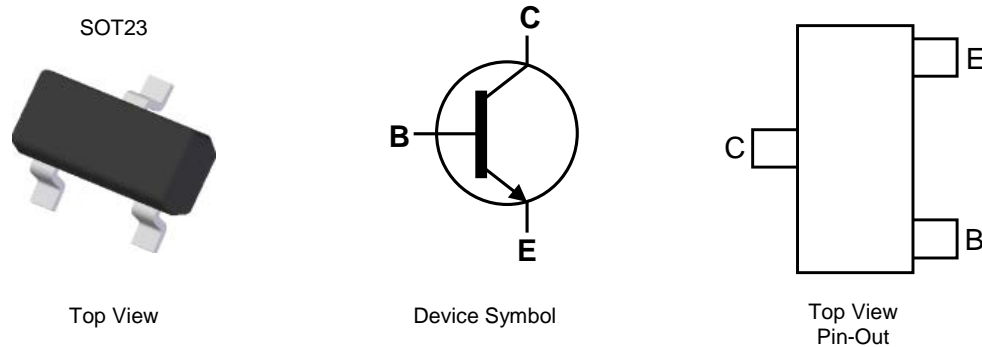


## Features

- $BV_{CEO} > 300V$
- $I_C = 200mA$  High Collector Current
- 350mW Power Dissipation
- Excellent  $h_{FE}$  Characteristics Up To 30mA
- Complementary Part Number FMMA92
- **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 208③
- Weight: 0.008 grams (Approximate)

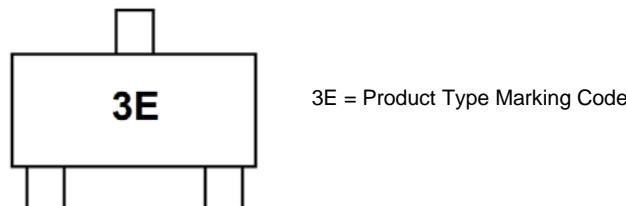


## Ordering Information (Notes 4 & 5)

| Product    | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|------------|------------|---------|--------------------|-----------------|-------------------|
| FMMTA42TA  | AEC-Q101   | 3E      | 7                  | 8               | 3000              |
| FMMTA42TC  | AEC-Q101   | 3E      | 13                 | 8               | 10,000            |
| FMMTA42QTA | Automotive | 3E      | 7                  | 8               | 3000              |

- 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. 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 <https://www.diodes.com/quality/>.
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



**Absolute Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic            | Symbol    | Value | Unit |
|---------------------------|-----------|-------|------|
| Collector-Base Voltage    | $V_{CB0}$ | 300   | V    |
| Collector-Emitter Voltage | $V_{CEO}$ | 300   | V    |
| Emitter-Base Voltage      | $V_{EBO}$ | 7     | V    |
| Collector Current         | $I_C$     | 200   | mA   |

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

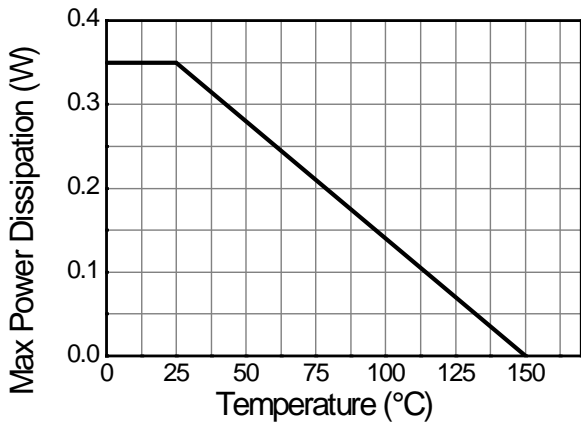
| Characteristic                          | Symbol          | Value           | Unit               |
|---|-----------------|-----------------|--------------------|
| Power Dissipation                       | $P_D$           | (Note 6)<br>310 | mW                 |
|   |                 | (Note 7)<br>350 |                    |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | (Note 6)<br>403 | $^\circ\text{C/W}$ |
|   |                 | (Note 7)<br>357 |                    |
| Thermal Resistance, Junction to Leads   | $R_{\theta JL}$ | 350             | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range | $T_J, T_{STG}$  | -55 to +150     | $^\circ\text{C}$   |

**ESD Ratings** (Note 9)

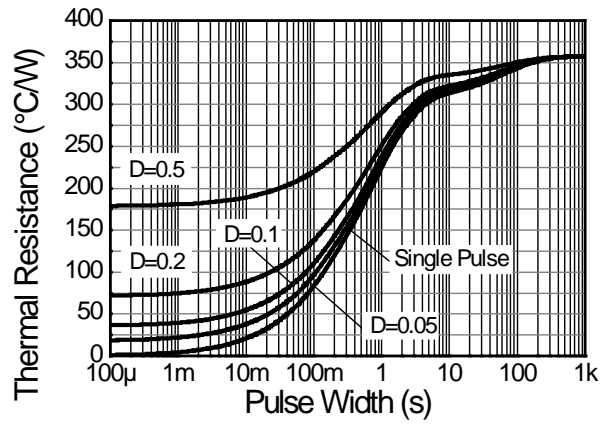
| Characteristic                           | Symbol  | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge—Human Body Model | ESD HBM | 4000  | V    | 3A          |
| Electrostatic Discharge—Machine Model    | ESD MM  | 400   | V    | C           |

