

50V NPN SILICON LOW SATURATION TRANSISTOR IN SOT23

Features and Benefits

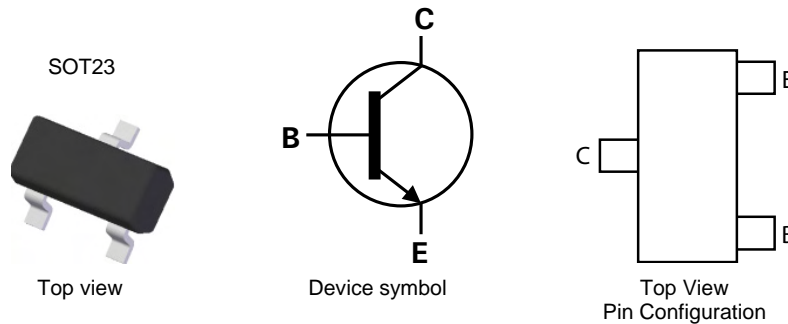
- $BV_{CE0} > 50V$
- $I_C = 2A$ Continuous Collector Current
- Low Saturation Voltage $V_{CE(sat)} < 200mV @ 1A$
- $R_{SAT} = 68m\Omega$ for a low equivalent on-resistance
- h_{FE} characterised up to 6A for high current gain hold-up
- 625mW power dissipation due to SuperSOT package
- Complementary NPN type: FMMT720
- **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: Matte Tin Finish annealed over Copper plated Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208 ③
- Weight: 0.008 grams (Approximate)

Applications

- MOSFET Gate Driving
- DC-DC / DC-AC Converters
- Regulator
- LED driver
- Motor Control

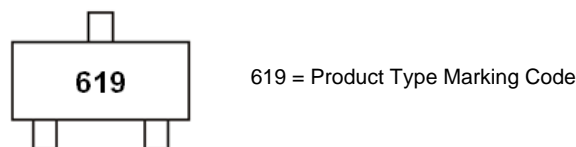


Ordering Information (Note 4)

| Product | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-----------|---------|--------------------|-----------------|-------------------|
| FMMT619TA | 619 | 7 | 8 | 3,000 |
| FMMT619TC | 619 | 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



Maximum Ratings @T_A = 25°C unless otherwise specified

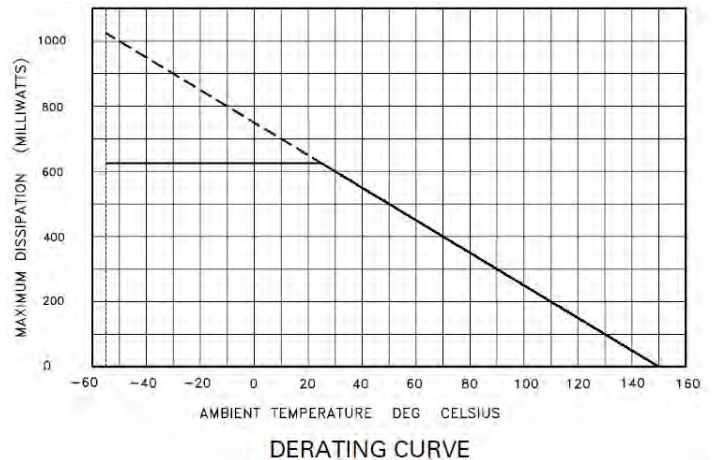
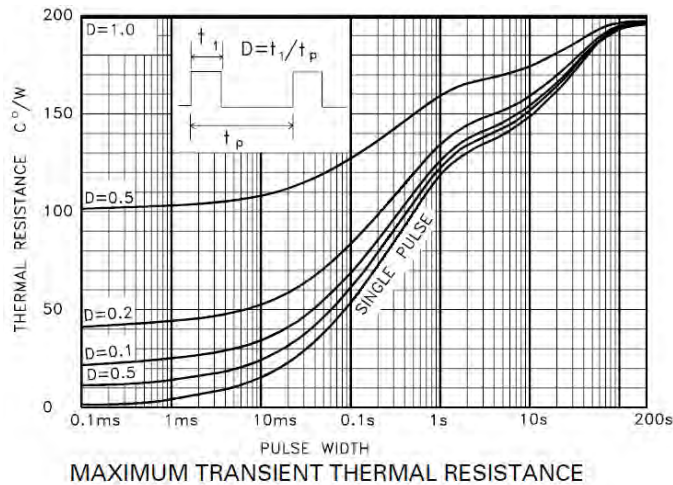
| Characteristic | Symbol | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CB0} | 50 | V |
| Collector-Emitter Voltage | V _{CEO} | 50 | V |
| Emitter-Base Voltage | V _{EBO} | 7 | V |
| Continuous Collector Current | I _C | 2 | A |
| Peak Pulse Current | I _{CM} | 6 | A |
| Base Current | I _B | 500 | mA |

