

## Description

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

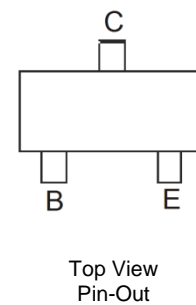
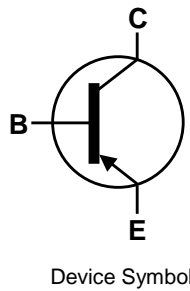
## Features

- $BV_{CEO} > -300V$
- $I_C = -200mA$  High Continuous Collector Current
- Complementary Type: FMMTA42Q
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The FMMTA92Q 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

- Package: SOT23
- Package 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)

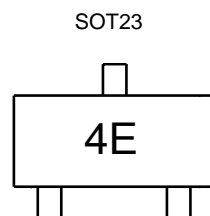


## Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
FMMTA92QTA	SOT23	4E	7	8	3,000	Reel

- 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



4E = 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>	-300	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-300	V
Emitter-Base Voltage	V <sub>EBO</sub>	-5	V
Continuous Collector Current	I <sub>C</sub>	-200	mA

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

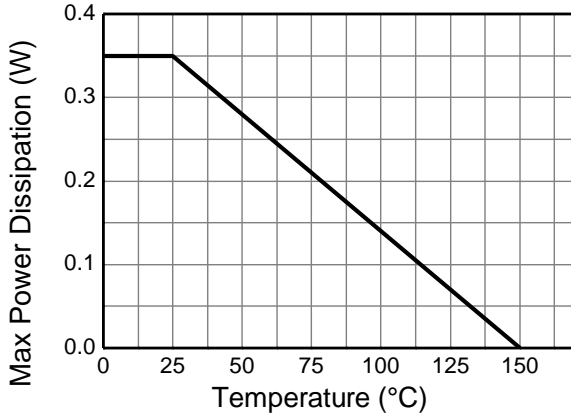
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	0.31	W
		0.35	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	403	°C/W
		357	
Thermal Resistance, Junction to Lead	R <sub>θJL</sub>	350	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

### ESD Ratings (Note 8)

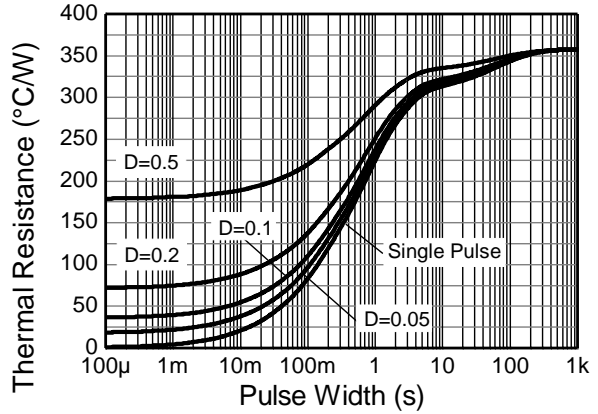
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge – Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge – Machine Model	ESD MM	400	V	C

- Notes:
5. For a device mounted on minimum recommended pad layout 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady state condition.
  6. Same as Note (5), except the device is mounted on 15mm x 15mm 1oz copper.
  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.

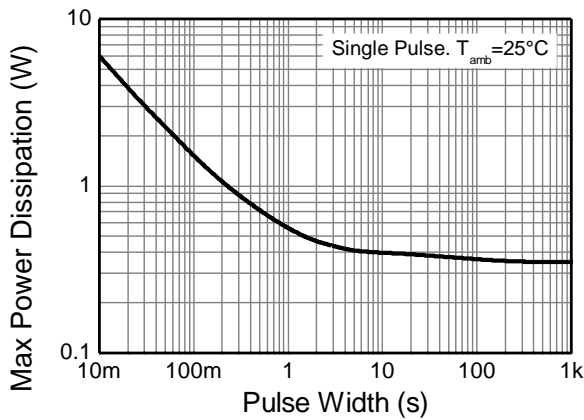
**Thermal Characteristics and Derating Information**



