

Features

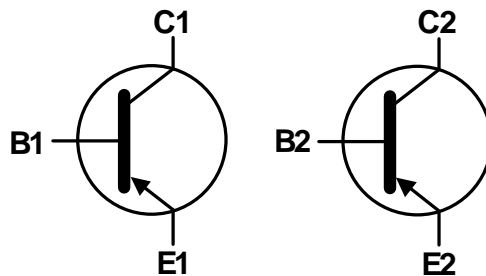
- Ultra-Small Surface Mount Package
- Epitaxial Planar Die Construction
- Ideal for Low Power Amplification and Switching
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

Mechanical Data

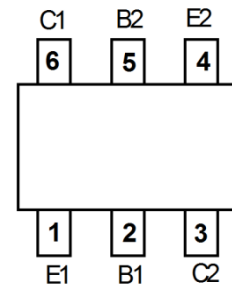
- Case: SOT363
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Finish. Solderable per MIL-STD-202, Method 208 ^(e3)
- Weight: 0.006 grams (Approximate)



Top View



Device Symbol



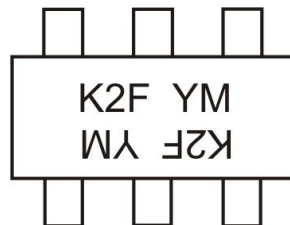
Top View Pin-Out

Ordering Information (Notes 4 & 5)

| Product | Status | Compliance | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|----------------|--------|------------|---------|--------------------|-----------------|-------------------|
| MMDT2907A-7-F | Active | AEC-Q101 | K2F | 7 | 8 | 3,000 |
| MMDT2907AQ-7-F | Active | Automotive | K2F | 7 | 8 | 3,000 |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See http://www.diodes.com/quality/lead_free.html 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/product_compliance_definitions.html.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



K2F = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: D = 2016)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | D | E | F | G | H | I | J | K | L | M | N | O |
| 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 |

Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|---------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CB0} | -60 | V |
| Collector-Emitter Voltage | V _{CEO} | -60 | V |
| Emitter-Base Voltage | V _{EBO} | -5.0 | V |
| Collector Current | I _C | -600 | mA |

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 6) | P _D | 200 | mW |
| Thermal Resistance, Junction to Ambient Air (Note 6) | R _{θJA} | 625 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

ESD Ratings (Note 7)

| Characteristic | Symbol | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V | 3A |
| Electrostatic Discharge - Machine Model | ESD MM | 400 | V | C |

- Notes:
- 6. For the device mounted on minimum recommended pad layout FR-4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
 - 7. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

