

**15V NPN LOW SATURATION TRANSISTOR IN SOT23**
**Features**

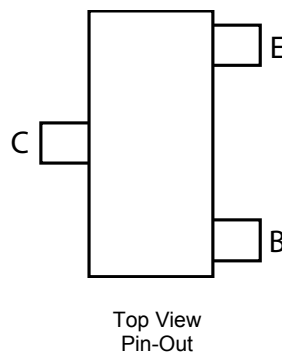
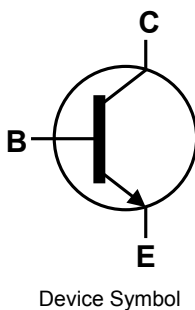
- $BV_{CEO} > 15V$
- $I_C = 3A$  high Continuous Collector Current
- $I_{CM} = 12A$  Peak Pulse Current
- $R_{CE(sat)} = 50m\Omega$  for a low equivalent On-Resistance
- 625mW Power dissipation
- $h_{FE}$  specified up to 12A for high current gain hold up
- Complementary PNP Type: FMMT717
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

**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 
- Weight 0.008 grams (approximate)

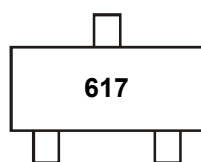
**Applications**

- DC-DC / DC-AC Modules
- Regulator
- LED driver
- CCFL Backlighting Inverters


**Ordering Information (Note 4)**

| Product   | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-----------|---------|--------------------|-----------------|-------------------|
| FMMT617TA | 617     | 7                  | 8               | 3,000             |
| FMMT617TC | 617     | 13                 | 8               | 10,000            |

- 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. For packaging details, go to our website at <http://www.diodes.com>.

**Marking Information**


617 = Product Type Marking Code

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

| Characteristic               | Symbol           | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage       | V <sub>CBO</sub> | 15    | V    |
| Collector-Emitter Voltage    | V <sub>CEO</sub> | 15    | V    |
| Emitter-Base Voltage         | V <sub>EBO</sub> | 7     | V    |
| Continuous Collector Current | I <sub>C</sub>   | 3     | A    |
| Peak Pulse Current (Note 5)  | I <sub>CM</sub>  | 12    | A    |
| Base Current                 | I <sub>B</sub>   | 500   | mA   |

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

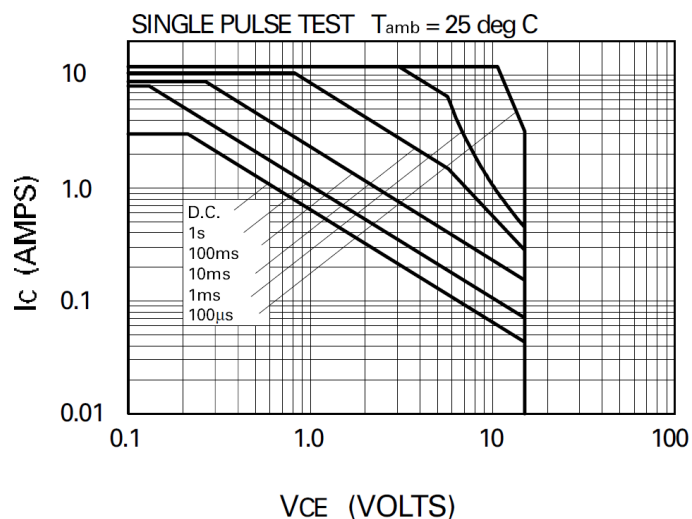
| Characteristic                                   | Symbol                            | Value       | Unit |
|--------------------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation (Note 5)                       | P <sub>D</sub>                    | 625         | mW   |
| Power Dissipation (Note 6)                       | P <sub>D</sub>                    | 806         | mW   |
| Thermal Resistance, Junction to Ambient (Note 5) | R <sub>θJA</sub>                  | 200         | °C/W |
| Thermal Resistance, Junction to Ambient (Note 6) | R <sub>θJA</sub>                  | 155         | °C/W |
| Thermal Resistance, Junction to Leads (Note 7)   | R <sub>θJL</sub>                  | 194         | °C/W |
| Operating and Storage Temperature Range          | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

