

300V PNP HIGH VOLTAGE TRANSISTOR IN SOT23
Description

This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirements of Automotive Applications.

Features

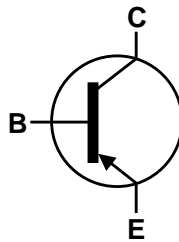
- $BV_{CEO} > -300V$
- $I_C = -200mA$ High Continuous Collector Current
- Complementary Type: FMMTA42Q
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

Mechanical Data

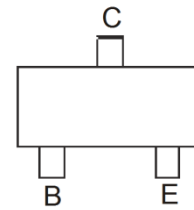
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 (e3)
- Weight 0.008 grams (Approximate)



Top View



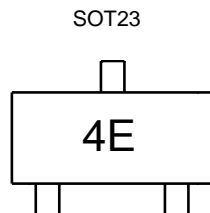
Device Symbol


 Top View
Pin-Out

Ordering Information (Notes 4 & 5)

| Product | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|------------|------------|---------|--------------------|-----------------|-------------------|
| FMMTA92QTA | Automotive | 4E | 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. Refer to http://www.diodes.com/quality/product_compliance_definitions/.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>

Marking Information


4E = Product Type Marking Code

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

| Characteristic | Symbol | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CBO} | -300 | V |
| Collector-Emitter Voltage | V _{CEO} | -300 | V |
| Emitter-Base Voltage | V _{EBO} | -5 | V |
| Continuous Collector Current | I _C | -200 | mA |

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

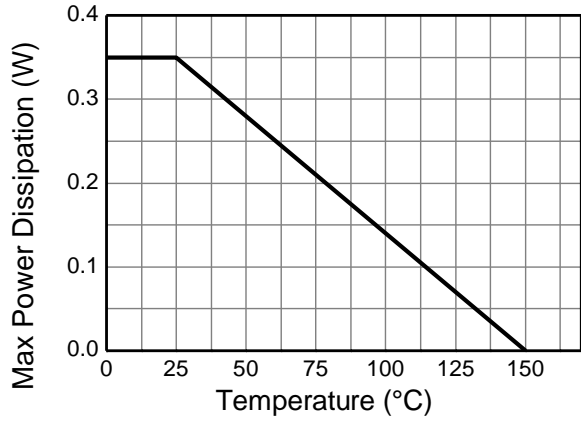
| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|-------------|------|
| Power Dissipation | P _D | 310 | mW |
| | | 350 | |
| Thermal Resistance, Junction to Ambient | R _{θJA} | 403 | °C/W |
| | | 357 | |
| Thermal Resistance, Junction to Lead | R _{θJL} | 350 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

ESD Ratings (Note 9)

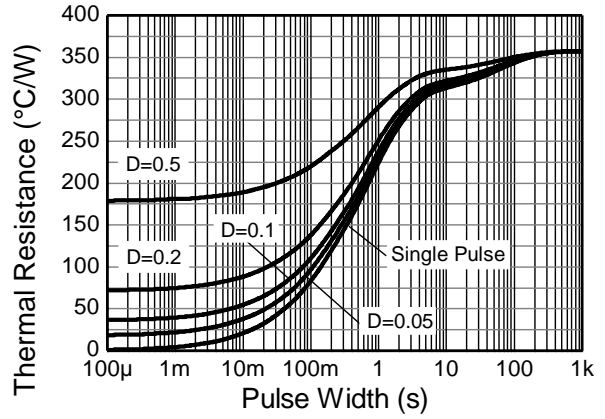
| Characteristic | Symbol | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge – Human Body Model | ESD HBM | 4,000 | V | 3A |
| Electrostatic Discharge – Machine Model | ESD MM | 400 | V | C |

- Notes:
6. For a device mounted on minimum recommended pad layout 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady state condition.
 7. Same as Note (6), except the device is mounted on 15mm x 15mm 1oz copper.
 8. Thermal resistance from junction to solder-point (at the end of the collector lead).
 9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

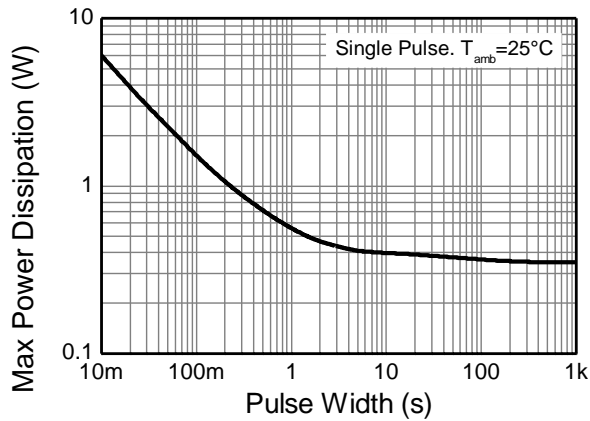
Thermal Characteristics and Derating Information



