# FMMT493QTA Datasheet


https://www.DiGi-Electronics.com

| | |
|---|---|
| DiGi Electronics Part Number | FMMT493QTA-DG |
| Manufacturer | Diodes Incorporated |
| Manufacturer Product Number | FMMT493QTA |
| Description | TRANS NPN 100V 1A SOT23-3 |
| Detailed Description | Bipolar (BJT) Transistor NPN 100 V 1 A 150MHz 500 mW Surface Mount SOT-23-3 |

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## Purchase and inquiry

| Manufacturer Product Number: | Manufacturer: |
| --- | --- |
| FMMT493QTA | Diodes Incorporated |
| Series: | Product Status: |
| - | Active |
| Transistor Type: | Current - Collector (Ic) (Max): |
| NPN | 1 A |
| Voltage - Collector Emitter Breakdown (Max): | Vce Saturation (Max) @ Ib, Ic: |
| 100 V | 600mV @ 100mA, 1A |
| Current - Collector Cutoff (Max): | DC Current Gain (hFE) (Min) @ Ic, Vce: |
| 100nA | 100 @ 250mA, 10V |
| Power - Max: | Frequency - Transition: |
| 500 mW | 150MHz |
| Operating Temperature: | Mounting Type: |
| -55°C ~ 150°C (TJ) | Surface Mount |
| Package / Case: | Supplier Device Package: |
| TO-236-3, SC-59, SOT-23-3 | SOT-23-3 |
| Base Product Number: | |
| FMMT493 | |

## Environmental & Export classification

| RoHS Status: | Moisture Sensitivity Level (MSL): |
| --- | --- |
| ROHS3 Compliant | 1 (Unlimited) |
| REACH Status: | ECCN: |
| REACH Unaffected | EAR99 |
| HTSUS: | |
| 8541.21.0075 | |

Lead-free Green

**FMMT493**

## 100V NPN MEDIUM POWER TRANSISTOR IN SOT23

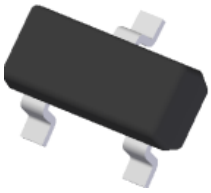
## Features

- $BV_{CEO}$ > 100V
- $I_C$ = 1A High Continuous Collector Current
- $I_{CM}$ = 2A Peak Pulse Current
- 500mW Power Dissipation
- $h_{FE}$ Characterised Up to 2A for High Current Gain Hold Up
- Complementary PNP Type: FMMT593
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The FMMT493Q is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**
  **https://www.diodes.com/quality/product-definitions/**

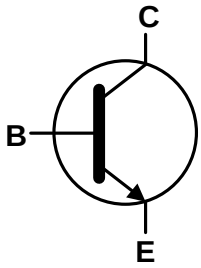
## Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.008 grams (Approximate)

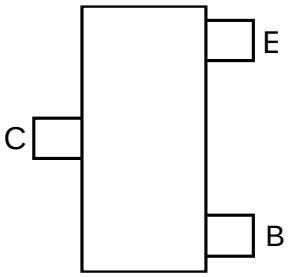
SOT23 (Type DN)



Top View




Device Symbol




Top View
Pin-Out

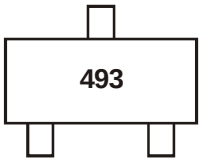
## Ordering Information (Note 4)

| Part Number | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|---|---|---|---|---|---|
| FMMT493TA | AEC-Q101 | 493 | 7 | 8 | 3,000 |
| FMMT493QTA | Automotive | 493 | 7 | 8 | 3,000 |
| FMMT493TC | AEC-Q101 | 493 | 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

SOT23 (Type DN)




493 = Product Type Marking Code

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

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | 120 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | 100 | V |
| Emitter-Base Voltage | $V_{EBO}$ | 7 | V |
| Continuous Collector Current | $I_C$ | 1 | A |
| Peak Pulse Current | $I_{CM}$ | 2 | A |
| Base Current | $I_B$ | 200 | mA |