- Notes:
6. For the 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 leads).
  9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

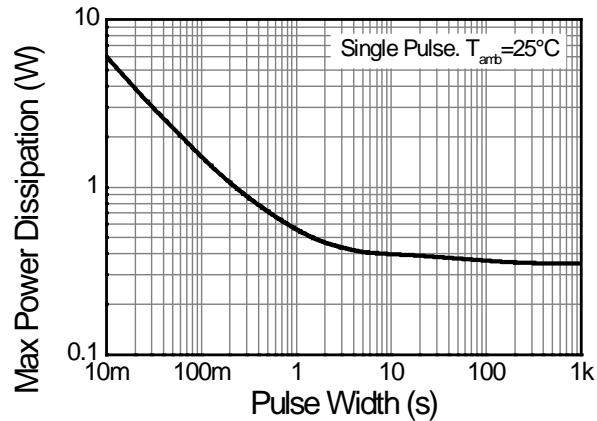
**Thermal Characteristics and Derating information**



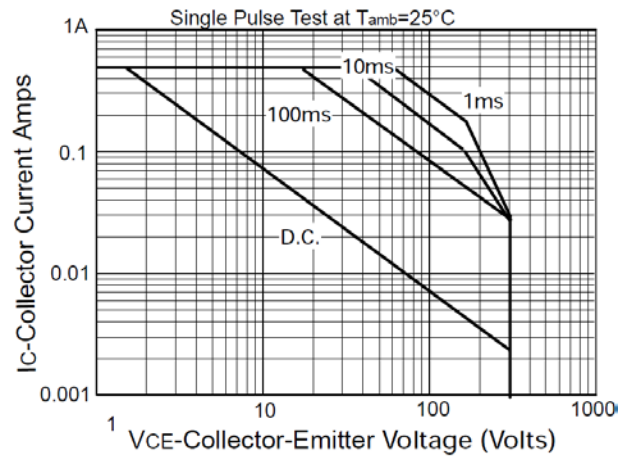
**Derating Curve**



**Transient Thermal Impedance**



**Pulse Power Dissipation**



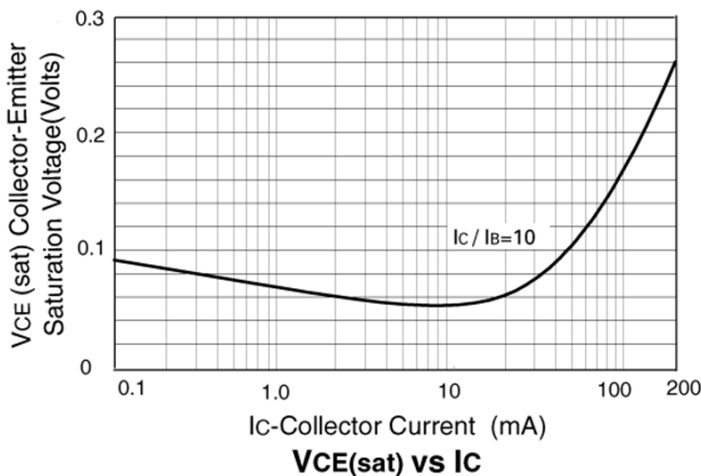
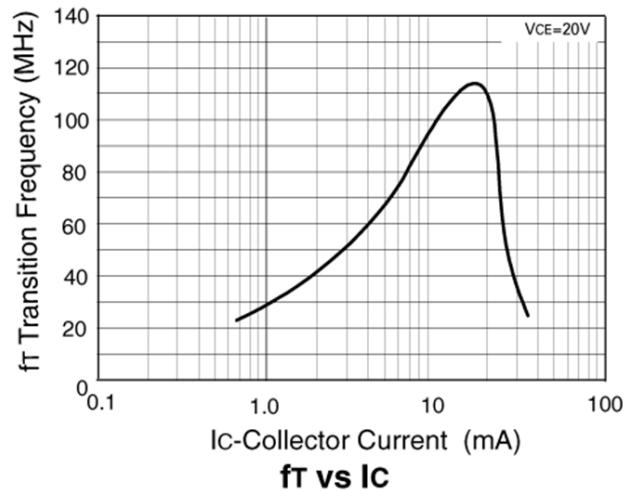
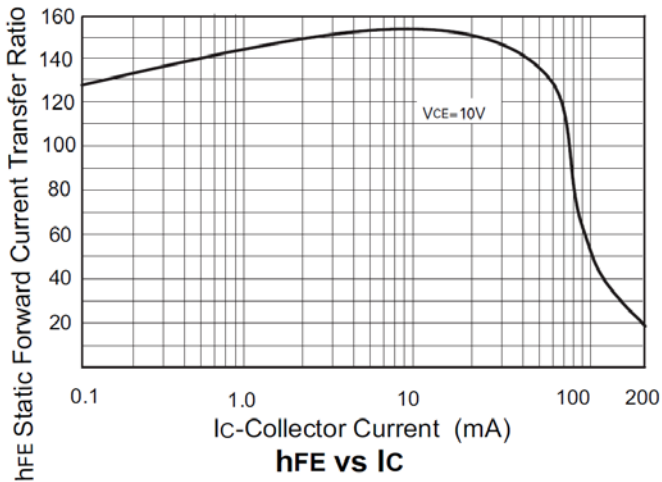
**Safe operating area**

