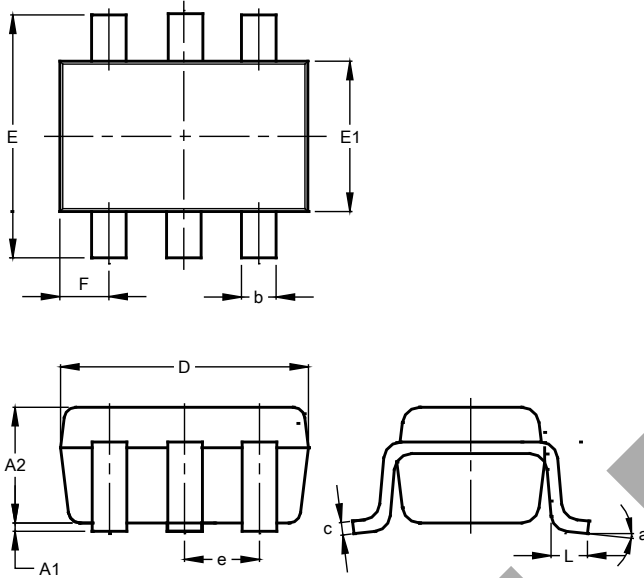
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Package Outline Dimensions

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

SOT363

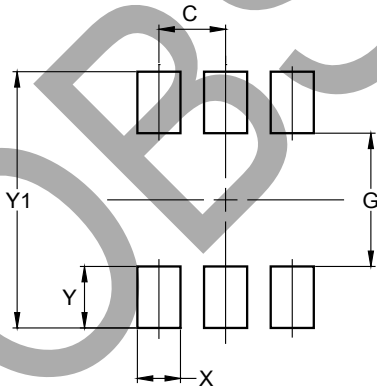


| SOT363 | | | |
|----------------------|-----------|------|-------|
| Dim | Min | Max | Typ |
| A1 | 0.00 | 0.10 | 0.05 |
| A2 | 0.90 | 1.00 | 0.95 |
| b | 0.10 | 0.30 | 0.25 |
| c | 0.10 | 0.22 | 0.11 |
| D | 1.80 | 2.20 | 2.15 |
| E | 2.00 | 2.20 | 2.10 |
| E1 | 1.15 | 1.35 | 1.30 |
| e | 0.650 BSC | | |
| 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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