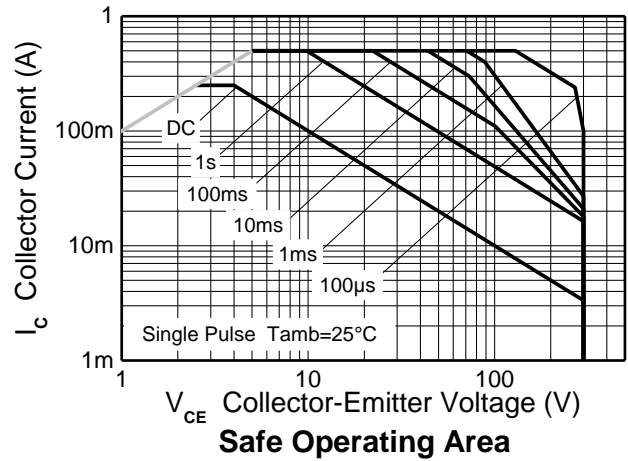
Derating Curve



Transient Thermal Impedance



Pulse Power Dissipation



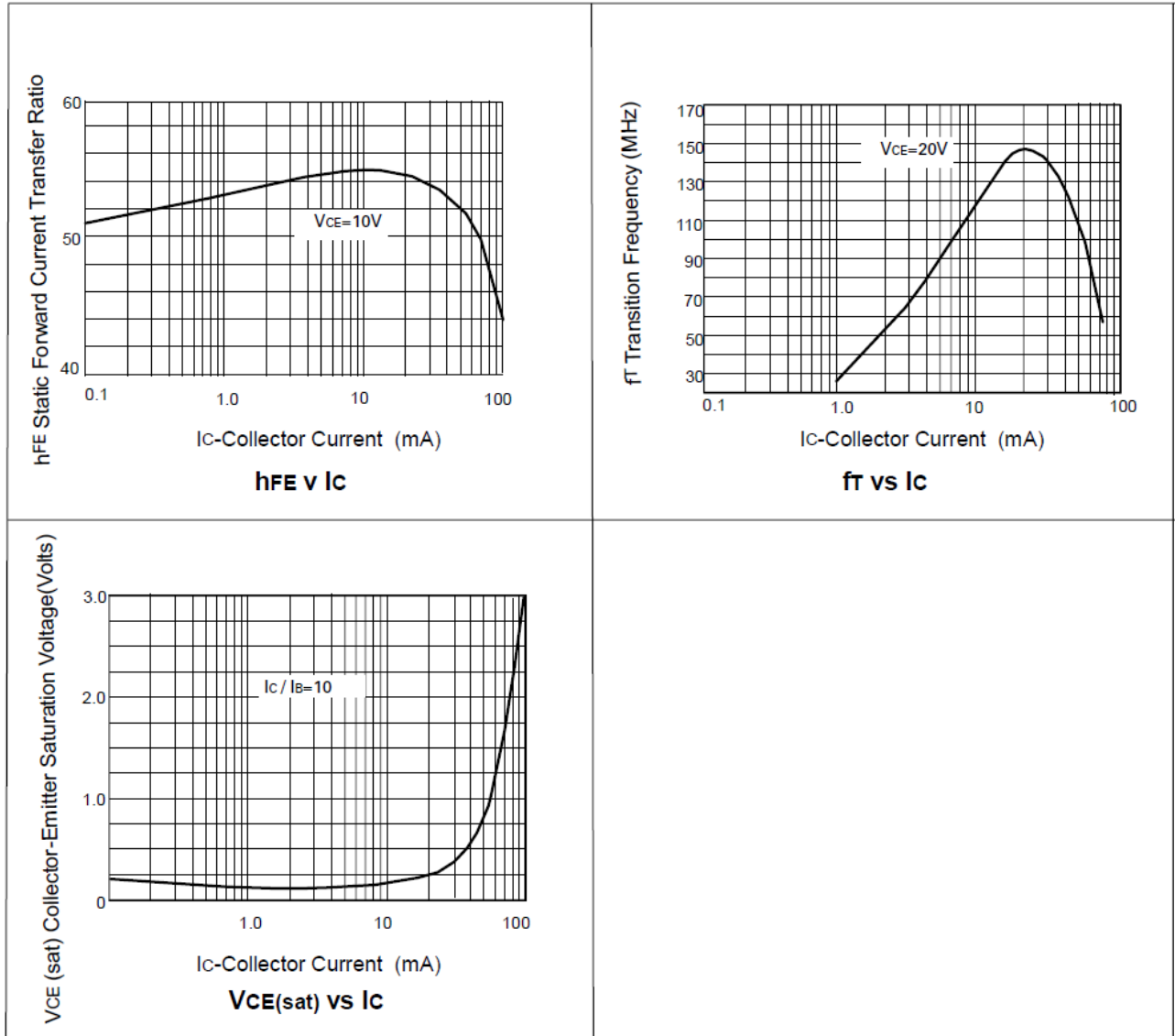
Safe Operating Area

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

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---------------|----------------|-------------|-------------|---------------|---|
| Collector-Base Breakdown Voltage | BV_{CBO} | -300 | — | — | V | $I_C = -100\mu\text{A}$ |
| Collector-Emitter Breakdown Voltage (Note 10) | BV_{CEO} | -300 | — | — | V | $I_C = -1\text{mA}$ |
| Emitter-Base Breakdown Voltage | BV_{EBO} | -5 | — | — | V | $I_E = -100\mu\text{A}$ |
| Collector Cutoff Current | I_{CBO} | — | — | -0.25 | μA | $V_{CB} = -200\text{V}$ $V_{CB} = -160\text{V}$ |
| Emitter Cutoff Current | I_{EBO} | — | — | -0.10 | nA | $V_{EB} = -3\text{V}$ |
| Static Forward Current Transfer Ratio (Note 10) | h_{FE} | 25 40 25 | — — — | — — — | — | $I_C = -1\text{mA}, V_{CE} = -10\text{V}$ $I_C = -10\text{mA}, V_{CE} = -10\text{V}$ $I_C = -30\text{mA}, V_{CE} = -10\text{V}$ |
| Collector-Emitter Saturation Voltage (Note 10) | $V_{CE(SAT)}$ | — | — | -0.5 | V | $I_C = -20\text{mA}, I_B = -2\text{mA}$ |
| Base-Emitter Saturation Voltage (Note 10) | $V_{BE(SAT)}$ | — | — | -0.9 | V | $I_C = -20\text{mA}, I_B = -2\text{mA}$ |
