



FMMT560Q

500V PNP HIGH VOLTAGE TRANSISTOR IN SOT23

Description

This bipolar junction transistor (BJT) has been designed to meet the stringent requirements of automotive applications.

Features

- BV_{CEO} > -500V
- I_C = -150mA high Continuous Collector Current
- I_{CM} Up to -500mA Peak Pulse Current
- Excellent h_{FE} Characteristics up to I_C = -100mA
- Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- The FMMT560Q is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.

https://www.diodes.com/quality/product-definitions/

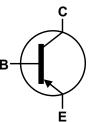
Mechanical Data

- 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)

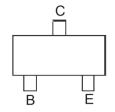
SOT23



Top View



Device Symbol



Top View Pin-Out

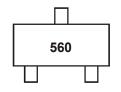
Ordering Information (Notes 4)

| Product | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|------------|------------|---------|--------------------|-----------------|-------------------|
| FMMT560QTA | Automotive | 560 | 7 | 8 | 3000 |
| FMMT560QTC | Automotive | 560 | 13 | 8 | 10,000 |

Notes:

- 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
- 2. See https://www.diodes.com/quality/lead-free/ 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 https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information



560 = Product Type Marking Code



Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CBO} | -500 | V |
| Collector-Emitter Voltage | V _{CEO} | -500 | V |
| Emitter-Base Voltage | V _{EBO} | -7 | V |
| Continuous Collector Current | Ic | -150 | mA |
| Peak Pulse Current | I _{CM} | -500 | mA |

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

| Characteristic | Symbol | Value | Unit | |
|--|----------------------------------|----------------|------|------|
| Power Dissipation | (Note 5) | P_{D} | 500 | mW |
| Thermal Resistance, Junction to Ambient (Note 5) | | $R_{	heta JA}$ | 250 | °C/W |
| Thermal Resistance, Junction to Lead (Note 6) | | $R_{	heta JL}$ | 194 | °C/W |
| Operating and Storage Temperature Range | T _{J,} T _{STG} | -55 to +150 | °C | |

ESD Ratings (Note 7)

| Characteristic | Symbol | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4000 | V | 3A |
| Electrostatic Discharge - Machine Model | ESD MM | 400 | V | С |

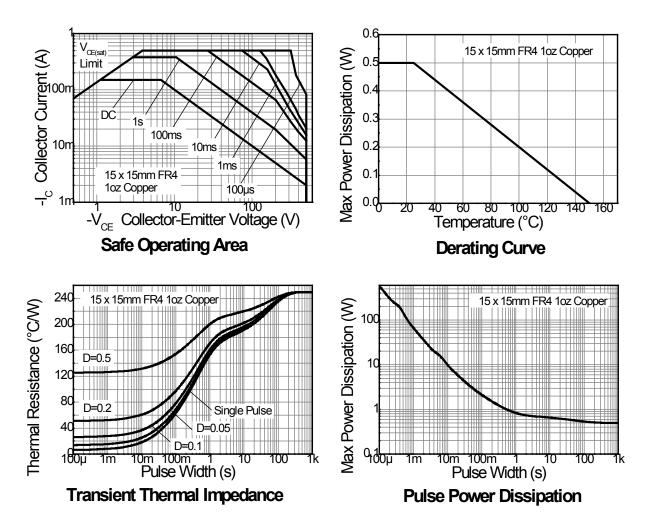
Notes:

^{5.} For a device mounted with the collector lead on 15mm × 15mm 1oz copper that is on a single-sided FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.

^{6.} Thermal resistance from junction to solder-point (at the end of the collector lead).
7. Refer to JEDEC specification JESD22-A114 and JESD22-A115.



Thermal Characteristics and Derating Information





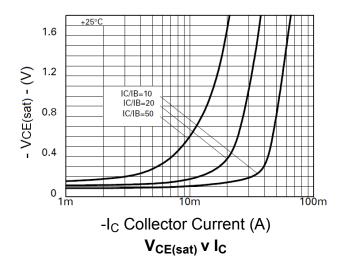
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

