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Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China




15V NPN LOW SATURATION TRANSISTOR IN SOT23

Features

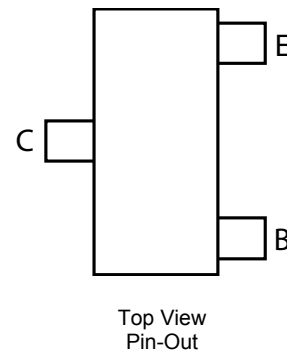
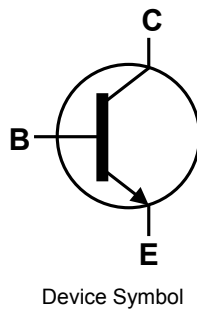
- $BV_{CEO} > 15V$
- $I_C = 3A$ high Continuous Collector Current
- $I_{CM} = 12A$ Peak Pulse Current
- $R_{CE(sat)} = 50m\Omega$ for a low equivalent On-Resistance
- 625mW Power dissipation
- h_{FE} specified up to 12A for high current gain hold up
- Complementary PNP Type: FMMT717
- **Totally Lead-Free & 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

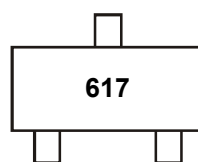


Ordering Information (Note 4)

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

| Characteristic | Symbol | Value | Unit |
|------------------------------|-----------|-------|------|
| Collector-Base Voltage | V_{CBO} | 15 | V |
| Collector-Emitter Voltage | V_{CEO} | 15 | V |
| Emitter-Base Voltage | V_{EBO} | 7 | V |
| Continuous Collector Current | I_C | 3 | A |
| Peak Pulse Current (Note 5) | I_{CM} | 12 | A |
| Base Current | I_B | 500 | mA |

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

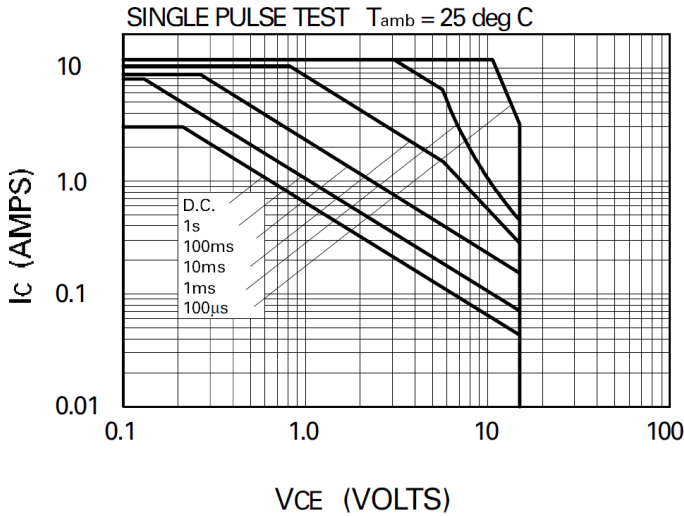
| Characteristic | Symbol | Value | Unit |
|--|-----------------|-------------|---------------------------|
| Power Dissipation (Note 5) | P_D | 625 | mW |
| Power Dissipation (Note 6) | P_D | 806 | mW |
| Thermal Resistance, Junction to Ambient (Note 5) | $R_{\theta JA}$ | 200 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Ambient (Note 6) | $R_{\theta JA}$ | 155 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Leads (Note 7) | $R_{\theta JL}$ | 194 | $^\circ\text{C}/\text{W}$ |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

ESD Ratings (Note 8)

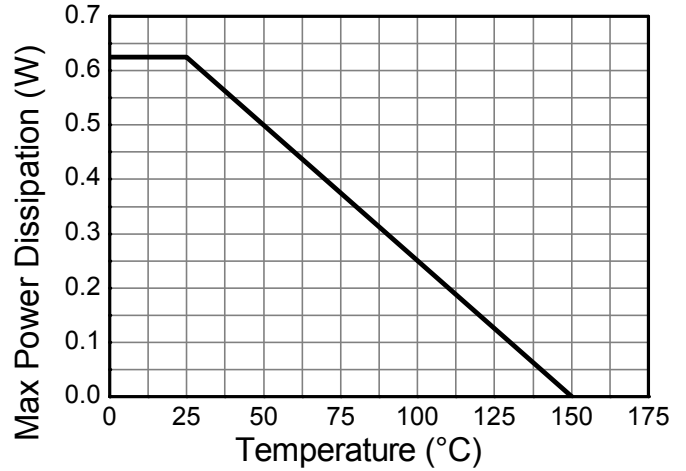
| Characteristic | Symbol | Value | Unit | JEDEC Class |
|--|---------|------------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V | 3A |
| Electrostatic Discharge - Machine Model | ESD MM | ≥ 400 | V | C |

- Notes:
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 $t \leq 5$ 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.