**ESD Ratings** (Note 8)

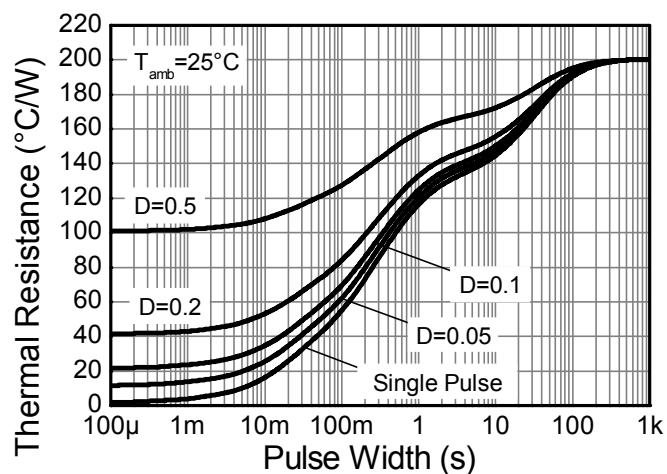
| Characteristic                             | Symbol  | Value | Unit | JEDEC Class |
|--------------------------------------------|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V    | 3A          |
| Electrostatic Discharge - Machine Model 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

- Notes:
5. For a device surface mounted on 25mm X 25mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
  6. Same as note 5, except the device is measured at t ≤ 5 sec.
  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.

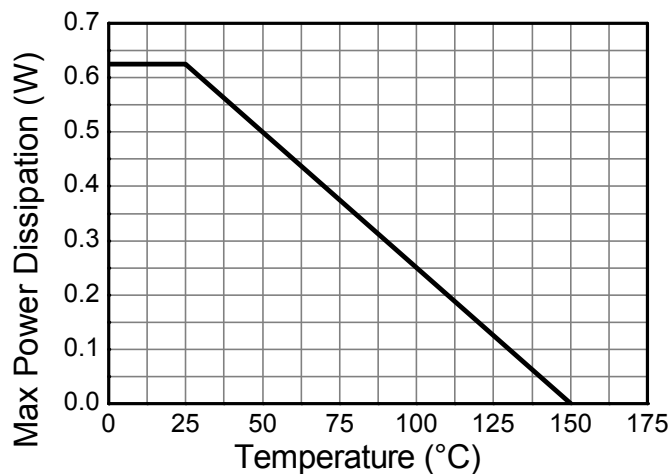
## Thermal Characteristics and Derating information