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

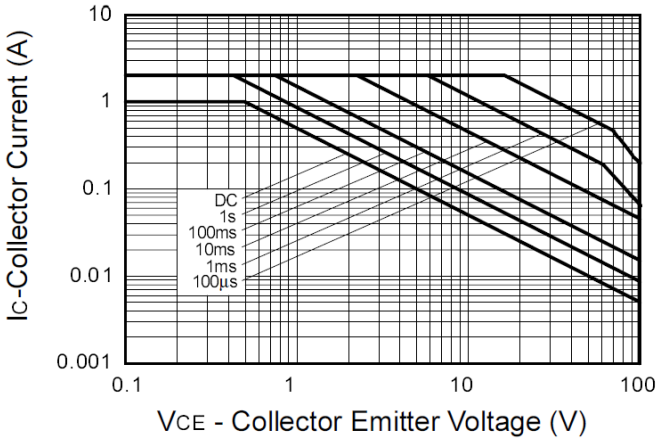
| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Power Dissipation (Note 5) | $P_D$ | 500 | mW |
| Thermal Resistance, Junction to Ambient (Note 5) | $R_{\theta JA}$ | 250 | °C/W |
| Thermal Resistance, Junction to Lead (Note 6) | $R_{\theta JL}$ | 197 | °C/W |
| Operating and Storage Temperature Range | $T_J$, $T_{STG}$ | -55 to +150 | °C |

## ESD Ratings (Note 7)

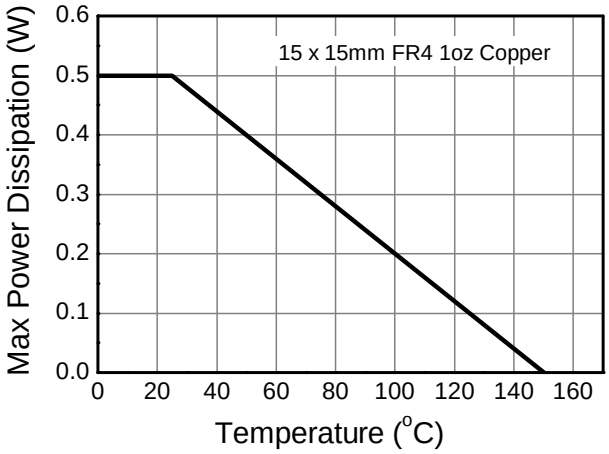
| Characteristic | Symbol | Value | Unit | JEDEC Class |
|---|---|---|---|---|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V | 3A |
| Electrostatic Discharge - Machine Model | ESD MM | ≥ 400 | V | C |

Notes:
5. For a device mounted on 15mm × 15mm 1oz weight 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.

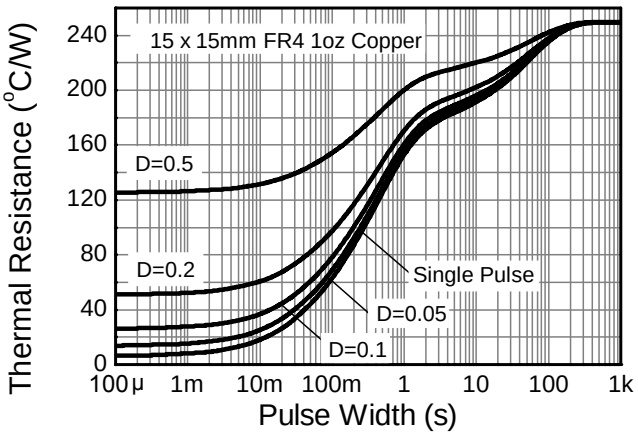
## Thermal Characteristics and Derating Information