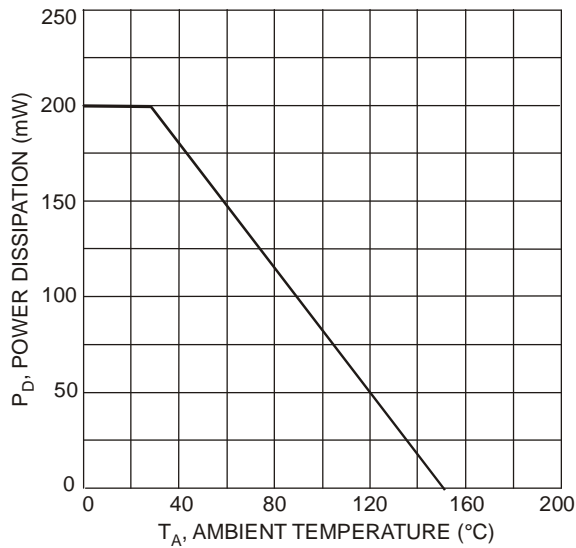


Figure 1 Power Derating Curve

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------|-----|-----|--------------|------|--|
| OFF CHARACTERISTICS | | | | | | |
| Collector-Base Breakdown Voltage | BV_{CB0} | -60 | — | — | V | $I_C = -10\mu\text{A}, I_B = 0$ |
| Collector-Emitter Breakdown Voltage (Note 8) | BV_{CEO} | -60 | — | — | V | $I_C = -10\text{mA}, I_B = 0$ |
| Emitter-Base Breakdown Voltage | BV_{EBO} | -5 | — | — | V | $I_E = -10\mu\text{A}, I_C = 0$ |
| Collector Cutoff Current | I_{CBO} | — | — | -10 | nA | $V_{CB} = -50\text{V}, I_E = 0$ |
| Collector Cutoff Current | I_{CEX} | — | — | -50 | nA | $V_{CB} = -50\text{V}, I_E = 0, T_A = +125^\circ\text{C}$ |
| Base Cutoff Current | I_{BL} | — | — | -50 | nA | $V_{CE} = -30\text{V}, V_{EB(OFF)} = -0.5\text{V}$ |
| ON CHARACTERISTICS (Note 8) | | | | | | |
| DC Current Gain | h_{FE} | 75 | — | — | — | $I_C = -100\mu\text{A}, V_{CE} = -10\text{V}$ |
| | | 100 | — | — | | $I_C = -1.0\text{mA}, V_{CE} = -10\text{V}$ |
| | | 100 | — | — | | $I_C = -10\text{mA}, V_{CE} = -10\text{V}$ |
| | | 100 | — | 300 | | $I_C = -150\text{mA}, V_{CE} = -10\text{V}$ |
| | | 50 | — | — | | $I_C = -500\text{mA}, V_{CE} = -10\text{V}$ |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | — | — | -0.4 -1.6 | V | $I_C = -150\text{mA}, I_B = -15\text{mA}$ $I_C = -500\text{mA}, I_B = -50\text{mA}$ |
| Base-Emitter Saturation Voltage | $V_{BE(sat)}$ | — | — | -1.3 -2.6 | V | $I_C = -150\text{mA}, I_B = -15\text{mA}$ $I_C = -500\text{mA}, I_B = -50\text{mA}$ |
| SMALL SIGNAL CHARACTERISTICS | | | | | | |
| Output Capacitance | C_{OBO} | — | — | 8.0 | pF | $V_{CB} = -10\text{V}, f = 1.0\text{MHz}, I_E = 0$ |
| Input Capacitance | C_{IBO} | — | — | 30 | pF | $V_{EB} = -2.0\text{V}, f = 1.0\text{MHz}, I_C = 0$ |
| Current Gain Bandwidth Product | f_T | 200 | — | — | MHz | $V_{CE} = -20\text{V}, I_C = -50\text{mA}, f = 100\text{MHz}$ |
| SWITCHING CHARACTERISTICS | | | | | | |
| Turn-On Time | t_{on} | — | — | 45 | ns | $V_{CC} = -30\text{V}, I_C = -150\text{mA}, I_{B1} = -15\text{mA}$ |
| Delay Time | t_d | — | — | 10 | ns | |
| Rise Time | t_r | — | — | 40 | ns | |
| Turn-Off Time | t_{off} | — | — | 100 | ns | $V_{CC} = -6\text{V}, I_C = -150\text{mA}, I_{B1} = -I_{B2} = -15\text{mA}$ |
| Storage Time | t_s | — | — | 80 | ns | |
| Fall Time | t_f | — | — | 30 | ns | |

Note: 8. Short duration pulse test used to minimize self-heating effect.

Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

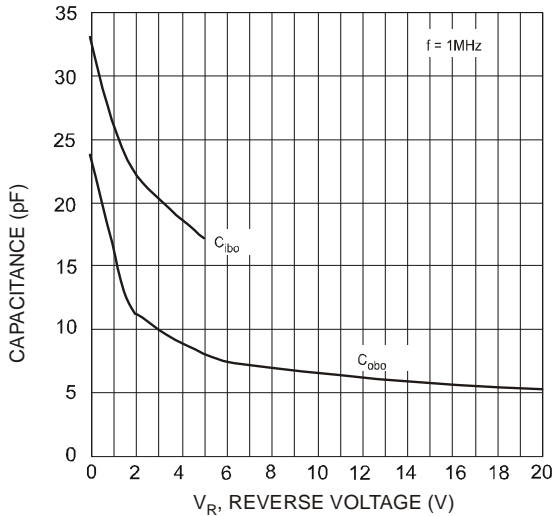


Fig. 2, Typical Capacitance Characteristics

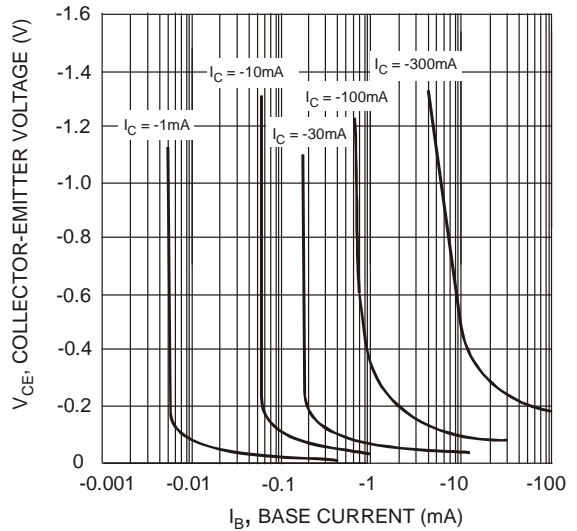


Fig. 3, Typical Collector Saturation Region

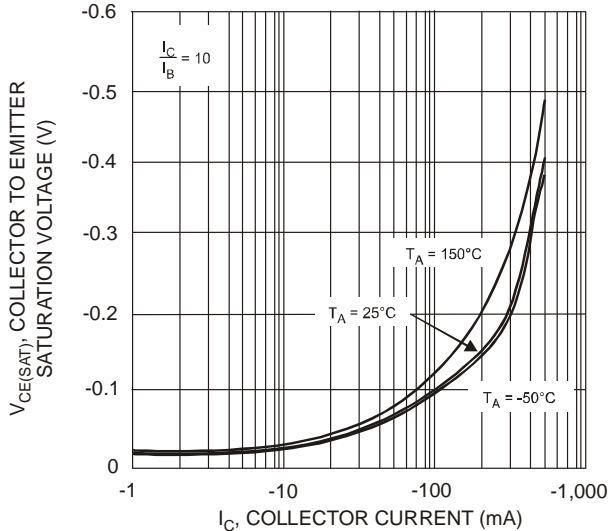


Fig. 4, Collector Emitter Saturation Voltage vs. Collector Current

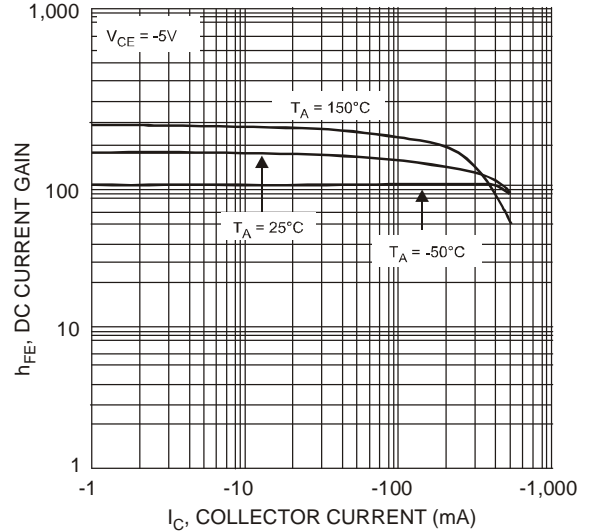


Fig. 5, DC Current Gain vs. Collector Current

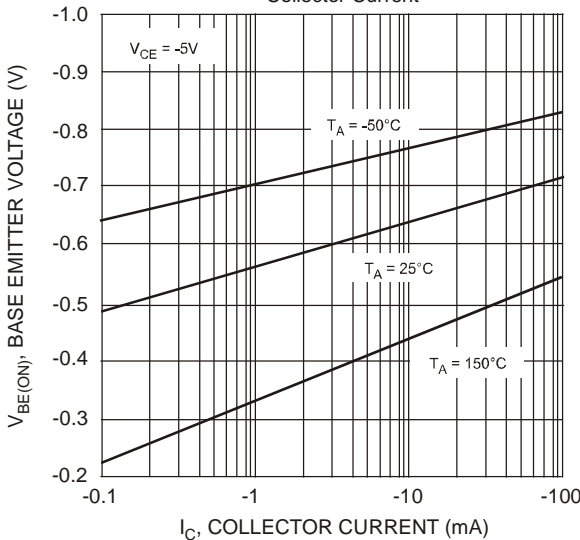


Fig. 6, Base Emitter Voltage vs. Collector Current

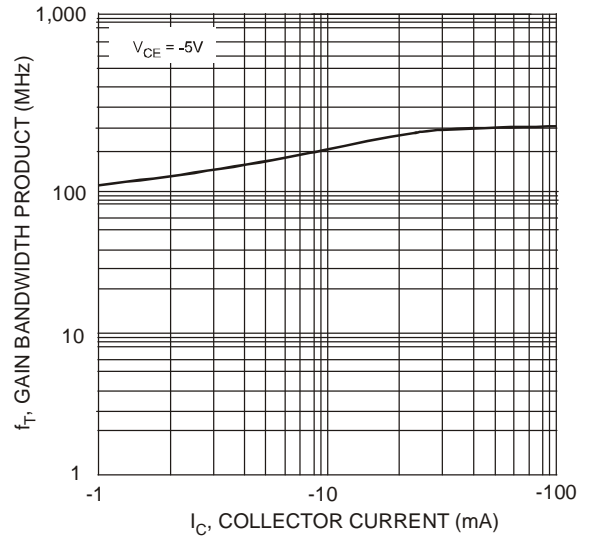
