

## Feature

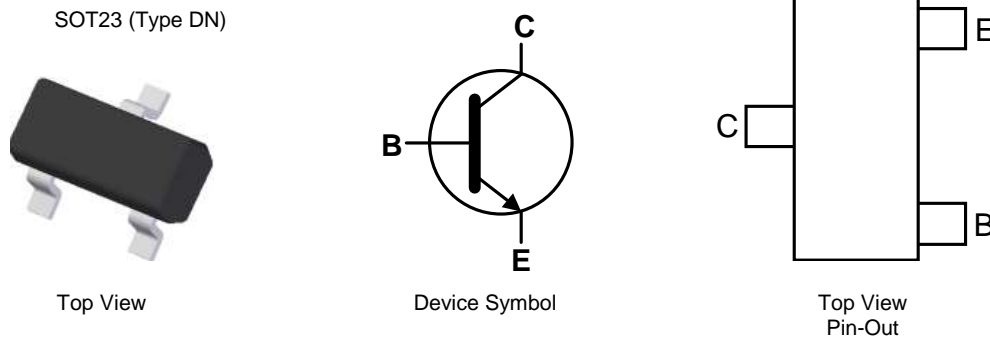
This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirements of Automotive Applications.

## Feature

- $BV_{CEO} > 120V$
- $I_C = 1A$  Continuous Collector Current
- $I_{CM} = 2A$  Peak Pulse Current
- 500mW Power Dissipation
- $h_{FE}$  characterised up to 1A 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 (Type DN)
- 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)

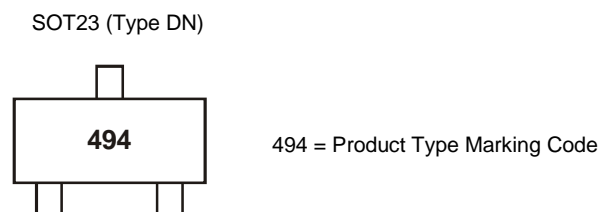


## Ordering Information (Notes 4 & 5)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
FMMT494QTA	Automotive	494	7	8	3,000
FMMT494QTC	Automotive	494	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 <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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to <https://www.diodes.com/quality/product-compliance-definitions/>.
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	140	V
Collector-Emitter Voltage	V <sub>CEO</sub>	120	V
Emitter-Base Voltage	V <sub>EBO</sub>	7	V
Continuous Collector Current	I <sub>C</sub>	1	A
Peak Pulse Current	I <sub>CM</sub>	2	A
Base Current	I <sub>B</sub>	200	mA

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

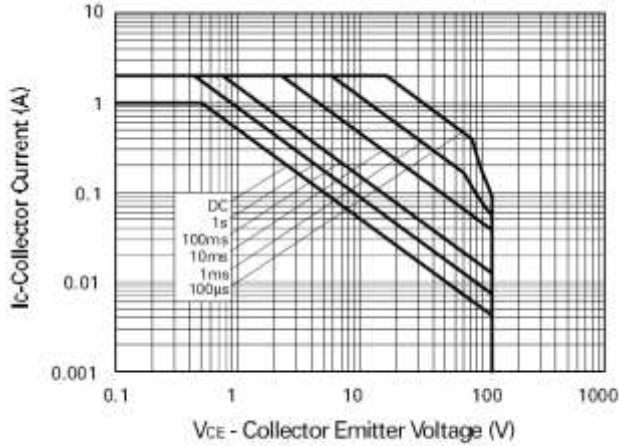
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P <sub>D</sub>	500	mW
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	250	°C/W
Thermal Resistance, Junction to Lead (Note 7)	R <sub>θJL</sub>	197	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**ESD Ratings** (Note 8)