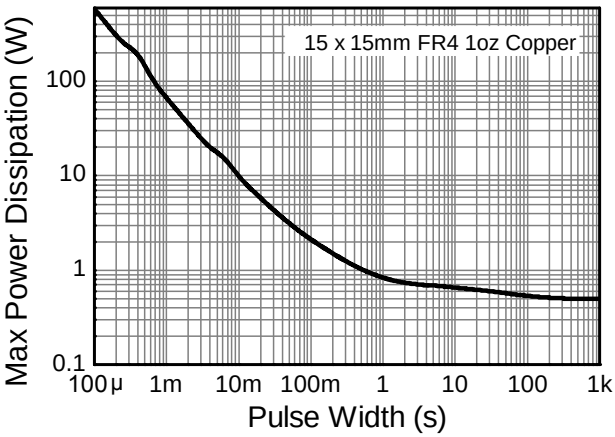

**Safe Operating Area**




**Derating Curve**




**Transient Thermal Impedance**



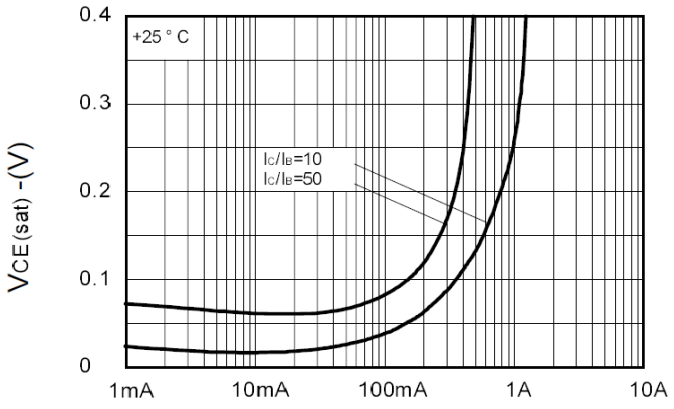

**Pulse Power Dissipation**

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

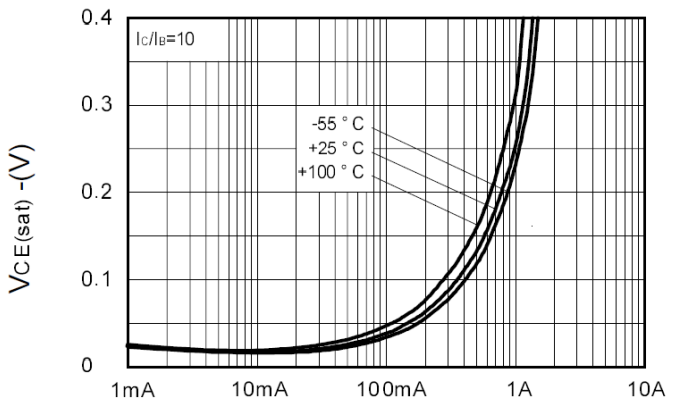
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage | $BV_{CBO}$ | 120 | — | — | V | $I_C$ = 100µA |
| Collector-Emitter Breakdown Voltage (Note 8) | $BV_{CEO}$ | 100 | — | — | V | $I_C$ = 1mA |
| Emitter-Base Breakdown Voltage | $BV_{EBO}$ | 7 | — | — | V | $I_E$ = 100µA |
| Collector Cutoff Current | $I_{CBO}$ | — | — | 100 | nA | $V_{CB}$ = 100V |
| Emitter Cutoff Current | $I_{EBO}$ | — | — | 50 | nA | $V_{EB}$ = 5.6V |
| Collector Emitter Cutoff Current | $I_{CES}$ | — | — | 100 | nA | $V_{CE}$ = 100V |
| Static Forward Current Transfer Ratio (Note 8) | $h_{FE}$ | 100<br>100<br>60<br>20 | —<br>—<br>—<br>— | —<br>300<br>—<br>— | — | $I_C$ = 1mA, $V_{CE}$ = 10V<br>$I_C$ = 250mA, $V_{CE}$ = 10V<br>$I_C$ = 500mA, $V_{CE}$ = 10V<br>$I_C$ = 1A, $V_{CE}$ = 10V |
| Collector-Emitter Saturation Voltage (Note 8) | $V_{CE(sat)}$ | — | — | 300<br>600 | mV<br>mV | $I_C$ = 500mA, $I_B$ = 50mA<br>$I_C$ = 1A, $I_B$ = 100mA |
| Base-Emitter Turn-On Voltage (Note 8) | $V_{BE(on)}$ | — | — | 1.0 | V | $I_C$ = 1A, $V_{CE}$ = 10V |
| Base-Emitter Saturation Voltage (Note 8) | $V_{BE(sat)}$ | — | — | 1.15 | V | $I_C$ = 1A, $I_B$ = 100mA |
| Output Capacitance | $C_{obo}$ | — | — | 10 | pF | $V_{CB}$ = 10V, f = 1MHz |
| Transition Frequency | $f_T$ | 150 | — | — | MHz | $V_{CE}$ = 10V, $I_C$ = 50mA, f = 100MHz |