Thermal Characteristics @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|-------------|-------|
| Power Dissipation | P _D | 625 | mW |
| Linear Rating Factor | | 5 | mW/°C |
| Thermal Resistance, Junction to Ambient | R _{θJA} | 200 | °C/W |
| Thermal Resistance, Junction to Lead | R _{θJL} | 194 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °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. Thermal resistance from junction to solder-point (at the end of the collector lead).

Thermal Characteristics and Derating information

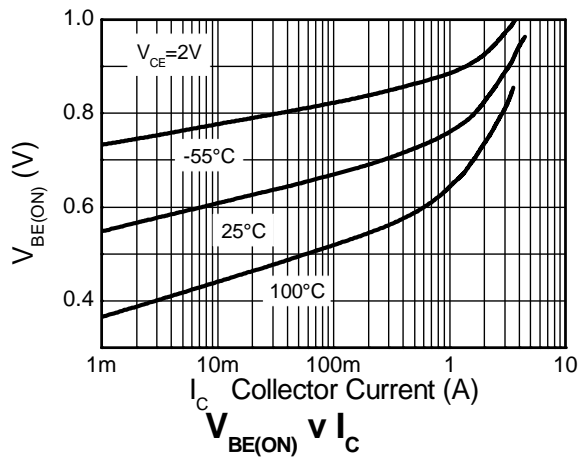
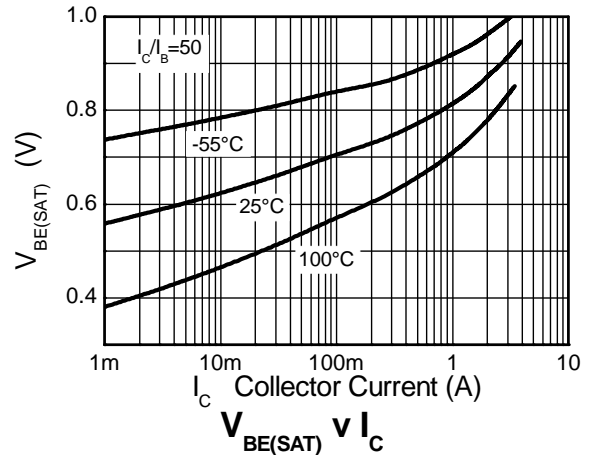
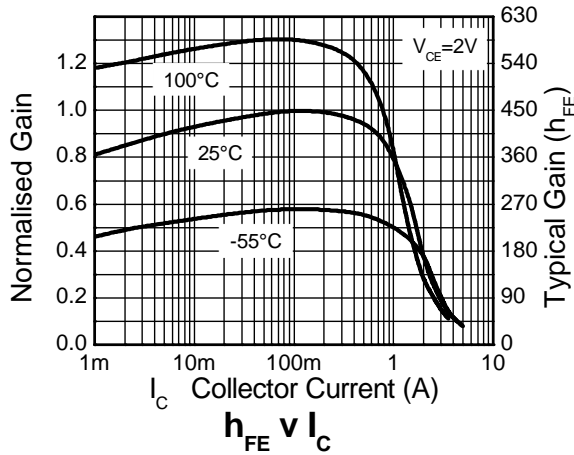
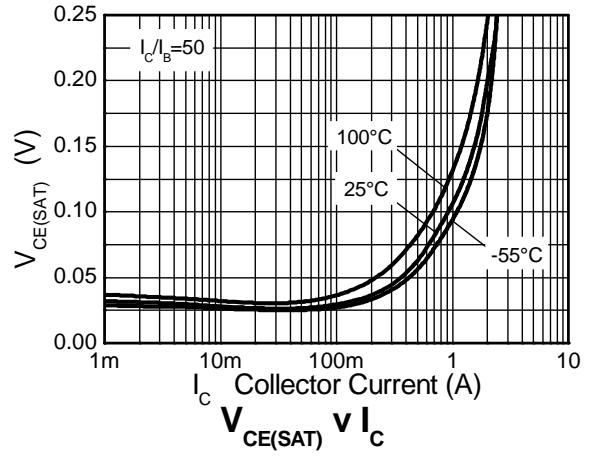
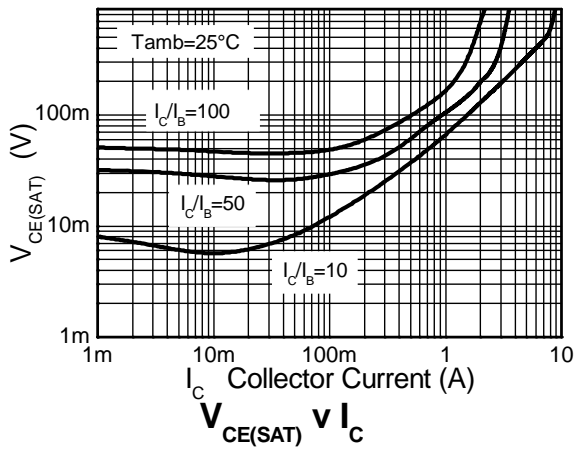


Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

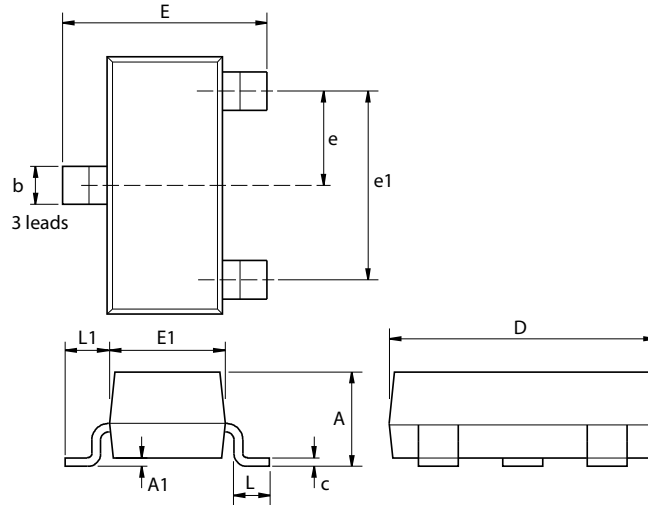
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------|-----|------|-----|------|---|
| OFF CHARACTERISTICS | | | | | | |
| Collector-Base Breakdown Voltage | BV_{CBO} | 50 | 190 | - | V | $I_C = 100\mu\text{A}$ |
| Collector-Emitter Breakdown Voltage (Note 7) | BV_{CEO} | 50 | 65 | - | V | $I_C = 10\text{mA}$ |
| Emitter-Base Breakdown Voltage | BV_{EBO} | 7 | 8.3 | - | V | $I_E = 100\mu\text{A}$ |
| Collector Cut-off Current | I_{CBO} | - | - | 100 | nA | $V_{CB} = 40\text{V}$ |
| Emitter Cut-off Current | I_{EBO} | - | - | 100 | nA | $V_{EB} = 6\text{V}$ |
| Collector Emitter Cut-off Current | I_{CES} | - | - | 100 | nA | $V_{CES} = 40\text{V}$ |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Static Forward Current Transfer Ratio | h_{FE} | 200 | 400 | - | - | $I_C = 10\text{mA}, V_{CE} = 2\text{V}$ |
| | | 300 | 450 | - | | |
| | | 200 | 400 | - | | |
| | | 100 | 225 | - | | |
| | | - | 40 | - | | |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | - | 10 | 20 | mV | $I_C = 0.1\text{A}, I_B = 10\text{mA}$ |
| | | - | 125 | 200 | | $I_C = 1\text{A}, I_B = 10\text{mA}$ |
| | | - | 150 | 220 | | $I_C = 2\text{A}, I_B = 50\text{mA}$ |
| Base-Emitter Saturation Voltage | $V_{BE(sat)}$ | - | 0.87 | 1.0 | V | $I_C = 2\text{A}, I_B = 50\text{mA}$ |
| Base-Emitter Saturation Voltage | $V_{BE(on)}$ | - | 0.80 | 1.0 | V | $I_C = 2\text{A}, V_{CE} = 2\text{V}$ |