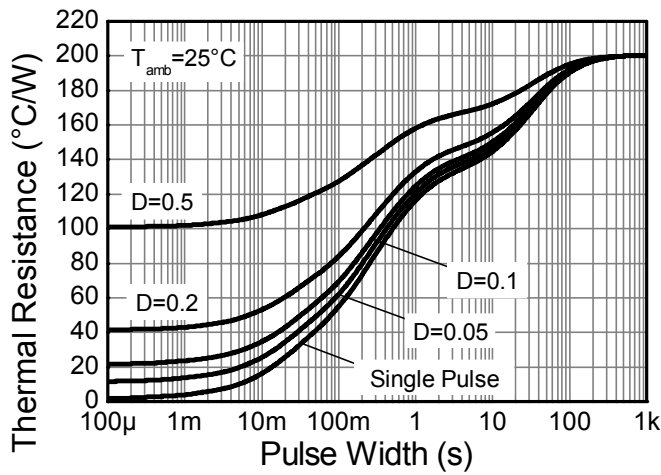
Thermal Characteristics and Derating information



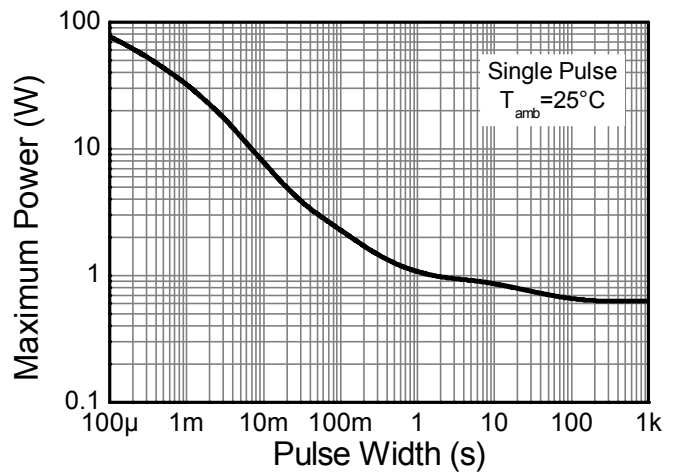
Safe Operating Area



Derating Curve



Transient Thermal Impedance



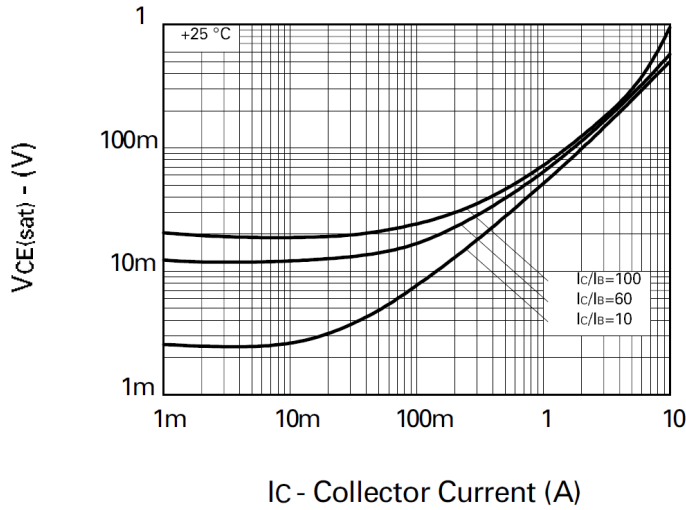
Pulse Power Dissipation

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

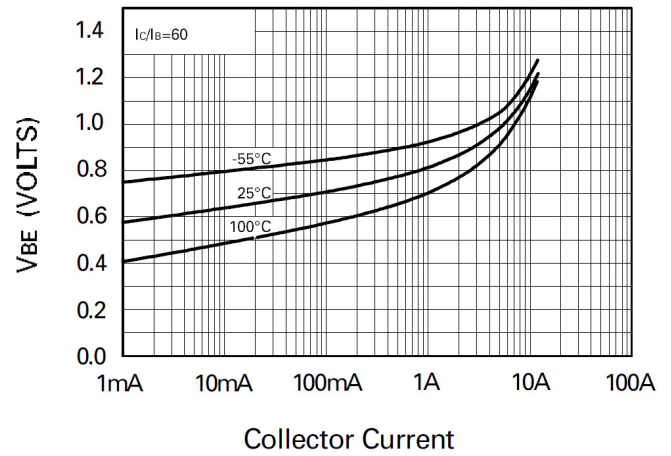
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------|-----|------|-----|------|--|
| Collector-Base Breakdown Voltage | BV_{CBO} | 15 | 70 | - | V | $I_C = 100\mu\text{A}$ |
| Collector-Emitter Breakdown Voltage (Note 9) | BV_{CEO} | 15 | 18 | - | V | $I_C = 10\text{mA}$ |
| Emitter-Base Breakdown Voltage | BV_{EBO} | 7 | 8.2 | - | V | $I_E = 100\mu\text{A}$ |
| Collector Cut-off Current | I_{CBO} | - | <1 | 100 | nA | $V_{CB} = 10\text{V}$ |
| Emitter Cut-off Current | I_{EBO} | - | <1 | 100 | nA | $V_{EB} = 5.6\text{V}$ |
| Collector Emitter Cut-off Current | I_{CES} | - | <1 | 100 | nA | $V_{CES} = 10\text{V}$ |
| Static Forward Current Transfer Ratio (Note 9) | h_{FE} | 200 | 415 | - | - | $I_C = 10\text{mA}, V_{CE} = 2\text{V}$ |
| | | 300 | 450 | - | | $I_C = 200\text{mA}, V_{CE} = 2\text{V}$ |