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

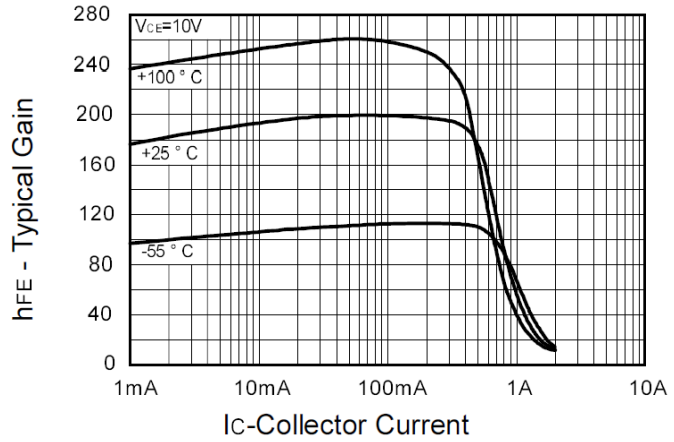
## Typical Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)



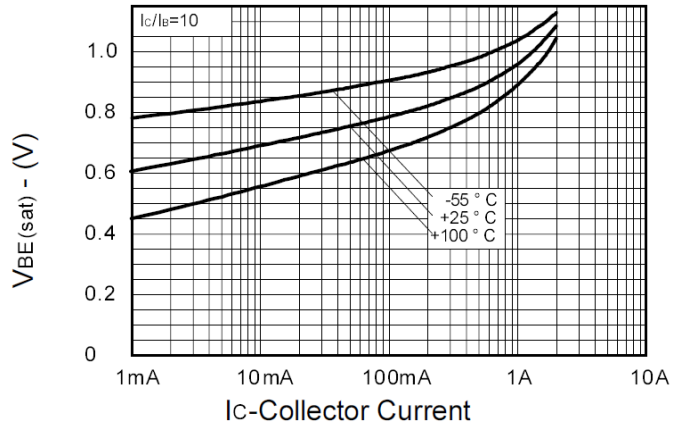

**VCE(sat) v IC**



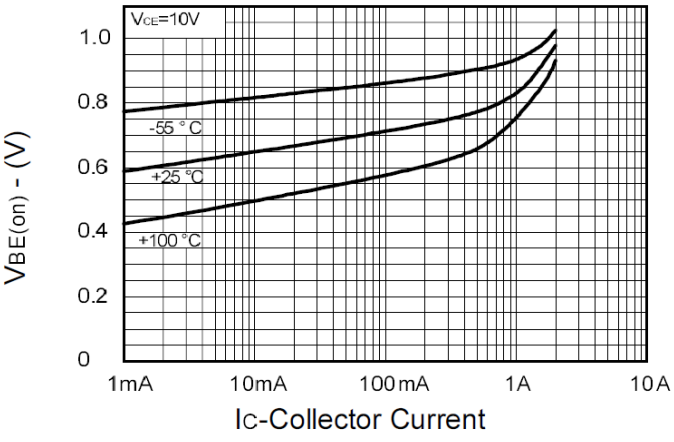

**VCE(sat) v IC**




**hFE V IC**




**VBE(sat) v IC**

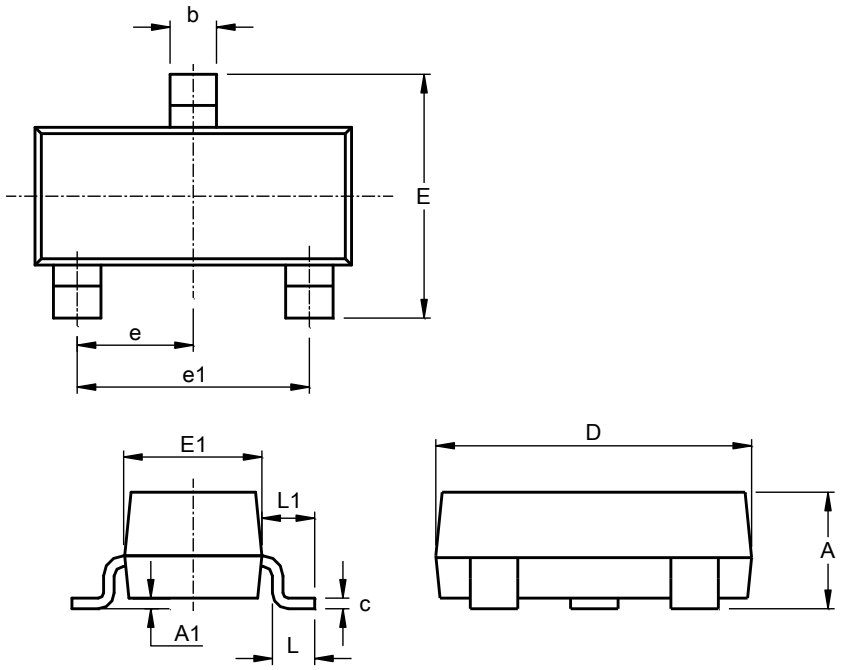



**VBE(on) v IC**

## Package Outline Dimensions

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

**SOT23 (Type DN)**

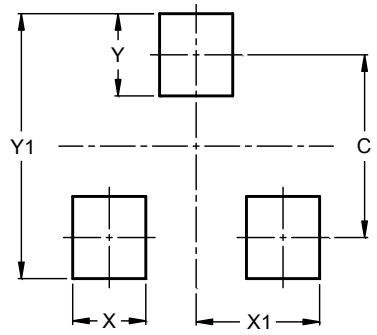



