

Description

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

Features

- $BV_{CEO} > 300V$
- $I_C = 200mA$ High Collector Current
- Complementary PNP Type Available: MMSTA92Q
- Ideal for Low Power Amplification and Switching
- **Totally Lead-Free & Fully RoHS Compliant (Note 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The MMSTA42Q 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/>

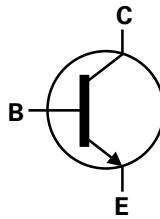
Mechanical Data

- Package: SOT323
- 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 0.006 grams (Approximate)

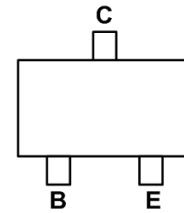
SOT323



Top View



Device Symbol



Top View
Pinout

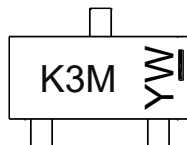
Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
MMSTA42Q-7	SOT323	K3M	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

SOT323



K3M = Product Type Marking Code
YW = Date Code Marking
Y = Year (ex: M = 2025)
W = Week 0 to 53

Date Code Key – Year

Year	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Code	M	N	P	R	S	T	U	V	W	X	Y	Z

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CB0}	300	V
Collector-Emitter Voltage	V _{CE0}	300	V
Emitter-Base Voltage	V _{EB0}	6	V
Continuous Collector Current	I _C	200	mA

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P _D	200	mW
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	625	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

ESD Ratings (Note 6)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge – Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge – Charged Device Model	ESD CDM	1000	V	C3

Notes: 5. For a device mounted on the minimum recommended pad layout on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in a steady state.
6. Refer to JEDEC specifications JESD22-A114 and JESD22-C101.