| SMALL SIGNAL CHARACTERISTICS | | | | | | |
| Transition Frequency | f_T | 100 | 165 | - | MHz | $I_C = 50\text{mA}, V_{CE} = 10\text{V}, f = 100\text{MHz}$ |
| Collector Output Capacitance | C_{obo} | - | 12 | 20 | pF | $V_{CB} = 10\text{V}, f = 1\text{MHz}$ |
| Turn-On Time | $t_{(on)}$ | - | 170 | - | ns | $V_{CC} = 10\text{V}, I_C = 1\text{A},$ |
| Turn-Off Time | $t_{(off)}$ | - | 750 | - | ns | $I_{B1} = -I_{B2} = 10\text{mA}$ |

Notes: 7. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$

Typical Electrical Characteristics



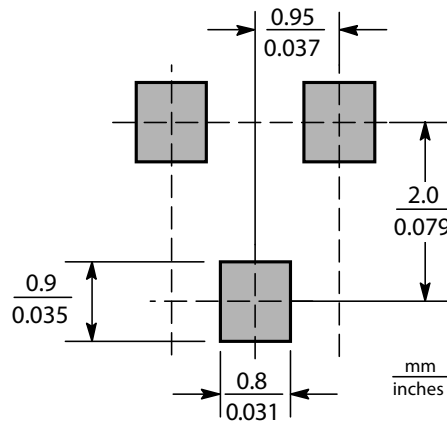
Package Outline Dimensions



| Dim. | Millimeters | | Inches | | Dim. | Millimeters | | Inches | |
|------|-------------|------|-----------|-------|------|-------------|------|-----------|--------|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Min. | Max. |
| A | - | 1.12 | - | 0.044 | e1 | 1.90 NOM | | 0.075 NOM | |
| A1 | 0.01 | 0.10 | 0.0004 | 0.004 | E | 2.10 | 2.64 | 0.083 | 0.104 |
| b | 0.30 | 0.50 | 0.012 | 0.020 | E1 | 1.20 | 1.40 | 0.047 | 0.055 |
| c | 0.085 | 0.20 | 0.003 | 0.008 | L | 0.25 | 0.60 | 0.0098 | 0.0236 |
| D | 2.80 | 3.04 | 0.110 | 0.120 | L1 | 0.45 | 0.62 | 0.018 | 0.024 |
| e | 0.95 NOM | | 0.037 NOM | | - | - | - | - | - |

Note: Controlling dimensions are in millimeters. Approximate dimensions are provided in inches

Suggested Pad Layout



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