

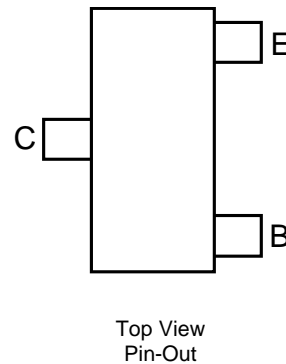
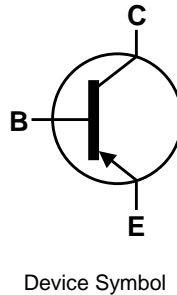
**12V PNP HIGH GAIN MEDIUM POWER TRANSISTOR IN SOT23**

**Features**

- $BV_{CEO} > -12V$
- $I_C = -1.25A$  Continuous Collector Current
- $I_{CM} = -4A$  Peak Pulse Current
- Low Saturation Voltage  $V_{CE(sat)} < -240mV @ -1A$
- $R_{CE(SAT)} = 160m\Omega$  for a low equivalent on-resistance
- 500mW power dissipation
- $h_{FE}$  characterised up to -3A for high current gain hold-up
- **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 ③
- Weight 0.008 grams (approximate)

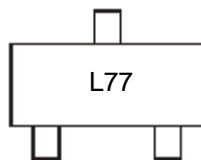


**Ordering Information** (Notes 4 & 5)

| Product     | Compliance | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-------------|------------|---------|--------------------|-----------------|-------------------|
| FMMTL717TA  | AEC-Q101   | L77     | 7                  | 8               | 3,000             |
| FMMTL717QTA | Automotive | L77     | 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/products/packages.html>.

**Marking Information**



L77 = Product Type Marking Code

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

| Characteristic               | Symbol           | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage       | V <sub>CB0</sub> | -12   | V    |
| Collector-Emitter Voltage    | V <sub>CEO</sub> | -12   | V    |
| Emitter-Base Voltage         | V <sub>EBO</sub> | -7    | V    |
| Continuous Collector Current | I <sub>C</sub>   | -1.25 | A    |
| Peak Pulse Current           | I <sub>CM</sub>  | -4    | A    |
| Base Current                 | I <sub>B</sub>   | -200  | mA   |

