

FMMT458

400V NPN HIGH VOLTAGE TRANSISTOR IN SOT23

Features

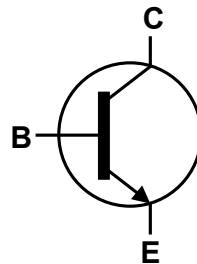
- $BV_{CEO} > 400V$
- $I_C = 225mA$ high Continuous Collector Current
- $I_{CM} = 1A$ Peak Pulse Current
- 500mW Power Dissipation
- Excellent h_{FE} Characteristics Up To 100mA
- Complementary PNP Type: FMMT558
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP capable (Note 4)**

Mechanical Data

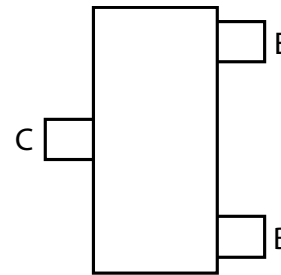
- Case: SOT23
- UL Flammability Rating 94V-0
- Case material: Molded Plastic. "Green" Molding Compound.
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 (3)
- Weight: 0.008 grams (Approximate)



Top View



Device Symbol



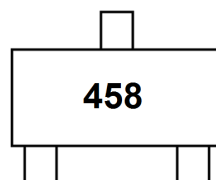
Top View Pin-Out

Ordering Information (Notes 4 & 5)

| Part Number | Compliance | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-------------|------------|---------|--------------------|-----------------|-------------------|
| FMMT458TA | AEC-Q101 | 458 | 7 | 8 | 3,000 |
| FMMT458QTA | Automotive | 458 | 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> 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.
 5. For packaging details, go to our website at <http://www.diodes.com>.

Marking Information



458 = Product Type Marking Code

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

| Characteristic | Symbol | Value | Unit |
|------------------------------|-----------|-------|------|
| Collector-Base Voltage | V_{CBO} | 400 | V |
| Collector-Emitter Voltage | V_{CEO} | 400 | V |
| Emitter-Base Voltage | V_{EBO} | 7 | V |
| Continuous Collector Current | I_C | 225 | mA |
| Peak Pulse Current | I_{CM} | 1 | A |
| Base Current | I_B | 200 | mA |