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

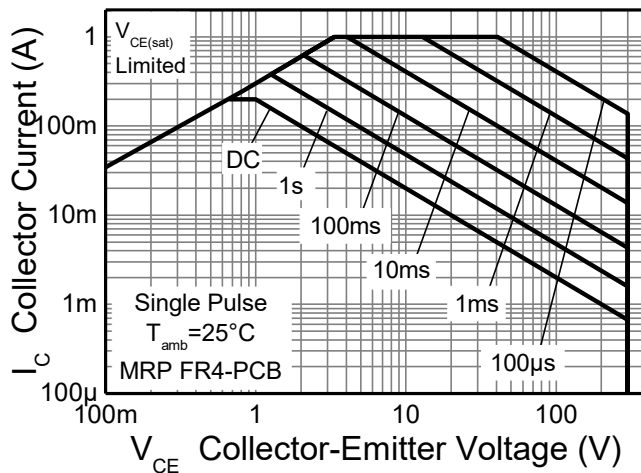


Fig.1 Safe Operating Area

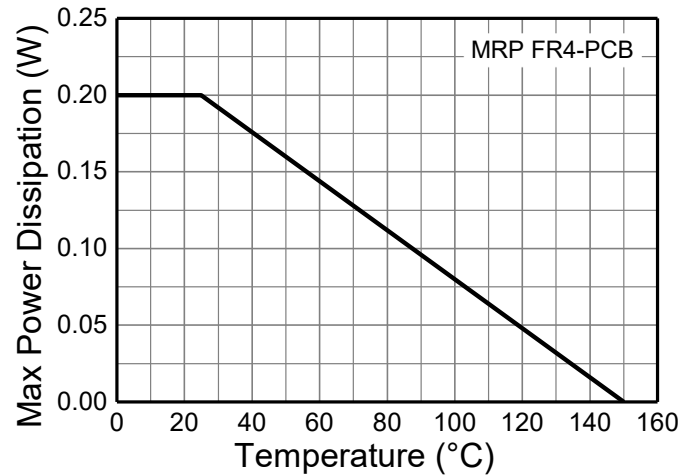


Fig.2 Derating Curve

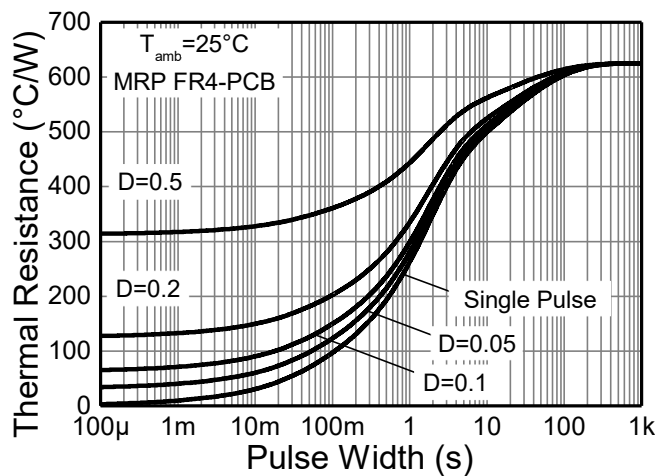


Fig.3 Transient Thermal Impedance

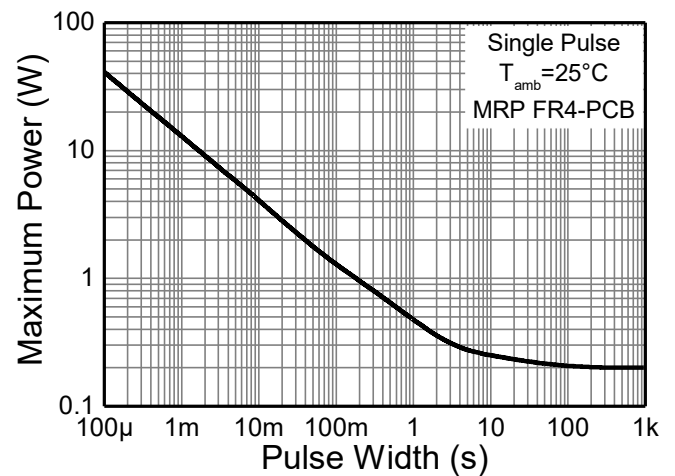


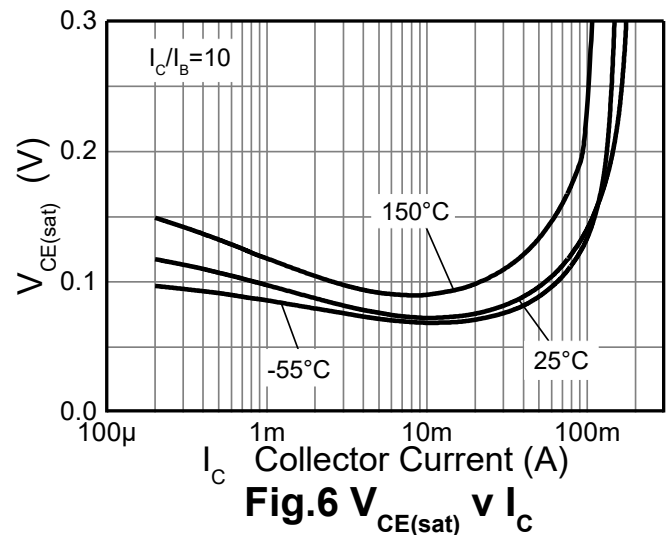
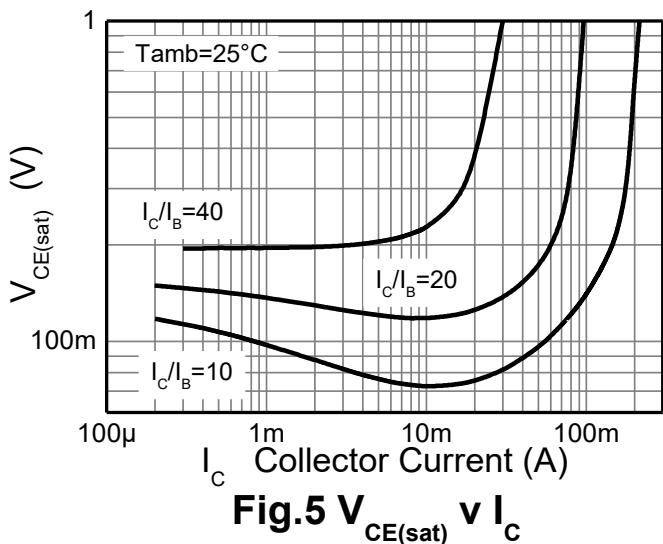
Fig.4 Pulse Power Dissipation