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

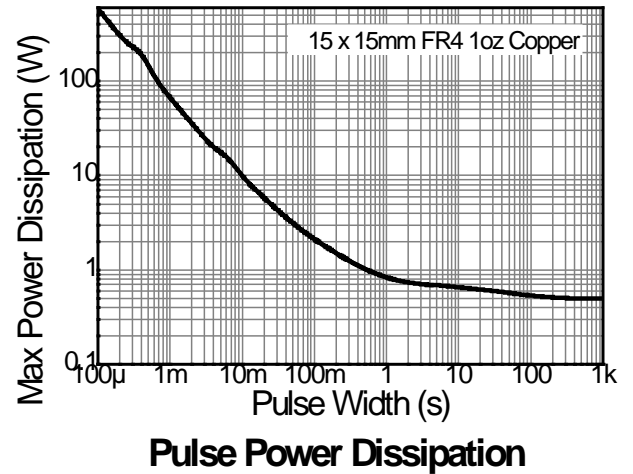
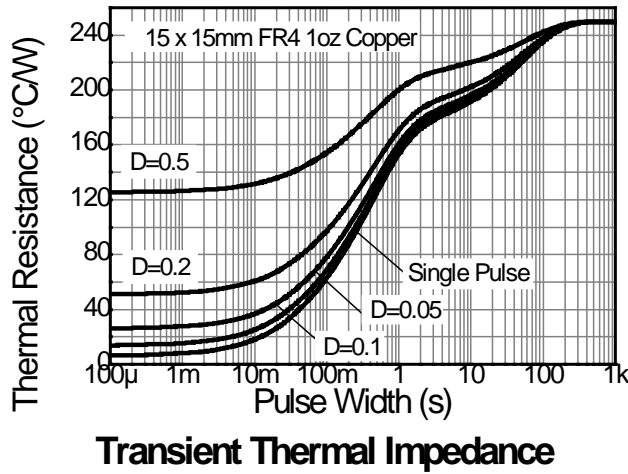
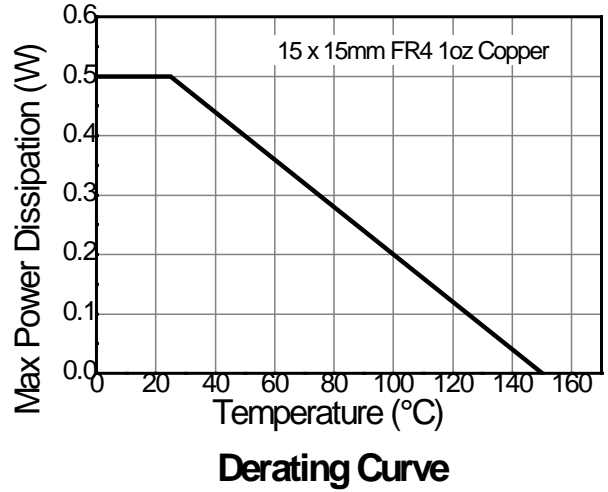
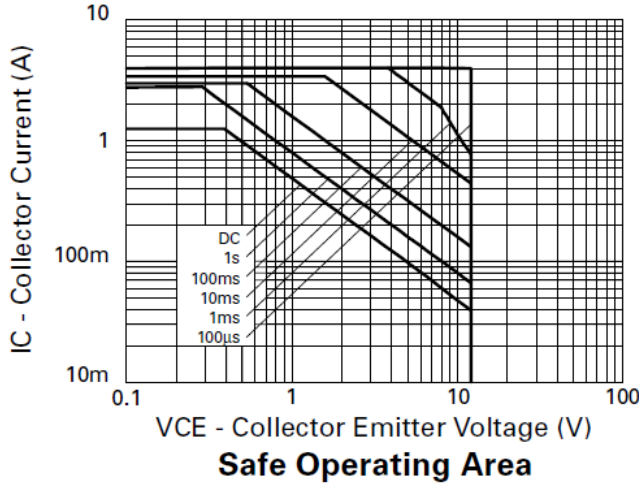
| Characteristic                                   | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 6)                       | P <sub>D</sub>                    | 500         | mW   |
| Thermal Resistance, Junction to Ambient (Note 6) | R <sub>θJA</sub>                  | 250         | °C/W |
| Thermal Resistance, Junction to Lead (Note 7)    | R <sub>θJL</sub>                  | 197         | °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:
6. For a device mounted with the collector lead on 15mm x 15mm 1oz copper that is on a single-sided FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  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**