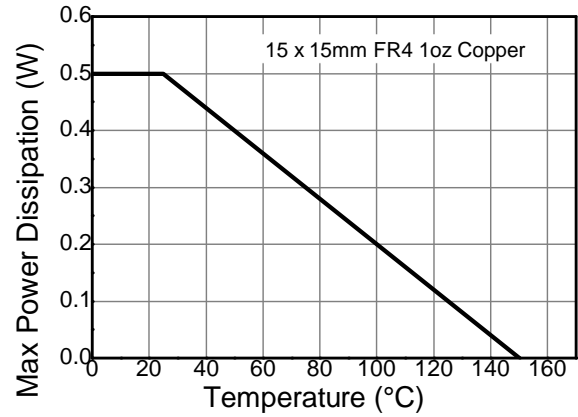
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	≥ 400	V	C

- Notes:
6. For a device surface mounted on 15mm X 15mm 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.
  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.

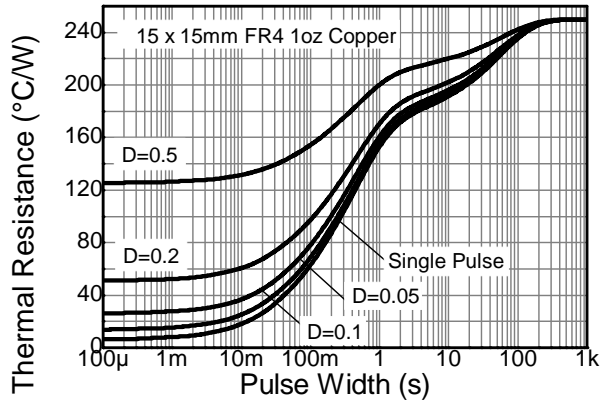
**Thermal Characteristics and Derating Information**