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

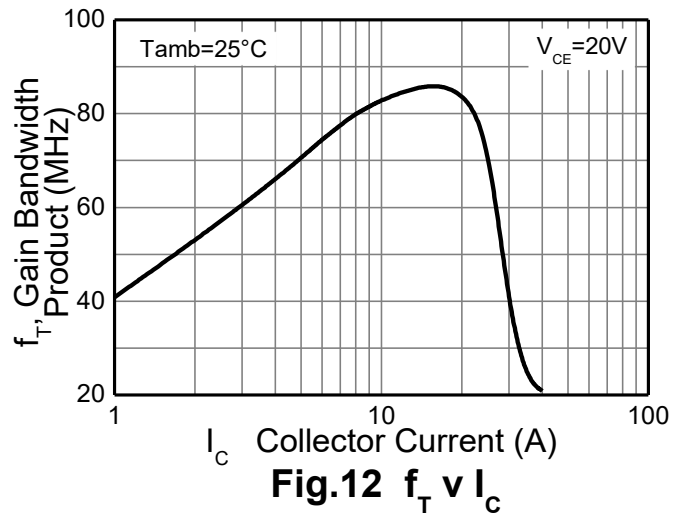
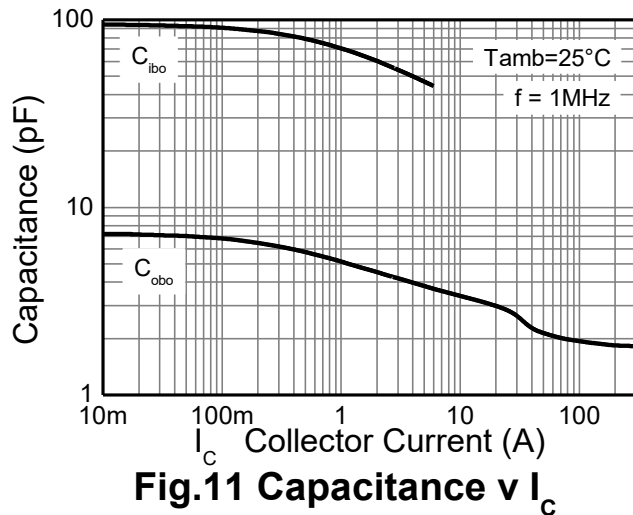
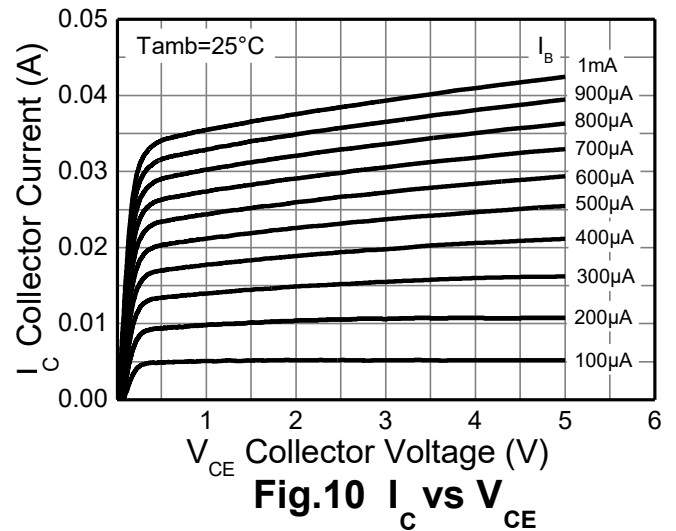
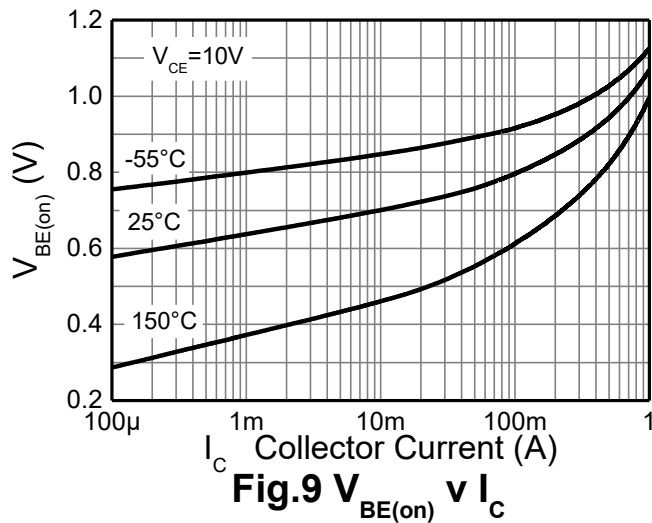
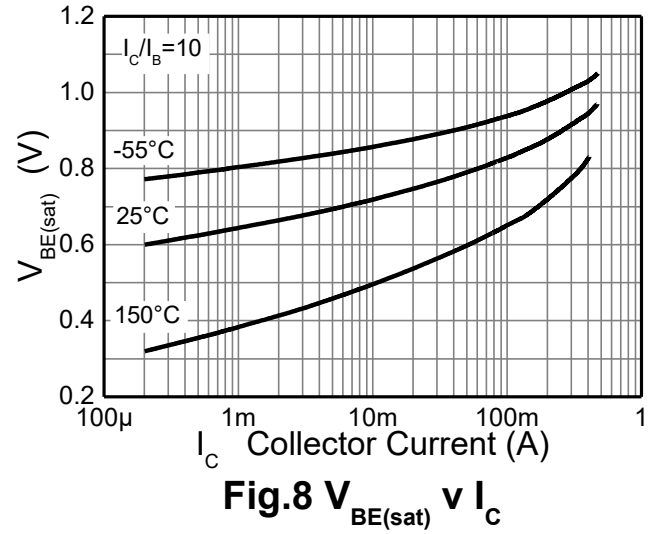
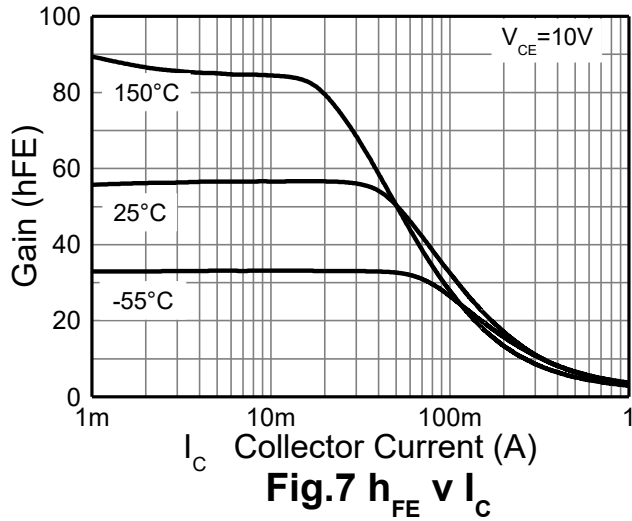
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage (Note 7)	BV _{CEO}	300	—	—	V	I _C = 1mA
Collector-Base Breakdown Voltage	BV _{CBO}	300	—	—	V	I _C = 100μA
Emitter-Base Breakdown Voltage	BV _{EBO}	6	—	—	V	I _E = 100μA
Collector-Base Cutoff Current	I _{CBO}	—	—	100	nA	V _{CB} = 200V
Emitter-Base Cutoff Current	I _{EBO}	—	—	100	nA	V _{CE} = 5V
ON CHARACTERISTICS						
DC Current Gain (Note 7)	h _{FE}	25	—	—	—	I _C = 1mA, V _{CE} = 10V
		40				I _C = 10mA, V _{CE} = 10V
		40				I _C = 30mA, V _{CE} = 10V
Collector-Emitter Saturation Voltage (Note 7)	V _{CE(sat)}	—	—	500	mV	I _C = 20mA, I _B = 2mA
Base-Emitter Voltage (Note 7)	V _{BE(sat)}	—	—	900	mV	I _C = 20mA, I _B = 2mA
SMALL-SIGNAL CHARACTERISTICS						
Input Capacitance	C _{ibo}	—	80	—	pF	V _{EB} = 0.5V, f = 1MHz
Output Capacitance	C _{obo}	—	3	6	pF	V _{CB} = 20V, f = 1MHz
Current Gain Bandwidth Product	f _T	50	83	—	MHz	V _{CE} = 20V, I _C = 10mA, f = 100MHz
Turn-On Time	t _d	—	124	—	ns	V _{CC} = 20V, I _C = 10mA, I _{B1} = -I _{B2} = 1mA
	t _r	—	88	—	ns	
Turn-Off Time	t _s	—	3168	—	ns	
	t _r	—	223	—	ns	