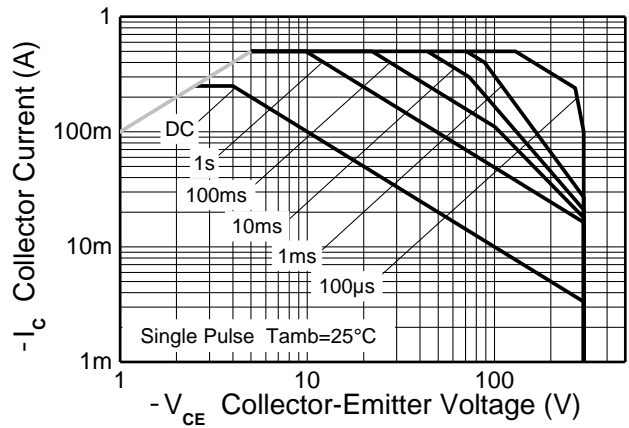
**Figure 1. Derating Curve**



**Figure 2. Transient Thermal Impedance**



**Figure 3. Pulse Power Dissipation**



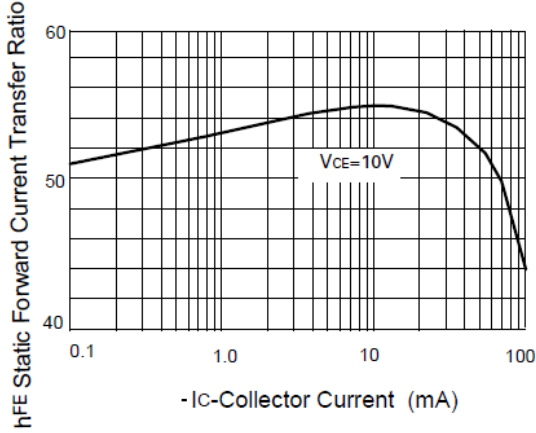
**Figure 4. Safe Operating Area**

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

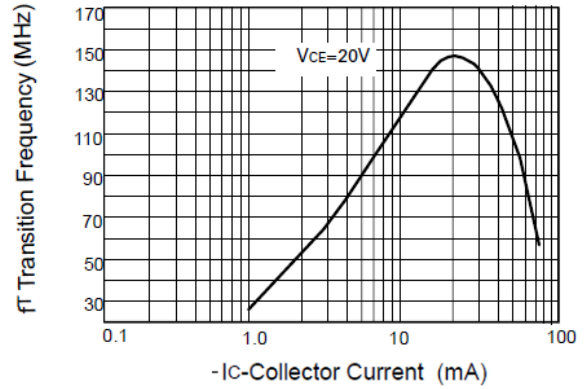
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-300	—	—	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	-300	—	—	V	I <sub>C</sub> = -1mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-5	—	—	V	I <sub>E</sub> = -100μA
Collector Cutoff Current	I <sub>CES</sub>	—	—	-250	nA	V <sub>CE</sub> = -200V
Collector Cutoff Current	I <sub>CBO</sub>	—	—	-250	nA	V <sub>CB</sub> = -200V V <sub>CB</sub> = -160V
Emitter Cutoff Current	I <sub>EBO</sub>	—	—	-100	nA	V <sub>EB</sub> = -3V
Static Forward Current Transfer Ratio (Note 9)	h <sub>FE</sub>	25 40 25	— — —	— — —	—	I <sub>C</sub> = -1mA, V <sub>CE</sub> = -10V I <sub>C</sub> = -10mA, V <sub>CE</sub> = -10V I <sub>C</sub> = -30mA, V <sub>CE</sub> = -10V
Collector-Emitter Saturation Voltage (Note 9)	V <sub>CE(sat)</sub>	—	—	-0.5	V	I <sub>C</sub> = -20mA, I <sub>B</sub> = -2mA
Base-Emitter Saturation Voltage (Note 9)	V <sub>BE(sat)</sub>	—	—	-0.9	V	I <sub>C</sub> = -20mA, I <sub>B</sub> = -2mA
Output Capacitance	C <sub>obo</sub>	—	—	6	pF	V <sub>CB</sub> = -20V, f = 1MHz
Transition Frequency	f <sub>T</sub>	50	—	—	MHz	V <sub>CE</sub> = -20V, I <sub>C</sub> = -10mA, f = 20MHz

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

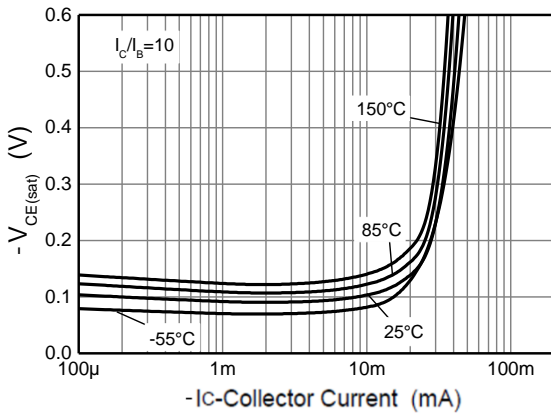
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