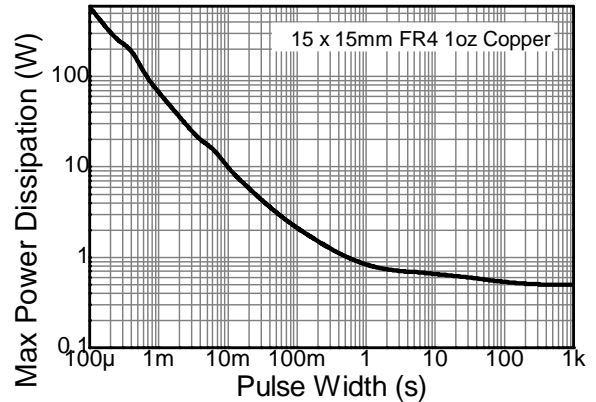
**Safe Operating Area**



**Derating Curve**



**Transient Thermal Impedance**



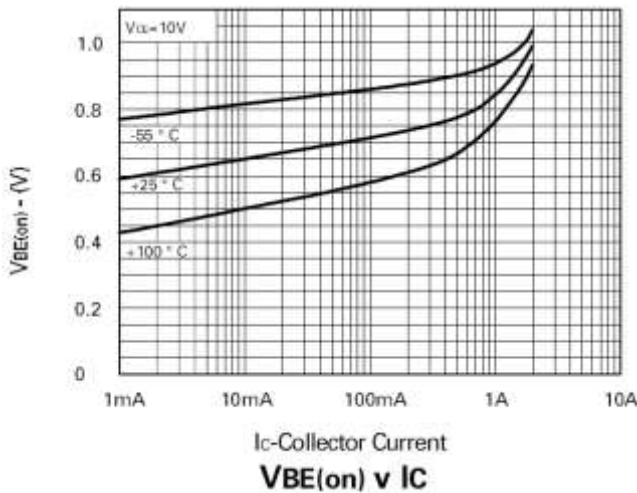
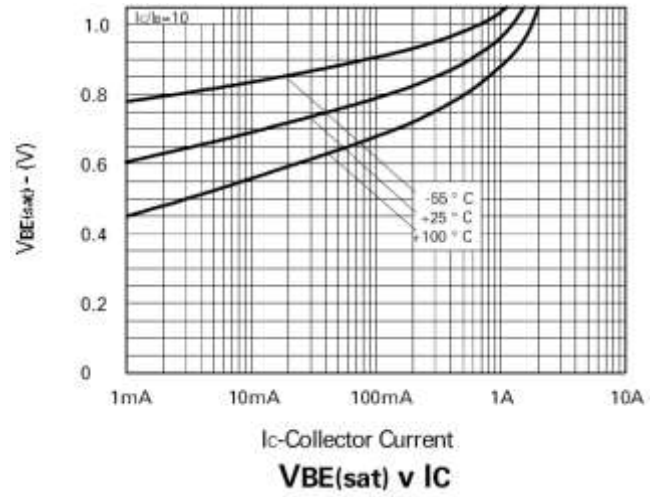
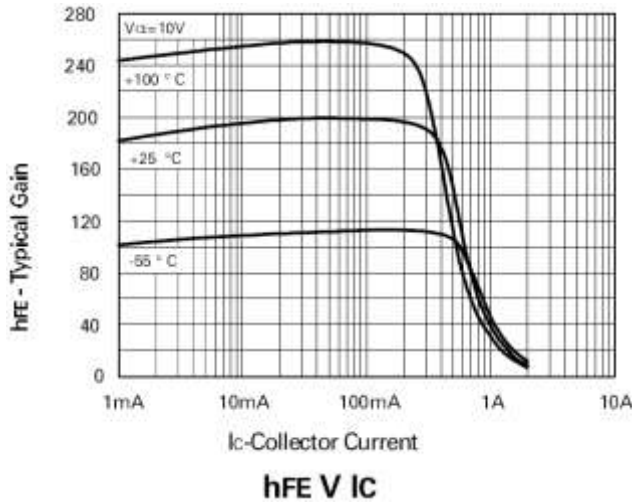
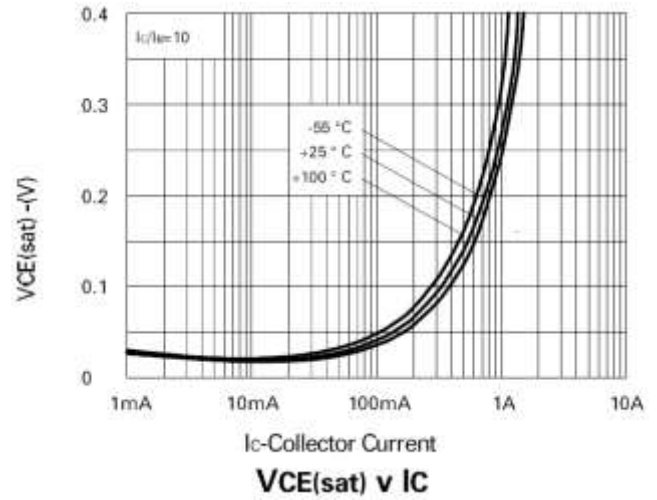
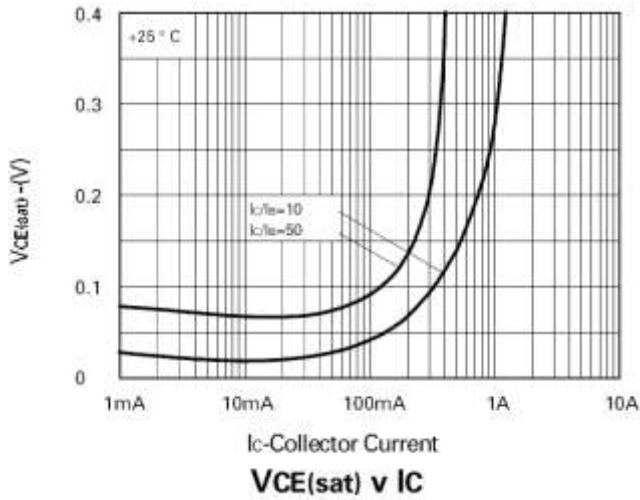
**Pulse Power Dissipation**