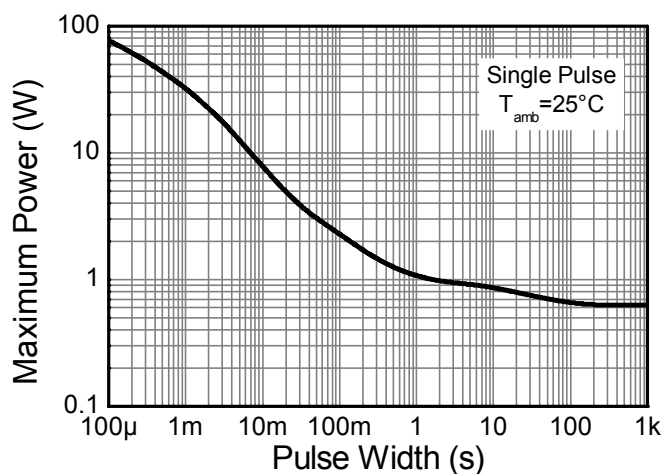
**Safe Operating Area**



**Transient Thermal Impedance**



**Derating Curve**



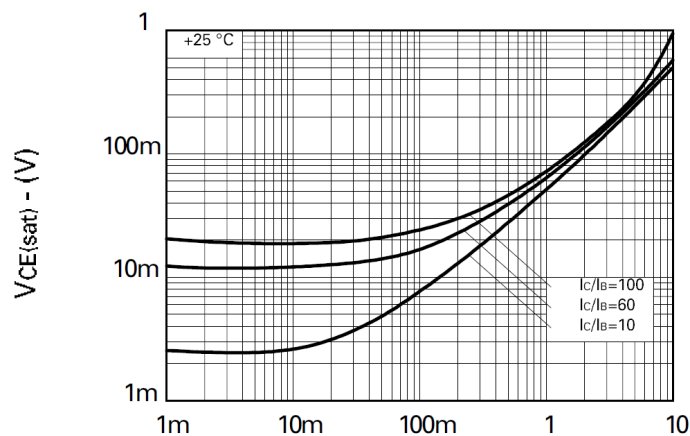
**Pulse Power Dissipation**

**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>CBO</sub>    | 15                            | 70                             | -                     | V    | I <sub>C</sub> = 100μA                                                                                                                                                                                                              |
| Collector-Emitter Breakdown Voltage (Note 9)   | BV <sub>CEO</sub>    | 15                            | 18                             | -                     | V    | I <sub>C</sub> = 10mA                                                                                                                                                                                                               |
| Emitter-Base Breakdown Voltage                 | BV <sub>EBO</sub>    | 7                             | 8.2                            | -                     | V    | I <sub>E</sub> = 100μA                                                                                                                                                                                                              |
| Collector Cut-off Current                      | I <sub>CBO</sub>     | -                             | <1                             | 100                   | nA   | V <sub>CB</sub> = 10V                                                                                                                                                                                                               |
| Emitter Cut-off Current                        | I <sub>EBO</sub>     | -                             | <1                             | 100                   | nA   | V <sub>EB</sub> = 5.6V                                                                                                                                                                                                              |
| Collector Emitter Cut-off Current              | I <sub>CES</sub>     | -                             | <1                             | 100                   | nA   | V <sub>CES</sub> = 10V                                                                                                                                                                                                              |
| Static Forward Current Transfer Ratio (Note 9) | h <sub>FE</sub>      | 200<br>300<br>200<br>150<br>- | 415<br>450<br>320<br>240<br>80 | -<br>-<br>-<br>-<br>- | -    | I <sub>C</sub> = 10mA, V <sub>CE</sub> = 2V<br>I <sub>C</sub> = 200mA, V <sub>CE</sub> = 2V<br>I <sub>C</sub> = 3A, V <sub>CE</sub> = 2V<br>I <sub>C</sub> = 5A, V <sub>CE</sub> = 2V<br>I <sub>C</sub> = 12A, V <sub>CE</sub> = 2V |
| Collector-Emitter Saturation Voltage (Note 9)  | V <sub>CE(sat)</sub> | -<br>-<br>-                   | 8<br>70<br>150                 | 14<br>100<br>200      | mV   | I <sub>C</sub> = 0.1A, I <sub>B</sub> = 10mA<br>I <sub>C</sub> = 1A, I <sub>B</sub> = 10mA<br>I <sub>C</sub> = 3A, I <sub>B</sub> = 50mA                                                                                            |
| Base-Emitter Saturation Voltage (Note 9)       | V <sub>BE(sat)</sub> | -                             | 0.9                            | 1.0                   | V    | I <sub>C</sub> = 3A, I <sub>B</sub> = 50mA                                                                                                                                                                                          |
| Base-Emitter Saturation Voltage (Note 9)       | V <sub>BE(on)</sub>  | -                             | 0.84                           | 1.0                   | V    | I <sub>C</sub> = 3A, V <sub>CE</sub> = 2V                                                                                                                                                                                           |
| Transition Frequency                           | f <sub>T</sub>       | 80                            | 120                            | -                     | MHz  | I <sub>C</sub> = 50mA, V <sub>CE</sub> = 10V,<br>f = 50MHz                                                                                                                                                                          |
| Collector Output Capacitance                   | C <sub>obo</sub>     | -                             | 30                             | 40                    | pF   | V <sub>CB</sub> = 10V, f = 1MHz                                                                                                                                                                                                     |
| Turn-On Time                                   | t <sub>(on)</sub>    | -                             | 120                            | -                     | ns   | V <sub>CC</sub> = 10V, I <sub>C</sub> = 3A,                                                                                                                                                                                         |
| Turn-Off Time                                  | t <sub>(off)</sub>   | -                             | 160                            | -                     | ns   | I <sub>B1</sub> = -I <sub>B2</sub> = 50mA                                                                                                                                                                                           |

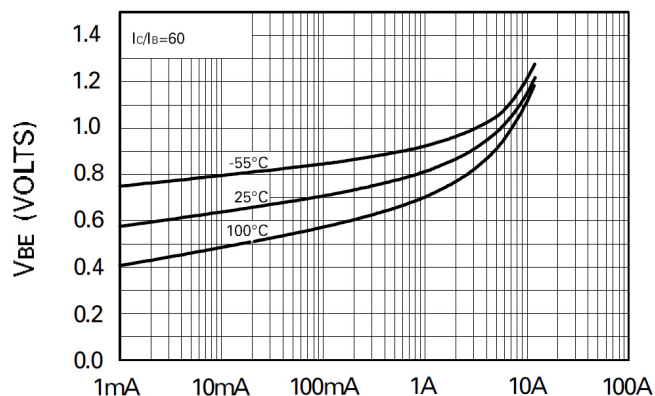
Notes: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%