| | | 200 | 320 | - | | $I_C = 3\text{A}, V_{CE} = 2\text{V}$ |
| | | 150 | 240 | - | | $I_C = 5\text{A}, V_{CE} = 2\text{V}$ |
| | | - | 80 | - | | $I_C = 12\text{A}, V_{CE} = 2\text{V}$ |
| Collector-Emitter Saturation Voltage (Note 9) | $V_{CE(sat)}$ | - | 8 | 14 | mV | $I_C = 0.1\text{A}, I_B = 10\text{mA}$ |
| | | - | 70 | 100 | | $I_C = 1\text{A}, I_B = 10\text{mA}$ |
| | | - | 150 | 200 | | $I_C = 3\text{A}, I_B = 50\text{mA}$ |
| Base-Emitter Saturation Voltage (Note 9) | $V_{BE(sat)}$ | - | 0.9 | 1.0 | V | $I_C = 3\text{A}, I_B = 50\text{mA}$ |
| Base-Emitter Saturation Voltage (Note 9) | $V_{BE(on)}$ | - | 0.84 | 1.0 | V | $I_C = 3\text{A}, V_{CE} = 2\text{V}$ |
| Transition Frequency | f_T | 80 | 120 | - | MHz | $I_C = 50\text{mA}, V_{CE} = 10\text{V}, f = 50\text{MHz}$ |
| Collector Output Capacitance | C_{obo} | - | 30 | 40 | pF | $V_{CB} = 10\text{V}, f = 1\text{MHz}$ |
| Turn-On Time | $t_{(on)}$ | - | 120 | - | ns | $V_{CC} = 10\text{V}, I_C = 3\text{A},$ |
| Turn-Off Time | $t_{(off)}$ | - | 160 | - | ns | $I_{B1} = -I_{B2} = 50\text{mA}$ |

Notes: 9. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$

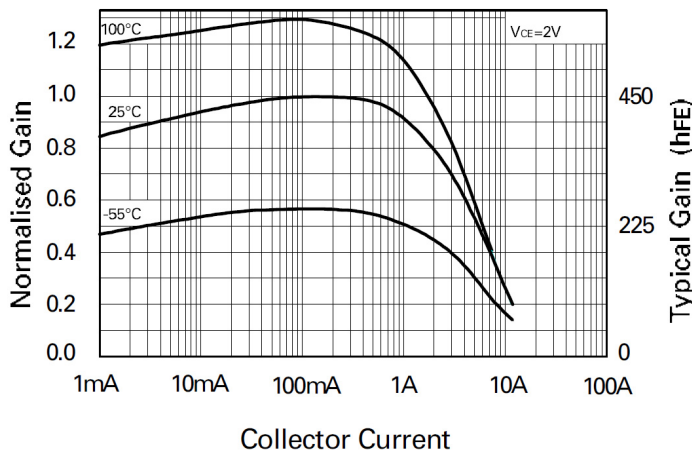
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