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$BV_{CBO}$	140	—	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 9)	$BV_{CEO}$	120	—	—	V	$I_C = 1\text{mA}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	7	—	—	V	$I_E = 100\mu\text{A}$
Collector Cutoff Current	$I_{CBO}$	—	—	100	nA	$V_{CB} = 120\text{V}$
Emitter Cutoff Current	$I_{EBO}$	—	—	100	nA	$V_{EB} = 5\text{V}$
Collector Emitter Cutoff Current	$I_{CES}$	—	—	100	nA	$V_{CE} = 120\text{V}$
Static Forward Current Transfer Ratio (Note 9)	$h_{FE}$	100	—	—	—	$I_C = 1\text{mA}, V_{CE} = 10\text{V}$
		100	—	300		$I_C = 250\text{mA}, V_{CE} = 10\text{V}$
		60	—	—		$I_C = 500\text{mA}, V_{CE} = 10\text{V}$
		20	—	—		$I_C = 1\text{A}, V_{CE} = 10\text{V}$
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	—	—	200	mV	$I_C = 250\text{mA}, I_B = 25\text{mA}$
		—	—	300		$I_C = 500\text{mA}, I_B = 50\text{mA}$
Base-Emitter Turn-On Voltage (Note 9)	$V_{BE(on)}$	—	—	1.0	V	$I_C = 500\text{mA}, V_{CE} = 10\text{V}$
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)}$	—	—	1.1	V	$I_C = 500\text{mA}, I_B = 50\text{mA}$
Output Capacitance	$C_{obo}$	—	—	10	pF	$V_{CB} = 10\text{V}, f = 1\text{MHz}$
Transition Frequency	$f_T$	100	—	—	MHz	$V_{CE} = 50\text{V}, I_C = 10\text{mA}, f = 100\text{MHz}$

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

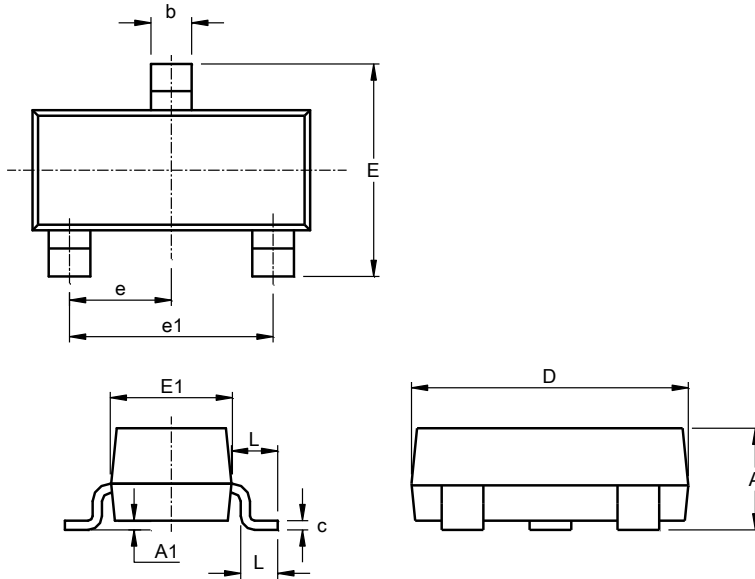
**Typical Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)



**Package Outline Dimensions**

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

**SOT23 Type DN**

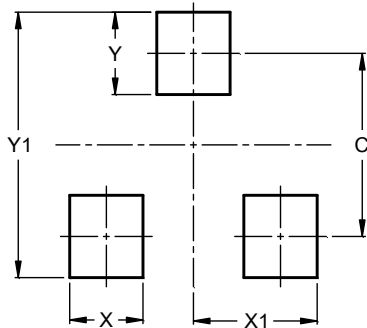


SOT23 Type DN			
Dim	Min	Max	Typ
A	0.89	1.12	1.00
A1	0.01	0.10	0.05
b	0.30	0.51	0.45
c	0.08	0.20	0.10
D	2.80	3.04	3.00
E	2.10	2.64	2.42
E1	1.20	1.40	1.37
e	0.95 REF		
e1	1.90 REF		
L	0.25	0.60	0.30
L1	0.45	0.62	0.54
All Dimensions in mm			

**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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