Note: 7. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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



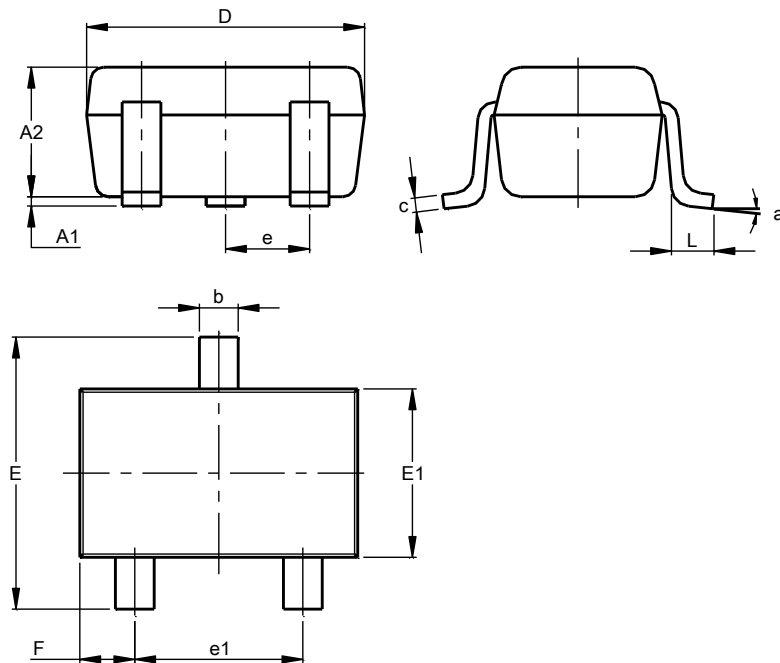
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.) (continued)



Package Outline Dimensions

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

SOT323

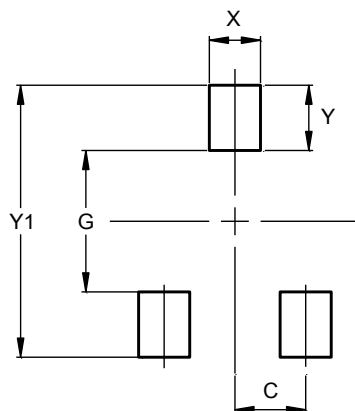


SOT323			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.25	0.40	0.30
c	0.10	0.18	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
e1	1.20	1.40	1.30
F	0.375	0.475	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT323



Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.470
Y	0.600
Y1	2.500

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