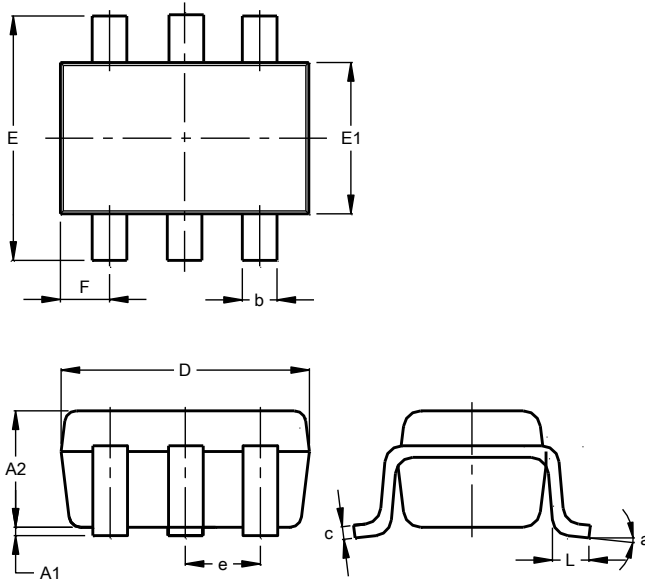


Fig. 7, Gain Bandwidth Product vs. Collector Current

Package Outline Dimensions

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

SOT363

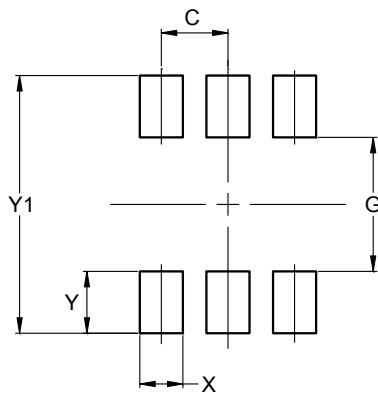


| SOT363 | | | |
|----------------------|-----------|------|-------|
| Dim | Min | Max | Typ |
| A1 | 0.00 | 0.10 | 0.05 |
| A2 | 0.90 | 1.00 | 1.00 |
| b | 0.10 | 0.30 | 0.25 |
| c | 0.10 | 0.22 | 0.11 |
| D | 1.80 | 2.20 | 2.15 |
| E | 2.00 | 2.20 | 2.10 |
| E1 | 1.15 | 1.35 | 1.30 |
| e | 0.650 BSC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