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



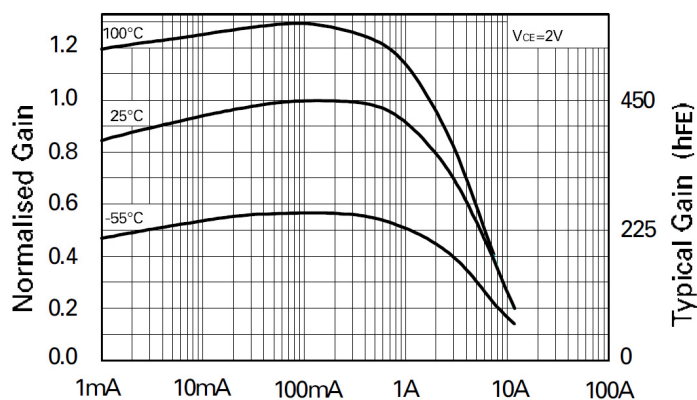
I<sub>C</sub> - Collector Current (A)

**VCE(SAT) v IC**



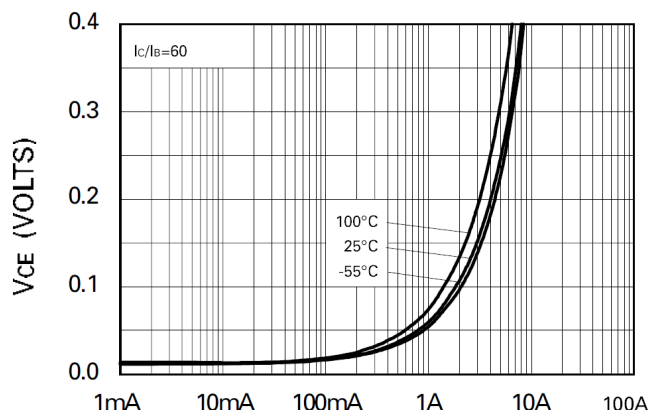
Collector Current

**VBE(SAT) vs IC**



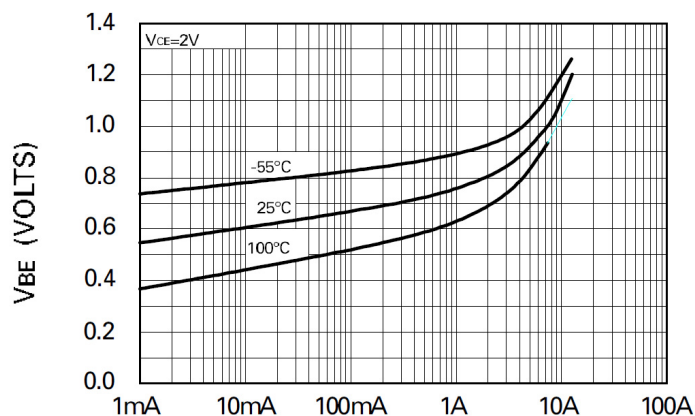
Collector Current

**hFE vs IC**



Collector Current

**VCE(SAT) vs IC**

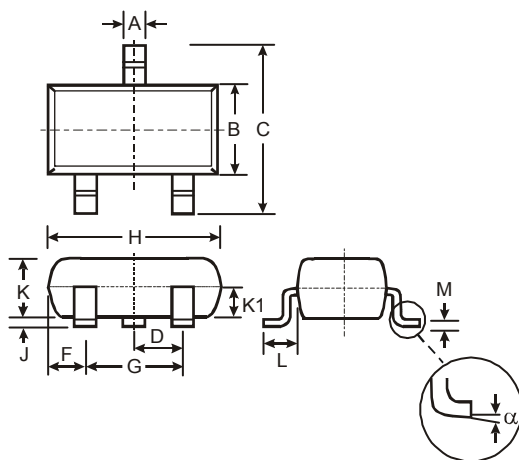


Collector Current

**VBE(ON) vs IC**

## Package Outline Dimensions

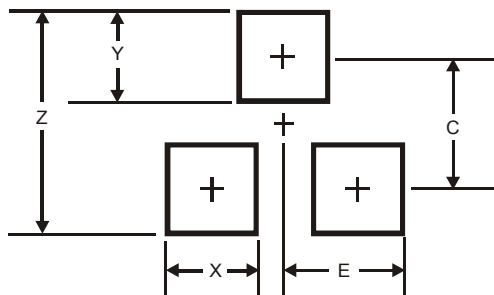
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| 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  |
| $\alpha$             | 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          |

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