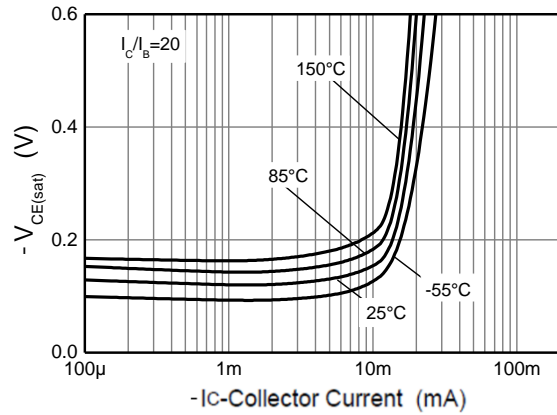
**Figure 5.  $h_{FE}$  vs  $I_C$**



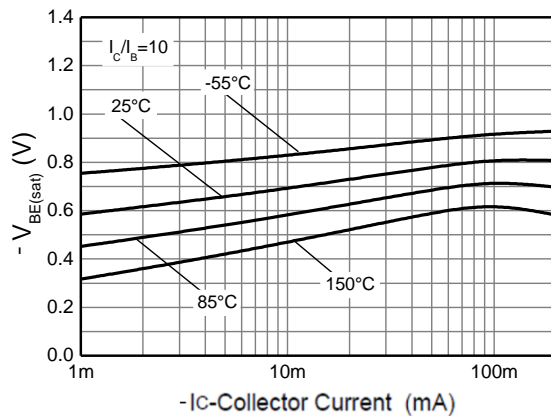
**Figure 6.  $f_T$  vs  $I_C$**



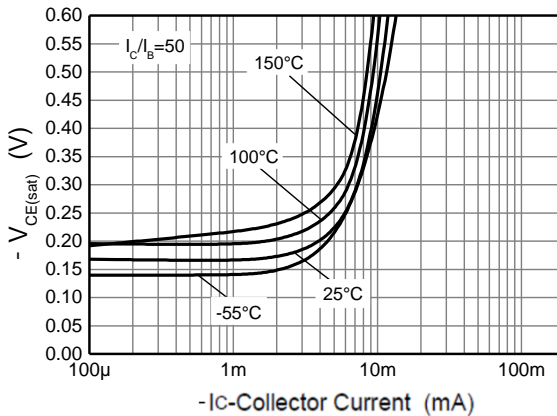
**Figure 7.  $V_{CE(sat)}$  v  $I_C$**



**Figure 8.  $V_{CE(sat)}$  v  $I_C$**



**Figure 9.  $V_{BE(sat)}$  v  $I_C$**

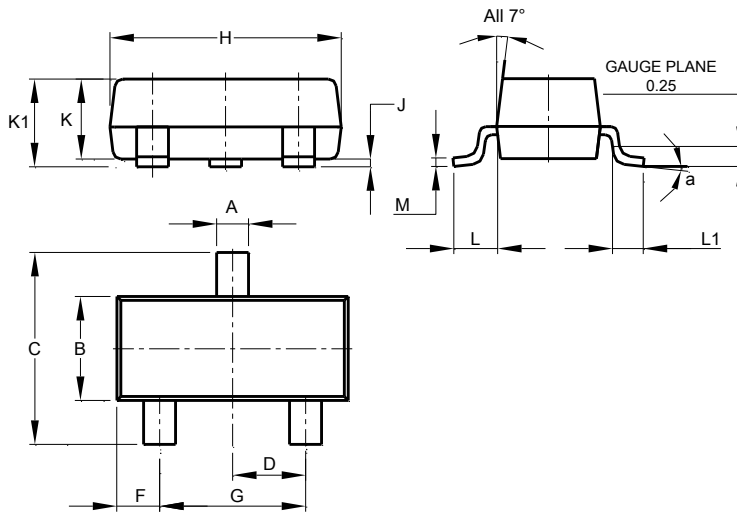


**Figure 10.  $V_{CE(sat)}$  v  $I_C$**

**Package Outline Dimensions**

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

**SOT23**

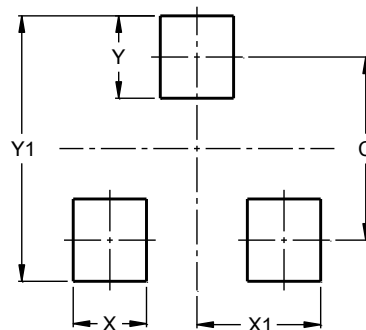


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	-
All Dimensions in mm			

**Suggested Pad Layout**

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

**SOT23**



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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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