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

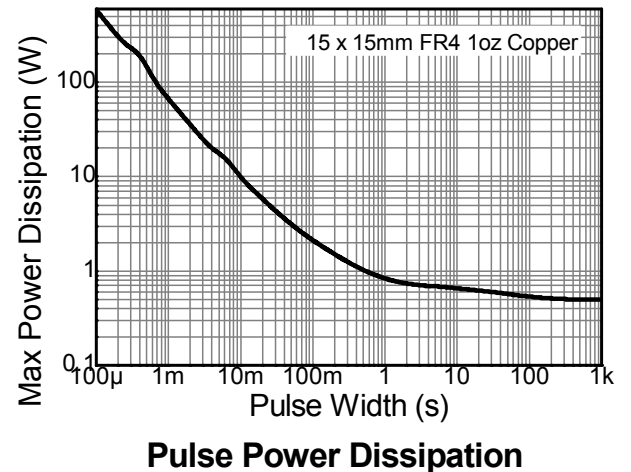
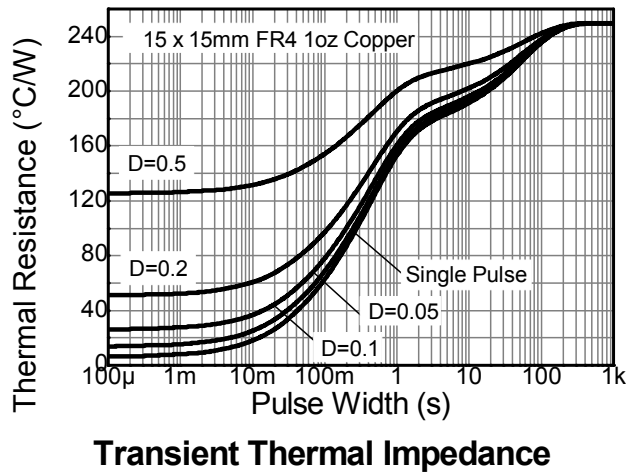
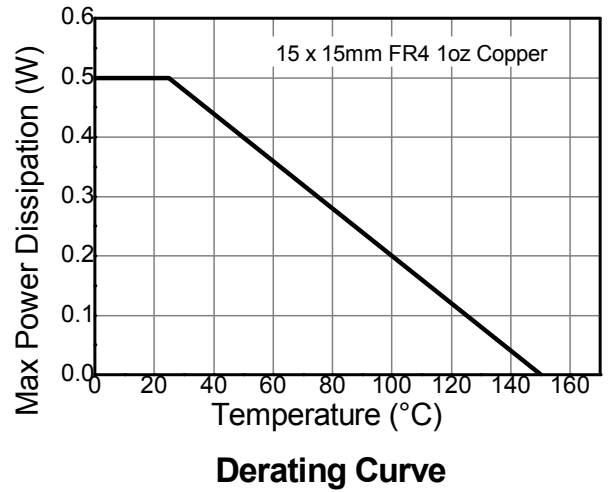
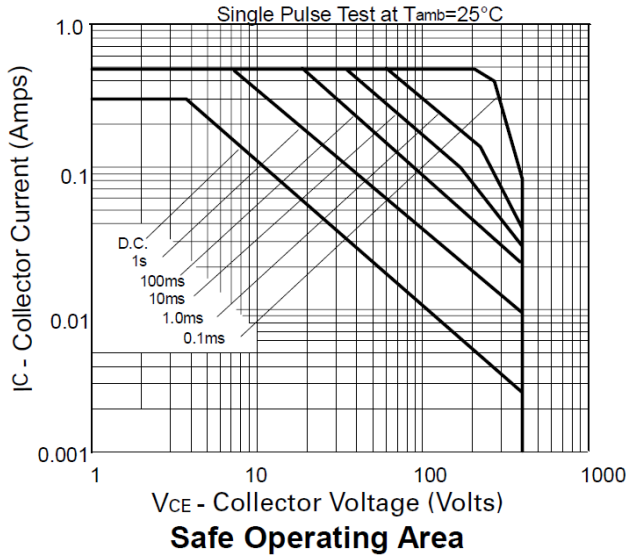
| Characteristic | Symbol | Value | Unit |
|--|-----------------|-------------|---------------------------|
| Power Dissipation (Note 6) | P_D | 500 | mW |
| Thermal Resistance, Junction to Ambient (Note 6) | $R_{\theta JA}$ | 250 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Lead (Note 7) | $R_{\theta JL}$ | 197 | $^\circ\text{C}/\text{W}$ |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

ESD Ratings (Note 8)

| 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 surface mounted on 15mm X 15mm X 1.6mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions.
 7. Thermal resistance from junction to solder-point (at the end of the collector lead).
 8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