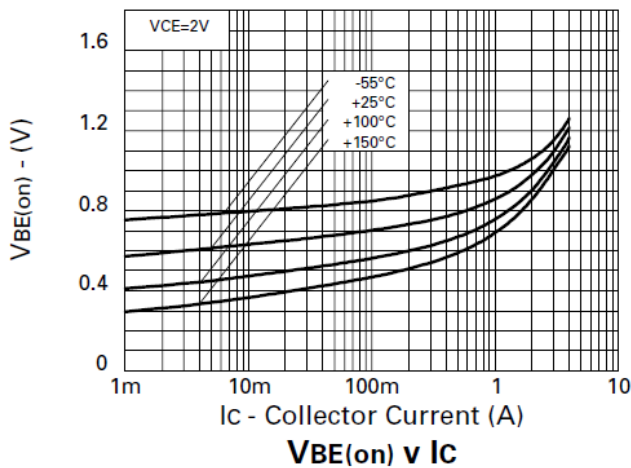
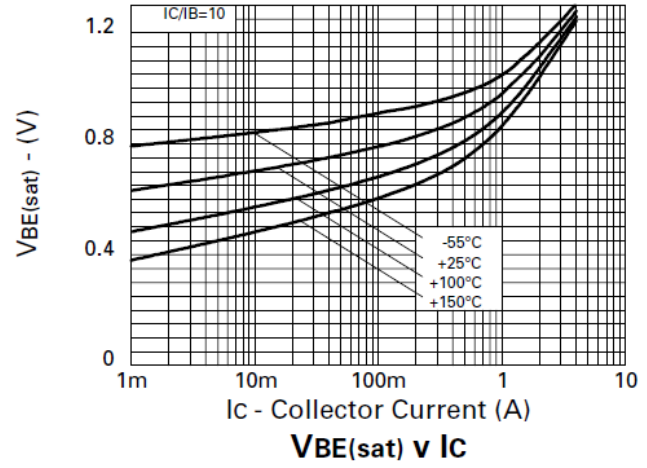
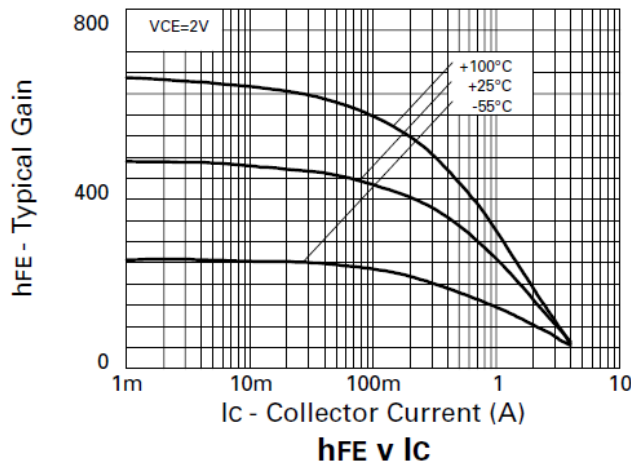
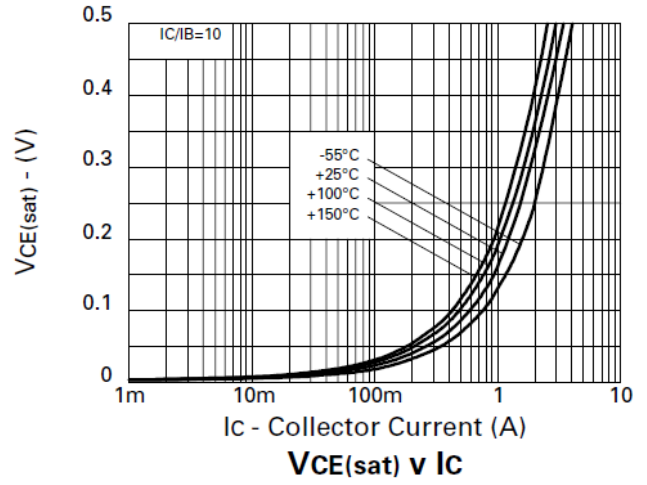
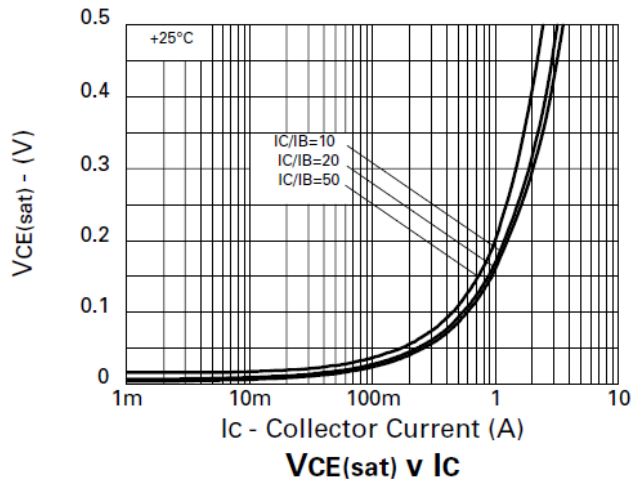