| Output Capacitance | C_{OBO} | — | — | 6 | pF | $V_{CB} = -20\text{V}, f = 1\text{MHz}$ |
| Transition Frequency | f_T | 50 | — | — | MHz | $V_{CE} = -20\text{V}, I_C = -10\text{mA}, f = 20\text{MHz}$ |

Note: 10. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$

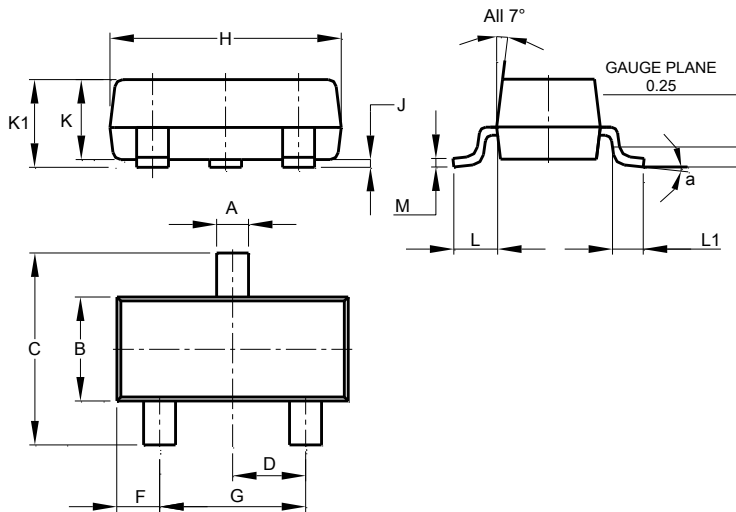
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



Package Outline Dimensions

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

SOT23

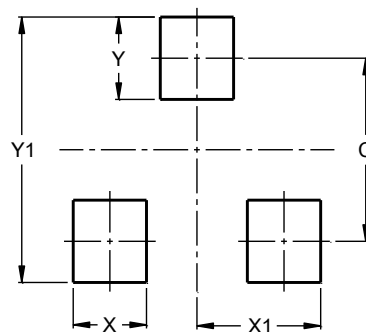


| SOT23 | | | |
|----------------------|-------|-------|-------|
| Dim | Min | Max | Typ |
| A | 0.37 | 0.51 | 0.40 |
| B | 1.20 | 1.40 | 1.30 |
| C | 2.30 | 2.50 | 2.40 |
| D | 0.89 | 1.03 | 0.915 |
| F | 0.45 | 0.60 | 0.535 |
| G | 1.78 | 2.05 | 1.83 |
| H | 2.80 | 3.00 | 2.90 |
| J | 0.013 | 0.10 | 0.05 |
| K | 0.890 | 1.00 | 0.975 |
| K1 | 0.903 | 1.10 | 1.025 |
| L | 0.45 | 0.61 | 0.55 |
| L1 | 0.25 | 0.55 | 0.40 |
| M | 0.085 | 0.150 | 0.110 |
| a | 0° | 8° | - |
| All Dimensions in mm | | | |

Suggested Pad Layout

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

SOT23



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 2.0 |
| X | 0.8 |
| X1 | 1.35 |
| Y | 0.9 |
| Y1 | 2.9 |

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device Terminals and PCB tracking.

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