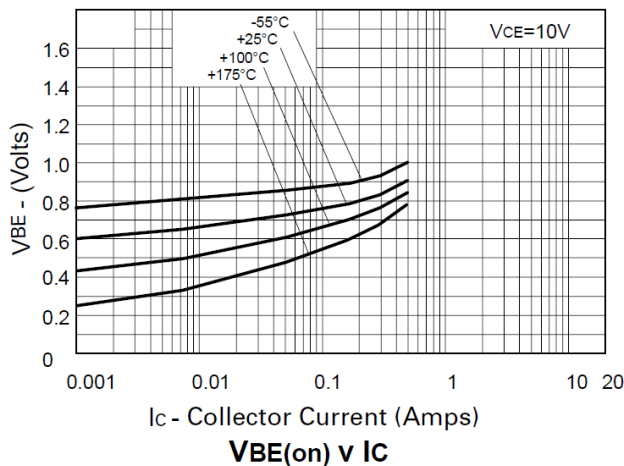
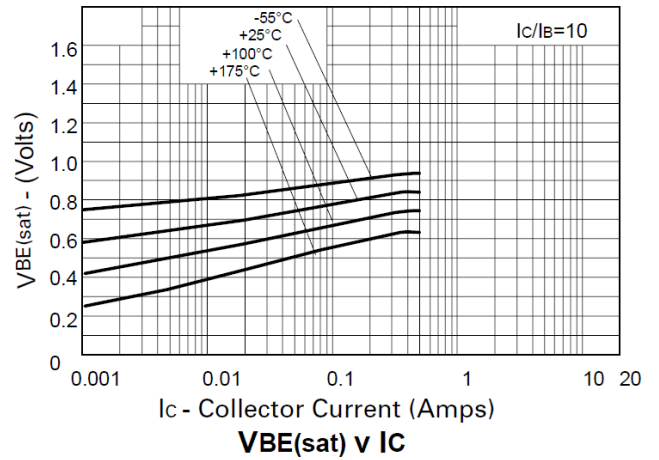
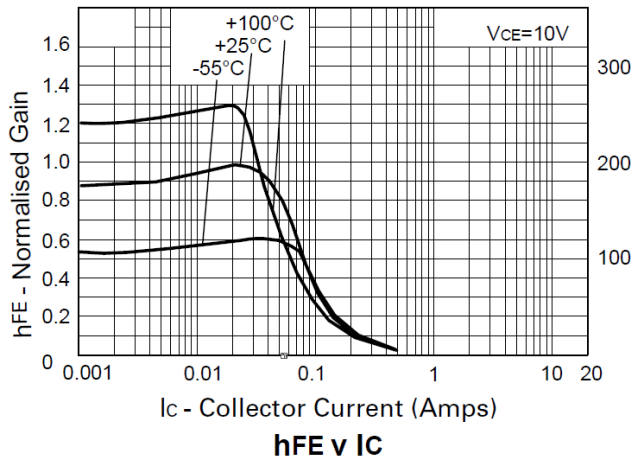
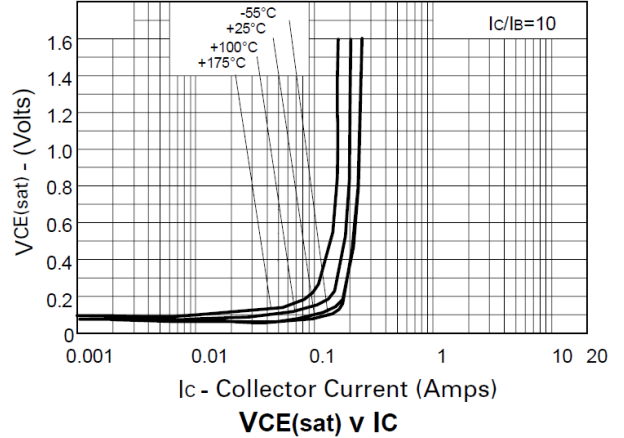
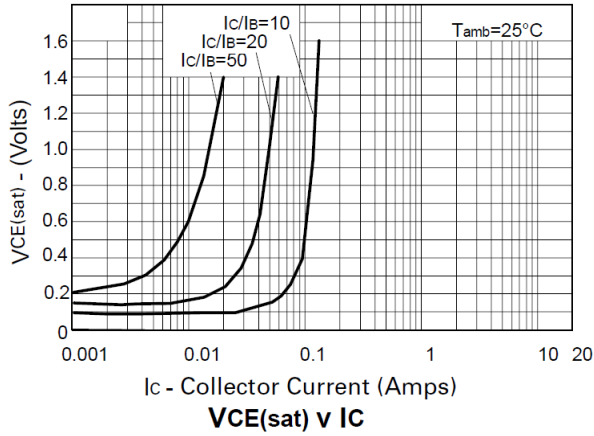