| SOT23 Type DN | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 0.89 | 1.12 | 1.00 |
| **A1** | 0.01 | 0.10 | 0.05 |
| **b** | 0.30 | 0.51 | 0.45 |
| **c** | 0.08 | 0.20 | 0.10 |
| **D** | 2.80 | 3.04 | 3.00 |
| **E** | 2.10 | 2.64 | 2.42 |
| **E1** | 1.20 | 1.40 | 1.37 |
| **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) |
|---|---|
| **C** | 2.0 |
| **X** | 0.8 |
| **X1** | 1.35 |
| **Y** | 0.9 |
| **Y1** | 2.9 |

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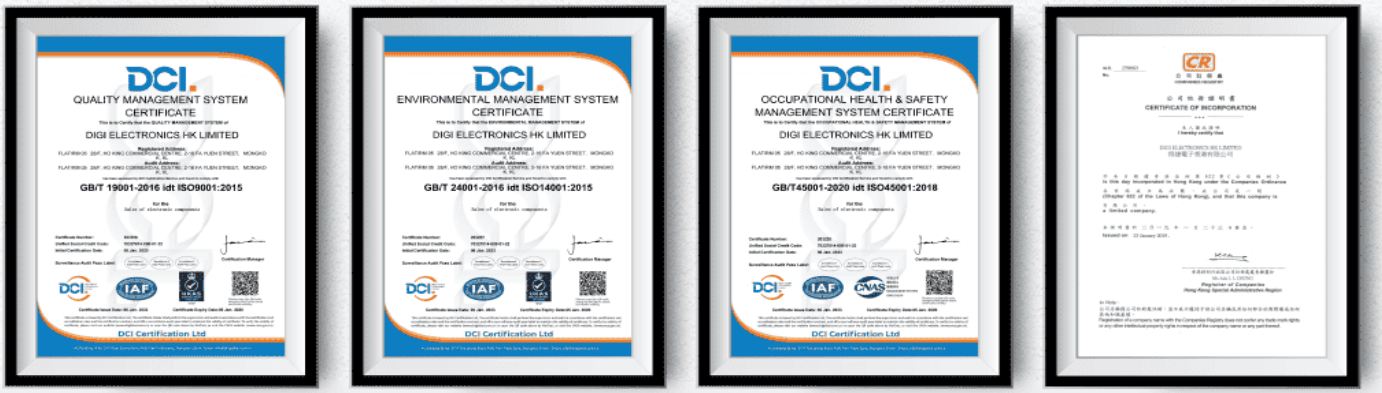



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