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                 | Symbol               | Min | Typ  | Max   | Unit | Test Condition  |
|--|----------------------|-----|------|-------|------|---|
| Collector-Base Breakdown Voltage               | BV <sub>CBO</sub>    | -12 | -35  | -     | V    | I <sub>C</sub> = -100μA                                       |
| Collector-Emitter Breakdown Voltage (Note 9)   | BV <sub>CEO</sub>    | -12 | -25  | -     | V    | I <sub>C</sub> = -10mA  |
| Emitter-Base Breakdown Voltage                 | BV <sub>EBO</sub>    | -7  | -8.5 | -     | V    | I <sub>E</sub> = -100μA                                       |
| Collector Cutoff Current                       | I <sub>CBO</sub>     | -   | <-1  | -10   | nA   | V <sub>CB</sub> = -10V  |
| Emitter Cutoff Current                         | I <sub>EBO</sub>     | -   | <-1  | -10   | nA   | V <sub>EB</sub> = -5.6V                                       |
| Collector Emitter Cutoff Current               | I <sub>CES</sub>     | -   | <-1  | -10   | nA   | V <sub>CE</sub> = -10V  |
| Static Forward Current Transfer Ratio (Note 9) | h <sub>FE</sub>      | 300 | 490  | -     | -    | I <sub>C</sub> = -10mA, V <sub>CE</sub> = -2V                 |
|  |                      | 300 | 450  | -     |      | I <sub>C</sub> = -0.1A, V <sub>CE</sub> = -2V                 |
|  |                      | 180 | 275  | -     |      | I <sub>C</sub> = -1A, V <sub>CE</sub> = -2V                   |
|  |                      | 100 | 180  | -     |      | I <sub>C</sub> = -2A, V <sub>CE</sub> = -2V                   |
|  |                      | 50  | 110  | -     |      | I <sub>C</sub> = -3A, V <sub>CE</sub> = -2V                   |
| Collector-Emitter Saturation Voltage (Note 9)  | V <sub>CE(sat)</sub> | -   | -24  | -40   | mV   | I <sub>C</sub> = -0.1A, I <sub>B</sub> = -10mA                |
|  |                      | -   | -94  | -140  | mV   | I <sub>C</sub> = -0.5A, I <sub>B</sub> = -20mA                |
|  |                      | -   | -160 | -240  | mV   | I <sub>C</sub> = -1A, I <sub>B</sub> = -50mA                  |
|  |                      | -   | -200 | -290  | mV   | I <sub>C</sub> = -1.25A, I <sub>B</sub> = -50mA               |
| Base-Emitter Turn-On Voltage(Note 9)           | V <sub>BE(on)</sub>  | -   | -875 | -1000 | mV   | I <sub>C</sub> = -1.25A, V <sub>CE</sub> = -2V                |
| Base-Emitter Saturation Voltage(Note 9)        | V <sub>BE(sat)</sub> | -   | -970 | -1100 | mV   | I <sub>C</sub> = -1.25A, I <sub>B</sub> = -50mA               |
| Output Capacitance                             | C <sub>obo</sub>     | -   | 15   | 20    | pF   | V <sub>CB</sub> = -10V, f = 1MHz                              |
| Transition Frequency                           | f <sub>T</sub>       | -   | 205  | -     | MHz  | V <sub>CE</sub> = -10V, I <sub>C</sub> = -50mA,<br>f = 100MHz |
| Turn-On Time                                   | t <sub>on</sub>      | -   | 76   | -     | ns   | V <sub>CC</sub> = -10V, I <sub>C</sub> = -1A                  |
| Turn-Off Time                                  | t <sub>off</sub>     | -   | 149  | -     | ns   | I <sub>B1</sub> = -I <sub>B2</sub> = -10mA                    |

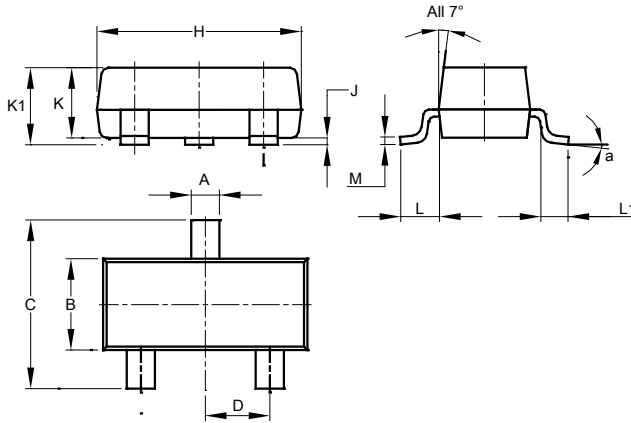
Notes: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%

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



### Package Outline Dimensions

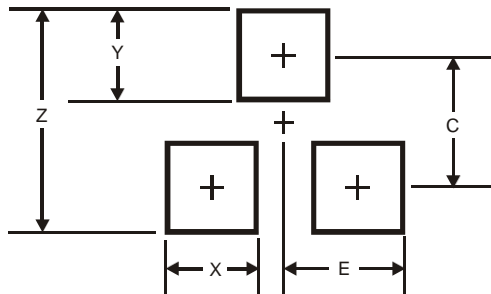
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| 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                    | 0.890 | 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                    | 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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