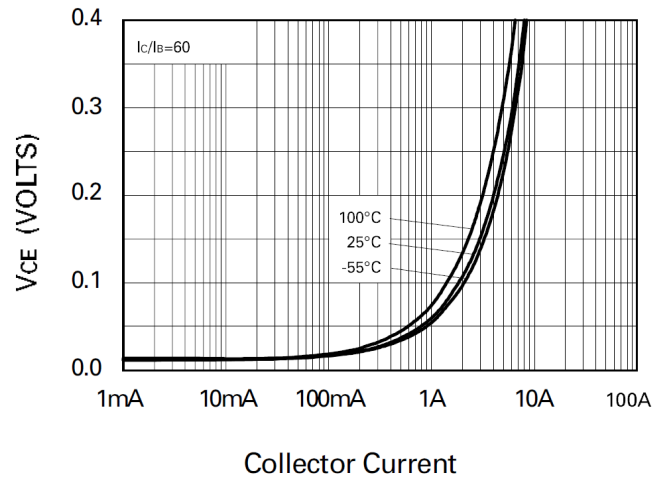
$V_{CE(SAT)}$ v I_C



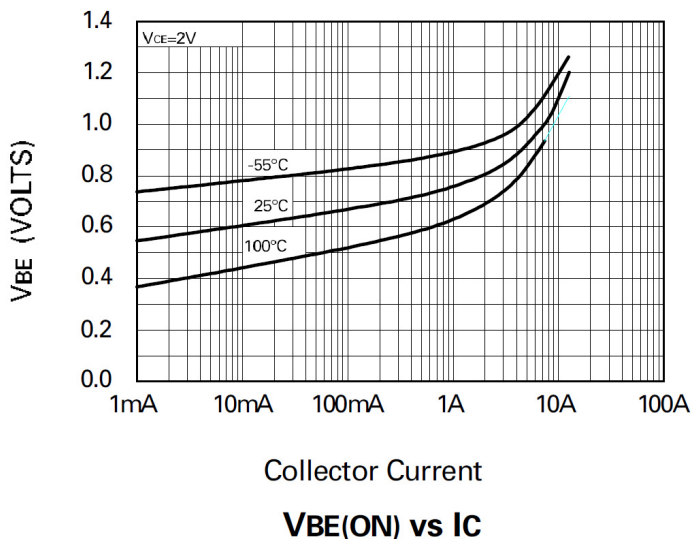
$V_{BE(SAT)}$ vs I_C



hFE vs I_C



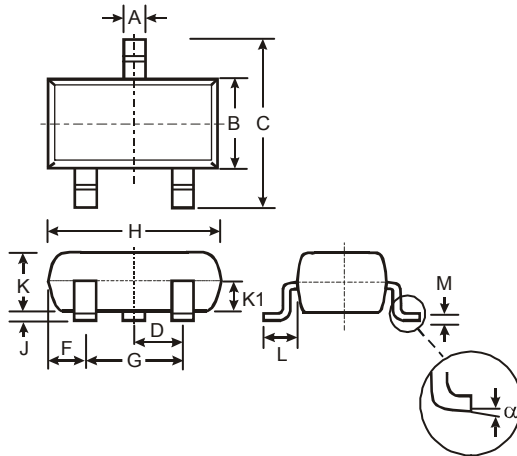
$V_{CE(SAT)}$ vs I_C



$V_{BE(ON)}$ vs I_C

Package Outline Dimensions

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

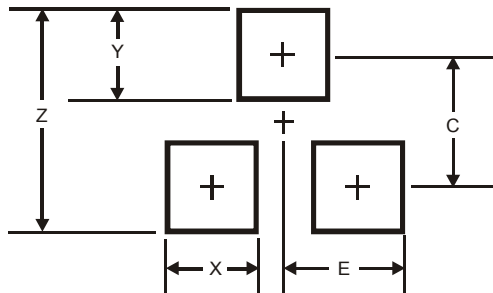


| SOT23 | | | |
|-------|-------|------|-------|
| Dim | Min | Max | Typ |
| A | 0.37 | 0.51 | 0.40 |
| B | 1.20 | 1.40 | 1.30 |
| C | 2.30 | 2.50 | 2.40 |
| D | 0.89 | 1.03 | 0.915 |
| F | 0.45 | 0.60 | 0.535 |
| G | 1.78 | 2.05 | 1.83 |
| H | 2.80 | 3.00 | 2.90 |
| J | 0.013 | 0.10 | 0.05 |
| K | 0.903 | 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 |

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