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                  | Symbol               | Min            | Typ | Max | Unit | Test Condition  |
|---|----------------------|----------------|-----|-----|------|---|
| Collector-Base Breakdown Voltage                | BV <sub>CB0</sub>    | 300            | —   | —   | V    | I <sub>C</sub> = 100μA  |
| Collector-Emitter Breakdown Voltage (Note 10)   | BV <sub>CEO</sub>    | 300            | —   | —   | V    | I <sub>C</sub> = 1mA  |
| Emitter-Base Breakdown Voltage                  | BV <sub>EBO</sub>    | 7              | —   | —   | V    | I <sub>E</sub> = 100μA  |
| Collector Cutoff Current                        | I <sub>CB0</sub>     | —              | —   | 100 | nA   | V <sub>CB</sub> = 200V  |
| Emitter Cutoff Current                          | I <sub>EBO</sub>     | —              | —   | 100 | nA   | V <sub>EB</sub> = 6V  |
| Static Forward Current Transfer Ratio (Note 10) | h <sub>FE</sub>      | 25<br>40<br>40 | —   | —   | —    | I <sub>C</sub> = 1mA, V <sub>CE</sub> = 10V<br>I <sub>C</sub> = 10mA, V <sub>CE</sub> = 10V<br>I <sub>C</sub> = 30mA, V <sub>CE</sub> = 10V |
| Collector-Emitter Saturation Voltage (Note 10)  | V <sub>CE(sat)</sub> | —              | —   | 500 | mV   | I <sub>C</sub> = 20mA, I <sub>B</sub> = 2mA   |
| Base-Emitter Saturation Voltage(Note 10)        | V <sub>BE(sat)</sub> | —              | —   | 900 | mV   | I <sub>C</sub> = 20mA, I <sub>B</sub> = 2mA   |
| Output Capacitance                              | C <sub>obo</sub>     | —              | —   | 6   | pF   | V <sub>CB</sub> = 20V. f = 1MHz   |
| Transition Frequency                            | f <sub>T</sub>       | 50             | —   | —   | MHz  | V <sub>CE</sub> = 20V, I <sub>C</sub> = 10mA, f = 20MHz   |

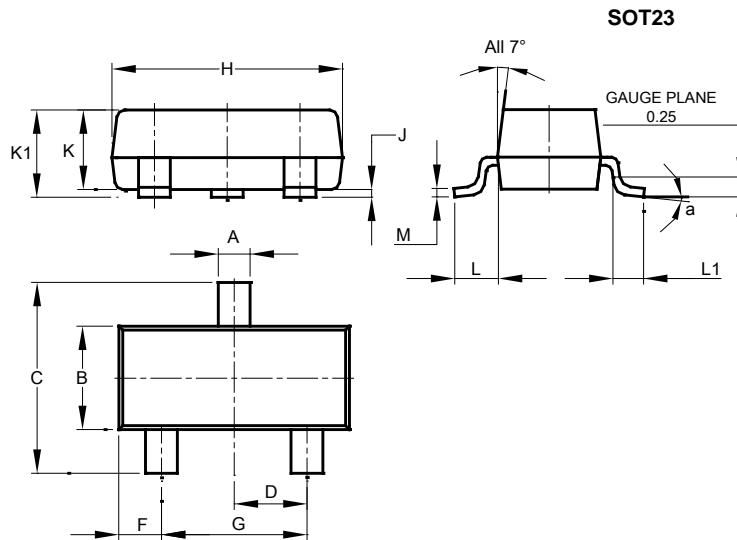
Note: 10. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

**Typical Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)



## Package Outline Dimensions

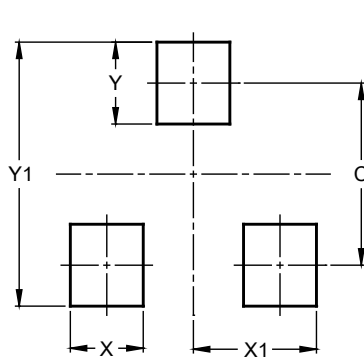
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



| 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.



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

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