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|----------------------|------------------|------|------------|----------|--|
| Collector-Base Breakdown Voltage | BV _{CBO} | 400 | — | — | V | I _C = 100μA |
| Collector-Emitter Breakdown Voltage (Note 9) | BV _{CEO} | 400 | — | — | V | I _C = 1mA |
| Emitter-Base Breakdown Voltage | BV _{EBO} | 7 | — | — | V | I _E = 100μA |
| Collector Cutoff Current | I _{CBO} | — | — | 100 | nA | V _{CB} = 320V |
| Emitter Cutoff Current | I _{EBO} | — | — | 100 | nA | V _{EB} = 5.6V |
| Collector Emitter Cutoff Current | I _{CES} | — | — | 100 | nA | V _{CE} = 320V |
| Static Forward Current Transfer Ratio (Note 9) | h _{FE} | 100 100 15 | — | 300 | — | I _C = 1mA, V _{CE} = 10V I _C = 50mA, V _{CE} = 10V I _C = 100mA, V _{CE} = 10V |
| Collector-Emitter Saturation Voltage (Note 9) | V _{CE(sat)} | — | — | 200 500 | mV mV | I _C = 20mA, I _B = 2mA I _C = 50mA, I _B = 6mA |
| Base-Emitter Turn-On Voltage(Note 9) | V _{BE(on)} | — | — | 0.9 | V | I _C = 50mA, V _{CE} = 10V |
| Base-Emitter Saturation Voltage(Note 9) | V _{BE(sat)} | — | — | 0.9 | V | I _C = 50mA, I _B = 5mA |
| Output Capacitance | C _{obo} | — | — | 5 | pF | V _{CB} = 20V. f = 1MHz |
| Transition Frequency | f _T | 50 | — | — | MHz | V _{CE} = 20V, I _C = 10mA, f = 20MHz |
| Turn-On Time | t _{on} | — | 135 | — | ns | V _{CE} =100V, I _C =50mA |
| Turn-Off Time | t _{off} | — | 2260 | — | ns | I _{B1} = 5mA, I _{B2} = -10mA |

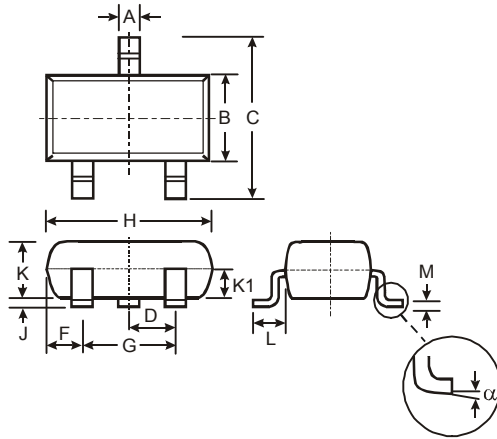
Notes: 9. Measured under pulsed conditions. Pulse width ≤ 300 μs. Duty cycle ≤ 2%.

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



Package Outline Dimensions

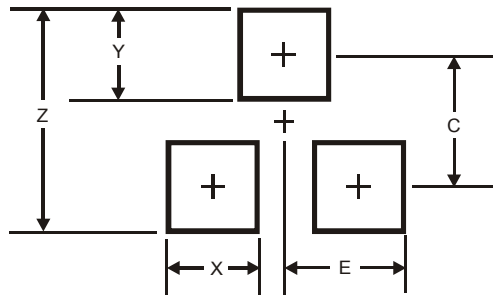
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| 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 | 0.903 | 1.10 | 1.00 |
| K1 | - | - | 0.400 |
| L | 0.45 | 0.61 | 0.55 |
| M | 0.085 | 0.18 | 0.11 |
| α | 0° | 8° | - |
| All Dimensions in mm | | | |

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



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

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to voltage spacing between terminals.

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Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.