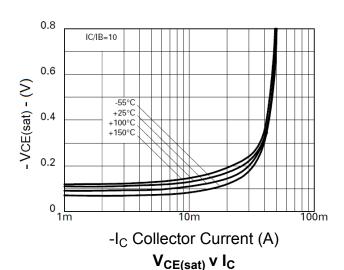
| Characteristic | Symbol | Min | Тур | Max | Unit | Test Condition |
|--|----------------------|----------------|--------------|-----------------|------|--|
| Collector-Base Breakdown Voltage | BV _{CBO} | -500 | _ | _ | V | I _C = -100μA |
| Collector-Emitter Breakdown Voltage (Note 8) | BV_{CEO} | -500 | _ | _ | V | $I_C = -1mA$ |
| Emitter-Base Breakdown Voltage | BV _{EBO} | -7 | _ | _ | V | I _E = -100μA |
| Collector Cutoff Current | I _{CBO} | _ | _ | -100 | nA | V _{CB} = -500V |
| Emitter Cutoff Current | I _{EBO} | _ | _ | -100 | nA | V _{EB} = -5V |
| Static Forward Current Transfer Ratio (Note 8) | h _{FE} | 100 80 — | _ _ 15 | 300 300 — | _ | I_C = -1mA, V_{CE} = -10V I_C = -50mA, V_{CE} = -10V I_C = -100mA, V_{CE} = -10V |
| Collector-Emitter Saturation Voltage (Note 8) | V _{CE(sat)} | _ | _ | -200 -500 | mV | $I_C = -20$ mA, $I_B = -2$ mA $I_C = -50$ mA, $I_B = -10$ mA |
| Base-Emitter Saturation Voltage (Note 8) | V _{BE(sat)} | _ | _ | -0.9 | V | $I_C = -50 \text{mA}, I_B = -10 \text{mA}$ |
| Base-Emitter Turn-On Voltage (Note 8) | V _{BE(on)} | _ | _ | -0.9 | V | $I_C = -50 \text{mA}, V_{CE} = -10 \text{V}$ |
| Output Capacitance | C_{obo} | _ | _ | 8 | pF | V _{CB} = -20V, f = 1MHz |
| Transition Frequency | f _T | 60 | _ | _ | MHz | $V_{CE} = -20V, I_{C} = -10mA,$ f = 50MHz |
| Turn-On Time | t _{on} | _ | 110 | _ | ns | $V_{CE} = -100V, I_{C} = -50mA,$ |
| Turn-Off Time | t _{off} | _ | 1.5 | _ | μs | $I_{B1} = -5mA$, $I_{B2} = 10mA$ |

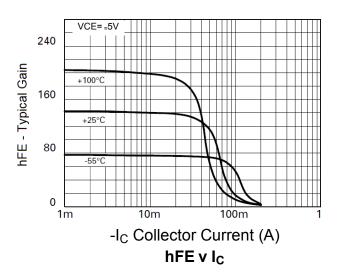
Note: 8. Measured under pulsed conditions. Pulse width \leq 300µs. Duty cycle \leq 2%

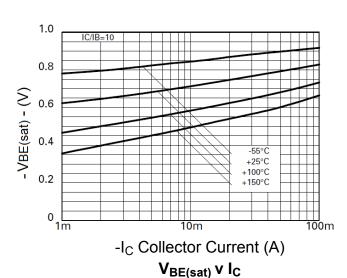


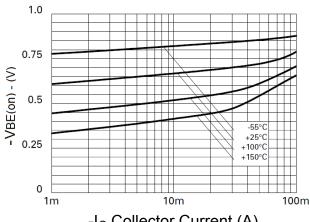
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)











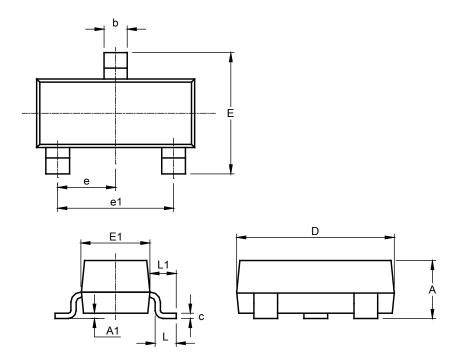
-I_C Collector Current (A) $V_{BE(on)} v I_{C}$



Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT23 Type DN

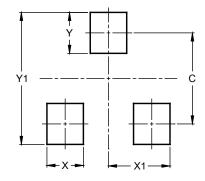


| SOT23 Type DN | | | | | |
|----------------------|------------|------|------|--|--|
| Dim | Min Max | | Тур | | |
| Α | 0.89 | 1.12 | 1.00 | | |
| A1 | 0.01 | 0.10 | 0.05 | | |
| b | 0.30 | 0.51 | 0.45 | | |
| С | 0.08 | 0.20 | 0.10 | | |
| D | 2.80 | 3.04 | 3.00 | | |
| Е | 2.10 | 2.64 | 2.42 | | |
| E1 | 1.20 | 1.40 | 1.37 | | |
| е | e 0.95 REF | | | | |
| e1 | 1.90 REF | | | | |
| L | 0.25 | 0.60 | 0.30 | | |
| L1 | 0.45 | 0.62 | 0.54 | | |
| All Dimensions in mm | | | | | |

Suggested Pad Layout

 $Please see \ http://www.diodes.com/package-outlines.html \ for \ the \ latest \ version.$

SOT23 Type DN



| Dimensions | Value (in mm) | | |
|------------|---------------|--|--|
| С | 2.0 | | |
| Х | 0.8 | | |
| X1 | 1.35 | | |
| Υ | 0.9 | | |
| Y1 | 29 | | |

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device Terminals and PCB tracking.



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